

**CHULALONGKORN UNIVERSITY**

Laboratory for Ergonomic Research  
Dr. Kittii Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

Professor Alain Wisner  
Laboratoire d'Ergonomie et Neurosciences du Travail  
CNAM  
41, Rue Gay Lussac  
75005 PARIS, FRANCE.  
FAX +33-1-43 25 36 14

2 April 1993

Dear Alain:

Thank you very much for a series of your fax messages with good news about Dr. Vogt and a grant from Naturalia and Biologia. I will be delighted to visit Europe during 6th to 27th June 1993.

Your invitation letter by fax looks marvellous. I wish to receive a hard copy by mail very soon. I also thank you very much for accepting our invitation to chair our conference. My students will be very glad to have you as a teacher again.

I am glad to learn that Dr. Daniellou is recovering in a good pace. I hope I will be able to meet him during my visit.

I am looking forward to seeing you again in Paris. With my best personal regards to you and Madame Wisner.

Truely yours,

\*\*\*\*\* MATRACOM \*\*\*\*\* JOURNAL \*\*\*\*\* DATE 01-04-1993 \*\*\*\*\* HEURE 16:10 \*\*\*\*\*

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\*\*\*\*\* -MATRA COMMUNICATION- \*\*\*\*\* -

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**TRANSMISSION PAR TELECOPIE**  
**FAX TRANSMISSION**

Date : 14/04/95

Nombre de pages : 4  
(y compris celle -ci)  
Number of pages including this one

Destinataire : P<sup>2</sup> KITTY INTARANT  
To :

N° Télécopieur : 19.662.258.61.61

Objet :  
Message :

Emetteur :  
From :

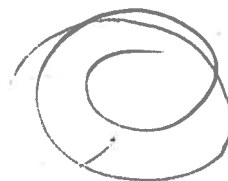
M P<sup>2</sup> Wisner

Laboratoire d'Ergonomie  
Conservatoire National des Arts et Métiers  
41, rue Gay-Lussac  
75005 PARIS  
FRANCE

Téléphone [33] 1 44 10 78 12  
Phone

Secrétariat [33] 1 43 54 18 27  
Secretary

Télécopieur [33] 1 43 25 36 14  
Fax number





MINISTÈRE DE L'ÉDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL

PARIS 1<sup>er</sup> April 1993

Dear Kitty,

Thank you for your letter of 24<sup>th</sup> March. I hope you have now received my fax and letter about your visit in France in June. If it is not the case I send you a copy of these.

I intend to spend the month of November 1993 in South East Africa and will be delighted to take part ~~in~~ <sup>of</sup> the EC - project Bangkok meeting. I will also be happy to teach again to your students.

With my best regards to yourself, your family and your coworkers and students

Truly yours

A. WISNER

I will be Emeritus Professor from 1<sup>st</sup> October 1993 for 3 years. It is positive as I can continue to help students who are preparing theses and to be in charge of official missions abroad.



MINISTERE DE L'EDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET METIERS  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL

Paris, 10th March 1993

Dr. Kitti Intaranont,  
Laboratory for Ergonomic Research  
Dpt of Industrial Engineering  
Faculty of Engineering  
Chulalongkorn University  
Bangkok 10330  
Thaïlande

19.662.253.61.61.

Dear Kitty,

I have informed Dr. Vogt that your conference will be given on Friday morning, 18th June. I have also invited him for lunch with you and me as I think it will be an opportunity for him to tell you directly what he may have not said during the discussion.

I am also sending you the formal invitation letter for your stay as I received confirmation from Naturalia et Biologia for your grant.

I think it is extremely important that you visit Kishida and Horino. It will be very interesting to discuss together the result of these visits when I am in November in Krung-Thep.

François Daniellou is as well as possible when wearing a neck-brace. He thinks he will resume his work at the end of April.

I am extremely happy to see you soon in Paris.

With my best regards,

Yours sincerely,

Alain Wisner

N.B. Don't be surprised if I don't answer quickly to your fax or letters in May as I shall be in Brazil. Fax and letters addressed to me at the laboratory will be forwarded to me but there might be a little delay.



MINISTERE DE L'EDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET METIERS  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL

Paris, 10th March 1993

Dr. Kitti Intaranont,  
Laboratory for Ergonomics Research  
Dpt of Industrial Engineering  
Faculty of Engineering  
Chulalongkorn University  
Bangkok 10330  
Thaïlande

Dear Professor Intaranont,

I followed from a distance your research on Heat in Industrial setting. Myself and a few other French specialists are eager to know the results of this research and I am extremely happy that you have accepted my invitation to present and discuss this research in our laboratory on Friday, 18th June 1993.

I confirm that Dr. Vogt, who is may be the best French specialist in Heat at work will be happy to attend your conference though his schedule is very tight being also General Director of INRS (Institut National de Recherche sur la Sécurité).

Your journey to France will be also an opportunity for us to present to you the new activities of the laboratory specially in my domaine in anthropotechnology. I hope that few of my foreign students will be able to benefit from your advices.

I have secured for you a grant from Naturalia and Biologia, a French private institution that favours exchanges between scientists of different countries.

I suggest that your stay in France takes place from 6th to 27th June 1993.

This visit will be a new step forward in the Thaï and French exchanges in the field of Ergonomics and specially of the cooperation that the President of Chulalongkorn University and the Administrateur Général of the Conservatoire National des Arts et Métiers have established two years ago through a convention.

I am looking forward to welcoming you in France.

With my best regards,

Yours sincerely,

Alain Wisner



## CHULALONGKORN UNIVERSITY

Laboratory for Ergonomic Research  
Dr Kitti Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

PROFESSOR ALAIN WISNER  
LABORATOIRE D'ERGONOMIE ET NEUROSCIENCES DU TRAVAIL  
CNAM  
41, RUE GAY LUSSAC  
75005 PARIS, FRANCE.  
FAX +33-1-43 25 36 14

31 OCTOBER 1993

DEAR ALAIN:

I JUST CAME BACK FROM JAPAN YESTERDAY. THE TRIP AND STAY WERE FANTASTIC. THE RESULTS ARE EXTREMELY FRUITFUL. I HAVE MADE MANY JAPANESE FRIENDS. I ALSO MET PROFESSOR LAURIG OF DORTMUND AND HIS WIFE IN JAPAN.

I LEARNED THAT YOU ARE COMING IN THE 4TH OF NOVEMBER AND YOUR ROOM HAS ALREADY BEEN BOOKED AT SASA. THE REASON I FAX TO YOU THIS TIME IS TO INFORM YOU THAT THE CLOSING SEMINAR IS SET ON MONDAY 29 NOVEMBER 1993 STARTING FROM 8:30 TO 18:00 PLUS. YOUR CLASS STARTS ON TUESDAY 9, 16, 23, AND 30 NOVEMBER 1993, FROM 17:30 TO 20:30.

I AM LOOKING FORWARD TO SEEING YOU AGAIN IN NOVEMBER. WITH MY BEST PERSONAL REGARDS TO YOU AND MADAMME WISNER.

TRUELY YOURS,



HAPPY BIRTHDAY  
TO  
UNCLE WISNER

From

The Intaranonts

Oct. 15 1993

To Prof. Wiener

I'm Sorry to send this message to late. About Accomodation, I would like you to stay at SaSa Nivet on Nov. 4 - Dec. 3 , 1993. EHC Conference held at Chulalongkorn University on November 29,1993.

Sincerly yours

Sriruk Srithongchai

From:

Laboratory of Ergonomics  
Department of Industrial Engineering,  
Chulalongkorn University  
Payathai Road, Bangkok 10330  
THAILAND.



# S

## SEMINARS AND MEETINGS



Seminars and meetings, both large and small, are regularly held at Sasa International House due to its full range of facilities. The G. M. Hall, the main conference room, can accommodate up to 100 participants, theater-style, or 60 in a U-shape layout and is fully equipped with audio-visual equipment. In addition, there are ten other smaller seminar rooms which can each accommodate up to 15-20 participants for meetings or study groups. For larger conferences, or when additional facilities are required, arrangements can be made for the extensive resources of the neighbouring Vidyabathna Building.

# A

## ACCOMMODATIONS



All rooms at Sasa International House are designed and furnished in the highest international standards in order to provide live-in guests with a relaxing and homelike atmosphere. There are four types of rooms : standard Executive and Manager Rooms which have air-conditioning, carpets and telephones; Vice President Rooms, which are similar to Executive and Manager Rooms but also have a refrigerator ; and the large President Rooms which have all the above facilities plus a kitchenette. Televisions can be rented on request and laundry service is available. Sasa International House accommodation is available on a daily, weekly or monthly basis, at a very reasonable cost, for any participants in Sasin sponsored programs or for those using the seminar or meeting facilities.

# S

## SASA CUISINE



Sasa Cuisine, located on the ground floor, offers full meals, either international or Thai specialties as well as snacks in a relaxed atmosphere. Accommodating up to 130 persons, Sasa Cuisine is open from 6.30 am. till 9.30 pm. It is the perfect place for a rendez-vous or informal meal a-la-carte at most reasonable prices.

# A

## ATHLETIC ACTIVITIES



An outdoor swimming-pool and sun terrace in a garden setting behind Vidyabathna Building is situated within walking distance for use by guests of Sasa International House. Tennis courts near the swimming pool are also available on certain days. In-house table-tennis is also available upon request. For study or leisure times, the air-conditioned library, in Vidyabathna Building, provides a wide range of reading. In-house personal computers may also be requested by guests.

# SASA



Chulalongkorn University, founded in 1917, is the oldest and largest university in Thailand. Its 500-acre campus is located in the center of Bangkok. It is composed of 128 academic departments divided into 15 faculties, a graduate school, 14 institutes, 5 research centers and 4 supporting centers.

Among its 14 institutes is the Sasin Graduate Institute of Business Administration.



Entered on September 15, 1982 as a joint undertaking of Chulalongkorn University, Northwestern University and the University of Pennsylvania, the Graduate Institute of Business Administration—previously known as GIBA) was given the name Sasin by H.M. King Bhumibol on the occasion of his 60th birthday, December 5, 1987. Sasin's primary objective is the development of efficient management personnel of the same caliber as graduates from top overseas universities who are well-versed in the principles and practices of international business.

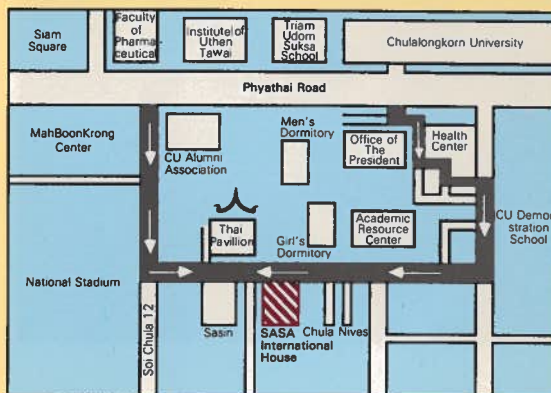


Each year at least 30 visiting professors come over from Northwestern University and the University of Pennsylvania to teach the MBA (Master of Business Administration) Program, the MM (Master of Management) Program and the SEP (Senior Executive Program) at Sasin.

Several students from Northwestern University also cross-register at Sasin every year.



The new Sasa International House (which officially opened on May 9, 1986) was designed to serve the needs of visiting professors, graduate students and guests of the University. Its central location on the peaceful campus of Chulalongkorn University makes it within walking distance of the National Stadium and a wide range of shops, department stores, offices, cinemas and restaurants.



### FOR RESERVATIONS:

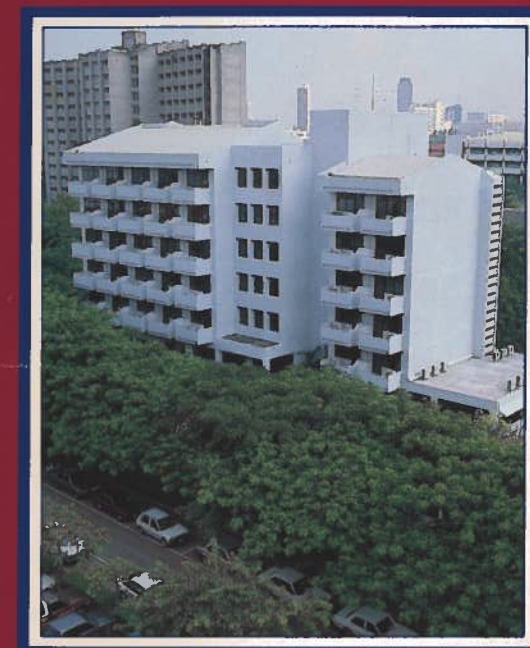
SASA International House  
Soi Chulalongkorn 12(2)  
Phyathai Road Bangkok 10500  
Thailand

Tel: 214 2581-2,  
215 3741-3,



# SASA

INTERNATIONAL HOUSE



BANGKOK  
THAILAND

PAX

14/66.2.215.38.80



SASA INTERNATIONAL HOUSE  
Rate Schedule 1990

ROOM RATES

	Daily Rate
President	₱ 1,600
Vice President	₱ 1,400
Executive (2 Beds)	₱ 1,200
Manager (3 Beds)	₱ 1,200
Extra Bed	₱ 150

All rates are subject to change without prior notice

MEAL RATES

Continental Breakfast.....	₱ 60
American.....	₱ 80
Lunch.....	₱ 100
Coffee Break.....	₱ 25
Dinner.....	₱ 130
Banquet Charge...depending on menu(s).....	
Meal rates plus 10% room service charge	

CONFERENCE ROOMS

	half-day	full-day
Vidyabathna Bldg.(200 persons)	₱ 3,000	6,000
G.M.Hall ( 60 persons)	₱ 1,200	2,000
M.D.1 ( 15 persons)	₱ 300	600
M.D.2 ( 15 persons)	₱ 200	400



MINISTRE DE L'EDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET METIERS  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL

Paris, 27th September 1993

COPY

*of my previous handwritten letter*

SASA International House,  
Soi Chulalongkorn 12(2)  
Phyathai Road  
Bangkok 10500  
Thailand

Dear Mr. Director,

As I did during the previous years, I intend to stay a month at SASA International House. Prof. Kitti INTARANONT probably told you that during this period, I will be teaching every week at Chulalongkorn University.

I shall arrive on Thursday, 4th November at 6.25 am and leave on Friday, December 3rd at 11.55 pm. I need, as previous years, a vice-president room.

Would you kindly confirm my reservation and indicate the cost of the room taking into account the University discount.

With my best regards,

Yours sincerely,

Professor Alain WISNER

Paris September 14<sup>th</sup>

Dear Mr or Mrs Director,


As I did previous years, I intend to stay a month  
 at SASA INTERNATIONAL HOUSE. As P. KITTI INTARANONT  
 probably told you during this period, it will give ~~me~~  
 teachings every week at CHULALONGKORN UNIVERSITY.

I will arrive <sup>on Thursday</sup> November 4<sup>th</sup> at 6 h 25 am and leave on  
 Friday December 3<sup>rd</sup> at 11h55 pm. I need as previous years  
 a vice president room.

Would you kindly confirm my reservation and the price  
 I will pay <sup>including the</sup> with special University discount accorded to Professors.

With my best regards

Truly yours



Professor D. WISNER

Paris, le 5 Mars 1993

Docteur Vogt  
Directeur Général de  
l'INRS  
30 rue Olivier Noyer  
75014 Paris

Cher ami,

Je viens de recevoir la réponse de Kitti Interanont à vos propositions de dates. Il suggère le vendredi 18 Juin au matin (entre 10h et 12h, si cela vous convient).

Je vous propose de déjeuner ensuite avec Kitti Interanont et moi-même, car notre auteur est très préoccupé par votre réaction qui va déterminer ses choix ultérieurs. Peut-être ne souhaitez-vous pas vous exprimer complètement au cours de la réunion. Naturellement, Kitti Interanont souhaiterait passer avec vous le vendredi après-midi. J'en serais très heureux pour lui, mais je ne suis pas certain que cela vous soit possible.

Merci, en tout cas, pour votre présence le 18 Juin.

Bien amicalement.

A. Wisner



MINISTERE DE L'EDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET METIERS  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL

Paris, 15th February 1993

Dr. Kitti Intaranont,  
Laboratory for Ergonomic Research  
Dpt of Industrial Engineering  
Faculty of Engineering  
Chulalongkorn University  
Bangkok 10330  
Thaïlande

Dear Kitty,

Thank you for your letter of January 22nd. I am happy that you are visiting us in June. The days are very convenient to me and I am only a little afraid that NEB will be slightly reluctant to give you the full one-month grant for a stay that will be shorter than three weeks. I hope anyway that this difficulty will be overcome.

Dr. Vogt is not only one of our best specialists in Heat physiology and Ergonomics (may be the best) but also the General Manager of our biggest institution in Work, Safety and Health, the INRS (Institut National pour la Recherche et la Sécurité). Around 600 people are employed in this institute. As you presumed, he is a good friend of mine and I had no difficulty to get in touch with him. He is extremely interested to attend your conference but though June is four months ahead, he has limited possibilities :

Monday 14 morning  
Wednesday 16, Thursday 17, Friday 18, all day  
Wednesday 23rd morning  
Thursday 24th all day.

Could you kindly let me know quickly which half day you are choosing for your conference so that I can inform Dr. Vogt which half day he has to keep aside for your lecture which will take place in our laboratory.

I will also arrange for you an appointment with Dr. Daniellou but I cannot do it just now as he had a severe mountain accident at the end of December with a neck vertebral fracture and he will not be back at work until the middle of April. We are all very happy that he survived with no other disablement.

It is really a great pleasure to see you again in Paris. I am myself planning my schedule for 1993 when I will probably go to the Philippines but, of course, I am always thinking first of Thailand. Are you still thinking of inviting me in August for a Meeting on your project ? Are you planning to teach at Chulalongkorn in November 93 or in another period in 1994 ?

Please give my best regards to your family.

Yours sincerely,



Alain Wisner



## CHULALONGKORN UNIVERSITY

Laboratory for Ergonomic Research  
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Department of Industrial Engineering  
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Professor Alain Wisner  
Laboratoire d'Ergonomie et Neurosciences du Travail  
CNAM  
41, Rue Gay Lussac  
75005 PARIS, FRANCE.  
FAX +33-1-43 25 36 14

22 January 1993

Dear Alain:

Thank you very much for the good news about the scholarship by your fax dated 19 January 1993, I have been waiting to hear this for quite some times. My tentative plan is to depart Bangkok either on 5 or 6 June depending upon the availability of the flight schedule. I would probably like to leave Paris some day during the week of 21 and 25 June. I also want to present some findings of my study to your students and staff between 8-11 or 21-24 June. If you are a good friend of Dr. Vogt, would you kindly ask him to join my seminar. We have met in Bali, Australia and Paris. He still remembered me last time in Paris. I know he has done numbers of work in heat stress. But if it causes burden, don't worry about it. I also like to meet Dr. Daniellou, if possible.

I hope to hear from you soon and looking forward to seeing you again in Paris. We wish you and your family all the best for every thing. Remember that in your old days you have made lots of good friends and colleagues, my family and I are no exception. You can count on us at your disposal.

With my best personal regards to you and Madame Wisner.

Truely yours,



**CHULALONGKORN UNIVERSITY**

Laboratory for Ergonomic Research  
Dr. Kitti Intaranont, Head

Department of Industrial Engineering  
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Bangkok 10330 THAILAND

Professor Alain Wisner  
Laboratoire d'Ergonomie et Neurosciences du Travail  
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41, Rue Gay Lussac  
75005 PARIS, FRANCE.  
FAX +33-1-43 25 36 14

22 January 1993

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I hope to hear from you soon and looking forward to seeing you again in Paris. We wish you and your family all the best for every thing. Remember that in your old days you have made lots of good friends and colleagues, my family and I are no exception. You can count on us at your disposal.

With my best personal regards to you and Madame Wisner.

Truely yours,

A handwritten signature in dark ink, appearing to be 'Kitti Intaranont'.



MINISTERE DE L'EDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET METIERS  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL

Paris, 19th January 1993

Prof. Kitti INTARANONT  
Dept. of Industrial Engineering  
Chulalongkorn University  
Bangkok 10330  
Thaïlande

Fax N° : 19 66 2 253 6161

Dear Kitti,

I hope that you have well began the New Year. I wish you all the best for yourself, your friendly family, your co-workers and your students.

I remember with emotion my last day in Bangkok that looks like a fairy tale with the farewell from your students, each of them with their gift and compliments. I remember also the surprise travel leading to the tailor shop with the promise of a wonderful gift that I was not able to refuse but that is much too important. The end was also marvellous with your enlarge family in this beautiful garden and very refined food.

Now we have in sight every day your marvellous silk flowers during our relaxed time. Thank you again for all these marvels.

I have good news for you as I have received the confirmation of the grant for 12,000 FF that has been re-attributed for the year 1993. Could you confirm that you still intend to come in June as I have to fix now my travel schedule for this year. I will probably be in Brazil in May and on holiday in July.


You will find under separate cover a paper I have found in *Ergonomics International* (May 1992) about the Australian Fund for Conferences. This could be useful for the Bangkok Meeting you are thinking of. May be you could also write from me to Prof. Hugues MONOD to ask for other subsidies from the fund that SELF (Société d'Ergonomie de Langue Française) will constitute in the same way as the Australians from the benefit of IEA 91. His address is :

Laboratoire de Physiologie du Travail  
91, boulevard de l'Hôpital  
75634 PARIS CEDEX 13  
France

I hope that your teaching and researches are developing as well as possible.

Please share my best regards with Mrs. Intaranont.

Yours sincerely,



Alain Wisner

Encls.



re us le 25 Mars

## CHULALONGKORN UNIVERSITY

Laboratory for Ergonomic Research  
 Dr. Kittl Intaranont, Head  
 Professor Alain Wisner  
 Laboratoire d'Ergonomie et Neurosciences du Travail  
 CNAM

41, Rue Gay Lussac  
 75005 PARIS, FRANCE:  
 FAX +33-1-43 25 36 14

Department of Industrial Engineering  
 Faculty of Engineering  
 Bangkok 10330 THAILAND

22 February 1993

Dear Alain:

Thank you very much for the good news about Dr. Vogt. I will be glad to meet him on Friday 18 June 1993 so that we will have all day to discuss some topics of interest. The presentation time should then be taken in the morning, if you kindly agree.

Please kindly provide your invitation letter to me as soon as you get the confirmation from the NEB. In your letter, please also specify duration of visit (i.e., from 6-27 June 1993) and the objectives of the visit such as workshop presentation and our cooperation signed by our University Presidents, etc. The letter will help me to obtain the University permission to leave and a Visa entering France.

If you plan to be in Southeast Asia again in 1993, I will be most delighted to invite you for a special lecture to my class in November. I will be in Japan between 20 September to 31 October 1991 to join hands with Professors Kishida and Horino trying to find some cooperations. With respect to the meeting of my project I am not certain that we can organized in August 1993. I really need to see Dr. Vogt's reaction to my final result which I shall present in your Laboratory on Friday 18 June 1993. Despite of our hard work we put into the project, allow me to express my sincere feeling that I am still not satisfied with the outcome.

I felt extremely sorry to hear sad news about Dr. Daniellou's accident. I hope that he will recover very soon. Please kindly bring him and his family my sincere wishes.

I am looking forward to seeing you again in Paris. With my best personal regards to you and Madame Wisner.

Truely yours,

**CHULALONGKORN UNIVERSITY**

Laboratory for Ergonomic Research  
Dr. Kittit Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

Professor Alain Wisner  
Laboratoire d'Ergonomie et Neurosciences du Travail  
CNAM  
41, Rue Gay Lussac  
75005 PARIS, FRANCE.  
FAX +33-1-43 25 36 14

24 March 1993

Dear Alain:

I hope you received my letter requesting the appointment with Dr. Vogt on Friday 18 June 1993 and the provision of your invitation letter for my visit to CNAM.

With respect to the meeting of the EC project, we plan to have the final conclusion in November 1993. If you plan to be in Bangkok during that time, please kindly accept our invitation to Chair our final conference. We plan to invite the EC Ambassador and Chula President to close the meeting. It will be a one-day presentation and at the end we will have a cock-tail reception at the Thai Pavillion opposite SASA NIVES. If you kindly agree to come, please let me know so that Vanwonderghem can approach you with further details.

I hope to learn your response very soon. I'm looking forward to seeing you again in Paris. With my best personal regards to you and Madame Wisner.

Truely yours,



**CHULALONGKORN UNIVERSITY**

Laboratory for Ergonomic Research  
Dr. Kitti Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

PROFESSOR ALAIN WISNER  
LABORATOIRE D'ERGONOMIE ET NEUROSCIENCES DU TRAVAIL  
CNAM  
41, RUE GAY LUSSAC  
75005 PARIS, FRANCE.  
FAX +33-1-43 25 36 14

31 AUGUST 1993

DEAR ALAIN:

I AM DEEPLY SORRY FOR NOT WRITING TO YOU SOONER BECAUSE MY HEAVY LOAD IN PREPARING THE FINAL REPORT OF THE EC PROJECT. I AM JUST WONDERING IF YOU HAVE PREPARED YOUR SCHEDULE FOR THE VISIT TO BANGKOK THIS OCTOBER. THE REASON I ASK IS BECAUSE I AM LEAVING FOR JAPAN ON 20 SEPTEMBER IF EVERYTHING IS ON TIME. I WILL BE BACK ON 31 OCTOBER. THEREFORE, I NEED TO PREPARE EVERYTHING FOR YOU HERE INCLUDING YOUR RESERVATION.

I AM LOOKING FORWARD TO SEEING YOU AGAIN SOON. WITH MY BEST PERSONAL REGARDS TO YOU AND MADAMME WISNER.

TRUELY YOURS,

YOUNG

7 rue Claude  
HAT RAT

92.130 1994 Len Mx

TRANSMISSION PAR TELECOPIE  
FAX TRANSMISSION

Date : 01/09/93

Nombre de pages : 3  
(y compris celle ci)  
Number of page including this one

DESTINATAIRE

To : KITI

N° Télécopieur : 1946622536161

Objet :

Message :

EMETTEUR :

From :

Laboratoire d'Ergonomie  
Conservatoire National des Arts et Métiers  
41 , rue Gay-Lussac  
75005 PARIS  
FRANCE

Téléphone (33) 1 44.10.78...  
Phone

Secrétariat (33) 1 43.54.18.27  
Secretary

Télécopieur (33) 1. 43. 25. 36. 14  
Fax Number

Paris September 1<sup>st</sup> 1993

Dear KITTI,

Thank you for your FAX of August 31<sup>st</sup>. I am happy that you are finishing the redaction of the E.C. report. Please send it to me as soon as possible. I enjoy the idea of reading it soon. I am also happy that you shall have some time in Japan to prepare future projects and cooperation.

My intention is to spend the whole month of November in BANGKOK except very few travels inside THAILAND that will take place when I will not teach at CHULA. So, I would be very happy if you may reserve for me a vice-president room at SASA from 1<sup>st</sup> to 30<sup>th</sup> of November. I will be grateful if you can obtain a reduction as a professor at CHULA. Before I had 30% and last year 20%. It is specially needed as we obtain now only 4 baths for 1 frame instead of 5 baths last year. But anyway, I will accept SASA conditions.

I agree to teach 3 hours one ~~evening~~ evening every week either Monday or Tuesday (can you tell me your choice between the two). I propose to teach four times (8<sup>th</sup> or 9<sup>th</sup>, 15<sup>th</sup> or 16<sup>th</sup>, 22<sup>nd</sup> or 23<sup>rd</sup>, 29<sup>th</sup> or 30<sup>th</sup>). Of course, I could teach also a 5<sup>th</sup> time (1<sup>st</sup> or 2<sup>nd</sup>) but as I will probably arrive the 1<sup>st</sup>, I would be very tired.

Could you kindly give me again the subjects in which

you want me to teach so that I could send you the summaries  
of the courses to be translated.

My best regards to M; INEAPAKONT and yourself

A. W. S.

Have you moved to CHULA CAMPUS ?



you want me to teach so that I could send you the summaries  
of the course to be translated.

My best regards to M; INBARANONT and yourself

A. W. S.

Have you moved to CHULA CAMPUS?

**CHULALONGKORN UNIVERSITY**

Laboratory for Ergonomic Research  
Dr. Kitti Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

Professor Alain Wisner  
Laboratoire d'Ergonomie et Neurosciences du Travail  
CNAM  
41, Rue Gay Lussac  
75005 PARIS, FRANCE.  
FAX +33-1-43 25 36 14

19 May 1993

Dear Alain:

Thank you for your signed letter of invitation. It works just fine. Enclosed on the second page is my brief schedule in Europe.

As a matter of fact, I was not satisfied with Hotel DAGUERRE but since it is very convenient to go to your office, I have to take it. Therefore, please kindly make a reservation for me on 7 8 and 9 June. However, if you have other choice which is better and you think I can afford it, you know I always follow your instruction.

I am looking forward to seeing you again in Paris. With my best personal regards to you and Madame Wisner.

Truely yours,



FACULTY OF ENGINEERING  
CHULALONGKORN UNIVERSITY  
BANGKOK 10330 THAILAND

Professor Alain Wisner  
Laboratoire d'Ergonomie et Neurosciences du Travail  
CNAM  
41, rue Gay Lussac  
75005 Paris  
FRANCE





## CHULALONGKORN UNIVERSITY

Laboratory for Ergonomic Research  
Dr. Kittit Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

Professor Alain Wisner  
Laboratoire d'Ergonomie et Neurosciences du Travail  
CNAM  
41, Rue Gay Lussac  
75005 PARIS, FRANCE.  
FAX +33-1-43 25 36 14

19 May 1993

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I am looking forward to seeing you again in Paris. With my best personal regards to you and Madame Wisner.

Truely yours,

BRIEF TRAVELING PLAN

FOR  
DR KITTI INTARANONT

6 JUNE 1993 TO 27 JUNE 1993

6 JUNE DEPART BANGKOK 2345 TG 932 ARRIVE PARIS (CDG) 7 JUNE 0920

STAY AT HOTEL DAGUERRE 94, rue DAGUERRE 75014 PARIS  
TEL (1) 43 22 43 54

7 JUNE TO 8 JUNE 1993 VISIT CNAM, PROFESSOR WISNER'S OFFICE.

9 JUNE DEPART FOR BRUSSELS BY TRAIN

STAY IN BELGIUM AND POLAND

16 JUNE COME BACK TO PARIS BY TRAIN.

18 JUNE REPORT PRESENTATION TO PROFESSOR VOGT AT CNAM.

**CHULALONGKORN UNIVERSITY**Laboratory for Ergonomic Research  
Dr. Kitti Intaranont, HeadDepartment of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

PROFESSOR ALAIN WISNER  
LABORATOIRE D'ERGONOMIE ET NEUROSCIENCES DU TRAVAIL  
CNAM  
41, RUE GAY LUSSAC  
75005 PARIS, FRANCE.  
FAX +33-1-43 25 36 14

19 MAY 1993

DEAR ALAIN:

THANK YOU FOR YOUR SIGNED LETTER OF INVITATION. IT WORKS JUST FINE. ENCLOSED ON THE SECOND PAGE IS MY BRIEF SCHEDULE IN EUROPE.

AS A MATTER OF FACT, I WAS NOT SATISFIED WITH HOTEL DAGUERRE BUT SINCE IT IS VERY CONVENIENT TO GO TO YOUR OFFICE, I HAVE TO TAKE IT. THEREFORE, PLEASE KINDLY MAKE A RESERVATION FOR ME ON 7 8 AND 9 JUNE. HOWEVER, IF YOU HAVE OTHER CHOICE WHICH IS BETTER AND YOU THINK I CAN AFFORD IT, YOU KNOW I ALWAYS FOLLOW YOUR INSTRUCTION.

I AM LOOKING FORWARD TO SEEING YOU AGAIN IN PARIS. WITH MY BEST PERSONAL REGARDS TO YOU AND MADAMME WISNER.

TRUELY YOURS,

## BRIEF TRAVELING PLAN

FOR

DR KITTI INTARANONT

6 JUNE 1993 TO 27 JUNE 1993

6 JUNE DEPART BANGKOK 2345 TG 932 ARRIVE PARIS (CDG) 7 JUNE 0920

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C.N.A.M - L. E. N. E. T  
Directeur: Professeur P. FALZON

**Le Professeur KITTI INTARANONT,**  
Université CHULALONGKORN, BANGKOK, THAILANDE,

Présentera le vendredi **18 JUIN 1993 à 11 Heures,**  
**SALLE 63**, (4ème étage), 41, Rue Gay Lussac,

Un exposé sur les recherches qu'il a conduites sur :

**LE TRAVAIL INDUSTRIEL A LA CHALEUR,**

En présence du Dr **VOGT**, Directeur Général Adjoint de l'INRS, Discutant.  
A. Wisner assurera la traduction alternée de l'exposé donné en anglais.





MINISTÈRE DE L'ÉDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL

Paris, 27th September 1993

*Please let me know the date of  
the seminar where you shall present  
your report on EEC project.*

Dr. Kitti Intaranont,  
Laboratory for Ergonomic Research  
Dpt of Industrial Engineering  
Faculty of Engineering  
Chulalongkorn University  
Bangkok 10330  
Thaïlande

Dear Kitti,

Thank you for your fax of September 15 and for the reservation at obviously very good price.

I have noted that I will teach from 5.30 to 8.30 pm every tuesday from 9th to 30th November.

As I am leaving only on 3rd December, there will be no problem for me to organise an exam on the 30th November and read the Students' papers.

I have received an invitation from Friedrich Ebert Foundation in Bangkok to deliver a speech during a forum they are organising on Thursday, 11th November which does not interfere with the teaching I am giving at Chulalongkorn.

I have bad news about the Thai girl student you have discussed to be admitted at Prof. Bouisset Master Degree preparation. I have called today Prof. Richardson who told me that after an interview and studying the curriculum of the candidate the jury has thought that she would meet very severe difficulties in mathematics and physics if she were admitted. I discovered on this occasion that this student was not an engineer but a nurse and I would have given a different advice had I known the field in which she had been trained first.

I shall try and get in touch with her in Grenoble and may be ask her to visit me in Paris so that she may occupy efficiently her following year study. \*

I hope that you will have a very good and fruitful stay in Japan.

I am delighted to see you again in November.

*I had your student at the plane to offer  
her to follow in our laboratory the  
ergonomics full time teaching but she  
has chosen to learn dietetics in  
Grenoble. In fact nursing is not a very  
good preparation for our teaching*

Yours sincerely,

Alain Wisner



## CHULALONGKORN UNIVERSITY

Laboratory for Ergonomic Research  
Dr. Kitti Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

PROFESSOR ALAIN WISNER  
LABORATOIRE D'ERGONOMIE ET NEUROSCIENCES DU TRAVAIL  
CNAM  
41, RUE GAY LUSSAC  
75005 PARIS, FRANCE.  
FAX +33-1-43 25 36 14

15 SEPTEMBER 1993

DEAR ALAIN:

THANK YOU VERY MUCH FOR YOUR FAX AND LETTER. YOUR ROOM HAS BEEN BOOKED FROM 1 TO 30 NOVEMBER. THE DISCOUNT OF 30% IS SERIOUSLY NEGOTIATING FOR YOU ONLY (KEEP IT A SECRET). I CANNOT REMEMBER VERY WELL ABOUT THE TOPIC THAT YOU ARE GOING TO TEACH IN WHICH WE HAVE ALREADY DISCUSSED AT CNAM. IT IS ABOUT ERGONOMICS METHODS AND DEVELOPMENT, I THINK. I REMEMBER THAT YOU PUT THE NOTES OF THIS IN YOUR FOLDERS. I REALLY DON'T MIND WHAT SUBJECT YOU ARE GOING TO TEACH BECAUSE YOU ARE ALWAYS PRACTICE THE BEST FOR THE STUDENTS IN DEVELOPING COUNTRIES. THE CLASS WILL BE CONDUCTED ON TUESDAY FROM 17.30 TO 20.30 AND WE CAN START ON THE 9TH, 16, 23, AND 30 (OR WE CAN ARRANGE A SPECIAL ONE EARLIER IF YOU PLAN TO LEAVE BANGKOK ON 30 NOV OR 1 DEC). WE CAN DISCUSS THIS MATTER LATER.

I HAVE AN URGENT REQUEST TO YOU. IF YOU COULD REMEMBER WHEN I WAS AT YOUR LAB LAST TIME, I HAVE ASKED PROF DANIELLOU TO ASK PROF. BOUISSET TO ACCEPT A THAI GIRL STUDENT AS A STUDENT AT PARIS ORSAY. PROF BOUISSET AGREED IN PRINCIPLE. BUT AS OF TODAY, I RECEIVED A MESSAGE FROM HER THAT SHE HAS NOT RECEIVED ANY PAPER FROM PARIS ORSAY FOR HER ADMISSION. I WOULD LIKE TO ASK YOU IF IT IS NOT INADEQUETTE FOR YOU TO MAKE A PHONE CALL TO PROF BOUISSET OR PROF RICHARDSON. PLEASE KINDLY HELP, I REALLY NEED SOMEONE TO BE EDUCATED FROM EUROPEAN SCHOOL OF ERGONOMICS TO WORK WITH ME. THANK YOU VERY MUCH. I AM LEAVING FOR JAPAN ON MONDAY 20 SEPT. IF YOU HAVE ANY MESSAGE FOR ME PLEASE USE FAX NUMBER 574 0078.

I AM LOOKING FORWARD TO SEEING YOU AGAIN SOON. WITH MY BEST PERSONAL REGARDS TO YOU AND MADAMME WISNER.

TRUELY YOURS,

URGENT



**CHULALONGKORN UNIVERSITY**

Laboratory for Ergonomic Research  
Dr. Kitti Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

Professor Alain Wisner  
Plaza Hotel  
FAX 237 0746

28 November 1994

Dear Alain:

Thank you very much for your last fax dated 27 November thanking me for what I did for the success of the 4th SEAES Conference. I appreciate your expression but that's not what I want. I want you to forgive me what I did to you at the SEAES meeting. There should be a better way for me to inform you but it was my bad manner just exploded. I told the story to my family they all agreed to blame and condemn me. I could not sleep well if you didn't forgive me.

With all my love, you know that we all in my family always love you.

Respectfully yours,

# TRANSMISSION REPORT

11.26.1994 18:46

PLAZA HOTEL 2370746

DATE	TIME	DURATION	REMOTE ID	MODE	PAGES	RESULT
11.26	18:45	00'41"	662 2536161	G3	1	O.K.

CR. WISNER

Por. 517.

~~Post~~

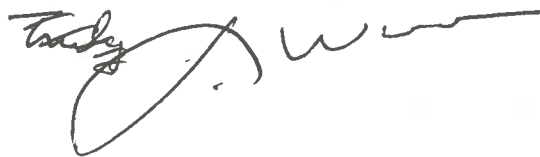
Sunday 27 November 1994

Dear Kitti,

I am thinking back to the remarkable success of the IVth SEAFS Egressions Congress and I want to thank you wholeheartedly for the enormous effort you devoted to the preparation of this meeting.

I know you are certainly exhausted and I don't want to disturb you. I am leaving tomorrow for the RAYONG seminar and I give at SASA reception desk a letter from POLYLANGA, the summary of my talk at RAYONG where I am speaking of you and a little gift.

My best regards for yourself and your family  
your faithful friend



Professor KITTI INTARANONT  
FAX 662.253.51.61  
252.64.11



THE  
MANDARIN  
BANGKOK

The Mandarin Hotel Public Company Limited (PLAZA HOTEL)

178 Surawong Road, Bangkok, Thailand. Tel. 235-1760-79 Cable : PLAZATEL Telex : TH 72152 PLAZA Fax : (662) 237-0746

# TRANSMISSION REPORT

11.30.1994 16:40

PLAZA HOTEL 2370746

DATE	TIME	DURATION	REMOTE ID	MODE	PAGES	RESULT
11.30	16:39	00'41"	02 2186411	G3	1	O.K.

MR. WISNER

ROOM 517

KRUNG THEP

30-11-94 2.30pm

Ms KITTI INTARANONT

FAX 218.64.11

Dear KITTI

I am very happy with your letter fax of today  
I fully agree your second proposal and will be ready at  
5 to 6 pm <sup>tomorrow</sup> at PLAZA to follow your excellent  
programme

With my best regards

Truly yours



I did not bring things at SASA and will give you  
tomorrow.



THE  
MANDARIN  
BANGKOK

The Mandarin Hotel Public Company Limited (PLAZA HOTEL)

178 Surawong Road, Bangkok, Thailand. Tel. 235-1760-79 Cable : PLAZATEL Telex : TH 72152 PLAZA Fax : (662) 237-0746

TRANSMISSION REPORT

11.30.1994 09:17

PLAZA HOTEL 2370746

DATE	TIME	DURATION	REMOTE ID	MODE	PAGES	RESULT
11.30	09:16	01'03"	662 2536161	G3	2	O.K.

MR. WISNER

Room 517



To ~~Datta~~ KITTI INTARANONT

FAX ~~662~~ 253 6161  
252 1513  
251 3939

30th Nov 94

Dear KITTI,

I have nothing to forgive you but if you need that I forgive you, It is easy to say that I have forgiven you from the first minute of this difficult evening

- you had never any intention to be disagreeable to me

- you were right from a certain viewpoint but at SEAES, we are in a diplomatic situation and in diplomacy we are frequently obliged to say in public things on which you don't agree

- you were not well informed.

So please, try to forget about these difficult and unjust discussions



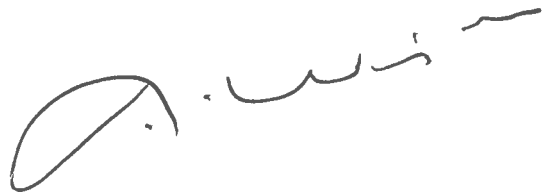
THE  
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BANGKOK

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178 Surawong Road, Bangkok, Thailand. Tel. 235-1760-79 Cable : PLAZATEL Telex : TH 72152 PLAZA Fax : (662) 237-0746

I would like to see you before I leave tomorrow  
night but today. I am busy from 5.30  
to very late, may be we meet later afternoon  
or tomorrow.

With all my friendship and love





THE  
MANDARIN  
BANGKOK

The Mandarin Hotel Public Company Limited (PLAZA HOTEL)

178 Surawong Road, Bangkok, Thailand. Tel. 235-1760-79 Cable : PLAZATEL Telex : TH 72152 PLAZA Fax : (662) 237-0746



**CHULALONGKORN UNIVERSITY**

Laboratory for Ergonomic Research  
Dr. Kitti Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

Professor Alain Wisner  
Plaza Hotel Room # 517  
FAX 237 0746

30 November 1994

Dear Alain:

Thank you very much for your last fax dated 30 November, now I can relax.

I try to phone you today but you were not in. I understand you will be leaving tomorrow late night. Tomorrow morning I will give a lecture outside but will be back before noon. I have two options for our meeting;

- 1 I invite you for lunch tomorrow, you choose the place. OR,
2. We invite you to our party tomorrow evening at Royal River Hotel. Chaiyuth and the others who work hard in the organizing committee will be with us. I will be the host if they allow me so.

If you choose the second choice, I will pick you up at Plaza Hotel at 4.00 pm and bring you to my lab where we have a talk. By 5.00 pm I drive you to the party which will start at 6.00 pm. By 8.30 pm I bring you to the Airport. How does this sound to you?

I am waiting for your reply by phone at 218 6410 OR 218 6411. Or you can send a fax to me at 218 6411. With my best personal regards.

Respectfully yours,



MINISTRE DE L'EDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET METIERS  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL

*enjoy with students*

Paris, 18th March 1994

Dr. Kitti Intaranont,  
Laboratory for Ergonomic Research  
Dpt of Industrial Engineering  
Faculty of Engineering  
Chulalongkorn University  
Bangkok 10330  
Thaïlande

Dear Kitti,

I hope that everything is going well with you and that you are enjoying your new home.

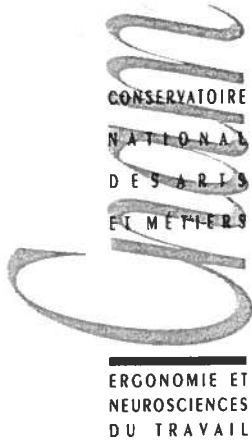
I am enclosing a few papers in English that I have written since we met and that may be of some interest to your students.

I hope to see you again soon, may be in Toronto, specially since I am not sure that I shall visit Thailand this year.

With my best wishes,

Yours sincerely,

Alain Wisner



Paris, 1st July 1994

Dr. Kitti Intaranont,  
Laboratory for Ergonomic Research  
Dpt of Industrial Engineering  
Faculty of Engineering  
Chulalongkorn University  
Bangkok 10330  
Thaïlande

Dear Kitti,

Thank you for the copy of Chayut's letter to Professor Patesson. I have just written a letter to Professor Patesson to support this request that seems to me fully justified.

I confirm my intention to attend the Congress and stay two weeks in Thailand. Thank you for inviting me to give an introductory paper but I don't want to repeat my previous speech. As I wrote to you before, I shall insist on the need for cognitive research in relation to the new aspects of industrialisation in South East Asia. My precise title would be :

" Approaching New Technologies :  
A new challenge for Ergonomics and Anthropotechnology".

I am very happy to meet again the old friends you have invited but I am very sorry that you have not invited at least two experts from SEAES to give introductory papers. What you did on heat, what Manuaba is doing for Indonesian aviation, Rubio's views on Company competence and workers' competence are among the new important and interesting trends that contribute to international Ergonomics.

With my best regards,

Yours sincerely,

Alain WISNER

LABORATOIRE  
D'ERGONOMIE

41, RUE  
GAY-LUSSAC  
75005 PARIS

TÉLÉPHONE  
(1) 43 54 18 27  
TÉLÉCOPIE  
(1) 43 25 36 14

Doubles adressés aux Prs Monod  
Daniellou

Paris, le 30 Juin 1994

Mr le Professeur René Patesson  
Président de la SELF  
Université Libre de Bruxelles  
Dépt Informatique et Sciences humaines  
50 Av. Franklin Roosevelt  
1050 Bruxelles Belgique

Monsieur le Président et cher ami,

La Société d'Ergonomie d'Asie du Sud-Est, dont je suis l'un des membres fondateurs et qui a montré son utilité pour servir de points de rencontres de chercheurs, très actifs mais très isolés, travaillant tous dans les pays d'Asie du Sud-Est, va tenir en Novembre prochain son 4ème Congrès en grande partie grâce au dévouement et à l'abnégation du Docteur Kitti Intaranont, secrétaire général de la S.E.A.E.S.

Sur mon conseil, le Président de la S.E.A.E.S., le Dr Chaiyuth Chavalitnitikul, a écrit au Dr Ian Noy, trésorier de l'I.E.A., afin d'obtenir un soutien sur les fonds alloués à cet effet par la Société Australienne d'Ergonomie après le Congrès de Sydney, et par la Société d'Ergonomie de Langue Française après le Congrès de Paris. Il semble, après ce contact, que c'est la Société donatrice, dans ce cas la SELF, qui doit recommander d'attribuer ces fonds à la Société bénéficiaire par une lettre adressée au Président, au Secrétaire général et au Trésorier de l'Association Internationale d'Ergonomie.

Je n'ai aucun mandat pour formuler une recommandation à votre égard et à celui du Conseil de la SELF. Toutefois, connaissant l'esprit qui anime notre Société, celui qui a animé l'organisation du Congrès de Paris, ainsi que les besoins et les mérites de la S.E.A.E.S., je me permets de vous exprimer un souhait : celui de la prise en considération par la SELF de la demande de la S.E.A.E.S.

Je pense que le montant demandé de 2000 dollars est très modeste, et qu'il serait souhaitable qu'il soit éventuellement accru.

Je vous prie d'agréer, Monsieur le Président, l'expression de mes sentiments amicaux et dévoués.

A. Wisner

**CHULALONGKORN UNIVERSITY**Laboratory for Ergonomic Research  
Dr. Kitti Intaranont, HeadDepartment of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

Professor Alain Wisner  
Laboratoire d'Ergonomie et Neurosciences du Travail  
CNAM  
41, Rue Gay Lussac  
75005 PARIS, FRANCE.

28 June 1994

Dear Alain:

Thank you very much for your last fax to help us find the way to ask for small money from SELF which Professor Patesson currently chairs the Society. The next two pages are copies of our letter sent to Professor Patesson by both fax and postal (EMS) air mail. I will send by fax to both Professors Daniellou and Monod to ask for their supports.

We would like to ask you to be a keynote speaker of the 4th SEAES Conference. If you accept we will have 4 keynote speakers.

Kogi will speak on participatory ergonomics and checklist,

Wisner will speak on technology transfer and its effects,

Vanwonderghem will speak on repetitive work,

Ayoub will speak on modeling of manual materials handling.

We expect about 26-30 papers to be presented at the conference.

We plan to have 2 keynotes/day and paper presentation for 2 and a half days. The last afternoon we will visit the factory and have a farewell party in the evening. A copy of the last brochure (not latest) is coming to you by mail.

I am looking forward to seeing you again in November. With my best personal regards to you and Madame Wisner.

Respectfully yours,

A handwritten signature in black ink, appearing to be 'Kitti'.

Telephone 466 2 252 5001

Telefax 466 2 253 1101

252 1513

251 3969



## South - East Asian Ergonomics Society (SEAES)

ADDRESS: NATIONAL INSTITUTE FOR THE IMPROVEMENT OF WORKING CONDITIONS AND ENVIRONMENT(NICE)  
PHRA PINKLAO - NAKORN CHAI SI HIGHWAY, THALING CHAN, BANGKOK 10170, THAILAND  
TEL. 440-6294-5 FAX (66-2) 440-2109 448-6509

No. 0611/1025

28 June 1994

Dear Professor Patesson:

I am writing this letter to request a small financial support from the SELF to organize our small conference which will be a gathering of ergonomics groups in Southeast Asia region. Some ergonomists from other countries outside the region will also participate.

Southeast Asia Ergonomics Society was established in 1985 in order to promote ergonomics activities in the developing countries in the region as one major objective. There were 3 previous conferences organized in Jakarta, Denpasar and Bangkok in 1985, 1988 and 1991, respectively. In 1994, the 4th SEAES conference is scheduled between 21-23 November at Royal City Hotel in Bangkok, Thailand. As we all know that people in this region are mainly poor, the organizer cannot propose a high fee for the conference participants. Since the Society is a regional association, partial supports (i.e., airfares) from the SEAES account will, sometimes, have to be provided for council members and active participants who must share their opinions with the others. The Annual membership fee of US\$ 10 is not regularly collected from the regional members due to the hardship of the regional economy. There are approximately 70-80 members but only 20% fee paid regularly.

Not to mention the correspondence cost which draws private money from the Secretary-Treasurer himself, all secretariat expenses made by the Society President and Secretary-Treasurer are paid from other funds. This pushes a heavy financial load to the Conference organizers. We have learned from IEA91 in Paris that the SELF was in favor to support meetings in countries where ergonomics is not yet well developed. Based on this fact, may we humbly request a small sum of US\$ 2000 from the SELF fund. The money received will be used for conference fees as scholarships for poor



- 2 -

participants, travel expenses for members of SEAES Council, etc. General secretariat expenses are covered by the Safety and Health at Work Promotion Association (Thailand). Royal Thai Government also provides office space and a limited fund for eligible Thai participants.

Thank you for your support and understanding. I am looking forward to hearing from you very soon.

Best regards.

Sincerely yours,



Chaiyuth Chavalitnitikul Ph.D.  
President SEAES

Monsieur le professeur Rene Patesson  
President de la SELF  
Universite libre de Bruxxeles  
Departement d'informatique et de sciences humaines  
CP 124  
50 Avenue Franklin Roosevelt  
1050 Bruxelles/Belgique FAX + 32-2-650 3521



MINISTERE DE L'EDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET METIERS  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL

Paris, 26th May 1994

Dr. Chaiyuth Chavalitnitikul  
NICE  
Phra Pinklao-Nakorn Chaisri  
Highway,  
Thaling Chan  
Bangkok 10170  
Thailand

66. 2.438. 2109

Dear Chairman,  
Dear Chaiyuth,

I received yesterday's mail in which I found only a copy of a four-pages fax dated March 28th you received from Ian Noy.

I presume that your secretary forgot to put in the envelope the letter in which you may have explained what you expected me to do in relation with this document.

You may know that, for a few years, I have not been a member of the IEA Council, and that considering my age I am not sure of my future programme of visits abroad.

With my best regards,

Yours sincerely,

Alain Wisner

21 I.A.E. 2537 / 1569

*new name committee  
du NICE  
le 24.5.94*



OLD WORLD - NEW WORLD  
ONE WORLD

# INTERNATIONAL ERGONOMICS ASSOCIATION

Y. Ian Noy, Ph.D.  
Treasurer, IEA  
c/o Ergonomics Div.  
Transport Canada  
344 Slater Street  
Ottawa, Ontario  
Canada  
K1A 0N5

Tel 1 (613) 998-  
2268

Fax 1 (613) 998-  
4831

## FAX COVER SHEET

Date: March 28, 1994

Number of pages, including cover sheet: 4

To:

Chaiyuth Chavalinitikul

Fax: 66 2 433 2109

Dear Dr. Chavalinitikul:

Hal Hendrick has forwarded your letter to him requesting seed funds for 4th SEAES Conference, Nov 21-23, 1994.

The most appropriate mechanism for doing so is the use of the Australian Fund for Conferences in Ergonomics in South East Asia. The Terms of Reference for this fund are attached for your information.

I will be pleased to expedite approval of the conference by the Science and Technology Committee and the Education & Training Committee. However, I would require that you submit to me at your earliest convenience additional information concerning

- o expected audience and attendance
- o draft budget and estimated registration fee
- o organization details, including timeframe and preparation schedule
- o qualifications and affiliations of organizers and key speakers
- o other sponsors
- o plans to publish and distribute proceedings or record of event

22 I.A.E. 2537 / 1569 / 91

222 I.A.E. 2537

I would also point out that the conference is expected to be budgeted on a cost-recovery basis and that the seed money will be returned to the IEA at the completion of the event.

I hope this information will be helpful and I look forward to receiving your application.

With kind regards,

Y. Ian Noy, Ph.D.  
IEA Treasurer

CC: Prof .Wisner

## TERMS OF REFERENCE

### Australian Fund for Conferences in Ergonomics in South East Asia

This fund is administered by the International Ergonomics Association (IEA) for the purpose of promoting ergonomics in developing countries with particular emphasis on countries in South East Asia. The fund was established with funds generously provided by The Ergonomics Society of Australia.

The fund makes available seed money to societies or other groups in industrially developing countries to cover initial start-up expenses for conferences, symposia, workshops or other similar events which have as their main objective the promotion of ergonomics through dissemination or exchange of knowledge and information in ergonomics, and which are to be held in an industrially developing country.

The amount provided by the IEA will be refunded upon the completion of the event. It is expected that such events will be budgeted on a cost-recovery basis and that the seed money will be identified as a liability.

The fund is managed by the Treasurer of the IEA separately from other IEA accounts. The account will be identified in the Treasurer's annual report to Council.

Normally, proposals will be accepted from IEA member societies. However, groups or organizations other than IEA federated or affiliated members may submit proposals provided:

- o the organizer(s) are qualified in ergonomics
- o where there is a member of the IEA in the region, attempts are made to coordinate the event with the local member prior to submitting the proposal
- o the primary purpose of the event is the promotion of ergonomics and addresses the needs of industrially developing countries in the region, and
- o the organizing committee has representation from government, academia or industry

Interested societies or eligible groups should submit proposals to the Secretary-General of the IEA addressed to the attention of the chairs of the Technology Transfer subcommittee (TT) of the Science and Technology Committee (S&T) and the Education & Training Committee (E&T) for their consideration. The request should include information about:

- o nature of the event
- o purpose of the event
- o subject area
- o expected audience and attendance
- o amount needed for start-up
- o draft budget and estimated registration fee
- o organization details, including timeframe and preparation schedule
- o qualifications and affiliations of organizers and key speakers
- o other sponsors
- o plans to publish and distribute proceedings or record of event

Proposals from groups not affiliated with the IEA should be signed by at least three persons qualified in ergonomics. The proposal should indicate that the individual applicants are authorized by their employers or affiliated institutions to undertake the event.

The Science & Technology Committee and the Education & Training Committee will recommend acceptance or rejection of individual applications to the Executive Committee of the IEA. The Executive Committee will approve or deny applications after due consideration of the recommendations of the S&T Committee and the E&T Committee. Decisions of the Executive Committee will authorize the Treasurer to disburse and receive funds, as required.

Requests for proposals will be communicated via notices in Ergonomics International, correspondence with IEA member societies and announcements conveyed through WHO and ILO. A communications plan will be drafted by the TT Subcommittee.

For further information, contact,

IEA Secretary-General  
prof.ir. D.P. Rookmaaker  
Netherlands Railways  
SE ARBO/Ergonomics  
P.O. Box 2025  
3500 HA Utrecht  
THE NETHERLANDS



MINISTERE DE L'EDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET METIERS  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL

Paris, 26th May 1994

Dr. Kitti Intaranont,  
Laboratory for Ergonomic Research  
Dpt of Industrial Engineering  
Faculty of Engineering  
Chulalongkorn University  
Bangkok 10330  
Thaïlande

FAK 19.662.253.6161

Dear Kitti,

Thank you very much for sending me the ultimate and excellent version of your report and the first Announcement of the SEAS Meeting.

You will find under the same cover a letter I wrote to Chaiyuth about a rather surprising mail I received from him. The best hypothesis I assume is that the covering letter has been forgotten but I am afraid it is just contempt.

I hope your family and yourself are well in your new home.

With my best regards,

Yours sincerely,

Alain Wisner

**CHULALONGKORN UNIVERSITY**Laboratory for Ergonomic Research  
Dr. Kitt Intaranont, HeadDepartment of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILANDPROFESSOR ALAIN WISNER  
LABORATOIRE D'ERGONOMIE ET NEUROSCIENCES DU TRAVAIL  
CNAM  
FAX +33-1-43 25 36 14

JUNE 22, 1992

DEAR ALAIN:

YOUR LETTER DATED 24TH FEBRUARY AND 15TH JUNE 1992 HAVE BEEN RECEIVED SOMETIMES AGO, I AM EXTREMELY SORRY FOR NOT ANSWERING YOU SOONER DUE TO SO MANY BAD THINGS HAPPENED.

DR. MALINEE ASKED ME IF I INTEND TO INVITE YOU FOR SOME LECTURES IN MY CLASS, I THOUGHT I HAVE ALREADY DONE, I SO REGRET FOR NOT DOING THAT BEFORE. MY CLASS STARTS THE FIRST WEEK OF NOVEMBER AND YOU ARE INVITED TO GIVE LECTURES ONCE A WEEK, 4 TIMES UNTIL THE END OF NOVEMBER. IT IS A THREE-HOUR CLASS IN THE EVENING STARTING AROUND 17.30 TO 20.30. THE CLASS WILL BE ON EITHER TUESDAY OR WEDNESDAY NIGHT. THE STUDENTS ARE MAINLY WORKING FOR THE MASTER'S DEGREE. IF YOU CAN START YOUR LECTURE WITH ANTHROPOLOGY AND ITS CONCEPT, ITS SIGNIFICANCE TO WORK DESIGN, ITS INFLUENCE TOWARDS THE DESIGN OF EQUIPMENT FOR PEOPLE TO USE. SOME HOURS SHOULD ALSO BEEN SPENT ON COGNITIVE ASPECTS AND ITS INVOLVEMENT WITH THE DESIGN OF HUMAN-COMPUTER INTERFACE. SOMETIMES BEFORE YOU ARE GOING BACK TO PARIS, I WOULD LIKE TO HAVE A TWO-HOUR TEST FOR THE STUDENTS. THEREFORE, I NEED YOUR QUESTIONS FOR THAT EXAM ALSO.

PLEASE KINDLY LET ME KNOW YOUR REACTION TO THE ABOVE PROPOSAL. THIS TIME I WILL ASK THE UNIVERSITY TO GIVE YOU A VERY GOOD DISCOUNT ON SASA. I HOPE IT WILL BE A HANDSOME ONE SINCE WE HAVE ESTABLISHED A CONTRACT BETWEEN OUR UNIVERSITIES. OF COURSE I CANNOT EMPLOY YOU FOR THIS MATTER SINCE THE INCOME STANDARD FOR EUROPEAN SCHOLAR IS ABOUT TWENTY TIMES OF THOSE WE RECEIVE. BUT STILL WE WANT TO SHARE TO EXPRESS OUR APPRECIATION FOR YOUR KIND ATTITUDE.

I HAVE TO BE IN WUHAN, CHINA IN THE FIRST WEEK OF NOVEMBER BUT I SHALL MEET YOU IN BANGKOK IN OCTOBER. IT IS POSSIBLE THAT I WILL VISIT YOUR LABORATORY IN THE LAST WEEK OF SEPTEMBER. I AM NOT SO SURE. DO YOU HAVE ANY CLASS FOR ME TO SHARE MY EXPERIENCES WITH FOR SOME HOURS?

I HOPE TO HEAR FROM YOU SOON AND LOOKING FORWARD TO SEEING YOU AGAIN. WITH MY BEST PERSONAL REGARDS TO YOU AND MRS. WISNER.

