Trade Unions in Singapore

(Model of an Alternative to Futility in a Developing Country)

by

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"It is the consciousness of our being co-owners of the new society we are creating that provides the drive for fulfilment. In multi-racial countries like ours, trade unions have a special role in building up this spirit of camaraderie amongst the workers. Developing the economy, increasing productivity, increasing returns, these make sense only when fair play and fair shares make it worth everyone's while to put in his share of effort for group survival and group prosperity."

– Lee Kuan Yew
Prime Minister, Singapore

WHAT ought to be the values and the goals of a trade union in a developing society? Is it either feasible or desirable that trade unions in developing societies should blindly imitate labour organisations in the advanced industrial countries of the West, in respect of their structure, priorities and *modus operandi?* To adequately answer these questions, one would have to ask yet another question: "What are the special socio-economic and political contexts in which trade unions in the developing world live, and move, and have their being?" (for what that may be worth!)

In order to answer these questions, we must allow a digression from the main theme of this essay. There is a fundamental fallacy in judging the third world on the basis of the standards, values and achievements of the advanced industrial nations of the West. In the first place, all value judgements, insofar as they relate to political and socio-economic conditions and circumstances, are relative, and therefore likely to be biased and one-sided. If at all there are seminal values, they belong not to the realm of politics, economics and sociology. They belong, rather, to the non-mundane spheres covered by the great spiritual mentors of mankind, by figures like Christ and Buddha, who speak not of relative values, but of fundamental and universally applicable values of goodness, beauty, truthfulness and selflessness. Christ from His cross did more to humanise Europe than all the politicians, ideologists, churchmen and system-builders put together. And the gentle voice of the Buddha, echoing down the centuries, has influenced individual human behaviour all over Asia infinitely more than the entire glittering galaxy of emperors

and warlords, sultans and maharajas, pundits and mandarins, taken together.

But leaving aside such universal and fundamental human values, which are common to all the great cultural traditions and civilisations of humanity, East or West, let us take a look at the lesser tribe of pontiffs and pundits of the West who look at the rest of the world through coloured spectacles, and naively presume to judge less fortunate societies on the basis of current Western models of achievement (and, in some cases, of failure), and standards of conduct. One encounters such self-righteous but sadly blinkered types among Western politicians, academicians and, for the purposes of this essay, also among labour leaders. Indeed, the degree of self-righteousness would appear to be directly proportionate to the thickness and opacity of the blinkers that are worn.

It requires only a modicum of history and of current knowledge to topple these gentlemen from their fragile pedestals of clay. Historically, one has to hark back no further than some 200 years ago, to the beginnings of the Industrial Revolution in England. Karl Marx, and several others after him, have carefully and minutely documented the savagery and inhumanity which characterised the period of the primitive accumulation of capital, involving the cruel exploitation of the labour of men, women and children (and the even more cruel exploitation of the subject peoples of the colonies), and which lie behind the material affluence and moral pretensions of the modern West.

The mire and the muck from which the rose of modern Western industrial civilisation has arisen is all too easily forgotten. Also conveniently forgotten is the fact that large parts of the developing world *still* live with the technology of the pre-industrial Age. Nonetheless, they are expected to by-pass the mire and the muck in which the modern West had its origins, and to telescope within a decade or two the technological breakthrough which took Western Europe a leisurely two centuries or so of unparalleled mass exploitation, poverty, and squalor, to achieve.

It is small wonder then that the initial euphoria which attended the newly independent nations of Asia and Africa, with their imitative panoply of parliamentary institutions and Western standards, quickly gave way to disenchantment and despair. Governments based on parliamentary institutions

fell like ninepins, and gave place to military takeovers and to one-party systems.

The brutal truth is that *no* developing country can hope to overcome the most daunting problems of social and ethnic inequalities, and of mass unemployment, poverty and squalor, and make its way into the technological Age without individual and social discipline, curbs on population growth, accumulation of savings for investment whether by consent or by enforcement, massive utilisation of technology transfers from the industrialised nations, *and* a political leadership committed to these goals and with a deserved reputation for integrity and incorruptibility. In the absence of all or even some of these attributes, Western-style parliamentary institutions are doomed to collapse. In deed, this is precisely what has happened in several parts of the so-called third world. Goaded into the kind of desperation engendered by unfulfilled expectations, the non-communist world has been consistently shrinking in area, while the communist and pro-communist world has been expanding.

Two roads to modernity are open to a developing country. First, a socio-political system based on the values of political democracy, of one-man-one-vote, and on the periodical accountability of those elected to govern, to the people who elect them. But neither the rulers nor the ruled in a developing society, if that society is to pull itself up by its own bootstraps as it were, can afford the looseness, the permissiveness and the downright license which increasingly pass for "freedom" in the Western world. Almost invariably, whenever a developing society has based itself on the institutions of political democracy, but in the name of such democracy has condoned the evils of corruption, knavery and nepotism at the top, and indiscipline and permissiveness on the ground, the way has inevitably been prepared for the more trenchant solutions offered by authoritarian ideologies.

And this brings us to the second road to modernisation – the regimented totalitarian society, in which savings are enforced, and in which the individual is subjected to the voice, eyes and ears of some infallible "Big Brother", in home and office, field and factory, and in which the human spirit is cribbed, crabbed and confined to the measure of a tryannous and all-emcompassing doctrine.

We in Singapore had thought that the choice for social democrats in our part of the world was clear-cut and unambiguous in the minds of our counterparts in the developed West. Apparently this is not so any longer. For there would appear to be elements among West European social democrats who find us wanting, because we decline to do precisely those things which would facilitate a communist takeover.

The choices exercised by social democracy in Singapore, the originality of both conception and implementation in the fields of politics, economics and social policy, are covered elsewhere in this book. The rest of this essay will attempt an evaluation of the role, significance and achievements of organised labour in social democratic Singapore, in terms of nation-building in a multi-racial society, and of the imperatives of economic development in a small island-nation which can boast of no natural resources apart from the industry and the skills of hand and brain of its people.

First, however, a minor but important reservation must be made. Unlike some of the self-righteous "know-alls" of trade unionism in Western Europe and North America, who presume to set the standards and values of trade unionism everywhere else, we in Singapore do not pretend that the structures, concepts, and *modus operandi* we have developed are universally applicable to trade unions in *all* developing countries. The size and conditions of developing countries vary far too much to permit of any easy generalisation from the Singapore experience. The modest claim might be made, however, that the approach we have taken to the role and function of trade unions in Singapore does have a relevance for those developing societies which still remain outside the totalitarian fold.

Whatever the difference in structure, conception and execution between our trade unions in Singapore and our counterparts in the developed industrial democracies of the West, there is one fundamental feature we do have in common: our trade unions are freely elected institutions, with ultimate responsibility to the workers whom they represent. Unlike communist countries, trade union leaders are not imposed onto the movement from outside by political party or government. They are accountable, in the first as well as in the last analysis, to the trade union ground which elects them to office.

And this is the reason why the Singapore trade union movement has natural and fraternal ties with the free trade unions of North America and West Europe, rather than with the communist-sponsored World Federation of Trade Unions.

Having said this, we may go on to observe, and without apologies to our Western friends either, that we have *never* been interested in casting ourselves into Western trade union moulds. Our approach and policy choices were determined as a positive democratic response to the continuing communist challenge to a free, democratic, and non-communist society in Singapore. It is a challenge which has increased in stridency since the communist takeovers in Vietnam, Cambodia and Laos in 1975.

The communists see trade unions as an instrument to wage class war, and to overthrow an elected government. But once they have achieved their goal, trade unions disappear, to eventually re-emerge only as emasculated minions of the totalitarian system.

One of the major policy achievements of democratic socialists in Singapore has been to eliminate acute class divisions and dissensions within the Republic. Many developing countries are plagued by prestigious parasites, who are content to enjoy absurd privileges without doing much good to anyone. Such minorities, privileged by virtue of ethnic origin, membership of a feudal aristocracy or of money-power, constitute a standing invitation of revolution.

The ossification of the class structure in Singapore has been shattered by the high degree of social mobility assured by our education system. We have no special schools for the privileged. Whatever the income level or social status of parents may be, all children attend the same schools. The end-result of such a policy has been the emergence of a meritocracy based on the principle of equality of opportunity, which overrides all the distinctions which rest on race, class, colour, or creed. Thus, many members of the professional and executive elite in the Republic today are the children of the street hawkers and washerwomen of yesteryear. And in most work-places, relations between production managers and workmen are singularly devoid of the kind of hostile class confrontation which characterises industrial relations in a country like Great Britain.

Communist attempts to exploit trade unions as agitational vehicles for the conduct of a socially debilitating class war have thereby been effectively pre-empted by the social democratic policies of the political leadership.

Again, where the communists see trade unions in non-communist societies playing a negative and hostile social role, the social democrats in the Singapore trade unions have transformed the movement into a vital and positive factor in our country's social and economic development.

While the institutional independence of the trade union movement from both party and government has been scrupulously maintained, trade union representatives sit on the following key statutory boards in the Republic:

(a) The Port of Singapore Authority
(b) The Economic Development Board
(c) The Housing and Development Board
(d) The Public Utilities Board
(e) The Telecommunications Authority of Singapore
(f) The Industrial Training Board
(g) The Adult Education Board
(h) The National Maritime Board
(i) The Central Provident Fund Board
(j) Jurong Town Corporation

Thus, hardly anywhere else in the developing world has the International Labour Organisation's principle of tripartism been so thoroughly and conscientiously implemented as it has been in Singapore.

There is another tripartite institution in Singapore, the National Wages Council (NWC), which was set up in 1972, and on which trade unions, employers and the Government have equal representation. Every year, the NWC studies the performance of the economy in the previous year, changes in the cost-of-living indices, the state of the investment climate, prospects of new job creation in the current and ensuing years to absorb young people who join the labour market, and related matters. On the basis of this analytic study, the NWC recommends, to the trade unions and to employers, broad guidelines to govern wage increases for the year. The annual NWC guidelines are not mandatory. However, all collective bargaining takes place within the general framework they provide.

If the performance of the economy justifies it, NWC guidelines exceed the built-in annual increments for workers already provided for in collective agreements. Fortunately for Singaporeans, this is precisely what has happened every year since 1973, and all classes of employees, from top to bottom, have thereby come to share the fruits of economic development.