SINCERELY YOURS,

Telephone +66 2 253 6001  
Telefax +66 2 253 6161  
252 1513  
251 3900





MINISTERE DE L'EDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET METIERS  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL

Paris, 2nd June 1994

Dr. Kitti Intaranont,  
Laboratory for Ergonomic Research  
Dpt of Industrial Engineering  
Faculty of Engineering  
Chulalongkorn University  
Bangkok 10330  
Thailande

Fax N° 19 66 2 253 6161

Dear Kitti,

I read with sadness your fax of May 31st learning all the difficulties you are meeting. All this is not really new but the persistence is unacceptable. A more personal aspect of my sadness is that I no longer feel strong enough to help you significantly but I will do my best.

First I am extremely happy that you have succeeded again abroad in the US and Sweden with EEC and now in Germany. You may find here evidence of your own scientific value.

I know rather deeply the sacrifices you made in staying in your country working so hard for your students in Bangkok and in Kong-Khaen and in the South and I know that you are not receiving from the powerful people of your country the support you need and deserve. From my experience it is always the case, in Thailand it is only a little worse. Powerful people don't like too much persons who are valuable by themselves and try to change something in the society even for the survival of that society.

The same reasons that decided you to come back from the States are still valid and even more now. As a friend of yourself and your country I ask you not to retire. You will be quickly so unhappy in your garden and your family and yourself would terribly suffer staying for years in a foreign country. Please forgive me to go so far but our old friendship advises me to do so.

I will discuss with Daniellou and Monod about what can be done with the money that was the outcome of Paris IEA Congress. You have not to be surprised with Ian Noy's answer. He is not open to countries which are not Anglo-American though he is not himself an Anglo-American born person. I suggest that you or Chaiyuth write directly to Hal Hendrick who is always extremely involved in Industrially Developing Countries and specially in South-East Asia. May be you could invite him to this SEAS Meeting. I met him last week in Stockholm and I was impressed by his understanding of the IDC and specially anthropotechnology.

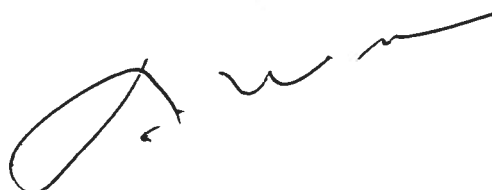
I am now passed 70 and my wife and I have from time to time small health problems so I am not yet sure to attend the Bangkok Meeting. If I travel it will be only for two weeks, the first one to adapt and the second to attend the meeting and I could not ensure a teaching programme.

François Daniellou's address is as follows :

Professeur François DANIELLOU  
Laboratoire d'Ergonomie des Systèmes complexes  
UFR Santé Publique  
146 rue Léo Saignat  
33076 BORDEAUX CEDEX

Fax : (33) 56 90 08 73

With my best regards to your family and to you, the assurance of my affectionate thoughts,

A handwritten signature in black ink, consisting of a large, stylized initial 'A' followed by a series of connected loops and a long horizontal stroke extending to the right.

Alain Wisner



## CHULALONGKORN UNIVERSITY

Laboratory for Ergonomic Research  
Dr. Kitti Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

PROFESSOR ALAIN WISNER  
LABORATOIRE D'ERGONOMIE ET NEUROSCIENCES DU TRAVAIL  
CNAM

41, RUE GAY LUSSAC  
75005 PARIS, FRANCE.  
FAX +33-1-43 25 36 14

31 MAY 1994

DEAR ALAIN:

I JUST CAME BACK FROM DORTMUND, GERMANY ON SUNDAY 29. THE TRIP AND STAY WERE VERY GOOD. THE RESULTS ARE EXTREMELY FRUITFUL. I HAVE EXPERIENCED SEVERAL RESEARCH METHODS OF ERGONOMICS FROM PROFESSOR LAURIG'S INSTITUTE.

I RECEIVED YOUR LAST FAX CONCERNING COPIES OF IAN NOY'S LETTER TO SEAES PRESIDENT AND YOU WONDERED WHY YOU RECEIVED SUCH COPIES WITHOUT KNOWING WHAT CHAIYUTH WANTED YOU TO DO BECAUSE NO COVERING LETTER FROM HIM. I WOULD LIKE TO EXPLAIN AS FOLLOWS:

DURING THE LAST MEETING OF SEAES ORGANIZING COMMITTEE FOR 4TH SEAES CONFERENCE, I INFORMED THE MEETING THAT SELF HAS GIVEN A SUM OF MONEY TO IEA TO ESTABLISH A FUND FOR DEVELOPING COUNTRIES IF THEY WANT TO ORGANIZE A MEETING OR A CONFERENCE. I RECEIVED STRONG ENCOURAGEMENT FROM PROFESSORS WISNER AND DANIELLOU TO APPLY FOR THAT FUND, BUT SEAES MUST PAY ANNUAL FEES. I ALSO INFORMED THE MEETING THAT I PERSONALLY DID NOT WANT TO REQUEST ANY FUNDING FROM IEA BECAUSE WE WOULD HAVE TO FOLLOW AN IEA BUREAUCRATIC SYSTEM TO GET WHAT WE ASKED FOR, I WANTED TO ORGANIZE THE CONFERENCE AS GOOD AS OUR REMAINING EFFORT. HOWEVER, THE MEETING APPROVED THE PAYMENT OF AN ANNUAL FEE TO IEA FROM SEAES FUND (LESS AND LESS BECAUSE OUR MEMBERS DO NOT WANT TO PAY ANNUAL MEMBERSHIP FEES) AND A REQUEST FOR MONEY FROM IEA THROUGH THE IEA PRESIDENT BY THE SEAES PRESIDENT.

JUST BEFORE I LEFT FOR DORTMUND, GERMANY, I RECEIVED A COPY OF IAN NOY'S LETTER FROM CHAIYUTH'S OFFICE ASKING ME WHAT TO DO NEXT. I WROTE A RECOMMENDATION TO SEAES PRESIDENT TO ANSWER TO IEA PRESIDENT, NOT TO IAN NOY, IF WE KNOW SUCH A STEEL PROCEDURE OF IEA EXISTED WE WOULD NOT HAVE TO REQUEST FOR IEA MONEY. SINCE WE HAVE TAKEN THIS ACTION UPON THE ENCOURAGEMENT FROM MY BEST FRIENDS IN FRANCE, THEY SHOULD HAVE BEEN INFORMED ABOUT THIS TRANSACTION AND ITS OUTCOME. I ALSO RECOMMENDED CHAIYUTH THAT WE DO IT ALONE WITH A LOCAL SOCIETY. WE MIGHT NOT OBTAIN FOREIGN SUPPORT AS MUCH AS I EXPECTED BUT I BELIEVE THAT I HAVE SOME FOREIGN FRIENDS WHO PERSONALLY WANTED TO SUPPORT, AND I REALLY HOPE THAT INCLUDES YOU AND DANIELLOU. I AM DEEPLY SORRY THAT I DO NOT HAVE FRANCOIS'S ADDRESS AT BORDEAUX (IF YOU CAN FETCH ME HIS ADDRESS I WILL BE VERY DELIGHTFUL).

THEN I LEFT FOR DORTMUND, I HAVE NOT TALKED WITH CHAIYUTH YET UNTIL I RECEIVED YOUR FAX. THAT MEANS HE FOLLOWED MY SUGGESTION BUT HE SHOULD INCLUDE HIS COVERING LETTER JUST TO INFORM YOU, NOT TO ASK YOU TO DO ANYTHING FURTHER. THEREFORE, IT WILL BE VERY DIFFICULT FOR THIS CONFERENCE TO PROVIDE TRAVEL EXPENSES FOR FOREIGN SPEAKERS AND PRESENTERS SINCE WE WILL HAVE A LIMITED RESUORCE.

I AM NOT HAPPY ABOUT THIS SITUATION BUT THERE IS NOTHING I CAN DO. I WILL NOT BE IN TORONTO, NOT TO BOYCOTT, BUT JUST A LITTLE DISPLEASE OF IAN NOY'S ACTION AND MANNER. I STRONGLY THINK THAT I WILL LEAVE THE COUNTRY TO GO SOMEWHERE FOR A COUPLE OF YEARS, ALL POLITICAL ATTITUDES GIVE ME LOTS OF PAIN. THEN I FORCE MYSELF FOR EARLY RETIREMENT AND COME BACK TO STAY AT MY COUNTRY GARDEN IN NORTHERN THAILAND. YOU, DANIELLOU AND ALL GOOD FRIENDS OF MINE ARE VERY WELCOME AT MY PLACE ANY TIME.

I AM LOOKING FORWARD TO SEEING YOU AGAIN IN NOVEMBER. WITH MY BEST PERSONAL REGARDS TO YOU AND MADAMME WISNER.

TRUELY YOURS,



PARIS 29<sup>th</sup> September 1994

A. WISNER

to

P. KITTI INTDRANONT

FAX (662) 574 0078

(662) 253 6161

Dear KITTI,

I have received with much pleasure your interesting programme. I am sure that this Congress will be a great success.

You shall receive soon by mail my full paper that I am sending today by Express Mail to HUMAN ERGOLOGY

I think <sup>that</sup> all my reservations are OK. I have ~~sent~~ exchanged FAX with SASA and they have agreed to give me 20% discount. I have faxed to CHAITUT secretary my demand for reservation to ROYAL CITY HOTEL

It gives the following schedule

Wednesday 16th early morning arrival at PONG HUAN  
WED 16th to SUN 20th SASA (relaxing and adapting)  
SUN 20th to WED 23rd ROYAL CITY HOTEL as Hotel and  
Congress site

WED 23rd to Dec 1st SASA (relaxing and

working with Malines ... and you if you are not

too exhausted

December 1st at night ~~to~~ departure

So I think that you may not add any problem coming from me to the many one you have anyway

Best regards - Truly yours A. Wisner



## South - East Asian Ergonomics Society (SEAES)

ADDRESS: NATIONAL INSTITUTE FOR THE IMPROVEMENT OF WORKING CONDITIONS AND ENVIRONMENT(NICE)  
PHRA PINKLAO - NAKORN CHAI SI HIGHWAY, THALING CHAN, BANGKOK 10170, THAILAND  
TEL. 448-5294-5 FAX: (66-2) 439-2199 448-6509

No. 0611/4025

๒๘ June 1994

Dear Professor Patesson:

I am writing this letter to request a small financial support from the SELF to organize our small conference which will be a gathering of ergonomics groups in Southeast Asia region. Some ergonomists from other countries outside the region will also participate.

Southeast Asia Ergonomics Society was established in 1985 in order to promote ergonomics activities in the developing countries in the region as one major objective. There were 3 pervious conferences organized in Jakarta, Denpasar and Bangkok in 1985, 1988 and 1991, respectively. In 1994, the 4th SEAES conference is scheduled between 21-23 November at Royal City Hotel in Bangkok, Thailand. As we all know that people in this region are mainly poor, the organizer cannot propose a high fee for the conference participants. Since the Society is a regional association, partial supports (i.e., airfares) from the SEAES account will, sometimes, have to be provided for council members and active participants who must share their opinions with the others. The Annual membership fee of US\$ 10 is not regularly collected from the regional members due to the hardship of the regional economy. There are approximately 70-90 members but only 20% fee paid regularly.

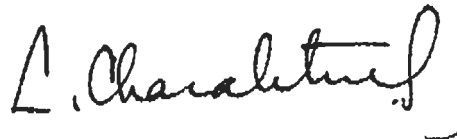
Not to mention the correspondence cost which draws private money from the Secretary-Treasurer himself, all secretariat expenses made by the Society President and Secretary-Treasurer are paid from other funds. This pushes a heavy financial load to the Conference organizers. We have learned from IEA91 in Paris that the SELF was in favor to support meetings in countries where ergonomics is not yet well developed. Based on this fact, may we humbly request a small sum of US\$ 2000 from the SELF fund. The money received will be used for conference fees as scholarships for poor

participants, travel expenses for members of SEAES Council, etc. General secretariat expenses are covered by the Safety and Health at Work Promotion Association (Thailand). Royal Thai Government also provides office space and a limited fund for eligible Thai participants.

Thank you for your support and understanding. I am looking forward to hearing from you very soon.

Best regards.

Sincerely yours,



Chaiyuth Chavalitnitikul Ph.D.  
President SEAES

Monsieur le professeur Rene Patesson  
President de la SELF  
Universite libre de Bruxxeles  
Departement d'informatique et de sciences humaines  
CP 124  
50 Avenue Franklin Roosevelt  
1050 Bruxelles/Belgique FAX + 32-2-650 3521



# South - East Asian Ergonomics Society (SEAES)

ADDRESS : NATIONAL INSTITUTE FOR THE IMPROVEMENT OF WORKING CONDITIONS AND ENVIRONMENT(NICE)  
PHRA PINKLAO - NAKORN CHAISRI HIGHWAY, THALING CHAN, BANGKOK 10170, THAILAND  
TEL. 448-6294-5 FAX: ~~661-23-189-2189~~ 448-6509

rep 24.7.94

Professor Alain Wisner  
Laboratoire d'Ergonomie et Neurosciences du Travail  
CNAM  
41, Rue Gay Lussac  
75005 PARIS, FRANCE.

13 July 1994  
→ 12 p dactylographie  
à français  
→ ecrire à l'adresse  
Human  
Ergology  
pour vérifier  
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et d'envier  
8, ??  
ARTICLE  
of  
Committee  
G.  
6 pages dactylographie  
français

Dear Professor Wisner:

I have great pleasure to invite you to give a special keynote speech at the 4th SEAES Conference in Bangkok, Thailand on 21-23 November 1994 at the Royal City Hotel. The topic of your speech, as you discussed earlier with the SEAES Secretary-Treasurer as "Approaching New Technologies: A New Challenge for Ergonomics and Anthropotechnology", is accepted by the Organizing Committee of the Conference.

As you may know that SEAES has been strongly supported by the Journal of Human Ergology since the Society was established in 1985, the Editors agree to publish a limited number of selected papers of this Conference in a special issue of the Journal of Human Ergology in 1995. This special issue will also contain the abstracts of all the papers of the Conference.

Your full paper and the abstract should reach the SEAES Secretary-Treasurer without fail by September 29, 1994. Please allow me to emphasize on the fact that you ought to comply strictly with the Instructions to Contributors (see enclosed note).

Thank you for your support and understanding. I am looking forward to seeing you in Bangkok, Thailand. Best regards.

Sincerely yours,

Dr. Chaiyuth Chavalitnitikul  
SEAES President





## LABORATOIRE D'ERGONOMIE DES SYSTEMES COMPLEXES

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Monsieur le Professeur Wisner  
Laboratoire d'Ergonomie CNAM  
41, rue Gay-Lussac  
75005 Paris

Bordeaux, le 22 Août 1994

Cher Monsieur,

Je vous restitue ci-joint le document que vous m'avez prêté à propos du congrès de Bangkok.

J'ai eu un peu de mal à reconstituer les différentes étapes des contacts malheureux entre la SEAES et l'IEA. Après un échange de faxes avec Intaranont, voici l'état de la situation. Le 16 Février, Chavalinitikul a écrit à Hendrick pour demander une avance (seed-money) de \$ 2000, pris sur le fond de la SELF. Il a reçu une réponse de Noy le 28 Mars. A son habitude, Noy a été particulièrement maladroit, en demandant tous les renseignements administratifs habituels pour les IEA-Approved meetings, (et en ne signant pas son fax !). Chavalinitikul a répondu le 17 May "If we know there are some rules or procedures to follow so much, we will be more humble. I personally apologize for wasting your time in responding to our small fund request. It will not happen again and we hope you will do the same" !!! Et la SEAES a retiré sa demande.

J'ai discuté avec Kogi et Horino, qui m'ont dit qu'ils allaient informer Intaranont que tout était maintenant arrangé, qu'il suffisait que la SEAES fournisse quelques renseignements habituels. Et j'ai transmis l'ensemble des informations à Hendrick, qui, je l'espère, devrait arranger l'affaire. Monod et moi avons insisté sur le fait que la SELF souhaitait contribuer au financement de cette réunion, non pas sous forme de seed-money, mais sous forme de don.

Je ne manquerai pas de vous tenir informé des prochains événements, qui, je l'espère, seront plus favorables.

Très cordialement,

*F. Daniellou*

---

F. Daniellou



11<sup>ème</sup> Congrès de l'Association Internationale d'Ergonomie  
11 th Congress International Ergonomics Association  
PARIS - 15 - 20 JUILLET 1991

Paris le 8 Mars 1993

Monsieur F. HUBAULT  
Département d'Ergonomie et Ecologie  
humaine  
162 rue Saint-Charles  
75740- PARIS Cedex 15

Monsieur le Secrétaire général et cher Collègue,

Lors de la dernière réunion du Conseil de la SELF, nous avons abordé le problème de l'utilisation des reliquats du Congrès IEA 91. Je vous confirme que sont à la disposition de la SELF 2 sommes:

- La première pour constituer un fonds doté de 100.000 F destiné à aider à l'organisation de réunions d'Ergonomie dans un ou des pays où l'Ergonomie n'est pas encore développée (Afrique, Amérique du Sud).
- La seconde, de 20.000 F est destinée à venir en aide à des collègues dont les moyens sont limités et qui souhaiteraient participer à la réunion organisée par Waldemar KARWOWSKI à Varsovie en Juin prochain.

L'utilisation de ces sommes est laissée à la décision de la SELF en liaison avec l'IEA.

Croyez, Monsieur le Secrétaire général et cher Collègue, à mes sentiments les meilleurs.

H. MONOD

copie à P. Rookmaaker



Pieter ROOKE makker  
General Secretary I.E.A

Paris, 24 August 1994

UNIVERSITÉ  
PIERRE ET MARIE CURIE

FACULTÉ DE MÉDECINE  
PITIÉ-SALPÊTRIÈRE

Département  
de Physiologie

91, boulevard de l'Hôpital  
75 634 PARIS CEDEX 13

LABORATOIRE  
DE PHYSIOLOGIE  
DU TRAVAIL  
ET DU SPORT

Pr. H. MONOD  
tél. 33 ( 1 ) 40 77 97 60  
43 31 85 29  
fax. 33 ( 1 ) 40 77 97 89

Dear Pieter,

I must apologize for the difficult discussions around the SELF fund and its utilisation. Could I remember you that more one year ago I sent a copy from the letter to François HUBAULT, the general secretary of SELF (see att. copy). The recommendations were perfectly clear. May be You didn't receive my fax, nor the official response from the general secretary or the president of SELF.

I have been very pleased to meet you again in Toronto and to contribute at your position in the IEA staff.

Best regards.

Prof. Hugues MONOD, M.D

Copies to :

- François DANIELLOU
- François HUBAULT
- Jan NOY
- Alain WISNER



**CHULALONGKORN UNIVERSITY**

Laboratory for Ergonomic Research  
Dr. Kittit Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

**Professor Alain Wisner**

**Laboratoire d'Ergonomie et Neurosciences du Travail**

**CNAM**

**41, Rue Gay Lussac**

**75005 PARIS, FRANCE. FAX +33-1-43 25 36 14**

**9 June 1994**

**Dear Alain:**

Thank you very much for your last letter and fax to encourage me to stay on the course of my present action. I have been thinking very hard lately about my future career. I have known for a long time that you are up against "BRAIN DRAINED", me too. Your strong input is very important to me and I intend to follow that as best as I can. I wonder if I can succeed or not. But I will keep myself low profile after the 4th SEAES Conference for at least 6 months to explore myself and try to answer **WHAT DO I WANT? WHERE DO I GO FROM HERE?**

Thank you for Prof Daniellou's address, I will try to request his participation in the 4th SEAES Conference as well as Prof Monod. I hope I will succeed because I think we will have a very good program.

The last part of your message just ignites my hope of staying active. A respectable gentleman is willing to share with us in a small meeting of members from poor and underdeveloped countries of Southeast Asia for two weeks, despite his health conditions. I cannot ask for more than that. Please kindly remember that you are a founding member of SEAES, no one will deny that fact.

Your suggestion to write a letter requesting funds from Hal Hendrick was carried out in the first place. He, rather than taking actions by himself, asked Ian Noy to correspond to our request. That was what you learned from Chaiyuth's copy forwarding to you. We always contact the IEA President directly but he didn't return his reply to us. All IEA correspondence to us were carried out by Bullock, Rookmaaker, and Ian Noy, so far. It is a pity but it is true. As you know, we, Thai people are always modest and humble and have a tendency to accept all kinds of suggestions and advices.

I am looking forward to seeing you again in November. With my best personal regards to you and Madame Wisner.

Respectfully yours,





## CHULALONGKORN UNIVERSITY

Laboratory for Ergonomic Research  
Dr Kitti Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

**Professor Alain Wisner**  
Laboratoire d'Ergonomie et Neurosciences du Travail  
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41, Rue Gay Lussac  
75005 PARIS, FRANCE. FAX +33-1-43 25 36 14

9 June 1994

Dear Alain:

Thank you very much for your last letter and fax to encourage me to stay on the course of my present action. I have been thinking very hard lately about my future career. I have known for a long time that you are up against "BRAIN DRAINED", me too. Your strong input is very important to me and I intend to follow that as best as I can. I wonder if I can succeed or not. But I will keep myself low profile after the 4th SEAES Conference for at least 6 months to explore myself and try to answer WHAT DO I WANT? WHERE DO I GO FROM HERE?

Thank you for Prof Daniellou's address, I will try to request his participation in the 4th SEAES Conference as well as Prof Monod. I hope I will succeed because I think we will have a very good program.

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Your suggestion to write a letter requesting funds from Hal Hendrick was carried out in the first place. He, rather than taking actions by himself, asked Ian Noy to correspond to our request. That was what you learned from Chaiyuth's copy forwarding to you. We always contact the IEA President directly but he didn't return his reply to us. All IEA correspondence to us were carried out by Bullock, Rookmaaker, and Ian Noy, so far. It is a pity but it is true. As you know, we, Thai people are always modest and humble and have a tendency to accept all kinds of suggestions and advices.

I am looking forward to seeing you again in November. With my best personal regards to you and Madame Wisner.

Respectfully yours,

A handwritten signature in dark ink, appearing to be 'S. H. H.', written in a cursive style.



TELECOPIE  
FAX TRANSMISSION

A - To: M. le Prof. A. WISNER, - CNAM Prof. Wisner

De - From: François Daniellou, Laboratoire d'Ergonomie des Systèmes Complexes

N° de Fax - Fax #: (+33) 56 90 08 73

Date: Jeu 1 Sep 1994 • 15:21

Transmission de page de garde incluse - Transmission of (2) pages, including cover page.

En cas de problème, veuillez appeler le - In case of a transmission problem, please call: (+33) 57 57 10 42

Note:

Veuillez trouver ci-joint copie du fax à Intaranont.

Bien cordialement

F. Daniellou





UNIVERSITE BORDEAUX 2  
U.F.R. de SANTE PUBLIQUE

LABORATOIRE D'ERGONOMIE DES SYSTEMES COMPLEXES

Professor K. Intaranont

Bordeaux, le 1 Septembre 1994

Dear Kitti,

I am sorry for the difficulties you have encountered for obtaining an IEA subsidy for the SEAES Congress. I think now things should be all right.

There has been a misunderstanding between SELF and IEA concerning the use of the SELF fund. This misunderstanding had absolutely nothing to do with the SEAES Congress and is solved now. Professor Patesson, President of SELF, has sent a letter to the IEA Officers to make things as clear as possible, and he has urged the Executive Committee to send the subsidy to SEAES as soon as possible. From our point of view, this is not seed-money and should not be refunded.

There are two possibilities on IEA's side : either to use the Australian fund, which is suited for conferences in South-East Asia, or the SELF fund which was initially aimed at conferences in Africa or South-America. SELF has very clearly signified that if it was not possible to use the Australian fund for that purpose, the SELF fund could very well be used.

The only thing to do on your side is to send the IEA Officers the administrative information that is required for all conferences approved by the IEA. May be you have already done so.

I wish this Congress a full success,

I am looking forward to meeting you soon,

Best personal regards,

*F. Daniellou*

---

F. Daniellou



FACULTY OF ENGINEERING  
CHULALONGKORN UNIVERSITY  
BANGKOK 10330, THAILAND.



Professor Alain Wisner  
Laboratoire d'Ergonomie et Neurosciences du Travail  
CNAM  
41, Rue Gay Lussac  
75005 PARIS  
FRANCE.



BY AIR MAIL  
PAR AVION



**CHULALONGKORN UNIVERSITY**

Laboratory for Ergonomic Research  
Dr. Kitti Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

**Professor Alain Wisner**

**Laboratoire d'Ergonomie et Neurosciences du Travail**

**CNAM**

**41, Rue Gay Lussac**

**75005 PARIS, FRANCE. FAX +33-1-43 25 36 14**

**9 June 1994**

**Dear Alain:**

Thank you very much for your last letter and fax to encourage me to stay on the course of my present action. I have been thinking very hard lately about my future career. I have known for a long time that you are up against "BRAIN DRAINED", me too. Your strong input is very important to me and I intend to follow that as best as I can. I wonder if I can succeed or not. But I will keep myself low profile after the 4th SEAES Conference for at least 6 months to explore myself and try to answer **WHAT DO I WANT? WHERE DO I GO FROM HERE?**

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Respectfully yours,

A handwritten signature in blue ink, appearing to be 'H. H.', written in a cursive style.

Doubles adressés : Pr Interanont -  
Dr Vanwonterghem

28 Juin 1991

Monsieur Albert Lumbroso  
Chargé de Mission  
Département Mathématiques  
et Physique de Base  
CNRS  
15 Quai Anatole France  
75700 Paris

Monsieur,

Je vous fais parvenir, ci-joint, la fiche relative à la proposition 911024MY de la DG XII-6/3 de la Commission des Communautés Européennes.

Ma réponse étant manuscrite et pouvant gêner un lecteur anglophone, je vous joins une transcription dactylographiée de mes appréciations.

Veillez agréer, Monsieur, l'expression de mes sentiments les meilleurs.

A. Wisner

DG XII-G/3

REFEREE'S EVALUATION RECORD

---

Reg. N. of Proposal: 911024MY

---

Title of Proposal:

An ergonomic study of strenuous repetitive tasks under tropical climatized and non climatized working conditions.

Proposers:

HAKIM JURI ABDUL

MALAYSIA

UNIVERSITY OF MALAYA  
DEPARTMENT OF MECHANICAL ENGINEERING

---

VANWONTERGHEM K.

BELGIUM

CERGO  
CENTER FOR ERGONOMIC RESEARCH

---

Panel Area: PHYSICAL, MATHEMATICAL & ENGINEERING

---

---

Proposal received from (name of the Panel Member):

Evaluation performed by (name and address of the Referee):

Alain WISNER

Professeur d'ERGONOMIE au C.N.A.M. (CONSERVATOIRE  
NATIONAL DES ARTS ET METIERS

41 rue GAY-LUSSAC

75.005

PARIS

tel 331/43.54.18.27

Referees are requested to evaluate proposals according to the criteria given below. Marks should be awarded on a range from zero (poor) to the figure indicated in each section (excellent), with average at about midpoint of the scale, and should be justified by a brief statement.

A. Expertise of personnel involved  
(capacity of personnel to execute the work programme)

D<sup>r</sup> VAN VONTERGHEM

...20... / 20

Je connais très bien le D<sup>r</sup> VAN VONTERGHEM  
dont j'apprécie la valeur scientifique  
et technique et le sérieux.  
Je sais aussi que son travail  
avec le D<sup>r</sup> INTARANONT se développe très bien à BANGKOK  
où je vais souvent.

D<sup>r</sup> ABDUL HAKIM JURI

ignored  
/ 20

Je pense que ~~le~~ partenaire malais le D<sup>r</sup> ABDUL HAKIM JURI  
doit être le meilleur possible mais je ne le connais pas.

B. Effectiveness of partnership

(benefit to be derived from division of tasks between partners  
and value of scientific link)

...20... / 20

Excellente répartition des tâches.

~~Budget très correct ainsi que l'ensemble cette répartition.~~

Une collaboration de ce genre entre le D<sup>r</sup> VAN VONTERGHEM  
et le P. INTARANONT (BANGKOK) est très efficace.

C. Scientific merit of proposal:

...40... / 40

1. innovative content of research work

...20... / 20

Il ne s'agit pas d'acquies des connaissances fondamentales  
nouvelles sur les effets de la chaleur et du froid sur l'homme, mais  
de savoir ce que les alternatives de froid au travail et de chaleur  
dans la vie quotidienne donnent sur le lieu et la santé.

2. soundness of objectives

...10... / 10

L'objectif de la recherche est très intéressant et  
comble un vide très regrettable concernant l'applicabilité  
~~de la réalité industrielle~~ des connaissances acquises en  
laboratoire dans la réalité industrielle.

3. adequacy of methods and techniques

...10... / 10

Bonne relation entre le but proposé et les  
méthodes choisies.

D. Realism of management of proposal:

...2.0... / 20

1. technical feasibility of the programme  
(resources vs. objectives, duration vs. objectives) ..... / 10

La partie ergonomique comme la partie épidémiologique  
du projet sont réalisables compte tenu des moyens  
financiers et de la durée

2. clear identification and realism in assignment of cost ....1.0... / 10

Budget très concis dans son montant et sa  
répartition

TOTAL (A+B+C+D)

...10.0... / 100

GENERAL COMMENTS ON THE PROPOSAL

Je recommande pleinement le projet proposé  
compte tenu de la valeur et du sérieux du partenaire  
belge le Dr. VAN VONTREHEM expert scientifique  
et industriel du projet proposé et des succès de son  
travail à BANGKOK.

J'attends des résultats de cette recherche une  
meilleure compréhension du travail au feu dans les  
pays chauds, en particulier quand il s'agit de  
microactivités répétitives. Je pense que des recommandations  
pratiques pourront être formulées à partir de ces résultats

..... PARIS 24 July 1991

(place and date)

.....  
(signature of the Referee)



- A. Je connais très bien le Dr VAN VONTERGHEM dont j'apprécie la valeur scientifique et technique et le sérieux. Je sais aussi que son travail avec le Dr INTARANONT se développe très bien à BANGKOK où je vais souvent.

Je pense que son partenaire malais, le Dr ABDUL HAMIM Juri doit être le meilleur possible, mais je ne le connais pas.

- B. Excellente répartition des tâches.

Une collaboration de ce genre entre le Dr VAN VONTERGHEM et le Pr INTARANONT (BANGKOK) est très efficace.

- C. 1) Il ne s'agit pas d'acquérir des connaissances fondamentales nouvelles sur les effets de la chaleur et du froid sur l'Homme, mais de savoir ce que les alternatives de froid au travail et de chaud dans la vie quotidienne donnent sur le bien-être et la santé. Dans ce cadre, la recherche est réellement innovante.
- 2) L'objectif de la recherche est très intéressant et comble un vide très regrettable concernant l'applicabilité des connaissances acquises en laboratoire dans la réalité industrielle.
- 3) Bonne relation entre le but proposé et les méthodes choisies.

D. 1) La partie ergonomique comme la partie épidémiologique du projet sont réalisables compte tenu des moyens financiers et de la durée.

2) Budget très correct dans son montant et sa répartition.

Je recommande pleinement le projet proposé compte tenu de la valeur et du sérieux du partenaire belge le Dr VAN VONTERGHEM, expert scientifique et industriel du projet proposé et du succès de son travail à BANGKOK.

J'attends des résultats de cette recherche une meilleure compréhension du travail au froid dans les pays chauds, en particulier quand il s'agit de microactivités répétitives. Je pense que des recommandations pratiques pourront être formulées à partir de ces résultats.

911024MY



COMMISSION  
OF THE EUROPEAN  
COMMUNITIES

Directorate-General  
Science, Research and Development  
DG XII - G  
rue de la Loi 200  
B-1049 Brussels  
Belgium

## JOINT RESEARCH PROPOSAL

### TITLE OF JOINT PROPOSAL

AN ERGONOMIC STUDY OF STRENUOUS REPETITIVE TASKS UNDER TROPICAL CLIMATIZED AND NON CLIMATIZED WORKING CONDITIONS

Key words: *(from broad areas to specific topics)*

Quality of life, Heat Stress, Thermal Strain, Thermoregulation, Acclimatization, Repetitive Strain Injuries, Musculo-skeletal Disorders, Hot-humid Conditions, Ergonomics

Duration *(in months)* 24

Planned starting date: September 1, 1991

Name of Proposers (Team Leaders)	Institution	Country	EC contribution requested (in ECU)
Dr. ABDUL HAKIM JURI	Department of Mechanical Engineering University of Malaya 59100 KUALA LUMPUR MALAYSIA	Malaysia MY. UMAYA. ONE	44.496.-
Dr. K. VANWONTERGHEM	CERGO vzw. Center for Ergonomic Research	Belgium BE. CERGO	67.815.-

*(the order in which Proposers are listed is not to be taken as signifying priority of any kind)*

112.311.-

TOTAL

(if more than 2 proposers, please make copies of this page)

A. ADMINISTRATIVE INFORMATION ABOUT PROPOSERS (Team Leaders)

PROPOSER

Title: ..... Dr. .... Name: ABDUL HAKIM JURI .....

Institution: ... University of Malaya .....

Department: .. Mechanical Engineering .....

Address: ..... Lembah Pantai .....

City: ..... 59100 KUALA LUMPUR ..... Country: ... Malaysia .....

Telephone: .. 03 - 7553466 ..... Telex: ..... Unimal MA 39845 .....

Telefax: ..... 03 - 7573661 ..... Others: .....

Type of Organisation:

- |   |  |
|---|--|
| <input checked="" type="checkbox"/> University/Higher Education Institute | <input type="checkbox"/> Non-profit Organisation |
| <input type="checkbox"/> Public or Semi public                            | <input type="checkbox"/> Commercial Company      |

PROPOSER

Title: ..... Dr. erg. .... Name: ..... KAMIEL VANWONTERGHEM .....

Institution: ..... CERGO vzw. Center for Ergonomic Research .....

Department: ..... Ergonomics .....

Address: ..... GACHARDSTRAAT, 88 Box 4 .....

City: ..... B - 1050 BRUSSELS ..... Country: ..... Belgium .....

Telephone: .. (0)2 648 03 37 ..... Telex: .....

Telefax: ... 32 11 23 23 25 ..... Others: .. Tel: 32 (0)11 21 24 94 .....

Type of Organisation:

- |  |   |
|--|---|
| <input type="checkbox"/> University/Higher Education Institute | <input checked="" type="checkbox"/> Non-profit Organisation |
| <input type="checkbox"/> Public or Semi public                 | <input type="checkbox"/> Commercial Company                 |

**B. SCIENTIFIC INFORMATION ABOUT PROPOSERS**

(To be attached as an annex)

Please see ANNEX 1 : Dr. ABDUL HAKIM JURI

ANNEX 2 : Dr.erg. K. VANWONTERGHEM

N.B. Each proposer (Team Leader) should attach to this form:

- a detailed Curriculum Vitae
- a list of his/her recent publications in the field of proposed research

C. ADMINISTRATIVE INFORMATION ABOUT JOINT RESEARCH PROPOSAL

Has this or a similar proposal been submitted to any other European Community R & D programme for financial support? (*Specify the proposer, the programme, date of submission and the financial support obtained, if any*).

Yes. Common research project of the Chualalongkorn University of Thailand and CERGO (Center for Ergonomic Research) of Belgium Project is titled "Study of the exposure limits in constraining climatic conditions for strenuous tasks: an ergonomic approach".

List of patents filed by the applicant institutions (*specify*) in the field of the proposed research.

None

Are there any other prior commitments such as cooperation agreements with other organisations, major commercial or business interests, which could have an effect on the execution of this proposal; or any other commitment or interest which could affect the availability of information or inventions resulting from this proposal?

No

If a proposer belongs to a commercial organisation, is his/her company a subsidiary, or an affiliate, of a non-EC parent or holding company? *(Specify)*

No

Is any dissemination of the results of the research proposal foreseen and, if so, what kind of dissemination?

A final report will be submitted at the end of the study and copies will be sent to government bodies, universities, and other institutions in ASEAN countries as well as countries in the European Community. Research papers will be presented in international conferences.

Is any restriction on the dissemination of certain information foreseen and, if so, what kind of restriction?

No

#### D. SCIENTIFIC INFORMATION ABOUT JOINT RESEARCH PROPOSAL

Present state of knowledge in the proposed research field.

Malaysia lies in the tropical region of the world. Its hot and humid climate may lead to heat and ventilation problems. In addition, manufacturing equipment, processes and building structures are also causes of heat stress. Since industrial development in micro-assembling activities increases considerably in Malaysia and since the investments and developments in infrastructure are based on the conditions in which the investing countries are working, almost nothing is known about the effects to the local Malaysian population arising from alternate exposure to hot/humid conditions during the night and free time and cool air-conditioned climatized environments during work.

In addition, for the worker engaged in repetitive work in micro-assembling activities in an almost fixed body posture, the cooling may have negative effects on the muscular-skeletal systems. No such studies have been reported in Malaysia nor in other tropical countries.

#### Objectives of the proposed research.

The objective of the project is to study the effects of repetitive work on the local population, working 8 hours in cooler environments than their normal social 16 hours free-life.

The impact of the cooler conditions on the musculo-skeletal system will be studied and should lead to improved working conditions and a better quality of life.

The use of the total ergonomics methodology as a system approach and the comparison with a control group is chosen in order to complete the activities studied in the Thai-project (mentioned on page 4, c) and to realize a basis for further research to the establishment of guidelines and standards for the thermal environment for repetitive working conditions.

Contacts with other ASEAN countries will be established in order to share the obtained experiences and, eventually, to extend the research field into other working conditions and activities.



Significance of the proposed research (contribution to fundamental science; benefits expected if applications are derived; innovation it represents, etc).

The scientific output of this study in ASEA will fill up an important gap in the already acquired knowledge about heat load and musculo-skeletal problems. The study will be an interesting and a necessary complement to the study undertaken in Thailand due to the fact that these types of industrial activities are increasing in appearance in the region. Since the development of ergonomics in the developed countries tends to take a total approach of the work systems, and ergonomics is almost non-existing in our country, the study could be the basis of a fruitful new development in the improvement of working conditions.

Duration of the proposed research (*not more than 48 months*) from the date of the conclusion of any contract:

..... 24 months .....

Planned starting date: ..... September 1, 1991 .....

## E. SUMMARY DESCRIPTION OF JOINT RESEARCH PROPOSAL\*

### AN ERGONOMIC STUDY OF STRENUOUS REPETITIVE TASKS UNDER TROPICAL CLIMATISED AND NON CLIMATISED WORKING CONDITIONS

.....

#### SUMMARY OF JOINT PROPOSAL

The influence of the total work load stress in repetitive tasks in air-conditioned and in normal climatic conditions in the tropical region will be studied in order to acquire knowledge about immediate short-term effects on local people. In this study, critical activities in micro-assembling and packing will be investigated by means of the total ergonomic system approach, i.e. measurement and evaluation of the external load: task, organisation, environment; the internal or functional load: psychosomataical and behavioural aspects and the subjective experienced load.

By this methodology the results of the chosen groups will be compared with a control group composed by workers with almost the same postural stress and proceeding repetitive movements aswell.

The scientific number of subjects will be closely observed during their activities by a multidisciplinary team. Depending on the output of this study, an epidemiologic study over longer periods should be taken in consideration following the hypothesis that the effects of climate on the musculo-skeletal system will be shown after longer periods of exposure. Proposals for improvement will be established in order to be beneficial to the workers health, safety and well being and to the efficiency of workingsystems.

---

\* This description (pages 8 and 9) should be drafted in the third person in such a way that it can be used, if necessary, as a Technical Annex to any future contract with the Commission of the EC.

*(if more than 2 proposers, please make copies of this name.*

TASKS OF PROPOSER .

Dr. ABDUL HAKIM JURI

The tasks are:

1. Setting up and planning of the study
2. Organising a multi-disciplinary team, the contacts with concerned industries in the country
3. Coordinating the measuring sessions, providing the necessary personnels and equipment
4. Providing maintenance of the used equipment
5. Organising meetings and a workshop
6. Analysing the obtained data and production of a final report
7. Contacting the ASEAN countries
8. Dissiminating the final report

TASKS OF PROPOSER ..... dr. erg. Kamiel VANWONTERGHEM ..... (name of Team Leader)

The tasks are to provide

1. Scientific guidance of the study
2. Scientific coordination of the ergonomic team
3. Continuous training of the technicians
4. Assistance and scientific guidance of some data uptake sessions
5. Advising and providing necessary equipment for measurements of physiological parameters, heart rate, body temperature, electromyography and the necessary hard- and software
6. Guiding the team during data collecting periods
7. Collaboration of workshops and semestrial meetings to evaluate past activities for the benefit of future plans
8. Contacts with European experts to be invited to the workshops in order to improve the final output
9. Planning and coordinating of stays of European experts in Malaysia
10. Study of litteratures, analysing data and statistical processing
11. Collaboration of the redaction of the final report

## F. DETAILED DESCRIPTION OF JOINT RESEARCH PROPOSAL

*(to be attached as an annex)*

see ANNEX 3

N.B.

- In preparing the attached annex, proposers may use any form of presentation.
- The scientific contribution of each proposer to the common research work should be given in detail.
- The Commission may request a bar diagram describing the schedule of tasks and showing the coordination of research work amongst participating teams.

**G.1. BREAKDOWN OF COSTS (to be completed separately by each proposer)**

PROPOSER (Title, Name, Institution, City, Country) .....

..... Dr. ABDUL HAKIM JURI .....

..... Department of Mechanical Engineering .....

..... University of Malaya .....

..... Lembah Pantai, 59100 KUALA LUMPUR - MALAYSIA .....

**TYPE OF RESEARCH CONTRACT REQUESTED**

- full economic shared contract (commercial companies)       marginal cost contract (mainly for universities, institutes of higher education and establishments within developing countries)

N.B. Marginal costs are the additional costs incurred by the proposer in order to cover the additional workload derived from this joint project.

**SUMMARY TABLE OF COSTS (financial contribution, in ECU, requested from the EC)**

	19 91	19 92	19 93	19	Total
Labour costs	4.224	10.992	5.880		21.096
Travel and subsistence	-	3.400	3.400		6.800
Durable equipment	7.500	-	-		7.500
Consumables	1.000	500	-		1.500
External assistance	1.500	2.000	2.000		5.500
Other expenditure	-	-	-		-
Overheads	420	1.100	580		2.100
TOTAL excluding VAT					44.496

LABOUR COSTS<sup>1</sup> (Only scientific, technical and specialized staff to be included. Overheads should be excluded)

Number of persons	Designation or grade (scientists, technicians, ...)	Place of work	Number of months per calendar year				Total	Monthly cost applicable (ECU)	Total Cost (ECU)
			1991	1992	1993	1994			
1	Ph.D. Engineer	Malaysia/Belgium	2	6	3		11	1.480	16.280
1	Scientist - Engineer	Malaysia	2	4	2		8	660	5.280
1	Occupational Physician	Malaysia	1	2	1		4	1.480	5.920
1	Technician/Research assistant	Malaysia	4	12	8		24	320	7.680
		Total Labour Costs							----- 35.160
Request from the European Community: 60 % of Labour costs: (60 % of 35.160.- )							Sub-total	21.096	
							Cost increase provision <sup>2</sup>	-	
							TOTAL	21.096	

<sup>1</sup> For marginal cost contracts, labour costs are the salaries of additional temporary staff recruited by the proposer to work on the project (locally or abroad).  
<sup>2</sup> Allow for annual cost increases resulting from economic factors.

**TRAVEL AND SUBSISTENCE EXPENSES**

*(daily allowances or complement of salary to cover short periods of stay abroad)*

Travel costs Kuala Lumpur/Brussels: 2,000 ECU/trip

Daily allowance: 100 ECU/day at 7-day week.

1 trip	2,000	}
2 weeks' stay	1,400	
Total	<u>3,400</u>	
	=====	

In total: 2 trips to Europe:

6.800 ECU

**DURABLE EQUIPMENT**

Description of Equipment	Value (ECU)	Allowable Cost <sup>1</sup> (ECU)
Climate: Thermometers, globe thermometers, anemometers	1,800	1,800
Work physiology: For heart rate: 10 sec. basis: sport-testers, PC, interface and software	2,700	2,700
Electromyography	3.000	3.000
	7.500	7.500

<sup>1</sup> How to calculate the allowable cost:

- Non-EC countries ..... : (depreciation of equipment is not taken into account)  
allowable cost = value of the equipment

- EC Countries ..... : (the equipment is assumed to be fully depreciated over 5 years)  
allowable cost = value ×  $\frac{\text{no. of years of utilisation within the project}}{5}$

**CONSUMABLES (to be defined by generic categories)**

Thermometers, Batteries, Electrodes, Films, Sensors, ...

Total amount: 1.500 ECU

**EXTERNAL ASSISTANCE**

*(Sub-contracts or services provided by third parties)*

Name(s) of subcontractor(s)	Subject matter	Duration (months)	Amount (ECU)
Engineering Research Institute	Administrative support	5	2.500

Name(s) of third party(ies)	Subject matter	Duration (months)	Amount (ECU)
Two experts (to be determined)	Ergonomic experts to be consulted in Malaysia/Thailand 500 ECU/week	6 weeks	3.000

**TOTAL**

**5.500**



OTHER EXPENDITURE (to be detailed)

Salary increase provision (10 % of labour costs): 3.516 ECU  
At charge of the University of Malaya

OVERHEADS

Percentage addition to be specified. No addition is allowable for durable equipment and external services.

10 % of labour costs: 2.100 ECU

TOTAL

Financial contribution requested from the EC: .....	44.496	(ECU)
Total cost of the project: .....	62.076	(ECU)
Financial contribution requested from the EC: .....	71.7 %	(in % of total cost)

G.1. BREAKDOWN OF COSTS (to be completed separately by each proposer)

PROPOSER (Title, Name, Institution, City, Country) ..... Dr. erg. Kamiel VANWONTERGHEM  
 ..... CERGO vzw  
 ..... GACHARDSTRAAT, 88 Box 4 -  
 ..... B - 1050 BRUSSELS

TYPE OF RESEARCH CONTRACT REQUESTED

- full economic shared contract (commercial companies)     marginal cost contract (mainly for universities, institutes of higher education and establishments within developing countries)

N.B. Marginal costs are the additional costs incurred by the proposer in order to cover the additional workload derived from this joint project.

SUMMARY TABLE OF COSTS (financial contribution, in ECU, requested from the EC)

	19 91	19 92	1993	19	Total
Labour costs	8.748	12.816	12.816		34.380
Travel and subsistence	6.350	7.300	6.350		20.000
Durable equipment	-	-	-		-
Consumables	-	-	-		-
External assistance	2.000	4.000	4.000		10.000
Other expenditure	-	-	-		-
Overheads	875	1.280	1.280		3.435
TOTAL excluding VAT	17.973	25.396	24.446		67.815

LABOUR COSTS<sup>1</sup> (Only scientific, technical and specialized staff to be included. Overheads should be excluded)

Number of persons	Designation or grade (scientists, technicians, ...)	Place of work	Number of months per calendar year				Total	Monthly cost applicable (ECU)	Total Cost (ECU)
			1991	1992	1993	19..			
1	Doctor ergonomist	Belgium/Malaysia	1	2	2		5	6.780	33.900
1	Ergonomist	Belgium/Malaysia	2	2	2		6	3.900	23.400
									57.300
Requested from the European Communities (60% of 57.300)							Sub-total	34.380.-	
							Cost increase provision <sup>2</sup>	-	
							TOTAL	34.380	

<sup>1</sup> For marginal cost contracts, labour costs are the salaries of additional temporary staff recruited by the proposer to work on the project (locally or abroad).

<sup>2</sup> Allow for annual cost increases resulting from economic factors.

**TRAVEL AND SUBSISTENCE EXPENSES**

*(daily allowances or complement of salary to cover short periods of stay abroad)*

- 1) Travel costs 1 flight Brussels/Amsterdam - Kuala Lumpur  
 = 2.000 ECU  
 Daily allowances: 100 ECU/day 7days = 1 week

Per stay of 1 trip/1 week = 2.700.- ECU

6 trips: 16.200 ECU

- 2) 4 trips from Bangkok - Kuala Lumpur  
 = 250 ECU/trip 1.000.  
 4 weeks stay: 2.800  
 3.800 3.800 ECU  
 -----  
 20.000 ECU

**DURABLE EQUIPMENT**

Description of Equipment	Value (ECU)	Allowable Cos: <sup>1</sup> (ECU)
none		

<sup>1</sup> How to calculate the allowable cost:

- Non-EC countries : (Depreciation of equipment is not taken into account)  
 allowable cost = value of the equipment
- EC Countries : (if the equipment is assumed to be fully depreciated over 5 years)  
 allowable cost = value ×  $\frac{\text{no. of years of utilisation within the project}}{5}$

CONSUMABLES (to be defined by generic categories)

2.000 ECU (at charge of CERGO)

EXTERNAL ASSISTANCE

(Sub-contracts or services provided by third parties)

Name(s) of subcontractor(s)	Subject matter	Duration (months)	Amount (ECU)
European Expert	Technical and scientific advise	5 weeks	10.000

Name(s) of third party(ies)	Subject matter	Duration (mon:hs)	Amount (ECU)
	none		

OTHER EXPENDITURE (to be detailed)

10 % salary increase = 5.730 ECU (at charge of CERGO)

OVERHEADS

Percentage addition to be specified. No addition is allowable for durable equipment and external services.

10 % of labour costs: 3.435 ECU

TOTAL

Financial contribution requested from the EC: ..... 67.815..... (ECU)

Total cost of the project: ..... 98.465..... (ECU)

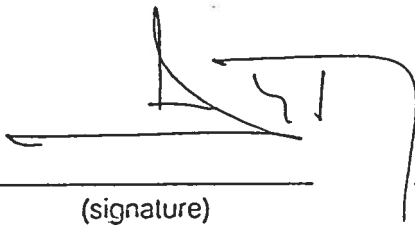
Financial contribution requested from the EC: ..... 68.9..... (in % of total cost)

Dr. ABDUL HAKIM JURI  
PROPOSER: .....

\_\_\_\_\_  
(signature)                      April 15, 1991  
\_\_\_\_\_  
(date)

---

Dr. Kamiel VANWONTERGHEM  
PROPOSER: .....

  
\_\_\_\_\_  
(signature)                      April, 09, 1991  
\_\_\_\_\_  
(date)

---

PROPOSER: .....

\_\_\_\_\_  
(signature)                      \_\_\_\_\_  
(date)

---

PROPOSER: .....

\_\_\_\_\_  
(signature)                      \_\_\_\_\_  
(date)

### ANNEX 3

Since the evolution in the workingsystems tends to reduce human fysical effort, more mechanised and automated systems are introduced in the production processes.

This means that there is also an evolution to more static and reduced dynamic muscular activity. Indeed, micro-assembling and packing activities of small parts and components become more important asking for an almost fixed body posture and movements within a restricted area and amplitude.

Especialy the upper limb regio is sollicitated and from European experience we know that, due to cumulative effects, the musculo-skeletal system becomes overstressed.

From te same experience we know that climate, especially the cold aspects, has an important influence on static workload aswell as other environmental phenomena (noise, vibrations, and even illumination since it may influence the body-posture, ...).

The alternation warm/cold (or air-conditioned rooms) could therefore be an important cause of biomechanical problems. With the organizational constraints (work/rest schedules, time constraints, ...) we are confronted with a problem - generally called 'Repetitive Strain Injuries' which has tremendous social consequences on employment and absenteeism rates as well as on the economic output of the industry.

Since multifactorial elements play an important role, a interdisciplinary approach of the problem seems to be the most effective one to prevent the musculo-skeletal disorders. The used methodology in this study concerns the measurement and evaluation of:

1. The external stressors: - task
  - organization
  - environment: physical and biomechanical
2. The functional or internal load: how people react on the given external workload:
  - physiological reactions: - cardiovascular reactions: heart rate
  - muscular activity/ electro-myography,
  - functionally consequences: reduced forces in upper limb (handdynamometer),....
3. Subjective experienced load and feelings of hinder and pain could give pre-indicating information.



In two kinds of industries, (2 with air-conditioned conditions and 2 in normal tropical conditions) about 100 workers (of both sexes) exposed to repetitive activities will be followed several times over a period of about 2 years.

Especially next aspects will be studied:

- the workload of each type of work
- the cumulative effects on strain signs for already experienced workers and for less experienced ones.  
For example: reduced forces at the end of a daily shift or a week;
- special attention will be given to new starting workers in order to follow the coping process both physiologically as mentally.

The project starts with the establishment of an ergonomic team multidisciplinary in its composition, which will be trained and guided by European experts.

This ergonomic team will carry out the field work - the measurement sessions and the analyses of the data - and study the obtained data. It collaborates effectively in the redaction of the final report.

After the first year, a workshop for Malaysian experts will be organized somewhere in the country and the obtained results will be compared with the Thai project.

Special attention will be given to the final presentation of the results at the end of the project by organizing a seminar on the problem.



# UNIVERSITI MALAYA

DEPARTMENT OF MECHANICAL ENGINEERING, UNIVERSITY OF MALAYA, 59100 KUALA LUMPUR, MALAYSIA.

JABATAN KEJURUTERAAN MEKANIK  
UNIVERSITI MALAYA  
59100 KUALA LUMPUR  
MALAYSIA

Tel: 03-7553468 Ext. 204  
Cable: UNIVSEL  
Telex: UNIMAL MA 39845  
Telefax: 03-7573661

28-3-1991

Dr. K. Vanwonderghem  
President, CERGO  
Gachardstraat, 88 Box 4  
1050 Brussels  
(by Fax: 32 2 648 68 67)

Dear Dr. Vanwonderghem,

Ergonomic Study Project - Universiti Malaya & CERGO

Firstly, I have to apologise for not contacting you earlier with respect to the above mentioned project. I am writing you this letter in respond to your fax dated March 26, sent to the Malaysian Ministry of Science, Technology & Environment, which was passed down to me.

For your information, sometime in October 1990, Mr Luc Vandebon, a representative from the EC DG XII visited Malaysia and had discussions with myself concerning the proposed project. He said that the EC would like to wait for this year's results from the work carried out in Bangkok, before they can make their decision on the project and it probably has to wait until 1992. Mr Vandebon also mentioned that he has had talks with you regarding this matter. Since the project proposal was being shelved temporarily, I never got round to contacting you.

But that was in 1990. Your fax to the Ministry definitely contain good news. I would like to inform you that the project team at the University of Malaya is still very much interested in undertaking the project.

The names of two other experts you mentioned in your fax can probably be brought in if they are interested, during later stages of the project as external experts for consultation. As the project will be carried out on electronic manufacturing industries around Kuala Lumpur, it would be best to have core members of the project team that is working in Kuala Lumpur. The Ministry of Science, Technology & Env. was consulted on this matter and they have agreed.

As for the budget, in view of its urgency, I have to leave it to your experienced judgement to prepare a new one, increasing the cost wherever appropriate to cover the proposed 2 year project.

For your trip to Bangkok in May, it would be nice if you can come down to KL, as we can then discuss appropriate preliminary work for the project. Please advise me on this matter.

Looking forward to hear from you. Thank you.

Yours sincerely,



Dr. Abdul Hakim Juri  
Dept. of Mechanical Engineering,  
University of Malaya,  
59100 Kuala Lumpur,  
Malaysia

Fax: 03-7673661

c.c En. Danil Taridi Ghazali  
Ministry of Science, Technology & Environment  
Fax: 03-2936006

MISSION

**Membre NEB demandeur**

Nom : ..WISNER Alain.....  
Prénom : ..Alain, Léon, Manuel.....  
Adresse : ..Laboratoire d'Ergonomie du CNAM, 41 rue Gay-Lussac, 75005, PARIS.....  
N° de tél : ..43.54.18.27..... N° de FAX : ..43.25.36.14.....

**Bénéficiaire**

Nom : ..INTARANONT.....  
Prénom : ..Kitti.....  
Fonction : ..Professeur..... Grade : .....  
Laboratoire de rattachement : Dept. of Industrial Engineering.....  
... Chulalongkorn University... BANGKOK 10330... Thaïlande.....

**Joindre un curriculum vitae d'une page maximum**

**Mission**

**Organisme d'accueil**

- Intitulé : ..Laboratoire d'Ergonomie et Neurosciences du travail du CNAM
- Nom du responsable : ..Professeur P. FALZON.....
- Lieu : Ville : ..Paris..... Pays : ..

. Dates du séjour : ..Juin 1993.....  
. Durée du séjour : ..1. mois.....

**Joindre la lettre d'invitation du responsable de l'organisme d'accueil**

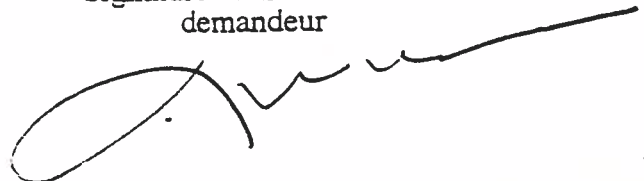
**Aspect scientifique**

**Joindre une description du programme de recherche et/ou d'enseignement prévu (quelques pages)**

**Prévisions financières**

- Frais de transport : .....6.000.....
- Frais d'hébergement : .....6.000.....
- Participation demandée : ..12.000.....

Signature du membre NEB  
demandeur



\*\*\*\*\* MATRACOM \*\*\*\*\* JOURNAL \*\*\*\*\* DATE 29-09-1992 \*\*\*\*\* HEURE 17:15 \*\*\*\*\*

NO.	COM	DOC	DUREE	E/R	IDENTIFICATION	DATE	HEURE	DIAGNOSTIC
27	OK	03	00:01'50	EMIS T	196622536161	29-09	17:13	840450AC7820

-CNAM-ERGONOMIE -

\*\*\*\*\* -MATRA COMMUNICATION- \*\*\*\*\* -

43253614- \*\*\*\*\*

# TRANSMISSION PAR TELECOPIE

## FAX TRANSMISSION

Date : 29/09

Nombre de pages : 3  
(y compris celle -ci)  
Number of pages including this one

Destinataire : Pr. Hitti ENTERANONT

To :

N° Télécopieur : 19.66.2.253.6161.

Objet :  
Message :

Emetteur :  
From :

M P. Wisner

Laboratoire d'Ergonomie  
Conservatoire National des Arts et Métiers  
41, rue Gay-Lussac  
75005 PARIS  
FRANCE

Téléphone [33] 1 44 10 78 ..  
Phone

Secrétariat [33] 1 43 54 18 27  
Secretary

Télécopieur [33] 1 43 25 36 14  
Fax number





Paris September 29<sup>th</sup> 1992

Dear Kiti,

Thank you for your Fax of September 18<sup>th</sup>. I am happy that you may consider visiting Paris next year.

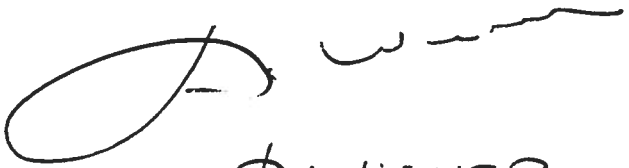
You are suggesting two periods one in April and the other one in June. April would not be the best for a meeting ~~to~~ between us. In fact my personal schedule includes a visit to ~~to~~ ISTANBUL (TURKEY) to teach and discuss with P. ÖZÖR of ISTANBUL Technical University. ~~at~~ This ~~is~~ 10 days visit will probably take place at the beginning of April and I will leave Paris for BRASIL at the end of April until the end of May. In between, ~~I~~ I will be in PARIS during 8 or 10 days with a lot to do. But maybe, we have not so much to discuss with me ~~in~~ in Paris as we shall have sometime in BANGKOK. In June things are much more easy for me.

Anyway, I am not sure to obtain again NEB scholarship for the year in NEB is that the scholarship not used during the year considered are lost. We have to ask again with a small handicap related to the fact that the grant

~~not~~ not used has been given to our lab and our candidate  
at the expense of other good demands. But of course I will  
do my best

with my best regards

Truly yours



J. WISNER

P.S. Francis Daniellu ~~will be out of PARIS~~  
~~from 10 to 24th April.~~ will be out of PARIS  
10 to 24th April. So, he prefers June  
where he will now ~~available~~ available  
from 1st to 15th. So, his time schedule  
is well correlated to mine. June is better  
Would you kindly confirm this period  
by FAX





## CHULALONGKORN UNIVERSITY

Laboratory for Ergonomic Research  
Dr. Kitti Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

Professor Alain Wisner  
Laboratoire d'Ergonomie et Neurosciences du Travail  
CNAM  
41, Rue Gay Lussac  
75005 PARIS, FRANCE.  
FAX +33-1-43 25 36 14

September 18, 1992

Dear Alain:

I have received your fax dated 8th September, thank you very much. After a thorough and careful thought, I will have available schedule after the middle of April and in around June 1993. May I make a humble request to you for making a trip to Paris around the middle of April 1993. If you can employ your charisma to convince NEB for the scholarship, it will be great impact for our strong connections.

I hope to hear from you soon and looking forward to seeing you again in Bangkok. With my best personal regards to you and Mrs. Wisner.

Sincerely yours,



## CHULALONGKORN UNIVERSITY

Laboratory for Ergonomic Research  
Dr. Kitti Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

PROFESSOR ALAIN WISNER FAX +33 -1 -43 25 36 14  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL  
CNAM  
41 RUE GAY-LUSSAC  
75005 PARIS  
FRANCE

30 SEPTEMBER 1992

DEAR ALAIN;

THANK YOU FOR YOUR FAX DATED 29 SEPTEMBER 1992. YOUR PROPOSAL IN THE BEGINNING OF JUNE 1993 IS PERFECT. I AGREE, ALSO PLEASE KINDLY INFORM PROFESSOR DANIELLOU OF MY INTENTION. I DO HOPE THAT OUR DISCUSSION WILL BRING FRUITFUL RESULTS.

WHEN YOU ARRIVE IN BANGKOK ON 18 OCTOBER, PLEASE TAKE A REST FOR A COUPLE OF DAYS. I WOULD LIKE TO HAVE THE APPOINTMENT WITH YOU ON WEDNESDAY 21 OCTOBER. ON THAT DATE, I AM ASKED TO TEACH ERGONOMICS TO 40 ENGINEERS OF A ROLLING-STEEL PLANT. I REFER YOU TO THE PLANT MANAGER AS MY GREATEST RESOURCE OF ERGONOMICS KNOWLEDGE. MAY I INVITE YOU TO SPEAK ABOUT ERGONOMICS IN GENERAL, HOW ERGONOMICS IMPROVE SAFETY STANDARDS? TIME WILL BE ABOUT 2 HRS AND I WILL BE SIDE BY SIDE WITH YOU. IF YOU KINDLY AGREE, WE WILL LEAVE SASA A LITTLE BEFORE 8.00 AM. A COMPANY CAR WILL BRING US TO THE PLANT 100 KM NORTH OF BANGKOK. WE START TEACHING AT 10.00 AM UNTIL 12.00. AFTER LUNCH, I WILL CONTINUE TEACHING ABOUT HEAT STRESS PROBLEMS UNTIL 4.30 PM. FOR YOU, AFTER LUNCH YOU WILL HAVE YOUR OWN CHOICE, 1) REST IN A PRIVATE ROOM, 2) TOUR THE PLANT OR 3) TOUR COUNTRYSIDE. AFTER 4.30 PM WE HEAD BACK TO SASA.

PLEASE KINDLY GIVE YOUR REACTION TO MY PROPOSAL, YOUR DECISION IS ALWAYS HONOURED. WITH MY BEST PERSONAL REGARDS TO YOU AND MADAMME WISNER, ALSO TO PROF. DANIELLOU.

SINCERELY YOURS,

FAX +66-2-574 0078

Telephone +66-2-252 5001  
Telefax +66-2-253 6161

~~252 1313~~  
~~251 3869~~

Paris, le 18 Septembre 1992

Monsieur le Professeur Fleury  
Administrateur Général du  
CNAM  
292 rue Saint Martin  
75141 Paris cedex 03

Monsieur l'Administrateur Général,

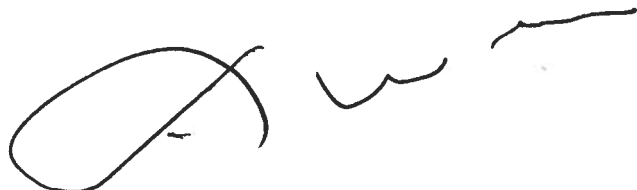
J'ai l'honneur de vous informer du fait que, dans le cadre de la Convention qui lie le CNAM à l'Université de Chulalongkorn, je dois aller animer un séminaire sur l'Anthropotechnologie, et séjourner, de ce fait, à Bangkok, du 18 Octobre au 30 Novembre 1992.

Au cours de ce séjour, je dois également participer à une réunion organisée par l'Université Mahidol, Faculté des Sciences Sociales, au sujet d'une maîtrise qui doit être créée dans le domaine des Sciences Humaines et Sociales appliquées au développement industriel. Je dois prononcer la Conférence introductive à cette réunion de réflexion qui réunit les Professeurs de l'Université concernée.

Enfin, je dois également prononcer une conférence au sein du Département de Sciences Sociales dans une troisième Université importante de Thaïlande, *l'Université*  
THAMMASAT

Je vous serais reconnaissant de bien vouloir me faire établir un ordre de mission sans frais.

Je vous prie d'agréer, Monsieur l'Administrateur Général, l'expression de mes sentiments distingués.



A. Wisner

\*\*\*\*\* MATRACOM \*\*\*\*\* JOURNAL \*\*\*\*\* DATE 01-10-1992 \*\*\*\*\* HEURE 15:02 \*\*\*\*\*

NO.	COM	DOC	DUREE	E/R	IDENTIFICATION	DATE	HEURE	DIAGNOSTIC
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-CNAM-ERGONOMIE -

\*\*\*\*\* -MATRA COMMUNICATION- \*\*\*\*\* -

43253614- \*\*\*\*\*

# TRANSMISSION PAR TELECOPIE

## FAX TRANSMISSION

Date : 10/10/92

Nombre de pages : 2  
(y compris celle -ci)  
Number of pages including this one

**Destinataire :** P<sup>o</sup> KITTI JITEBANONT

To :

N<sup>o</sup> Télécopieur : (19) 66.2.574 0078

Objet :  
Message :

**Emetteur :**

From :

M P<sup>o</sup> Wisner

Laboratoire d'Ergonomie  
Conservatoire National des Arts et Métiers  
41, rue Gay-Lussac  
75005 PARIS  
FRANCE

**Téléphone** [33] 1 44 10 78 ..  
Phone

**Secrétariat** [33] 1 43 54 18 27  
Secretary

**Télécopieur** [33] 1 43 25 36 14  
Fax number



MINISTÈRE DE L'ÉDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL

Paris 30<sup>th</sup> September 1992

Dear Kitti,

Thank you for your FAX dated this day (communications are good) about a visit and discussion in a Rolling Steel Mill. I agree fully to your proposal and I choose to visit the steel mill after lunch - if I am not too tired.

Could you kindly tell me where is this factory so that I may consider how interesting is the province.

With my best regards

Truly yours

A. WISNER



## CHULALONGKORN UNIVERSITY

Laboratory for Ergonomic Research  
Dr. Kitt Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

PROFESSOR ALAIN WISNER FAX +33 -1 -43 25 36 14  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL  
CNAM  
41 RUE GAY-LUSSAC  
75005 PARIS  
FRANCE

30 SEPTEMBER 1992

DEAR ALAIN;

THANK YOU FOR YOUR FAX DATED 29 SEPTEMBER 1992. YOUR PROPOSAL IN THE BEGINNING OF JUNE 1993 IS PERFECT. I AGREE, ALSO PLEASE KINDLY INFORM PROFESSOR DANIELLOU OF MY INTENTION. I DO HOPE THAT OUR DISCUSSION WILL BRING FRUITFUL RESULTS.

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SINCERELY YOURS,

FAX +66-2-574 0078



MINISTERE DE L'EDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET METIERS  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL

August 28, 1992

Professor Kitti Intaranont, Head  
Chulalongkorn University  
Laboratory for Ergonomic Research  
Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

Dear Kitti,

Please find enclosed the letter I am sending by fax to SASA International House. Would you kindly confirm to them my teaching at Chulalongkorn University and your request for the 30% discount?

As you may remark, I will be in Thailand nearly two weeks prior to November, when I will teach at Chulalongkorn and Mahidol universities, but I need this time first to relax and acclimatize, and second for my personal work.

It will be a great pleasure for me to see you again, and to work with your remarkable co-workers and students.

Please present my best regards to Mrs. Intaranont.

Very truly yours,

Alain Wisner

FAX

~~266~~ 66-2-253.61.61

252.15.13

251.38.68





MINISTERE DE L'EDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET METIERS  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL

Paris, 24th June 1992

Prof. Kitti INTARANONT  
Dept. of Industrial Engineering  
Chulalongkorn University  
Bangkok 10330  
Thaïlande

Fax N° : 19 66 2 253 6161

Dear Kitti,

I was extremely happy to receive your fax of June 22nd and I realise that you were not ill but deeply affected by the events that we, friends of Thailand, have followed with great interest and some sadness. But I am sure that your country will get over this difficult period and continue its dynamic development.

I thank you very much to invite me again to teach about subjects I am extremely interested in. I have only a small problem that, I think, will be easily solved, and it is the incompatibility between the Tuesday or Wednesday nights and the travel Malinee has suggested. I am writing to her on this, may be you may also arrange this with her by phone.

As usual you have not to bother about any fee but I am very grateful to you to help obtaining favourable conditions at SASA.

I am very happy that you intend to visit us in September. There is no class at that moment but I will organise a meeting of the people interested in anthropotechnology who will be in Paris at that time. The only period where it is not possible is the week from 23rd to 26th September as we have the French-speaking Ergonomics Congress in Lille during that week.

I hope that all your family is well.

With my best regards,

Yours sincerely;

Alain WISNER



## CHULALONGKORN UNIVERSITY

Laboratory for Ergonomic Research  
Dr. Kittit Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

PROFESSOR ALAIN WISNER  
LABORATOIRE D'ERGONOMIE ET NEUROSCIENCES DU TRAVAIL  
CNAM  
FAX +33-1-43 25 36 14

JUNE 22, 1992

DEAR ALAIN:

YOUR LETTER DATED 24TH FEBRUARY AND 15TH JUNE 1992 HAVE BEEN RECEIVED SOMETIMES AGO. I AM EXTREMELY SORRY FOR NOT ANSWERING YOU SOONER DUE TO SO MANY BAD THINGS HAPPENED.

DR. MALINEE ASKED ME IF I INTEND TO INVITE YOU FOR SOME LECTURES IN MY CLASS. I THOUGHT I HAVE ALREADY DONE. I SO REGRET FOR NOT DOING THAT BEFORE. MY CLASS STARTS THE FIRST WEEK OF NOVEMBER AND YOU ARE INVITED TO GIVE LECTURES ONCE A WEEK, 4 TIMES UNTIL THE END OF NOVEMBER. IT IS A THREE-HOUR CLASS IN THE EVENING STARTING AROUND 17.30 TO 20.30. THE CLASS WILL BE ON EITHER TUESDAY OR WEDNESDAY NIGHT. THE STUDENTS ARE MAINLY WORKING FOR THE MASTER'S DEGREE. IF YOU CAN START YOUR LECTURE WITH ANTHROPOLOGY AND ITS CONCEPT, ITS SIGNIFICANCE TO WORK DESIGN, ITS INFLUENCE TOWARDS THE DESIGN OF EQUIPMENT FOR PEOPLE TO USE. SOME HOURS SHOULD ALSO BEEN SPENT ON COGNITIVE ASPECTS AND ITS INVOLVEMENT WITH THE DESIGN OF HUMAN-COMPUTER INTERFACE. SOMETIMES BEFORE YOU ARE GOING BACK TO PARIS, I WOULD LIKE TO HAVE A TWO-HOUR TEST FOR THE STUDENTS. THEREFORE, I NEED YOUR QUESTIONS FOR THAT EXAM ALSO.

PLEASE KINDLY LET ME KNOW YOUR REACTION TO THE ABOVE PROPOSAL. THIS TIME I WILL ASK THE UNIVERSITY TO GIVE YOU A VERY GOOD DISCOUNT ON SASA. I HOPE IT WILL BE A HANDSOME ONE SINCE WE HAVE ESTABLISHED A CONTRACT BETWEEN OUR UNIVERSITIES. OF COURSE I CANNOT EMPLOY YOU FOR THIS MATTER SINCE THE INCOME STANDARD FOR EUROPEAN SCHOLAR IS ABOUT TWENTY TIMES OF THOSE WE RECEIVE. BUT STILL WE WANT TO SHARE TO EXPRESS OUR APPRECIATION FOR YOUR KIND ATTITUDE.

I HAVE TO BE IN WUHAN, CHINA IN THE FIRST WEEK OF NOVEMBER BUT I SHALL MEET YOU IN BANGKOK IN OCTOBER. IT IS POSSIBLE THAT I WILL VISIT YOUR LABORATORY IN THE LAST WEEK OF SEPTEMBER. I AM NOT SO SURE. DO YOU HAVE ANY CLASS FOR ME TO SHARE MY EXPERIENCES WITH FOR SOME HOURS?

I HOPE TO HEAR FROM YOU SOON AND LOOKING FORWARD TO SEEING YOU AGAIN. WITH MY BEST PERSONAL REGARDS TO YOU AND MRS. WISNER.

SINCERELY YOURS,

Telephone +66-2-252 5001  
Telefax +66-2-253 6161  
252 1513  
251 3969

8<sup>e</sup> Septembre 1992

Dear Kitti

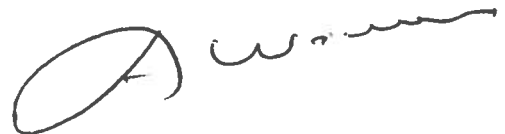
Thank you for your FAX dated Sept 5, and for your kind arrangements at SASA and for reading.

I hope that you will enjoy the congress in CHINA and understand you difficulty to find a solution for your travel to Paris.

My preoccupation is related to the grant offered by N.E.B. If you are not able to come at all, this grant will ~~not~~ be lost both for you and the laboratory. I think that I could extend a little the delay until the beginning of 1993. Would it be possible for you to visit Paris either in December 92 or in January 93, I think that the grant could be available. Of course, I would understand that the academic year in CHULA doesn't ~~allow~~ allow a new travel after the Chinese one. So, be free to answer yes or no.

With my best regards for you and M. Inizanant

Truly yours



A WISNER



## CHULALONGKORN UNIVERSITY

Laboratory for Ergonomic Research  
Dr. Kitti Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

Professor Alain Wisner  
Laboratoire d'Ergonomie et Neurosciences du Travail  
CNAM  
41, Rue Gay Lussac  
75005 PARIS, FRANCE.  
FAX +33-1-43 25 36 14

September 5, 1992

Dear Alain:

I have received your fax to me and a copy to SASA Director. Your arrangement with SASA has been confirmed according to your schedule. Your class schedule at my Laboratory will start on the 3rd of November at 5.30 p.m. The class will be on Tuesday night. Your last class meeting will be on 24 November including 1-hour examination of your lecture. Each class meeting will last for 2-3 hours depending upon your arrangement.

I am deeply regret to inform you that I cannot visit CNAM to meet Professor Daniellou this year as planned. This is because my travel agent cannot arrange my connecting flight to Peking within my limited budget. The only way she can is to issue two tickets for me; BKK-PARIS-BKK and BKK-PEKING-BKK. That means I have to fly back to BKK on 29 October in order to be in CHINA on 1 Nov. I am writing a letter to Professor Daniellou to apologize for not being able to meet him as scheduled.

I hope to hear from you soon and looking forward to seeing you again in Bangkok. With my best personal regards to you and Mrs. Wisner.

Sincerely yours,

N.B. SASA DIRECTOR ASKED ME TO  
CONVEY CONFIRM MESSAGE TO YOU



MINISTERE DE L'EDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET METIERS  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL

August 28, 1992

Professor Kitti Intaranont, Head  
Chulalongkorn University  
Laboratory for Ergonomic Research  
Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

Dear Kitti,

Please find enclosed the letter I am sending by fax to SASA International House. Would you kindly confirm to them my teaching at Chulalongkorn University and your request for the 30% discount?

As you may remark, I will be in Thailand nearly two weeks prior to November, when I will teach at Chulalongkorn and Mahidol universities, but I need this time first to relax and acclimatize, and second for *my work period*

It will be a great pleasure for me to see you again, and to work with your remarkable co-workers and students.

Please present my best regards to Mrs. Intaranont.

Very truly yours,

Alain Wisner

**CHULALONGKORN UNIVERSITY**

Laboratory for Ergonomic Research  
Dr. Kitti Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

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September 5, 1992

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I hope to hear from you soon and looking forward to seeing you again in Bangkok. With my best personal regards to you and Mrs. Wisner.

Sincerely yours,

Agreement between  
Le Conservatoire National des Arts et Metiers  
and  
Chulalongkorn University

## SECTION I - AIMS

### ARTICLE 1

Each of the two parties, eager to organize bilateral exchanges, shall endeavour to reach the following goals :

- to participate in the management of the other party through the provision of members of its teaching or research staff for short, medium or long-term periods, within the possibilities of each of the establishments.
- to exchange issue information on the organization and aims of each of the parties, both as regards teaching and research, in order to encourage applications for teaching jobs in cooperation, so as to participate in both research and teaching activities;
- to find all the means liable to encourage research in fields of common interest and to promote better training for students, teachers, researchers and engineers;
- to hold consultations in order to improve and develop university and post-university training;
- to encourage the mutual participation of each party, conferences, training courses and summer schools organized by either of the parties;
- to encourage exchanges and contacts between the university departments and industrial companies of the two countries.

### ARTICLE 2

The two parties shall agree to regularly exchange information about organization and educational documentation.

In the field of research, both establishments shall organize, in unison, the dispatch of post-graduate researchers in the context of joint research and shall reserve participation, on a preferential basis, for the them at scientific events, subject to availability of necessary finance.

## SECTION II - CONDITIONS AND FIELD OF COOPERATION

### ARTICLE 3

The development of inter-establishment cooperation shall be the subject of a programme established in common at the time of meetings of the interested parties. These programmes shall be submitted to the competent Thai and French authorities.

2



ARTICLE 4

The annual programme shall indicate the scientific or technical specialties and the qualifications of the permanent teachers which one of the parties shall provide to the other.

Where applicable, this annual programme shall establish:

- a list of the names, grades and references of teachers, consultants and experts detached for short or medium-term missions, conferences, training courses or technical types of intervention;
- the number of students and the study programme selected for their exchange;
- the number and type of companies which wish to participate in the training.

SECTION III - CONTRACTUAL CLAUSES

ARTICLE 5

Exchanges of teachers, researchers or students

Each year, the two institutions shall endeavour to exchange teachers, researchers and students in each direction on a roughly equal basis. In particular, this effort shall concern students preparing Ph.D. thesis.

5.1 Exchanges of teachers and researchers

Each establishment shall pay its teachers during their stay abroad. The host establishment shall provide assistance as regards their accommodation and social welfare needs.

5.2 Exchanges of students

The practice established for dealing with the equivalence of modules, semesters and diplomas will be the subject of reciprocal consultation.

ARTICLE 6

In order to ensure follow-up of the agreement, each party shall appoint a committee with a secretariat which shall be responsible for establishing a report on the work done, especially at the end of the second semester of the university year.

An annual report shall be submitted to the authorities of the two parties.

16

SECTION IV - MEANS

ARTICLE 7

The two parties shall ask the organizations in charge of encouraging scientific cooperation for the finance necessary to implement this agreement.

In addition, they shall endeavour to support the actions engaged with all organizations authorized for this purpose.

ARTICLE 8

The financial conditions agreed to in the context of the cultural and scientific cooperation programme between the governments of the two countries shall apply to the implementation of this agreement and the programmes resulting therefrom.

SECTION V - APPROVAL OF THIS AGREEMENT

ARTICLE 9

Any difficulties arising from application of this agreement shall be examined at meetings of the interested parties in order to facilitate settlement. Where necessary, difficulties shall be referred to the competent authorities of the two countries.

ARTICLE 10

This agreement is effective for a period of four years. It shall be renewed through tacit agreement and shall take effect as from the day of its signature. It may be cancelled through written notice sent six (6) months before expiry of the current period.

Signed in BANGKOK  
on

Signed in PARIS  
on

Professor Charas Suwanwela, M.D.  
President of Chulalongkorn  
University



Guy Fleury Sc. D.  
General Administrator  
of the Conservatoire National  
des Arts et Metiers

17



## CHULALONGKORN UNIVERSITY

Laboratory for Ergonomic Research  
Dr. Kitti Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

Professor Alain Wisner  
Laboratoire d'Ergonomie et Neurosciences du Travail  
CNAM  
41, Rue Gay Lussac  
75005 PARIS, FRANCE.  
FAX +33-1-43 25 36 14

August 4, 1992

Dear Alain:

I have received Dr. Daniellou's fax dated 30 July 1992. I thank you very much for helping me extend the contact with him. It will be a great value to both of our institutions in which the agreement has been created by you. Along with this letter to you, I also send my message of agreement that I shall meet with him on 29 and 30 October 1992. I will speak about current research activities on Ergonomics in Thailand. I hope that this topic will be of his interest. I will write to him for the specific topic.

If the above paragraph is true, it means that it is possible for me to visit CNAM even without your presence. Then I suppose Mme Rebiffe will handle your Society scholarship. Please kindly advise.

As soon as you can fix your schedule in Thailand, please give me some broad period which you will come to and leave Bangkok so that it will help me arrange your time at SASA.

I hope to hear from you soon and looking forward to seeing you again. With my best personal regards to you and Mrs. Wisner.

Sincerely yours,

A handwritten signature in blue ink, appearing to be 'Kitti Intaranont'.

Fatalquier 27.7.92

Cher Danielle,

Pourriez vous écrire à Kitti Intaraonont à propos de  
sa demande de rencontre avec vous à PARIS du 29 au 31  
Octobre ?

J'espère que tout va bien.

Bien amicalement

D. W. S.

+ d'ailleurs lettre Kitti  
- Me repose

Fercal quin 27 Juillet 1992

Dear KITTI,

Thank you for your letter dated July 17th, I have received in our country here where we are taking some holiday

I am very happy to teach again at CHULA to your excellent students and coworkers. I have no opinion about the best week day to teach Tuesday or Wednesday please choose yourself.

For SASA, I would be very happy. if you could reserve me a "vice president" room at 30% discount for the period between October 18th and November 30th I will send you at the end of August the precise dates in relation with my flights as I don't yet know, if I will not go a little in SINGAPORE. I know that CHULA is closed in October but I need a few days to relax and work for me before I can will be able to work for you and MALINEE in November.

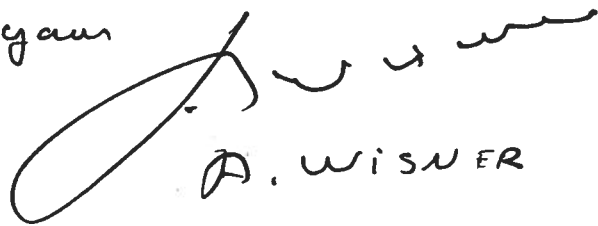
I would like to know, if I will teach at CHULA the first week of November though you will be at WUHAN May be some of your colleagues or coworkers could translate my speech - or shall I wait until you come back.

You may - of course - visit PARIS a few days when

I am in THAILAND. I am writing to P. DANIELOU  
to answer directly to this part of your letter. But, such  
a short stay is not what I announced when I asked  
the money for you. I hope I will be in a position  
to arrange things in such a way that it could be  
possible to have the full reimbursement. Remember, please  
that N.E.B. ~~needs~~ needs to see your ~~PARIS~~-BANGKOK-PARIS  
return ticket.

Anyway, I am happy to see you a long time in  
BANGKOK soon

Truly yours



A. WISNER



## CHULALONGKORN UNIVERSITY

Laboratory for Ergonomic Research  
Dr. Kittit Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

Professor Alain Wisner  
Laboratoire d'Ergonomie et Neurosciences du Travail  
CNAM  
41, Rue Gay Lussac  
75005 PARIS, FRANCE.  
FAX +33-1-43 25 36 14

July 17, 1992

Dear Alain:

Your letter dated 24 June 1992 has been received. Thank you very much that you accepted our invitation. Please let me know sooner the better that you prefer Tuesday or Wednesday night for teaching in the class.

With regard to my visit to your Institute which I plan to be around September, it may not be possible. The very possible one will be the last week in October in which you will be in Bangkok already. May I ask if it is possible for me to visit your Lab while you are in Bangkok and ask Professor Daniellou to receive me for possible future cooperation. I can be in Paris 29-31 Oct, then I will leave for Wuhan, China. I come back to Bangkok again on 6 November. If this is not possible, it is all right, I may look for other possible schedule later on. But please kindly let me know so that I can negotiate with the travel agent.

With regard to your schedule in Thailand, please give me some broad period which you will come to and leave Bangkok so that it will help me arrange your time at SASA.

I hope to hear from you soon and looking forward to seeing you again. With my best personal regards to you and Mrs. Wisner.

Sincerely yours,

MERRY CHRISTMAS  
AND  
HAPPY NEW YEAR  
1991

Year 1990 has been a good experienced for the Intaranont Family. While the Boss (by word only) of the house was staying in Sweden for 10 months, the real one took care of their family in Thailand all by herself and the job was surely well-done.

A joint research project Thai-Belgium is on-going just fine. The work has begun from 1 July 1990. The first seminar "Workload in Hot Environment" has just completed. Famous friends in Ergonomics Circle such as John Fox of EC Luxembourg, N. Watfa of ILO Bangkok and many others had joined as speakers at the seminar. Prior to this event, Kitti had organized a seminar for H. Jueptner, a past ISO Ergonomics member, titled "Ergonomics and Design Process." Heinrich has made lots of good friends in Thailand.

Year 1991 is predicted to be a very busy year for Kitti who will carry full loads of teaching, research as well as administration. He is also involved in the joint conference between ACOH and SEAES in late November 1991. He hopes he survive through the year with strong good soul.

As always, Kitti and his family sincerely make the best wishes for you and your family to have a happy year with all prosperity to come and

May Your Almighty Bring the World to Peace.

From the Intaranonts.

Please also convey my  
best wishes to Mrs. Wisner



Kitti





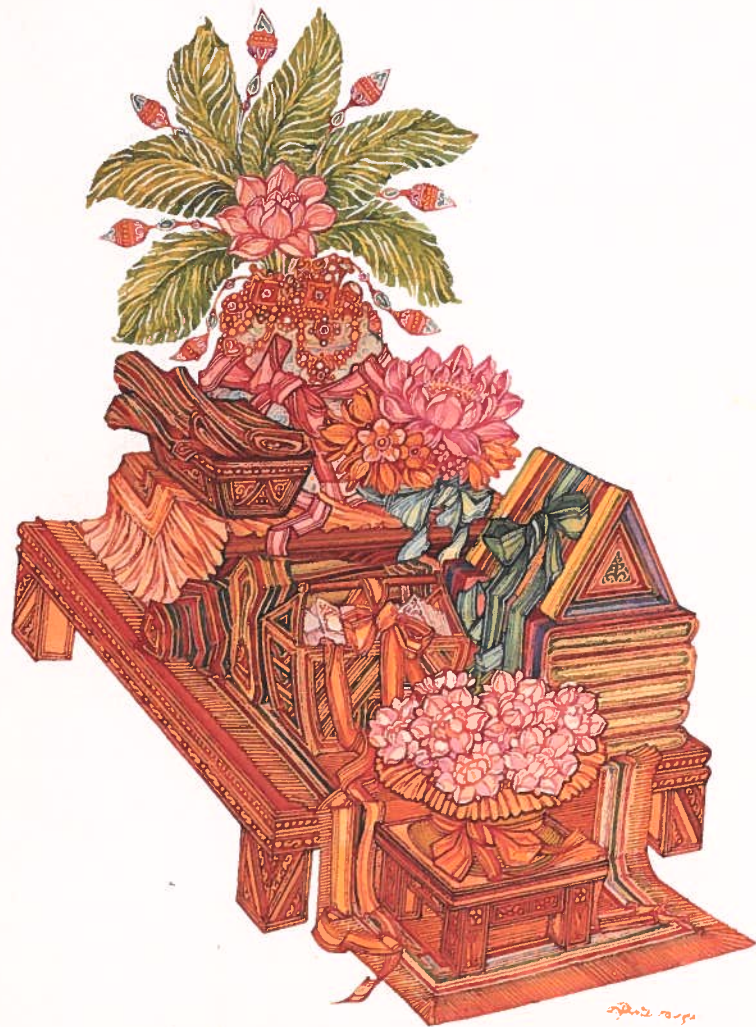
สิ่งดีช่วยรวยลาภธนากร  
มีพระคุณเสริมลาภธนา

งามปวรบุญญาธิสังสา  
เพิ่มภรมาเสริมชีวิตขึ้นมงคล

จิตรกร : อรุโณทัย สมสกุล  
Painted by: Arunothay Somsakul

มอบให้เพื่อหารายได้บำรุงสภากาชาดไทย  
CONTRIBUTED TO BENEFIT THE THAI RED CROSS SOCIETY

กองหารายได้ สภากาชาดไทย ตึกอำนวยการธรรม ชั้น 2 ถนนพระราม 4 กทม. 10330  
โทร. 251-6964, 251-1218





## CHULALONGKORN UNIVERSITY

Laboratory for Ergonomic Research  
Dr. Kitti Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

Professor Alain Wisner  
Laboratoire d'Ergonomie et Neurophysiologie du Travail  
CNAM  
41, Rue Gay Lussac  
75005 PARIS, FRANCE.  
FAX +33-1-43 26 88 16

September 6, 1991

Dear Alain:

Your both faxes were received including the one you tried to send to SASA. I checked with SASA they have not received anything. But don't you worry I manage everything. That means everything is undercontrolled, though your first stay 16-20 October might run into some obstacles but it will be all right.

With regard to the student's thesis, as you may recall, I asked you to be an advisor for that thesis, not only a member of the jury, and I will be a co-advisor. The idea is I will work under your name. However, if you think this is not a proper way, please reconfirm. To have you as a member of the jury is great honour to us but to have you acting as the thesis advisor is the greatest honour to the student, to me, and to all. Anyhow please let us know your decision urgently.

The agreement you gave to me when I was at the Congress in Paris has already been reviewed by the Foreign Affairs Department of Chulalongkorn University. I will forward to you later on if you agree, please bring to the attention of your Director-General for his signature. After that you can bring the agreement to Bangkok covered with the letter of the Director-General to the President of Chulalongkorn University.

I hope to hear from you soon and looking forward to seeing you in Bangkok, October and November. Your room has been reserved. With my best personal regards to you and Mrs. Wisner.

Sincerely yours,

SASA telephone numbers  
216 8833  
216 8844

SASA telefax numbers  
215 3880



MINISTÈRE DE L'ÉDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS

ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

Paris, le 14th December 1990

Dr. Kitti INTARAMONT  
Dept. of Industrial Engineering  
Chulalongkorn University  
Bangkok 10330  
Thaïlande

Dear Kitti, Dear Prof. Intaramont,

Thank you for your two letters of 14 and 21 November.

I have a complete confirmation of the Agreement from our Administrateur Général for cooperation at university level. I have explored the opinion of the French Embassy. The French Authorities have a high consideration for Chulalongkorn University and consider positively such an agreement between our two institutions. Therefore, if you wish to give a solemn atmosphere to the signature, it would be possible to invite the French Ambassador. But this is not at all compulsory. Our Administrateur Général is very sensitive to the invitation of your President but he is afraid not to be available within a reasonable lapse of time considering the fact that he was appointed quite recently in a period where there is a new upheaval in the French Universities in view of adapting them even more to the transformation of society and economy. Professeur FLEURY thinks that I could sign, on his behalf, the Agreement in Bangkok when I will be in Thailand in October/November 1991.

What remains to be done is only to write the Agreement which could be very close to the one we signed together. As you invite me to do it, I will prepare a text that I shall send for your consideration and that of your President.

As far as the Bus Project is concerned, I have explored the way to build a fruitful visit in France as well as I have worked on your project, but nothing official has been done and I will not do anything until there is a formal proposal from you about the subject. In fact I am not at all in a hurry as I am still for a few months Director of our Laboratory and I have a very heavy task in the preparation of the IEA Congress. I will probably also have to work on a new project about the Taipei Metro.

I am not surprised to hear about the new development related to the ACO/SEAS Conference. I tried my best when I was in Bangkok last August to help co-operation but this is, in fact, a pure Thai matter and I can only tell you that I will do my best to the solution you will choose. "Do it by yourself" is, of course, a positive answer. If necessary, you may remember that I have proposed many times to offer a 5,000 French francs guarantee (very near to 25,000 bhts).

I would like you to feel that in our scientific relations I am here to help and not to bring new complications so remain assured that I will always agree to what is best from your view point.

With my best regards,

*is best*

Yours sincerely,

Alain Wisner

<sup>nd</sup>  
2<sup>th</sup> November 1990

Professor Kitti Intaranont  
Department of Industrial Engineering  
Faculty of Engineering  
Chulalongkorn University  
Bangkok 10500      Thaïlande

Dear Kitti,

I am very sorry not to have been able to send you earlier a letter about my own views on our common project "Assessment of driver's workload for bus design guidelines : an ergonomic approach".

The first thing, I would like to say is that I am always as interested by this project and that I think we are quite able to succeed together with our teams. All the remarks I have written are not oriented toward negative criticism but toward the success of our common project.

PROJECT BACKGROUND. The main reasons given to, support the project, the ergonomic fitting of the driver's situation in the new Thai bus for Bangkok are related to the high level of traffic accidents in Bangkok and more precisely of those accidents where buses are involved.

If it is quite reasonable to think that a better design of buses could reduce the frequency of traffic accidents where buses are involved, we have to realize that this engineering action could only contribute to this objective-though significantly. It is proven by quite convincing and numerous studies in different countries that anthropological and even more socio-économical

*Handwritten notes in red ink:*  
Kitti as  
Chairman  
of the  
committee  
CUP-OWAPOST

characteristics of a country have a deciding influence not only on the frequency of traffic accidents but also on the frequency of accidents in general.

The main factors are knowledge and use of the safety regulations and more precisely the speed limits in town and priority rules.

Coming back to buses, in some countries or towns (I have not seen that too much in Bangkok), some passengers may travel sitting on the roof or hanging on the sides of the bus mostly around the doors. In this case, the task of the bus driver is really hard. Sometimes - that I have seen many times in Bangkok - pedestrians or two wheels drivers slide in front or alongside the buses out of the sight of the driver.

Following these remarks, I suggest that in the chapter "Project background", the project would be presented as a highly significant contribution to the reduction of traffic accidents in Bangkok but only as a contribution. To reduce the traffic accidents related to buses, other decisions have also to be taken.

DRIVERS WORKLOAD. It is very likely that the Bangkok bus driver workload is much too high. Nevertheless before deciding using workload as an intermediate variable in our project, let us consider this concept more precisely.

We have first to make a distinction between stress and strain. Unlike some speaking habits coming from Selye (an hungarian living in french Canada), stress means the constraints, what the operator, the driver has to do to carry out his task and strain is related to the cost of the work for the driver both at a physiological and psychological Viewpoint.

Considering the constraints, the bus driver's stress is not related only to driving the bus in the Bangkok awful traffic jams and to avoid accidents but also, related to the situation and the driver's attributions to control order in the bus, to inform the passengers, to sale and control tickets and, may be, to perform other activities I dont know. It seems that, in these conditions, we have first to perform ergonomic work analysis in quite a few real driving situations so that we would be in a position to describe not only the task, the prescribed activities but also the real activities he has to perform, the true basis of his workload.

If we now consider the cost of the real activities, the driver's work strain, we are not able to provide a unique method of measurement. We have to consider - at least since 10 years - three type of strain related to physical load, cognitive load and psychic suffering. Inside these 3 large categories we have again to consider different aspects and methodologies. For physical strain, we have to look at posture, vibrations, efforts on controls, help to the passengers. Of course the strain is different if the driver is young or older, in good health or ill. Cognitive load is always high but even higher if the driver is a beginner, if ~~he~~ he doesnt know well the itinerary of the line, if an event compels him to change his usual route. If we consider now psychic suffering, we have to take in account the driver's relations with management, inspectors, passengers, other drivers, pedestrians, policemen and of course the personal and family problems of the driver.

AN ERGONOMIC METHODOLOGY. The driver's workload inventory and even more its measurement constitutes a very extensive research program without any certainty that many results could be of direct use in the design of the driver's working situation.

As we are ergonomists working only in the perspective of a successful bus design, I suggest that we bypass the question of driver's workload restricting ourselves to the description of the

drivers population and to <sup>the</sup> analysis of the drivers activities.

Before we realize these ergonomic activities analysis we have - as you suggest - to have good evidence concerning the traffic accidents in Bangkok and mainly those where buses are involved : statistics and - may be - detailed description of some accidents or near-accidents.

The drivers population has to be precisely described as you suggest

- Age distribution.
- Appreciation of health as far as possible.
- Anthropometric measurements.
- Nutritional habits and conditions.
- Perception aptitudes ...

The ergonomic work analysis have to be done after we have chosen critical situations from our own observations and from advices given by bus managers and drivers and policemen.

In the situation that we shall analyse, the whole behavior of the bus driver has to be considered : actions on the controls and ticket machine, physical help to passengers, observations (eye movements and fixation) to control the itinerary, to spot the potentially dangerous behavior of other buses, trucks, cars, two-wheels, pedestrians, animals, etc ... to observe passengers. Communications (mainly verbal exchanges but also warning signals, alarms, etc ...) that may be recorded on tapes. Recombining all these informations will allow us to understand the different simultaneous and/or sequential driver's activities. A great help is in this case the use of a video camera but I dont know how far this will be possible in the research context.

An important step of the work analysis methodology is the confrontation between the driver and the objective description of

his activities in critical situations. This confrontation is nether oriented toward any criticism of the driver's behaviour but it aims only to understand the reasons of the driver's behaviour. It is then that we realize the pragmatic constraints to which the driver is submitted : dead angles where he cannot see pedestrians, two-wheels drivers or even cars, dials out of order, controls too far situated or too hard to use, etc ... These observations related to our knowledge about accidents and our informations about the drivers' population will lead us to formulate accurate recommandations for the design.

Of course, there recommandations originate in the old situation the one the drivers are living in the old buses and we have to design new buses. But we may use many methodologies very classical in car manufacturers design departments : "realistic" mock-up, computer mock up, prototypes but also progressive partial changes in an experimental bus we may ask for.

CONCLUSIONS AND FOLLOW UP. I am afraid that I am suggesting a little change in your perspectives but - may be - we are nearer than I think for we have nether discussed orally this project. In fact I believe strongly that the recommandations I submit to you<sup>2</sup> appreciation will strongly increase our chances to obtain significant data in the delay we have. This is related to my 35 years experience in the field of car design and to the successes and difficulties my former students in France and my colleagues in the world have met during this time.

It is quite possible that my proposals remain quite obscure to you. It is why I join to this letter a few papers in english. Some are very old and others quite new. I hope that they will be useful complements to this letter.

But I am sure that an oral discussion is anyway quite necessary in a rather short delay. If you need this discussion we may decide that I will call you at the phone at 4 pm in Bangkok



(10 am for me) the day convenient to you and at the phone number you shall give me. I hope that you shall attend IEA91 (15-20th July 1991). May be we you shall decide to have with me a full day discussion immediately after the Congress. I will be in Bangkok at the end of October 1991, but it will be perhaps a little late for our decisions. Inbetween, I hope that you shall be in Paris with the thai group if, as I hope, we find the money quickly.

Please dont worry about these recommandations, my only pre-occupation is to help you to meet success in the project and I will anyway agree to your final version of the project.

As I wrote you recently, I am working both on the agreement between Chula and CNAM, and on the financing of the 6 thai project managers and researchers travel to France.

With my best regards to you and your family.

A. Wisner



MINISTÈRE DE L'ÉDUCATION NATIONALE  
**CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS**

ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

Paris, le 23 January 1989

Professor Kitti Intaranont  
Department of Industrial Engineering  
Faculty of Engineering  
Chulalongkorn University  
Bangkok 10500  
THAILANDE

Dear Kitti

Thank you for your charming photo and nice letter which you have sent me for the 1989 New Year. I wish you and your family, and your co-workers, the best year possible.

I would especially like to know how the health is of your co-worker who was so ill when I visited Khon Kaen.

I have excellent news for you from Professor Luczak. I think the best is to send you a copy of his letter.

I will be so happy if you succeed in financing this stay in Berlin. In that case, please give me a week in Paris. We shall find the money for your travel from Berlin and for your expenses in Paris. But for financial reasons, I must know your plans as early as possible.

Such a stay in Paris would be very good for our friendship, our mutual interests, my students, and also the preparation for the 1990-1991 SEAES meeting in Thailand if you want.

With my best regards,

Very truly yours,

Alain Wisner

*Thank you again for the splendid  
silk gift that my wife has  
admired so much*

Encl



DEPARTMENT OF INDUSTRIAL ENGINEERING  
FACULTY OF ENGINEERING  
CHULALONGKORN UNIVERSITY  
BANGKOK 10500, THAILAND

Professor Alain Wisner  
LABORATOIRE D'ERGONOMIE  
CONSERVATOIRE NATIONAL DES  
ARTS ET METIERS  
41 RUE GAY-LUSSAC  
75005 PARIS  
FRANCE

September 9, 1988.

Dear Alain:

I felt extraordinary that you had a chance to drop by and visit us in Bangkok. I hope you had an excellent flight back home. Discussion with you was just like to talk to another scholar, I felt fulfilled and satisfied. Dr. Ong contacted me and planned to be in Bangkok this November. I have already informed Dr. Malinee to request for the appointment with her during that date so that we would be able to discuss more in detail of the SEAES Conference 1991.

Attached you will find a copy of my letter to Professor Luczak to let him know what I plan to pursue, if you have any comment please let me know I am ready to respond. Best regards.

Sincerely yours,

Kitti Intaranont

## HAPPY NEW YEAR 1989

Dear Friends:

This 1988 year has been fantastic to this family. It started with good news that Kitti was eligible to join the Southeast Asian Ergonomics Society (SEAES) Conference in Bali, Indonesia and the IEA 88 in Sidney, Australia. Before that he was accademically promoted with only \$20 raise (Ha...), but he was full of pride anyway. He has received three research grants for 2 consecutive years that would certainly make him quiet for a while.

His wife, Piliawan, still works for the Government Enterprise as an economist who plays a little role in pricing the electricity rate for the country. She also takes care of her family in every detail, no less. Of course, Kitti is the boss of the house, Pilaiwan is only the decision maker, that's all.

Their two daughters are extremely fine. The eldest, Nid, just passed year 10, stays in Grade 5. She loves painting and drawing. She is making good progress in her music lesson. The little one, Nuke, just passed year 4, knows only 3 things, crying, playing and singing. She goes to a kindergarten closed to their home.

In Sydney, Kitti had a very good time to reunion with his major professors and their families, Dr. Ayoub and Dr. J. Smith, and for the first time he met Dr. Leamon and his family. After the Congress, Kitti received Professor Wisner of France, Professor Akita of Japan and David O'Niel of UK. They had a very good time together at his home. They discussed many good things on the development of Ergonomics in Thailand. Recently, Dr. Ong, Secretary-General of SEAES from Singapore, came to Bangkok for Toxicology Conference. He met his colleagues and Kitti. They discussed the possibility of organizing SEAES 1991 in Thailand. All agreed in principle. Dr. Ong would discuss this matter further with the President of SEAES, Dr. Manuaba of Indonesia.

This is the report of the year 1988 that the INTARANONT proudly presents to their friends around the world. For the next year they wish and pray for the Best of Everything coming to you and your family. May your Mighty God bring you and your family the Best of Love, Happiness and Success.

Peace to the World. Love you all.

The Intaranont.



Kitti



MINISTÈRE DE L'ÉDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS

ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

Paris, le

Exposé à KITT i en Nov 90

Ergonomie in understanding developing countries

Technology and Human Reliability

Organizational Issues

Diagnosis in Ergonomics

Le transfert de technologie sous une nouvelle optique



Laboratory for Ergonomic Research  
Dr. Kittti Intaranont, Head  
Tel +66-2-252 5001  
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253 6161  
251 3969

Dept. of Industrial Eng.  
Faculty of Engineering  
Chulalongkorn University  
Bangkok 10330 THAILAND

TO: Professor Alain Wisner, Fax +33-1-47 07 5901  
Laboratoire d'Ergonomie et Neurophysiologie du Travail  
CNAM  
41, Rue Gay Lussac  
75005 Paris, France.

November 21, 1990

Dear Alain:

Thank you very much for your speedy letter dated 15th Nov. last. You are very fast in action even at my age I haven't thought about the visit to France for six executives and scientists yet. I still in waiting for the recommendation of how to proceed for the joint agreement of the two bosses as I outlined to you in the last letter. I think we should make both sides write to each other first before doing anything else, unless you suggest otherwise, of course.

Definitely our lines for fax message are open for 3 lines as you can see on top. You can try to use them one by one, respectively from the top.

The ACOH/SEAES joint conference doesn't look good at all. Last time I participated in the meeting of the Organizing Committee, her Dean denied her involvement in the Organizing Committee while she was on foreign trip. Now she is back and the only thing I heard from her was "things are better now" and she asked for money from SEAES contribution to the conference which she ought to know by now that SEAES has very little money. I know that her Dean didn't like the idea of including SEAES joint with ACOH. I talked to Chaiyuth, he said "in worst case we can do it by ourselves." What do you say in this case?

I hope to hear from you soon. With my best personal regards to you and Mrs. Wisner.

Sincerely yours,



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253 6161  
251 3969

Dept. of Industrial Eng.  
Faculty of Engineering  
Chulalongkorn University  
Bangkok 10330 THAILAND

TO: Professor Alain Wisner, Fax +33-1-47 07 5901  
Laboratoire d'Ergonomie et Neurophysiologie du Travail  
CNAM  
41, Rue Gay Lussac  
75005 Paris, France.

November 14, 1990

Dear Professor Wisner:

Thank you for your letter dated 18th October 1990. Sorry for the delay, this is because we have quite a number of guests from abroad. Chulalongkorn University has organized the international conference on auto technology. Professor Juptner of Germany also came to present his paper on auto design with ergonomic criteria. It is good to have someone from abroad speaking about ergonomics and design process.

It is good news indeed that your Director-General had agreed on our cooperation at the university level. Next step I can do is to ask the University President to invite the Director-General to visit Thailand. Then we can have the agreement signed properly. Or we can draft the agreement format first and let both side see it, then we invite your Administrator-General to visit us. I let you take a lead on this case, just let me know in order to prepare for the right direction.

I still keep my fingers cross on the "Hot Bus Project." I have sent two abstracts for IEA 91 in Paris as the way you suggested. Hope they will be all right in the eyes of the authorities.

I hope to hear from you soon. With my best personal regards to you and Mrs. Wisner.

Sincerely yours,



11<sup>ème</sup> Congrès de l'Association Internationale d'Ergonomie  
11 th Congress International Ergonomics Association  
PARIS - 15 - 20 JUILLET 1991

18th October 1990

Dr. Kitti INTARAMONT  
Dept. of Industrial Engineering  
Chulalongkorn University  
Bangkok 10330  
Thailande

Dear Kitti,

Thank you for your interesting abstract that will certainly be accepted. You will receive the official answer at the beginning of December.

Since we had our very successful meeting in Bangkok, the holiday period in France during which it is very difficult to negotiate serious things has prevailed. But in September I got a chance to meet the new Administrateur général of the Conservatoire and he has agreed fully to sign an agreement with Chulalongkorn University's President. This agreement would cover and confirm the exchange of letter in which we have expressed our intention to cooperate. Professeur FLEURY, our Administrateur général who is very positively oriented towards international relations, has even evoked the possibility of an agreement at the diplomatic level. But I think the first thing would be to prepare a paper that would be convenient to your President and our Administrateur général.

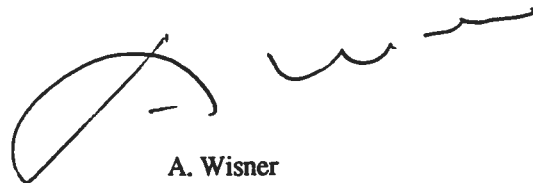
I think that this is a very good point that will be implemented rather soon and will facilitate our special intention about the Bus project. As I told you I agree in principle but I have not yet had the time to send you precise remarks about your project as I am just back from Canada and the States after a one-month stay. My intention is to write to you soon on this precise project.

Anyway, I have begun to make contacts to involve the French Transport Authorities in this project in view of obtaining the necessary money. I have with surprise discovered that the "tropical bus" is a hot subject !

I have also to inform you that I have simultaneously an interesting project of anthropotechnology relating to the future Taipei metro but this is a very classical contract with the French firm which is selling the metro to Taipei. For our common project it is very interesting because it is in the same circle that decisions are taken and also because Bangkok is just a nice step en route to Taipei..

Therefore, dear Friend, I think that our projects are moving nicely in the right direction.

With my best regards to you and your family,



A. Wisner

P.S. I think the best thing for Daniellou's participation to SEAES Workshop would be that you extend to him directly an invitation so that we could have his opinion and eventually find the money for his travel.





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Dept. of Industrial Eng.  
Faculty of Engineering  
Chulalongkorn University  
Bangkok 10330 THAILAND

TO: Professor Alain Wisner. Fax +33-1-47 07 5901  
Laboratoire d'Ergonomie et Neurophysiologie du Travail  
CNAM  
Paris, France.

September 15, 1990

Dear Professor Wisner:

The second page of this fax is my abstracts for the IEA' 91 Congress. I apologize for the delay, it is extremely busy around here. I should have sent this abstracts to the person in charge but I have lost his address. Please kindly forward this paper for me. If I discover the address I will redo immediately or you may kindly advise me to do otherwise I will be delighted.

Hope you will finish reading the Bus project very soon so that I can feel your response as well as the answer from Dr. Daniellou to participate in the SEAES Workshop. Please remind me to Mrs. Wisner also. With my best personal regards.

Sincerely,

*Alli*, 15 Sept. 1990

C. c. F. Daniellou



MINISTÈRE DE L'ÉDUCATION NATIONALE  
**CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS**

ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

Paris, le

5 June 1990

Professor Kitti Intaranont  
The Swedish Institute  
of Production Engineering Research  
Mölnadalsvägen 85  
S-41285 Göteborg  
SUEDE

Via FAX 46-31-40-78-76

Dear Kitti:

Thank you for your last letter. NEB has appreciated your letter and air ticket. I am very happy that your family has enjoyed the Paris visit.

I am sending this letter by Fax because I do not remember exactly when you are returning to Thailand.

I confirm all that I told you, and especially my travel schedule, enclosed.

I also confirm my interest in the design of the new bus for Thai and maybe South East Asian use. I certainly agree to work on this project myself, as a former Renault car designer, and I can afford my personal travel costs. But if we need more money for this project, we have to write something more precise. The best would be that you begin yourself to describe what you need.

In a more general way, I think that we can now give a higher standard to our agreement, written in our memorandum of May 3rd, for we shall soon have a new Director of the CNAM from whom a signature may be easier to obtain.

I am sure that you are very happy to come back to Thailand and have a family life.

With warm regards, to yourself and your family, I remain,

Very truly yours,



A. Wisner

# PROJET DE VOYAGE DE A. WISNER AU JAPON ET EN THAILANDE

## DU 11 JUILLET AU 3 AOUT 1990

11/12 Juillet	PARIS TOKYO	8 H.10 pm 2 H.55 pm	J.L. 406
12 Juillet	TOKYO OSAKA	5 H.30 pm 6 H.30 pm	J.L. 051
12 - 25 Juillet	Hôtel Palace-Side Kamigyo-Ku, Shimodachuri-Karasuma KYOTO - JAPON Tél. 19 / 81 75 431 81 71		
14 - 16 Juillet	Conseil de l' I.E.A.		
18 - 21 Juillet	International Symposium on Human Factors in Organizational Design and Management at Kyoto International Conference Hall Kyoto Institute of Technology		
25 Juillet	OSAKA BANGKOK	5 H.30 pm 9 H. pm	T.G. 623
	Airport Hôtel 333 Chert Wudhakas Road DON MUANG - THAILANDE Tél. 19 / 66 2 523 91 77 523 93 33		
26 Juillet	BANGKOK CHIANG MAI	9 H.50 am 11 H. am	T.G. 114
26 Juillet - 1er Août	Chiang Maï Orchid Hôtel 100-102 Huay Kaew Road CHIANG MAI - THAILANDE Tél. 19 / 66 42 222 099 Fax 19 / 66 42 221 625		
1er Août	CHIANG MAI	2 H.05 pm 3 H.10 pm	T.G. 105
1er/2 Août	S.A.S.A. International House Soï Chulalongkorn 12 Phyathai Road BANGKOK - THAILANDE Tél. 19 / 66 2 214 25 81 ou 82 19 / 66 2 215 37 41 à 43		
2 Août	Conférence aux dirigeants d'entreprises Thai		
2/3 Août	BANGKOK PARIS	11 H.59 pm 9 H.20 am	T.G. 930

\*\*\*\*\* MATRACOM \*\*\*\*\* JOURNAL \*\*\*\*\* DATE 27-06-1991 \*\*\*\*\* HEURE 13:43 \*\*\*\*\*

NO.	COM	DOC	DUREE	E/R	IDENTIFICATION	DATE	HEURE	DIAGNOSTIC
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-11th CONGRESS IEA 91 -

\*\*\*\*\* -MATRA COMMUNICATION- \*\*\*\*\* - 33 1 43253614- \*\*\*\*\*



*11<sup>ème</sup> Congrès de l'Association Internationale d'Ergonomie*  
11 th Congress International Ergonomics Association  
PARIS - 15 - 20 JUILLET 1991

26th June, 1991

Prof. Kitti INTARANONT  
Dept. of Industrial Engineering  
Chulalongkorn University  
Bangkok 10330  
Thaïlande

Fax N° : 66 2 252 1513  
253 6161  
251 3969

Dear Kitti,

Thank you for your letter of June 18 to which I give below a few answers.

I think the best would be to reserve a V-P room at SASA with the nice discount offered for the full month of November since I would like to be at your disposal when the students come back and I have to leave just after the Congress.

Please do not worry about the funding as I have already told you.

I am delighted to be the Adviser of your student's thesis. I shall be very happy to receive her proposal but, in fact, I cannot read it before August since, at present, the Congress is taking all of my time.

My wife and I are extremely happy to meet you again with your wife in Paris.

With my best regards,

Yours sincerely,

Alain Wisner



11<sup>ème</sup> Congrès de l'Association Internationale d'Ergonomie  
11 th Congress International Ergonomics Association  
PARIS - 15 - 20 JUILLET 1991

FACSIMILE TRANSMISSION - LEADERPAGE

Date: 26.06.91

To : Prof. INTARANONT

Fax Number: 19 ~~4~~ 66 2 25 2 15 13

From: A. WISNER

Fax Number: (33) 1 43 25 36 14

Telephone : (33) 1 43 26 27 22

Total number of sheets transmitted : 2



## CHULALONGKORN UNIVERSITY

Laboratory for Ergonomic Research  
Dr. Kittit Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

Professor Alain Wisner  
Laboratoire d'Ergonomie et Neurophysiologie du Travail  
CNAM  
41, Rue Gay Lussac  
75005 PARIS, FRANCE.  
FAX +33-1-43 26 88 16

June 18, 1991

Dear Alain:

Thank you very much for your letter dated May 22, 1991 as well as a separate mailing of your documents and books. It is a pity that my Dean cannot be in Paris or in Europe in this July.

I agree with your plan to visit Southeast Asian region. It is true that we do not have classes in October. The school begins in November for the second term. Your proposal to teach 2 courses for three weeks or more in November is cordially accepted. I agree entirely with your contents in both courses. We shall book you at SASA for the Vice-President room with 30% discount and I will try my best to allocate some funding to pay off your rent partially. Therefore, please send your tentative schedule to me if possible.

Like I asked you when you were in Bangkok last time, I have one student working on a master's thesis. She proposes a comparative study of mental fatigue in repetitive tasks using fuzzy set to quantify her finding. She is writing a proposal for her thesis now. She has worked quite a bit in her field. It will be great honour to her, to me, to the Faculty and to the University if you would accept to be her thesis advisor and I will assume the role of a co-advisor. If you kindly accept I would ask her to send you her proposal for your advice and comment or even corrections. She is expected to defend her thesis sometimes in November, that is to say, by the time you will be in Thailand. The defense will be in English.

I hope to hear from you soon and looking forward to seeing you in Paris in July. My wife will come along with me and we'll stay at Hotel Daguerre at Danfert Rochereau. We will arrive in Paris on Sunday 14.

With my best personal regards to you and Mrs. Wisner.

Sincerely yours,



## CHULALONGKORN UNIVERSITY

Laboratory for Ergonomic Research  
Dr. Kitti Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

Professor Alain Wisner  
Laboratoire d'Ergonomie et Neurophysiologie du Travail  
CNAM  
41, rue Gay Lussac  
75005 PARIS, FRANCE.  
FAX +33-1-43 26 88 16

September 24, 1991

Dear Alain:

This letter is first to inform you that your reservation at SASA for your first stay 16-20 October is OK. Your stay during November is absolutely no problem.

Secondly, I will publish my report "Repetitive Work" I worked in Sweden and will be distributed free of charge to my colleagues who may be interested in. I really hope that you still have a copy I gave you in April 1990. Please kindly take a look at it, I need your modest and humble "FOREWORD" about one page that will cover up the report.

Thank you for accepting the advising job. It is the greatest honour to the student, to me, and to all.

The agreement you gave to me when I was at the Congress in Paris has already been reviewed by the Foreign Affairs Department of Chulalongkorn University. A copy is enclosed. Please see to if it is the right format of your style and then bring to the attention of your Director-General for his signature. After that you can bring the agreement to Bangkok in November 1991 covered with the letter of the Director-General to the President of Chulalongkorn University.

I hope to hear from you soon and looking forward to seeing you in Bangkok. With my best personal regards to you and Mrs. Wisner.

Sincerely yours,



\*\*\*\*\* MATRACOM \*\*\*\*\* JOURNAL \*\*\*\*\* DATE 02-10-1991 \*\*\*\*\* HEURE 17:38 \*\*\*\*\*

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-11th CONGRESS IEA 91 -

\*\*\*\*\* -MATRA COMMUNICATION- \*\*\*\*\* - 33 1 43253614- \*\*\*\*\*



MINISTÈRE DE L'ÉDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS

ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

Paris, le

2nd October, 1991

Prof. Kitti INTARANONT  
Dept. of Industrial Engineering  
Chulalongkorn University  
Bangkok 10330  
Thaïlande

Fax N° : 66 2 252 1513  
253 6161  
251 3969

Dear Kitti,

Thank you for your letter of September 24th and for the confirmation of my reservation at SASA.

I am very honoured to write a foreword for your excellent report on Repetitive Work but I cannot write it before leaving Paris. Please leave me a copy of your work at SASA and I will give you the paper before I leave Bangkok on 20th October. You will have only to ask your secretary to type it.

I received also the Agreement you sent me. I will study it and give it to the General Administrator of the CNAM. I hope that no obstacle will prevent me from bringing it back to Bangkok with a convenient letter.

With my best regards,

Yours sincerely,

Alain Wisner

ASSESSMENT OF DRIVERS' WORKLOAD  
FOR  
BUS-DESIGN GUIDELINES: AN ERGONOMIC APPROACH

A Project Proposal of the  
Conservatoire National des Arts et Metiers  
(Professor Alain Wisner)  
and  
Chulalongkorn University

January 1992 - December 1994

TO BE SUBMITTED TO:

PROJECT NAME:

Assessment of Drivers' Workload for Bus-Design Guidelines: An Ergonomic Approach.

PROJECT REQUESTORS:

Conservatoire National des Arts et Metiers (CNAM)  
Laboratoire de Ergonomie et Neurophysiologie du Travail  
41 Rue Gay-Lussac  
75005 Paris, FRANCE

Chulalongkorn University (CHULA)  
Faculty of Engineering  
Department of Industrial Engineering  
Laboratory for Ergonomic Research  
Bangkok 10330, THAILAND

PROJECT LEADERS

Professor Alain Wisner for CNAM  
Dr. Kitti INTARANONT for CHULA

(Throughout this text "CNAM" should always be interpreted as "under the guidance of Professor Alain Wisner").

ORGANIZATIONAL FRAMEWORK:

The proposed project has two distinct phases. Phase I is related to the study and assessment of bus drivers' workload in order to formulate guidelines for the ergonomic design of public buses, driver's cab in particular. For optimum driving performance, safety transport means and passenger comfort, however, special treatments on population anthropometry and biomechanics, also mechanical design of the bus must be emphasized. Phase II is concerned with the construction of a mock-up (a bus) as designed in Phase I, and testing in the City of Bangkok. Modification of the bus transport between cities and testing will be implemented. Transport test can also be done in other Asian cities if approved by the authorities concerned. Only Phase I is presented in this document in detail. A separate detailed proposal for Phase II will be made after Phase I has started and proved to be successful.

STARTING DATE OF PHASE I: January 1, 1992.

DURATION OF PHASE I: 3 years (1-1-1992 to 12-31-1994).

TOTAL BUDGET REQUESTED FOR PHASE I:

CONTENTS

1. Project Background .....1

2. Project Identification, General Objectives and Responsibilities.....

    2.1 Identification .....

    2.2 General Objectives .....

    2.3 Responsibilities .....

3. Project Components of Phase I .....

4. Manpower Requirements for Phase I .....

    4.1 CHULA Experts .....

    4.2 CNAM Experts .....

    4.3 Project Personnels in Thailand .....

    4.4 Project Personnels in France .....

5. Budget .....

6. References .....

## 1. PROJECT BACKGROUND.

Throughout the world, the growth of transport systems has been a key element in economic development. For both developed and developing countries, increases in gross national product are accompanied by greater movement of people and goods, and greater investment in both vehicles and transport infrastructure. In the developing world, current trends in population, industrialization, and urbanization are putting pressures on transportation systems.

Some of the unwanted side-effects of this growth in traffic, such as congestion, noise, and pollution, are well documented and immediately obvious to all; others, such as the growing numbers of deaths and injuries from road traffic accidents, are apparent. These reveal a serious and growing problem, with absolute fatality and casualty figures rising rapidly in the majority of developing countries, and with death rates considerably higher than in the developed world.

Thailand has managed to increase the GNP from 58.9 billion Baht in 1961 to 1,041 billion Baht in 1985, an increase of 18 times. During the same period the per capita income has also increased about 10 times from 2,150 Baht to 20,420 Baht. Road transport has played a major role in this economic development process. The total number of vehicle registration has also increased dramatically from 738,000 in 1970 to 4,794,000 in 1987 with an average annual growth rate of about 12.7%. Trend in road accidents has followed economic growth with total number of 34,615 in 1988 as compared to 8,724 in 1971. The police records also put the number of fatalities at 3,196, 3,043 and 2,900 for 1986, 1987 and 1988, respectively. Of these records, traffic accidents occurred only in Bangkok amounts upto 9,539 in 1987 and 9,917 in 1988 with 85 and 75 fatalities, respectively.