Annexure XXV to my statement to the Socialist International contains the findings of an American group of economists of the firm of Arthur D. Little. These findings show that, next to Japan, the workers of Singapore enjoy the highest income levels in Asia. However, this is *no* cause for elation. On the contrary, we are concerned that if wage levels in Singapore become excessively high in comparison with wage levels in nations with competing economies, Singapore-manufactured goods will be priced out of export markets. *It is simply a question of the economics of survival.* Hence the great insistence in Singapore that wage increases in the Republic *must,* among other things, bear a relation to productivity increases. Therefore, trade unions are, in their own enlightened self-interest, in the forefront to the productivity movement in the nation.

As of now, 574 freely negotiated collective agreements are in force in the Republic. The minimum duration of a collective agreement is two years, with a maximum duration of three years. There are eighty-nine trade unions of employees in the Republic. All these are easily verifiable facts.

But Singaporeans have become highly dubious about the commitment to honesty of certain groups in West Europe who indulge in the most blatant falsehoods about the Republic. What, for instance, are we to make of the May 1976 issue of *Labour* published by the World Confederation of Labour (the WCL)? This organisation is essentially a Christian labour outfit, distinguished for its quite un-Christian propagation of palpable falsehoods. Let us read what this journal says in an article about Singapore, under the title: "Singapore: The Position of the Working Classes". I quote from the article:

> "Collective bargaining agreements simply do not exist. The workers are not free to organise themselves. They have no chance of doing so: trade unionism and all it entails would put foreign investments in danger."

And this about a country in which 574 freely negotiated collective agreements are currently in force, and in which eighty-nine trade unions freely operate. What respect can one possibly have for people who are capable of perpetrating such brazen outrages against the truth!

The WCL and their ilk probably feel that they can get away with lies about a small country like Singapore. Great Britain, for example, is in a far more favourable position. For not even the biggest liars in the world can possibly hope to convince anybody anywhere in the world that neither collective agreements nor trade unions exist in Great Britain. Tiny Singapore, however, is fair game for all liars, big and small.

Be all that as it may, while collective bargaining continues to be regarded as the primary responsibility of trade unions in the Republic, it has ceased to be the sole and exclusive trade union preoccupation. The Singapore National Trades Union Congress (SNTUC) recognised that if organised labour was to exercise its rightful role and influence in society, and if the potential of a free labour movement in an open society was to be realised in full, it would have to develop its own financial and human resources.

Dynamic projects and programmes were therefore formulated and implemented, with the result that within the space of the last decade the face of trade unionism in Singapore has been transformed beyond all recognition. Our trade unions are no longer the vehicles of pro-communist agents furthering the aim of the Communist Party of Malaya, to violently overthrow the elected Governments of Malaysia and Singapore. Neither are our unions the weak, anaemic, and disunited remnants which have never progressed beyond passing fiercely-worded and negative resolutions denouncing everything under the sun except their own inadequacies, and which pass for trade unionism in several parts of the third world.

Among the largest insurance undertakings in Singapore today is the NTUC insurance cooperative, known as INCOME. One in every three life insurance policies sold in Singapore is an NTUC INCOME policy. The surpluses generated by INCOME have been utilised for beneficial investments in cooperative and other trade union projects.

Again, in 1974, when worldwide inflation hit Singapore, and food prices sky-rocketted, it was the trade union movement which played a major role in stabilising food prices by launching a chain of cooperative supermarkets, known as WELCOME. Five of these supermarkets, which enjoy an incredible turnover, are in operation today. This number is expected to increase to eight by the end of 1976.

The first full-fledged consumer movement in the Republic, known as CASE (the Consumer Association of Singapore), was launched in 1973 with the NTUC as founder member.

The NTUC has also embraced taxi-drivers in Singapore within its fold. This was the aim of the trade union transport cooperative, known as COMFORT, which today boasts a well-run fleet of 1,600 owner-driven taxis, 350 minibuses, also owner-driven, and 28 shuttle buses. COMFORT's objective is that every taxi in Singapore should eventually be an owner-driven taxi, with self-respecting taxi operators freed from the exploitation of compradores and financiers.

Getting off the launching pad by the end of 1976 will be the NTUC COMFORT Motor Workshop, which will service and repair both the NTUC's fleet of vehicles, as well as private vehicles.

There are two other trade union cooperatives, FAIRDEAL, which retails low-cost textbooks to schoolchildren, and DENTICARE, which provides low-cost dental treatment for workers and their families.

In addition, the SNTUC also runs a thriving travel agency which is among the largest in Singapore – the NTUC Travel Services (Private) Ltd.

Besides the abovementioned undertakings run by the SNTUC, several affiliated unions also run a variety of multi-purpose cooperative societies which cater to the needs of the members and their families. Indeed, one of the significant trade union developments in Singapore is the increasing extent to which the benefits of trade union membership are being extended to the families of union members. A veritable cooperative commonwealth, collectively owned and managed by the trade union movement, has sprung up around the NTUC and its affiliated unions.

All these cooperative and other undertakings are not, however, regarded as ends in themselves. Rather, they are conceived as a means to larger ends, embracing the totality of interests of the working population of Singapore. The financial muscles and the professional skills which have accrued to the labour movement from the operation of such projects have been utilised, among other things, for the following purposes:

(a) The enhancement of the economic, industrial and sociological research facilities of the SNTUC, under highly qualified persons, which are made freely available to affiliated trade unions and other friendly organisations.
(b) The promotion of a wide-ranging series of trade union education programmes, aimed at equipping trade union leaders and rank-and-file members with a high level of trade union consciousness, trade union skills, and with the democratic values necessary to the efficient functioning of a free trade union movement, sensitive to the needs and priorities of an open society in a developing nation, which has to make its way in the volatile and turbulent milieu of Southeast Asia.
(c) The recruitment and training of a field force of trade union organisers and officers, whose services are utilised by trade unions in the spheres of collective bargaining, industrial advocacy, cooperative development, organisation of women and youth groups, and of a variety of welfare, cultural and recreational projects.

As a result of the wide-ranging scope and thrust of trade union interests, projects, and programmes, and of direct trade union involvement in the decision-making processes of key areas of socio-economic planning and development, the labour movement has acquired a status and influence in the public life of the nation, unheard of in most parts of the developing world and, indeed, even in many developed countries.

Trade unions and their members have therefore come to possess a sense of belonging to their society and their nation. They recognise that they are, in a very real and tangible sense, the co-owners of society.

Never before has trade union membership stood so high in the Republic, and the numbers keep on increasing. It must

be borne in mind that the overwhelming endorsement by the workers of the objectives of the national labour movement is subject to regular testing by secret ballot. The pro-communist trade unions in the Republic have been routed time and time again through recourse to the ballot box, when trade union recognition ballots are conducted in places of employment, in accordance with the provisions of the law, when rival unions claim jurisdiction.

The trade union movement is also confidently aware of the fact that no political group which hopes to rule Singapore, on the basis of the institutions of political democracy, can do so without the support and goodwill of the labour movement. For it so happens that probably around 70 per cent of the total electorate in Singapore are wage earners or salary earners, who could belong to one trade union or another.

Singapore is an open society, open to study, investigation, and fair comment by open organisations in other open societies. Like other trade union organisations elsewhere, we also have our fair share of shortcomings and failures. However, it might be justifiably claimed, without appearing immodest, that the concepts, structures, projects, programmes and general *modus operandi* developed by the free non-communist trade unions of Singapore provide one of the few credible models for a democratic trade union alternative in other third world countries, which are similarly besieged by seemingly intractable socio-economic problems, and by the blandishments of totalitarian ideologies.

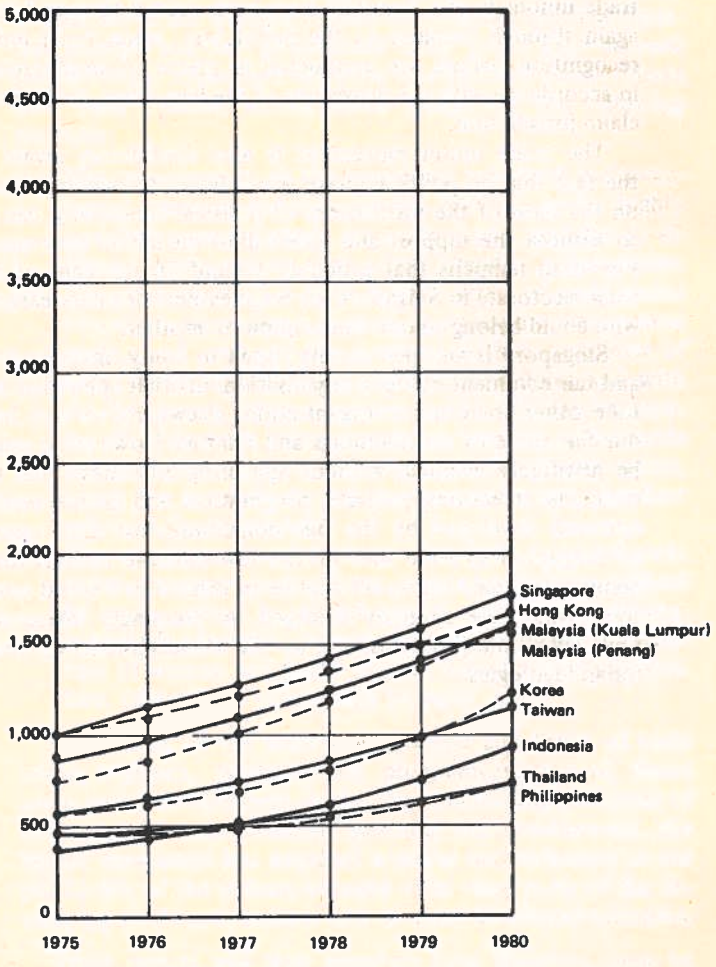

FIGURE IIB-1 COMPENSATION* PAID UNSKILLED LABOR IN 1975-1980 EXPRESSED IN COMMON CURRENCY (US$ PER MONTH)

*Including Wages, Fringe Benefits, and Bonuses.

Note: Monthly Compensation as Graphically Displayed is a Product of Wages Paid in a Local Currency Times Prevailing Exchange Rates Against the US Dollar Year-By-Year, Which Allowed Expressing all Wages in a "Common Currency", Viz. the US Dollar.