Urban bus transportation plays an important part in daily lives of people in Bangkok like in other developing countries. They basically rely heavily on public transportation as a means of affordable mode of transportation. The role of bus transportation or any other public transportation system is primarily service oriented and not profit motivated. Accident statistics caused by or involved with public buses is about 3% in the city of Bangkok. Economic losses due to bus accidents is tremendously high in both direct and indirect costs because of traffic congestion and mental stress of people involved. In addition, existing bus has considerably poor design based on comfort and safety criteria for both the driver and passengers.

The causes of accidents may be described in several ways. At a general level, traffic accidents can be attributed to human behaviour, the vehicle and the environment, usually with some interaction among these. Older and Spicer (1976) advocated that accidents be the consequence of conflict situations involving the driver and the environment (and plus the vehicle presumably) that led to evasive actions on the part of the driver. Shinar (1978) reported data on the percentage of accidents from two samples that were attributed to human, vehicle and environmental causes and their combinations. One sample of 2258 accidents was investigated on-site, and the other sample of 420 was investigated in depth. The finding confirmed that human behaviour was clearly the dominant cause.

The driving environment includes the roads and highways, street and highway lighting, road markings, road signs, and traffic as well as the natural features of the ambient environment such as temperature and rain. Since this study will

concentrate on the drivers' performance based on human engineering discipline leading to ergonomic design of the bus, the road and street characteristics are beyond the scope of this study and will not be emphasized. Road markings, road signs and traffic lighting will be investigated as to promote the driver's visibility, if necessary.

Vehicle characteristics, such as displays, control processes and mechanisms, bus body dimension, seating and space considerations, and vibration and motion will be studied in detail. Jones (1976) discussed that the control characteristics was especially important in promoting safe driving pattern. It is commonly accepted that heavy cars are safer than light cars as confirmed by Grime and Hutchinson (1979) in their head-on-accident study in rural areas of Great Britain. The implication of this remark introduce a potentially conflicting problem in Bangkok when there is a tendency toward increased use of smaller cars for energy-conservation purposes and efficient moves along congested traffic.

It is imperative that a comprehensive study and design should be carried out to promote safe-driving conditions and be constructed and implemented accordingly. This project envisages a two phase evaluative study and implemented procedure:

- Phase I: Bus driving tasks in Bangkok will be analysed and evaluated in terms of stress and workload. Computerized design of the bus will be set up at the Engineering Computer Center. Department of Transportation (DOT) will be requested to cooperate with the project as well as the Bangkok Mass Transit Authority (BMTA). Both governmental agencies are well aware of the problems and they indeed show willingness to cooperate with full hope to introduce the standard design for the bus.
- Phase II: Construction of the bus designed in Phase I will be conducted. Extensive transport test will be implemented in Bangkok and throughout the country. Testing data such as subjective questionnaires and physiological responses will be collected and analysed. If opportunity opens with the approval of the authorities the bus can be road tested in other Asian cities as well.

The implementation of the project will be made possible through the cooperation of Chulalongkorn University, Faculty of Engineering, Department of Industrial Engineering, Thailand, Conservatoire National des Arts et Metiers, Laboratoire d'Ergonomie et Neurophysiologie du Travail. Technical assistance for testing of bus components for the evaluation of human compatibility will be sought from established bus manufacturers and dealers in Thailand and in France.

## 2. PROJECT IDENTIFICATION, GENERAL OBJECTIVES AND RESPONSIBILITIES.

### 2.1 Identification

The major components of the project are:

- 1) Comprehensive ergonomic experiments of the existing bus operations in Bangkok and inter-cities to assess drivers' workload in terms of physiological and psychological strain; evaluation of capacity norms in physiological, psychological and biomechanical aspects to establish standard work load in bus driving.
- 2) Human data collection of bus drivers and passengers such as anthropometrical and strength data to formulate ergonomic design of the bus; in-depth study with analysis of the man-machine interaction to determine the framework of the "design for people" with safety, comfort, legal and economical criteria.
- 3) Study of the mechanical design aspects of the bus; design layout of the bus

using computer-aided-design (CAD); Implementation of computer simulation showing driver-passengers-bus interaction to ensure the practical design.

Phase I of the proposed project will be undertaken for a period of three years, starting in January 1992. Phase II will start at a later date and will probably last for two or three years. The project consists of 2 phases. On completion of Phase I, computer simulation demonstration will be set up to evaluate the compatibility of the driver-passenger-bus system, prior to an attempt of Phase II implementation. A short study tour for small number of executives will be organized to cities in France where bus design and manufacturing institutes are established.

## 2.2 General Objectives.

The followings are the general objectives of this project:

- 1) Disseminate the experience and knowledge gathered by CHULA and CNAM through well-designed experiment of man-machine-environment system using work load assessment of bus drivers and passenger safety and comfort as ergonomic design criteria for the bus.
- 2) Formulate appropriate design algorithm and methodology based on human characteristics and capacity within economical framework.
- 3) Selection or development (if necessary) of appropriate computer softwares to supplement the second objective.
- 4) To establish and promote the institutional capabilities of CHULA and CNAM in the country in ergonomic research of transportation system.
- 5) To promote French expertise and technical capabilities suitable for Thailand.

## 2.3 Responsibilities.

The overall project will be undertaken under the joint responsibility of CHULA and CNAM. The specific responsibilities will be as follows:

### \*\* CNAM \*\*

- Professor Alain Wisner, professor in Ergonomics, will contribute to .....

He will be responsible for all aspects related to the French counterpart budget. He will be the principal investigator in CNAM.

The CNAM correspondence address:

Professor Alain WISNER,  
Laboratoire d'Ergonomie et Neurophysiologie du Travail  
Conservatoire National des Arts et Metiers  
41, Rue Gay-Lussac  
75005 Paris, FRANCE

### \*\* CHULA \*\*

Department of Industrial Engineering, Department of Mechanical Engineering and Engineering Computer Center will be involved in the project.

- Dr. Kitti INTARANONT, associate professor of industrial engineering, will be responsible for experimental design, procedures and analysis. He will also be the principal investigator of the project in CHULA and will be responsible for all aspects related to the CHULA counterpart budget.



- Dr. Ittiphol Pan-ngum, associate professor of mechanical engineering, will be responsible for mechanical design and testing of the bus. He will be the main coordinator between CHULA and DOT and BMTA.
- Mr. Chinathep Penjati, senior lecturer of mechanical engineering, will be responsible for mechanical testing of the components to determine the relationship between a driver and his bus control devices. He will also be an alternate for coordinating task between CHULA and other authoritative agencies.

The CHULA correspondence address:  
 Dr. Kittti INTARANONT  
 Chulalongkorn University (CHULA)  
 Faculty of Engineering  
 Department of Industrial Engineering  
 Laboratory for Ergonomic Research  
 Bangkok 10330, THAILAND

**\*\* CHULA & CNAM \*\***

Specific joint CHULA-CNAM responsibilities will be shared and decisions will be made by mutual agreement between Professor Alain WISNER and Prof. Dr. Kittti INTARANONT. CHULA and CNAM shall have the right to use the results obtained from this project for the purpose of academic publications.

**3. PROJECT COMPONENTS OF PHASE I.**

The three major components identified in 2.1 are elaborated here. The first component, assessment of workload and development of capacity norms of bus drivers, comprises the following:

- 1) To study, in depth, bus-accident statistics in Bangkok and inter-cities from all probable sources such as DOT, BMTA, Department of Police Highway Patrol, Department of Police Traffic Control, BMA Traffic Control Office and National Statistics Office. It is vital to understand the causes of accidents. It is normal if these statistical reports are different to certain extent. It is the duty of the investigators to elaborate in logical format.
- 2) To monitor time and motion of bus driving activity in Bangkok and inter-cities; to conduct task analysis and study working hours and shiftwork; to monitor flickering test of drivers before and after driving activity; to investigate existing driving control arrangement in terms of layout and force exertion requirement and to study working posture of the bus driver.
- 3) To monitor heart rate and visibility of the bus driver at work in Bangkok and inter-cities; to conduct nutritional analysis of the bus driver to determine daily energy input; to conduct hearing test and behavioural tests for the bus driver and also vision test such as static visual acuity test in high and low levels of illumination similar to those encountered in nighttime driving; to conduct an experiment on reaction time of drivers.

The second component delineated in 2.1 is the component of human data collection and ergonomic analysis of the man-machine-environment system. This mainly comprises the following items:

- 4) To measure, collect and analyse the anthropometric (42 items) and static strength (6 items) data as described in Ayoub, et al. (1984) and Ayoub, et al. (1978) of one-hundred bus drivers selected at random as well as bus passengers with equal number.
- 5) To measure, collect and analyse the reach envelope as described by Hertzberg (1972) of the bus drivers; to measure and record work space dimensions of driver's compartment as well as entrance/exit and bus body dimensions; to conduct a step test for the passengers to determine the appropriate height of bus steps.
- 6) To conduct psychological test on comfort ratings for drivers, in depth, as well as for passengers; to conduct mechanical tests for control mechanism components.

The last component is the design and demonstration phase and comprises the following:

- 7) To analyse the driver's movement in driving and compare to the reach envelope of his; To analyse heart rate pattern during driving and compare with flickering test results; to compare the control mechanism resistance with strength capacity of drivers.
- 8) To analyse the impact of environmental factors on driving capability and rate of fatigue; to redesign the driver's cab, seating and control by CAD as well as the passengers' section, seating and hand-holding rails.
- 9) To redesign a bus using a CAD system; to simulate the driver-passenger-bus system by computerized-graphic display using developed and/or selected software packages; to conduct detailed engineering economic analysis of the new bus design; to printout the design at all levels.

The following figure illustrates a tentative schedule of different activities.

4. MANPOWER REQUIREMENTS FOR PHASE I.

The following categories of staff are required for the project:

- CHULA Experts
- CNAM Experts
- Project personnels (in Thailand)
- Project personnels (in France)

4.1 CHULA Experts.

This category consists of professors from CHULA in the relevant areas covered in the project (cf. 2.3 \*\* CHULA \*\*). Professors are appointed according to the rules and regulations of CHULA. The tasks and responsibilities of each expert will be jointly decided by the project coordinators from three institutions.

4.2 CNAM Experts.

This category consists of experts from France organized by Professor Alain WISNER in the relevant areas of ..... Professor Alain WISNER is the expert who can be requested to make an in-depth study of bus-related problems and can receive financial assistance to study ergonomic problems in bus transportation in Bangkok. During this study in Bangkok, he could give short courses or seminars at CHULA.

4.3 Project personnels (in Thailand; to be hired according to CHULA Rules).

Notification and selection of personnels in Thailand will be done under the responsibility of the project coordinator in CHULA. The duration of employment should correspond to the specifications made in the project documents. Changes are allowed under the conditions that budget re-allocations remain within a maximum range of 20%.

Besides one Secretary, the following members constitute this category of staff:

Research Associate (one) 1-1-1992 to 12-31-1994. The research associate shall be at least a master's graduate in a relevant discipline, preferably working knowledge in engineering and experimental psychology or human factors. He or she should be able to comprehend the design problems of the man-machine-environment system. Working knowledge in computer programming is required and necessary as well as English proficiency but French and/or Dutch is a distinct advantage. The duration of this employment will be three years (to be reconsidered every year).

Research Assistant (one) 1-1-1993 to 12-31-1994. The research assistant shall be fluent in English. He or she should be able to translate technical documents from Thai to English and vice versa, and should also be able to assist in interviews and surveys to be conducted during the first two years of the project. Proficiency in Thai and English typing will be a distinct advantage. He or she will be responsible the administrative work within CHULA and liaison with government agencies and private companies. The duration of employment will be two years (to be reconsidered every year).

System Engineer (one) 1-1-1993 to 12-31-1994. The system engineer should possess sufficient experience in system analysis and software development. Knowledge of computer-aided-design programming is required and necessary. He or she should be capable of developing software packages in different aspects of computer graphic simulation. The system engineer should be able to work in concert with other members of the project staff and with smooth flow of information transfer. The duration of employment will be two years (to be considered yearly).

In short, the research associate will be responsible for more theoretical analysis and will have a coordinating role. The research assistant will be especially useful in data acquisition and administrative contacts. The system engineer will select, modify or develop user-friendly software adapted to the needs for CAD and computer graphic simulation of the driver-passenger-bus system. Occasionally, CHULA master's students can assist in data collection or computational tasks. For this purpose, a small budget will be provided.

4.5 Project personnels (in France: to be hired according to CNAM regulations).

5. BUDGET.

The requested budget is broken down in details as follows:

Table 1: expenses on CHULA level (Thailand).

Table 2: expenses on CNAM level (France).

Table 3: summary of the total budget.

The following points are to be stressed in addition to the budget details presented in Tables 1, 2, and 3.

- CHULA counterpart inputs "which are not budgeted" are as shown below:

Project Leader and other experts (approximately 10% of their time for 36 months)	400,000	Baht
Support facilities for 36 months, office accomodation and furnishing library	200,000	Baht
Teaching aids, printing and documentation	200,000	Baht
Some computer facilities and assistance	<u>200,000</u>	Baht
Total (yearly)	<u>1,000,000</u>	Baht

- However, a budget is requested for a short observation tour to France for maximum four executives of DOT and BMTA. This observation tour will provide opportunities to those invited executives to appreciate French technology in designing and constructing buses using "design for people" criteria. It will bring the DOT and BMTA direction in direct contact with French know-how in the field of bus design and construction. The four executives will be joined by one CHULA expert involved in the project and one member of the CHULA project personnel.

- CNAM counterpart inputs "which are not budgeted" are as shown below:

Project Leader and other experts (10% of their time for 36 months)	500,000	Ffr.
Support facilities, furnishing and services	100,000	Ffr.
Teaching aids, library and documentation	<u>100,000</u>	Ffr.
Total (yearly)	<u>700,000</u>	Ffr.

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MINISTÈRE DE L'ÉDUCATION NATIONALE

# CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS

ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

13 Novembre 1990

Paris, le

Monsieur le Professeur Fleury  
Administrateur Général  
C N A M

Copie : Pr F. Davoine

Monsieur l'Administrateur Général et cher collègue,

Lors de l'entretien que vous avez bien voulu m'accorder le 25 Septembre dernier, j'ai évoqué en particulier l'accord que le Professeur Intaranont et moi-même avons formalisé sous forme d'un memorandum en date du 3 Mai 1990, et dont je vous joins une copie.

Cet accord prendrait toute sa valeur s'il devenait un accord entre le Conservatoire National des Arts et Métiers et l'Université Chulalongkorn de Bangkok. Cette université est de beaucoup la meilleure université technique de Thallande et se situe à un bon niveau international.

Parmi les projets immédiats que nous considérons se trouvent :

- la préparation de la première maîtrise d'ergonomie en Thallande,
- une recherche commune sur la conception d'un nouvel autobus urbain construit par les Thai avec, peut-être, une coopération industrielle française,
- la préparation du congrès de la Société d'Ergonomie d'Asie du Sud-Est, qui se tiendra à Bangkok en Novembre 1991. Il se trouve que j'ai joué un certain rôle dans la fondation et le développement de cette Société.

Au cours de notre entretien du 25 Septembre, vous avez bien voulu considérer qu'un tel accord universitaire ne vous paraissait pas présenter de difficultés. Je sais, en tout cas, que le Recteur de l'Université de Shulalongkorn est disposé à signer. Vous aviez même évoqué un accord franco-thallandais au niveau diplomatique, mais l'étape inter-universitaire me paraît de toutes façons très positive, et plus facile à réaliser dans l'immédiat.

Veuillez agréer, je vous prie, l'expression de mes sentiments dévoués.

A. Wisner



MINISTÈRE DE L'ÉDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS

ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

Paris, le

MEMORANDUM

Since 1988, Professor Alain Wisner, Director of Laboratory of Ergonomics and Work Neurophysiology, Conservatoire National des Arts et Métiers, Paris, and Professor Kitti Intaranont, Faculty of Engineering, Chulalongkorn University, Bangkok, have discussed and shared interests in Ergonomic research and application of Ergonomics.

Professor Wisner had made a visit to the Laboratory for Ergonomic Research in 1988 and to Khon Kaen University where a pioneered Ergonomic research was on going under the guidance of Professor Intaranont.

In 1990, Professor Intaranont was invited to visit the Laboratory of Ergonomics and Work Neurophysiology in Paris. He gave a seminar on "How the Laboratory contributes to the change in working conditions in Thailand".

Considering their mutual interests, Professors Wisner and Intaranont agree

1. to exchange Ergonomic information and knowledge
2. to jointly conduct seminars and research in Ergonomics
3. to exchange professors and students, and
4. other actions useful for the development of teaching, research and application in Ergonomics.

This memorandum is signed on the third of May, 1990

A. Wisner

K. Intaranont

\*\*\*\*\* MATRACOM \*\*\*\*\* JOURNAL \*\*\*\*\* DATE 22-05-1991 \*\*\*\*\* HEURE 16:43 \*\*\*\*\*

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MINISTÈRE DE L'ÉDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS

ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

Paris, le

22nd May, 1991

Prof. Kitti INTARANONT  
Dept. of Industrial Engineering  
Chulalongkorn University  
Bangkok 10330  
Thailande

Fax N° : 66 2 252 1513  
253 6161  
251 3969

Dear Kitti,

I am very happy and proud that you are now Associate Dean. I hope that, as you expected, your Dean will come to IEA 91. In fact, this congress will be quite a success : 2,800 pages documents will be published and we expect as twice as many participants as the biggest congress ever held until now.

I thank you very much to have accepted to chair the session in a domaine where you are extremely competent.

I am preparing the proposal of Agreement between our two Universities. I realise that I am late but the preparation of the congress is a terrible load and I am still at the head of the Laboratory.

Considering now my travel to South East Asia, I have to underline that I will not be in Bangkok for holidays (I will be on holidays in France in August) but I will be in your country to work. This is why my wife will remain in France helping in different ways our children to take care of our grand children.

First I will be in Thailand to help you if you wish. Secondly I will write my Bangkok Conference and some parts of my book on Anthropotechnology. Thirdly I will take part in the Bangkok Conference.

I agree fully to your proposal of teaching. I understand that there is no teaching in Thailand Universities in October. Therefore, in the last two weeks of October I shall go either to The Philippines to teach at UP or in ~~Taiwan~~ <sup>Taiwan</sup> for a research contract on Taipei subway.

If you maintain your proposal, I shall teach in November 91 the two courses you propose on Safety and Engineering.

1st : Safety <sup>System</sup> Design Project. I intend to speak on complex systems and their risks, specially in Industrially Developing countries, taking examples in the famous catastrophe in Bohpal I have specially studied, Three-Miles Island, Chernobyl and so on.

2nd : Safety Engineering. I intend to speak about the importance of Work Analysis of existing machines and about the Methodology to analyse the possible behaviours of the workers in the future machines. It is a special orientation of the lab.

There will be no problems for the first three weeks : 1st-24th November but even during the Congress, 25th-29th November, I accept to teach if your students do not attend the congress and if you can avoid the day I am giving my conference on Occupational Ergonomics Toxicology in tropical countries.

I will, of course, teach in English. Do your students have any difficulty about this language ?

I would be delighted to stay in SASA but only in the "Vice-President" room. The "Executive" is not comfortable enough. But the Vice-President costs 1,400 Bhts (if the prices have not raised, please check it). It is acceptable only if tax and service are included ; with 30% discount, this means I shall pay only 1,000 Bhts. Will it be possible to obtain these prices as an Invited Professor to Chulalongkorn ? If not, I will go in Silom-Suriwong area or Sukhumvit where I know many decent hotels with good rooms and swimming pools at 1,000 Bhts, tax and service included.

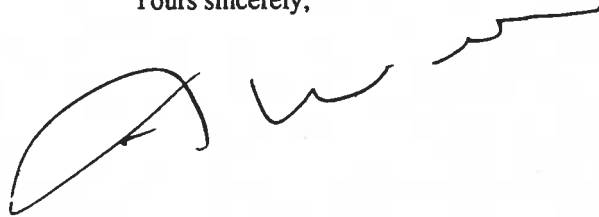
You are looking very kindly about some money for my living expenses. I am very grateful for it but, as you know, I have some needs related to my age and health that incite me to stay in a rather expensive place but happily I can afford it. So please do not worry too much about this question.

I am sending under separate cover a book collecting the papers I have written in English during the last ten years and two books in which I have assembled a series of papers written by other authors about Cognitive Sciences at work.

I am very happy to see you in Paris in July and in Bangkok in November.

With my best regards,

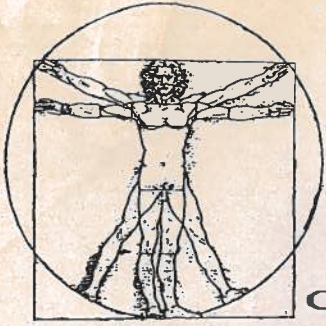
Yours sincerely,



Alain Wisner

Ⓚ cognitive psychology and Anthropology vol I & II  
+ Ergonomics cognitive anthropotechnology 81-91





## CHULALONGKORN UNIVERSITY

Laboratory for Ergonomic Research  
Dr. Kittit Intaranont, Head

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Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

TO: Professor Alain Wisner, Fax +33-1-47 07 5901  
Laboratoire d'Ergonomie et Neurophysiologie du Travail  
CNAM  
41, Rue Gay Lussac  
75005 PARIS, FRANCE.

February 14, 1991

Dear Alain:

Like I stated in my last fax to you yesterday that good news followed. The post graduate course in safety engineering and ergonomics has been approved by Ministry of University Affairs. The course will be offered next school year starting June 1991 and ending September 1991. The second semester starts November 1991 to February 1992. You have mentioned to me once that you prefer to take a month-leave after the Congress. And since you are going to come to Thailand to join the ACOH/SEAES Conference in late November 1991, it will be a very good opportunity for both of us to discuss future plan if you could stay with us and conduct classes for a month (November). We offer 2 classes in the second semester: 1) SAFETY SYSTEM DESIGN PROJECT and 2) SEMINAR IN SAFETY ENGINEERING. These two classes are for the post graduate students. The first one meets one hour per week, and 2 hours/week for the second one. Students are expected to complete their assignments and report to the teacher every week. We will arrange the place for you and Mrs. Wisner to stay close to the campus but not at SASA because it is expensive if you stay for that long period. And the Graduate School will pay a little money for teaching per hour. I mean very very little. By this arrangement both of you will have lots of time for resting and travel to the country side.

I have better news for you, that is, I have been appointed to be an Associate Dean for Graduate Studies of Faculty of Engineering. The new Dean is very active to establish new cooperation with a variety of organizations. If you have some times please try to draft a letter from your Director to my President to encourage official relationship between the two Institutions. If possible, I try to bring my Dean to Paris IEA91 also. Let's keep in touch. We'll never know because thing's been changed rapidly. By the way, Gavriel Salvendy is here for a short visit. He gave one lecture. It was quite interesting. He will go back this Friday 15 February. What a nice man!

I hope to hear from you soon. With my best personal regards to you and Mrs. Wisner.

Sincerely yours,



MINISTÈRE DE L'ÉDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS

ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

Paris, le 30th April 1990

Dr. Kitti INTARANONT  
The Swedish Institute of  
Production  
Engineering Research  
Mölnadalsvägen 85  
S-412 85 GÖTEBORG  
Sweden

Dear Professor Intaranont,

Thank you very much for your important review about repetitive work. I have read it with the greatest interest. It is both scientifically solid and highly useful for practical applications. It shows that repetitive work is highly dangerous for muscular and osteomuscular systems but that ergonomic changes and better organisation can reduce these dangers. Some of the papers give practical and feasible solutions.

The effects of repetitive work as it is shown by your review are not only local but general and you are giving descriptions of some of the best papers on the effects of this type of stress.

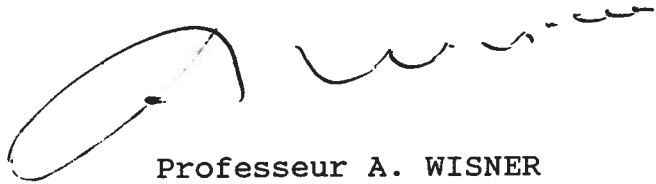
It is doubtful that cognitive activities like some of the ones on computer could be put in the same category as the one you have studied though they are extremely repetitive by nature. I think that another report could be written by another expert on this subject.

You asked me if it would be useful to publish this report as a book. My answer is highly positive : I have found a lot of intellectual satisfaction in reading your report and I will use it largely for research and teaching. I would like that as many of my colleagues as possible could be in a position to enjoy the same benefits.

The needed alterations are very few if there are any as this work has been done very carefully. My only suggestion would be to put at the beginning of the book a list of the authors and the title of their paper with the pagination. It would help the consultation.

I would like to thank you for having asked my advice on your report. It was both an honour and a pleasure.

Sincerely yours,

A handwritten signature in black ink, consisting of a large, sweeping initial 'A' followed by several smaller, connected loops and a final horizontal stroke.

Professeur A. WISNER  
Directeur du Laboratoire  
d'Ergonomie  
et Neurophysiologie du Travail

Paris, le 31 Janvier 1992

Monsieur Castets  
(Bureau du Professeur Davoine)  
Secrétariat International  
CNAM  
292 rue St Martin  
75141 Paris cedex 03

Cher Monsieur,

Je vous remercie de votre accueil toujours si ouvert.

J'ai enfin retrouvé la version de la Convention avec Chulalongkorn, en français. J'ai demandé au secrétariat du laboratoire de lui donner une forme convenable, et vous en adresse trois exemplaires - deux qui devraient être signés par le Professeur Fleury, et un que vous pourriez garder pour vos archives.

Je vous remercie de ce que vous faites pour aider mes activités internationales.

Veillez agréer, cher Monsieur, l'expression de mes sentiments dévoués.

A. Wisner

# CONVENTION

ENTRE

L'Université Chulalongkorn (Thaïlande)

ET

Le Conservatoire National des Arts et Métiers (France)

TITRE I - OBJECTIFS

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Article 1

Désireuses d'organiser des échanges bilatéraux, chacune des deux parties s'attachera à atteindre les objectifs suivants :

- . participer à l'encadrement de l'autre partie par la mise à sa disposition de membres de son personnel enseignant ou de recherche pour des périodes de courte, moyenne, et longue durée dans la mesure des possibilités de chacun des établissements;
- . diffuser des informations sur l'organisation et les objectifs de chacune des parties tant en ce qui concerne l'enseignement que la recherche, en vue de susciter des candidatures à des postes d'enseignants en coopération pour participer tant aux activités de recherche qu'aux activités pédagogiques;
- . rechercher tous les moyens susceptibles de favoriser la recherche dans les domaines d'intérêt commun et de promouvoir une meilleure formation des étudiants, enseignants, chercheurs et ingénieurs;
- . procéder à des consultations en vue de l'amélioration et du développement de la formation universitaire et post-universitaire;
- . favoriser une participation mutuelle aux congrès, colloques, stages et écoles d'été organisés par l'une ou l'autre des parties;



- . favoriser les échanges et les contacts entre les structures universitaires et les entreprises industrielles des deux pays.

## Article 2

Les deux parties s'engagent à échanger régulièrement des informations relatives à l'organisation et à la documentation pédagogique.

Dans le domaine de la recherche, les deux établissements organiseront de concert l'envoi de chercheurs post-gradués dans le cadre de recherche commune et réserveront une participation privilégiée à ceux-ci aux manifestations scientifiques, sous réserve de disposer des financements correspondants.

## TITRE II - MODALITES ET DOMAINE DE COOPERATION

### Article 3

Le développement de la coopération inter-établissements fera l'objet d'une programmation élaborée en commun à l'occasion de réunions entre les parties intéressées. Ces programmes seront soumis aux autorités thaïlandaises et françaises compétentes.

### Article 4

Il sera précisé dans le programme annuel les spécialités scientifiques ou techniques et les qualifications des enseignants permanents que l'une des parties met à la disposition de l'autre.

Ce programme annuel établira le cas échéant :

- . la liste nominative, les grades et les références des enseignants, des consultants, des experts détachés pour des missions de courte ou moyenne durée, des conférences, des stages ou des interventions d'ordre technique;

- . le nombre d'étudiants et leur programme d'étude retenu pour l'échange;
- . le nombre et type d'entreprises désireuses de participer à leur formation.

### TITRE III - CLAUSES CONTRACTUELLES

#### Article 5

##### Echanges d'enseignants-chercheurs ou d'étudiants

Les deux institutions s'efforceront d'échanger chaque année enseignants, chercheurs et étudiants dans chaque sens sur une base approximativement paritaire. L'effort portera tout particulièrement sur les étudiants préparant des thèses de Doctorat.

##### 5.1. Echanges d'enseignants-chercheurs

Chaque établissement assurera la rémunération de ses enseignants pendant leur séjour à l'étranger. L'établissement d'accueil leur apportera son aide en ce qui concerne leur logement et la couverture sociale.

##### 5.2. Echanges d'étudiants

La pratique établie pour traiter l'équivalence des unités de valeur, des semestres et des diplômes fera l'objet d'une consultation réciproque.

#### Article 6

Afin d'assurer le suivi de la convention, chaque partie désignera un comité disposant d'un secrétariat et notamment chargé à la fin du second semestre de l'année universitaire de dresser un bilan des réalisations.

Un rapport annuel sera soumis aux autorités de tutelle des deux parties.

TITRE IV - MOYENS

Article 7

Les deux parties solliciteront auprès des organismes chargés d'encourager la coopération scientifique, les participations nécessaires à la mise en oeuvre du présent accord.

Elles s'efforceront par ailleurs de soutenir les actions engagées auprès de tout organisme habilité pour ce faire.

Article 8

Les dispositions financières convenues dans le cadre du programme de coopération culturelle et scientifique entre les gouvernements des deux pays seront applicables au fonctionnement de cette convention et des programmes qui en découleront.

TITRE V - APPROBATION DU PRESENT ACCORD

Article 9

Toutes les difficultés liées à l'application du présent accord seront examinées à l'occasion de réunions entre les parties intéressées afin d'en faciliter le règlement. Il en sera référé, le cas échéant, aux autorités de tutelle compétentes des deux pays.

Article 10

Le présent accord est conclu pour une période de quatre ans, renouvelable par tacite reconduction, et prend effet à la date de la signature. Sa dénonciation s'effectuera par écrit six (6) mois avant l'expiration de la période en cours.

Fait à BANGKOK  
le

Fait à PARIS  
le

Le Pr Charas Suwanwela, M.D.  
Président de l'Université  
CHULALONGKORN

Le Pr Guy Fleury  
Administrateur Général  
du Conservatoire National  
des Arts et Métiers



**SOUTHEAST  
ASIA  
ERGONOMICS  
SOCIETY**  
(SEAES)

**TOPICS FOR ERGONOMICS IN DEVELOPING COUNTRIES.**

Themes of interest discussed at various International Symposiums on Ergonomics in Developing Countries can be summarised as follows;

**I. Role of ergonomics in development**

- The impact of ergonomics on working conditions, productivity and worker's health
- Design problems in the adaptation of machinery, tools and equipment and workplaces to the anthropometric differences of various populations.
- Application of ergonomics in the transfer of technology.
- Review of policies and measures with regard to systematic application of ergonomics.

**II. Ergonomics in industry.**

- Practical means of applying ergonomics in undertakings of various sizes in different industries.
- Case studies and low-cost solutions to traditional and new problems.
- Work and workload in the natural environment of the tropics.
- Ergonomic design of work systems and workplaces.

**III Ergonomics in the rural sector.**

- Application of ergonomics to cope with strenuous and hazardous work in agriculture, forestry, plantations and cottage industries.
- Case studies of improvements applying simple methods.

**IV. Education and training in ergonomics.**

- Policies, curricula and methods of education and training in ergonomics for designers, engineers, occupational safety-health personnel, inspectors, managers and workers.
- Collection of ergonomic data.
- Exchange of information and experience.

**SOUTHEAST ASIA ERGONOMICS SOCIETY  
(SEAES)**

**President:**

Dr. Chaityuth Chavalitnitikul  
Director, National Institute  
for the Improvement of Working  
Conditions and Environment,  
Department of Labour Protection  
and Welfare  
Thaling Chan, Bangkok, 10170  
THAILAND

**Secretary-Treasurer:**

Dr. Kitti Intaranont  
Laboratory for Ergonomics research  
Department of Industrial Engineering  
Faculty of Engineering  
Chulalongkorn University  
Bangkok 10330, THAILAND

**Council Members:**

Dr. C.N. Ong, Singapore  
Dr. Clarissa Rubio, the Philippines  
Dr. Guat-Lin Evelyn Tan, Malaysia  
Mr. Imam Birowo, Indonesia

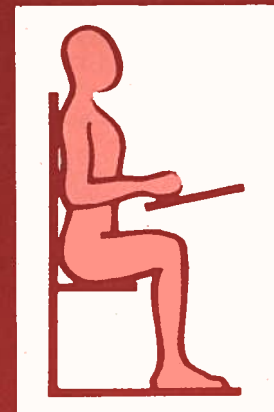
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**SEAES SECRETARIAT OFFICE**

Laboratory for Ergonomics research,  
Department of Industrial Engineering,  
Faculty of Engineering, Chulalongkorn University,  
Bangkok 10330, THAILAND

Tel: (02) 252-5001

Fax: (02) 574-0078, 253-6161



**SOUTHEAST  
ASIA  
ERGONOMICS  
SOCIETY**  
(SEAES)

SEAES, a professional society founded in 1984, promotes research, application and training in ergonomics, or human factors in technology and daily life, in countries in Southeast Asia.

## OBJECTIVE:

To promote research and action in ergonomics, looking into human factors arising from the relationship between man and his occupation, equipment and environment in the countries in Southeast Asia.

## ORIGIN:

Ergonomists working in and for Southeast Asia initiated in 1976 a link of exchanging experiences. The co-operation grew through scientific meetings and mutual visits. From concern with human factors in this rapidly changing and developing region, SEAES was founded in 1984 to foster the link and promote wider application of ergonomics.

## ORGANISATION:

SEAES is a professional society of researchers and practitioners in ergonomics who work primarily in ASEAN countries; Brunei, Indonesia, Malaysia, the Philippines, Singapore and Thailand. It is constituted of fee-paying members and affiliated organisation, guided by a Council. The Members of the Council including Officers are elected at a General Meeting. For the period of 1992-1994, the President is Dr.Chaiyuth Chavalitnitikul, Thailand; and the Secretary-Treasurer is Dr.Kitti Intaranont, Thailand.

## ACTIVITIES:

SEAES's functions are:-

- to promote study and publications;
- to educate and train in ergonomics;
- to collaborate with similar institutions;
- to organise meetings; and
- to help advance practical application in the field of ergonomics.

The promotion of understanding and action in human factors is particularly important in the developing world. Ergonomics can play a significant role in making work and equipment adapted to people and products fit for human use. Technology often neglects local people's capacities and size. Its mismatch can bring about serious consequences for many people, such as accidents, discomfort, ill-health and lowered productivity. Using information about people's size, ability to work and handle information and daily life needs, ergonomists should work together to make workplaces, equipment and products safer, more comfortable and more productive. In November 1985, the First General Meeting of SEAES was held in Denpasar, Bali Indonesia. This was held after the International Symposium on Ergonomics in Developing Countries organised in Jakarta by the ILO, WHO, the Department of Manpower of Indonesia, the International Ergonomics Association and SEAES. The Second SEAES Conference and Meeting was also held in Denpasar, Bali Indonesia in late July 1988, just before the 10th IEA 88 Congress in Sydney, Australia. The Third Conference was jointly organized with ACOH in Bangkok, Thailand in late November 1991. The General Meeting decided to concentrate, in 1992-1994, on exchange of research results and training materials, regular publication of two periodicals and promotion of training activities. SEAES has been accepted as a Federated Society Member of the International Ergonomics Association (IEA).

## PUBLICATION:

SEAES Newsletter is published periodically for free distribution to the members, affiliated organisations and people interested in co-operation with SEAES. Journal of Human Ergology, a scientific periodical with original papers and short communications, is published jointly by the Human Ergology Society, based in Japan, and SEAES. The journal is free to members.

(Non-members can also subscribe to the Journal of Human Ergology by paying the subscription fee. Send the application to:

Center for Academic Publications Japan,  
4-16, Yayoi 2-chome, Bunkyo-ku,  
Tokyo 113, JAPAN)

## FINANCE:

SEAES is financed by membership fees, affiliated organisation fees and funds or grants given for the support of its work.

## APPLICATION FOR MEMBERSHIP :

- The membership fee is US\$10.00 or 250 Baht per year for individual members. Application for membership should be made by completing the enclosed slip and sending it to:

Dr.Kitti Intaranont  
SEAES Secretary-Treasurer  
Laboratory for Ergonomics Research  
Department of Industrial Engineering  
Faculty of Engineering  
Chulalongkorn University  
Bangkok 10330; THAILAND

- Firms, companies and associations having interest in ergonomics in Southeast Asia may become Affiliated Organizations. The annual fee is US\$ 100.00 or 2,500 Baht. Each Affiliated Organization receives two copies of all circulars and programmes and may send two representatives to all scientific meetings of SEAES. Application should be sent to the above address.

## APPLICATION FORM FOR MEMBERSHIP

Annual subscription for individual members:  
US\$ 10.00 or 250 Baht payable to:

SEAES-Ergonomics Society  
Account No. 045-2-35831-8  
Siam Commercial Bank  
Sapha Kachat Thai Branch  
Henri Dunant St. Bangkok 10330

Membership includes:

Circulars  
SEAES Newsletter  
Journal of Human Ergology

I wish to apply for membership of SEAES and enclose a bankdraft US\$ \_\_\_\_\_ membership subscription for \_\_\_\_ year(s) beginning 19\_\_\_\_.

NAME

Dr/Prof/Mr/Miss \_\_\_\_\_

Position in the Institution: \_\_\_\_\_

Name of the Institution: \_\_\_\_\_

ADDRESS

Office \_\_\_\_\_

Tel. \_\_\_\_\_

Home \_\_\_\_\_

Tel. \_\_\_\_\_

Please send this completed application form and your subscription to:

\*\*\* Dr. Kitti Intaranont  
SEAES Secretariat Office  
Laboratory for Ergonomics Research  
Department of Industrial Engineering  
Faculty of Engineering  
Chulalongkorn University  
Bangkok 10330, THAILAND

\*\*\*



# SEAES

## NEWS LETTER

### South-East Asian Ergonomics Society

The Third SEAES Conference  
jointly organized with ACOH  
at Central Plaza Hotel  
Bangkok, THAILAND  
25-27 November 1991

The Third Conference of the South-East Asia Ergonomics Society (SEAES) was held jointly with the 13th Asian Conference on Occupational Health (ACOH) at Central Plaza Hotel, Bangkok, Thailand from 25-27 November 1991. According to the AAOH report of the Conference, there were 32 scientists from all over the world participated in the Conference and 159 papers presented. There were 29 sessions inclusive of scientific, symposium, posters and plenary. Among these, 7 sessions had a word "ergonomics" in the session title. In these ergonomics sessions, there were about 35 papers presented. For the sake of statistics, the following shows nationality list of the ergonomics presentors,

1	from Bangladesh
1	from Belgium
1	from Finland
2	from Great Britain
1	from Hong Kong
3	from India
2	from Indonesia
10	from Japan
1	from Korea
2	from Philippines
3	from Singapore
4	from Thailand

It was no doubt that, despite small numbers of ergonomics presentation, the audiences were well-packed in the rooms. Fruitful discussions have been realized among the participants. This is a sound indication for future development of ergonomics in our region.

#### New Officers for 1992-1994 Elected at the General Meeting

The General Assembly of SEAES members took place at Central Plaza Hotel, Bangkok, Thailand, on Monday 25 November 1991. The meeting discussed the report of President A. Manuaba and elected new executives. Thirty-one members attended. Professor Manuaba reported that not many activities had been implemented during the past three years due to legal matters in Singapore. Dr. Ong, the SEAES Secretary-Treasurer, added there was a legal problem to utilize SEAES money due to the fact that SEAES has not been registered in Singapore.

Professor Manuaba also reported his attendance at the IEA Board Meeting in Paris (11th IEA Congress). He proposed Bali, Indonesia, as the place for IEA Congress of the year 2000 competing against Los Angeles, Edinburgh and Berlin. The decision will be made in Berlin by the IEA Board in August 1992. The members welcomed his idea and also blessed his courage.

With respect to the co-operation with IEA, there was a proposal to have Roving Seminars in Southeast Asia in which IEA would provide Ergonomics Experts to join with local experts in the seminars. The members were encouraged to join the team.

The Meeting also approved the membership fee to be US\$ 10 or 250 Baht per year for individual member and US\$ 100 or 2500 Baht per year for corporate member. The members then elected new executives of the Society for the 1992-1994 period as follows:

President:

Dr. Chaiyuth Chavalitnitikul  
Thailand

Secretary-Treasurer:

Dr. Kitti Intaranont  
Thailand

Council Members:

Dr. C.N. Ong, Singapore

Dr. C. Rubio, Philippines

Dr. G-L Evelyn Tan, Malaysia

Mr. Imam Birowo, Indonesia

PRESIDENT: CHAIYUTH CHAVALITNITIKUL, PH.D.

SECRETARY-TREASURER: KITTI INTARANONT, PH.D.

SECRETARIAT OFFICE: LABORATORY FOR ERGONOMICS RESEARCH, DEPARTMENT OF INDUSTRIAL ENGINEERING,  
FACULTY OF ENGINEERING, CHULALONGKORN UNIVERSITY, BANGKOK 10330, THAILAND.

TEL: (662) 252-5001 FAX: (662) 574-0078, 253-6161

In closing the meeting, the members agreed to offer a vote of appreciation to Professor Manuaba and Dr. Ong for their untiring efforts as President and Secretary-Treasurer, respectively.

In the pursuing discussions, there were 2 proposals to organize the next conference. One idea was to plan a joint conference with Pan-Pacific Conference on Occupational Ergonomics in 1994. Another was to join with Australian Ergonomics Society in 1993. No decision has been made. The meeting agreed that it should be the duty of the new SEAES Executives to advise the members.

### Proceedings

The Organizing Committee requested for the order of ACOH/SEAES Conference Proceedings. Members can place their orders with:

Conference Secretariat ACOH/SEAES  
c/o C.C.E. (Thailand)  
P.O. Box 10-163  
Lard Proa, Bangkok  
Bangkok 10310, THAILAND

Better hurry up, limited copies!

### Important News

Members who work for National Government and are interested in getting supports for their training and research programs can contact:

Chief Technical Advisor  
Asian Regional Programme on  
Occupational Safety and Health  
(RAS/90/M12/FIN)  
P.O. Box 1759  
Bangkok 10501, THAILAND

and request for a copy of Summary Paper.

### Miscellaneous

We welcome members who wish to send their communications. Please do so by making a contact with SEAES Secretariat Office, address shown above.

The President advised the Secretary-Treasurer to set up a small group meeting to discuss Roving Seminars as proposed by IEA Chairman, Education and Training Committee (Prof. M. Bullock). Invitations will be ready in due time.

\*\*\*\* Alarming News \*\*\*\*  
\*\*\*\*\*

The Society list shows 140 members registered, the number can be reduced if our respected members do not pay the fee before the end of April 1992. We thank those who have sent their membership due before the time. Please kindly observe that the strength of our SEAES relies heavily on the membership fee.



\*\*\*\*\* MATRACOM \*\*\*\*\* JOURNAL \*\*\*\*\* DATE 16-06-1992 \*\*\*\*\* HEURE 11:10 \*\*\*\*\*

NO.	COM	DOC	DUREE	E/R	IDENTIFICATION	DATE	HEURE	DIAGNOSTIC
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- CNAM - ERGONOMIE -

\*\*\*\*\* -MATRA COMMUNICATION- \*\*\*\*\* - 33 1 43253614- \*\*\*\*\*

TRANSMISSION PAR TELECOPIE  
FAX TRANSMISSION

Date : 16/06/92

Nombre de pages : 3  
(y compris celle -ci)  
Number of pages including this one

Destinataire : Prof. KITTI INTARANONT  
To :

N° Télécopieur : 19.66.2.252.1519.

Objet :  
Message :

Emetteur :  
From :

M

Laboratoire d'Ergonomie  
Conservatoire National des Arts et Métiers  
41, rue Gay-Lussac  
75005 PARIS  
FRANCE

Téléphone [33] 1 44 10 78 ..  
Phone

Secrétariat [33] 1 43 54 18 27  
Secretary

Télécopieur [33] 1 43 25 36 14  
Fax number



MINISTERE DE L'EDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET METIERS  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL

Paris, 15th June 1992

Prof. Kiti INTARANONT  
Dept. of Industrial Engineering  
Chulalongkorn University  
Bangkok 10330  
Thaïlande

Dear Kitti,

I am now back from Brazil where I stayed for six weeks teaching in different Universities.

I hoped to find in my mail when coming back an answer to my letter of 24th February about your intention to visit France this year with the funding I have obtained from NEB. May be my letter never reached you ? I am therefore enclosing a copy but may be your answer was lost in the post. I know also how busy you are and you may have gone over your own strength. I hope anyway your health is still in good shape.

If you intend to come to France, September or December (until 20th) would be good.

I have myself the intention to go back to South-East Asia. Our friend, Dr. Malinee, has proposed to me a rather busy schedule for November but, of course, time is always available if you wish to meet me or to employ me when I am in Bangkok in October-November (approximately the same period as last year). I don't think I will go to Manilla this time.

Of course, I followed with anxiety as our friends of Thailand have done, the events that took place recently in your country. I hope that the issue of this crisis will be positive.

I hope that I shall have the opportunity to meet you either in Bangkok or in Paris and send you my best regards and wishes for yourself and your family.

Yours sincerely;

Alain WISNER

Paris, le 25 Février 1992

Monsieurs Castets  
Affaires Internationales  
C.N.A.M.  
292 rue Saint Martin  
75141 Paris cedex 03

Cher Monsieur,

Je pense qu'après ma lettre du 31 Janvier accompagnée du texte français corrigé de la Convention avec l'Université Chulalongkorn, il vous a été possible d'adresser deux exemplaires signés de Monsieur Fleury, au Président de cette Université.

Je viens de recevoir de mon collègue, le Professeur Interanont, la lettre dont je vous joins copie, ainsi que de ma réponse.

Si, par hasard, les deux exemplaires de la Convention en Français signés du Professeur Fleury, n'étaient pas encore partis, il faudrait les adresser au Vice-Président pour les Affaires Extérieures de l'Université Chulalongkorn.

Le Président de cette Université demande également, très normalement, qu'il y ait deux exemplaires du texte en anglais, afin que chaque Université en garde un exemplaire doublement paraphé dans ses archives.

Veillez agréer, cher Monsieur, l'expression de mes sentiments dévoués.

A. Wisner



## CHULALONGKORN UNIVERSITY

Laboratory for Ergonomic Research  
Dr. Kitti Intaranont, Head

Department of Industrial Engineering  
Faculty of Engineering  
Bangkok 10330 THAILAND

Professor Alain Wisner  
Laboratoire d'Ergonomie et Neurosciences du Travail  
CNAM  
41, Rue Gay Lussac  
75005 PARIS, FRANCE.  
FAX +33-1-43 25 36 14

February 11, 1992

Dear Alain:

Your letter dated 24th December 1991 and redated 6 January 1992 has been received sometimes ago. We are glad that the orchid has made your wife and your daughter happy.

I hope you received my two reports I have sent to you after you left Bangkok. If not please inform me by fax, I shall send them again.

The original copy of the Agreement has been sent to Professor Fleury by Chulalongkorn University. We have asked his Office to prepare another original one for Chulalongkorn University to keep it in file. Enclosed you will find a french version of the Convention. I have marked an error on Page 3 which related Brazil not Thailand. If you want my President to sign on the French version, you can do so by answering the letter of the Vice President for Foreign Affairs (CHULA). I also enclose his copy to Professor Fleury for your information.

Thank you very much for your kind attempt to obtain funds for my research travel. Please kindly advise me when I should take a trip.

I hope to hear from you soon and looking forward to seeing you again. With my best personal regards to you and Mrs. Wisner.

Sincerely yours,



MINISTERE DE L'EDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET METIERS  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL

Paris, 24th February 1992

Prof. Kiti INTARANONT  
Dept. of Industrial Engineering  
Chulalongkorn University  
Bangkok 10330  
Thaïlande

Dear Kitti,

Thank you for your letter of 11 February.

CNAM has sent to the President of CHULA a corrected French version of the Convention signed by our Administrateur général. Could you kindly check if it has been safely received. I am sending a copy of this letter to Dr. Castets who is now in charge of foreign affairs at the CNAM.

You may travel to France any time but it has to be in 1992 as the funds will no longer be available in 1993. I will be in Paris until 15th April and will be in Brazil from 16th April until 31st May and in Paris again during the month of June. I will be in our country home in July and may be a week in September ; therefore, I should normally stay in Paris from 1st August until 15th October when I shall leave for South East Asia.

I received some proposals from Malinee to give one or two conferences in Bangkok and other Thai cities but, of course, I am specially available for you as far as you need it. I have also some projects for Manilla and Vietnam, as you know. Things are not at all fixed, so you can decide freely.

I will be again in Paris from 1st to 20th December.

With my best regards,

Yours sincerely,

Alain WISNER

No.0340/E/ 438

December 10, 1991

Conservatoire National des Arts  
et Metiers  
292, Rue Saint-Martin  
75141, Paris Cedex 03

Monsieur l'Administrateur General

We are pleased to inform you that our President, Professor Charas Suwanwela, has received your letter of 14 October 1991 and he gracefully agreed to sign the academic agreement with the Conservatoire National des Arts et Metiers represented by Professor Wisner. The signature was done on 22 November 1991. This agreement marks the beginning of formal links between our two institutions, which I believe, will be developed for greater benefit of our two universities.

Enclosed is the only original of the signed agreement sent to be kept at your Institution. We would be pleased if you would kindly send us another original with your signature in order that it could be signed by our President and be kept in our file.

With best regards,

Yours faithfully,

Dr. Wiwat Mungkandi  
Vice President for International Affairs  
Chulalongkorn University

*Handwritten notes:*  
1 60  
1

*Handwritten notes:*  
16/11/91

# CONVENTION

ENTRE

L'Université Chulalongkorn (Thaïlande)

ET

Le Conservatoire National des Arts et Métiers (France)



TITRE I - OBJECTIFS

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Article 1

Désireuses d'organiser des échanges bilatéraux, chacune des deux parties s'attachera à atteindre les objectifs suivants :

- . participer à l'encadrement de l'autre partie par la mise à sa disposition de membres de son personnel enseignant ou de recherche pour des périodes de courte, moyenne, et longue durée dans la mesure des possibilités de chacun des établissements;
- . diffuser des informations sur l'organisation et les objectifs de chacune des parties tant en ce qui concerne l'enseignement que la recherche, en vue de susciter des candidatures à des postes d'enseignants en coopération pour participer tant aux activités de recherche qu'aux activités pédagogiques;
- . rechercher tous les moyens susceptibles de favoriser la recherche dans les domaines d'intérêt commun et de promouvoir une meilleure formation des étudiants, enseignants, chercheurs et ingénieurs;
- . procéder à des consultations en vue de l'amélioration et du développement de la formation universitaire et post-universitaire;
- . favoriser une participation mutuelle aux congrès, colloques, stages et écoles d'été organisés par l'une ou l'autre des parties;

10

- . favoriser les échanges et les contacts entre les structures universitaires et les entreprises industrielles des deux pays.

## Article 2

Les deux parties s'engagent à échanger régulièrement des informations relatives à l'organisation et à la documentation pédagogique.

Dans le domaine de la recherche, les deux établissements organiseront de concert l'envoi de chercheurs post-gradués dans le cadre de recherche commune et réserveront une participation privilégiée à ceux-ci aux manifestations scientifiques, sous réserve de disposer des financements correspondants.

## TITRE II - MODALITES ET DOMAINE DE COOPERATION

### Article 3

Le développement de la coopération inter-établissements fera l'objet d'une programmation élaborée en commun à l'occasion de réunions entre les parties intéressées. Ces programmes seront soumis aux autorités brésiliennes et françaises compétentes.

### Article 4

Il sera précisé dans le programme annuel les spécialités scientifiques ou techniques et les qualifications des enseignants permanents que l'une des parties met à la disposition de l'autre.

Ce programme annuel établira le cas échéant :

- . la liste nominative, les grades et les références des enseignants, des consultants, des experts détachés pour des missions de courte ou moyenne durée, des conférences, des stages ou des interventions d'ordre technique;

- . le nombre d'étudiants et leur programme d'étude retenu pour l'échange;
- . le nombre et type d'entreprises désireuses de participer à leur formation.

### TITRE III - CLAUSES CONTRACTUELLES

#### Article 5

##### Echanges d'enseignants-chercheurs ou d'étudiants

Les deux institutions s'efforceront d'échanger chaque année enseignants, chercheurs et étudiants dans chaque sens sur une base approximativement paritaire. L'effort portera tout particulièrement sur les étudiants préparant des thèses de Doctorat.

##### 5.1. Echanges d'enseignants-chercheurs

Chaque établissement assurera la rémunération de ses enseignants pendant leur séjour à l'étranger. L'établissement d'accueil leur apportera son aide en ce qui concerne leur logement et la couverture sociale.

##### 5.2. Echanges d'étudiants

La pratique établie pour traiter l'équivalence des unités de valeur, des semestres et des diplômes fera l'objet d'une consultation réciproque.

#### Article 6

Afin d'assurer le suivi de la convention, chaque partie désignera un comité disposant d'un secrétariat et notamment chargé à la fin du second semestre de l'année universitaire de dresser un bilan des réalisations.

Un rapport annuel sera soumis aux autorités de tutelle des deux parties.

✓

TITRE IV - MOYENS

Article 7

Les deux parties solliciteront auprès des organismes chargés d'encourager la coopération scientifique, les participations nécessaires à la mise en oeuvre du présent accord.

Elles s'efforceront par ailleurs de soutenir les actions engagées auprès de tout organisme habilité pour ce faire.

Article 8

Les dispositions financières convenues dans le cadre du programme de coopération culturelle et scientifique entre les gouvernements des deux pays seront applicables au fonctionnement de cette convention et des programmes qui en découleront.

TITRE V - APPROBATION DU PRESENT ACCORD

Article 9

Toutes les difficultés liées à l'application du présent accord seront examinées à l'occasion de réunions entre les parties intéressées afin d'en faciliter le règlement. Il en sera référé, le cas échéant, aux autorités de tutelle compétentes des deux pays.

Article 10

Le présent accord est conclu pour une période de quatre ans, renouvelable par tacite reconduction, et prend effet à la date de la signature. Sa dénonciation s'effectuera par écrit six (6) mois avant l'expiration de la période en cours.

Fait à BANGKOK  
le

Fait à PARIS  
le

le Pr Charas Suwanwela, M.D.  
Président de l'Université  
CHULALONGKORN

Le Pr Guy FLEURY  
Administrateur Général  
du Conservatoire National  
des Arts et Métiers





จุฬาลงกรณ์มหาวิทยาลัย  
*Chulalongkorn University*

GREETINGS AND HAPPY NEW YEAR 1992

To

Friends and Colleagues:

The year 1991 is extremely busy for everyone of INTARANONTS. Dr. Salvendy visited Bangkok in February and led the seminar on human-computer interface at Chulalongkorn University. He had quite a good time with his long-time friend, Kovit Satavuthi. The family also hosted a wonderful girl from Canada, Jennifer Bennett, for 3 months.

Kitti has been appointed as an Associate Dean of Engineering for Graduate Studies since last March. He participated in IEA 91 Congress in Paris, as the only delegate from Thailand.

In November 1991, ACOH/SEAES Conference was organized in Bangkok, Thailand. Dr. Wisner took his vacation in Bangkok and Manila at the same period. He was very kind to give special lectures on cognitive engineering for IE graduate students. Kitti was elected as Secretary-General of the South-East Asian Ergonomics Society (SEAES). He will serve the Society from 1991 to 1994. The President-elected is Dr. Chaiyuth Chavalitnitikul of Department of Labour, Thailand.

Apart from the above duties and his teaching, he must take full responsibility of the joint ergonomic research (Thai-Belgium) sponsored by the Commission of European Communities for two more years. His partner, Vanwongerghem, has promised to make Kitti work harder ever to ensure good results for the Commission. God bless his heart.

Pilaiwan and children, Nid and Nuke, are busy too but strong and happy, despite of the fact that Kitti has travelled quite a lot. This year, he flies every Saturday to teach Ergonomics at Prince of Songkhla University in the south of Thailand. The session will end in March 1992.

The coming year of 1992, the INTARANONTS send their Best Wishes to friends and colleagues. May your Almighty Bless your Souls and Bring

ในวาระดิถีปีใหม่นี้

ขออำนาจสิ่งศักดิ์สิทธิ์ที่ท่านเคารพนับถือ

ได้โปรดอำนวยการให้ท่านประสบแต่ความสุขความเจริญ

และสำเร็จในสิ่งอันพึงปรารถนาทุกประการ

*Season's Greetings  
and Best Wishes for The New Year*



*Please extend our Best  
Wishes to Mrs. Wisner  
& family.*



MINISTÈRE DE L'ÉDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL

Paris, 24th December 1991

Prof. Kiti INTARANONT  
Dept. of Industrial Engineering  
Chulalongkorn University  
Bangkok 10330  
Thaïlande

*Received 6 January 1992 !!*

Dear Kitti,

I have been back in France for three weeks but all the friendship you showed me during my stay in Thailand is constantly present in my mind. I specially remember the last night where I was a little too afraid of being late. I was so sorry to be obliged to refuse one of the precious gifts that Mrs. Intaranont had prepared for me. The orchids have been the joy of not only my wife but also my daughter. Would you kindly thank again Mrs. Intaranont for them and for the charming day we spent together on the way to Ayudhya.

The Seminars-Meetings with your students were extremely stimulating for me and the travel to Songkhal most interesting.

I am very happy that we were in a position to receive the signature of the President of Chulalongkorn. I hope that the secretariat has been able to send a copy to Professeur Fleury at the CNAM. I am a little sorry because I cannot find again the erroneous French version. May be you could find it somewhere in Bangkok and send a copy to me as I would like this version to be signed also after correction.

I am very happy that you have been selected General Secretary of SEAES and I am sure that you will ensure the revival of this Society after the excellent presentation of Ergonomics at the mixed Congress SEOH-SEAES.

I hope that all this will continue and I am ready to continue to take part as I told you, probably in visiting again South East Asia from 15th October to 30th November 1992. I always privilege Thailand, the Philippines and may be Vietnam.

Anyway I hope that we shall soon discuss all these things in Paris. I am happy to inform you that Naturalia and Biologie have attributed 10,000 French francs towards your research travel in 1992 but I am afraid I cannot find any other subsidiaries as I am no longer the Director of the Laboratory. To prepare our discussion I would be extremely happy to receive one copy of each of the books you have published last November and that I did not bring with me due to luggage weight reasons.

*in* This period of the year is so important for Christians I wish you all the best for the New Year for yourself, your family and all your activities.

Yours sincerely,

Alain WISNER





MINISTERE DE L'EDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET METIERS  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL

Paris, 13th January 1992

Ms Sriruk Srithongchai  
Dept of Industrial Engineering  
Chulalongkorn University  
BANGKOK 10330  
Thailand

Dear Ms. Srithongchai,

I thank you very much for your New Year wishes. I wish you all the best for the New Year for yourself and your family.

I remember with pleasure our cooperation for your thesis and I thank you again for your help during my teaching.

I hope to be back in Bangkok, and specially in Chulalongkorn, in October/November 1992.

I would also welcome very much your stay in the Laboratory.

With my best regards,

Yours sincerely,

Alain WISNER

ASSESSMENT OF DRIVERS' WORKLOAD  
FOR  
BUS-DESIGN GUIDELINES: AN ERGONOMIC APPROACH

A Project Proposal of the  
Conservatoire National des Arts et Metiers  
(Professor Alain Wisner)  
and  
Chulalongkorn University

January 1992 - December 1994

TO BE SUBMITTED TO:

PROJECT NAME:

Assessment of Drivers' Workload for Bus-Design Guidelines: An Ergonomic Approach.

PROJECT REQUESTORS:

Conservatoire National des Arts et Metiers (CNAM)  
Laboratoire de Ergonomie et Neurophysiologie du Travail  
41 Rue Gay-Lussac  
75005 Paris, FRANCE

Chulalongkorn University (CHULA)  
Faculty of Engineering  
Department of Industrial Engineering  
Laboratory for Ergonomic Research  
Bangkok 10330, THAILAND

PROJECT LEADERS

Professor Alain Wisner for CNAM  
Dr. Kittti INTARANONT for CHULA

(Throughout this text "CNAM" should always be interpreted as "under the guidance of Professor Alain Wisner").

ORGANIZATIONAL FRAMEWORK:

The proposed project has two distinct phases. Phase I is related to the study and assessment of bus drivers' workload in order to formulate guidelines for the ergonomic design of public buses, driver's cab in particular. For optimum driving performance, safety transport means and passenger comfort, however, special treatments on population anthropometry and biomechanics, also mechanical design of the bus must be emphasized. Phase II is concerned with the construction of a mock-up (a bus) as designed in Phase I, and testing in the City of Bangkok. Modification of the bus transport between cities and testing will be implemented. Transport test can also be done in other Asian cities if approved by the authorities concerned. Only Phase I is presented in this document in detail. A separate detailed proposal for Phase II will be made after Phase I has started and proved to be successful.

STARTING DATE OF PHASE I: January 1, 1992.

DURATION OF PHASE I: 3 years (1-1-1992 to 12-31-1994).

TOTAL BUDGET REQUESTED FOR PHASE I:

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## 1. PROJECT BACKGROUND.

Throughout the world, the growth of transport systems has been a key element in economic development. For both developed and developing countries, increases in gross national product are accompanied by greater movement of people and goods, and greater investment in both vehicles and transport infrastructure. In the developing world, current trends in population, industrialization, and urbanization are putting pressures on transportation systems.

Some of the unwanted side-effects of this growth in traffic, such as congestion, noise, and pollution, are well documented and immediately obvious to all; others, such as the growing numbers of deaths and injuries from road traffic accidents, are apparent. These reveal a serious and growing problem, with absolute fatality and casualty figures rising rapidly in the majority of developing countries, and with death rates considerably higher than in the developed world.

Thailand has managed to increase the GNP from 58.9 billion Baht in 1961 to 1,041 billion Baht in 1985, an increase of 18 times. During the same period the per capita income has also increased about 10 times from 2,150 Baht to 20,420 Baht. Road transport has played a major role in this economic development process. The total number of vehicle registration has also increased dramatically from 738,000 in 1970 to 4,794,000 in 1987 with an average annual growth rate of about 12.7%. Trend in road accidents has followed economic growth with total number of 34,615 in 1988 as compared to 8,724 in 1971. The police records also put the number of fatalities at 3,196, 3,043 and 2,900 for 1986, 1987 and 1988, respectively. Of these records, traffic accidents occurred only in Bangkok amounts upto 9,539 in 1987 and 9,917 in 1988 with 85 and 75 fatalities, respectively.

Urban bus transportation plays an important part in daily lives of people in Bangkok like in other developing countries. They basically rely heavily on public transportation as a means of affordable mode of transportation. The role of bus transportation or any other public transportation system is primarily service oriented and not profit motivated. Accident statistics caused by or involved with public buses is about 3% in the city of Bangkok. Economic losses due to bus accidents is tremendously high in both direct and indirect costs because of traffic congestion and mental stress of people involved. In addition, existing bus has considerably poor design based on comfort and safety criteria for both the driver and passengers.

The causes of accidents may be described in several ways. At a general level, traffic accidents can be attributed to human behaviour, the vehicle and the environment, usually with some interaction among these. Older and Spicer (1976) advocated that accidents be the consequence of conflict situations involving the driver and the environment (and plus the vehicle presumably) that led to evasive actions on the part of the driver. Shinar (1978) reported data on the percentage of accidents from two samples that were attributed to human, vehicle and environmental causes and their combinations. One sample of 2258 accidents was investigated on-site, and the other sample of 420 was investigated in depth. The finding confirmed that human behaviour was clearly the dominant cause.

The driving environment includes the roads and highways, street and highway lighting, road markings, road signs, and traffic as well as the natural features of the ambient environment such as temperature and rain. Since this study will

concentrate on the drivers' performance based on human engineering discipline leading to ergonomic design of the bus, the road and street characteristics are beyond the scope of this study and will not be emphasized. Road markings, road signs and traffic lighting will be investigated as to promote the driver's visibility, if necessary.

Vehicle characteristics, such as displays, control processes and mechanisms, bus body dimension, seating and space considerations, and vibration and motion will be studied in detail. Jones (1976) discussed that the control characteristics was especially important in promoting safe driving pattern. It is commonly accepted that heavy cars are safer than light cars as confirmed by Grime and Hutchinson (1979) in their head-on-accident study in rural areas of Great Britain. The implication of this remark introduce a potentially conflicting problem in Bangkok when there is a tendency toward increased use of smaller cars for energy-conservation purposes and efficient moves along congested traffic.

It is imperative that a comprehensive study and design should be carried out to promote safe-driving conditions and be constructed and implemented accordingly. This project envisages a two phase evaluative study and implemented procedure:

- Phase I: Bus driving tasks in Bangkok will be analysed and evaluated in terms of stress and workload. Computerized design of the bus will be set up at the Engineering Computer Center. Department of Transportation (DOT) will be requested to cooperate with the project as well as the Bangkok Mass Transit Authority (BMTA). Both governmental agencies are well aware of the problems and they indeed show willingness to cooperate with full hope to introduce the standard design for the bus.
- Phase II: Construction of the bus designed in Phase I will be conducted. Extensive transport test will be implemented in Bangkok and throughout the country. Testing data such as subjective questionnaires and physiological responses will be collected and analysed. If opportunity opens with the approval of the authorities the bus can be road tested in other Asian cities as well.

The implementation of the project will be made possible through the cooperation of Chulalongkorn University, Faculty of Engineering, Department of Industrial Engineering, Thailand, Conservatoire National des Arts et Metiers, Laboratoire d'Ergonomie et Neurophysiologie du Travail. Technical assistance for testing of bus components for the evaluation of human compatibility will be sought from established bus manufacturers and dealers in Thailand and in France.

## 2. PROJECT IDENTIFICATION, GENERAL OBJECTIVES AND RESPONSIBILITIES.

### 2.1 Identification

The major components of the project are:

- 1) Comprehensive ergonomic experiments of the existing bus operations in Bangkok and inter-cities to assess drivers' workload in terms of physiological and psychological strain; evaluation of capacity norms in physiological, psychological and biomechanical aspects to establish standard work load in bus driving.
- 2) Human data collection of bus drivers and passengers such as anthropometrical and strength data to formulate ergonomic design of the bus; in-depth study with analysis of the man-machine interaction to determine the framework of the "design for people" with safety, comfort, legal and economical criteria.
- 3) Study of the mechanical design aspects of the bus; design layout of the bus

using computer-aided-design (CAD); Implementation of computer simulation showing driver-passengers-bus interaction to ensure the practical design.

Phase I of the proposed project will be undertaken for a period of three years, starting in January 1992. Phase II will start at a later date and will probably last for two or three years. The project consists of 2 phases. On completion of Phase I, computer simulation demonstration will be set up to evaluate the compatibility of the driver-passenger-bus system, prior to an attempt of Phase II implementation. A short study tour for small number of executives will be organized to cities in France where bus design and manufacturing institutes are established.

## 2.2 General Objectives.

The followings are the general objectives of this project:

- 1) Disseminate the experience and knowledge gathered by CHULA and CNAM through well-designed experiment of man-machine-environment system using work load assessment of bus drivers and passenger safety and comfort as ergonomic design criteria for the bus.
- 2) Formulate appropriate design algorithm and methodology based on human characteristics and capacity within economical framework.
- 3) Selection or development (if necessary) of appropriate computer softwares to supplement the second objective.
- 4) To establish and promote the institutional capabilities of CHULA and CNAM in the country in ergonomic research of transportation system.
- 5) To promote French expertise and technical capabilities suitable for Thailand.

## 2.3 Responsibilities.

The overall project will be undertaken under the joint responsibility of CHULA and CNAM. The specific responsibilities will be as follows:

### \*\* CNAM \*\*

- Professor Alain Wisner, professor in Ergonomics, will contribute to .....

He will be responsible for all aspects related to the French counterpart budget. He will be the principal investigator in CNAM.

The CNAM correspondence address:

Professor Alain WISNER,

Laboratoire d'Ergonomie et Neurophysiologie du Travail

Conservatoire National des Arts et Metiers

41, Rue Gay-Lussac

75005 Paris, FRANCE

### \*\* CHULA \*\*

Department of Industrial Engineering, Department of Mechanical Engineering and Engineering Computer Center will be involved in the project.

- Dr. Kitti INTARANONT, associate professor of industrial engineering, will be responsible for experimental design, procedures and analysis. He will also be the principal investigator of the project in CHULA and will be responsible for all aspects related to the CHULA counterpart budget.

- Dr. Ittiphol Pan-ngum, associate professor of mechanical engineering, will be responsible for mechanical design and testing of the bus. He will be the main coordinator between CHULA and DOT and BMTA.
- Mr. Chinathep Penjati, senior lecturer of mechanical engineering, will be responsible for mechanical testing of the components to determine the relationship between a driver and his bus control devices. He will also be an alternate for coordinating task between CHULA and other authoritative agencies.

The CHULA correspondence address:

Dr. Kitti INTARANONT  
 Chulalongkorn University (CHULA)  
 Faculty of Engineering  
 Department of Industrial Engineering  
 Laboratory for Ergonomic Research  
 Bangkok 10330, THAILAND

**\*\* CHULA & CNAM \*\***

Specific joint CHULA-CNAM responsibilities will be shared and decisions will be made by mutual agreement between Professor Alain WISNER and Prof. Dr. Kitti INTARANONT. CHULA and CNAM shall have the right to use the results obtained from this project for the purpose of academic publications.

### 3. PROJECT COMPONENTS OF PHASE I.

The three major components identified in 2.1 are elaborated here. The first component, assessment of workload and development of capacity norms of bus drivers, comprises the following:

- 1) To study, in depth, bus-accident statistics in Bangkok and inter-cities from all probable sources such as DOT, BMTA, Department of Police Highway Patrol, Department of Police Traffic Control, BMA Traffic Control Office and National Statistics Office. It is vital to understand the causes of accidents. It is normal if these statistical reports are different to certain extent. It is the duty of the investigators to elaborate in logical format.
- 2) To monitor time and motion of bus driving activity in Bangkok and inter-cities; to conduct task analysis and study working hours and shiftwork; to monitor flickering test of drivers before and after driving activity; to investigate existing driving control arrangement in terms of layout and force exertion requirement and to study working posture of the bus driver.
- 3) To monitor heart rate and visibility of the bus driver at work in Bangkok and inter-cities; to conduct nutritional analysis of the bus driver to determine daily energy input; to conduct hearing test and behavioural tests for the bus driver and also vision test such as static visual acuity test in high and low levels of illumination similar to those encountered in nighttime driving; to conduct an experiment on reaction time of drivers.

The second component delineated in 2.1 is the component of human data collection and ergonomic analysis of the man-machine-environment system. This mainly comprises the following items:



- 4) To measure, collect and analyse the anthropometric (42 items) and static strength (6 items) data as described in Ayoub, et al. (1984) and Ayoub, et al. (1978) of one-hundred bus drivers selected at random as well as bus passengers with equal number.
- 5) To measure, collect and analyse the reach envelope as described by Hertzberg (1972) of the bus drivers; to measure and record work space dimensions of driver's compartment as well as entrance/exit and bus body dimensions; to conduct a step test for the passengers to determine the appropriate height of bus steps.
- 6) To conduct psychological test on comfort ratings for drivers, in depth, as well as for passengers; to conduct mechanical tests for control mechanism components.

The last component is the design and demonstration phase and comprises the following:

- 7) To analyse the driver's movement in driving and compare to the reach envelope of his; To analyse heart rate pattern during driving and compare with flickering test results; to compare the control mechanism resistance with strength capacity of drivers.
- 8) To analyse the impact of environmental factors on driving capability and rate of fatigue; to redesign the driver's cab, seating and control by CAD as well as the passengers' section, seating and hand-holding rails.
- 9) To redesign a bus using a CAD system; to simulate the driver-passenger-bus system by computerized-graphic display using developed and/or selected software packages; to conduct detailed engineering economic analysis of the new bus design; to printout the design at all levels.

The following figure illustrates a tentative schedule of different activities.

4. MANPOWER REQUIREMENTS FOR PHASE I.

The following categories of staff are required for the project:

- CHULA Experts
- CNAM Experts
- Project personnels (in Thailand)
- Project personnels (in France)

4.1 CHULA Experts.

This category consists of professors from CHULA in the relevant areas covered in the project (cf. 2.3 \*\* CHULA \*\*). Professors are appointed according to the rules and regulations of CHULA. The tasks and responsibilities of each expert will be jointly decided by the project coordinators from three institutions.

4.2 CNAM Experts.

This category consists of experts from France organized by Professor Alain WISNER in the relevant areas of ..... Professor Alain WISNER is the expert who can be requested to make an in-depth study of bus-related problems and can receive financial assistance to study ergonomic problems in bus transportation in Bangkok. During this study in Bangkok, he could give short courses or seminars at CHULA.

4.3 Project personnels (in Thailand; to be hired according to CHULA Rules).

Notification and selection of personnels in Thailand will be done under the responsibility of the project coordinator in CHULA. The duration of employment should correspond to the specifications made in the project documents. Changes are allowed under the conditions that budget re-allocations remain within a maximum range of 20%.

Besides one Secretary, the following members constitute this category of staff:

Research Associate (one) 1-1-1992 to 12-31-1994. The research associate shall be at least a master's graduate in a relevant discipline, preferably working knowledge in engineering and experimental psychology or human factors. He or she should be able to comprehend the design problems of the man-machine-environment system. Working knowledge in computer programming is required and necessary as well as English proficiency but French and/or Dutch is a distinct advantage. The duration of this employment will be three years (to be reconsidered every year).

Research Assistant (one) 1-1-1993 to 12-31-1994. The research assistant shall be fluent in English. He or she should be able to translate technical documents from Thai to English and vice versa, and should also be able to assist in interviews and surveys to be conducted during the first two years of the project. Proficiency in Thai and English typing will be a distinct advantage. He or she will be responsible the administrative work within CHULA and liaison with government agencies and private companies. The duration of employment will be two years (to be reconsidered every year).

System Engineer (one) 1-1-1993 to 12-31-1994. The system engineer should possess sufficient experience in system analysis and software development. Knowledge of computer-aided-design programming is required and necessary. He or she should be capable of developing software packages in different aspects of computer graphic simulation. The system engineer should be able to work in concert with other members of the project staff and with smooth flow of information transfer. The duration of employment will be two years (to be considered yearly).

In short, the research associate will be responsible for more theoretical analysis and will have a coordinating role. The research assistant will be especially useful in data acquisition and administrative contacts. The system engineer will select, modify or develop user-friendly software adapted to the needs for CAD and computer graphic simulation of the driver-passenger-bus system. Occasionally, CHULA master's students can assist in data collection or computational tasks. For this purpose, a small budget will be provided.

4.5 Project personnels (in France: to be hired according to CNAM regulations).

-----

#### 5. BUDGET.

The requested budget is broken down in details as follows:

Table 1: expenses on CHULA level (Thailand).

Table 2: expenses on CNAM level (France).

Table 3: summary of the total budget.

The following points are to be stressed in addition to the budget details presented in Tables 1, 2, and 3.

- CHULA counterpart inputs "which are not budgeted" are as shown below:

Project Leader and other experts (approximately 10% of their time for 36 months)	400,000	Baht
Support facilities for 36 months, office accomodation and furnishing library	200,000	Baht
Teaching aids, printing and documentation	200,000	Baht
Some computer facilities and assistance	<u>200,000</u>	Baht
Total (yearly)	<u>1,000,000</u>	Baht

- However, a budget is requested for a short observation tour to France for maximum four executives of DOT and BMTA. This observation tour will provide opportunities to those invited executives to appreciate French technology in designing and constructing buses using "design for people" criteria. It will bring the DOT and BMTA direction in direct contact with French know-how in the field of bus design and construction. The four executives will be joined by one CHULA expert involved in the project and one member of the CHULA project personnel.

- CNAM counterpart inputs "which are not budgeted" are as shown below:

Project Leader and other experts (10% of their time for 36 months)	500,000	Ffr.
Support facilities, furnishing and services	100,000	Ffr.
Teaching aids, library and documentation	<u>100,000</u>	Ffr.
Total (yearly)	<u>700,000</u>	Ffr.

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ASSESSMENT OF DRIVERS' WORKLOAD  
FOR  
BUS-DESIGN GUIDELINES: AN ERGONOMIC APPROACH

A Project Proposal of the  
Conservatoire National des Arts et Metiers  
(Professor Alain Wisner)  
and  
Chulalongkorn University

January 1992 - December 1994

TO BE SUBMITTED TO:

*avec remarques*  
\_\_\_\_\_  
\_\_\_\_\_

PROJECT NAME:

Assessment of Drivers' Workload for Bus-Design Guidelines: An Ergonomic Approach.

PROJECT REQUESTORS:

Conservatoire National des Arts et Metiers (CNAM)  
Laboratoire de Ergonomie et Neurophysiologie du Travail  
41 Rue Gay-Lussac  
75005 Paris, FRANCE

Chulalongkorn University (CHULA)  
Faculty of Engineering  
Department of Industrial Engineering  
Laboratory for Ergonomic Research  
Bangkok 10330, THAILAND

PROJECT LEADERS

Professor Alain Wisner for CNAM  
Dr. Kitti INTARANONT for CHULA

(Throughout this text "CNAM" should always be interpreted as "under the guidance of Professor Alain Wisner").

ORGANIZATIONAL FRAMEWORK:

The proposed project has two distinct phases. Phase I is related to the study and assessment of bus drivers' workload in order to formulate guidelines for the ergonomic design of public buses, driver's cab in particular. For optimum driving performance, safety transport means and passenger comfort, however, special treatments on population anthropometry and biomechanics, also mechanical design of the bus must be emphasized. Phase II is concerned with the construction of a mock-up (a bus) as designed in Phase I, and testing in the City of Bangkok. Modification of the bus transport between cities and testing will be implemented. Transport test can also be done in other Asian cities if approved by the authorities concerned. Only Phase I is presented in this document in detail. A separate detailed proposal for Phase II will be made after Phase I has started and proved to be successful.

STARTING DATE OF PHASE I: January 1, 1992.

DURATION OF PHASE I: 3 years (1-1-1992 to 12-31-1994).

TOTAL BUDGET REQUESTED FOR PHASE I:

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- 3. Project Components of Phase I .....
- 4. Manpower Requirements for Phase I .....

  - 4.1 CHULA Experts .....
  - 4.2 CNAM Experts .....
  - 4.3 Project Personnels in Thailand .....
  - 4.4 Project Personnels in France .....

- 5. Budget .....
- 6. References .....

1. PROJECT BACKGROUND.

Throughout the world, the growth of transport systems has been a key element in economic development. For both developed and developing countries, increases in gross national product are accompanied by greater movement of people and goods, and greater investment in both vehicles and transport infrastructure. In the developing world, current trends in population, industrialization, and urbanization are putting pressures on transportation systems.

Some of the unwanted side-effects of this growth in traffic, such as congestion, noise, and pollution, are well documented and immediately obvious to all; others, such as the growing numbers of deaths and injuries from road traffic accidents, are apparent. These reveal a serious and growing problem, with absolute fatality and casualty figures rising rapidly in the majority of developing countries, and with death rates considerably higher than in the developed world.

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*old and bad distinction between driver vehicle environment*

The driving environment includes the roads and highways, street and highway lighting, road markings, road signs, and traffic as well as the natural features of the ambient environment such as temperature and rain. Since this study will



concentrate on the drivers' performance based on human engineering discipline leading to ergonomic design of the bus, the road and street characteristics are beyond the scope of this study and will not be emphasized. Road markings, road signs and traffic lighting will be investigated as to promote the driver's visibility, if necessary.

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The implementation of the project will be made possible through the cooperation of Chulalongkorn University, Faculty of Engineering, Department of Industrial Engineering, Thailand, Conservatoire National des Arts et Metiers, Laboratoire d'Ergonomie et Neurophysiologie du Travail. Technical assistance for testing of bus components for the evaluation of human compatibility will be sought from established bus manufacturers and dealers in Thailand and in France.

## 2. PROJECT IDENTIFICATION, GENERAL OBJECTIVES AND RESPONSIBILITIES.

### 2.1 Identification

The major components of the project are:

- 1) Comprehensive ergonomic experiments of the existing bus operations in Bangkok and inter-cities to assess drivers' workload in terms of physiological and psychological strain; evaluation of capacity norms in physiological, psychological and biomechanical aspects to establish standard work load in bus driving.
- 2) Human data collection of bus drivers and passengers such as anthropometrical and strength data to formulate ergonomic design of the bus; in-depth study with analysis of the man-machine interaction to determine the framework of the "design for people" with safety, comfort, legal and economical criteria.
- 3) Study of the mechanical design aspects of the bus; design layout of the bus

not so  
simple

X

No

Yes

using computer-aided-design (CAD); Implementation of computer simulation showing driver-passengers-bus interaction to ensure the practical design.

Phase I of the proposed project will be undertaken for a period of three years, starting in January 1992. Phase II will start at a later date and will probably last for two or three years. The project consists of 2 phases. On completion of Phase I, computer simulation demonstration will be set up to evaluate the compatibility of the driver-passenger-bus system, prior to an attempt of Phase II implementation. A short study tour for small number of executives will be organized to cities in France where bus design and manufacturing institutes are established.

Review  
//  
critique

2.2 General Objectives.

The followings are the general objectives of this project:

- 1) Disseminate the experience and knowledge gathered by CHULA and CNAM through well-designed experiment of man-machine-environment system using work load assessment of bus drivers and passenger safety and comfort as ergonomic design criteria for the bus.
- 2) Formulate appropriate design algorithm and methodology based on human characteristics and capacity within economical framework.
- 3) Selection or development (if necessary) of appropriate computer softwares to supplement the second objective.
- 4) To establish and promote the institutional capabilities of CHULA and CNAM in the country in ergonomic research of transportation system.
- 5) To promote French expertise and technical capabilities suitable for Thailand.

X  
//

2.3 Responsibilities.

The overall project will be undertaken under the joint responsibility of CHULA and CNAM. The specific responsibilities will be as follows:

**\*\* CNAM \*\***

- Professor Alain Wisner, professor in Ergonomics, will contribute to .....

He will be responsible for all aspects related to the French counterpart budget. He will be the principal investigator in CNAM.

The CNAM correspondence address:

Professor Alain WISNER,  
Laboratoire d'Ergonomie et Neurophysiologie du Travail  
Conservatoire National des Arts et Metiers  
41, Rue Gay-Lussac  
75005 Paris, FRANCE

**\*\* CHULA \*\***

Department of Industrial Engineering, Department of Mechanical Engineering and Engineering Computer Center will be involved in the project.

- Dr. Kitti INTARANONT, associate professor of industrial engineering, will be responsible for experimental design, procedures and analysis. He will also be the principal investigator of the project in CHULA and will be responsible for all aspects related to the CHULA counterpart budget.

- Dr. Ittiphol Pan-ngum, associate professor of mechanical engineering, will be responsible for mechanical design and testing of the bus. He will be the main coordinator between CHULA and DOT and BMTA.
- Mr. Chinathep Penjati, senior lecturer of mechanical engineering, will be responsible for mechanical testing of the components to determine the relationship between a driver and his bus control devices. He will also be an alternate for coordinating task between CHULA and other authoritative agencies.

The CHULA correspondence address:  
 Dr. Kittti INTARANONT  
 Chulalongkorn University (CHULA)  
 Faculty of Engineering  
 Department of Industrial Engineering  
 Laboratory for Ergonomic Research  
 Bangkok 10330, THAILAND

**\*\* CHULA & CNAM \*\***

Specific joint CHULA-CNAM responsibilities will be shared and decisions will be made by mutual agreement between Professor Alain WISNER and Prof. Dr. Kittti INTARANONT. CHULA and CNAM shall have the right to use the results obtained from this project for the purpose of academic publications.

**3. PROJECT COMPONENTS OF PHASE I.**

The three major components identified in 2.1 are elaborated here. The first component, assessment of workload and development of capacity norms of bus drivers, comprises the following:

1) To study, in depth, bus-accident statistics in Bangkok and inter-cities from all probable sources such as DOT, BMTA, Department of Police Highway Patrol, Department of Police Traffic Control, BMA Traffic Control Office and National Statistics Office. It is vital to understand the causes of accidents. It is normal if these statistical reports are different to certain extent. It is the duty of the investigators to elaborate in logical format.

yes

no 2) To monitor time and motion of bus driving activity in Bangkok and inter-cities; to conduct task analysis and study working hours and shiftwork; to monitor flickering test of drivers before and after driving activity; to investigate existing driving control arrangement in terms of layout and force exertion requirement and to study working posture of the bus driver.

yes  
no  
yes  
yes

no yes 3) To monitor heart rate and visibility of the bus driver at work in Bangkok and inter-cities; to conduct nutritional analysis of the bus driver to determine daily energy input; to conduct hearing test and behavioural tests for the bus driver and also vision test such as static visual acuity test in high and low levels of illumination similar to those encountered in nighttime driving; to conduct an experiment on reaction time of drivers.

no yes  
yes  
no yes no  
yes

The second component delineated in 2.1 is the component of human data collection and ergonomic analysis of the man-machine-environment system. This mainly comprises the following items:

4) To measure, collect and analyse the anthropometric (42 items) and static strength (6 items) data as described in Ayoub, et al. (1984) and Ayoub, et al. (1978) of one-hundred bus drivers selected at random as well as bus passengers with equal number.

yes

5) To measure, collect and analyse the reach envelope as described by Hertzberg (1972) of the bus drivers; to measure and record work space dimensions of driver's compartment as well as entrance/exit and bus body dimensions; to conduct a step test for the passengers to determine the appropriate height of bus steps.

yes

6) To conduct psychological test on comfort ratings for drivers, in depth, as well as for passengers; to conduct mechanical tests for control mechanism components.

yes

The last component is the design and demonstration phase and comprises the following:

7) To analyse the driver's movement in driving and compare to the reach envelope of his; To analyse heart rate pattern during during and compare with flickering test results; to compare the control mechanism resistance with strength capacity of drivers.

yes  
no  
no  
yes

8) To analyse the impact of environmental factors on driving capability and rate of fatigue; to redesign the driver's cab, seating and control by CAD as well as the passengers' section, seating and hand-holding rails.

yes  
yes

9) To redesign a bus using a CAD system; to simulate the driver-passenger-bus system by computerized-graphic display using developed and/or selected software packages; to conduct detailed engineering economic analysis of the new bus design; to printout the design at all levels.

yes

The following figure illustrates a tentative schedule of different activities.

4. MANPOWER REQUIREMENTS FOR PHASE I.

The following categories of staff are required for the project:

- CHULA Experts
- CNAM Experts
- Project personnels (in Thailand)
- Project personnels (in France)

4.1 CHULA Experts.

This category consists of professors from CHULA in the relevant areas covered in the project (cf. 2.3 \*\* CHULA \*\*). Professors are appointed according to the rules and regulations of CHULA. The tasks and responsibilities of each expert will be jointly decided by the project coordinators from three institutions.

4.2 CNAM Experts.

This category consists of experts from France organized by Professor Alain WISNER in the relevant areas of ..... Professor Alain WISNER is the expert who can be requested to make an in-depth study of bus-related problems and can receive financial assistance to study ergonomic problems in bus transportation in Bangkok. During this study in Bangkok, he could give short courses or seminars at CHULA.

yes  
yes

4.3 Project personnels (in Thailand; to be hired according to CHULA Rules).

Notification and selection of personnels in Thailand will be done under the responsibility of the project coordinator in CHULA. The duration of employment should correspond to the specifications made in the project documents. Changes are allowed under the conditions that budget re-allocations remain within a maximum range of 20%.

Besides one Secretary, the following members constitute this category of staff:

Research Associate (one) 1-1-1992 to 12-31-1994. The research associate shall be at least a master's graduate in a relevant discipline, preferably working knowledge in engineering and experimental psychology or human factors. He or she should be able to comprehend the design problems of the man-machine-environment system. Working knowledge in computer programming is required and necessary as well as English proficiency but French and/or Dutch is a distinct advantage. The duration of this employment will be three years (to be reconsidered every year).

Research Assistant (one) 1-1-1993 to 12-31-1994. The research assistant shall be fluent in English. He or she should be able to translate technical documents from Thai to English and vice versa, and should also be able to assist in interviews and surveys to be conducted during the first two years of the project. Proficiency in Thai and English typing will be a distinct advantage. He or she will be responsible the administrative work within CHULA and liaison with government agencies and private companies. The duration of employment will be two years (to be reconsidered every year).

System Engineer (one) 1-1-1993 to 12-31-1994. The system engineer should possess sufficient experience in system analysis and software development. Knowledge of computer-aided-design programming is required and necessary. He or she should be capable of developing software packages in different aspects of computer graphic simulation. The system engineer should be able to work in concert with other members of the project staff and with smooth flow of information transfer. The duration of employment will be two years (to be considered yearly).

In short, the research associate will be responsible for more theoretical analysis and will have a coordinating role. The research assistant will be especially useful in data acquisition and administrative contacts. The system engineer will select, modify or develop user-friendly software adapted to the needs for CAD and computer graphic simulation of the driver-passenger-bus system. Occasionally, CHULA master's students can assist in data collection or computational tasks. For this purpose, a small budget will be provided.

4.5 Project personnels (in France: to be hired according to CNAM regulations).

5. BUDGET.

The requested budget is broken down in details as follows:

Table 1: expenses on CHULA level (Thailand).

Table 2: expenses on CNAM level (France).

Table 3: summary of the total budget.

The following points are to be stressed in addition to the budget details presented in Tables 1, 2, and 3.

- CHULA counterpart inputs "which are not budgeted" are as shown below:

Project Leader and other experts (approximately 10% of their time for 36 months)	400,000	Baht
Support facilities for 36 months, office accomodation and furnishing library	200,000	Baht
Teaching aids, printing and documentation	200,000	Baht
Some computer facilities and assistance	<u>200,000</u>	Baht
Total (yearly)	<u>1,000,000</u>	Baht

- However, a budget is requested for a short observation tour to France for maximum four executives of DOT and BMTA. This observation tour will provide opportunities to those invited executives to appreciate French technology in designing and constructing buses using "design for people" criteria. It will bring the DOT and BMTA direction in direct contact with French know-how in the field of bus design and construction. The four executives will be joined by one CHULA expert involved in the project and one member of the CHULA project personnel.

- CNAM counterpart inputs "which are not budgeted" are as shown below:

Project Leader and other experts (10% of their time for 36 months)	500,000	Ffr.	$\frac{45.000}{36}$
Support facilities, furnishing and services	100,000	Ffr.	1520.000
Teaching aids, library and documentation	<u>100,000</u>	Ffr.	
Total (yearly)	<u>700,000</u>	Ffr.	$\frac{1}{3} \# 500.000$ pendant 3 ans.

6 pers  
120-150.000 Ffr

## REFERENCES

- Ayoub, M.M.; Bethea, N.J.; Daivanayagam, S.; Asfour, S.S.; and M. Sherif, "Determination and Modeling of Lifting Capacity," Final Report HEW (NIOSH) Grant No. 5R01OH-00545-02, September 1978.
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- Jones, I.S., The Effect of Vehicle Characteristics on Road Accidents, Oxford, England, and New York, N.Y., Pergamon Press, 1976.
- Shinar, D., Psychology on the Road: The Human Factor in Traffic Safety, New York, Wiley, 1978.

Agreement between  
Le Conservatoire National des Arts et Metiers  
and  
Chulalongkorn University



## SECTION I - AIMS

### ARTICLE 1

Each of the two parties, eager to organize bilateral exchanges, shall endeavour to reach the following goals :

- to participate in the management of the other party through the provision of members of its teaching or research staff for short, medium or long-term periods, within the possibilities of each of the establishments.
- to exchange issue information on the organization and aims of each of the parties, both as regards teaching and research, in order to encourage applications for teaching jobs in cooperation, so as to participate in both research and teaching activities;
- to find all the means liable to encourage research in fields of common interest and to promote better training for students, teachers, researchers and engineers;
- to hold consultations in order to improve and develop university and post-university training;
- to encourage the mutual participation of each party, conferences, training courses and summer schools organized by either of the parties;
- to encourage exchanges and contacts between the university departments and industrial companies of the two countries.

### ARTICLE 2

The two parties shall agree to regularly exchange information about organization and educational documentation.

In the field of research, both establishments shall organize, in unison, the dispatch of post-graduate researchers in the context of joint research and shall reserve participation, on a preferential basis, for the them at scientific events, subject to availability of necessary finance.

## SECTION II - CONDITIONS AND FIELD OF COOPERATION

### ARTICLE 3

The development of inter-establishment cooperation shall be the subject of a programme established in common at the time of meetings of the interested parties. These programmes shall be submitted to the competent Thai and French authorities.

ARTICLE 4

The annual programme shall indicate the scientific or technical specialties and the qualifications of the permanent teachers which one of the parties shall provide to the other.

Where applicable, this annual programme shall establish:

- a list of the names, grades and references of teachers, consultants and experts detached for short or medium-term missions, conferences, training courses or technical types of intervention;
- the number of students and the study programme selected for their exchange;
- the number and type of companies which wish to participate in the training.

SECTION III - CONTRACTUAL CLAUSES

ARTICLE 5

Exchanges of teachers, researchers or students

Each year, the two institutions shall endeavour to exchange teachers, researchers and students in each direction on a roughly equal basis. In particular, this effort shall concern students preparing Ph.D. thesis.

5.1 Exchanges of teachers and researchers

Each establishment shall pay its teachers during their stay abroad. The host establishment shall provide assistance as regards their accommodation and social welfare needs.

5.2 Exchanges of students

The practice established for dealing with the equivalence of modules, semesters and diplomas will be the subject of reciprocal consultation.

ARTICLE 6

In order to ensure follow-up of the agreement, each party shall appoint a committee with a secretariat which shall be responsible for establishing a report on the work done, especially at the end of the second semester of the university year.

An annual report shall be submitted to the authorities of the two parties.

SECTION IV - MEANS

ARTICLE 7

The two parties shall ask the organizations in charge of encouraging scientific cooperation for the finance necessary to implement this agreement.

In addition, they shall endeavour to support the actions engaged with all organizations authorized for this purpose.

ARTICLE 8

The financial conditions agreed to in the context of the cultural and scientific cooperation programme between the governments of the two countries shall apply to the implementation of this agreement and the programmes resulting therefrom.

SECTION V - APPROVAL OF THIS AGREEMENT

ARTICLE 9

Any difficulties arising from application of this agreement shall be examined at meetings of the interested parties in order to facilitate settlement. Where necessary, difficulties shall be referred to the competent authorities of the two countries.

ARTICLE 10

This agreement is effective for a period of four years. It shall be renewed through tacit agreement and shall take effect as from the day of its signature. It may be cancelled through written notice sent six (6) months before expiry of the current period.

Signed in BANGKOK  
on

Signed in PARIS  
on

Professor Charas Suwanwela, M.D.  
President of Chulalongkorn  
University

Professor Guy Fleury Sc. D  
General Administrator  
of the Conservatoire National  
des Arts et Metiers



**ORDRE DE MISSION  
SANS FRAIS**

Demande présentée par : Monsieur Alain WISNER

Qualité : Professeur au Conservatoire National des Arts et Métiers

Objet de la Mission : Enseignement en Ergonomie et consultation sur l'organisation d'une maîtrise d'Ergonomie

Lieu de destination : Manille (PHILIPPINES) et Bangkok (THAILANDE)

Moyen de transport : Avion

Date de départ : 15 octobre 1991

Date de retour : 30 novembre 1991

Fait à PARIS, le 11 OCT. 1991

Pour l'Administrateur Général  
Le Directeur-Adjoint

A handwritten signature in black ink, appearing to read 'C. DAHAN', is written over the typed name.

C. DAHAN

13 Septembre 1991

Monsieur le Professeur Fleury  
Administrateur Général du  
CNAM

### **Ordre de mission pour les Philippines et la Thaïlande**

Monsieur l'Administrateur Général et cher collègue,

J'ai l'honneur de vous informer du fait que j'ai été invité à donner un enseignement d'un mois en ergonomie par le Département de Génie Industriel de l'Université Chulalongkorn à Bangkok. C'est avec cette Université qu'un accord est en cours de signature.

J'ai également été invité par les Départements d'ingénierie de Psychologie et de Sociologie de l'Université des Philippines à Manille, à donner une consultation sur l'éventuelle organisation d'une maîtrise d'Ergonomie au sein de cette Université.

La personne invitante est le Professeur Clarissa Rubio, Docteur en Ergonomie du CNAM. J'ai été, il y a 10 ans, Professeur invité à l'Université des Philippines.

Je vous serais reconnaissant de bien vouloir me faire établir un ordre de mission sans frais, du 15 Octobre au 30 Novembre 1991. Je serai, dans la deuxième quinzaine d'Octobre, à l'Université des Philippines, et pendant le mois de Novembre à l'Université Chulalongkorn.

Je dois, en outre, présenter un exposé introductif à la réunion conjointe qui se tiendra à Bangkok du 25 au 27 Novembre, et qui sera à la fois la 13e Conférence Asienne de la santé au travail, et la 3ème conférence de la Société d'Ergonomie d'Asie du Sud, dont je suis membre fondateur.

Cette période de l'année est favorable pour mes responsabilités d'enseignement et de recherche puisque j'assurerai du 15 Août au 15 Octobre, la préparation et l'évaluation des mémoires de DEA d'Ergonomie et les thèses en cours, et que je serai de retour le 1er Décembre pour le séminaire d'anthrotechnologie que j'anime les 1er et 2ème trimestres.

Je vous prie d'agréer, Monsieur l'Administrateur et cher collègue, l'expression de mes sentiments dévoués.

A. Wisner



MINISTÈRE DE L'ÉDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS

ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

Paris, le

Ecrire : J.J. PAVAN → cerule 6

—  
C. HICHI  
Mme G. rappr PAVAN 13.11.90  
—

Le rapport PAVAN reçu de L. HICHI le 16.11.90  
ne porte que sur des projets très exploratoires pour  
l'an 2000 et doit être développé en France et  
dans le cadre de l'Europe  
19.11.90  
—



MINISTÈRE DE L'ÉDUCATION NATIONALE  
 CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS

ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

Paris, le

- HEULIEZ

Anna la condamini

FLORES  
 13.11.90

BUS TITAI

- RATP OUSTRIC (CNAM)

projet futur

PVI Ergo

- Alain CONDOM

- MST Bausse ergo  
 - autre ergo

Pl voir le dossier (Versailles)



# CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS

ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

Paris, le

## MEMORANDUM

Since 1988, Professor Alain Wisner, Director of Laboratory of Ergonomics and Work Neurophysiology, Conservatoire National des Arts et Métiers, Paris, and Professor Kitti Intaranont, Faculty of Engineering, Chulalongkorn University, Bangkok, have discussed and shared interests in Ergonomic research and application of Ergonomics.

Professor Wisner had made a visit to the Laboratory for Ergonomic Research in 1988 and to Khon Kaen University where a pioneered Ergonomic research was on going under the guidance of Professor Intaranont.

In 1990, Professor Intaranont was invited to visit the Laboratory of Ergonomics and Work Neurophysiology in Paris. He gave a seminar on "How the Laboratory contributes to the change in working conditions in Thailand".

Considering their mutual interests, Professors Wisner and Intaranont agree

1. to exchange Ergonomic information and knowledge
2. to jointly conduct seminars and research in Ergonomics
3. to exchange professors and students, and
4. other actions useful for the development of teaching, research and application in Ergonomics.

This memorandum is signed on the third of May, 1990

A. Wisner

K. Intaranont





MINISTÈRE DE L'ÉDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS

ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

Paris, le

MEMORANDUM

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2. to jointly conduct seminars and research in Ergonomics
3. to exchange professors and students, and
4. other actions useful for the development of teaching, research and application in Ergonomics.

This memorandum is signed on the third of May, 1990

A. Wisner

K. Intaranont

date

our reference

dealt with by

your date

your reference

THE SWEDISH INSTITUTE OF PRODUCTION ENGINEERING RESEARCH • THE SWEDISH INSTITUTE OF PRODUCTION ENGINEERING RESEARCH • THE SWEDISH INSTITUTE OF PRODUCTION ENGINEERING RESEARCH

Professor A. Wisner  
Director  
Laboratoire d'Ergonomie et Neurophysiologie du Travail  
CNAM  
41, Rue Gay-Lussac  
75005 Paris  
FRANKRIKE

18 May 1990

Dear Alain:

Thank you very much for your constructive review of my work. It is very kind of you indeed to suggest several ideas for improvement. I have shown your letter to my Swedish colleagues, they all appreciated your advice.

From a tentative program of the 10th UOEH International Symposium, Dr. Manuaba will present his paper in Kitakyushu, Japan and probably go on to the IEA Executive Meeting in Kyoto. I still do not know when the ACOH will take place in Bangkok, therefore, I have not written a letter to Dr. Chaiyuth yet. If you receive any information from Dr. Malinee, please kindly inform me.

Enclosed you will find a copy of my letter to "Naturalia et Biologia" and a used airline ticket. Again, please let me know if your trip schedule to Thailand is fixed so that we can do something about it. Thank you very much again for everything you have arranged for me and my family, we will never forget. With best personal regards.

Sincerely yours,



Kitti Intaranont



MINISTÈRE DE L'ÉDUCATION NATIONALE  
**CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS**

ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

Paris, le  
25th May 1989

Dr. Kitti INTARANONT  
The Swedish Institute of Production  
Engineering Research  
Molndalsvägen 85,  
S-412 85 GÖTEBORG  
Sweden

Dear Kitti,

Thank you for your letter of May 18 and for the interesting news you are giving me.

I received today a fax from Malinee who tells us that ACOH will be held in Bangkok from Sunday 17th to Wednesday 20th November 1991.

You may now decide if you prefer to organise the SEAS Meeting during the last days of the week, Thursday 21st and Friday 22nd, or if you prefer to have your meeting just before, i.e. Thursday 14th and Friday 15th.

I have not yet phoned to Kogi but I will do it soon and explain the situation to him.

With my best regards,

Sincerely yours,

A. Wisner



CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS

ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

Paris, 14th April 1990

Dr. Kitti INTARANONT  
The Swedish Institute of Production  
Engineering Research  
Mölnadalsvägen 85.  
S-412 85 GÖTEBORG  
Sweden

Dear Kitti.

The period when you will be in Paris is getting nearer and I would like to give you some information.

As I wrote to you before, I will try my best to be at De Gaulle airport on April 23rd to welcome you but I have so many commitments that I am not absolutely sure to be able to make it. I, therefore, think it wise to tell you that, on receipt of your fax dated 9th April, we contacted the Hôtel Daguerre, 94 rue Daguerre, 75014 Paris, where we were able to book a double room for the four of you at the cost of 305 French francs per night, breakfast non included. This is the actual price which is much higher than the one you quoted but it is still less expensive than the hôtel Saint Severin where we had made a reservation for you and that we have now cancelled.

I met Professor Wongphanich in Bangkok and Dr. Van Wouterghem in Brussels so I have enough information to discuss seriously about the Bangkok 91 Meeting. But, of course, we have so many other interesting things to think about together.

I am very much looking forward to seeing you soon.

With my best personal regards.

Yours sincerely,

A. Wisner

12 Avril 1990

Hotel Daguerre  
94 rue Daguerre  
75014 PARIS

Monsieur le Directeur,

Je vous confirme la réservation d'une chambre double (couple + deux enfants) pour le Professeur Kitti Intaranont, pour la période du 23 Avril au 4 Mai 1990.

Je vous adresse ci-joint un chèque d'acompte de 305 Francs représentant la première nuit.

Recevez, Monsieur le Directeur, mes sincères salutations.

Mme T. Rebiffé

THE SWEDISH  
INSTITUTE OF  
PRODUCTION  
ENGINEERING  
RESEARCH



INSTITUTET  
FÖR  
VERKSTADSTEKNISK  
FORSKNING

TELEFAX

9 April 1990

TO:

PROFESSOR DR. ALAIN WISNER

+ 33 - 1 - 47 07 5901 CNAM PARIS FRANCE

FROM:

KITTI INTARANONT

IVF

Mölnadalsvägen 85

S-412 85 GÖTEBORG SWEDEN

Telefax: +46 - 31 40 78 76

Telephone: +46 - 31 83 86 00

Telex: 27872 ivfgbg s

This message consists of 1 page(s) incl this one

Dear Alain:

My family has arrived in Sweden on last Saturday 7 April. We will start traveling to Denmark, FRG, and Holland on 11 April early morning. We will be back in Gothenburg on April 20 to prepare ourselves for Paris trip on 23 April. I will come to the office (IVF) on April 21 and 22 to check my mail. Therefore if you have any information for me please do not hesitate to send me a letter or a Fax. Your guidance will always be given the highest priority.

A friend of mine in Sweden had given the name of a hotel which might be of help, HOTEL Daguerre at 94 rue Daguerre 75014 PARIS, telephone 43 22 43 54. I called them once but unable to communicate due to language difficulty. It was said that it costed 100 FF/night last year for a double bed room.

We are still waiting for your recommendation. I heard that you had a pleasant time in Bangkok last month. Best regards.

Kitti Intaranont

de. 250 F + 305 / unit

göteborg A.R = 2.150

$$7.500 - 2.150 = 5.350$$

~~28~~  
~~470~~ ~~Leab.~~ ~~2~~ ~~360~~  
568 x 11 = 6.268

39 Mars 1990

Hôtel Saint Séverin  
40 rue Saint Séverin  
75005 PARIS

66 360 570

Monsieur le Directeur,

Je vous confirme la réservation d'une chambre double (couple + deux enfants) pour le Professeur Kitti Intaranont, pour la période du 23 Avril au 4 Mai 1990.

Je vous adresse ci-joint un chèque d'acompte de 500 francs.

Recevez, Monsieur le Directeur, mes sincères salutations.

Mme T. Rebiffé

N.B. J'ai bien noté que le prix de la chambre était de 568 Fr/jour, 4 petits déjeuners compris

Annulé le 12.4.90



23 April / 6 Rai

20 Février 1990

Professor Kitti Intaranont  
IVF  
Mölnadalsvägen 85  
S 412 85 GÖTEBORG

Dear Kitti,

Thank you for your letter of 15th February. I realize that very soon your family and yourself will be in Paris and enjoy this perspective.

It is certainly a very nice idea to travel with your family but it is an obstacle to obtain housing from University authorities. In the buildings reserved for visiting professors, children are not allowed; the guests are supposed to work and write in their rooms and children use to be noisy.

So we are trying to find a cheap but nice hotel for the four of you. But it will be anyway rather expensive specially now when dollar and yen are low in relation to european currencies. I will write you later to give you the name and address of the hotel.

I will try my best to be at the airport when you shall arrive.

With my best regards,

Truly yours,

A. Wisner

dealt with by  
IVF Göteborg, Mr. Kitti Intaranont, Ph.D.

date  
1990-02-15  
your date

our reference  
KI/ES231  
your reference

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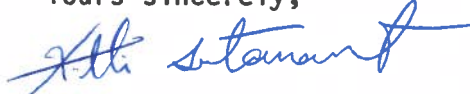
Professor A. Wisner  
CNAM  
Ergonomie et Neurophysiologie du Travail  
41, Rue Gay-Lussac  
F-75005 PARIS  
FRANKRIKE

Dear Alain,

Thank you very much for your letter dated January 8, 1990, regarding the support that you kindly give me to visit your Institute between April 23 to May 4, 1990. It is a great honour indeed. I have already applied for visa to enter France and hopefully there will cause no problem. My family will join me in Sweden on April 7, 1990. Therefore, may I ask for them to join my trip to Paris also. With your kind permission, of course, we will arrive at Charles De Gualle Paris Airport Internationale on April 23, 1990, at 18.20 by SAS Flight No. SK567 from Copenhagen and will leave on May 4 early. Since we travel together 4 persons, 2 adults and 2 children, we indeed need very economical stay. Our friends in Thailand suggested the Cité, we think it may suit our economy or if you have better idea please kindly arrange, we will be extremely delighted and grateful.

Thank you very much for everything, we are looking forward to meeting you again in Paris.

Yours sincerely,



Kitti Intaranont

Datum 1990-03-2

Beteckning

Avsändarens handläggare

Ert datum

Er beteckning

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Professor A. Wisner  
CNAM  
Ergonomie et Neurophysiologie du Travail  
41, Rue Gay-Lussac  
F-75005 PARIS  
FRANKRIKE

Dear Alain,

Thank you very much for your letter dated February 20, 1990, regarding the support that you will kindly provide us with a room in a proper hotel. We are really appreciated that very much. I have been thinking a lot, however, about the stay in Paris. If I can be of help, please also consider a short-term rent of a room of a house or of an apartment. I hope that my request will not cause you any more trouble because I think you understand my economy perfectly well.

I have just returned from a meeting with Professor Åsa Kilbom in Stockholm. We had a very good discussion on repetitive works and perhaps some cooperation in the future. Then I took that opportunity to obtain my visa application approved by the French Embassy.

Thank you again for everything, please kindly let me know if you have learned any development of the housing. We are keeping our hope alive to meet you in Paris.

Your Sincerely,



Kitti Intaranont

Prof. Wisanu

CONSERVATOIRE NATIONAL DES ARTS ET METIERS  
LABORATOIRE D'ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

## **ANTHROPOTECHNOLOGIE**

Dans le cadre du séminaire d'anthropotechnologie  
le Professeur KITTI INTARANONT du centre de  
recherche ergonomique de **CHULA LONGKORN**  
**TECHNICAL BANGKOK UNIVERSITY** fera une  
conférence ce vendredi **27/04** de 10 h à 12 h.

le thème sera :

**How this center contributes to the change  
in working conditions in Thailand ?**

(Comment le centre contribue-t-il à l'amélioration des conditions de travail au Thaïlande)



date

our reference

dealt with by

your date

your reference

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Dr.Chaiyuth Chavalitnitikul  
SEAES Vice President  
Bangkok, THAILAND

May 31, 1990.

Dear Sir:

Referring to our prior communication regarding the 3rd SEAES Conference in Bangkok 1991, we have looked into the possibility to organize the joint conference with ACOH. Despite of the encouragement from all concerned, may I propose to organize a separate meeting for the benefit of SEAES members. The SEAES Conference can be jointly organized by Department of Labour and universities. If Mahidol University is not interested, I can encourage Chulalongkorn University taking part with DOL. ACOH will have the meeting between Sunday 17th to Wednesday 20th November 1991 at the (Ambassador?) Hotel. If we want more international participants to attend SEAES meeting, I shall propose that 21st to 23rd November 1991 be the SEAES Conference date. Since we have limited resources, the meeting should take place on the university campus. To organize this meeting, the Society needs to request for financial support from some organizations, i.e., IEA, ILO, WHO, etc. If you approve my proposal, please write a letter, in the capacity of SEAES Vice President, to the SEAES President requesting him to officially approach IEA, ILO and the others when he travels to Japan to participate in the IEA Executive meeting early July this year.

I will start working at Chulalongkorn University on 28 June 1990. Please do not hesitate to contact me then. Best regards.

Sincerely Yours,

Kitti Intaranont, Ph.D.  
Council Member

cc: SEAES President  
SEAES Secretary General  
Professor A. Wisner  
Dr. K. Kogi



CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS

ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

Paris, le 8th January 1990

Copie : Dr Van Wonterghem

Dr Kitti Intaranont  
Institutet för Verkstadsteknisk Förskning  
FAX 46 31 40 78 76

Dear Dr Intaranont,

It is my pleasure to confirm my invitation to visit our laboratory from April 23rd to May 4th 1990.

I have obtained 7.500 F.F. (≠ 7.500 SK) for your travel and expenses in Paris. If you buy one month at the minimum before your travel (23rd March) an APEX ticket, it will cost you only 2.150 FF. But you need the rest of the money (5.350 FF) for your expenses in Paris, for the hotels and restaurants are quite expensive. Could you kindly confirm the dates of your travel, so that we are able to reserve early in a hotel with the best cost/benefit ratio.

I know that you are soon travelling to Bangkok with Dr Van Wonterghem. It will be good for your work but also for your family. I will myself be two times in Thailand this year. The first stay will be in Bangkok from 21st February to 10th March and the second at the end of July for holidays coming back from Japan with my wife, but we shall mainly stay in Chiang-Mai.

I am working on the difficult question of the joint meeting with Malinee. We shall have lot of time in April to discuss deeply this question.

I hope that you shall accept to give us a 2 hours conference on ergonomics in Thailand and mainly on your own researches.

Thank you so much for your greetings. I have not answered earlier for I was ill.

Truly yours,

A. Wisner



MINISTÈRE DE L'ÉDUCATION NATIONALE  
**CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS**

ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

Paris, le

23 Novembre 1989

Dr. Kitti INTARANONT  
The Swedish Institute of Production  
Engineering Research  
Mölnadalsvägen 85,  
S-412 85 GÖTEBORG  
Sweden

Dear Kitti.

I am very happy that you agree to visit us in a few months. The end of April would be excellent but I will probably not be back to Paris until Sunday 22nd April as it is Easter Holidays and I am too tired to miss this occasion to go to the countryside. If you could make the beginning of your visit on Monday 23rd, it would be perfect.

I needed your confirmation to formally ask to the Association *Naturalia et Biologia* the money for your travel. I shall receive confirmation of their grant by December 15 and will then let you know immediately. However, I am pretty sure the answer will be positive as I am the President of this Association.

The address and fax number of Malinee Wongphanich is as follows :

Occupational Health Department  
Faculty of Public Health,  
Mahidol Univeristy  
420/1 Rajvidhi Road  
Phayathai,  
Bangkok 10400

Tel. 245-7793, 240-1258-9, Ext. 259, 260, 261  
Fax (662) 246-7765

As for Dr. Choon Nam Ong, I can only give you his phone number as I have not yet received his fax number. It is : 7724293 / 7724299. The telex number is : UNISPO RS 33943 - and the Cable name : UNIVSPORE.

Lastly I am enclosing a photocopy of the list of participants at the 11th I.E.S. Congress in Sydney. I do apologise for the pencil marks which I beg you to ignore.

I am very much looking forward to welcoming you here in Paris in April.

With my best regards,

Yours sincerely,

A. Wisner

THE SWEDISH  
INSTITUTE OF  
PRODUCTION  
ENGINEERING  
RESEARCH



INSTITUTET  
FÖR  
VERKSTADSTEKNISK  
FORSKNING

TELEFAX

November 21, 1989.

TO:

Professor Dr. Alain Wisner

+33 - 1 - 47 07 5901

FROM:

Dr. Kittti Intaranont

IVF

Mölnadalsvägen 85

S-412 85 GÖTEBORG SWEDEN

Telefax: +46 - 31 40 78 76  
Telephone: +46 - 31 83 86 00  
Telex: 27872 ivfgbg s

This message consists of 1 page(s) incl this one

Dear Alain:

Thank you for your letter dated October 31, 1989 for inviting me to visit your famous institute. It is an honour indeed. May I have some greater courage to accept your kind invitation. The period started on April 15, 1990 will likely suit my schedule. Please let me know if there is any inconvenience on your side.

As per our discussion in Paris, I need to have the Fax numbers of Dr. Cheon Nam Ong of Singapore and Dr. Malinee of Thailand. I also need a list of participants at IEA 88 in Sydney. Please kindly mail me one copy if you have such a list. I think I should contact some of them while I am staying in Sweden.

Thank you very much for your kind cooperation and help. I wish to hear from you very soon.

With best regards, I remain.

Your sincerely,

*Kitti* 11-21-89

Kitti Intaranont



MERRY CHRISTMAS AND HAPPY NEW YEAR

1990

Time has passed for another year. It is a pleasurable duty for the Intaranont Family to report the past activity to friends all over the world as always. This year, on the contrary, Kitti has to do it by himself without a consultation from his "DECISION MAKER" because he stays alone in Sweden working on "Repetitive Works" until June 20, 1990.

At the beginning of this year, between March and April, he organized a 40-hour short course "Safety Engineering for Managers" with cooperation from Department of Labor and the Federation of Thai Industries. dr. erg. Kamiel Vanwonderghem, his research partner from Belgium, also participated and gave lectures. The course was considerably successful. Kamiel and Kitti have worked in concert to have their research proposal granted by the Commission of the European Communities. The project, "Study of the Exposure Limits in Constraining Climatic Conditions for Strenuous Tasks: An Ergonomic Approach," will start in January 1990 and last for 3 years. That will keep him very busy! More than that, they are trying to develop a master's degree international program in Safety Engineering and Ergonomics at Chulalongkorn University starting 1991. This is UNBELIEVABLE! They must have quite motivation and courage.

His stay in Sweden is not as easy as expected. Weather, language and culture of the two countries are totally different. He has been in Gothenburg for more than 3 months, still no sign of being adaptable. It is probably due to his age or his work stress because it is so repetitive as the name implied.

He wishes to thank Steve Konz for introducing his picture in the IEA Newsletter to convince his friends' families that "Kitti" is actually a boy's name. He also wants to extend his appreciation to the Editor of "Applied Ergonomics" for the critique of his presentation at the IEA 88 in Sydney. This kind of supports will encourage him to continue his work in his own country indeed.

He hopes to meet and have good times with his friends and colleagues from around the world some time in 1991 when Thai ergonomists and members organize the Third SEAES Conference in Bangkok. As always, he wishes his colleagues and friends and their families the Best of the Best in every year to come. May the Almighty bring them all prosperity, wisdom and happiness.

HAPPY NEW YEAR TO ALL



For the INTARANONTS

God Jul  
och  
Gott Nytt År

önskar 1990

Hope you still strong



 INSTITUTET  
FÖR  
VERKSTADSTEKNISK  
FORSKNING

Datum

Beteckning

Avsändarens handläggare

Ert datum

Er beteckning

THE SWEDISH INSTITUTE OF PRODUCTION ENGINEERING RESEARCH · THE SWEDISH INSTITUTE OF PRODUCTION ENGINEERING RESEARCH · THE SWEDISH INSTITUTE OF PRODUCTION ENGINEERING RESEARCH

Professor Alain Wisner  
Conservatoire National Des Arts Et Metiers  
Ergonomie Et Neurophysiologie Du Travail  
41, Rue Gay-Lussac  
75005 Paris  
Republic of France

December 4, 1989.

Dear Alain:

Thank you very much for your letter dated November 23, 1989. It is my honour indeed to visit your worldly-known Institute. If Monday 23rd April is perfect for you, it will also be perfect for me.

Lately I received a copy of letter from Dr.Kogi and Dr.Manuaba, informing that they favoured the joint conference between ACOH and SEAES. And every time they produced such letters they must have my name on as if I were in a position to do such thing. I, then, sent a letter to them asking for the appropriate protocol. I also attach copies of those letters including mine for your information. I don't mind doing work, as a matter of fact I enjoy working so much because it keeps me busy. But it has to be done adequately.

Thank you again for sending me the IEA 88 mailing list. Hope you still enjoy swimming. I will see Professor Åsa Kilbom on December 14 in Solna, her office.

I am looking forward to meeting you again. Best regards.

Sincerely yours,



Kitti Intaranont

date

our reference

dealt with by

your date

your reference

THE SWEDISH INSTITUTE OF PRODUCTION ENGINEERING RESEARCH • THE SWEDISH INSTITUTE OF PRODUCTION ENGINEERING RESEARCH • THE SWEDISH INSTITUTE OF PRODUCTION ENGINEERING RESEARCH

Dr. A. Manuaba  
President of the SEAES  
JI Serma Gede 18  
Denpasar 80114, Bali  
Indonesia

28 November 1989.

Dear Dr. Manuaba:

Thank you for the copy of your letter to Dr. Kogi dated 4 October 1989. Based on the information on Dr. Ong's, Dr. Kogi's and your letter in that order, it seems that the Society wants a joint conference with ACOH if agreement of both associations can be reached. I feel so much pressure over my shoulders because I could see my name referred in all above-mentioned correspondences. I am just a newly-elected Council Member of the SEAES. It does not imply that I am the representative of the Society who has the authority to negotiate on this matter. And even so, one must consider carefully on my capability, judgement and seniority in the Society. In Thailand, there are two members in the Council, Dr. Chaiyuth, the Vice President and myself. We discussed the matter of joint meeting before when I was in Thailand but we have not seriously talked about who will represent the Society in the negotiation with ACOH President. I think this action is extremely necessary and it should be done according to the Rule and Regulation of the Society. Since I am going back to Bangkok for a two-week visit on January 16 next year, it would be a good timing for further development during that period.

Again, thank you very much for letting me know every form of ideas and concepts. I also hope that the joint conference is possible. I will stay in Sweden until June next year.

Please remember me to your family and your staff. Best regards, I remain.

Sincerely yours,



Kitti Intaranont

cc:

Dr. Chaiyuth Chavalitnitikul  
Dr. C.N. Ong  
Dr. Malinee Wongpanich  
Dr. K. Kogi

DR KAZUTAKA KOGI  
P.O.BOX 500  
CH-1211 Geneva 22  
SWITZERLAND.

04 October 1989

Dear Dr Kogi,

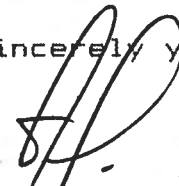
I thank you very much for your kind and important letter of 5 September 1989. The idea to organize a joint conference between SEAES and ACOH is excellent, especially seen from efficiency of time, finance and papers presented. Of course from my side I will give my full support to the idea and also to the implementation by trying to participate fully to this coming meeting.

I am confidence that most of our members, especially from Indonesia will give their full support to the idea. Of course all efforts must be done to facilitate their participation like providing special air fare, reasonable congress fee, discount hotel rate and attractive programmes both scientifically and socially as well. To be frank, it will be still expensive for Indonesian since we have still to pay what we called "fiscal tax" ( US\$ 150.-). I believe in Bangkok, participants will pay more cheaper congress and board and lodging fee than in Bali (SEAES Second Meeting).

Other thing that might also be good to be considered is to choose the right time to conduct the meeting, especially in regard to the IEA Congress in Paris 1991. According to me and also to Prof Wisner a very wise decision must be carried out to choose the dates. Some proposed that it must be directly after or before Paris meeting with the purpose to give participants an opportunity to attend both meetings economically. By doing so, air ticket which they have to purchase will be more cheaper. But some said that they must be separated so that the participants will be able to enjoy more time in both places after or before the meetings. They have to pay a lot, and they want to enjoy that, not only to attend the meeting. Finally, a wise decision must be carried out to choose the dates, with aim to have more friends attending.