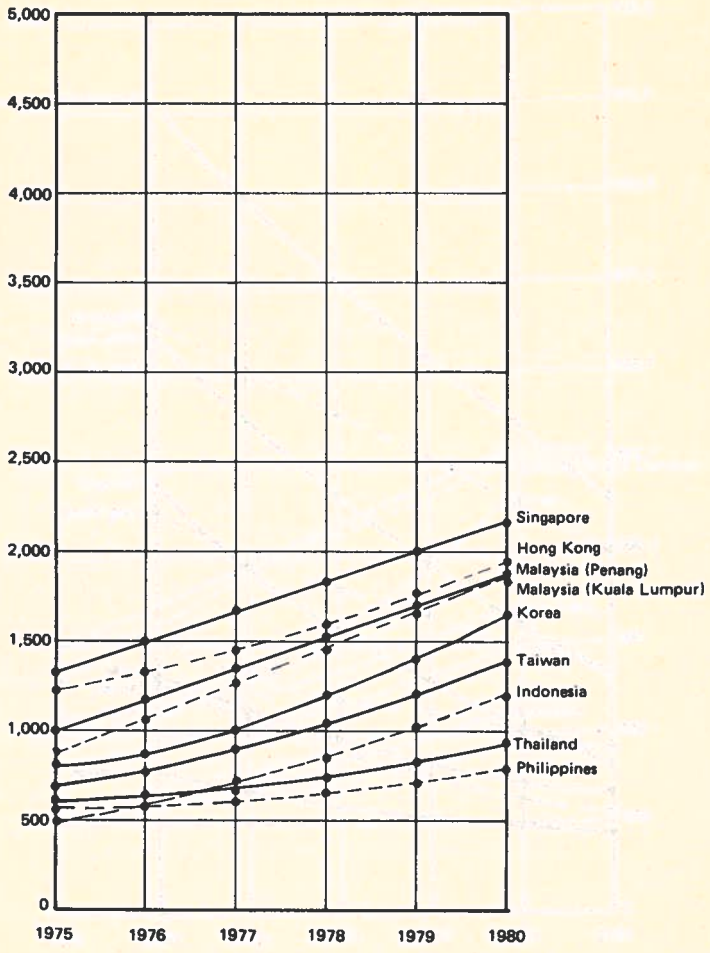

FIGURE IIB-2 COMPENSATION* PAID SEMISKILLED LABOR IN 1975-1980 EXPRESSED IN COMMON CURRENCY (US$ PER MONTH)

*Including Wages, Fringe Benefits, and Bonuses.

Note: Monthly Compensation as Graphically Displayed is a Product of Wages Paid in a Local Currency Times Prevailing Exchange Rates Against the US Dollar Year-By-Year, Which Allowed Expressing all Wages in a "Common Currency", Viz. the US Dollar.

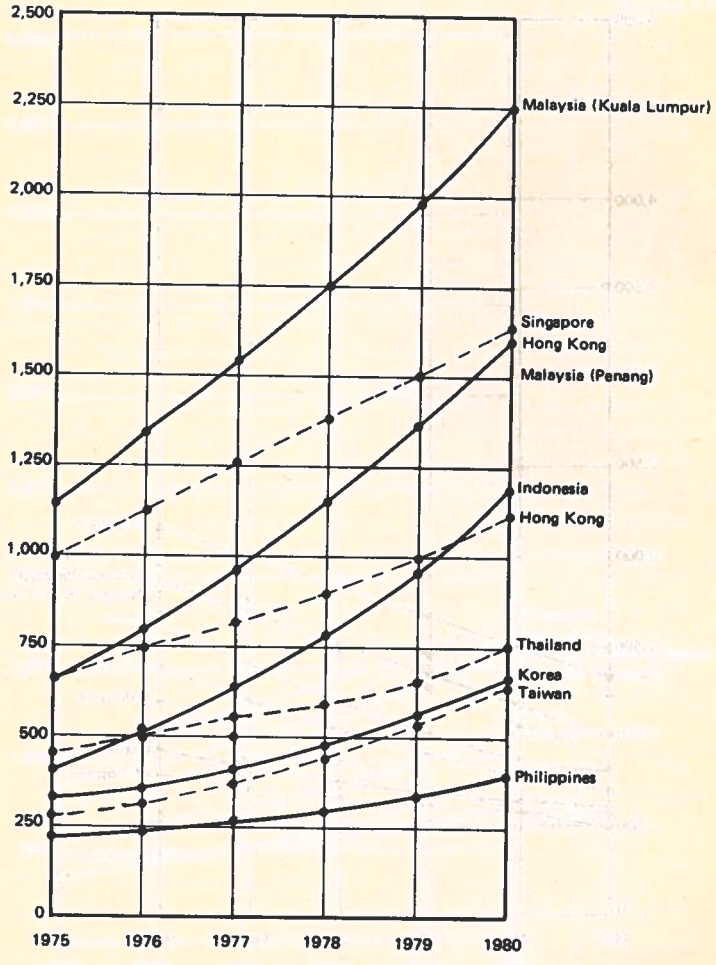

FIGURE IIB-3 COMPENSATION* PAID SKILLED PRODUCTION LABOR IN 1975-1980 EXPRESSED IN COMMON CURRENCY (US$ PER MONTH)

*Including Wages, Fringe Benefits, and Bonuses.

Note: Monthly Compensation as Graphically Displayed is a Product of Wages Paid in a Local Currency Times Prevailing Exchange Rates Against the US Dollar Year-By-Year, Which Allowed Expressing all Wages in a "Common Currency", Viz. the US Dollar.

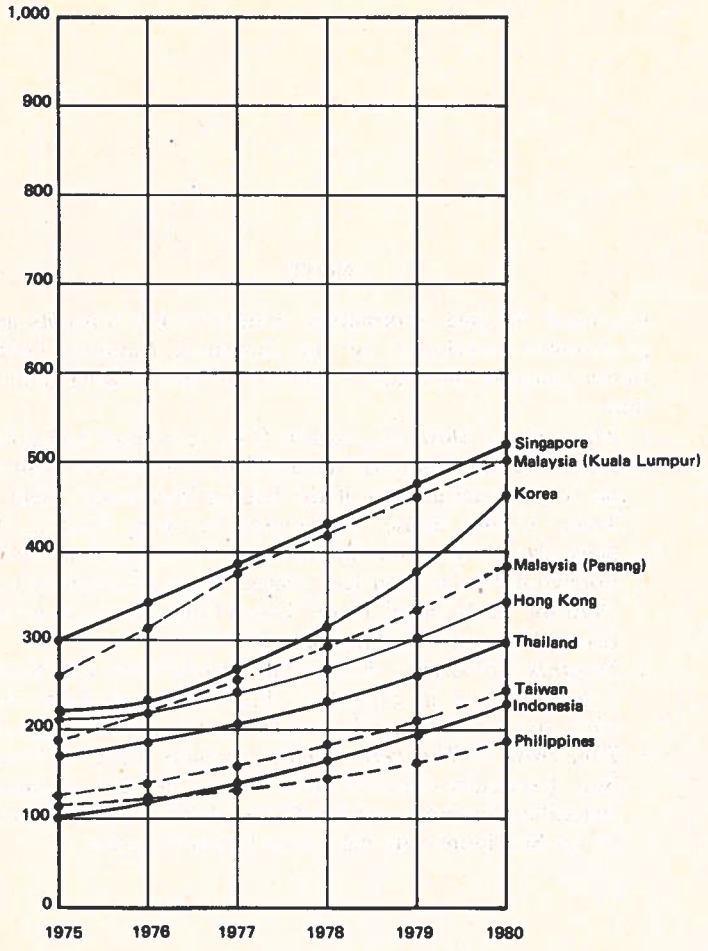

FIGURE IIB-4 COMPENSATION* PAID SKILLED TECHNICIAN LABOR IN 1975-1980 EXPRESSED IN COMMON CURRENCY (US$ PER MONTH)

*Including Wages, Fringe Benefits, and Bonuses.

Note: Monthly Compensation as Graphically Displayed is a Product of Wages Paid in a Local Currency Times Prevailing Exchange Rates Against the US Dollar Year-By-Year, Which Allowed Expressing all Wages in a "Common Currency", Viz. the US Dollar.

NOTE

For more detailed information relating to the concepts and programmes developed by the Singapore National Trades Union Congress, the reader is referred to the following publications:

1 *Why Labour Must Go Modern* (The full report and documents of the National Trades Union Congress seminar on the "Modernisation of the Labour Movement", held at Trade Union House, Singapore, between Sunday, 16 November 1969 and Wednesday, 19 November 1969). Foreword by Dr Goh Keng Swee. First published March 1970 by the National Trades Union Congress, Trade Union House, Shenton Way, Singapore 1.

2 *Towards Tomorrow.* Essays on Development and Social Transformation in Singapore. First published September 1973 by the National Trades Union Congress, Singapore.

3 *Tomorrow – The Peril and the Promise.* By C.V. Devan Nair (Secretary-General's Report to the 2nd Triennial Delegates Conference of the NTUC, April 1976). Published by the Singapore National Trades Union Congress.

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THE LEGISLATIVE BACKGROUND

The legislation on occupational safety is principally contained in the following statutes (and the regulations made under them):

> The Factories and Commercial Premises Act 1981; the Machinery Act 1950; the Bush Workers Act 1945; the Construction Act 1959; the Accident Compensation Act 1972; the Coal Mines Act 1925; the Mining Act 1971; the Explosives Act 1957; the Dangerous Goods Act 1974; the Boilers, Lifts, and Cranes Act 1950; the Shipping and Seamen Act 1952; the Quarries Act 1944; the Health Act 1956 insofar as it relates to occupational health (see Section 5A); the Petroleum Act 1937; the Geothermal Energy Act 1953; the Electricians Act 1952; the Electric Linemen Act 1959; the Agricultural Workers Act 1977; the Electrical Wiring Regulations 1976; and the Electrical Supply Regulations 1967.

The Department of Labour has the largest overall responsibility for the prevention of accidents in industry. The principal statutes it administers are: The Factories and Commercial Premises Act 1981, which is concerned with safety, health, and welfare in factories, offices and other undertakings; the Construction Act 1959, which covers safety, health, and welfare of workmen on construction work as defined in the Act; and the Machinery Act 1950, which is concerned with the inspection of all machinery (with some exceptions covered by other legislation) in work places and the safety of persons working with such machinery. The department also administers regulations under these Acts, and other statutes dealing with specific spheres of occupational safety, health, and welfare, e.g. the Bush Workers Act 1945, the Agricultural Workers Act 1977.

In addition the department supervises more than 1225 collective agreements and awards, many of which include specific safety, health, and welfare provisions relating to particular occupations and processes.

The administration of this safety legislation is based primarily on regular inspection of work places and requisitioning for improvements, together with investigation of reported breaches of legislation by employers and workers and investigation of a large number of accidents including serious and fatal accidents in industries coming within the scope of the legislation. The department employs some 194 inspectors of factories (including 14 who specialise in bush undertakings), together with some 58 safety inspectors appointed under the Construction Act 1959, all of whom are qualified by special examination. Their work is substantially preventive. The department also engages in a large amount of occupational safety education.

A Joint Committee on Occupational Health and Safety of the Departments of Labour and Health and the Accident Compensation Corporation ensures that the educational work in this field is co-ordinated and that unnecessary overlapping of functions is avoided.

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Machinery Act - The Machinery Act 1950, with certain exceptions, applies to all machinery and places an obligation on the owners of machines to securely fence moving and dangerous parts. The Act also covers amusement devices, which require a certificate from a registered engineer that the device is mechanically and structurally safe for the purpose intended. The Act also requires the testing and certification of tractor safety frames used in agricultural operations.

Construction Act - The Construction Act 1959, the provisions of which are in addition to and not in substitution for the safety provisions of any other Act, promotes the safety and welfare of persons engaged in construction work, a description which covers a wide variety of work including new construction, maintenance, and demolition of buildings, roads, harbour works, railways, canals, bridges, dams, pipelines, earthworks, etc. Certificates of competency are issued after examination to scaffolders, safety supervisors, and construction blasters.

A register of suitably qualified construction divers, crane operators, and construction riggers is maintained.

Explosives and Dangerous Goods Acts

Ministry of Transport: *Safety of Ships* - A substantial portion of the Shipping and Seamen Act 1952 is concerned with the safety of ships and those who sail in them. This Act contains the necessary authority for implementing the provisions of the International Convention for the Safety of Life at Sea 1960 and the International Load Line Convention 1966, to both of which New Zealand is a signatory. Both conventions deal principally with ships engaged on international voyages, but the Shipping and Seamen Act 1952 also contains provisions concerning the safety of all other ships plying in and about New Zealand coastal waters.

Aircraft - The Ministry of Transport is responsible for promoting the safety of aircraft and crews engaged in private and commercial carriage of the public and commercial carriage of goods, including agricultural aviation.

Boilers, Lifts, and Cranes - All boilers and power cranes are inspected and certificated once a year and lifts twice a year.

Ministry of Energy - The Mining Act 1971 and the Quarries Act 1944 make provision for the safety of persons working in mines (both underground and opencast) and in quarries. The definition of a quarry covers the construction of electric power generation works, dams for public water supply, tunnels, and opencast coal quarries.

The ministry is also responsible for the administration of Acts designed to ensure the safety of electrical apparatus and installations and of electrical workers.

Ministry of Works and Development - On each major construction project the Ministry of Works and Development appoints a senior technical officer to act in the capacity of safety officer.

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Occupational Health Centres - The Department of Health provides occupational health centres at strategic points in Takapuna, Auckland, Rotorua, Mount Maunganui, Petone, Wellington, Christchurch and Dunedin.

The two principal pieces of Legislation are the Factories and Commercial Premises Act 1981 and the Accident Compensation Act 1972.

THE FACTORIES AND COMMERCIAL PREMISES ACT 1981

The section of this legislation dealing with safety, health and welfare commences with the following statement:

> "Safety generally - The occupier of an undertaking shall take all reasonable precautions for the safety and health of workers, and persons lawfully on the premises of the undertaking."

Subsequent provisions include:

> Protective Clothing and Equipment
>
> "The occupier of an undertaking shall provide for workers who are engaged in any process or activity that involves a risk of bodily injury to them, or a danger to their health, from flying particles or fragments, or from falling objects, or from scalding, corrosive, irritant, toxic, or explosive substances, or from electro-magnetic or ionising radiation, or from any similar cause, such protective clothing and equipment as may be necessary to afford them reasonable protection against that risk or danger."
>
> Carrying of Heavy Loads
>
> "No occupier of an undertaking shall require any worker to lift, carry or move any load so heavy that its lifting carriage or movement would be likely to injure him."
>
> Cleanliness
>
> "The occupier of an undertaking shall ensure that that undertaking is kept clean, free from any nuisance, and free from any smell or leakage from any drain or sanitary convenience."
>
> Overcrowding and Airspace
>
> "(1) The occupier of an undertaking shall ensure that no part of that undertaking is so crowded as to cause the risk of injury to the health of workers.
>
> (2) Without limiting the generality of subsection (1) of this section, a room in an undertaking shall be deemed to be crowded as aforesaid if the volume of the room, measured in accordance with subsection (3) of this section, is less than a volume calculated on the basis of $12m^3$ for each of the workers employed in it at any one time.

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(3) In calculating the volume of any room for the purposes of subsection (2) of this section -

(a) No space shall be taken into account unless it is kept properly lit and ventilated, and kept clear from all materials, goods, and tools, other than those actually used or required by the persons employed in the room; and

(b) No space more than 4m from the floor shall be taken into account; and

(c) Any gallery or mezzanine floor forming part of the room or opening onto the room shall be treated as if it were partitioned off from the remainder of the room and formed a separate room."

Ventilation

"The occupier of an undertaking shall ensure that each room in the undertaking is so ventilated as to -

(a) Provide a supply of fresh air sufficient for the workers using the room; and

(b) Carry off and render harmless, so far as is practicable, all steam, fumes, dust, and other impurities, arising in the course of the work done in that undertaking."

Lighting

"(1) The occupier of an undertaking shall ensure that -

(a) There is sufficient and suitable lighting, whether natural or artificial, in every part of that undertaking where workers are employed or pass; and

(b) All artificial lights in that undertaking are so placed and shaded that no worker is subjected to any avoidable glare."

Atmospheric Conditions

"(1) Subject to subsection (2) of this section, the occupier of an undertaking shall ensure that there are provided in each workroom situated in that undertaking means that are, having regard to the processes and activities carried on in that workroom, effective and suitable so to control -

(a) The temperature; and
(b) The humidity arising from any process or activity carried on in that undertaking; and
(c) The air velocity; and
(d) The amount of radiant heat; and
(e) The quantity of fresh air -

in that workroom as to ensure that workers employed in that workroom work in reasonably comfortable atmospheric conditions."

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ACCIDENT COMPENSATION ACT 1972

The three main objectives of the legislation are:

(a) To promote safety in every walk of life;

(b) To urge forward the concept of prompt and effective rehabilitation of all people injured by accident so as to restore them to the fullest physical, mental, social, vocational, and economic usefulness of which they are capable; and

(c) To provide prompt, fair, and reasonable compensation so that every accident victim will be treated according to his real needs.

Cover, embracing all three objectives, extends to virtually everyone in New Zealand, from the smallest child to the oldest citizen.

Accident prevention, which is of great importance to the Accident Compensation Corporation, is promoted by a safety division which aims at co-ordinating existing organisations and maintaining its own advisory programme.

Under the Act, the Corporation has "an active and co-ordinating role in the promotion of safety". Objectives of this role are to:-

Avoid human suffering

Prevent wastage of manpower and so assist efficiency and productivity.

To do this, the Corporation seeks change in everybody's attitude to accident prevention, to implant awareness of why and especially how to prevent accidents and minimize the effects of injury which does occur. Efforts to achieve this include the following:-

Advising on methods of injury avoidance, safety systems, safety management

Stimulating exchanges of view on safety

Disseminating safety information, using all media and techniques

Conducting and sponsoring safety campaigns

Supporting the work of relevant interests

Researching accidents, injuries and occupational disease.

The Corporation has 43 safety officers operating from 12 centres throughout New Zealand. The fieldwork is directed and monitored by the Head Office, Safety Division. ACC activity involves all areas - work, home and recreational; in both sectors - public and private; at all levels - central and local government, management, unions, organisations, groups, schools ... The Corporation has advisory groups - including occupational safety, home safety and rural safety - to inform and guide it on particular needs.

Accident prevention work usually achieves results gradually, not immediately, as a result of advice, instruction, demonstration and display. This is so particularly with the Corporation where the accent is on education and on the integration and support of safety efforts generally, not on coercion.

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As society becomes more complex, so accident risks multiply. Since inception, however, Corporation accident prevention work such as courses, talks, and visits to plants and schools had contacted an estimated 180,000 people. They have received added awareness of the need for safety, most of them able to communicate this to other people. ACC publications on accident prevention and allied matters, with frequently pioneering emphasis on the *why* and especially the *how* of accident prevention, have been sought by an even greater and increasing number of New Zealand and overseas interests and individuals.

Geographic/Climatic Influences

New Zealand consists of two main islands situated between 34 degrees to 47 degrees south latitude and has a land area of 27.1 million hectares. No part of New Zealand is more than 130km from the sea. Daily weather patterns are dominated by eastward moving anticyclones and troughs of low pressure. Winds from a westerly quarter prevail in all seasons. Mean temperatures at sea level decrease steadily southwards from 15°C in the north to 12°C in the centre (Cook Strait) then to 9°C in the south. January and February are the warmest months and July the coolest. Humidity is commonly between 70 and 80 per cent in coastal areas and some 10 per cent lower inland.