Finally, thank you again for the attention and the good ideas. Wishing you a success in implementing the ideas. My best personal regards,

Sincerely yours,



A. Manuaba  
Jl Serma Gede 18  
Denpasar 80114 Indonesia

Bali

cc. Dr Wongpanich  
Dr Ong CN  
✓ Dr Kitty



INTERNATIONAL LABOUR OFFICE  
BUREAU INTERNATIONAL DU TRAVAIL  
OFICINA INTERNACIONAL DEL TRABAJO

4, route des Morillons, Genève  
Adresse postale CH-1211 GENEVE 22  
Telegrammes INTERLAB GENEVE  
Télex 22.271 BIT CH  
Telephone direct: (022) 99  
central: (022) 99 61 11

Dr. A. Manuaba  
President,  
South-East Asian Ergonomics Society  
Jalan Serma Gede 18  
Denpasar, Bali  
(Indonesie)

Ref. BIT/ILO n°

Votre réf. n°

5 September 1989

Dear Dr. Manuaba,

I am writing this letter to seek your advice about how to hold the Third Conference of the South-East Asian Ergonomics Society (SEAES) foreseen in Thailand in 1991.

During my home leave last July and August, I met Dr. Malinee and Dr. Kitti in Bangkok and then Dr. Malinee again in Tokyo. I have found that both Dr. Malinee and Dr. Kitti are in favour of organising a joint Conference of the 13th Asian Conference of Occupational Health and the Third Conference of SEAES in the second half of 1991 with a view to increasing the reputation of the two meetings. I also believe this is an excellent idea. It would contribute much to demonstrating the new trends in our fields. For those travelling to attend either of the meetings, a joint Conference (which may be called the 13th ACOH and the 3rd Conference of SEAES) will make their participation attractive and economic. This will be true for both those from within Asia and those additional people coming from outside Asia.

As you know, Dr. Malinee Wongphanich is President of the Asian Association of Occupational Health (AAOH) from 1988 to 1991 and responsible for organising the 13th ACOH. Dr. Kitti Intaranont is responsible together with other Thai colleagues for organising the 3rd SEAES Conference. As both the key persons agree in principle with the idea of a joint Conference, it is worth exploring it. All of several other persons I met during my leave supported the idea. To mention a few, they include Prof. Tati, Prof. Tsuguyoshi Suzuki as well as Dr. Temmyo and other Japanese SEAES members. Dr. Kitti also told me that some colleagues in Europe such as Prof. Wisner are likewise in favour of a joint meeting as a means to boost SEAES and increase the number of Conference participants. It will also be economic for the local organisers.

If this idea of a joint Conference in Bangkok in 1991 should be agreeable to you and Dr. Ong and to the Thai members of the AAOH, then it could be officially proposed to the two organisations. Dr. Malinee intends to issue the first circular of the 13th ACOH by the end of this year, and therefore the plan of a joint AAOH/SEAES Conference could be announced in time.

On the AAOH part at present, Dr. Malinee is planning to set a Conference theme (such as "the place of occupational health in develop-

ment") and organise symposia and panel discussions on several topics (such as health as a goal of industrial development; new technologies; hazards in agriculture; lung diseases; ergonomics application for health and safety at work; small enterprises; training for health leadership). As you note, most of these topics are of ergonomics interest and seem very suitable from the SEAES points of view as well. Further, topics for free communications will naturally include SEAES-related ones, such as application of ergonomics, stress at work, night and shift work, work-related diseases, physical environment, work and health of women and the relationship between occupational and other services. In brief, there will be real merits for organising a joint Conference.

I would like to strongly support this idea of having a joint AAOH/SEAES Conference in 1991. For my part, I would like very much to help organise it in an effective manner. I agree with the colleagues I met that the joint meeting will greatly enhance the reputation of both SEAES and AAOH.

I should be grateful if you would let us have your view about this idea at your earliest convenience. I trust that the idea would attract you, too. Should you and Dr. Ong agree, then our Thai Colleagues would be able to further pursue the possibility of preparing a joint Conference. The next step would be to inform Council members of the two organisations, set up a joint local organising committee, fix the dates, fees and topics and issue the first circular jointly.

For your information, I arranged during my stay in Tokyo for paying SEAES members' 1988 subscription fees of US\$ 2000 for the Journal of Human Ergology. According to your kind consent, I used \$ 500 of the IEA seed money given to SEAES and added donations from Japanese members of SEAES and me. The rest of the seed money which I keep here will be spent in the same manner for the next three years.

I look forward to hearing from you soon. If your advice on the above-mentioned idea should be affirmative, I would appreciate your writing to Dr. Malinee at the same time, as she is anxious to know your response.

With best wishes to yourself and your family,

Yours sincerely,

Kazutaka Kogi  
P.O. Box 500  
CH-1211 Geneva 22  
Switzerland.

cc: Dr. Malinee Wongphanich  
Dr. C. N. Ong  
~~Dr. Kitti Intaranont~~

19 December 1988

Dr. Kitti Intaranont  
Department of Industrial Engineering  
Faculty of Engineering  
Chulalongkorn University  
Bangkok 10500  
THAILANDE

Dear Dr. Intaranont:

Please find enclosed a copy of a letter I have sent to Professor Luczak. Given the great importance of the work you are doing, I certainly hope that your project for returning for a period to Europe will come to fruition. I am thus very happy to be of any assistance I can to help in your meeting this aim.

Hoping to be seeing you again soon, this time in Paris, with best personal regards and wishes for the new year, I remain,

Very truly yours,

Professor Alain Wisner

**DEPARTMENT OF INDUSTRIAL ENGINEERING  
FACULTY OF ENGINEERING  
CHULALONGKORN UNIVERSITY  
BANGKOK 10500, THAILAND**

Professor Holger Luczak  
ERNST-REUTER-PLATZ 7  
D-1000 Berlin 10  
Federal Republic of Germany

September 9, 1988.

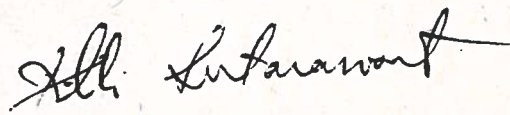
Dear Professor Luczak:

Professor Wisner of France advised me to write to you. He met me in both Bali and Sydney. I am a Council member of the South East Asia Ergonomics Society (SEAES). We have several common interesting topics. I had presented a paper in Sydney at the IEA 88 Congress. On the way back to France, Professor Wisner stayed in Bangkok for two weeks. We have discussed many things. I asked him if he knew some outstanding ergonomist from Germany, he replied without hesitation that it was you. The reason I asked because Governments of Federal Republic of Germany and Thailand had signed a memorandum to propose joint researches for the two countries. National Research Council of Thailand (NRCT) and Deutsche Forschungsgemeinschaft (DFG) are the two institutes to organize such researches. One of major requirements is the proposed research team must be composed of German and Thai persons. If you are interested in you may want to approach the DFG. Postfach 20 50 04, D-5300 Bonn 2, or if you want to know more about me please let me know.

I am deeply regret that we did not have the opportunity to meet each other at the Congress. However, Professor Wisner would write to you in a few days to let you know how many plans I do have.

Thank you very much for your kind attention. I hope to hear from you very soon. Best regards.

Sincerely yours,



(Kitti Intaranont, Ph.D.)  
Associate Professor



19 December 1988

Prof. Dr.-Ing. H. Luczak  
Technische Universität Berlin  
Institut für Arbeitswissenschaft  
Ernst-Reuter-Platz 7  
1000 Berlin 10  
RFA

Dear Professor Luczak:

You have some time ago received a letter from my friend Dr. Kitti Intaranont, who is Associate Professor of Industrial Engineering at the best Thai technical university. I was very happy to meet him in Sydney and to afterwards have the opportunity to gain an in-depth understanding of his diverse activities in the field of ergonomics and industrial engineering.

As you may know, Dr. Intaranont has been trained in West Germany, where he received his Ph.D. He is now developing an original program on the anthropometric dimensions of Thai farmers. He also works as an adviser to a university in the North Eastern region of Thailand.

I have visited the place and admired the quality of the sampling and measurements methodology as well as the scientific rigor of the co-workers team. I am sure that this work will soon produce one of the best papers we possess on farmers' anthropometry in an industrially developing country.

He also has a fine laboratory in Bangkok at the Chulalongkorn University where he develops original technology.

Dr. Intaranont needs a new stay in a country with a high degree of scientific resources. For this reason, I suggested to him that he return to West Germany where he did his training. He is fluent in both German and in English.

I think that it would be marvelous if you were able to receive him. I am sure that the type of program that you are developing as well as the contact with you would be extremely stimulating for him. Considering the value of Dr. Intaranont, I also think that you would find that such an effort on your part would be extremely fruitful.

Of course I hope that Dr. Intaranont will be able to pay us a visit if he has the chance to stay in Berlin for awhile.

Hoping to see you soon, with best regards and best wishes for the holiday season and the new year, I remain,

Very truly yours,

Professor Alain Wisner

03.01.90 14:43

1945 31407875



MINISTÈRE DE L'ÉDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS

ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

Paris, le 8th January 1990

Dr Kitti Intaranont  
Institutet för Verkstadsteknisk Förksning  
FAX 46 31 40 78 76

Dear Dr Intaranont,

It is my pleasure to confirm my invitation to visit our laboratory from April 23rd to May 4th 1990.

I have obtained 7.500 F.F. (~~7.500~~ SK) for your travel and expenses in Paris. If you buy one month at the minimum before your travel (23rd March) an APEX ticket, it will cost you only 2.150 FF. But you need the rest of the money (5.350 FF) for your expenses in Paris, for the hotels and restaurants are quite expensive. Could you kindly confirm the dates of your travel, so that we are able to reserve early in a hotel with the best cost/benefit ratio.

I know that you are soon travelling to Bangkok with Dr Van Wonterghem. It will be good for your work but also for your family. I will myself be two times in Thailand this year. The first stay will be in Bangkok from 21st February to 10th March and the second at the end of July for holidays coming back from Japan with my wife, but we shall mainly stay in Chiang-Mai.

I am working on the difficult question of the joint meeting with Malinee. We shall have lot of time in April to discuss deeply this question.

I hope that you shall accept to give us a 2 hours conference on ergonomics in Thailand and mainly on your own researches.

Thank you so much for your greetings. I have not answered earlier for I was ill.

Truly yours,

A. Wisner



MINISTÈRE DE L'ÉDUCATION NATIONALE  
**CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS**

ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

Paris, le October 31, 1989

Mr. Kitti Intaranont  
Institutet För  
Verkstadsteknisk Forskning  
Mölnadalsvägen 85  
41285 Göteborg  
SUEDE

Tarif ABEX  
AR = 2.150  
(7 w.e.)

Dear Kitti:

It has been a great pleasure to receive your letter of October 10 for I really did not know where I could get in touch with you. I am really happy that you are now at this excellent Swedish institute working on CAD/CAM; that will soon be something extremely important in all countries but especially in Thailand, where the modern sector is growing so quickly.

I have kept in mind your kind proposal to visit us in Paris, and my students and I are eager to hear your new ideas. I am nearly sure that I will have the money for your roundtrip travel between Göteborg and Paris, and for modest accommodations and living expenses in Paris during two weeks. I will have the confirmation December 11, and I will confirm this invitation just after that date; but as of now we may fix the period of travel without fear from the 1st of January 1990.

Another good point is that I have perhaps found some money to help you for the organization of the SEAES Congress in Bangkok in 1991, thanks to an Australian fund. However, this project is not as yet finalized enough to give you more precise details at this time. I saw Choon Nam Ong in Boston recently and we discussed all the aspects of SEAES finance.

I take great pleasure at the idea of seeing you in Paris with Dr. Vanwongerghem next Thursday, November 9, when we shall also discuss all aspects of our cooperation.

With warm regards, I remain,

Very truly yours,

A. Wisner

Avsändarens handläggare

Datum

Beteckning

Ert datum

Er beteckning

THE SWEDISH INSTITUTE OF PRODUCTION ENGINEERING RESEARCH · THE SWEDISH INSTITUTE OF PRODUCTION ENGINEERING RESEARCH · THE SWEDISH INSTITUTE OF PRODUCTION ENGINEERING RESEARCH

Professor A. Wisner  
Director  
Physiologie du Travail Ergonomie  
Conservatoire National des Arts et Metiers  
41 Rue Gay-Lussac  
75005 Paris  
FRANCE

October 10, 1989

Dear Alain:

Finally I am in Sweden. I have been with this institute since the final week of August 1989. I will be here until June 20, 1990. I was in Hannover, FRG for EMO 89 Equipment Exhibition last month. Prior to go there I faxed Prof. Luczak to have the opportunity to meet him but he was in the States at that time so we missed. Probably we try once again in the near future.

I also enclose herewith the brochure to introduce the IVF, the Swedish Institute for Production Engineering Research, which I conduct research in two areas, Ergonomics and CAD/CAM. Hopefully we will have the opportunity to combine them into one single project. In Ergonomics, we explore the possibility to determine the dose of repetitive works for the workers. We will take preliminary step as general as possible and then proceed to sheet metal industry in which I am engaged in CAD/CAM system.

dr. erg. Kamiel VANWONTERGHEM is inviting me to Brussels during the first week of November. We are very positive to get financial assistance from the Community for our first joint research project. If it's true and you have some time available, please kindly help me one way or the other.

I hope you are still as healthy as swimming across the Dover Channel. I am as always, eat less and cold. Hope to see you soon. Best regards.

Sincerely yours,



Kitti Intaranont

23 Novembre 1989

Dr. Kitti INTARANONT  
The Swedish Institute of Production  
Engineering Research  
Mölnadalsvagen 85,  
S-412 85 GÖTEBORG  
Sweden

Dear Kitti.

I am very happy that you agree to visit us in a few months. The end of April would be excellent but I will probably not be back to Paris until Sunday 22nd April as it is Easter Holidays and I am too tired to miss this occasion to go to the countryside. If you could make the beginning of your visit on Monday 23rd, it would be perfect.

I needed your confirmation to formally ask to the Association *Naturalia et Biologia* the money for your travel. I shall receive confirmation of their grant by December 15 and will then let you know immediately. However, I am pretty sure the answer will be positive as I am the President of this Association.

The address and fax number of Malinee Wongphanich is as follows :

Occupational Health Department  
Faculty of Public Health,  
Mahidol Univeristy  
420/1 Rajvidhi Road  
Phayathai,  
Bangkok 10400

Tel. 245-7793, 240-1258-9, Ext. 259, 260, 261  
Fax (662) 246-7765

As for Dr. Choon Nam Ong, I can only give you his phone number as I have not yet received his fax number. It is : 7724293 / 7724299. The telex number is : UNISPO RS 33943 - and the Cable name : UNIVSPORE.

Lastly I am enclosing a photocopy of the list of participants at the 11th I.E.S. Congress in Sydney. I do apologise for the pencil marks which I beg you to ignore.

I am very much looking forward to welcoming you here in Paris in April.

With my best regards.

Yours sincerely,

A. Wisner



MINISTÈRE DE L'ÉDUCATION NATIONALE  
**CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS**

ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

Paris, le  
25th May 1989

Dr. Kitti INTARANONT  
The Swedish Institute of Production  
Engineering Research  
Molndalsvagen 85,  
S-412 85 GÖTEBORG  
Sweden

Dear Kitti,

Thank you for your letter of May 18 and for the interesting news you are giving me.

I received today a fax from Malinee who tells us that ACOH will be held in Bangkok from Sunday 17th to Wednesday 20th November 1991.

You may now decide if you prefer to organise the SEAS Meeting during the last days of the week, Thursday 21st and Friday 22nd, or if you prefer to have your meeting just before, i.e. Thursday 14th and Friday 15th.

I have not yet phoned to Kogi but I will do it soon and explain the situation to him.

With my best regards,

Sincerely yours,

A. Wisner



MINISTÈRE DE L'ÉDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS

ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

Paris, le 30th April 1990

Dr. Kitti INTARANONT  
The Swedish Institute of  
Production  
Engineering Research  
Mölnadalsvägen 85  
S-412 85 GÖTEBORG  
Sweden

Dear Professor Intaranont,

Thank you very much for your important review about repetitive work. I have read it with the greatest interest. It is both scientifically solid and highly useful for practical applications. It shows that repetitive work is highly dangerous for muscular and osteomuscular systems but that ergonomic changes and better organisation can reduce these dangers. Some of the papers give practical and feasible solutions.

The effects of repetitive work as it is shown by your review are not only local but general and you are giving descriptions of some of the best papers on the effects of this type of stress.

It is doubtful that cognitive activities like some of the ones on computer could be put in the same category as the one you have studied though they are extremely repetitive by nature. I think that another report could be written by another expert on this subject.

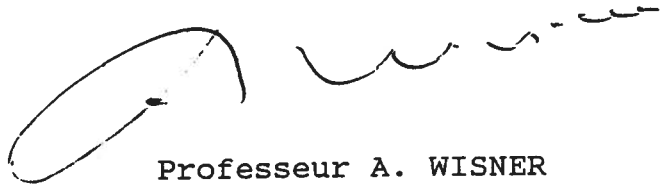
You asked me if it would be useful to publish this report as a book. My answer is highly positive : I have found a lot of intellectual satisfaction in reading your report and I will use it largely for research and teaching. I would like that as many of my colleagues as possible could be in a position to enjoy the same benefits.



The needed alterations are very few if there are any as this work has been done very carefully. My only suggestion would be to put at the beginning of the book a list of the authors and the title of their paper with the pagination. It would help the consultation.

I would like to thank you for having asked my advice on your report. It was both an honour and a pleasure.

Sincerely yours,

A handwritten signature in black ink, consisting of a large, sweeping initial 'A' followed by several smaller, connected loops and a final horizontal stroke.

Professeur A. WISNER  
Directeur du Laboratoire  
d'Ergonomie  
et Neurophysiologie du Travail



**DEPARTMENT OF INDUSTRIAL ENGINEERING  
FACULTY OF ENGINEERING  
CHULALONGKORN UNIVERSITY  
BANGKOK 10500, THAILAND**

Professor Alain Wisner  
LABORATOIRE D'ERGONOMIE  
CONSERVATOIRE NATIONAL DES  
ARTS ET METIERS  
41 RUE GAY-LUSSAC  
75005 PARIS  
FRANCE

February 17, 1989.

Dear Alain:

Thank you for your letters; letting me know your contact with Professor Luczak and Professor Malinee. It is good to hear news from you. Please accept my apology for not responding soon enough. We have just finished our final research report, the one that we were doing in Khon Kaen. The report looks great and as soon as I finish translating into English I distribute around the world. I do plan to write a paper on this and submit to "Ergonomics". My coworker is doing fine, he is all right, but you know better than me if someone is suffering of kidney problems.

With regard to my visit to your Academy and Professor Luczak's Institute, I am working on it. Since I am receiving a post doctoral research grant from the Royal Academy of Engineering Science of Sweden, I will go to Sweden and conduct my assigned research there for 10 months. The Academy wants me to leave Thailand in late April, I decide to postpone to early August this year. This news came to me as a shock. I tried to cancel or postpone because I have so many things to complete but my government denied. Both governments have agreed and approved on the recipients and I have already had an audience with King Carl III Kustaf of Sweden. The grants came to the government as the gift on the occasion of His Majesty's birthday. So I have no alternatives but gratefully accepted. If everything falls into my plan, I will leave Bangkok in August 1989 and come back in early June 1990. The Swedish coordinator will come to Bangkok in the middle of April, then I will learn everything from him including information on my host scientist, departure date and etc. From this point, with little financial assistance from you and Professor Luczak, I will have great chance to be in Paris and Berlin. Nevertheless, before I leave Bangkok I need to prepare a proposal to Professor Luczak for a joint research which we plan to conduct starting 1990. If you want me to be in Paris on my way to Sweden in late July or early August please kindly let me know so that I can arrange my schedule appropriately. For the SEAES Conference in 1991, no news leaks from the Secretary-General Office in Singapore nor from the Presidential Office in Bali, Indonesia. Probably they want to do confidentially.

Thank you for everything. Best regards.

Sincerely yours,

Kitti Intaranont



MINISTÈRE DE L'ÉDUCATION NATIONALE  
**CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS**

ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

Paris, le March 20, 1989

Mr. Kitti Intaranont  
Department of Industrial Engineering  
Faculty of Engineering  
Chulalongkorn University  
Bangkok 10500  
THAILANDE

Dear Kitti:

Your letter of February 17 was full of good news. I am so happy that your co-worker in Khon Kaen is now in better health.

But the most important news was in relation to the post doctoral research grant you have received from the Royal Academy of Engineering Science of Sweden. It is one of the best research units in the world and very near to your own preoccupations, if the orientation I observed some 10 years ago is always the same. And it is very pleasing for your friend that the Prince of Ergonomics has been invited through the good relationship between two Kings!

I will be on holiday at the end of July but will be coming back to Paris at the beginning of August. I will probably be at the Laboratory Tuesday, August 1st, but the Laboratory itself will be nearly empty; the first fortnight of August is the main annual vacation period in France. So I would be very happy to receive you then but you will miss the other members of the Laboratory.

Another solution could be for you to visit us later, for example in December 1989 or January/February 1990. In that case, we shall pay your Stockholm/Paris roundtrip air ticket and try to provide you with the possibility for a stopover in Berlin so that you can visit our friend, Professor Luczak.

Please let me know what your choice is so that I can prepare the funding in time.

Concerning the SEAES Ergonomics Conference in Bangkok in 1991, I think that you have to prepare it yourself and inform Professor Manuaba and Dr. Ong of your intentions so that they can contribute to your thinking. But do keep in mind that they are both quite involved in severe difficulties in their

cont'd/2

own countries; therefore, I do not think that you must expect too much initiative from them. Finally, as I have already written to you, I think that the connection with Professor Manuaba's meeting will be very helpful for the attendance and travel grants.

In any case, this will certainly be a major point in our reflections together in Paris, either in August or in late 1989/early 1990.

With warm personal regards for you and your family, and looking forward with much pleasure to seeing you in Paris, I remain,

Very truly yours,

A. Wisner

Dear P. LUCZAK,

It has been a pleasure to see you again in SYDNEY and to remember my nice stay in BERLIN. I remind you proposal of writing a paper for P. ROHMERT's book.

I am now in BANGKOK visiting ~~the~~ CHULALONGKORN UNIVERSITY, the best technical university in THAILAND. I am mainly related to Dr. KITTI INTARANONT (Ph.D. Texas ~~State~~ <sup>Techn</sup> University) whose work in industrial ergonomics is outstanding in his country. <sup>(He is associate Professor of Industrial Engineering)</sup> I would like to ~~visit~~ <sup>conduct some joint research in</sup> Europe and mainly <sup>in</sup> Germany and I have suggested him that you would be his best partner.

Dr. INTARANONT knows that a cooperation research ~~agreement~~ <sup>(D.F.G.)</sup> exists between Germany and Thailand and suggest to use it.

My personal opinion is that I would be <sup>myself</sup> eager to have Dr. INTARANONT in my team for some time.

I hope to see you soon again  
Truly yours

ALWISNER



CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS

ERGONOMIE ET NEUROPHYSIOLOGIE DU TRAVAIL

Paris, le October 31, 1989

Mr. Kitti Intaranont  
Institutet För  
Verkstadsteknisk Forskning  
Mölnadalsvägen 85  
41285 Göteborg  
SUEDE

Dear Kitti:

It has been a great pleasure to receive your letter of October 10 for I really did not know where I could get in touch with you. I am really happy that you are now at this excellent Swedish institute working on CAD/CAM; that will soon be something extremely important in all countries but especially in Thailand, where the modern sector is growing so quickly.

I have kept in mind your kind proposal to visit us in Paris, and my students and I are eager to hear your new ideas. I am nearly sure that I will have the money for your roundtrip travel between Göteborg and Paris, and for modest accommodations and living expenses in Paris during two weeks. I will have the confirmation December 11, and I will confirm this invitation just after that date; but as of now we may fix the period of travel without fear from the 1st of January 1990.

Another good point is that I have perhaps found some money to help you for the organization of the SEAES Congress in Bangkok in 1991, thanks to an Australian fund. However, this project is not as yet finalized enough to give you more precise details at this time. I saw Choon Nam Ong in Boston recently and we discussed all the aspects of SEAES finance.

I take great pleasure at the idea of seeing you in Paris with Dr. Vanwongerghem next Thursday, November 9, when we shall also discuss all aspects of our cooperation.

With warm regards, I remain,

Very truly yours,

A. Wisner

INSTITUUT VOOR REDDINGSWYZEN, ERGONOMIE EN ARBEIDSHYGIENE  
 Wetenschap zonder wetenschappelijkheid



T E L E F A X

ADRESSE à : Prof. Alain WISNER

CNAM - Paris

NUMERO FAX DE L'ADRESSE : 00 - 33 - 1 - 47075901.

NOMBRE DE PAGES : 1

COMMENTAIRE : vraisemblablement je repois le Prof. Kitti

INTARANONT (Bangkok, actuellement en Suède) pendant la semaine du 6 au 10 novembre prochain. C'est prévu de

descendre à Paris mercredi le 8/11. Est-ce cela vous convient de nous voir dans l'après-midi? Le retour en Belgique est prévu vers 17<sup>00</sup> H.

Nous pourrions alors discuter les projets <sup>communs</sup> que nous avons en préparation.

Bien à vous

SIGNÉ :

  
 Dr. K. VANWONTERGHEM.

I R E A, Kempische steenweg 555 B-3500 HASSELT

TEL : 32 11 22.21.75 - FAX : 32 11 24.10.79

PHYSICAL LIFTING CAPACITY:  
THE ANAEROBIC THRESHOLD APPROACH

K. Intaranont,<sup>1</sup> M.M. Ayoub,<sup>2</sup> W.M. Bobo,<sup>3</sup> and J.L. Smith<sup>4</sup>

<sup>1</sup> Department of Industrial Engineering  
Chulalongkorn University, Bangkok 10500 THAILAND  
<sup>2,3,4</sup> Department of Industrial Engineering  
Texas Tech University, Lubbock, Texas 79409 USA

Ten college men were paid volunteers to be subjects of the experiment to examine the effects of task factors to the PWC and the AT. Another objective was to determine the physical lifting capacity (PLC) at the energy cost 10% lower than the AT and validate the results. A progressive submaximal technique was used to estimate the PWC of all tasks. A graded exercise protocol with incrementing the weights and constant frequency was used to obtain  $\dot{V}E$ ,  $\dot{V}O_2$ , and other physiological values for the detection of the AT. The results revealed that the PLC was well within the lifting capacity norms. The validation process gave satisfactory results and they were in agreement with those reported in literatures. Future researches, however, were suggested in the area of invasive methods and of widening ranges of task factors.

INTRODUCTION

For many years, manual materials handling has been recognized by many experts on occupational health and safety as creating a major hazard to industrial workers, particularly in terms of low back pain. A great deal of time and effort has been expended to estimate a person's capability to lift loads safely for both occasional and repetitive lifting. Occasional lifting involves only occasional high levels of physical exertion, such as lifting a full box of parts once or twice during an hour. Investigators attempt to search for the relationship between the maximum strength of man's skeletal muscle system and forces and torques created within the body by the task. This can be achieved through the biomechanical or psychophysical analyses. Repetitive lifting is described as a rhythmic activity which can cause physiological stress, if not limited by strength factors, for a specified period of time, such as lifting parts or boxes along an assembly line. The investigators can assess the stress through the measurement of physiological responses such as oxygen consumption ( $\dot{V}O_2$ ), heart rate, blood pressure, and lactic acid accumulation. This can be done by the physiological and psychophysical analyses.

With respect to the physiological viewpoint, an individual's capability has long been recognized as the maximum amount of oxygen uptake that he or she can attain during a physical work while breathing at sea level (Astrand and Rodahl (1977)). This physiological capacity is also known as an aerobic capacity or physical work capacity (PWC) or maximal oxygen uptake ( $\dot{V}O_{2max}$ ).



Much research has been conducted to determine a safe level of physical work. The limit of such work will allow an individual to perform throughout the working day without excessive fatigue. The levels are expressed in at least three forms: 1) 35 and 50% of  $VO_{2max}$  determined by bicycling (Michael, Hutton, and Horvath (1961); Astfand (1967)), 2) an energy cost of 5 kcal/min or oxygen uptake of 1 liter/min required (Muller (1953)) mostly determined from bicycling and treadmill, and 3) a heart rate not to exceed 110-115 beats/min resulting from the lifting activity (Snook and Irvine (1969)). Work limit is also a function of task factors. Hence, the safe level of physical work determined from some other rhythmic exercise may not be adequate. The use of heart rate criterion alone one needs to be cautious. Literatures (Kamon and Pandolf (1972); Davies and Sargeant (1974); Cunningham and Critz (1975); and Davies, et al. (1976)) also reported that PWC values determined by different modes of exercise were different. The activity that utilized a smaller muscle group always results in less value of PWC (in l/min of oxygen or kcal/min). Petrofsky and Lind (1978a) concluded from their study that PWC for lifting a 36.36 kg-box from floor to 60 cm above the floor was 80% of that for bicycling. They also indicated that the PWC values for lifting varied directly to the weight being lifted. These same authors also recommended that the limit for lifting a box without fatigue be 50% of the PWC for lifting that weight (Petrofsky and Lind (1978b)). The work load for lifting in their experiment was increased by incrementing the frequency of lift. They employed Techniques of EMG and blood lactate analysis to identify the development of fatigue in lifting tasks. They also implied that an important factor that influenced the ability of a worker to perform a task was the PWC for that particular task.

The purpose of this study is twofold: 1) to investigate the effects of the task on the corresponding PWC, 2) to determine the physical lifting capacity defined as the limit for lifting a box without excessive fatigue under the onset of an anaerobic threshold using a noninvasive method. The anaerobic threshold (AT) is defined as "the level of work or oxygen consumption just below that at which metabolic acidosis and the associated changes in gas exchange occur" (Wasserman, et al. (1973)). It is also identified as a new parameter that may be closely related to the percentage of the capacity that one can maintain for a prolonged period of time (deVries (1980)). The AT can be determined by an invasive or a noninvasive method. Highly significant correlation (more than 0.85) between the results from the two methods is reported in literatures (Davis, et al. (1976); Reinhard, Muller, and Schmulling (1979); and Yoshida, et al. (1981)).

The criteria used to determine the AT as reported in the literatures for the noninvasive method (Wasserman, et al. (1973); Davis, et al. (1979); and Caiozzo, et al. (1982)) were 1) a nonlinear increase in volume of expired air ( $VE$ , BTPS), 2) a nonlinear increase in carbon dioxide output ( $VCO_2$ , STPD), 3) a systematic increase in the ventilatory ratio for oxygen ( $VE/VO_2$ ) without an increase in the ventilatory ratio in carbon dioxide ( $VE/VCO_2$ ). Orr, et al. (1982) developed a linear regression computer program in FORTRAN between  $VE$ , BTPS and  $VO_2$ , STPD to identify the AT. The program calculated the 2 or 3-section straight line that minimized the pooled residual sum of squares. The first break point was considered to be the AT.

## METHODS

A total of ten male college students were paid volunteers. All of them were informed of all experimental procedures and gave their consent to be subjects for this study. Each subject was medically examined prior to the start of the experiment. Their physical characteristics are shown in Table 1. All experiments were performed in a stable laboratory environment (21-25.5 C, 45-70% Relative Humidity). Each subject was trained for three weeks, 4 days a week to familiarize with the operation of each piece of equipment (breathing apparatus, in particular) and to tone the muscle groups required to perform each task.

Table 1  
Physical Characteristics of Subjects

Variables	Mean	Standard Deviation
Age, years	21.1	2.5
Body Weight, kg	73.3	8.9
Lean Body Weight (Sloan (1967)), kg	63.5	7.9
Height, cm	174.6	5.9
Shoulder Height, cm	142.5	6.7
Knuckle Height, cm	76.2	3.4

## PROCEDURES

Three tasks were performed on three types of equipment namely, an arm ergometer (Monark 881-Rehab Trainer), a bicycle ergometer (Cyber Fitron), and a lifting apparatus (described by Ayoub, et al. (1982)). Prior to the experiment for at least two hours, each subject was asked not to eat, smoke, or drink. They were also asked not to participate in any strenuous exercise throughout the experiment.

To estimate the PWC, a submaximal test described by deVries (1980) and Kamon and Ayoub (1976), known as an indirect method, was employed to reduce the possible risks to the subjects. Each subject worked at 3 different submaximal work loads for 4 minutes or steady state reached at each load. These load intensities were 30, 50, and 70 watts for the arm cycling task; 400, 600, and 800 kpm/min for the bicycling task; 9.1, 18.1, and 27.2 kg for the lifting task. The rates of working were 50 rpm, and 60 rpm for the arm cycling and bicycling tasks, respectively, while 6, 7.5, and 9 lifts/min for the lifting tasks. The ranges of lift were from floor to knuckle height and from knuckle height to shoulder height to simulate the use of different muscle groups utilized during the industrial tasks. Each subject was asked to lift a box of 30 X 38 X 23 cm with side handles using a free style technique; but the subjects were asked to maintain the same posture throughout the experiment in order to eliminate the effect of postural changes. The exact style of lifting posture was also recorded. However, if the heart rate response at the end of each load was not sufficiently high, the next load would be increased more than the predetermined one. Only  $VO_2$  and the heart rate at the end of each load were used in the analysis. Of particular interest, the third load for the lifting tasks was not to be more than the maximum permissible of lift (Badger (1981) pp 124-129) namely approximately 45.3 kg (100 pounds). All subjects were asked to perform the PWC test for each task prior to the training session.

To estimate the AT, a graded exercise protocol (progressive) was employed. Each subject was asked to perform each task starting with a zero load for four minutes to initialize the energy balance of the body. The work rates were the same as for the determination of PWC. The loads were incremented every minute after the 4-minute period by 10 watts, 50 kpm/min, and 1.1 kg for the arm cycling, bicycling, and lifting tasks, respectively. Literatures (Davis, et al. (1976); Yoshida, et al. (1981); and Ready and Quinney (1982)) showed that the AT existed well below 75% of PWC determined by bicycling. Therefore the subjects were asked to exercise up to 90% of the respective PWC values which were estimated from the straight-line relationship between work loads and  $\dot{V}O_2$  at the steady states from the PWC test prior to the training. However, a subject could terminate the test at his own will. To reduce the risk to the subjects, the final weight for lifting was not to be more than 45.3 kg (100 pounds).

A SAS computer program was written to determine two-segmental linear regression (least square) between minute ventilation ( $\dot{V}E$ , BTPS) and  $\dot{V}O_2$ , STPD, both in liter/minute. This procedure was regarded as the primary criterion. If, however, the best two-segmental lines were not apparent, other criteria such as the lowest point of  $\dot{V}E/\dot{V}O_2$  and  $\dot{V}E\dot{O}_2$  would be applied as recommended by Ready and Quinney (1982) and Caiozzo, et al. (1982).

After the AT for lifting was identified in terms of oxygen consumption in liters/min, a point at 90% of the AT (A90) was calculated. This percentage was arbitrarily chosen as a safety factor. This adoption was due to the fact that variation existed among individuals and the controversial issue Green, et al. (1983) concerning the delay of the occurrence of the AT. The load lifted at this point (A90), considered as the physical lifting capacity (PLC), was then calculated by using the linear relationship between the load lifted and oxygen consumed. All subjects were asked to participate in a validation procedure for as many sessions as possible. Each session required experimental time of at least 35 minutes and one session per day. A participating subject was instructed to lift the box of 190 kg (the load lifted at the A90) at a corresponding frequency and range of lift. Minute ventilation and  $\dot{V}O_2$  were recorded every 30 seconds and heart rate was recorded every three minutes.

A Beckman Metabolic Measurement Cart (MMC) and four channel Narco Bio-systems Physiograph were used to measure the oxygen consumption and heart rate, respectively. By using the breath mode option and an 8-card program, the MMC was able to printout more values of the physiological responses such as  $\dot{V}E$ ,  $\dot{V}O_2$ ,  $\dot{V}CO_2$ , percentage of  $O_2$  in the expired air ( $FEO_2$ ),  $\dot{V}E/\dot{V}O_2$ , and  $\dot{V}E/\dot{V}CO_2$ . The MMC was calibrated prior to the first session of the day and every two hours thereafter. The calibration was carried out according to the equipment instruction manual.

#### EXPERIMENTAL DESIGN

A randomized complete block design with factorial treatment combinations was utilized. Each subject was considered as a block, and performed the 16 possible treatment combinations. Two sessions per cell were performed to ensure the reproducibility of the data and results. Therefore, each subject was tested 32 sessions. The order of these sessions was randomized. A total of 320 sessions were performed by the ten subjects in this experiment. Thus, 160 linear regression equations were developed to estimate the PWC, and 160 two-segmental regression equations were also deve-

oped to identify the AT. The data were statistically analyzed with the 5% confidence level using the Statistical Analysis Systems package (SAS 79.4).

#### RESULTS

The PWC determined by lifting tasks (PWCL) at different frequencies and ranges of lift were analyzed by using the analysis of variance procedure (ANOVA Procedure). The result showed no significant difference ( $F=1.07$ ). The result was opposite, however, if the PWC for bicycling (PWCB) was included ( $F=6.17$ ). Duncan's Multiple Range Test indicated that the PWCB alone was significantly higher than the others. Table 2 shows the results of PWC values for each task (in liters/min of  $O_2$ ).

Table 2

Means and Standard Deviation of PWC

Tasks	Test 1	Test 2
Bicycling	3.55(.43)	3.53(.38)
Arm Cycling	2.91(.45)	2.85(.43)
Lifting;		
From floor to		
knuckle height		
at 6 lifts/min	2.95(.48)	2.93(.53)
at 7.5 lifts/min	2.87(.43)	2.92(.38)
at 9 lifts/min	3.09(.49)	3.16(.48)
From knuckle to		
Shoulder height		
at 6 lifts/min	2.94(.37)	2.98(.42)
at 7.5 lifts/min	2.92(.39)	2.93(.34)
at 9 lifts/min	2.85(.33)	2.86(.29)

A two-way ANOVA of PWCL between ranges of lift (HT) and frequencies of lift (FR) was performed. No significant difference in HT ( $F=.99$ ), FR ( $F=.39$ ), or the interaction effects between HT and FR ( $F=1.78$ ) was observed.

The principal criterion for determining the AT was the use of the SAS program. Figure 1 shows an example of a plot between  $\dot{V}O_2$ , STPD and  $\dot{V}E$ , BTPS and the intersection of the two straight lines. This graph was achieved after the equations of the two lines had been determined by the SAS computer program.

A one-way ANOVA showed a significant difference ( $F=18.46$ ) when comparisons of the AT for lifting tasks at different ranges of lift and frequencies were made. Duncan's Multiple Range Test revealed that the AT determined by leg works was significantly higher than those by arm works. Table 3 depicts the results of the AT for each task (in liters/min of  $O_2$ ).

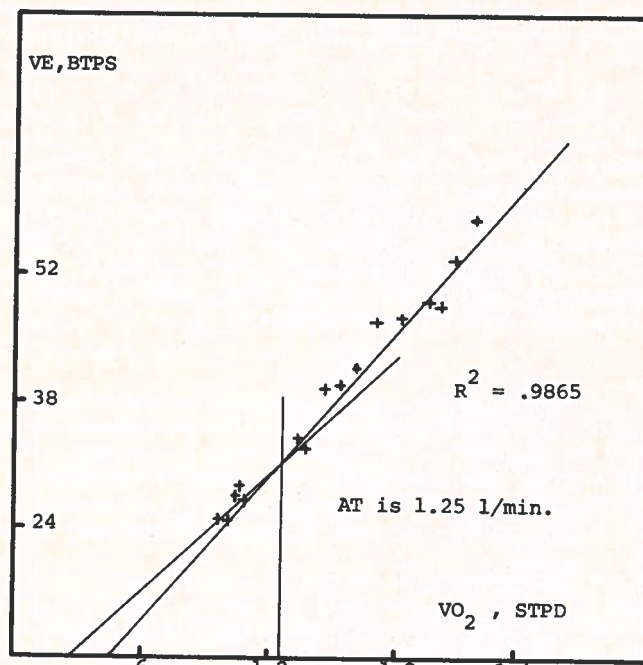


Figure 1 Two-Segmental Line Regression To Determine AT

Table 3

Means and Standard Deviation of AT

Tasks	Test 1	Test 2
Bicycling	1.55(.36)	1.57(.29)
Arm Cycling	1.16(.23)	1.17(.28)
Lifting:		
From floor to knuckle height		
at 6 lifts/min	1.49(.32)	1.57(.29)
at 7.5 lifts/min	1.54(.31)	1.57(.21)
at 9 lifts/min	1.69(.33)	1.58(.27)
From knuckle to shoulder height		
at 6 lifts/min	1.19(.16)	1.23(.20)
at 7.5 lifts/min	1.14(.19)	1.11(.23)
at 9 lifts/min	1.35(.35)	1.38(.31)

A two-way ANOVA of the ATL (AT determined by the lifting tasks) between ranges of lift (HT) and frequencies of lift (FR) showed a significant effect by HT ( $F=88.02$ ). No significant difference in FR ( $F=0.23$ ) or the interaction of HT X FR ( $F=1.91$ ) was shown.

The relative values of the AT expressed in terms of a percentage of PWCB are shown in Table 4 (mean values of the FWC or AT for each subject were used). The percentages of PWCL and of PWCA according to leg works or arm works were also listed.

Table 4

Means and Standard Deviation of AT as a Percentage of FWC

Tasks	100*AT/FWC P1	100*AT/PWCB P2	100*AT/PWCA P3
Bicycling	44.86(11.47)	-	-
Arm Cycling	41.01(9.76)	-	-
Lifting:			
From floor to knuckle height			
at 6 lifts/min	52.35(8.01)	43.34(6.76)	-
at 7.5 lifts/min	53.95(8.01)	43.95(5.78)	-
at 9 lifts/min	52.64(9.08)	46.31(7.22)	-
From knuckle to shoulder height			
at 6 lifts/min	41.83(8.73)	-	42.34(6.14)
at 7.5 lifts/min	38.62(6.19)	-	39.53(6.77)
at 9 lifts/min	38.75(7.14)	-	38.88(7.57)

Loads lifted at the AT were found by using the linear relationship between the work loads and oxygen consumption (deVries (1980); and Fox and Matthews (1981)). A physical lifting capacity (PLC) was then determined after a value of 90% of the AT (A90) had been obtained. The same linear relationship between the load (kg) and  $VO_2$  (liters/min) was used to determine the PLC at the A90. Figure 2 illustrates the graphical representation and uses the same data as in Figure 1. Table 5 shows mean and maximum values of the PLC as compared to lifting capacity norms established by Ayoub, et al. (1983).

After the validation procedure, visual inspection of physiological responses ( $VO_2$ , VE, and heart rate) indicated that each subject had reached the steady state as there were no increasing trends as lifting time prolonged up to the end of the test. Table 6 depicts means and standard deviation values of heart rate of the subjects who participated in the validation process. Blank cells implied no validation for that combination for that subject due to the unavailability of time.

DISCUSSION AND CONCLUSION

It was apparent that PWCL was less than PWCB which was in agreement with Petrofsky and Lind (1978a). Interestingly, PWCA was almost equal to PWCL. It was also speculated that when lifting a box from floor to knuckle height at a higher frequency, the PWCL would be higher since the task intensity became more dynamic. In the case of lifting from knuckle to shoulder height, the PWCL decreased as the frequency of lift increased. Localized muscle fatigue probably became a significant limiting factor. The small muscle mass of the upper limb could be another factor because of the

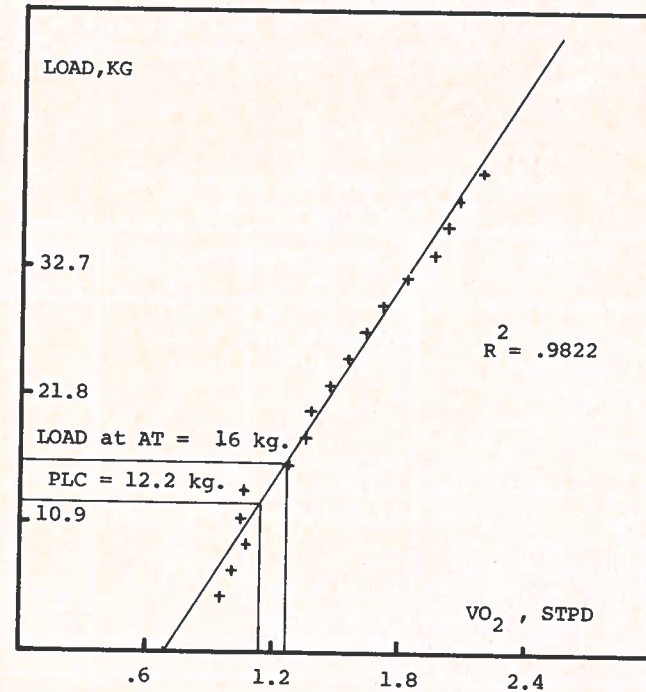


Figure 2 Determination of PLC

Table 5  
Comparison of the PLC and Lifting Capacity Norms

Tasks	PLC		Lifting Capacity Norms	
	Mean kg	Max kg	Mean kg	95th Percentile kg
Lifting from floor to knuckle height				
at 6 lifts/min	22.6	29.4	24.4	36.2
at 7.5 lifts/min	17.1	25.4	23.1	34.2
at 9 lifts/min	13.5	18.9	21.7	32.2
Lifting from knuckle to shoulder height				
at 6 lifts/min	25.9	36.4	21.4	26.7
at 7.5 lifts/min	19.7	28.5	20.2	29.3
at 9 lifts/min	15.4	19.0	18.7	27.3

Note: Lifting Capacity Norms at 7.5 lifts/min, the average value between at 7 and 8 lifts/min was used. Statistical analysis is not appropriate due to a large difference of sample sizes.

Table 6  
Heart Rate during the Validation Experiment

ID	Lifting From floor to knuckle height			Lifting From knuckle to shoulder height		
	lifts/min			lifts/min		
	6	7.5	9	6	7.5	9
1	107(1.7)	113(2.7)				103(2.0)
2	123(4.3)	130(3.6)	126(1.3)		98(1.8)	94(2.8)
3	144(2.2)	142(2.6)	131(2.2)		118(1.6)	115(2.7)
4	128(3.1)	132(4.3)	132(3.6)	105(1.8)	107(4.0)	122(1.8)
5		107(4.0)	116(5.3)	97(2.0)		87(1.9)
6			102(1.7)		89(1.0)	
7		108(2.2)				93(3.8)
8	126(3.2)			104(1.2)	103(1.3)	
9	132(3.2)	126(6.0)		101(2.5)	91(4.9)	
10	104(3.0)	112(4.4)		108(3.9)	11(3.4)	
Grand Mean	122(12.4)			102(9.8)		

relatively less oxygen consumed. This study, however, would not be able to determine which factor (weight to lift, range of lift, or frequency of lift) would provide more significant effects to the PWCL values. It is safe to say that the PWCL is a function of these three factors.

In Table 4, P1 for arm cycling was less than that for bicycling as expected (Davis, et al. (1976)). For lifting from floor to knuckle height at all frequencies, the average P1 was 52.98% which was a little higher than those (50%) reported by Astrand (1967) and Petrofsky and Lind (1978a). Astrand (1967) also concluded that the mean upper limit of work tolerance for construction building task (upper body movement) was 39% which was a little less than the result (P2) from this study (44.53%). This P2 result was also a little higher than that concluded (25 and 40%) by Petrofsky and Lind (1978b). These differences were anticipated because the endurance limit (liters/min of O<sub>2</sub>) should be lower than the AT value.

For lifting from knuckle to shoulder height, it was obvious that P1 was significantly less than 50%. This was probably because 1) smaller muscle mass consumed less oxygen (Hughes, Turner, and Brooks (1981)), and 2) the individual's muscular strength became another limiting factor in addition to or rather than his physiological endurance (Asfour (1980)).

In Table 5, the maximum values of the PLC were well within the 95th percentile of the norms. For lifting from knuckle to shoulder height, on the contrary, only at 7.5 and 9 lifts/min the PLC stayed within the norms. This was probably due to the subjects characteristics. Five subjects were participating in an upper-body conditioning program (weight curling and lifting). This would probably increase a threshold level of localized muscle fatigue which, in turn, might slow down the occurrence of the AT at low frequencies.

During the experiment, all subjects decided to use a squat lift as a choice of a free-style technique for lifting from floor to knuckle height. Energy cost prediction models developed by Garg, Chaffin, and Herrin (1978) were employed to predict  $VO_2$  based on the PLC. A comparison between the A90 and predicted  $VO_2$  was performed using a t-test of the difference of both values. Table 7 summarizes the result.

Table 7  
Comparison between A90 and Predicted  $VO_2$  by Garg

Variables	Tasks	
	Arm Lift	Squat Lift
A90	1.03(.18)	1.42(.26)
Garg	.92(.12)	1.36(.17)
Diff	.11(.10) <sup>1</sup>	.05(.17) <sup>2</sup>
Note: All values were significantly different at the 5% confidence level.		
	1	t=8.62
	2	t=2.46

Although significant differences resulted, the differences between values were small. For practical purposes, it was conceivable that Garg's models predicted well.

In Table 6, the mean heart rate was in agreement with the limit proposed by Wells, Balke, and van Fossan (1957) who concluded that heart rate up to 120 beats/min would not induce blood lactate to exceed the normal level.

The conclusion from the results of this investigation is only applicable to limited ranges of frequencies (6-9 lifts/min) and heights of lift (floor to knuckle height and knuckle to shoulder height). From Table 3, it is probable to conclude that the more active muscle mass required to perform the tasks, the higher AT values obtained. If the AT can be determined as in Figure 1, it is said that the AT is identified quantitatively. Other methods are less quantifiable. The physiological approach to determine the PLC using the AT criterion has one limitation if low frequencies are used. That is to say, if frequency of lift of less than 5 lifts/min (arm lift) is applied, the AT will be very difficult to detect quantitatively. The results of this study indicates that the AT concept is a reliable one to determine a lifting capacity of an individual physiologically. Future researches, however, to determine the PLC invasively are encouraged to check the level of the AT detected noninvasively. A treadmill exercise protocol to identify the AT needs to be developed to enable an investigator developing the physiological limit of tasks involving carrying and moving objects.

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nomm Jean Jacques FAURE

Attache nouvelle

(SOUTH SATHORN Road)

expect us 4 to 6.30 pm

Tuesday 25<sup>th</sup>

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987.15.92

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AGREEMENT

BETWEEN:

The University of Chulalongkorn (Thailand)

AND:

Le Conservatoire National des Arts et Métiers (France)

In the scientific field and the training of engineers, particularly in the field of Ergonomics.



## SECTION I - AIMS

### ARTICLE 1

X Each of the two parties, which is eager to organize bilateral exchanges, shall endeavour to reach the following targets: *goals*

- to participate in management of the other party through the provision of members of its teaching or research staff for short, medium or long-term periods, within the possibilities of each of the establishments,
- to issue information on the organization and aims of each of the parties, both as regards teaching and research, in order to encourage applications for teaching jobs in cooperation, so as to participate in both research and teaching activities;
- to find all the means liable to encourage research in fields of common interest and to promote better training for students, teachers, researchers and engineers;
- X- to <sup>hold</sup>~~carry~~ out consultations in order to improve and develop university and post-university training;
- to encourage the mutual participation in conventions, conferences, training courses and summer schools organized by either of the parties;
- to encourage exchanges and contacts between the university structures and industrial companies of the two countries.

### ARTICLE 2

The two parties shall agree to regularly exchange information about organization and educational documentation.

In the field of research, both establishments shall organize, in unison, the dispatch of post-graduate researchers in the context of joint research and shall reserve participation, on a preferential basis, for the them at scientific events, subject to availability of the ~~corresponding~~ *necessary* finance.

## SECTION II - CONDITIONS AND FIELD OF COOPERATION

### ARTICLE 3

The development of inter-establishment cooperation shall be the subject of a programme established in common at the time of meetings of the interested parties. These programmes shall be submitted to the competent Thai and French authorities.

### ARTICLE 4

The annual programme shall indicate the scientific or technical specialties and the qualifications of the permanent teachers which one of the parties shall provide to the other.

Where applicable, this annual programme shall establish:

- a list of the names, grades and references of the teachers, consultants and experts detached for short or medium-term missions, conferences, training courses or technical types of intervention;
- the number of students and the study programme selected for their exchange;
- the number and type of companies which wish to participate in the training.

## SECTION III - CONTRACTUAL CLAUSES

### ARTICLE 5

#### Exchanges of teachers, researchers or students

Each year, the two institutions shall endeavour to exchange teachers, researchers and students in each direction on a roughly equal basis. In particular, this effort shall concern students ~~in the third stage of~~ *secondary education, preparing Ph.D. thesis*

#### 5.1 Exchanges of teachers and researchers

Each establishment shall pay its teachers during their stay abroad. The host establishment shall provide assistance as regards their accommodation and social ~~security cover~~.

*welfare needs*

## 5.2 - Exchanges of students

The practice established for dealing with the equivalence of modules, semesters and diplomas will be the subject of reciprocal consultation.

### ARTICLE 6

In order to ensure follow-up of the agreement, each party shall appoint a committee with a secretariat which shall be responsible for establishing a report on the work done, especially at the end of the second semester of the university year.

An annual report shall be submitted to the authorities of the two parties.

## SECTION IV - MEANS

### ARTICLE 7

The two parties shall ask the organizations in charge of encouraging scientific cooperation for the finance necessary to implement this agreement.

In addition, they shall endeavour to support the actions engaged with all organizations authorized for this purpose.

### ARTICLE 8

The financial conditions agreed in the context of the cultural and scientific cooperation programme between the governments of the two countries shall apply to the implementation of this agreement and the programmes resulting therefrom.

## SECTION V - APPROVAL OF THIS AGREEMENT

### ARTICLE 9

Any difficulties arising from application of this agreement shall be examined at meetings of the interest parties in order to facilitate settlement. Where necessary, difficulties shall be referred to the competent authorities of the two countries.

ARTICLE 10

This agreement is signed for a period of four years. It shall be renewed through tacit agreement and shall take effect as from the day of its signature. It may be cancelled through written notice sent six (6) months before expiry of the current period.

Signed in BANGKOK  
on

Signed in PARIS  
on

*President* Pr. Charas Suwanwela M.D.  
~~Chairman~~ of CHULALONGKORN  
University

Pr. Guy FLEURY *S.G.P.*  
~~General Director~~ *General Administrator*  
of the Conservatoire National  
des Arts et Métiers

*Conservatoire National  
des Arts & Métiers*

Paris, le 14 octobre 1991

L'Administrateur Général

MC/jh

Monsieur le Président et cher collègue,


J'ai chargé M. le Professeur A. WISNER de proposer à votre agrément une convention de coopération entre nos deux universités dont les préoccupations sont largement convergentes, en particulier dans le domaine de la formation des ingénieurs et singulièrement, en ergonomie.

Je souhaite que des échanges fructueux puissent être développés dans le cadre de cet accord.

M. WISNER, dont je sais l'attention qu'il a portée à l'élaboration de celui-ci, pourra étudier en mon nom les thèmes de programmes conjoints susceptibles d'être mis en oeuvre dans l'avenir.

J'espère enfin que l'occasion me sera donnée d'évoquer avec vous ces perspectives, à l'occasion d'une venue en France que pourrait rendre souhaitable l'intensification de vos relations avec notre pays.

Je vous prie de croire, Monsieur le Président et cher collègue, à l'assurance de ma considération distinguée.

Guy FLEURY 

**Monsieur le Président  
de l'Université de CHULALONGKORN  
Phyrathaï Road  
BANGKOK (Thaïland)**



(TRANSLATION)

Paris, 14th October 1991.

Mr. President and Dear Colleague,

I have asked Professor A. Wisner to submit to your agreement a cooperation convention between our two Universities whose preoccupations are very convergent, in particular in the domain of engineers' training and most specially in the field of ergonomics.

I hope that fruitful exchanges may be developed in the agreement's frame.

Dr. Wisner of whom I know how carefully he has followed the preparation of this agreement, may study on my behalf the common programs' themes which are the most likely to be developed in the future.

Finally, I hope that I will be able to discuss with you these perspectives at the occasion of your venue in France, that could be necessary if the links between our two countries and Universities could intensify.

I present you, Mr. President and Dear Colleague, the expression of my very special consideration.

Guy FLEURY

General Administrator.

Bangkok 18.11.91

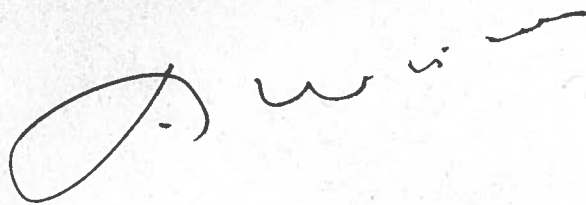
Chère Madame,

Merci d'abord pour la lettre et la convention signées par  
M. Fleury. L'affaire est bien engagée.

Merci aussi pour ce rappel des délais de NEB. Vous trouverez  
ci-joint une lettre par M<sup>lle</sup> BOILEAU la nouvelle secrétaire  
générale de NEB. Si vous trouvez cette lettre par trop illisible, veuillez,  
je vous prie, j'en faire une copie dactylographiée.

J'ai tenté de faire bien si l'on considère les pertes de temps liées  
au développement et mes propres limites. Je  
retrouverai avec <sup>plaisir</sup> la France et ses autres types de difficultés car  
j'ai besoin de la chaleur - humaine - de ma famille et du Laos.

Recevez toutes mes amitiés et veuillez les partager avec  
vos collègues et amis



# CONVENTION

ENTRE

L'Université Chulalongkorn ( Thaïlande )

ET

Le Conservatoire National des Arts et Métiers ( France )

Dans le domaine scientifique et de la formation d'ingénieurs  
en particulier dans la domaine de l'Ergonomie



## TITRE I - OBJECTIFS

### ARTICLE 1

Désireuses d'organiser des échanges bilatéraux, chacune des deux parties s'attachera à atteindre les objectifs suivants :

- . participer à l'encadrement de l'autre partie par la mise à sa disposition de membres de son personnel enseignant ou de recherche pour des périodes de courte, moyenne et longue durée dans la mesure des possibilités de chacun des établissements ;
- . diffuser des informations sur l'organisation et les objectifs de chacune des parties tant en ce qui concerne l'enseignement que la recherche, en vue de susciter des candidatures à des postes d'enseignants en coopération pour participer tant aux activités de recherche qu'aux activités pédagogiques ;
- . rechercher tous les moyens susceptibles de favoriser la recherche dans les domaines d'intérêt commun et de promouvoir une meilleure formation des étudiants, enseignants, chercheurs et ingénieurs ;
- . procéder à des consultations en vue de l'amélioration et du développement de la formation universitaire et post-universitaire ;
- . favoriser une participation mutuelle aux congrès, colloques, stages et écoles d'été organisés par l'une ou l'autre des parties ;
- . favoriser les échanges et les contacts entre les structures universitaires et les entreprises industrielles des deux pays.

### ARTICLE 2

Les deux parties s'engagent à échanger régulièrement des informations relatives à l'organisation et à la documentation pédagogique.

Dans le domaine de la recherche, les deux établissements organiseront de concert l'envoi de chercheurs post-gradués dans le cadre de recherche commune et réserveront une participation privilégiée à ceux-ci aux manifestations scientifiques, sous réserve de disposer des financements correspondants.

## TITRE II - MODALITES ET DOMAINE DE COOPERATION

### ARTICLE 3

Le développement de la coopération inter-établissements fera l'objet d'une programmation élaborée en commun à l'occasion de réunions entre les parties intéressées. Ces programmes seront soumis aux autorités brésiliennes et françaises compétentes.

### ARTICLE 4

Il sera précisé dans le programme annuel les spécialités scientifiques ou techniques et les qualifications des enseignants permanents que l'une des parties met à la disposition de l'autre.

Ce programme annuel établira le cas échéant :

- . la liste nominative, les grades et les références des enseignants, des consultants, des experts détachés pour des missions de courte ou moyenne durée, des conférences, des stages ou des interventions d'ordre technique ;
- . le nombre d'étudiants et leur programme d'étude retenu pour l'échange ;
- . le nombre et type d'entreprises désireuses de participer à leur formation.

## TITRE III - CLAUSES CONTRACTUELLES

### ARTICLE 5

#### Echanges d'enseignants-chercheurs ou d'étudiants

Les deux institutions s'efforceront d'échanger chaque année enseignants, chercheurs et étudiants dans chaque sens sur une base approximativement paritaire. L'effort portera tout particulièrement sur les étudiants de 1<sup>er</sup> cycle.

#### 5.1 Echanges d'enseignants-chercheurs

Chaque établissement assurera la rémunération de ses enseignants pendant leur séjour à l'étranger. L'établissement d'accueil leur apportera son aide en ce qui concerne leur logement et la couverture sociale.

### 5.2 Echanges d'étudiants

La pratique établie pour traiter l'équivalence des unités de valeur, des semestres et des diplômes fera l'objet d'une consultation réciproque.

### ARTICLE 6

Afin d'assurer le suivi de la convention, chaque partie désignera un comité disposant d'un secrétariat et notamment chargé à la fin du second semestre de l'année universitaire de dresser un bilan des réalisations.

Un rapport annuel sera soumis aux autorités de tutelle des deux parties.