The following table provides in summary the main climatological elements for the three major cities in New Zealand:

		Annual Averages			*Air Temperatures (Degrees Celsius)*						
						Mean Daily Maximum		*Mean Daily Minimum*		*Mean Annual*	
	Altitude (metres)	*Rain Days (1.0 mm or more)*	*Rain Days (5.0 mm or more)*	*Bright Sunshine (Hours)*	*Mean Temp.*	*Jan*	*Jul*	*Jan*	*Jul*	*Max.*	*Min.*
Auckland	49	140	67	2140	15.4	23	14	16	8	27	3
Wellington	126	124	68	2014	12.5	20	11	13	6	26	1
Christchurch	7	85	37	1985	11.7	22	11	12	1	32	-4

The Employment Background

Industrial Group	*Males*	*Females (000)*	*Total*
Primary industry -			
Agriculture, hunting, and fishing	104.4	26.2	130.6
Forestry and logging	9.0	0.7	9.7
Mining and quarrying	4.5	0.3	4.8
Total, primary industry	117.9	27.2	145.1

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Industrial Group	*Males*	*Females* (000)	*Total*
Manufacturing -			
Food, beverages, and tobacco (including seasonal workers)	60.0	14.3	74.3
Textiles, clothing and leather	15.5	31.6	47.1
Wood and wood products	20.6	2.7	23.3
Paper and paper products, printing and publishing	25.6	9.7	35.3
Chemicals, petroleum, rubber and plastics	19.4	7.9	27.3
Non-metallic mineral products	8.7	1.7	10.4
Metal products and engineering	25.2	4.4	29.6
Machinery (excluding electrical machinery)	20.4	3.3	23.7
Electrical equipment	9.5	5.8	15.3
Transport equipment	18.9	2.8	21.7
Other manufacturing	3.8	2.5	6.3
Total manufacturing	227.6	86.7	314.3
Electricity, gas, and water	13.6	1.8	15.4
Construction	86.3	5.7	92.0
Wholesale and retail trade, etc -			
Wholesale trade	45.1	15.6	60.7
Retail trade	68.1	61.5	129.6
Restaurants, hotels, etc	15.0	23.1	38.1
Total, wholesale & retail trade, etc	128.2	100.2	228.4
Transport and communications -			
Transport and storage	65.5	10.9	76.4
Communications	19.6	14.4	34.0
Total, transport & communications	85.1	25.3	110.4
Finance, insurance, etc -			
Finance	12.3	14.1	26.4
Insurance	8.9	5.7	14.6
Real estate and business services	26.4	19.6	46.0
Total, finance, insurance, etc	47.6	39.4	87.0
Community and personal services -			
Public administration	36.3	22.5	58.8
Sanitary services, etc	4.2	3.4	7.6
Education services	27.8	40.1	67.9
Research and scientific institutes	3.5	1.6	5.1
Health services	18.8	53.1	71.9
Other community services	7.3	9.8	17.1
Recreational services	11.2	5.5	16.7
Personal and household services	21.6	11.2	32.8
Total, community and personal services	130.7	147.2	277.9

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Industrial Group	*Males*	*Females (000)*	*Total*
Total in industry	837.0	433.5	1270.5
Armed forces	9.3	1.0	10.3
Estimated labour force	846.3	434.5	1280.8

Unit Size

94% of all New Zealand factories employ a workforce of less than 50.

86% of all New Zealand factories employ a workforce of less than 20.

There are only a handfull of ergonomists practising professionally in New Zealand. Qualifications in ergonomics can only be obtained overseas. Those obtaining qualifications in ergonomics find that rewards, opportunities and recognition are greater outside New Zealand. There is no university in New Zealand offering qualifications in ergonomics although ergonomics lectures are offered as part of other disciplines (psychology, engineering, architecture, etc).

Job design in New Zealand falls to managers, engineers and industrial engineers/ work study practitioners. In many instances those with university training may have received some basic instruction in ergonomics.

Training in ergonomics forms part of the training for industrial engineering and is practised by industrial engineers (and managers) often without realisation that ergonomics is being applied.

In New Zealand most of the professional industrial engineers belong to the Institute of Industrial Engineers (which is associated with the New Zealand Institute of Management). Corporate membership of the Institute of Industrial Engineers is just over 200 and these are graded into Associate Members, Members and Fellows. New members are expected to have graduated by attending technical college courses and passing examinations set by the Institute.

Ergonomics features as part of the method and study unit of the basic industrial engineering course. It is also dealt with more comprehensively in the Management Services Diploma course - which is a more advanced course set up by the Institute of Industrial Engineers in conjunction with the educational authorities.

The problem of industrial engineering is (by degree) that of ergonomics in that the number of trained personnel applying their discipline in the workplace is small. Numbers have in fact decreased over recent years. The workforce is small in number, production units are small in size and plant designed for long production runs must operate in conditions dictating low volume and short runs.

The term "ergonomics" is unfamiliar to the workforce. One consultant ergonomist has pointed out the frequency with which he must repeat the name of his science (regularly misheard as economics) and having established the word must then explain what it means. A man can go anywhere and say he is a doctor or an architect and immediately establish his credentials. A man claiming to be an

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ergonomist is in for a long conversation. Similarly any pamphlet touching on ergonomics is obliged at the outset to explain what ergonomics is. As examples refer to attached pamphlets:

"The Ergonomics of Machine Guarding"
published by New Zealand Department of Labour

"You and the Way you Sit"
prepared by the N.Z. Accident Compensation Corporation

Considering the importance of the science to the wellbeing of every individual (inside or outside the workplace) it is unfortunate that it is encumbered by such a title. The alternative "Human Factors Engineering" is much more commercial.

The New Zealand worker is independent minded and self sufficient. Faced with a set of stairs with the rises built at varying heights you could say to a New Zealand worker that ergonomics was not taken into account in the design. He very likely would reply to you that "neither was common sense".

Undoubtedly, the principal problems of an ergonomic nature in the New Zealand work environment are:

(1) The lack of professional people who are trained in and who are applying the science in the workplace.

(2) While New Zealand has considerable advantages through relevant legislation and other factors which I shall touch on, managers and workers broadly are not consciously aware of the existence of, the meaning of, and the advantages of Human Factors Engineering.

(3) Thus workers (whether or not their job has been designed to take into account human factors) are in their minds at least modifying themselves to the machine.

The primary responsibility for improving and making the workplace safe must lie with management. The education process however must cover everyone in the workplace, with the aim of creating an informed workforce. Everyone needs to be aware that dangers exist and can be eliminated, that processes can be improved to everyone's benefit, that the workplace can be made a better place in which to be.

"The pathway to control must be paved with awareness."

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New Zealand is advantaged by the industrial legislation outlined at the beginning of this paper. The Factories and Commercial Premises Act (and associated legislation) places a clear responsibility on the employer to create a safe working environment. The legislation is policed by trained inspectors from the Labour Department. The legislation requires the employer (whether he has heard of ergonomics or not) to take into account human factors within the workplace. Apart from regular inspections of the workplace, the Labour Department produces a large range of pamphlets on workplace design and on industrial safety. As examples, refer attached pamphlets:-

"Planning the Workplace"
"Atmospheric Conditions in Factories"
"Noise"
"The Ergonomics of Machine Guarding".

The Labour Department carries out detailed inspections to establish the cause of all accidents of a serious nature and requisitions alteration to work practice or introduction/alteration to guarding to prevent reoccurrence.

The Accident Compensation Act is legislation of which New Zealand is justifiably proud. The safety and accident prevention emphasis of the legislation creates an educational base to inform management and the workforce of the dangers that exist and of the steps that can be taken to remove danger. The Accident Compensation Corporation makes active use of ergonimists in the production of its material (refer attached example pamphlet, "You and the Way You Sit"; attached poster, "Cut the Stress"; attached pamphlet, "How to Prevent Back Injury"), and as participants in safety and accident prevention lectures.

Secondary industry in New Zealand has grown essentially since the Second World War and has been growing considerably over the last few years. Traditionally dairy, meat and wool products have been the basis of New Zealand's export trade but this has changed to include manufactured goods, forest products, textiles and engineering products, which has risen from 5% of total exports in 1966 to 23% in 1980. In terms of persons employed, manufacturing represented in 1980, with 24% of persons employed, the strongest individual business sector of the 1.2 million strong New Zealand labour force. For comparison, the farming sector employed 10% of the total workforce. Thus manufacturing plants in New Zealand tend to be of comparatively new construction. Statistics given early in this paper show how the New Zealand workplace consists mainly of small units employing small numbers of employees. Such units could never carry a practising ergonomist and generally will not have an industrial engineer/work study practitioner. While these are obvious disadvantages it must be pointed out that these small units, because of the level of participation and discussion tend to be high on application of "common sense" methods and approach.

Nevertheless, a recent major study carried out by the Engineering Department of Auckland University on behalf of the Department of Scientific and Industrial Research on component handling in the New Zealand Manufacturing Industry made the following observations:-

> "The main source of all problems is considered to be an inadequate planning and management function within the companies. About 43% of the handling problems analysed showed basic organisational problems which could be improved through quite small capital investments. They would respond to better training of staff, a more disciplined workforce and improvements in the overall planning. To improve the other 57% of the problems analysed, greater investments would be necessary which would result in an excellent return on investment.

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This investigation has shown that there is an excellent potential for improvement in the component handling function of the New Zealand manufacturing industry. A very large fraction of the total area of improvement may be classified as basic organisational problems. They demonstrated that approximately 43% of the total number of problems analysed require only minor capital expenditure and offer a short term payback period.

They include:

- lack of planning of overall material handling function;
- inappropriate stock control;
- unnecessary rehandling of componentry;
- componentry put in transport way or machining area;
- unmarked transport and machining areas;
- non-ergonomic design workplaces.

To solve the other 57% of the problems mentioned, namely;

- unsuitable storage systems;
- lack of storage space;
- unsuitable transport means;
- inappropriate machine tool loading and unloading;
- possible industrial robot application;
- feeders and specially designed equipment needed;
- multiple tools preferable;
- alternative machinery better;

usually requires more substantial investment.

It is significant that the main source of all problems are management responsibilities. They include inadequate planning, and arise from a lack of qualified staff with full time responsibility in component handling and in overall industrial engineering tasks.

In 57% of the companies analysed the design of individual workplaces was found to be unsatisfactory. The criticised workplaces are mainly concerned with product assembly, and are operated eight hours per day. Because of this high degrees of utilisation, they offer a potential for substantial savings. So far New Zealand management has not sufficiently recognised this opportunity for effecting savings. The low percentage of manufacturing engineering offices or of persons responsible for the design of workplaces and equipment, are reasons for the present situation. Also, hardly any time and motion study specialists exist in the investigated companies. To improve the ergonomics of workplaces seems to be one of the major tasks for the future."

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Under the Accident Compensation Act the first week of compensation for a work accident is paid by the worker's employer. Compensation under the Act is only paid by the Accident Compensation Corporation in the case of accidents involving more than one week off work. Thus, a great many accidents do not feature in the statistics compiled by the Corporation. Their statistics only cover accidents involving compensation paid by the Corporation. Those facts emphasise the reality behind the following statistics.

In the 1980/81 year, compensation was involved for:-

8131 injury cases from lifting or lowering
1251 injury cases from stacking/unstacking
1093 injury cases from carrying
5681 injury cases from handling.

Back injury is one of the most common forms of work injury suffered by New Zealanders. A great deal of accident prevention education has been directed towards the reduction of back injury without producing appreciable changes in the incident of such accidents. Much of that education has been directed at teaching people how to lift. (Refer attached poster and pamphlet from the Accident Compensation Corporation).

As a result of research, a vast amount of information now exists on back pathology and spinal mechanics yet still the injury toll goes on. The eduction on lifting techniques must continue but the need now is to switch emphasis on to looking at the work environment to determine whether in any given situation the need to lift exists at all. Design out unnecessary lifting and bending. Order deliveries/make deliveries in packages capable of being lifted in reasonable safety.

The practice of teaching people how backs and spines function and consequently how they should lift is already well established. What is needed is the climate of mind to accept that despite that training people will still lift and carry and lower and handle in ignorance, and that therefore, the workplace must be tailored and changed in recognition of the fact that a worker will commit unsafe acts.

The total income of the Accident Compensation Corporation for the year ended March 1982 was $242,388,617 of which $174,967,836 was received in levy form.

All employers pay a levy based on a percentage of their payroll. The levy varies from industry to industry based on the nature (and accident record) of the industry.

Examples:-	Woollen Mills	$1.30 per $100 of payroll
	Sugar Refining	$1.25 per $100 of payroll
	Clerical Work	.50 per $100 of payroll
	Furniture Manufacture	$1.50 per $100 of payroll.

The Accident Compensation Act provides for the following:-

> "Subject to any regulations made under this Act, the Commission may from time to time, after having regard to the accident experience of an employer or a self-employed person as compared with the general accident experience of employers or self-employed persons in the same class of business and such other factors as it considers

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relevant under the circumstances, in its discretion and on such terms and conditions as it thinks fit, by notice in writing to the employer or self-employed person concerned:-

Either pay to the employer or self-employed person a safety-incentive bonus of such amount as it thinks fit (not exceeding 50 percent of the amount of annual levy on earnings as an employee, or as the case may be, earnings as a self-employed person that that employer or self-employed person was last liable to pay immediately before the date of that notice), or permit the employer or self-employed person to pay a rebated rate of levy (not being below the normal rate for his class by more than 50 percent), on the earnings for such period as the Commission specifies."

(The Act also provides for the imposition of penalties on employers with an accident history which is worse than the general accident experience of employers in the same industry class).

As yet, there has been little experience of payment back to industry of the safety incentive bonus. It is critical that this section of the Act should come into play. It is exactly this type of incentive that will encourage industries to focus on planning the workplace on job design and on the further development of their existing safety programmes.

The introduction of new technology, particularly as it relates to micro-electronic developments, has seen considerable emphasis placed on the ergonomic aspects associated with the change. Predominantly this has focused on the white collar sector (both private and state employees) and the relevant unions have been active in all aspects of change attributable to new technology. The initial involvement of unions originated in concern over redundancy and loss of job opportunity and has extended to retraining, wages, health, safety, workplace design and so on.

The Arbitration Court has determined that any decision by management to introduce technological change into the workplace is a decision for the employer and that that decision is not an industrial matter in terms of industrial relations legislation.

A number of awards now include basic provisions concerning the introduction of technological change. An example is from the New Zealand Clerical Workers' Award:-

"TECHNOLOGY

40(a) When an employer is considering the introduction of new computer technology (including word processing machines) the employees likely to be affected by any decision arising therefrom will be first advised.

(b) When an employer has decided to introduce such technology the employer concerned shall consult fully with the employees affected and the representative of the union.

(c) When the introduction of such technology will result in redundancies, the employer concerned shall notify the union to enable discussions on redundancy to take place. Such notification shall be in accordance with Clause 39 (Redundancy) of this agreement.".

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Beyond that, there are many cases where more detailed agreements have been entered into between individual employers and unions, examples of which are attached to this paper.

Refer:- "Air New Zealand Ltd Clerical Workers' Voluntary Collective Agreement"

"P.S.A. and S.S.C. VDU Agreement"

NOTE - This is an agreement between the Public Service Association and the State Services Commission and relates to government employees.

It will be seen from both these agreements that considerable emphasis has been placed on the ergonomic aspects of the work. I have stated earlier that there is much that needs to be done in the field of ergonomics in the broader working scene in New Zealand. The introduction of silicon chip technology to the New Zealand "office" environment has been the vehicle that has brought ergonomic awareness with it for the employer, for the white collar worker, for the companies selling the technology and for the union representative. Inevitably, this has tended to create a climate of belief that an ergonomist is a person who designs comfortable chairs but that is simply a growth pain that will pass.

Problems associated with the ergonomic aspects of the introduction of new technology were and are basically those that stem from lack of knowledge. It is accepted that an operator will function more efficiently if he/she is comfortable but given that the office already had desks and chairs and painted walls before the installation of VDU's a manager may well wonder at the need for changing those items now that the VDU has arrived. The often adversary roles of union and management have at times, made difficult the reaching of agreement on matters such as work break time necessary as a consequence of the advent of the new technology where that subject is one on which neither manager nor worker representative may have particular expertise. Clearly, knowledge and understanding and acceptance is growing rapidly in this area and that must prove of real benefit subsequently to the broader workforce and their employers.

JET/cbr
27.7.82
First draft

CWL 3-1-4-1

Actual hours of work in developing countries

Explanatory note

The length of time workers spend on the job is one of the most basic conditions of their employment. It determines the time they will have available for rest and recovery, for leisure and family activities, for self-improvement and for participation in the religious, cultural, social and political life of their locality and country. It is hardly surprising, then, that economic progress is usually accompanied by a shorter workweek and an increase in weekly rest, annual leave and holidays.

In developing countries, there are strong reasons to expect that working time will often be very long: low incomes, the weak bargaining positions of many workers, shortages of skilled workers, the need to assure full use of equipment and plant capacity, less stringent or poorly enforced legislation. On the other hand, there are as well many arguments in favour of shorter hours: poor nutrition or health of many workers, difficult living conditions, arduous work, climate, hazardous or unhealthy working environments, etc. These factors are complicated by the existence of high rates of unemployment and underemployment with accompanying intermittent, casual, temporary, seasonal or otherwise irregular patterns of work.

Most of the existing knowledge about the actual length of time workers spend on the job is in the form of fragmentary observations of labour inspectorates about the observance of legislative provisions, scattered collective agreements, occasional official statistics (often restricted to small segments of the labour force) and the comments or claims of various observers, including organisations of employers and workers. There is relatively systematic information available on legislative provisions and partial information on provisions of collective agreements,[1] but almost all this information relates to normal hours of work, which can be quite far from actual hours of work in practice. The Yearbook of Labour Statistics[2] publishes average hours worked (or paid for) where regular national statistical series exist, but few developing countries are included. Moreover, legislation, collective agreements and national statistics often fail to cover precisely those occupations, enterprises, industries, localities, etc. where actual hours might be expected to differ most from the average.

From a policy point of view, additional information on actual hours of work would be very valuable. This information could be used to help monitor the observance of legislation, identify abusive situations, clarify the extent of underemployment, analyse labour productivity and in general contribute to setting social goals and ascertaining the extent of progress toward them.

more "typical" than the average: in this hypothetical example, half the workers worked 48 hours or more and half worked 48 hours or less.

It should be clear that neither the average nor the median shows very much from a policy point of view. Not only do they fail to reveal very much about long or short hours; it can be very misleading to compare averages with each other or to interpret changes in averages without additional information. For example, a rising average could result from a reduction in involuntary short-time work or an increase in the working time of workers who were already experiencing very long hours.

Even in the bar chart, much information is missing. We know that 35 per cent of the workers fall into the category of 46 to 55 hours per week, but this is a relatively broad category. We know nothing about the arrangement of time within the week (length of the working day, hours spent on meals or breaks, weekly rest) or over longer periods (holidays, annual leave). Most important of all, the differences between industries, occupations, enterprises, the public and private sectors, etc. do not appear.

Survey of existing data

As a first step toward clarifying the situation with respect to actual hours of work, a systematic search for existing data will be undertaken. Some of this information will be available at ILO headquarters in Geneva. The statistics collection and other sources in the library, files kept by the Conditions of Work and Life Branch, etc. will therefore be examined. However, a preliminary search has revealed that most of the available information on hours of work in developing countries concerns legislative provisions or statistical averages. Very few examples of the kind of distributional data described in the hypothetical bar chart above are available in Geneva. Such information as is available has usually been gathered through ad hoc surveys in specific industries or localities or in the framework of large labour force surveys undertaken at long intervals. Only rarely are such surveys restricted to hours of work. Most are undertaken by central statistical offices, planning ministries, World Bank teams, etc. concerned with manpower and employment and cover working time only incidentally. Given the lack of full statistical data, in many developing countries the situation with regard to actual hours of work can only be described with partial data or indirect indicators.

In view of the paucity of information in Geneva, ILO field offices will be asked to undertake a search at national level for additional information. The likely sources of such

information and the main types of information sought are summarised in Figure 2 below.

Figure 2: Information search at national level

Likely sources:	Information sought
Statistical offices; planning ministries; manpower departments; employment/manpower planning/labour statistics/ social security/labour administration experts; World Bank teams; reports or studies from all the above.	Statistics on the distribution of hours of work, household surveys including questions on working time, enterprise statistics reporting hours and overtime: if possible by industry and by size of enterprise.
Labour and factory inspectorates, Departments of industrial relations, labour institutes, labour administration/occupational safety and health experts.	Studies on working conditions which include working time, indications of groups which have particularly long hours (e.g. workers outside the scope of legislation).
Employers' and workers' representatives.	Information on hours of work in specific sectors or industries, collective agreements, problems with enforcement of legislation.

N.B. Of course all the sources should be asked about all the different forms of information sought. The figure merely illustrates the more likely results. Other sources should be checked as well, especially when recommended by one of the above examples.

Field studies

Field studies will be undertaken to provide in-depth information on specific situations and to explore the desirability or effectiveness of concrete measures which have been taken to reduce hours of work or to assure that hours are not excessively long.

Each field study will concentrate on actual hours of work in the context of a specific industry and locality. By choosing a locality in which a particular industry is represented by several enterprises, it should be possible to compare and cross-validate data gathered from different sources.

In addition, some of the field studies will relate to a specific attempt to make an improvement or evaluate a proposed change.

The reports of the field studies will be divided into three main parts:

(a) A background report. This will cover national legislation; national, industrial and if possible district statistics; relevant collective agreements or standard practices; enforcement of labour legislation; information on the local population, etc. (15-20 pages).