## TITRE IV - MOYENS

### ARTICLE 7.

Les deux parties solliciteront auprès des organismes chargés d'encourager la coopération scientifique, les participations nécessaires à la mise en oeuvre du présent accord.

Elles s'efforceront par ailleurs de soutenir les actions engagées auprès de tout organisme habilité pour ce faire.

### ARTICLE 8

Les dispositions financières convenues dans le cadre du programme de coopération culturelle et scientifique entre les gouvernements des deux pays seront applicables au fonctionnement de cette convention et des programmes qui en découleront.

## TITRE V - APPROBATION DU PRESENT ACCORD

### ARTICLE 9

Toutes les difficultés liées à l'application du présent accord seront examinées à l'occasion de réunions entre les parties intéressées afin d'en faciliter le règlement. Il en sera référé, le cas échéant, aux autorités de tutelle compétentes des deux pays.

ARTICLE 10

Le présent accord est conclu pour une période de quatre ans, renouvelable par tacite reconduction, et prend effet à la date de la signature. Sa dénonciation s'effectuera par écrit six (6) mois avant l'expiration de la période en cours.

Fait à BANGKOK  
le .....

Fait à PARIS  
le .....

le Pr .....  
Président de l'Université  
CHULALONGKORN

le Pr Guy FLEURY  
Administrateur Général  
du Conservatoire National  
des Arts et Métiers.

10 Juin 1991

Monsieur le Professeur Guy Fleury  
Administrateur Général du CNAM

Monsieur l'Administrateur Général et cher collègue,

Je vous remercie vivement d'avoir approuvé le projet de convention entre le CNAM et l'Université de Santa Catarina.

J'en ai adressé une copie au Professeur Neri Dos Santos qui, je l'espère, apportera avec lui un exemplaire signé de son Président, avec peut-être une version en portugais.

Comme vous vous en souvenez peut-être, je disposais également d'un accord formel du Président de l'Université Chulalongkorn en Thaïlande. Pour un agrément analogue, le Professeur Davoine avait consulté l'Attaché Scientifique à Bangkok qui en avait approuvé le principe.

Je vous fais donc parvenir, ci-joint, un projet de convention avec l'Université de Chulalongkorn. Il est identique à celui que vous avez approuvé pour l'Université de Santa Catarina.

Si cet accord vous convient également, je l'adresserai en Thaïlande avec une copie en anglais, car je ne pense pas que les Thaïs nous demandent de signer un accord rédigé dans leur langue et leur écriture !

Je vous remercie à nouveau de vous intéresser à cette question; c'est la première fois que quelqu'un qui dirige le CNAM manifeste un tel intérêt.

Je vous prie d'agréer, Monsieur l'Administrateur Général et cher collègue, l'expression de mes sentiments dévoués.

A. Wisner

Agreement between  
Le Conservatoire National des Arts et Metiers  
and  
Chulalongkorn University

Proposition Thai du 2-10-91

## SECTION I - AIMS

### ARTICLE 1

Each of the two parties, eager to develop bilateral exchange, shall endeavour to achieve the following goals:

- to participate in the management of the other party through the provision of members of its teaching or research staff for short, medium or long-term periods, within the possibilities of each of the establishments.
- to exchange information on the organization and aims of each of the parties, both as regards teaching and research, in order to encourage applications for teaching jobs in cooperation, so as to participate in both research and teaching activities;
- to find all the means liable to encourage research in fields of common interest and to promote better training for students, teachers, researchers and engineers;
- to hold consultations in order to improve and develop university and post-university training;
- to encourage the mutual participation of each party, conferences, training courses and summer schools organized by either of the parties;
- to encourage exchanges and contacts between the university departments and industrial companies of the two countries.

### ARTICLE 2

The two parties shall agree to regularly exchange information about organization and educational documentation.

In the field of research, both establishments shall organize, in unison, the dispatch of post-graduate researchers in the context of joint research and shall reserve participation, on a preferential basis, for them at scientific events, subject to availability of necessary finance.

## SECTION II - CONDITIONS AND FIELD OF COOPERATION

### ARTICLE 3

The development of inter-establishment cooperation shall be the subject of a programme established in common at the time of meetings of the interested parties. These programmes shall be submitted to the competent Thai and French authorities.

ARTICLE 4

The annual programme shall indicate the scientific or technical specialties and the qualifications of the permanent teachers which one of the parties shall provide to the other.

Where applicable, this annual programme shall establish:

- a list of the names, grades and references of teachers, consultants and experts detached for short or medium-term missions, conferences, training courses or technical types of intervention;
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ARTICLE 5

Exchanges of teachers, researchers or students

Each year, the two institutions shall endeavour to exchange teachers, researchers and students in each direction on a roughly equal basis. In particular, this effort shall concern students in the third stage of secondary education.

*supera* 5.1 Exchanges of teachers and researchers

Each establishment shall pay its teachers during their stay abroad. The host establishment shall provide assistance as regards their accommodation and social welfare needs.

5.2 Exchanges of students

The practice established for dealing with the equivalence of modules, semesters and diplomas will be the subject of reciprocal consultation.

ARTICLE 6

In order to ensure follow-up of the agreement, each party shall appoint a committee with a secretariat which shall be responsible for establishing a report on the work done, especially at the end of the second semester of the university year.

An annual report shall be submitted to the authorities of the two parties.



SECTION IV - MEANS

ARTICLE 7

The two parties shall ask the organizations in charge of encouraging scientific cooperation for the finance necessary to implement this agreement.

In addition, they shall endeavour to support the actions engaged with all organizations authorized for this purpose.

ARTICLE 8

The financial conditions agreed to in the context of the cultural and scientific cooperation programme between the governments of the two countries shall apply to the implementation of this agreement and the programmes resulting therefrom.

SECTION V - APPROVAL OF THIS AGREEMENT

ARTICLE 9

Any difficulties arising from application of this agreement shall be examined at meetings of the interested parties in order to facilitate settlement. Where necessary, difficulties shall be referred to the competent authorities of the two countries.

ARTICLE 10

This agreement is effective for a period of four years. It shall be renewed through tacit agreement and shall take effect as from the day of its signature. It may be cancelled through written notice sent six (6) months before expiry of the current period.

Signed in BANGKOK  
on

Signed in PARIS  
on

Professor Charas Suwanwela, M.D.  
President of Chulalongkorn  
University

Professor Guy Fleury  
~~Director General~~ *Administration General*  
of the Conservatoire National  
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des Arts et Metiers

*Conservatoire National  
des Arts & Métiers*

Paris, le 14 octobre 1991

L'Administrateur Général

MC/jh

Monsieur le Président et cher collègue,

J'ai chargé M. le Professeur A. WISNER de proposer à votre agrément une convention de coopération entre nos deux universités dont les préoccupations sont largement convergentes, en particulier dans le domaine de la formation des ingénieurs et singulièrement, en ergonomie.

Je souhaite que des échanges fructueux puissent être développés dans le cadre de cet accord.

M. WISNER, dont je sais l'attention qu'il a portée à l'élaboration de celui-ci, pourra étudier en mon nom les thèmes de programmes conjoints susceptibles d'être mis en oeuvre dans l'avenir.

J'espère enfin que l'occasion me sera donnée d'évoquer avec vous ces perspectives, à l'occasion d'une venue en France que pourrait rendre souhaitable l'intensification de vos relations avec notre pays.

Je vous prie de croire, Monsieur le Président et cher collègue, à l'assurance de ma considération distinguée.

Guy FLEURY 

Monsieur le Président  
de l'Université de CHULALONGKORN  
Phyrathaï Road  
BANGKOK (Thaïland)



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Proposition Thai du 2-10-91

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# CONVENTION

ENTRE

L'Université Chulalongkorn (Thaïlande)

ET

Le Conservatoire National des Arts et Métiers (France)

TITRE I - OBJECTIFS

---

Article 1

Désireuses d'organiser des échanges bilatéraux, chacune des deux parties s'attachera à atteindre les objectifs suivants :

- . participer à l'encadrement de l'autre partie par la mise à sa disposition de membres de son personnel enseignant ou de recherche pour des périodes de courte, moyenne, et longue durée dans la mesure des possibilités de chacun des établissements;
- . diffuser des informations sur l'organisation et les objectifs de chacune des parties tant en ce qui concerne l'enseignement que la recherche, en vue de susciter des candidatures à des postes d'enseignants en coopération pour participer tant aux activités de recherche qu'aux activités pédagogiques;
- . rechercher tous les moyens susceptibles de favoriser la recherche dans les domaines d'intérêt commun et de promouvoir une meilleure formation des étudiants, enseignants, chercheurs et ingénieurs;
- . procéder à des consultations en vue de l'amélioration et du développement de la formation universitaire et post-universitaire;
- . favoriser une participation mutuelle aux congrès, colloques, stages et écoles d'été organisés par l'une ou l'autre des parties;

- . favoriser les échanges et les contacts entre les structures universitaires et les entreprises industrielles des deux pays.

#### Article 2

Les deux parties s'engagent à échanger régulièrement des informations relatives à l'organisation et à la documentation pédagogique.

Dans le domaine de la recherche, les deux établissements organiseront de concert l'envoi de chercheurs post-gradués dans le cadre de recherche commune et réserveront une participation privilégiée à ceux-ci aux manifestations scientifiques, sous réserve de disposer des financements correspondants.

### TITRE II - MODALITES ET DOMAINE DE COOPERATION

#### Article 3

Le développement de la coopération inter-établissements fera l'objet d'une programmation élaborée en commun à l'occasion de réunions entre les parties intéressées. Ces programmes seront soumis aux autorités brésiliennes et françaises compétentes.

#### Article 4

Il sera précisé dans le programme annuel les spécialités scientifiques ou techniques et les qualifications des enseignants permanents que l'une des parties met à la disposition de l'autre.

Ce programme annuel établira le cas échéant :

- . la liste nominative, les grades et les références des enseignants, des consultants, des experts détachés pour des missions de courte ou moyenne durée, des conférences, des stages ou des interventions d'ordre technique;

- . le nombre d'étudiants et leur programme d'étude retenu pour l'échange;
- . le nombre et type d'entreprises désireuses de participer à leur formation.

### TITRE III - CLAUSES CONTRACTUELLES

#### Article 5

##### Echanges d'enseignants-chercheurs ou d'étudiants

Les deux institutions s'efforceront d'échanger chaque année enseignants, chercheurs et étudiants dans chaque sens sur une base approximativement paritaire. L'effort portera tout particulièrement sur les étudiants préparant des thèses de Doctorat.

##### 5.1. Echanges d'enseignants-chercheurs

Chaque établissement assurera la rémunération de ses enseignants pendant leur séjour à l'étranger. L'établissement d'accueil leur apportera son aide en ce qui concerne leur logement et la couverture sociale.

##### 5.2. Echanges d'étudiants

La pratique établie pour traiter l'équivalence des unités de valeur, des semestres et des diplômes fera l'objet d'une consultation réciproque.

#### Article 6

Afin d'assurer le suivi de la convention, chaque partie désignera un comité disposant d'un secrétariat et notamment chargé à la fin du second semestre de l'année universitaire de dresser un bilan des réalisations.

Un rapport annuel sera soumis aux autorités de tutelle des deux parties.

TITRE IV - MOYENS

Article 7

Les deux parties solliciteront auprès des organismes chargés d'encourager la coopération scientifique, les participations nécessaires à la mise en oeuvre du présent accord.

Elles s'efforceront par ailleurs de soutenir les actions engagées auprès de tout organisme habilité pour ce faire.

Article 8

Les dispositions financières convenues dans le cadre du programme de coopération culturelle et scientifique entre les gouvernements des deux pays seront applicables au fonctionnement de cette convention et des programmes qui en découleront.

TITRE V - APPROBATION DU PRESENT ACCORD

Article 9

Toutes les difficultés liées à l'application du présent accord seront examinées à l'occasion de réunions entre les parties intéressées afin d'en faciliter le règlement. Il en sera référé, le cas échéant, aux autorités de tutelle compétentes des deux pays.

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## CONVENTION

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# CHRONOPOST

INTERNATIONAL

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Code postal 6 75015			Ville 7 PARIS			Pays FRANCE			Code postal 10 113			Ville 11 TOKYO			Pays JAPON																										
Personne à contacter 8 WISNER						N° de téléphone 9 44.10.78.12						Personne à contacter 12 K. HASAYA KANDA						N° de téléphone 13																							
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July 26, 1995

Dr. Alain Wisner  
Conservatoire National des Arts et Metiers  
41, rue Gay-Lussac  
75005 Paris  
France

Dear Dr. Wisner

Your manuscript entitled : THE IRRUPTION OF NEW TECHNOLOGIES: A NEW CHALLENGE FOR ERGONOMICS AND ANTHROPOTECHNOLOGY

that you submitted for publication in J.Human Ergol., has been accepted and appears in the Jun.1995 issue (Vol.24, no.1).

We are enclosing herewith your galley proof and manuscript.

Please check on your side with blue ink, and send them within 2 days after receipt by EMS or airmail.

Your cooperation will be highly appreciated.

With best regards,

*Masaya Kanja*  
Masaya Kanja

Copy Editor of J.Human Ergol.  
c/o Center for Academic Publications Japan,  
4-16, Yayoi 2-Chome, Bunkyo-ku,  
Tokyo, 113 Japan



PARIS Tuesday 8/8/95



Dear M. Masaya-Komga,

I am really sorry to send you this document so late but I was in Holiday in the South of France and found your mail only when I came back. July August are the months where academics take a leave in France

I have admired the remarkable editing work you did. I have answered to all your questions except for the paper of WISNER '95B paper that is announced but not yet published in the next issue of ERGONOMICS. I think that this journal is overloaded by papers and could not publish the IEA94 reports before September 1995.

If there is any other difficulty, please fax me and I will answer the same day (except weekends) for I am everyday at the lab.

I am very happy to read very soon my paper in the Journal of Human Ergology, journal I appreciate very much

With my best regards

Truly yours

Jean WISNER

Professeur Emeritus

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**The irruption of new technologies: a new challenge for ergonomics and anthropotechnology**

Alain WISNER, *Conservatoire National de l'Arts et Metiers, Paris* S

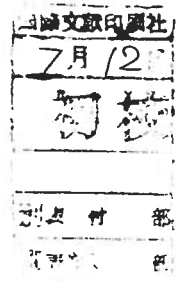
The irruption of New Technologies in South-East Asia has dreadful social effects such as unemployment and the rejection of former worker skills, but is also an opportunity to show that ergonomics has resources which have been neglected so far in this part of the world. The outstanding feature of these resources, which are vital for the successful transfer of these New Technologies, is that they are both technically and economically indispensable. Although the well-being, health and safety of workers may be sadly overlooked without drastic economic effects, this is not the case when using New Technologies, since costly mistakes may arise if the operators are unable to use computerized systems properly. Cognitive ergonomics associated with situated cognition may then make a great contribution. Since New Technologies are generally imported from Europe, the United States or Japan, they include special features which originate from these industrialized societies. Thanks to Ergonomic Work Analysis, we can discover the difficulties encountered in the importing country and find solutions based on anthropotechnology concepts, methodologies and knowledge.

When talking to ergonomists from a region as vast and diverse as South-East Asia, there is a risk of formulating analyses and recommendations which are of no interest to most listeners who are concerned with a particular industry or a particular region. What is there in common between improving the working conditions of the poorest farmers in Indonesia by MANUABA (1976, 1991) and in India by SEN (1984) and NAG (1981) and perfecting the human-computer relation in Singapore, the necessity of which was demonstrated by ONG and HOON (1987).

My concern is more limited, although it is related to a movement which

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concerns all the countries of the region and will concern them in a rapidly increasing way in the next 10 years. I am talking about the explosion of New Technologies. This expression refers to technical systems, including data processing, to various extents. It covers office machines (for accounts, word processing), automated systems (chemical industries) and mechanized production systems (robotics, automated and semiautomated systems).

Given the effect which New Technologies have had in the world economy over the past 25 years, this phenomenon has been given wide and relatively accurate coverage in the popular press, sometimes with a certain exaltation.

It is true that the work of a great number of people has been modified and sometimes transformed in the United States, Europe, Japan, Singapore and in other great industrial centres in South-East Asia.

This transformation may take surprising forms. Two to 3 years ago, it was learned that a certain European airline company would now have its tickets processed in India thanks to telecomputing. In the same way, the accounts of a large French company were done in the Philippines, etc.

Last year, I was invited to take part in a conference organized in Bangkok by the Women's Study Programme of Thammasat University, the Thai Institute for the Development of Work and the Friedrich Ebert Foundation, concerning the unemployment created among textile industry workers in Thailand through the transfer of certain types of textile production to neighbouring countries: Laos, Vietnam and China, where the labour costs were even less than in Thailand (CHANDHAMRONG and POLIOUDAKIS, 1994).

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*Ergonomics in South-East Asia*

As regards Ergonomics, these very considerable technical and economic developments, which can only become more widespread, are leading to the discovery of new fields of research, education and application, the scientific and problematic bases of which are very different from those familiar to ergonomists of the SEAES.

It could rightly be considered that the ergonomics activity should continue to be dedicated to the poorest workers, farmers using traditional tools, workers in small and medium-sized companies which lack capital (KOGI, 1992) and workers with low qualifications doing repetitive activities in heavy industry. It is obvious that the multiform suffering and pathology of these workers continues to call for our efforts along the lines we have followed since the early days of ergonomics: anthropometry (or, better still, physical anthropology), biomechanics, physiology of physical work and heat and experimental psychology concerned with ethnical differences. A considerable and intense effort is still necessary in these various fields, as shown by the remarkable work of Manuaba, Sen and his school, ~~Kitti~~

Intaranont (1994), etc. The importance of ergotoxicology (WISNER and SZNELWAR, 1994) could also be underlined. In particular, it should be noted that the last

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SEAES Congress was organized in Bangkok in 1991 in a very legitimate way at the same time as the 13th Asian Conference on Health at Work (Wongphanich et al, 1992). However, it is noticeable that, despite remarkable arguments like those of OHTSUKA (1994), these efforts are barely encouraged by national authorities which are more concerned with other social emergencies or are insensitive to the political and social power of the social categories concerned. This is true throughout the world: easing the suffering of workers only becomes a priority under certain political, social and economic conditions, which belong to rich or very rich countries. The results at the workstation are far from convincing, even in these countries and even after 50 or 100 years of effort.

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The increasingly widespread use of new technologies raises multiple new problems for ergonomists. This irruption is taking place under very diverse conditions. However, one positive, common aspect is that the ergonomist is no longer called in just to ease ~~that~~ suffering of workers but also—and especially—to ensure that the technical system works properly; in other words, ergonomics is becoming a form of knowledge and practice with an economic significance.

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Contrary to what is claimed by those who sell computer systems, the new systems are far from operating as well as they should. Too often, they do not achieve the level of performance announced in terms of the quality and quantity of production. In addition, dismal failures have become more frequent. In the minds of the public, there is a legitimate association of new technologies with major disasters: Seveso, Three Mile Island, Bhopal and Chernobyl, to name the best known.

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In defence of their science, computer experts blame Man for the defects of computerized systems and thus strongly question the relations between Man and the computer, a field which has become major in ergonomics. One fact suggests that this branch of ergonomics is expanding: there are around twice as many Congresses dealing with Human-Computer Interaction (H.C.I.) than Congresses dealing with ergonomics as a whole, and H.C.I. congresses attract twice as many participants. In the first part of the history of Human-Computer interaction, two questions were uppermost: replacement of Man by the Computer and the matter of the Human-Computer Interface.

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*Facts and fiction about new technologies*

As regards the replacement of Man by the Computer, this is a real social fact. Numerous efficient automated systems characterize the distribution of New Technologies and lead to high unemployment. This phenomenon is actually more ambiguous than it appears since many services are no longer rendered to users and operators. The fact that drivers in the United States and in Europe have to fill up their own petrol tanks and possibly pay at an automatic payment terminal using a credit card is not simply the result of computerization. It is also the effect of the decision to do away with a large number of services previously rendered by people:

do not get one's hands dirty and have them smelling of petrol, do not check the oil level and tyre pressures, do not have the windscreen cleaned, do not ask for directions, ect. Activity analysis, which is now a clearly defined ergonomics method, highlights that which, in the reduction of employment, corresponds to the existence of new technologies and that which corresponds to the reduction of services rendered. When you know that a person who sells train tickets spends half his/her time giving information and advice to users, it is easy to see that the automatic ticket distributor is only partly responsible for the reduction in the number of railway employees, since the rest is due to the reduction of the service rendered to users.

*OK* *tr.* From a more philosophical viewpoint, the total replacement of man by a robot is no longer topical, except in comic strips. Human complexity cannot be modelled sufficiently with the tools and concepts at our disposal. Even in the case of enormous technical systems, like nuclear power stations or oil refineries, we now consider these technical systems as tools for the operators and not as masters which should be served by operators through the application of pre-determined instructions, under penalty of being considered as guilty of negligence, at least.

The only essential question for us is therefore the relation between Man and the Computer. For a rather long period, the main concerns were related to the problems raised by the interface between man and the computer: prevention of visual disorders related to the lack of definition of characters, to their graphic features, the battle against postural pains related to the reflection of light sources on the screen, the poor design of office furniture and the possibly harmful effects of radiation from the screen.

At present, we know that the most serious problems are linked to the actual dialogue between the operator and the computer. How can an operator understand the computer with no mistakes? How can unexpected situations be taken into account in order to interpret the recommendations programmed by the computer?

In an attempt to ensure this compatibility between the logic built into the computer and the reasoning of the operator, two main paths have been explored: cognitive sciences and situated cognition.

Cognitive sciences constitute a vast group consisting of formal logic, certain aspects of mathematics, neurophysiology and computational cognitive psychology. The very remarkable effort of this aspect of psychology is directed towards the study of human thought and, in particular, its logical aspects. The aim of the more computational aspect is to model human cognitive mechanisms in the form of computer programmes. The result of this work is impressive. This is the field of artificial intelligence, expert systems, etc. Did not recently see the world chess champion beaten by a software programme that can be bought in a supermarket?

However, there are limits to the work of computational cognitive psychology and to the computer products which result from them. First of all, it should be recalled that computerized models of human cognition do not represent human

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cognition. The machine obtains the same results through other means (for example, the very fast speed of calculation and exploration of the computer memory). In particular, computational cognitive psychology mainly deals with problem-solving and not problem-building (WISNER, 1995<sup>u</sup>). As in the case of solving mathematical problems given to pupils in school, the data of the problems are necessary and sufficient and the theorems to be used are found in the programme studied recently. If we take the example of a game of chess, this is a mathematical and logical game invented in India in the 4th century and not a part of real life. Its data are precise and its rules are formal.

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In life, we don't always know what data will be necessary to solve the problem. Perhaps data that are easy to discover are useless and perhaps other data are hidden and have to be sought. In reality, the problem has to be *built* before it can be *solved*.

*Ergonomic work analysis*

The observation of people working, an observation performed according to a precise methodology, that of Ergonomic Work Analysis (WISNER, 1995<sup>u</sup>) indicates how operators build the problem before solving it. Each of us thinks "in situation," meaning that the situation and the environment is taken into account. The so-called "situated cognition" scientific movement developed over the last 30 years in the USA (RESNICK, 1976; CASSON, 1981; ROGOFF and LAVE, 1984; DOUGHERTY, 1985) clearly showed the necessary appropriation of technical systems in terms of the surrounding environment, but also in terms of the state of the system and the operator's know-how. This movement encounters an older practice of French-speaking ergonomists: Ergonomic Work Analysis. Since PACAUD (1949) and OMBREDANE and FAVERGE (1955), we know that in order to build the problem, operators develop observable behaviour of action on the objects and controls, information collection (movement of eyes and head towards the indicators, but also towards informal sources of knowledge) and communication. Communication may be postural, gestural, oral or written. This last-mentioned field has developed considerably thanks to applied linguistics. We examine the written documents produced during work on paper or on the screen and we see, first of all, if these documents clearly satisfy the intentions of the persons sending them—this is the specifically linguistic part of the research. We also observe the way in which these documents are used and the acts which follow their consultation. this is the more ergonomic side of the study of texts.

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Oral communication, which ergonomists initially distrusted as a means of expressing an attitude rather than an activity, is now the subject of considerable work which gives different statuses to speech:

*Action speech* : during a work activity, this is often an essential element of an action sequence. It forms part of the materials which the ergonomist has to examine.

*Interpretation speech* : this is very important in Ergonomic work Analysis.

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When allowed by circumstances, these verbalizations are *interruptive*. They interrupt the work when the work appears less intense. They enable explanations to be obtained immediately, but it is rarely possible reach a real explanation from this stage.

Ergonomic Work Analysis normally includes an essential phase of *Self-confrontation* (THEUREAU, 1992) in which the way the work is done is presented to the operator in the form of a detailed report and, where possible, in the form of a video recording. The operator is often surprised by the spectacle of his own activities; he thought he regularly monitored such an indicator, when in fact he neglected it. On the other hand, he often looked at a bit of the part being machined when in fact he thought this was not the case. These observations and those of the ergonomist lead to a discussion in which the reality of the activities provides access to the reasons for the behaviour observed and the operator's representations. Sometimes, this representation is incorrect and leads to the operator's training being complemented. More often, this representation is justified by the differences between the raw materials used and those which had been planned, by the state of deterioration of the production system or by the absence of a member of the team. On the basis of this analysis of *real work*, we can formulate ergonomic recommendations concerning the technical system and organizational recommendations which may concern the structures and activities of a relatively higher level.

Finally, analysis of conversations at work recorded on a tape recorder or, better still, on a video tape recorder, enable us to understand the conditions of the relations which exist between the interlocutors and, possibly, the stakes which exist behind the dialogue (GOFFMAN, 1976; GUMPERZ, 1992).

As such, through Ergonomic Work Analysis it is possible to grasp not only the reality of the difficulties of operators, but also those of workshop supervisors in large companies or managers of small- and medium-sized companies, as shown by the work of Langa (LANGA and WISNER, 1994). In view of the fact that the activity of managers is mainly oral, Langa proposed that the manager be confronted with the transcription of what he said during his work so he could give technical explanations. This is "written self-confrontation." However, the work of management often involves complex considerations concerning realities located rather far from the immediate work. Langa proposed "Interviews guided by facts" which, while starting from the immediate reality observed, search for the causes as far away as necessary.

The study of the situated action and the search for the causes of differences between the prescribed work and the real work, the transformation of the situation by ergonomics, training and organization depend on a better understanding of the thought, of the cognition of operators, the rationality of whom we accept—and check—although the bases of the reasoning which we discover could naturally consist of incorrect premises. Only the discovery of these activities, however,

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enables us to find out and convince.

The study of the relation between Man and the computer is of the greatest interest since it shows the relations between the software—the result of cognitive sciences of computational cognitive psychology—and the real operation of the brain, which are known thanks to the study of situated cognition and to Ergonomic Work Analysis.



All the considerations which have been developed previously could be found in all regions of the world during the period when New Technologies emerged, but these remarks do not have the same significance according to the country and the particular orientation of each of us. However, two types of consideration may be developed on the basis of these data and this know-how.

First of all, the powerful and inventive character of the human mind, demonstrated at the time of the study of New Technologies, is a general fact. Human intelligence thrives in traditional civilizations, the results of which we can still admire in certain parts of the Region. The industrial civilization discovered Taylorian work organization which is very efficient under certain technical and economic circumstances. Unfortunately, this organization is very negative for health, as shown, for example, by the endemic disease of the peri-articular syndromes due to repetitive physical work. In addition, it is accompanied by a pseudo ideological justification which is sometimes difficult to ignore. If workers are condemned to do a repetitive and fragmentary job according to protocols determined by others, it is because they are not intelligent and are incapable of organizing their own work. Taylor said that he needed "workers with the strength and intelligence of an ox" who could easily be given detailed instructions. The reality is clearly different and in the most repetitive work, we see the expression of the ability of workers to be the iterative creators of their task, to construct an efficient activity despite the flaws of the technical system and the organization. We also see the appearance of the ethical dimension of human thought (ANTUNES LIMA, 1995). In fact, human intelligence is a vast resource of the economy which is very little used in modern industry. However, as shown by RUBIO (1991-1994), the ability of the company is vital in order to develop and use the skills of the workers.

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*Anthropotechnology in South-East Asia*

Rather than develop this major theme, we considered it more interesting to come back to the problems specific to South-East Asia, problems for which the anthropotechnological approach contributes data, explanations and also solutions.

The ergonomics of the technology transfer was called Anthropotechnology (WISNER, 1984) so as to underline the fact that the knowledge useful for solving the difficult problems of the transfer belongs to collective Human Sciences and not to individual Human Sciences, as for Ergonomics.

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Twenty years' experience in various countries (Algeria, Argentina, Brazil,



Canada, Central African Republic, Columbia, India, Indonesia, Ivory Coast, Japan, Mexico, Philippines, Senegal, Singapore, Thailand, Tunisia, Zaire, ect.) along with personal studies and international cooperation suggest the existence of problematics specific to each country, linked to the great diversity of situations noted in the countries and regions which acquire foreign technology and try to use it with various degrees of success. These major differences observed in the installation and the results of identical technologies, depending on the location of the company, impose the joint study of geographical, historical and, more particularly, ethnological dimensions, as underlined in the book by CHAPANIS (1975) "Ethnic variables in human factors engineering." However, the common points in the economic development of the most diverse countries are too numerous for us to rule out the powerful socio-economic components which ~~clearly~~ translate the multiple expressions used in the popular press (Third World, Countries of the South, of the periphery, Developing Countries, etc.). However, 40 years after the start of the widespread distribution of industrial technologies throughout the world, we have to admit that many nations which started from comparable socio-economic levels have experienced very different types of development. Among the countries we prefer to call Industrially Developing Countries (IDCs), some have become Newly Industrialized Countries (NICs) and are successfully competing with the old industrialized countries. Others should shortly be joining the ranks of the NICs. On the other hand, others have all sorts of difficulties, with GNP (Gross National Product) growing at a slower rate than the population. Due to this, these populations are seeing their personal and indirect revenue dropping constantly.

Many authors endeavour to explain and even predict these developments—which are so different—in order to advise the buyer countries or the exporting manufacturers. Unfortunately, most of these studies follow exclusively the logic of a single discipline (most often economics), or even of an ideology. They have little interest in giving advice concerning a real improvement in working conditions or use of the technology, advice taking into account the very complex realities of the country.

If we insist on mentioning the industrial character of the development problems of IDCs, it is because many of them have a culture that is older and more refined ~~(that)~~ than that of countries which have been industrialized for a longer time. Certainly, Western countries like to recall, and rightfully so, the origins of their cultures: ancient Egypt and Iraq, Greece and the Roman Empire. However, they forget to recall the great invasions that came from Asia, but which brought little of Asian civilization. On the contrary, in Asia we know civilizations which have lasted from antiquity to the present day, without a break, despite violent invasions or policies. GOONATILAKE (1984) was right to query the lack of transformation of the ancient civilizations of Asia into industrial civilizations in the 18th and 19th centuries. He made a very sound study of the history of Indian science. He attributed to colonization the lack of transformation of this science into a modern

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industrialized civilisation, before the advent of recent remarkable developments.

### *Awakening dragons*

The "dragons" were asleep, but a hundred years ago, in the last quarter of the 19th century, the "great dragon" (meaning Japan) showed that there were immense development possibilities in Asia. A study of the first Meiji era, from 1868 onwards, is certainly of great interest when it comes to understanding the outstanding success of present-day Japan. In this respect, one can read the remarkable book by MORISHIMA (1982) which, in particular, makes a comparison of confucianism in China, Korea and Japan. There is also another way of reading Japanese history, of which there is a great ignorance in the West and perhaps also in South-East Asia. In the 8th century, a bronze statue of the Buddha, 25 m high, was built in Nara, the then capital of Japan. Recently, in excavations around the temple of Nara, a treatise on work medicine and wounds caused by work accidents was found.

The French anthropologist LEVI-STRAUSS (1980) recalled "that in the 16th century, Japan was a powerful country through its industry which exported tens of thousands of suits of armour, swords and, later guns to China. It has 25,000,000 inhabitants at a time when France, with 16,000,000 inhabitants, was the most densely populated country in Europe, including Russia. At the start of the 19th century, when foodstuffs were still sold loose in Western shops, Japanese products were already being sold in packets bearing labels indicating their quality and price. All these examples show that, in the past, Japan and the West were not as different as one might think. Their differences amounted to the fact that, historically, they were out of step. For a time it was Japan, then it was the West which found itself in front for a few decades or a few centuries. As if the same cards had been dealt to both of them since time immemorial: neither had played its cards in the same way."

The introduction of New Technologies provokes a new situation where it is no longer cheap physical strength that favours industry but the intelligence introduced by users of data processing. Ergonomists in each of the countries of South-East Asia have a vital role to play in order to facilitate the success of this crucial stage of industrial development, but they must fully understand what constitutes the dynamics and what is the history of their own country since the different countries of South-East Asia do not have the same history, either recent or ancient. They do not have the same natural resource, the same difficulties or geographical advantages. Some of the countries of Asia have played their cards more recently than Japan, but with talent. Sometimes they are referred to as the "little dragons." I prefer to call them the "recently awakened dragons." I do not know South-East Asia very well, despite my interest in it. So I shall limit my comments to a few remarks concerning Thailand which I have visited nearly every year for the past 20 years. I discovered that King Chulalongkorn (RAMA V, 1868-1910) had a similar action to that of the Emperor Meiji, at roughly the same time. A study of the

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analogies and the differences of these two movements would be engrossing. It is very significant that the Chulalongkorn University was opened 77 years ago to honour the memory of this revolutionary King and that it specialized in technical training. (Perhaps my ignorance and my attachment to this University, which has repeatedly asked me to join its body of teachers, are leading me astray. I beg those of you who know better to excuse me.) Like most comparable universities in South-East Asia, the Chulalongkorn University has considerably developed the teaching of computer sciences in the past few years. These universities will have to develop the science of the relation between man and the computer—cognitive ergonomics—in the same way. This urgent development is not easy since, although students from Thailand and from the rest of South-East Asia, have, as I have noted, the same intellectual capacities as their European or American counterparts, they have the experience of other economic, social and cultural realities. These are the differences which should be integrated in the specific teaching they will need to be given in cognitive ergonomics. To come back to Japan for a moment, the existence of three writing styles makes it difficult to design word processors in Japan, but encourages intellectual games which are re-used in other sectors of data processing. cap ok

Success is impossible in passive technology transfers. Each country has to learn how to find out its strengths and weaknesses and to use them to ensure its successful development. This is the aim of cognitive ergonomics from an anthropotechnological viewpoint. #/es ok

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Improvement of lifting heavy objects work

C. CHAVALINITIKUL and Colleagues, National Institute for the Improvement of Working Condition and Environment (NICE), Ministry of Labour and Social Welfare, Bangkok

In 1993, the Ministry of Labour and Welfare has to make compensation payments to 11,308 workers (equivalent to 7.22%) for their sickness

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**THE IRRUPTION OF NEW TECHNOLOGIES**

**A NEW CHALLENGE FOR ERGONOMICS AND ANTHROPOTECHNOLOGY**

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The ~~irruption~~ of New Technologies in South-East Asia has dreadful social effects such as unemployment and the rejection of former worker skills. But is also an opportunity to show that ergonomics has resources which have been neglected so far in this part of the world. The outstanding feature of these resources, which are vital for the successful transfer of these New Technologies, is that they are both technically and economically indispensable.

Although the well-being, health and safety of workers may be sadly overlooked without drastic economic effects, this is not the case when using New Technologies, since costly mistakes may arise if the operators are unable to use computerized systems properly. Cognitive ergonomics associated with situated cognition may then make a great contribution.

Since New Technologies are generally imported from Europe, the United States or Japan, they include special features which originate from these industrialized societies.

Thanks to Ergonomic Work Analysis, we can discover the difficulties encountered in the importing country and find solutions ~~in the light of~~ anthropotechnology concepts, methodologies and knowledge.  
*based on*



**THE IRRUPTION OF NEW TECHNOLOGIES,**

**A NEW CHALLENGE FOR ERGONOMICS AND ANTHROPOTECHNOLOGY**

Speech given to the 4th South-East Asia Ergonomics Congress

(Bangkok, November 21-23, 1994)

by A. WISNER, Emeritus Professor at the

CONSERVATOIRE NATIONAL DES ARTS ET METIERS

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When talking to ergonomists from a region as vast and diverse as South-East Asia, there is a risk of formulating analyses and recommendations which are of no interest to most listeners who are concerned with a particular industry or a particular region. What is there in common between improving the working conditions of the poorest farmers in Indonesia by Manuaba (1976, 1991) and in India by Sen (1984) and Nag (1981) and perfecting the human-computer relation in Singapore, the necessity of which was demonstrated by Ong (1987).

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My concern is more limited, although it is related to a movement which concerns all the countries of the region and will concern them in a rapidly increasing way in the next 10 years. I am talking about the explosion of New Technologies. This expression refers to technical systems, including data processing, to various extents. It covers office machines (for accounts, word processing), automated systems (chemical industries) and mechanized production systems (robotics, automated and semi-automated systems).

Given the effect which New Technologies have had in the world economy over the past 25 years, this phenomenon has been given wide and relatively accurate coverage in the popular press, sometimes with a certain exaltation.

It is true that the work of a great number of people has been modified and sometimes transformed in the United States, Europe, Japan, Singapore and in other great industrial centres in South-East Asia.

This transformation may take surprising forms. Two to ~~three~~<sup>3</sup> years ago, it was learned that a certain European airline company would now have its tickets processed in India thanks to telecommuting. In the same way, the accounts of a large French company were done in the Philippines, etc.

telecomputing?

□ Last year, I was invited to take part in a conference organized in Bangkok by the Women's Study Programme of Thammasat University, the Thai Institute for the Development of Work and the Friedrich Ebert Foundation, concerning the unemployment created among textile industry workers in Thailand through the transfer of certain types of textile production to neighbouring countries: Laos, Vietnam and China, where the labour costs were even less than in Thailand (Chandhamrong and Polioudakis, 1994).

### Ergonomics in South-East Asia

□ As regards Ergonomics, these very considerable technical and economic developments, which can only become more widespread, are leading to the discovery of new fields of research, education and application, the scientific and problematic bases of which are very different from those familiar to ergonomists of the SEAES.

□ It could rightly be considered that the ergonomics activity should continue to be dedicated to the poorest workers, farmers using traditional tools, workers in small and medium-sized companies which lack capital (Kogi, 1992) and workers with low qualifications doing repetitive activities in heavy industry. It is obvious that the multiform suffering and pathology of these workers continues to call for our efforts along the lines we have followed since the early days of ergonomics: anthropometry (or, better still, physical anthropology), biomechanics, physiology of physical work and heat and experimental psychology concerned with ethnical differences. A considerable and intense effort is still necessary in these various fields, as shown by the remarkable work of Manuaba, Sen and his school, Kitti Intaranont (1994), etc. The importance of ergotoxicology (Wisner and Sznelwar, 1991) could also be underlined. In particular, it should be noted that the last SEAES Congress was organized in Bangkok in 1991 in a very legitimate way at the same time as the 13th Asian Conference on Health at Work (Wonghanich et al., 1992). However, it is noticeable that, despite remarkable arguments like those of Ohtsuka (1994), these efforts are barely encouraged by national authorities which are more concerned with other social emergencies or are insensitive to the political and social power of the social categories concerned. This is true throughout the world: easing the suffering of workers only becomes a priority under certain political, social and economic conditions, which belong to rich or very rich countries. The results at the workstation are far from convincing, even in these countries and even after 50 or 100 years of effort.

□ The increasingly widespread use of new technologies raises multiple new problems for ergonomists. This irruption is taking place under very diverse conditions. ~~But~~ <sup>However</sup> one positive, common aspect is that the ergonomist is no longer called in just to ease the suffering of workers but also - and especially - to ensure that the technical system works properly; in other words, ergonomics is becoming a form of knowledge and practice with an economic significance.



Contrary to what is claimed by those who sell computer systems, the new systems are far from operating as well as they should. Too often, they do not achieve the level of performance announced in terms of the quality and quantity of production. In addition, dismal failures have become more frequent. In the minds of the public, there is a legitimate association of new technologies with major disasters: Seveso, Three Mile Island, Bhopal and Chernobyl, to name ~~but~~ the best known.

In defence of their science, computer experts blame Man for the defects of computerized systems and thus strongly question the relations between Man and the computer, a field which has become major in ergonomics. One fact ~~gives an idea of the expansion of~~ <sup>suggests that</sup> this branch of ergonomics <sup>(is expanding)</sup> there are around twice as many Congresses dealing with Human-Computer Interaction (H.C.I.) than Congresses dealing with ergonomics as a whole. And H.C.I. congresses attract twice as many participants. In the first part of the history of Human-Computer interaction, two questions were uppermost: replacement of Man by the Computer and the matter of the Human-Computer Interface.

#### Facts and fiction about new technologies

As regards the replacement of Man by the Computer, this is a real social fact. Numerous efficient automated systems characterize the distribution of New Technologies and lead to high unemployment. This phenomenon is actually more ambiguous than it appears since many services are no longer rendered to users and operators. The fact that drivers in the United States and in Europe have to fill up their own petrol tanks and possibly pay at an automatic payment terminal using a credit card is not simply the result of computerization. It is also the effect of the decision to do away with a large number of services previously rendered by people: ~~don't~~ get one's hands dirty and have them smelling of petrol, ~~do not~~ check the oil level and tyre pressures, ~~do not~~ have the windscreen cleaned, ~~do not~~ ask for directions, etc. Activity analysis, which is now a clearly defined ergonomics method, highlights that which, in the reduction of employment, corresponds to the existence of new technologies and that which corresponds to the reduction of services rendered. When you know that a person who sells train tickets spends half his/her time giving information and advice to users, it is easy to see that the automatic ticket distributor is only partly responsible for the reduction in the number of railway employees, since the rest is due to the reduction of the service rendered to users.

From a more philosophical viewpoint, the total replacement of man by a robot is no longer topical, except in comic strips. Human complexity cannot be modelled sufficiently with the tools and concepts at our disposal. Even in the case of enormous technical systems, like nuclear power stations or oil refineries, we now consider these technical systems as tools for the operators and not as masters which should be served by operators through the application of pre-determined instructions, under penalty of being considered as guilty of negligence, at least.

The only essential questions for us is therefore the relation between Man and the Computer. For a rather long period, the main concerns were related to the problems raised by the interface between man and the computer: prevention of visual disorders related to the lack of definition of characters, to their graphic features, the battle against postural pains related to the reflection of light sources on the screen, the poor design of office furniture and the possibly harmful effects of radiation from the screen.

At present, we know that the most serious problems are linked to the actual dialogue between the operator and the computer. How can an operator understand the computer with no mistakes? How can unexpected situations be taken into account in order to interpret the recommendations programmed by the computer?

In an attempt to ensure this compatibility between the logic built into the computer and the reasoning of the operator, two main paths have been explored: cognitive sciences and situated cognition.

Cognitive sciences constitute a vast group consisting of formal logic, certain aspects of mathematics, neurophysiology and computational cognitive psychology. The very remarkable effort of this aspect of psychology is directed towards the study of human thought and, in particular, its logical aspects. The aim of the more computational aspect is to model human cognitive mechanisms in the form of computer programmes. The result of this work is impressive. This is the field of artificial intelligence, expert systems, etc. ~~Didn't~~ <sup>Did not</sup> we recently see the world chess champion beaten by a software programme that can be bought in a supermarket?

However, there are limits to the work of computational cognitive psychology and to the computer products which result from them. First of all, it should be recalled that computerized models of human cognition do not represent human cognition. The machine obtains the same results through other means (for example, the very fast speed of calculation and exploration of the computer memory). In particular, computational cognitive psychology mainly deals with problem-solving and not problem-building (Wisner, 1994). As in the case of solving mathematical problems given to pupils in school, the data of the problems are necessary and sufficient and the theorems to be used are found in the programme studied recently. If we take the example of a game of chess, this is a mathematical and logical game invented in India in the 4th Century and not a part of real life. Its data are precise and its rules are formal.

In life, we don't always know what data will be necessary to solve the problem. Perhaps data that are easy to discover are useless and perhaps other data are hidden and have to be sought. In reality, the problem has to be built before it can be solved.

### Ergonomic work analysis

The observation of people working, an observation performed according to a precise methodology, that of Ergonomic Work Analysis (Wisner, 1995), indicates how operators build the problem before solving it. Each of us thinks "in situation", meaning that the situation and the environment is taken into account. The so-called "situated cognition" scientific movement developed over the last 30 years in the USA (Resnick, (1976); Casson, (1981); Rogoff and Lave, (1984); Dougherty (1985) clearly showed the necessary appropriation of technical systems in terms of the surrounding environment, but also in terms of the state of the system and the operator's know-how. This movement encounters an older practice of French-speaking ergonomists: Ergonomic Work Analysis. Since S. Pacaud (1949) and Ombredane and Faverge (1955), we know that in order to build the problem, operators develop observable behaviour of action on the objects and controls, information collection (movement of eyes and head towards the indicators, but also towards informal sources of knowledge) and communication. Communication may be postural, gestural, oral or written. This last-mentioned field has developed considerably thanks to applied linguistics. We examine the written documents produced during work on paper or on the screen and we see, first of all, if these documents clearly satisfy the intentions of the persons sending them - this is the specifically linguistic part of the research. We also observe the way in which these documents are used and the acts which follow their consultation. This is the more ergonomic side of the study of texts.

Oral communication, which ergonomists initially distrusted as a means of expressing an attitude rather than an activity, is now the subject of considerable work which gives different statuses to speech:

Action speech: during a work activity, this is often an essential element of an action sequence. It forms part of the materials which the ergonomist has to examine.

Interpretation speech: this is very important in Ergonomic Work Analysis. When allowed by circumstances, these verbalizations are interruptive. They interrupt the work when the work appears less intense. They enable explanations to be obtained immediately, but it is rarely possible reach a real explanation from this stage.

Ergonomic Work Analysis normally includes an essential phase of Self-confrontation (Theureau, 1992) in which the way the work is done is presented to the operator in the form of a detailed report and, where possible, in the form of a video recording. The operator is often surprised by the spectacle of his own activities; he thought he regularly monitored such an indicator, when in fact he neglected it. On the other hand, he often looked at a bit of the part being machined when in fact he thought this was not the case. These observations and those of the ergonomist lead to a discussion in which the reality of the activities provides access to the reasons for the behaviour observed and the operator's representations. Sometimes, this representation is incorrect and leads to the operator's training being complemented. More often, this representation is justified by the differences between the raw materials used and those which had been planned, by the state of deterioration of the production system or by the absence of a member of the team. On the basis of this analysis of real work, we can formulate ergonomic recommendations concerning the technical system and organizational recommendations which may concern the structures and activities of a relatively higher level.

Finally, analysis of conversations at work recorded on a tape recorder or, better still, on a video tape recorder, enable us to understand the conditions of the relations which exist between the interlocutors and, possibly, the stakes which exist behind the dialogue (Goffman, (1976); Gumperz (1992)).

As such, through Ergonomic Work Analysis it is possible to grasp not only the reality of the difficulties of operators, but also those of workshop supervisors in large companies or managers of small and medium-sized companies, as shown by the work of Langa (Langa and Wisner, 1994). In view of the fact that the activity of managers is mainly oral, Langa proposed that the manager be confronted with the transcription of what he said during his work so he could give technical explanations. This is "written self-confrontation." However, the work of management often involves complex considerations concerning realities located rather far from the immediate work. Langa proposed "Interviews guided by facts" which, while starting from the immediate reality observed, search for the causes as far away as necessary.

The study of the situated action and the search for the causes of differences between the prescribed work and the real work, the transformation of the situation by ergonomics, training and organization depend on a better understanding of the thought, of the cognition of operators, the rationality of whom we accept - and check - although the bases of the reasoning which we discover could naturally consist of incorrect premises. ~~But~~ only the discovery of these activities <sup>however</sup> enables us to find out and convince.

The study of the relation between Man and the computer is of the greatest interest since it shows the relations between the software - the result of cognitive sciences - computational cognitive psychology and the real operation of the brain, which are known thanks to the study of situated cognition and to Ergonomic Work Analysis.

All the considerations which have been developed previously could be found in all regions of the world during the period when New Technologies emerged, <sup>(rk)</sup> But these remarks do not have the same significance according to the country and the particular orientation of each of us. However, two types of consideration may be developed on the basis of these data and this know-how.

First of all, the powerful and inventive character of the human mind, demonstrated at the time of the study of New Technologies, is a general fact. Human intelligence thrives in traditional civilizations, the results of which we can still admire in certain parts of the Region. The industrial civilization discovered Taylorian work organization which is very efficient under certain technical and economic circumstances. Unfortunately, this organization is very negative for health, as shown,

for example, by the endemic disease of the peri-articular syndromes due to repetitive physical work. In addition, it is accompanied by a pseudo ideological justification which is sometimes difficult to ignore. If workers are condemned to do a repetitive and fragmentary job according to protocols determined by others, <sup>it is</sup> because they are not intelligent and are incapable of organizing their own work. Taylor said that he needed "workers with the strength and intelligence of an ox" who could easily be given detailed instructions. The reality is clearly different and in the most repetitive work, we see the expression of the ability of workers to be the iterative creators of their task, to construct an efficient activity despite the flaws of the technical system and the organization. We also see the appearance of the ethical dimension of human thought (Antunes Lima, 1995). In fact, human intelligence is a vast resource of the economy which is very little used in modern industry. <sup>However,</sup> ~~But~~ as shown by <sup>the</sup> C. Rubio (1991-1994), the ability of the company is vital in order to develop and use the skills of workers.

### Anthropotechnology in South-East Asia

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> Rather than develop this major theme, we considered it more interesting to come back to the problems specific to South-East Asia, problems for which the anthropotechnological approach contributes data, explanations and also solutions.
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> The ergonomics of the technology transfer was called Anthropotechnology (Wisner, 1984) so as to underline the fact that the knowledge useful for solving the difficult problems of the transfer belongs to collective Human Sciences and not to individual Human Sciences, as for Ergonomics.
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> Twenty years' experience in various countries (Algeria, Argentina, Brazil, Canada, Central African Republic, Columbia, India, Indonesia, Ivory Coast, Japan, Mexico, Philippines, Senegal, Singapore, Thailand, Tunisia, Zaire, etc.) along with personal studies and international cooperation suggest the existence of problematics specific to each country, linked to the great diversity of situations noted in the countries and regions which acquire foreign technology and try to use it with various degrees of success. These major differences observed in the installation and the results of identical technologies, depending on the location of the company, impose the joint study of geographical, historical and, more particularly, ethnological dimensions, as underlined in the book by Chapanis (1975) "Ethnic variables in human factors engineering". However, the common points in the economic development of the most diverse countries are too numerous for us to rule out the

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powerful socio-economic components which clearly translate the multiple expressions used in the popular press (Third World, Countries of the South, of the periphery, Developing Countries, etc.). However, 40 years after the start of the widespread distribution of industrial technologies throughout the world, we have to admit that many nations which started from comparable socio-economic levels have experienced very different types of development. Among the countries we prefer to call Industrially Developing Countries (IDCs), some have become Newly Industrialized Countries (NICs) and are successfully competing with the old industrialized countries. Others should shortly be joining the ranks of the NICs. On the other hand, others have all sorts of difficulties, with GNP (Gross National Product) growing at a slower rate than the population. Due to this, these populations are seeing their personal and indirect revenue dropping constantly.

Many authors endeavour to explain and even predict these developments - which are so different - in order to advise the buyer countries or the exporting manufacturers. Unfortunately, most of these studies follow exclusively the logic of a single discipline (most often economics), or even of an ideology. They have little interest in giving advice concerning a real improvement in working conditions or use of the technology, advice taking into account the very complex realities of the country.

If we insist on mentioning the industrial character of the development problems of IDCs, <sup>it is</sup> because many of them have a culture that is older and more refined than that of countries which have been industrialized for a longer time. Certainly, <sup>the</sup> western countries like to recall, and rightfully so, the origins of their cultures: ancient Egypt and Iraq, Greece and the Roman Empire. <sup>However</sup> ~~But~~ they forget to recall the great invasions that came from Asia, but which brought little of Asian civilization. On the contrary, in Asia we know civilizations which have lasted from antiquity to the present day, without a break, despite violent invasions or policies. Goonatilake (1984) was right to query the lack of transformation of the ancient civilizations of Asia into industrial civilizations in the 18th and 19th centuries. He made a very sound study of the history of Indian science. He attributed to colonization the lack of transformation of this science into a modern industrialized civilisation, before the advent of recent remarkable developments.

### Awakening dragons

The "dragons" were asleep, <sup>cl.</sup> But a hundred years ago, in the last quarter of the 19th century, the "great dragon" (meaning Japan) showed that there were immense development possibilities in Asia. A study of the first Meiji era, from 1868 onwards, is certainly of great interest when it comes to understanding the outstanding success of present-day Japan. In this respect, one can read the

remarkable book by Morishima (1982) which, in particular, makes a comparison of <sup>(1)</sup>Confucianism in China, Korea and Japan. There is also another way of reading Japanese history, of which there is a great ignorance in the West and perhaps also in South-East Asia. In the 8th century, a bronze statue of the Buddha, 25 metres high, was built in Nara, the then capital of Japan. Recently, in excavations around the temple of Nara, a treatise on work medicine and wounds caused by work accidents was found.

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 J □ The French anthropologist Levi-Strauss (1980) recalled <sup>(2)</sup>that in the 16th century, Japan was a powerful country through its industry which exported tens of thousands of suits of armour, swords and, later, guns to China. It had 25,000,000 inhabitants at a time when France, with 16,000,000 inhabitants, was the most densely populated country in Europe, including Russia. At the start of the 19th century, when foodstuffs were still sold loose in <sup>(3)</sup>western shops, Japanese products were already being sold in packets bearing labels indicating their quality and price <sup>(4)</sup>. All these examples show that, in the past, Japan and the West were not as different as one might think. Their differences amounted to the fact that, historically, they were out of step. For a time it was Japan, then it was the West which found itself in front for a few decades or a few centuries. As if the same cards had been dealt to both of them since time immemorial: neither had played its cards in the same way. ✓

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 J □ The introduction of New Technologies provokes a new situation where <sup>(5)</sup>is ~~was~~ no longer cheap physical strength that favours industry but the intelligence introduced by users of data processing. Ergonomists in each of the countries of South-East Asia have a vital role to play in order to facilitate the success of this crucial stage of industrial development. <sup>(6)</sup>But they must fully understand what constitutes the dynamics and what is the history of their own country since the different countries of South-East Asia ~~do not~~ have the same history, either recent or ancient. They ~~do not~~ have the same natural resources, the same difficulties or geographical advantages. Some of the countries of Asia have played their cards more recently than Japan, but with talent. Sometimes they are referred to as the "little dragons". I prefer to call them the "recently awakened dragons". <sup>(7)</sup>I ~~do not~~ know South-East Asia very well, despite my interest in it. So I shall limit my comments to a few remarks concerning Thailand which I have visited nearly every year for the past 20 years. I discovered that King Chulalongkorn (RAMA V, 1868-1910) had a similar action to that of the Emperor Meiji, at roughly the same time. A study of the analogies and the differences of these two movements would be engrossing. It is very significant that the Chulalongkorn University was opened 77 years ago to



honour the memory of this revolutionary King and that it specialized in technical training. (Perhaps my ignorance and my attachment to this University, which has repeatedly asked me to join its body of teachers, are leading me astray. I beg those of you who know better to excuse me.) Like most comparable universities in South-East Asia, the Chulalongkorn University has considerably developed the teaching of computer sciences in the past few years. These universities will have to develop the science of the relation between man and the computer - cognitive ergonomics - in the same way. This urgent development is not easy since, although students from Thailand and from the rest of South-East Asia, have, as I have noted, the same intellectual capacities as their European or American counterparts, they have the experience of other economic, social and cultural realities. These are the differences which should be integrated in the specific teaching they will need to be given in cognitive ergonomics. To come back to Japan for a moment, the existence of three writing styles makes it difficult to design word processors in Japan, but encourages intellectual games which are re-used in other sectors of data processing.

Success is impossible in passive technology transfers. Each country has to learn how to find out its strengths and weaknesses and to use them to ensure its successful development. This is the aim of cognitive ergonomics from an anthropotechnological viewpoint.

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**THE IRRUPTION OF NEW TECHNOLOGIES**

**A NEW CHALLENGE FOR ERGONOMICS AND ANTHROPOTECHNOLOGY**

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## SUMMARY

The irruption of New Technologies in South-East Asia has dreadful social effects such as unemployment and the rejection of former worker skills. But is also an opportunity to show that ergonomics has resources which have been neglected so far in this part of the world. The outstanding feature of these resources, which are vital for the successful transfer of these New Technologies, is that they are both technically and economically indispensable.

Although the well-being, health and safety of workers may be sadly overlooked without drastic economic effects, this is not the case when using New Technologies, since costly mistakes may arise if the operators are unable to use computerized systems properly. Cognitive ergonomics associated with situated cognition may then make a great contribution.

Since New Technologies are generally imported from Europe, the United States or Japan, they include special features which originate from these industrialized societies.

Thanks to Ergonomic Work Analysis, we can discover the difficulties encountered in the importing country and find solutions in the light of anthropotechnology concepts, methodologies and knowledge.

## **THE IRRUPTION OF NEW TECHNOLOGIES**

### **A NEW CHALLENGE FOR ERGONOMICS AND ANTHROPOTECHNOLOGY**

Speech given to the 4th South-East Asia Ergonomics Congress  
(Bangkok, November 21-23, 1994)

by A. WISNER, Emeritus Professor at the  
CONSERVATOIRE NATIONAL DES ARTS ET METIERS

When talking to ergonomists from a region as vast and diverse as South-East Asia, there is a risk of formulating analyses and recommendations which are of no interest to most listeners who are concerned with a particular industry or a particular region. What is there in common between improving the working conditions of the poorest farmers in Indonesia by Manuaba (1976, 1991) and in India by Sen (1984) and Nag (1981) and perfecting the human-computer relation in Singapore, the necessity of which was demonstrated by Ong (1987).

My concern is more limited, although it is related to a movement which concerns all the countries of the region and will concern them in a rapidly increasing way in the next 10 years. I am talking about the explosion of New Technologies. This expression refers to technical systems, including data processing, to various extents. It covers office machines (for accounts, word processing), automated systems (chemical industries) and mechanized production systems (robotics, automated and semi-automated systems).

Given the effect which New Technologies have had in the world economy over the past 25 years, this phenomenon has been given wide and relatively accurate coverage in the popular press, sometimes with a certain exaltation.

It is true that the work of a great number of people has been modified and sometimes transformed in the United States, Europe, Japan, Singapore and in other great industrial centres in South-East Asia.

This transformation may take surprising forms. Two to three years ago, it was learned that a certain European airline company would now have its tickets processed in India thanks to telecommuting. In the same way, the accounts of a large French company were done in the Philippines, etc.

Last year, I was invited to take part in a conference organized in Bangkok by the Women's Study Programme of Thammasat University, the Thai Institute for the Development of Work and the Friedrich Ebert Foundation, concerning the unemployment created among textile industry workers in Thailand through the transfer of certain types of textile production to neighbouring countries: Laos, Vietnam and China, where the labour costs were even less than in Thailand (Chandhamrong, Polioudakis, 1994).

### **Ergonomics in South-East Asia**

As regards Ergonomics, these very considerable technical and economic developments, which can only become more widespread, are leading to the discovery of new fields of research, education and application, the scientific and problematic bases of which are very different from those familiar to ergonomists of the SEAES.

It could rightly be considered that the ergonomics activity should continue to be dedicated to the poorest workers, farmers using traditional tools, workers in small and medium-sized companies which lack capital (Kogi, 1992) and workers with low qualifications doing repetitive activities in heavy industry. It is obvious that the multiform suffering and pathology of these workers continues to call for our efforts along the lines we have followed since the early days of ergonomics: anthropometry (or, better still, physical anthropology), biomechanics, physiology of physical work and heat and experimental psychology concerned with ethnical differences. A considerable and intense effort is still necessary in these various fields, as shown by the remarkable work of Manuaba, Sen and his school, Kitti Intaranont, (1994), etc. The importance of ergotoxicology (Wisner, Sznalwar, 1991) could also be underlined. In particular, it should be noted that the last SEAES Congress was organized in Bangkok in 1991 in a very legitimate way at the same time as the 13th Asian Conference on Health at Work (Wonghanich and allied, 1992). However, it is noticeable that, despite remarkable arguments like those of Ohtsuka (1994), these efforts are barely encouraged by national authorities which are more concerned with other social emergencies or are insensitive to the political and social power of the social categories concerned. This is true throughout the world: easing the suffering of workers only becomes a priority under certain political, social and economic conditions, which belong to rich or very rich countries. The results at the workstation are far from convincing, even in these countries and even after 50 or 100 years of effort.

The increasingly widespread use of new technologies raises multiple new problems for ergonomists. This irruption is taking place under very diverse conditions. But one positive, common aspect is that the ergonomist is no longer called in just to ease the suffering of workers but also - and especially - to ensure that the technical system works properly; in other words, ergonomics is becoming a form of knowledge and practice with an economic significance.

Contrary to what is claimed by those who sell computer systems, the new systems are far from operating as well as they should. Too often, they do not achieve the level of performance announced in terms of the quality and quantity of production. In addition, dismal failures have become more frequent. In the minds of the public, there is a legitimate association of new technologies with major disasters: Seveso, Three Miles Island, Bhopal and Chernobyl, to name but the best known.