(b) A field survey. This will provide data on 35 enterprises (standard forms to be provided) and from 120 personal interviews at homes of workers or key informants (standard forms to be provided).

(c) An analytic report on possible means of improvement and related constraints, if possible based on actual cases (15-20 pages).

International comparative study

The information above will serve as inputs to an international comparative study on actual hours of work in developing countries.. A preliminary outline of this study is appended. In addition to the national data and field studies, the comparative study will rely on analyses of the relationship between hours of work and productivity, fatigue and other factors.

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1 D. Maric: La durée du travail dans les pays en voie de développement (Geneva, ILO, 1981).

2 ILO: Yearbook of Labour Statistics (Geneva, ILO, 1981 and previous years).

Annex

Actual hours of work in developing countries

Preliminary outline of an international study

I. Definitions and scope of the study.

A. Definitions of normal and actual hours of work.

B. The scope and distribution of hours of work in developing countries.

C. A preliminary definition of excessive hours of work and exploration of the scope of excessive hours in developing countries.

II. The context of working time.

A. Worker characteristics, incomes, nutrition, health, living conditions.

B. Working environment.

C. Additions to working time (transport time, domestic work, etc.).

III. Pressures favouring longer hours of work.

A. Low incomes, weak bargaining position of workers.

B. Need to assure full use of equipment.

C. Shortages of skilled workers leading to overtime.

D. Seasonal work, intermittent work requiring long waiting periods.

E. Exclusions from legislative protection; problems of enforcement.

F. Per capita taxes, employment security legislation, legislative provisions which do not apply below a certain size of enterprise and other incentives to employers to resort to overtime rather than hire additional workers.

IV. Pressures for the reduction of hours of work.

A. International labour standards and other forms of international pressure.

B. National legislation and its enforcement.

C. Trade unions, collective bargaining.

V. The relationships between working time and economic and social variables.

A. Productivity.

B. Incomes and employment.

C. Fatigue, unmet needs for nutrition, accidents, absence of leisure, absenteeism.

VI. Field studies.

VII. Conclusions, suggestions for action.

Field studies on actual hours of work

NATIONAL BACKGROUND REPORT

The national background report presents a description of the national situation concerning hours of work and related questions. It will provide the necessary context for analysis of the field survey and the case studies which follow.

The first section of the national background report will cover national legislation and its enforcement. Emphasis is to be placed on those legislative provisions which tend to limit actual hours of work (normal hours, restrictions on overtime, overtime premium, minimum daily and weekly rest, holidays and annual leave) and on any exceptions which allow longer hours for particular industries, small firms, specific occupations, etc. The coverage of enforcement will give basic data on the inspectorate (number of inspectors, number of inspection visits per year, geographical distribution of inspectors) and an analysis of the main problems it faces (e.g. too few inspectors, complex legislation, lack of transportation, insufficient prosecution or penalties).

The second section will provide basic data on employment and conditions of work (where they exist). Particularly important are data on the industrial structure of employment, on the number and total employment of enterprises of various sizes, on wages, on industrial accidents and diseases and of course on hours of work.

The third section will supplement the available statistical information on hours of work by reference to collective

agreements, standard practices, studies, etc. It should also contain information from the organisations of employers and workers and from the government regarding the situation, trends and potential for improvement concerning actual hours of work.

A final section will present any information which is available on the relationship of actual hours of work to incomes, productivity, health, safety, employment or other variables which relate to the desirability or feasibility of making improvements. This section should summarise any relevant existing studies.

JMT/cbr
6.8.82

Field studies on actual hours of work

DESIGN OF THE FIELD SURVEY

Introduction

The field survey involves the collection of data on actual hours of work and related subjects through the use of questionnaires. Two questionnaires will be used: Form E (Enterprise Questionnaire) and Form W (Worker Questionnaire). The first will be used to gather information at enterprise level, primarily from management. The second will be used to gather information directly from workers and will only be used outside enterprises.

The field survey report will be completed by two other reports in order to make the complete field study. The first of these is a background report covering national legislation; national, industrial and if possible district statistics; relevant collective agreements and standard practice; enforcement of labour legislation; information on the local population; etc. The second report will examine possible means of improvement and related constraints on the basis of case studies. The field survey will contribute to these two reports by providing relevant statistics and examples. In addition, it will be the subject of a separate tabulation and analysis.

Choice of industries and selection of enterprises

Form E will be used to gather information on 70 enterprises in five industries. For each industry two large enterprise (100 or more workers), four medium-sized enterprises

(20 to 99 workers) and six small enterprises (less than 20 employees) should be included. The industries chosen should be well represented in the country and should account for much of the country's employment. The textile and garment, food and drink, furniture and wood products and metal products industries are likely choices among manufacturing industries, followed by chemicals and chemical products. Among other industries, construction is particularly important and transport or mining could be considered. The final choice of industries should depend mainly on the employment structure of the country. If one industry is particularly dominant and accounts by itself for a substantial proportion of national employment, the number of enterprises in each size category for the industry may be doubled (to 4,8 and 12 respectively) and only four industries covered (but still 70 enterprises). Alternatively, it may be desirable to subdivide a particularly important industry (e.g. by separating the textile [ISIC 321] from the garment [ISIC 322] industry).

Once the industries are chosen, it is not possible to substitute one size of enterprise for another or an enterprise in one industry for an enterprise in another.

The enterprises themselves should be chosen in a random fashion. For the medium and large enterprises it may be possible to use lists from government agencies or employers' associations and then to make a random selection within the size category. For the small enterprises (if many enterprises are not registered) it may be necessary to pick random geographical areas and then search for enterprises.

Selection of workers

The worker interviews are meant to gather information on individual workers in addition to the information in Form E. In addition, they serve as a check on enterprise-provided data.

Six workers should be selected from each large enterprise, three from each medium-sized enterprise and four from each small enterprise. They should be selected randomly from a list of personnel.

The interviews should be carried out outside the enterprise and the workers should be assured that the information they give is confidential. The information collected from workers will not be reported back to enterprises in any form.

If a randomly-selected worker refuses to make an appointment, he should be replaced with another randomly-selected worker.

Supervision

Data collection should be carefully supervised. The supervisor should, among other things, reconduct a random sample of the interviews for both Form E and Form W to assure accuracy.

Summary of data to be collected

INDUSTRY	FORM	SMALL ENTERPRISES (less than 20 workers)	MEDIUM-SIZED ENTERPRISES (20-99 workers)	LARGE ENTERPRISES (100 workers or more
A	E	6 enterprises	4 enterprises	2 enterprises
	W	12 workers	12 workers	12 workers
B	E	6 enterprises	4 enterprises	2 enterprises
	W	12 workers	12 workers	12 workers
C	E	6 enterprises	4 enterprises	2 enterprises
	W	12 workers	12 workers	12 workers
D	E	6 enterprises	4 enterprises	2 enterprises
	W	12 workers	12 workers	12 workers
E	E	6 enterprises	4 enterprises	2 enterprises
	W	12 workers	12 workers	12 workers

Tabulation

Separate forms will be provided for tabulation purposes.

Field studies on actual hours of work

GENERAL INSTRUCTIONS FOR INTERVIEWS

The purpose of the interviews is to collect data on actual working time and related matters by filling out questionnaires. The data will be used along with other information in the preparation of a report and later in the preparation of an ILO international comparative study.

Confidentiality. This information is confidential. Neither the names of individuals nor the names of enterprises will ever be used. No one will be told what any specific person reported to an interviewer. The interviewer should make this very clear at the start of each interview. If the respondent is worried that information will be given to his supervisor or to the labour inspectorate, he or she cannot be expected to answer the questions correctly.

Accuracy. It is very important to be sure the information is accurate. The following steps will help:

(a) Be patient. Allow the respondent to think, to ask questions, to check with someone else if necessary. If the respondent seems confused, go over the question again in different words.

(b) Conduct the interview in surroundings where the respondent feels at home and where interruptions are unlikely.

(c) Before going to the next question, think about the answer to make sure you understand what is meant and that it is reasonable. If something seems wrong, go over it again carefully with the respondent. Do not accuse the respondent

of lying if you think his answer is inaccurate; give him an easy way to change his mind.

(d) Be sure to write legibly and to check over the completed questionnaire before leaving for any missed questions or incomplete answers.

Preparation. Practice using the questionnaire before actually starting your first interview. You should put each item into your own words and be ready for any questions about it.

Problems. If it becomes obvious that an interview will give inaccurate or largely incomplete results, cancel it and replace it with another of the same type. Keep a record of the number of times this is done.

If there is a problem with a specific question, attach a note of explanation to the completed questionnaire.

Do not give the questionnaire to someone to fill out himself. Write down each answer yourself before going on to the next question.

JBT/cbr
6.8.82
Second draft

INTERNATIONAL LABOUR OFFICE

Field studies on actual hours of work

FORM E: ENTERPRISE QUESTIONNAIRE

Before using this questionnaire, please refer to the note on the "Design of the field survey" and the "General instructions for interviews". This questionnaire should be filled out only by the interviewer. The information is confidential. The main source of information should be management, but the managers should know that a separate questionnaire exists for workers and should be encouraged to answer with a worker representative present.

Country: _____

Research Institution: _____ Case No. _____

Interviewer: _____ Date _____

Name of enterprise: _____

Address or location: _____

Industry: _____ Size of firm: _____

* * * * * * * * * * * * * * * * *

A. GENERAL INFORMATION ON THE ENTERPRISE

A1. Main goods manufactured: _____

_____

A2. First year of business operation: _____

A3. Market:

☐ domestic only

☐ domestic and export

☐ export only

A4. Number of employees:

Full-time employees: _____ persons (male: _____, female: _____)

Part-time employees: _____ persons (male: _____, female: _____)

Are there variations by season or other reasons in the number of employees?

☐ yes ☐ no

(describe: _____)

A5. Number of school years attended by the majority of production workers: _____ years.

A6. Length of employment of typical production worker:

Male: about _____ years.

Female: about _____ years.

A7. Prevalent wage system for production workers:

☐ simple piece rate

☐ other piece rate or incentive system

☐ hourly rate

☐ daily rate

☐ weekly or monthly wages

☐ others

(Describe: _____

_____)

A8. Daily earnings of a typical worker (specify the job title):

Male: Earnings _____ per week. Job title: _____

Female: Earnings _____ per week. Job title: _____

A9. Welfare and other services provided by the enterprise:

☐ medical services (doctor or nurse present)

☐ supply of work clothes/uniforms

☐ daily transportation service

☐ nursery/crèche

☐ canteen

☐ shower/bath facilities

☐ dormitory (hostel) (about_____persons)

☐ company-owned houses/flats (about_____persons)

☐ others (Specify:_____)

A10. Income guarantee in the case of sick leave:

☐ not provided

☐ provided (Specify conditions and amount:
_____)

A11. Trade unions:

☐ not present

☐ present Number of unions: _____

Percentage of
workers in union(s):_____%

A12. Average percentage of workers absent from work on a typical work day.