In defence of their science, computer experts blame Man for the defects of computerized systems and thus strongly question the relations between Man and the computer, a field which has become major in ergonomics. One fact gives an idea of the expansion of this branch of ergonomics: there are around twice as many Congresses dealing with Human-Computer Interaction (H.C.I.) than Congresses dealing with ergonomics as a whole. And H.C.I. congresses attract twice as many participants. In the first part of the history of Human-Computer interaction, two questions were uppermost: replacement of Man by the Computer and the matter of the Human-Computer Interface.

### **Facts and fiction about new technologies**

As regards the replacement of Man by the Computer, this is a real social fact. Numerous efficient automated systems characterize the distribution of New Technologies and lead to high unemployment. This phenomenon is actually more ambiguous than it appears since many services are no longer rendered to users and operators. The fact that drivers in the United States and in Europe have to fill up their own petrol tanks and possibly pay at an automatic payment terminal using a credit card is not simply the result of computerization. It is also the effect of the decision to do away with a large number of services previously rendered by people: don't get one's hands dirty and have them smelling of petrol, don't check the oil level and tyre pressures, don't have the windscreen cleaned, don't ask for directions, etc. Activity analysis, which is now a clearly defined ergonomics method, highlights that which, in the reduction of employment, corresponds to the existence of new technologies and that which corresponds to the reduction of services rendered. When you know that a person who sells train tickets spends half his/her time giving information and advice to users, it is easy to see that the automatic ticket distributor is only partly responsible for the reduction in the number of railway employees, since the rest is due to the reduction of the service rendered to users.

From a more philosophical viewpoint, the total replacement of man by a robot is no longer topical, except in comic strips. Human complexity cannot be modelled sufficiently with the tools and concepts at our disposal. Even in the case of enormous technical systems, like nuclear power stations or oil refineries, we now consider these technical systems as tools for the operators and not as masters which should be served by operators through the application of pre-determined instructions, under penalty of being considered as guilty of negligence, at least.

The only essential question for us is therefore the relation between Man and the Computer. For a rather long period, the main concerns were related to the problems raised by the interface between man and the computer: prevention of visual disorders related to the lack of definition of characters, to their graphic features, the battle against postural pains related to the reflection of light sources on the screen, the poor design of office furniture and the possibly harmful effects of radiation from the screen.

At present, we know that the most serious problems are linked to the actual dialogue between the operator and the computer. How can an operator understand the computer with no mistakes? How can unexpected situations be taken into account in order to interpret the recommendations programmed by the computer?

In an attempt to ensure this compatibility between the logic built into the computer and the reasoning of the operator, two main paths have been explored: cognitive sciences and situated cognition.

Cognitive sciences constitute a vast group consisting of formal logic, certain aspects of mathematics, neurophysiology and computational cognitive psychology. The very remarkable effort of this aspect of psychology is directed towards the study of human thought and, in particular, its logical aspects. The aim of the more computational aspect is to model human cognitive mechanisms in the form of computer programmes. The result of this work is impressive. This is the field of artificial intelligence, expert systems, etc. Didn't we recently see the world chess champion beaten by a software programme that can be bought in a supermarket?



However, there are limits to the work of computational cognitive psychology and to the computer products which result from them. First of all it should be recalled that computerized models of human cognition do not represent human cognition. The machine obtains the same results through other means (for example, the very fast speed of calculation and exploration of the computer memory). In particular, computational cognitive psychology mainly deals with problem-solving and not problem-building (Wisner, 1994). As in the case of solving mathematical problems given to pupils in school, the data of the problems are necessary and sufficient and the theorems to be used are found in the programme studied recently. If we take the example of a game of chess, this is a mathematical and logical game invented in India in the 4th Century and not a part of real life. Its data are precise and its rules are formal.

In life, we don't always know what data will be necessary to solve the problem. Perhaps data that are easy to discover are useless and perhaps other data are hidden and have to be sought. In reality, the problem has to be built before it can be solved.

### **Ergonomic work analysis**

The observation of people working, an observation performed according to a precise methodology, that of Ergonomic Work Analysis (Wisner, 1995), indicates how operators build the problem before solving it. Each of us thinks "in situation", meaning that the situation and the environment is taken into account. The so-called "situated cognition" scientific movement developed over the last 30 years in the USA (Resnick (1976), Casson (1981), Rogoff and Lave (1984); Dougherty (1985) clearly showed the necessary appropriation of technical systems in terms of the surrounding environment, but also in terms of the state of the system and the operator's know-how. This movement encounters an older practice of French-speaking ergonomists: Ergonomic Work Analysis. Since S. Pacaud (1949), Ombredane and Faverge (1955), we know that in order to build the problem, operators develop observable behaviour of action on the objects and controls, information collection (movement of eyes and head towards the indicators, but also towards informal sources of knowledge) and communication. Communication may be postural, gestural, oral or written. This last-mentioned field has developed considerably thanks to applied linguistics. We examine the written documents produced during work on paper or on the screen and we see, first of all, if these documents clearly satisfy the intentions of the persons sending them - this is the specifically linguistic part of the research. We also observe the way in which these documents are used and the acts which follow their consultation. This is the more ergonomic side of the study of texts.

Oral communication, which ergonomists initially distrusted as a means of expressing an attitude rather than an activity, is now the subject of considerable work which gives different statuses to speech:

- action speech: during a work activity, this is often an essential element of an action sequence. It forms part of the materials which the ergonomist has to examine.
- interpretation speech: this is very important in Ergonomic Work Analysis. When allowed by circumstances, these verbalizations are interruptive. They interrupt the work when the work appears less intense. They enable explanations to be obtained immediately, but it is rarely possible reach a real explanation from this stage.
- Ergonomic Work Analysis normally includes an essential phase of Self-confrontation (Theureau, 1992) in which the way the work is done is presented to the operator in the form of a detailed report and, where possible, in the form of a video recording. The operator is often surprised by the spectacle of his own activities; he thought he regularly monitored such an indicator, when in fact he neglected it. On the other hand, he often looked at a bit of the part being machined when in fact he thought this was not the case. These observations and those of the ergonomist lead to a discussion in which the reality of the activities provides access to the reasons for the behaviour observed and the operator's representations. Sometimes, this representation is incorrect and leads to the operator's training being complemented. More often, this representation is justified by the differences between the raw materials used and those which had been planned, by the state of deterioration of the production system or by the absence of a member of the team. On the basis of this analysis of real work, we can formulate ergonomic recommendations concerning the technical system and organizational recommendations which may concern the structures and activities of a relatively higher level

Finally, analysis of conversations at work recorded on a tape recorder or, better still, on a video tape recorder, enable us to understand the conditions of the relations which exist between the interlocutors and, possibly, the stakes which exist behind the dialogue (Goffman, (1976), Gumperz (1992)).

As such, through Ergonomic Work Analysis it is possible to grasp not only the reality of the difficulties of operators, but also those of workshop supervisors in large companies or managers of small and medium-sized companies, as shown by the work of Langa (Langa and Wisner, 1994). In view of the fact that the activity of managers is mainly oral, Langa proposed that the manager be confronted with the transcription of what he said during his work so he could give technical explanations. This is "written self-confrontation." However, the work of management often involves complex considerations concerning realities located rather far from the immediate work. Langa proposed "Interviews guided by facts" which, while starting from the immediate reality observed, search for the causes as far away as necessary.

The study of the situated action and the search for the causes of differences between the prescribed work and the real work, the transformation of the situation by ergonomics, training and organization depend on a better understanding of the thought, of the cognition of operators, the rationality of whom we accept - and check - although the bases of the reasoning which we discover could naturally consist of incorrect premises. But only the discovery of these activities enables us to find out and convince.

The study of the relation between Man and the computer is of the greatest interest since it shows the relations between the software - the result of cognitive sciences - computational cognitive psychology and the real operation of the brain, which are known thanks to the study of situated cognition and to Ergonomic Work Analysis.

All the considerations which have been developed previously could be found in all regions of the world during the period when New Technologies emerged. But these remarks do not have the same significance according to the country and the particular orientation of each of us. However, two types of consideration may be developed on the basis of these data and this know-how.

First of all, the powerful and inventive character of the human mind, demonstrated at the time of the study of New Technologies, is a general fact. Human intelligence thrives in traditional civilizations, the results of which we can still admire in certain parts of the Region. The industrial civilization discovered Taylorian work organization which is very efficient under certain technical and economic circumstances. Unfortunately, this organization is very negative for health, as shown,

for example, by the endemic disease of the peri-articular syndromes due to repetitive physical work. In addition, it is accompanied by a pseudo ideological justification which is sometimes difficult to ignore. If workers are condemned to do a repetitive and fragmentary job according to protocols determined by others, it's because they are not intelligent and are incapable of organizing their own work. Taylor said that he needed "workers with the strength and intelligence of an ox" who could easily be given detailed instructions. The reality is clearly different and in the most repetitive work, we see the expression of the ability of workers to be the iterative creators of their task, to construct an efficient activity despite the flaws of the technical system and the organization. We also see the appearance of the ethical dimension of human thought (Antunes Lima, 1995). In fact, human intelligence is a vast resource of the economy which is very little used in modern industry. But, as shown by C. Rubio (1991-1994), the ability of the company is vital in order to develop and use the skills of workers.

#### **Anthropotechnology in South-East Asia**

Rather than develop this major theme, we considered it more interesting to come back to the problems specific to South-East Asia, problems for which the anthropotechnological approach contributes data, explanations and also solutions.

The ergonomics of the technology transfer was called Anthropotechnology (Wisner, 1984) so as to underline the fact that the knowledge useful for solving the difficult problems of the transfer belongs to collective Human Sciences and not to individual Human Sciences, as for Ergonomics.

Twenty years' experience in various countries (Algeria, Argentina, Brazil, Canada, Central African Republic, Columbia, India, Indonesia, Ivory Coast, Japan, Mexico, Philippines, Senegal, Singapore, Thailand, Tunisia, Zaire, etc.) along with personal studies and international cooperation suggest the existence of problematics specific to each country, linked to the great diversity of situations noted in the countries and regions which acquire foreign technology and try to use it with various degrees of success. These major differences observed in the installation and the results of identical technologies, depending on the location of the company, impose the joint study of geographical, historical and, more particularly, ethnological dimensions, as underlined in the book by Chapanis (1975) "Ethnic variables in human factors engineering". However, the common points in the economic development of the most diverse countries are too numerous for us to rule out the

powerful socio-economic components which clearly translate the multiple expressions used in the popular press (Third World, Countries of the South, of the periphery, Developing Countries, etc.). However, 40 years after the start of the widespread distribution of industrial technologies throughout the world, we have to admit that many nations which started from comparable socio-economic levels have experienced very different types of development. Among the countries we prefer to call Industrially Developing Countries (IDCs), some have become Newly Industrialized Countries (NICs) and are successfully competing with the old industrialized countries. Others should shortly be joining the ranks of the NICs. On the other hand, others have all sorts of difficulties, with GNP (Gross National Product) growing at a slower rate than the population. Due to this, these populations are seeing their personal and indirect revenue dropping constantly.

Many authors endeavour to explain and even predict these developments - which are so different - in order to advise the buyer countries or the exporting manufacturers. Unfortunately, most of these studies follow exclusively the logic of a single discipline (most often economics), or even of an ideology. They have little interest in giving advice concerning a real improvement in working conditions or use of the technology, advice taking into account the very complex realities of the country.

If we insist on mentioning the industrial character of the development problems of IDCs, it's because many of them have a culture that is older and more refined than that of countries which have been industrialized for a longer time. Certainly, western countries like to recall, and rightfully so, the origins of their cultures: ancient Egypt and Iraq, Greece and the Roman Empire. But they forget to recall the great invasions that came from Asia, but which brought little of Asian civilization. On the contrary, in Asia we know civilizations which have lasted from antiquity to the present day, without a break, despite violent invasions or policies. Goonatilake (1984) was right to query the lack of transformation of the ancient civilizations of Asia into industrial civilizations in the 18th and 19th centuries. He made a very sound study of the history of Indian science. He attributed to colonization the lack of transformation of this science into a modern industrialized civilisation, before the advent of recent remarkable developments.

### **Awakening dragons**

The "dragons" were asleep. But a hundred years ago, in the last quarter of the 19th century, the "great dragon", meaning Japan, showed that there were immense development possibilities in Asia. A study of the first Meiji era, from 1868 onwards, is certainly of great interest when it comes to understanding the outstanding success of present-day Japan. In this respect, one can read the

remarkable book by Morishima (1982) which, in particular, makes a comparison of Confucianism in China, Korea and Japan. There is also another way of reading Japanese history, of which there is a great ignorance in the West and perhaps also in South-East Asia. In the 8th century, a bronze statue of the Buddha, 25 metres high, was built in Nara, the then capital of Japan. Recently, in excavations around the temple of Nara, a treatise on work medicine and wounds caused by work accidents was found.

The French anthropologist Levi-Strauss (1980) recalled "that in the 16th century, Japan was a powerful country through its industry which exported tens of thousands of suits of armour, swords and, later, guns to China. It had 25,000,000 inhabitants at a time when France, with 16,000,000 inhabitants, was the most densely populated country in Europe, including Russia. At the start of the 19th century, when foodstuffs were still sold loose in western shops, Japanese products were already being sold in packets bearing labels indicating their quality and price ... All these examples show that, in the past, Japan and the West were not as different as one might think. Their differences amounted to the fact that, historically, they were out of step. For a time it was Japan, then it was the West which found itself in front for a few decades or a few centuries. As if the same cards had been dealt to both of them since time immemorial: neither had played its cards in the same way."

The introduction of New Technologies provokes a new situation where is ~~was~~ no longer cheap physical strength that favours industry but the intelligence introduced by users of data processing. Ergonomists in each of the countries of South-East Asia have a vital role to play in order to facilitate the success of this crucial stage of industrial development. But they must fully understand what constitutes the dynamics and what is the history of their own country, since the different countries of South-East Asia don't have the same history, either recent or ancient. They don't have the same natural resources, the same difficulties or geographical advantages. Some of the countries of Asia have played their cards more recently than Japan, but with talent. Sometimes they are referred to as the "little dragons". I prefer to call them the "recently awakened dragons". I don't know South-East Asia very well, despite my interest in it. So I shall limit my comments to a few remarks concerning Thailand which I have visited nearly every year for the past 20 years. I discovered that King Chulalongkorn (RAMA V, 1868-1910) had a similar action to that of the Emperor Meiji, at roughly the same time. A study of the analogies and the differences of these two movements would be engrossing. It is very significant that the Chulalongkorn University was opened 77 years ago to

honour the memory of this revolutionary King and that it specialized in technical training. [Perhaps my ignorance and my attachment to this University, which has repeatedly asked me to join its body of teachers, are leading me astray. I beg those of you who know better to excuse me.] Like most comparable universities in South-East Asia, the Chulalongkorn University has considerably developed the teaching of computer sciences in the past few years. These universities will have to develop the science of the relation between man and the computer - cognitive ergonomics - in the same way. This urgent development is not easy since, although students from Thailand and from the rest of South-East Asia, have, as I have noted, the same intellectual capacities as their European or American counterparts, they have the experience of other economic, social and cultural realities. These are the differences which should be integrated in the specific teaching they will need to be given in cognitive ergonomics. To come back to Japan for a moment, the existence of three writing styles makes it difficult to design word processors in Japan, but encourages intellectual games which are re-used in other sectors of data processing.

Success is impossible in passive technology transfers. Each country has to learn how to find out its strengths and weaknesses and to use them to ensure its successful development. This is the aim of cognitive ergonomics from an anthropotechnological viewpoint.

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## L'IRRUPTION DES NOUVELLES TECHNOLOGIES

### UN NOUVEAU DEFI POUR L'ERGONOMIE ET L'ANTHROPOTECHNOLOGIE

Exposé présenté au 4e Congrès d'Ergonomie d'Asie du Sud-Est (Bangkok 21-23 Nov. 94) par A. WISNER Professeur Emérite au CONSERVATOIRE NATIONAL DES ARTS ET METIERS

Quand on s'adresse aux ergonomistes d'une région aussi vaste et aussi diverse que l'Asie du Sud-Est, on risque de formuler des analyses et des recommandations sans intérêt pour la plupart des auditeurs qui sont préoccupés d'une industrie ou d'une région particulière. Qu'y-a-t'il de commun entre l'amélioration du travail agricole des plus pauvres paysans en Indonésie par Manuaba (1976, 1991) et en Inde par Sen (1984) et Nag (1981) et le perfectionnement de la relation Homme-Ordinateur à Singapour dont Ong (1987) a montré la nécessité à Singapour.

Ma préoccupation est plus limitée bien qu'elle soit en relation avec un mouvement qui touche tous les pays de la région et les touchera de façon rapidement croissante dans les 10 ans à venir, il s'agit de l'explosion des Nouvelles Technologies. On entendra ici par cette expression les dispositifs techniques incluant l'informatique à des degrés divers. Il s'agit des machines de bureau (comptabilité, traitement de textes), des systèmes automatisés (industries chimiques) et systèmes de production mécaniques (robotique, automatismes, semi-automatismes).

Etant donné l'effet des Nouvelles Technologies dans l'économie mondiale depuis 25 ans, cette question a été traitée très largement dans la grande presse de façon plus ou moins exacte, parfois avec une certaine exaltation.

En fait, il est vrai que le travail d'un très grand nombre de personnes a été modifié, parfois transformé aux Etats-Unis, en Europe, au Japon, à Singapour et dans d'autres grands centres industriels d'Asie du Sud-Est.

Cette transformation peut prendre des aspects surprenants. On apprenait, il y a 2 à 3 ans que telle compagnie aérienne européenne faisait désormais traiter sa billetterie en Inde grâce au télétravail. De même, la comptabilité d'une grande entreprise française était traitée aux Philippines ...

L'an dernier, j'ai été invité à participer à Bangkok à des journées organisées par le Programme d'Etude Féminin de l'Université Thammasat, l'Institut Thaï de Développement du Travail et la Fondation Friedrich Ebert au sujet du chômage induit en Thaïlande chez les travailleurs de l'industrie textile par le transfert de certaines productions textiles dans des pays voisins : Laos, Vietnam, Chine où la main d'oeuvre est encore moins chère qu'en Thaïlande.

En ce qui concerne l'Ergonomie, ces faits techniques et économiques très considérables et qui ne font que s'amplifier, conduisent à la découverte de nouveaux domaines de recherche, d'enseignement et d'application dont les bases scientifiques et la problématique sont bien différentes de celles qui sont familières aux ergonomistes de la SEAES.

On peut considérer à juste titre que l'activité ergonomique doit continuer à se consacrer au service des plus pauvres, des paysans utilisant des outils traditionnels, des ouvriers des petites et moyennes entreprises dépourvues de capital, aux travailleurs peu qualifiés exerçant des activités répétitives dans la grande Industrie. Il est certain que la souffrance et la pathologie multiformes de ces travailleurs continue à appeler notre effort et cela selon les directions qui sont les nôtres depuis le début de l'ergonomie : anthropométrie (ou mieux anthropologie physique), biomécanique, physiologie du travail physique et de la chaleur, psychologie expérimentale intéressée par les différences ethniques. Un effort considérable et passionnant est encore nécessaire dans ces divers domaines comme en témoignent les remarquables travaux de Manuaba, de Sen et de son école, de Kitti Intaranont, (1994) etc ... On peut aussi souligner l'importance de l'ergotoxicologie (Wisner, 1991) et noter surtout que de façon très légitime le dernier Congrès de la SEAES fut organisé en 1991 à Bangkok de façon conjointe avec la 13e Conférence Asienne sur la Santé au Travail. On remarquera toutefois que malgré des plaidoyers remarquables comme celui d'Ohtsuka (1994), ces efforts ne sont guère encouragés par les autorités nationales préoccupées d'autres urgences sociales ou peu sensibles au pouvoir politique et social des catégories sociales considérées. Cela est vrai partout dans le monde : le soulagement de la souffrance des travailleurs ne devient une priorité que dans certaines conditions politiques, sociales et économiques qui appartiennent aux pays riches ou très riches. Les résultats au poste de travail sont loin d'être convaincants même dans ces pays, et même après un demi-siècle ou un siècle d'efforts.

L'usage de plus en plus large des nouvelles technologies pose de multiples problèmes nouveaux aux ergonomistes. Cette efflorescence se fait dans des conditions très diverses,

mais un aspect positif commun est que l'appel à l'ergonome n'est plus seulement destiné à soulager la souffrance des travailleurs. mais aussi - et surtout - à permettre un bon fonctionnement du système technique, c'est-à-dire que l'ergonomie devient un savoir et une pratique ayant une signification économique.

En effet, contrairement à ce qui est affirmé par les vendeurs d'informatique, les systèmes nouveaux sont loin de fonctionner aussi bien qu'ils devraient : trop souvent, ils ne réalisent pas les performances annoncées du point de vue de la quantité et de la qualité de production. En outre, des faillites retentissantes sont devenues plus fréquentes. Il y a une association légitime dans l'opinion publique entre les nouvelles technologies et les grandes catastrophes : Seveso, Three Miles Island, Bhopal, Tchernobyl, pour n'évoquer que les plus célèbres.

Pour défendre leur science, les informaticiens rejettent sur l'Homme les défauts des systèmes informatisés et posent ainsi fortement la question des relations entre l'Homme et l'ordinateur, domaine devenu majeur de l'ergonomie. Une indication permet de mesurer l'essor de cette branche de l'Ergonomie : il y a environ deux fois plus de Congrès portant sur la relation entre l'Homme et l'ordinateur (H.C.I. Human Computer Interaction) que de Congrès portant sur l'ensemble de l'ergonomie et les congrès H.C.I. ont deux fois plus de participants. Dans la première partie de l'histoire des relations Homme-Ordinateur, deux questions dominaient : le remplacement de l'Homme par l'Ordinateur et la question de l'Interface Homme-Ordinateur.

En ce qui concerne le remplacement de l'Homme par l'Ordinateur, c'est un fait social réel. Des automatismes nombreux et efficaces caractérisent la diffusion des Nouvelles Technologies et s'accompagnent d'un chômage important. En fait, ce phénomène est beaucoup plus ambigu qu'il n'y paraît car de nombreux services ne sont plus rendus aux usagers et aux opérateurs. Le fait qu'en Europe et aux Etats-Unis, on doive soi-même remplir le réservoir de sa voiture et éventuellement payer à une caisse automatique grâce à une carte de crédit, n'est pas seulement le résultat de l'informatisation. C'est aussi l'effet de la décision de supprimer un grand nombre de services rendus auparavant par des personnes : ne pas se salir les mains et éviter de les parfumer à l'essence, ne pas faire vérifier la pression des pneus et le niveau d'huile, ne pas se faire nettoyer le pare-brise, ne pas demander des renseignements d'itinéraire, etc ... L'analyse des activités qui est maintenant une méthode ergonomique bien au point permet de mettre en évidence ce qui, dans la réduction des emplois, correspond à l'existence des nouvelles technologies et ce qui correspond à la réduction des services rendus. Si l'on sait que la personne qui vend des billets de train passe la moitié de son temps à renseigner et à conseiller

l'utilisateur, on comprend que le distributeur automatique de tickets n'est que pour moitié responsable de la réduction du nombre des employés des chemins de fer, le reste étant lié à la réduction du service rendu aux usagers.

D'un point de vue plus philosophique, le remplacement complet de l'homme par le robot n'est plus d'actualité sauf dans les bandes dessinées. La complexité humaine ne peut être modélisée de façon suffisante avec les outils et les concepts dont nous disposons. Même dans le cas de dispositifs techniques énormes comme les centrales nucléaires ou les raffineries de pétrole, on considère maintenant ces systèmes techniques comme des outils pour les opérateurs et non pas comme des maîtres que les opérateurs devraient servir en appliquant des consignes pré-établies sous peine d'être considérés comme coupables au moins de négligence.

La seule question essentielle pour nous est donc celle des relations entre l'Homme et l'Ordinateur. Pendant une assez longue période, les préoccupations essentielles ont porté sur les problèmes que pose l'interface entre l'homme et l'ordinateur : prévention des troubles visuels liés au manque de netteté des caractères, à leurs caractéristiques graphiques, lutte contre les douleurs posturales en relation avec les reflets des sources d'éclairage sur l'écran, avec la mauvaise conception du mobilier de bureau, effets des radiations éventuellement nocives issues de l'écran.

On sait actuellement que les problèmes les plus graves sont liés au dialogue lui-même entre l'ordinateur et l'opérateur. Dans quelle mesure l'opérateur peut-il comprendre sans erreur les indications de l'ordinateur, comment tenir compte des réalités inattendues pour interpréter les recommandations programmées par l'informatique !

Pour tenter d'assurer cette compatibilité entre la logique incluse dans l'ordinateur et le raisonnement de l'opérateur, deux grandes voies ont été explorées : les sciences cognitives et la cognition située.

Les Sciences cognitives constituent un vaste ensemble comprenant la logique formelle, certains aspects des mathématiques, de la neurophysiologie et la psychologie cognitive computationnelle. L'effort tout à fait remarquable de cet aspect de la psychologie est orienté vers l'étude de la pensée humaine et, en particulier, de ses aspects logiques. L'aspect plus particulièrement computationnel a pour but de modéliser les mécanismes cognitifs humains sous forme de programmes informatiques. Le résultat de ces travaux sont impressionnants. C'est le domaine de l'intelligence artificielle, des systèmes experts,

etc ... N'avons-nous pas vu récemment le champion du monde des échecs battu par un logiciel que l'on peut acheter dans un supermarché ?

Il y a toutefois des limites aux travaux de la psychologie cognitive computationnelle et aux produits informatiques qui en sont issus. D'une part, il faut se rappeler que les modèles informatiques de la cognition humaine ne sont pas la cognition humaine. La machine obtient les mêmes résultats par d'autres moyens (par exemple, l'extrême rapidité des calculs et de l'exploration de la mémoire informatique). Surtout la psychologie cognitive computationnelle traite essentiellement de la résolution de problèmes et non pas de leur constitution (Wisner, 1994). Comme dans le cas de la résolution des problèmes mathématiques donnés à l'école aux élèves, les données des problèmes sont nécessaires et suffisantes, les théorèmes à utiliser se trouvent dans le programme étudié récemment. Pour reprendre l'exemple du jeu d'échecs, il s'agit d'un jeu mathématique et logique inventé en Inde au IV<sup>e</sup> siècle et non pas d'une partie de la vie réelle. Ses données sont précises et ses règles formelles.

Dans la vie, on ne sait pas toujours quelles sont les données nécessaires pour résoudre le problème, peut-être celles qui sont aisément connues sont-elles inutiles, peut-être d'autres sont-elles cachées et doivent être recherchées. Il faut, dans la réalité, constituer le problème avant de le résoudre.

L'observation des personnes en train de travailler, observation réalisée selon une méthodologie précise, celle de l'Analyse Ergonomique du Travail (Wisner, 1995), permet de saisir comment les opérateurs constituent le problème avant de le résoudre. Chacun de nous pense "en situation", c'est-à-dire en tenant compte de la situation et de l'environnement. Le mouvement scientifique dit de la cognition située s'est développé aux U.S.A. depuis une trentaine d'années (Resnick (1976), Casson (1981), Rogoff et Lave (1984), Dougherty (1985) et a bien montré la nécessaire appropriation des dispositifs techniques en fonction de la situation environnante, mais aussi de l'état du dispositif, du savoir des opérateurs. Ce mouvement rencontre une pratique plus ancienne des ergonomistes de langue française : l'Analyse Ergonomique du Travail. Depuis S. Pacaud (1949), Ombredane et Favergé (1955), on sait que pour constituer le problème, les opérateurs développent des comportements observables d'action sur les objets et les commandes, de prise d'information (mouvement des yeux et de la tête vers les indications, mais aussi vers les sources informelles de connaissances), de communication. La communication peut être gestuelle, orale ou écrite. Ce dernier domaine s'est développé de façon considérable grâce à la linguistique appliquée. On examine les documents écrits produits au cours du travail sur papier ou sur écran et l'on

étudie, d'une part, si ces documents répondent bien aux intentions des émetteurs - c'est la partie proprement linguistique de la recherche. On observe aussi la façon dont ces documents sont utilisés et les actes qui suivent leur consultation, c'est le versant plus ergonomique de l'étude des textes.

La communication orale d'abord considérée par les ergonomistes avec méfiance comme un moyen d'exprimer une attitude plus qu'une activité, fait l'objet maintenant de travaux considérables qui donnent à la parole des statuts divers :

- la parole d'action au cours d'une activité de travail est souvent un élément essentiel d'une séquence d'action. Elle fait partie des matériaux que l'ergonome doit examiner;

- la parole d'interprétation est très importante dans l'Analyse Ergonomique du Travail. Quand les circonstances le permettent, ces verbalisations sont interruptives. Elles interrompent le travail quand ce dernier paraît moins intense. Elles permettent d'obtenir des explications immédiates mais il est rarement possible d'aller alors jusqu'à une véritable explication.

- L'analyse ergonomique du Travail comporte normalement une phase essentielle d'Autoconfrontation (Theureau, 1992) où la façon dont le travail a été réalisé est présenté à l'opérateur sous forme de compte-rendu détaillé, et, quand cela est possible, d'enregistrement vidéo. L'opérateur est souvent surpris par le spectacle de ses propres activités : il pensait surveiller régulièrement tel indicateur qu'en fait il néglige. Au contraire, il regarde souvent une partie de la pièce travaillée alors qu'il ne croyait pas le faire. Ces constatations et celles de l'ergonome engagent une discussion où la réalité des activités permet d'accéder aux raisons des comportements observés et aux représentations de l'opérateur. Parfois, cette représentation est erronée et conduit à compléter la formation de l'opérateur. Le plus souvent, cette représentation est justifiée par des différences entre les matières premières utilisées et celles qui étaient prévues, par l'état de dégradation du système de production, par l'absence d'un membre de l'équipe. On peut, à partir de cette analyse du travail réel, formuler des recommandations ergonomiques portant sur le dispositif technique et des recommandations organisationnelles qui peuvent concerner des structures et des activités d'un niveau plus ou moins élevé.

Enfin, l'analyse des conversations au travail enregistrées sur magnétophone et mieux sur magnétoscope, permet aussi de comprendre les modalités des relations qui existent entre

les interlocuteurs et éventuellement les enjeux qui existent derrière le dialogue (Goffman, (1976), Gumperz (1992)).

Ainsi, l'Analyse Ergonomique du Travail permet de saisir la réalité des difficultés des opérateurs, mais aussi des chefs d'atelier d'une grande entreprise ou de responsables de P.M.E. (Petites et Moyennes Entreprises) comme le montre le travail de Langa(Langa et Wisner, 1994) . Compte tenu du fait que l'activité des chefs est essentiellement orale, Langa propose de confronter le responsable avec la transcription de ce qu'il a dit au cours de son travail afin que ce dernier donne des explications techniques. C'est "l'autoconfrontation écrite". Toutefois, le travail de l'encadrement comporte souvent des considérations complexes portant sur des réalités situées assez loin du travail immédiat. Langa propose les "Entretiens guidés par les faits" qui, tout en partant de la réalité immédiate observée, en recherchent les causes aussi loin qu'il est nécessaire.

L'étude de l'action située, la recherche des causes des différences entre le travail prescrit et le travail réel, la transformation de la situation par l'ergonomie, la formation et l'organisation reposent sur une meilleure compréhension de la pensée, de la cognition des opérateurs dont on admet - et on vérifie - la rationalité bien que les bases du raisonnement que l'on découvre puissent naturellement être constituées de prémisses erronées. Mais seule la découverte de ces activités permet de connaître et de convaincre.

L'étude de la relation entre l'Homme et l'ordinateur est du plus grand intérêt puisqu'elle montre les relations entre le logiciel, fruit des sciences cognitives, de la psychologie cognitive computationnelle et le fonctionnement réel du cerveau, connus grâce à l'étude de la cognition située, à l'Analyse Ergonomique du Travail.

L'ensemble des considérations qui ont été développées plus haut pourraient avoir leur place dans toutes les régions du monde pendant la période que marque l'irruption des Nouvelles Technologies. Ces remarques n'ont d'ailleurs pas la même signification suivant le pays et l'orientation particulière de chacun d'entre nous. Toutefois, deux types de considérations peuvent être développés à partir de ces données et de ces savoirs.

D'une part, le caractère puissant et inventif de l'esprit humain que l'on a montré à l'occasion de l'étude des Nouvelles Technologies est une vérité générale. L'intelligence humaine s'épanouit dans les civilisations traditionnelles dont nous admirons les produits encore vivants dans certaines parties de la Région. La civilisation industrielle a découvert l'organisation taylorienne du travail qui est très efficace dans certaines conditions

techniques et économiques. Cette organisation est malheureusement très négative pour la santé comme le montre, par exemple, l'endémie des syndrômes péri-articulaires du travail physique répétitif. Elle s'est, en outre, accompagnée d'une pseudo-justification idéologique à laquelle il est parfois difficile d'échapper. Si les travailleurs sont condamnés à exécuter un travail répétitif et parcellaire selon des protocoles fixés par d'autres, c'est parce qu'ils ne sont pas intelligents et incapables d'organiser leur propre travail. Taylor disait qu'il lui fallait "des travailleurs ayant la force et l'intelligence d'un boeuf" qu'il lui serait facile de commander dans les détails. La réalité est bien différente, et dans les travaux les plus répétitifs, on voit s'exprimer la capacité des travailleurs à être les créateurs iteratifs de leur tâche, de construire une activité efficace malgré les défaillances du système technique et de l'organisation. On voit apparaître aussi les dimensions éthiques de la pensée humaine (Antunes Lima, 1995). En fait, l'intelligence humaine est une vaste ressource de l'économie, très peu utilisée dans l'industrie moderne. Mais, comme l'a montré C. Rubio (1991-1994), la compétence de l'entreprise est indispensable pour développer et utiliser les compétences des travailleurs.

Plutôt que de développer ce thème majeur, il nous semble plus intéressant de revenir sur des problèmes propres à l'Asie du Sud-Est, problèmes pour lesquels l'approche anthropotechnologique apporte des données, des explications et aussi des solutions.

L'ergonomie du transfert de technologie a été dénommée Anthropotechnologie (Wisner, 1984) pour souligner le fait que les savoirs utiles pour traiter les difficiles questions du transfert appartiennent aux Sciences de l'Homme collectif et non aux Sciences de l'Homme individuel comme pour l'Ergonomie.

Une expérience de 20 années dans des pays divers (Algérie, Argentine, Brésil, Canada, Colombie, Côte d'Ivoire, Inde, Indonésie, Japon, Mexique, Philippines, République Centre-Africaine, Sénégal, Singapour, Thaïlande, Tunisie, Zaïre, etc ...) grâce à des études personnelles et des collaborations internationales permet de conclure à l'existence d'une problématique propre à chaque pays liée à la grande diversité des situations que l'on observe dans les pays et les régions qui acquièrent des technologies étrangères et tentent de les mettre en oeuvre avec des succès divers. Ces grandes différences observées dans l'implantation et les résultats des technologies identiques selon la localisation de l'entreprise imposent l'étude conjointe des dimensions géographiques, historiques, et plus particulièrement ethnologiques comme le souligne le livre de Chapanis (1975) "Ethnic variables in human factors engineering". Toutefois, il existe trop de points communs dans le développement économique des pays les plus divers pour négliger les fortes composantes socio-économiques que traduisent bien les multiples expressions utilisées



dans la grande presse (Tiers-Monde, Pays du Sud, de la périphérie, Pays en Développement, etc ...). Cependant, 40 ans après le début de la diffusion large des technologies industrielles dans l'ensemble des pays du monde, force est de constater que de nombreuses nations parties d'un niveau socio-économique comparable ont connu des évolutions très différenciées. Parmi les pays que nous préférons nommer Pays en Voie de Développement Industriel (P.V.D.I.) certains sont devenus des Pays Nouvellement Industrialisés (P.N.I.) et rivalisent avec succès avec les pays industriels anciens. D'autres devraient rejoindre bientôt les P.N.I.. D'autres, au contraire, ont des difficultés de tous ordres, l'accroissement de leurs P.N.B. (Produit National Brut) étant inférieur à celui de la population. Ces populations voient, de ce fait, leurs revenus personnels et indirects baisser de façon continue.

Beaucoup d'auteurs s'attachent à expliquer, voire à prédire, ces évolutions si différentes afin de conseiller les pays acquéreurs ou les industriels exportateurs. Malheureusement, la plupart de ces études suivent exclusivement la logique d'une seule discipline (le plus souvent l'économie), voire d'une idéologie. Elles ne s'intéressent guère à fournir des avis relatifs à l'amélioration concrète du travail et de l'usage de la technologie, avis tenant compte des réalités très complexes du pays.

Si nous insistons pour évoquer le caractère industriel des problèmes de développement des P.V.D.I., c'est que beaucoup d'entre eux ont une culture plus ancienne et plus raffinée que celle des pays plus anciennement industrialisés. Certes, les pays occidentaux aiment à rappeler à juste titre les origines de leurs cultures : l'Égypte et l'Iraq anciens, la Grèce et l'empire romain, mais ils oublient de rappeler les grandes invasions venues d'Asie, mais peu porteuses des civilisations asiatiques. En Asie, au contraire, on connaît des civilisations qui se prolongent depuis l'antiquité jusqu'à nos jours sans interruptions, malgré des invasions ou des politiques violentes. Goonatilake (1984) a raison de se poser la question de l'absence de la transformation des civilisations antiques de l'Asie en civilisations industrielles pendant le XVIII et le XIX siècles. Il étudie avec beaucoup de sûreté l'histoire de la science indienne. Il attribue à la colonisation l'absence de la transformation de cette science en civilisation industrielle moderne avant les remarquables développements récents.

Les "dragons" s'étaient endormis. Mais le "grand dragon", c'est-à-dire le Japon a montré dès le dernier quart du XIX siècle, il y a 100 ans, que d'immenses possibilités de développement existaient en Asie. L'étude de l'ère de Meiji à partir de 1868 est certainement du plus grand intérêt pour comprendre la réussite éclatante du Japon actuel. On peut lire à ce propos le livre remarquable de Morishima qui compare, en particulier,

l'évolution du confucianisme en Chine, en Corée et en Inde. Il est possible de lire autrement l'histoire japonaise qui est profondément ignorée en Occident et peut-être aussi en Asie du Sud-Est. Au VIII<sup>e</sup> siècle, on construisait à Nara alors capitale du Japon, une statue de Bouddha en bronze de 25m de haut. On a retrouvé récemment dans des fouilles autour du temple de Nara, un traité de médecine du travail et de traitement des blessures par accident du travail.

L'anthropologue français Levi-Strauss (1980) rappelle "qu'au XVI<sup>e</sup> siècle, le Japon était un pays puissant par son industrie qui exportait des dizaines de milliers d'armures, de sabres et plus tard de canons en direction de la Chine. Il comptait 25.000.000 d'habitants quand la France en comptait 16.000.000 tout en étant le pays le plus peuplé d'Europe, y compris la Russie. Au début du XIX<sup>e</sup> siècle, quand les produits alimentaires se vendaient encore en vrac dans les boutiques occidentales, les produits japonais étaient déjà emballés avec des étiquettes indiquant leurs qualités et leurs prix ...

Tous ces exemples montrent que dans le passé le Japon et l'Occident étaient moins différents qu'on ne le croit. Leurs différences consistaient en des décalages historiques. Tantôt, c'est le Japon, tantôt l'Occident qui se trouvait en tête pour quelques décennies ou quelques siècles. Comme si les mêmes cartes avaient été distribuées aux deux depuis des temps immémoriaux : chacun n'a pas joué ses cartes de la même façon".

L'introduction des Nouvelles Technologies provoque une nouvelle situation où ce n'est plus la force physique à bon marché qui favorise l'industrie, mais l'intelligence mise en jeu par les utilisateurs de l'Informatique. Les ergonomistes de chacun des Pays d'Asie du Sud-Est ont un rôle essentiel à jouer pour faciliter la réussite de cette étape cruciale du développement industriel. Mais ils doivent bien comprendre ce qui constitue la dynamique et ce qui est l'histoire de leur propre pays, car les divers pays d'Asie du Sud-Est n'ont pas la même histoire proche ou lointaine, ils n'ont pas les mêmes ressources naturelles, les mêmes difficultés ou avantages géographiques. Certains d'entre les pays d'Asie ont joué leurs cartes plus récemment que le Japon, mais avec talent. On les appelle parfois les "petits dragons". Je préférerais qu'on les appelle les "dragons récemment réveillés". Je connais très mal l'Asie du Sud-Est malgré l'intérêt que je lui porte. Je me bornerai à quelques remarques à propos de la Thaïlande où je suis venu presque tous les ans depuis 20 ans. J'ai découvert que le roi Chulalongkorn (RAMA V, 1868-1910) avait eu une action analogique à celle de l'empereur Meiji et cela à peu près à la même époque. Les analogies et les différences de ces deux mouvements seraient passionnantes à étudier. Il est très significatif que l'Université Chulalongkorn ait été créée il y a 77 ans pour honorer la mémoire de ce roi révolutionnaire et qu'elle ait été orientée

vers la formation technique. [Peut-être mon ignorance et mon attachement à cette Université qui m'a invité de façon répétée à faire partie de son corps professoral m'égarent-ils. Que les personnes plus compétentes veuillent bien m'excuser]. Comme la plupart des Universités comparables d'Asie du Sud-Est, l'Université Chulalongkorn a fortement développé l'enseignement de l'informatique dans les récentes années. Il faut encore que ces Universités développent de façon analogue la science de la relation entre l'Homme et l'Ordinateur, l'ergonomie cognitive. Ce développement urgent n'est pas simple car si les étudiants thaïs et du reste de l'Asie du Sud-Est ont, comme j'ai pu le constater, les mêmes capacités intellectuelles que leurs camarades européens ou américains, ils ont l'expérience d'autres réalités économiques, sociales et culturelles. Ce sont ces différences qui doivent être intégrées dans l'enseignement spécifique qu'ils doivent recevoir en ergonomie cognitive. Pour en revenir un instant au Japon, l'existence de 3 types d'écriture rend difficile la conception des machines à traitement de texte au Japon, mais favorise des jeux intellectuels qui sont réemployés dans d'autres secteurs de l'informatique.

Il n'y a pas de réussite possible dans le transfert passif de la technologie. Chaque pays doit apprendre à connaître ses forces et ses faiblesses et à jouer de celles-ci pour réussir son développement. C'est le but de l'ergonomie cognitive dans une perspective anthropotechnologique.

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## CONVENTION

ENTRE

L'Université Chulalongkorn (Thaïlande)

ET

Le Conservatoire National des Arts et Métiers (France)

TITRE I - OBJECTIFS

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Article 1

Désireuses d'organiser des échanges bilatéraux, chacune des deux parties s'attachera à atteindre les objectifs suivants :

- . participer à l'encadrement de l'autre partie par la mise à sa disposition de membres de son personnel enseignant ou de recherche pour des périodes de courte, moyenne, et longue durée dans la mesure des possibilités de chacun des établissements;
- . diffuser des informations sur l'organisation et les objectifs de chacune des parties tant en ce qui concerne l'enseignement que la recherche, en vue de susciter des candidatures à des postes d'enseignants en coopération pour participer tant aux activités de recherche qu'aux activités pédagogiques;
- . rechercher tous les moyens susceptibles de favoriser la recherche dans les domaines d'intérêt commun et de promouvoir une meilleure formation des étudiants, enseignants, chercheurs et ingénieurs;
- . procéder à des consultations en vue de l'amélioration et du développement de la formation universitaire et post-universitaire;
- . favoriser une participation mutuelle aux congrès, colloques, stages et écoles d'été organisés par l'une ou l'autre des parties;

- . favoriser les échanges et les contacts entre les structures universitaires et les entreprises industrielles des deux pays.

## Article 2

Les deux parties s'engagent à échanger régulièrement des informations relatives à l'organisation et à la documentation pédagogique.

Dans le domaine de la recherche, les deux établissements organiseront de concert l'envoi de chercheurs post-gradués dans le cadre de recherche commune et réserveront une participation privilégiée à ceux-ci aux manifestations scientifiques, sous réserve de disposer des financements correspondants.

## TITRE II - MODALITES ET DOMAINE DE COOPERATION

### Article 3

Le développement de la coopération inter-établissements fera l'objet d'une programmation élaborée en commun à l'occasion de réunions entre les parties intéressées. Ces programmes seront soumis aux autorités thaïlandaises et françaises compétentes.

### Article 4

Il sera précisé dans le programme annuel les spécialités scientifiques ou techniques et les qualifications des enseignants permanents que l'une des parties met à la disposition de l'autre.

Ce programme annuel établira le cas échéant :

- . la liste nominative, les grades et les références des enseignants, des consultants, des experts détachés pour des missions de courte ou moyenne durée, des conférences, des stages ou des interventions d'ordre technique;



- . le nombre d'étudiants et leur programme d'étude retenu pour l'échange;
- . le nombre et type d'entreprises désireuses de participer à leur formation.

### TITRE III - CLAUSES CONTRACTUELLES

#### Article 5

##### Echanges d'enseignants-chercheurs ou d'étudiants

Les deux institutions s'efforceront d'échanger chaque année enseignants, chercheurs et étudiants dans chaque sens sur une base approximativement paritaire. L'effort portera tout particulièrement sur les étudiants préparant des thèses de Doctorat.

##### 5.1. Echanges d'enseignants-chercheurs

Chaque établissement assurera la rémunération de ses enseignants pendant leur séjour à l'étranger. L'établissement d'accueil leur apportera son aide en ce qui concerne leur logement et la couverture sociale.

##### 5.2. Echanges d'étudiants

La pratique établie pour traiter l'équivalence des unités de valeur, des semestres et des diplômes fera l'objet d'une consultation réciproque.

#### Article 6

Afin d'assurer le suivi de la convention, chaque partie désignera un comité disposant d'un secrétariat et notamment chargé à la fin du second semestre de l'année universitaire de dresser un bilan des réalisations.

Un rapport annuel sera soumis aux autorités de tutelle des deux parties.

TITRE IV - MOYENS

Article 7

Les deux parties solliciteront auprès des organismes chargés d'encourager la coopération scientifique, les participations nécessaires à la mise en oeuvre du présent accord.

Elles s'efforceront par ailleurs de soutenir les actions engagées auprès de tout organisme habilité pour ce faire.

Article 8

Les dispositions financières convenues dans le cadre du programme de coopération culturelle et scientifique entre les gouvernements des deux pays seront applicables au fonctionnement de cette convention et des programmes qui en découleront.

TITRE V - APPROBATION DU PRESENT ACCORD

Article 9

Toutes les difficultés liées à l'application du présent accord seront examinées à l'occasion de réunions entre les parties intéressées afin d'en faciliter le règlement. Il en sera référé, le cas échéant, aux autorités de tutelle compétentes des deux pays.

Article 10

Le présent accord est conclu pour une période de quatre ans, renouvelable par tacite reconduction, et prend effet à la date de la signature. Sa dénonciation s'effectuera par écrit six (6) mois avant l'expiration de la période en cours.

Fait à BANGKOK  
le

Fait à PARIS  
le

Le Pr Charas Suwanwela, M.D.  
Président de l'Université  
CHULALONGKORN

Le Pr Guy Fleury  
Administrateur Général  
du Conservatoire National  
des Arts et Métiers



MINISTERE DE L'EDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET METIERS  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL

Paris, 15th February 1993

Dr. Chaiyuth Chavalitnitikul  
NICE  
22/3 Baromratchinné Road  
Thaling Chan  
Bangkok 10170  
Thailand

Dear Dr. Chavalitnitikul,  
Dear Chaiyuth,

I am terribly ashamed to answer with such a delay to your kind New Year greetings. I was specially touched by these greetings both because they are coming from you personally and also from Thailand to which industrial and social success I am so devoted.

I would like you to accept my best wishes that are very sincere though late for yourself, your family, your Institute and also for SEAES that you are chairing so well.

May be Dr. Kitti Intaranont has shared with you the information about some subsidies that could be obtained from IEA and that are devoted to the support of meetings in South East Asia by the Australian colleagues who managed the 10th IEA Congress in Sydney.

A similar fund will be created soon with the benefits of the 11th IEA Congress in Paris by the French-speaking Ergonomics Society (SELF).

With my best regards,

Yours sincerely,

Alain Wisner

MR. TWATCHAI

paid many times 3000  
I will leave 2 days <sup>Today</sup> & <sup>Sunday</sup>

did not allow <sup>in</sup> Na

to stay <sup>Friday</sup> ~~saturday~~

until 8 pm. After  
discuss paid 550



MINISTERE DE L'EDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET METIERS  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL

August 28, 1992

The Director  
SASA International House  
Chulalongkorn Campus

SOI CHULALONGKORN 12/2  
PHYATHAI ROAD

Bangkok, THAILAND 10.330

Dear Sir/Madam:

I will be back in Thailand to teach at Chulalongkorn University, Department of Industrial Engineering, and I would like to stay again at SASA in a "Vice-President" room.

I believe that Professor Kitty Intaranont has already informed you and asked for a 30% discount for stay.

I will arrive in Bangkok by the flight TG 937 on Sunday, October 18, in the early morning, and will be at SASA around 8:00 A.M.

I will leave Friday, November 27, at night, by the flight TG 939, and will leave SASA at 9:00 P.M.

I will probably leave SASA for a few days, two or three times, to travel inside Thailand.

Would you kindly confirm my reservation.

With best regards,

Alain Wisner  
Professor

662.215.3880

*SASA INTERNATIONAL HOUSE*

*HOUSE RULES*

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- 1. Outsiders are not allowed to stay, either temporarily or permanent, with you without permission and have to be registered.*
  - 2. Please do not change any part of the room or annex something to the room.*
  - 3. Please do not move the furniture, or spill liquids onto the floor or furniture, Also driving nails or hooks into the wall or any furniture is not allowed. A fine will be assessed for violation.*
  - 4. No cooking is allowed.*
  - 5. No pets of any kind are allowed in the room.*
  - 6. No visitor is allowed in the room without permission of the House.*
  - 7. Please do not make loud noise or do whatever that may disturb your neighbours.*
  - 8. Please help conserve energy; switch off all lights upon leaving your room.*
  - 9. Sasa International House reserves the right to terminate any person's stay in the case of his/her non-observance of the above.*
-

Paris, le 16 Décembre 1991

Monsieur Le Professeur Fleury  
Administrateur Général  
CNAM

Monsieur l'Administrateur Général,

Je suis revenu des Philippines le 30 Novembre. Ma mission s'est déroulée dans des conditions tout à fait satisfaisantes, aussi bien dans le domaine de l'enseignement que dans celui de la recherche.

J'ai été reçu par le Président de l'Université de Chulalongkorn entouré de son état-major, avec la plus grande considération, liée au fait que je vous représentais.

Le Président a insisté sur l'importance des relations entre la Thaïlande et la France, en particulier dans le but de diversifier les relations internationales de l'Université de Chulalongkorn. Le Président, ainsi que plusieurs de ses collaborateurs, ont d'ailleurs des relations étroites avec la France.

Vous recevrez d'ici quelque temps la convention, qui vous sera adressée par le Président de Chulalongkorn. Toutefois, la signature a eu lieu en ma présence.

J'ai été reçu par Monsieur Jean-Jacques Faure, Attaché Scientifique à l'Ambassade de France à Bangkok, et je l'ai informé de la signature de la convention.

Il s'est réjoui de cet accord et a tout de suite essayé de voir comment il pourrait aider à sa réalisation. J'étais accompagné par le Professeur Kitti Intaranont, le collègue thaï avec qui je travaille.

Je vous prie d'agréer, Monsieur l'Administrateur Général, l'expression de mes sentiments dévoués.

A. Wisner

CASTETS  
Copie : Mr ~~Cassette~~



Copies : Pr Davoine  
Pr Caspar  
M.Ch. Wargny  
M.Marc Castets

Paris, le 1er Décembre 1992

Monsieur le Professeur Fleury  
Administrateur Général du  
C.N.A.M.  
292 rue St Martin  
75141 Paris cedex 03

Monsieur l'Administrateur Général,

Vous avez bien voulu m'accorder un ordre de mission pour un séjour de 6 semaines en Thaïlande, qui s'est achevé le 27 Novembre.

Le programme prévu a pu être mené à bien de façon satisfaisante au sein de l'Université Chulalongkorn, avec laquelle nous avons un lien sous forme d'un accord inter-universitaire. J'ai assuré un enseignement de 12 heures suivi d'un examen écrit au sein du Master de Génie Industriel et Ergonomie que dirige le Professeur Kitti Intaranont.

J'ai été très impressionné, non seulement par l'essor industriel foudroyant de ce pays (augmentation du P.M.B. de 10% par an depuis 10 ans), mais aussi par le développement très considérable de l'Université Chulalongkorn qui est le centre essentiel de préparation de cadres nécessaires à ce développement.

J'ai été invité par les Universités Mahidol et Thammasat, principales universités thaïlandaises pour la médecine d'une part, et les sciences sociales d'autre part, à donner une conférence initiale à un séminaire auquel j'ai participé pour la création d'une maîtrise des sciences sociales industrielles.

Enfin, j'ai participé à trois importantes réunions syndicales, un congrès des travailleurs du pétrole et de la chimie, une réunion des ouvrières du tissage, et une réunion de la région industrielle située au sud de Bangkok.

J'ai été heureux de pouvoir travailler aussi avec les syndicats, car l'essor industriel thaïlandais s'accompagne de conditions de travail très dures qui font parfois penser à la première révolution industrielle en Angleterre ou en France.

Je vous prie d'agréer, Monsieur l'Administrateur Général, l'expression de mes sentiments dévoués.

A. Wisner



MINISTERE DE L'EDUCATION NATIONALE  
CONSERVATOIRE NATIONAL DES ARTS ET METIERS  
ERGONOMIE ET NEUROSCIENCES DU TRAVAIL

Paris, 13th January 1992

Dr. Chaiyuth Chavalitnitikul  
Director,  
National Institute for the Improvement  
of Working Conditions and Environment  
Department of Labour  
Phra Pinklao-Nakorn Chaisri Highway  
Thaling Chan,  
BANGKOK 10170  
Thailand

Dear Dr. Chavalitnitikul,

Dear Chaiyuth,

I received with much pleasure your kind wishes for a Happy New Year. In turn, I am sending you my best wishes for a good and fruitful year for yourself, your family, your Institute and also SEAES of which I am happy to know you are now the Chairman. I am sure you will promote new ideas and actions during the next two years with the help of Kitty Intaranont. I think it is very good that Thailand which is the most quickly progressing country among the Asian has now the responsibility of orientating SEAES.

This diagnosis about the leadership of Thailand has induced me to devote part of my time (approximately 6 weeks every year) to the progress of Ergonomics in SEAES but especially Thailand. My relation is more important with Kitty Intaranont as there is a Convention between Chulalongkorn University and the Conservatoire National des Arts et Métiers.

I have also some relation with Prof. Malinee Wongphanich but, of course, I am at the disposal of NICE and of its Director. I will probably be in Thailand in October and November 1992.

With my best regards,

Yours sincerely,

Alain wisner  
Professeur, CNAM

Agreement between  
Le Conservatoire National des Arts et Metiers  
and  
Chulalongkorn University

se. anglais signé par

le 2 :

CNATM

Chulalongkorn

## SECTION I - AIMS

### ARTICLE 1

Each of the two parties, eager to organize bilateral exchanges, shall endeavour to reach the following goals :

- to participate in the management of the other party through the provision of members of its teaching or research staff for short, medium or long-term periods, within the possibilities of each of the establishments.
- to exchange issue information on the organization and aims of each of the parties, both as regards teaching and research, in order to encourage applications for teaching jobs in cooperation, so as to participate in both research and teaching activities;
- to find all the means liable to encourage research in fields of common interest and to promote better training for students, teachers, researchers and engineers;
- to hold consultations in order to improve and develop university and post-university training;
- to encourage the mutual participation of each party, conferences, training courses and summer schools organized by either of the parties;
- to encourage exchanges and contacts between the university departments and industrial companies of the two countries.

### ARTICLE 2

The two parties shall agree to regularly exchange information about organization and educational documentation.

In the field of research, both establishments shall organize, in unison, the dispatch of post-graduate researchers in the context of joint research and shall reserve participation, on a preferential basis, for the them at scientific events, subject to availability of necessary finance.

## SECTION II - CONDITIONS AND FIELD OF COOPERATION

### ARTICLE 3

The development of inter-establishment cooperation shall be the subject of a programme established in common at the time of meetings of the interested parties. These programmes shall be submitted to the competent Thai and French authorities.

2

ARTICLE 4

The annual programme shall indicate the scientific or technical specialties and the qualifications of the permanent teachers which one of the parties shall provide to the other.

Where applicable, this annual programme shall establish:

- a list of the names, grades and references of teachers, consultants and experts detached for short or medium-term missions, conferences, training courses or technical types of intervention;
- the number of students and the study programme selected for their exchange;
- the number and type of companies which wish to participate in the training.

SECTION III - CONTRACTUAL CLAUSES

ARTICLE 5

Exchanges of teachers, researchers or students

Each year, the two institutions shall endeavour to exchange teachers, researchers and students in each direction on a roughly equal basis. In particular, this effort shall concern students preparing Ph.D. thesis.

5.1 Exchanges of teachers and researchers

Each establishment shall pay its teachers during their stay abroad. The host establishment shall provide assistance as regards their accommodation and social welfare needs.

5.2 Exchanges of students

The practice established for dealing with the equivalence of modules, semesters and diplomas will be the subject of reciprocal consultation.

ARTICLE 6

In order to ensure follow-up of the agreement, each party shall appoint a committee with a secretariat which shall be responsible for establishing a report on the work done, especially at the end of the second semester of the university year.

An annual report shall be submitted to the authorities of the two parties.

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SECTION IV - MEANS

ARTICLE 7

The two parties shall ask the organizations in charge of encouraging scientific cooperation for the finance necessary to implement this agreement.

In addition, they shall endeavour to support the actions engaged with all organizations authorized for this purpose.

ARTICLE 8

The financial conditions agreed to in the context of the cultural and scientific cooperation programme between the governments of the two countries shall apply to the implementation of this agreement and the programmes resulting therefrom.

SECTION V - APPROVAL OF THIS AGREEMENT

ARTICLE 9


Any difficulties arising from application of this agreement shall be examined at meetings of the interested parties in order to facilitate settlement. Where necessary, difficulties shall be referred to the competent authorities of the two countries.

ARTICLE 10


This agreement is effective for a period of four years. It shall be renewed through tacit agreement and shall take effect as from the day of its signature. It may be cancelled through written notice sent six (6) months before expiry of the current period.

Signed in BANGKOK  
on

Signed in PARIS  
on

  
Professor Charas Suwanwela, M.D.  
President of Chulalongkorn  
University



  
Guy Fleury Sc. D.  
General Administrator  
Conservatoire National  
des Arts et Metiers

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## CONSERVATOIRE NATIONAL DES ARTS &amp; METIERS

292, rue Saint-Martin

75141 PARIS CEDEX 03

TELECOPIE (TELEFAX) (1) 42 71 93 29

Téléphone : 40 27 - Télex : 240 247 F.

## TELECOPIE

DATE : 10-10-91

DESTINATAIRE : M<sup>me</sup> REBIFFÉ

(Texte de la convention

ENAOI / CHOLALONGKORN

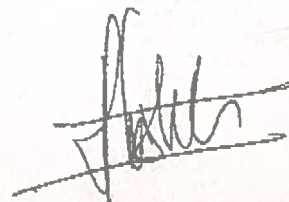
en Anglais )

EXPEDITEUR : M. CASSEPS

Nombre de pages : 5 y compris celle-ci.

Merci d'avoir adressé ce page  
de garde après les documents - - -

Amicalement



Agreement between  
Le Conservatoire National des Arts et Metiers  
and  
Chulalongkorn University



SECTION I - AIMSARTICLE 1

Each of the two parties, eager to develop bilateral exchange, shall endeavour to achieve the following goals:

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- to exchange issue information on the organization and aims of each of the parties, both as regards teaching and research, in order to encourage applications for teaching jobs in cooperation, so as to participate in both research and teaching activities;
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-2-

ARTICLE 4

The annual programme shall indicate the scientific or technical specialties and the qualifications of the permanent teachers which one of the parties shall provide to the other.

Where applicable, this annual programme shall establish:

- a list of the names, grades and references of teachers, consultants and experts detached for short or medium-term missions, conferences, training courses or technical types of intervention;
- the number of students and the study programme selected for their exchange;
- the number and type of companies which wish to participate in the training.

SECTION III - CONTRACTUAL CLAUSESARTICLE 5Exchanges of teachers, researchers or students

Each year, the two institutions shall endeavour to exchange teachers, researchers and students in each direction on a roughly equal basis. In particular, this effort shall concern students in the third stage of secondary education.

*supawa*  
5.1 Exchanges of teachers and researchers

Each establishment shall pay its teachers during their stay abroad. The host establishment shall provide assistance as regards their accommodation and social welfare needs.

5.2 Exchanges of students

The practice established for dealing with the equivalence of modules, semesters and diplomas will be the subject of reciprocal consultation.

ARTICLE 6

In order to ensure follow-up of the agreement, each party shall appoint a committee with a secretariat which shall be responsible for establishing a report on the work done, especially at the end of the second semester of the university year.

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-3-

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Signed in PARIS  
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Professor Charas Suwanwela, M.D.  
President of Chulalongkorn  
University

Professor Guy Fleury  
~~Director General Administration General~~  
of the Conservatoire National  
des Arts et Metiers