Approximately _____%

Main reasons of absence (Note: if there are any seasonal trends, please describe): _____

_____

A13. Approximate rate of labour turnover of production employees:

Approximately _____persons per month

(or _____persons per year)

B. WORKING TIME

B1. Days of business operation per week:

☐ 5 days

☐ 5 1/2 days

☐ 6 days

☐ 7 days, with interruption

☐ 7 days, continuous

B2. Number of days usually worked by a production worker:

_____days per week.

B3. Hours of standard work week: _____hours.

B4. Normal hours of work: (use 2400 time, e.g. 1.00 p.m. =1300)

_____to _____ (Saturday: _____to_____)
begin end

With rest period(s) and meal breaks of

begin end
_____minutes (_____to_____)

_____minutes (_____to_____)

_____minutes (_____to_____)

B5. Shift system:

☐ not applied (skip B6 to B10)

☐ applied (fill in B6 to B10)

B6.

	Hours	Meal breaks
Morning shift:	_____to_____	(_____to_____)
Afternoon shift:	_____to_____	(_____to_____)
Night shift	_____to_____	(_____to_____)

B7. Do workers ever work two shifts in the same day?

☐ yes _____workers work two shifts on a typical day.

☐ no

B8. Total number of shift workers: _____persons

(male:_____, female:_____)

	Total	Male	Female
In two shifts on a rotation basis:	_____	(_____,	_____)
In three shifts on a rotation basis:	_____	(_____,	_____)

In permanent afternoon shift: _____ (_____, _____)

In permanent night shift: _____ (_____, _____)

In other types of shift systems: _____ (_____, _____)

B9. Describe the usual pattern of rotation of shifts for a worker: _____

(Example: in the case of a three-shift system with morning [M], afternoon [A] and night [N] shifts and restdays [R],

M M M M M M R A A A A A A R N N N N N R
[weekly rotation]

or

M M M A A A R N N N R R [rotation by 4 teams]).

B10. Shift premiums: ☐ yes ☐ no

_____% for afternoon shift (in addition to normal wage)

_____% for night shift (in addition to normal wage)

B11. Average number of hours worked per production worker per week (including overtime):

Roughly _____hours per week.

B12. Entitlement to paid annual leave: _____days per year.

B13. Entitlement to paid public holidays: _____days per year.

B14. Overtime premium: ☐ yes ☐ no

_____% (in addition to normal wage)

B15. Does any worker or group of workers have longer hours on average than the typical production worker?

☐ yes Number of workers _____

Job(s) which are carried out during the extra hours _____

_____

Extra hours per week _____

Extra pay per week

B16. Hours of work, overtime and pay in the most recent week (or pay period, if different).

Job classification	No. of workers	Hours per worker		Wages per worker		
		Normal	Overtime	base	Overtime premium	Total

B17. Are there any setting up, cleaning up or other tasks which are done before or after the paid working hours?

/___/ yes /___/ no.

If yes, how long do these tasks take? _____minutes per day. Describe the tasks _____

_____

B18. Are there any other factors which add to the length of the working day (transport to or from work sites in addition to normal commuting time, particularly dirty work requiring washing up on the workers own time, etc.)?

/___/ yes /___/ no

If yes, how much time is required? _____minutes per day. Describe the factors which add to working time:

_____

_____

C. WORKING ENVIRONMENT

The purpose of this section is identification of any jobs which are particularly heavy, hot, unhealthy, dangerous or dirty. Both questions to management and workers and observation of the workplace should be used.

C1. How many jobs are carried out in particularly hot or humid conditions? _____jobs. Describe the conditions (e.g. next to a furnace, inside a hot shed)_____

_____

C2. How many jobs are carried out with exposure to particularly hazardous conditions (loud noises, chemicals, dangerous equipment, dusts, fumes, possible falling objects,

insecure ladders, etc.) _____ jobs. Describe the conditions: _____

_____

Give any available information on accident rates or industrial diseases: _____

C3. How many jobs involve particularly heavy labour (lifting heavy objects, work in awkward positions, etc) _____ jobs. Describe the conditions: _____

_____.

C4. For any of the jobs described in C1, C2 or C3, are there any extra work breaks? _____ extra breaks totaling _____ minutes during the work day.

FORM W: WORKER QUESTIONNAIRE

Before using this questionnaire, please refer to the note on the "Design of the field survey" and the "General instructions for interviews". This questionnaire should be filled out only by the interviewer. The information is confidential. The main source of information should be workers interviewed outside their place of work.

Country: _____

Research Institution: _____ Case No. _____

Interviewer: _____

Location of workers' home: _____

Date of initial contact: _____ Time: _____

Date of interview: _____ Time: _____

Industry: _____ Size of firm: _____

* * * * * * * * * * * * * * * *

A. INFORMATION ABOUT THE WORKER

A1. Sex ☐ male ☐ female

A2. Age: _____ years

A3. Education: _____ years

A4. Size of household _____ adults and _____ children

A5. Wages: _____ per week (on average)

A6. Total household income _____ per week (on average)

A7. Proportion of total household income spent:

on food _____ % on housing _____ %

A8. Member of trade union? ☐ yes ☐ no

A9. Employed by (company name) _____

A10. Job title/description: _____

_____

A11. Employed at company for _____ years (or _____ months).

A12. Usually works:

☐ about the same hours as the typical production worker in his enterprise

_____ hours per week more

_____ hours per week less

B. INFORMATION ON THE WORKER'S ENTERPRISE

B1. Number of employees:

Full-time employees: _____ persons (male _____, female _____)

Part-time employees: _____ persons (male _____, female _____)

Are there variations by season or other reasons in the number of employees?

☐ yes ☐ no

(describe: _____)

B2. Number of years of school attended by the majority of production workers: _____ years.

B3. Length of employment of typical production worker:

Male: about _____ years

Female: about _____ years

B4. Prevalent wage system for production workers:

☐ simple piece rate

☐ other piece rate or incentive system

☐ hourly rate

☐ daily rate

☐ weekly or monthly wages

☐ others

(describe: _____

_____)

B5. Weekly earnings of a typical worker (specify the job title):

Male: Earnings_____per week. Job title:_____

Female: Earnings_____per week. Job title:_____

B6. Welfare and other services provided by the enterprise:

☐ medical services (doctor or nurse present)

☐ supply of work clothes/uniforms

☐ daily transportation service

☐ nursery/crèche

☐ canteen

☐ shower/bath facilities

☐ dormitory (hostel) (about_____persons)

☐ company-owned houses/flats (about_____persons)

☐ others (Specify:_____)

B7. Income guarantee in the case of sick leave:

☐ not provided

☐ provided (Specify conditions and amount:

_____)

B8. Trade unions:

☐ not present

☐ present Number of unions: _____

Percentage of workers in union(s):_____%

B9. Average percentage of workers absent from work on a typical work day.

Approximately_____%

Main reasons of absence (Note: if there are any seasonal trends, please describe):_____

_____

B10. Approximate rate of labour turnover of production employees:

Approximately_____persons per month

(or_____persons per year)

C. WORKING TIME

C1. Days worked per week:

- ☐ 5 days
- ☐ 5 1/2 days
- ☐ 6 days
- ☐ 7 days

C2. Hours worked per week:_____hours

C3. Normal hours of work: (use 2400 time, e.g. 1.00 p.m.=1300)

_____to_____ (Saturday:_____to_____)
begin end

With rest period(s) and meal breaks of

begin end
_____minutes (_____to_____)

_____minutes (_____to_____)

_____minutes (_____to_____)

C4. Are shifts worked?

☐ yes ☐ no

If yes, what is the shift system worked?

- ☐ two shifts with rotation
- ☐ three shifts with rotation
- ☐ permanent day shift
- ☐ permanent afternoon shift
- ☐ permanent night shift

C5. Shift premiums:

_____% for afternoon shift (in addition to normal wage)

_____% for night shift (in addition to normal wage)

C6. Are two shifts ever worked the same day?

☐ yes _____times a month

☐ no

C7. Entitlement to paid annual leave: _____days per year.

C8. Entitlement to paid public holidays: _____days per year.

C9. Overtime premium:

☐ yes ☐ no

_____% (in addition to normal wage)

C10. When overtime is worked, is it usually (check both if appropriate):

☐ after work for _____hours a day

☐ on a rest day or holiday for _____hours

C11. Typical weekly pay

Basic wage

+ Overtime pay

+ Shift premium

+ Other payments_____(Describe:_____)

Total

- Deductions_____(Describe:_____)

Net pay_____

C12. Are there any setting up, cleaning up or other tasks which are done before or after the paid working hours?

☐ yes ☐ no

If yes, how long do these tasks take?_____minutes per day. Describe the tasks _____

_____

C13. Are there any other factors which add to the length of the working day (transport to or from work sites in addition to normal commuting time, particularly dirty work requiring washing up on the workers' own time, etc.)?

☐ yes ☐ no

If yes, how much time is required?_____minutes per day. Describe the factors which add to working time:

_____

_____

C14. How long does it take to travel from home to work?

_____minutes.

C15. How long does it take to return home from work?_____minutes.

C16. How much time is spent each week in work activity not included in the job described above (second job, paid odd jobs, making goods for sale at home, etc.)?_____hours.

D. WORKING ENVIRONMENT

D1. Is the job carried out in particularly hot or humid conditions?

☐ no

☐ yes. Describe the condition (e.g. next to a furnace inside a hot shed) _____

_____

D2. Describe any exposure to particularly hazardous conditions (loud noise, chemicals, dangerous equipment, dusts, fumes, possible falling objects, insecure ladders, etc.):

_____

_____

D3. Describe any particularly heavy part of the job (lifting heavy objects, work in awkward positions, etc.):_____

_____

D4. For any of the conditions desoribed in E1, E2 or E3 are there any extra work breaks? _____extra breaks totalling _____minutes during the work day.

D5. Describe any recent accidents or work-related health problems (last two years):_____

_____

_____

the severity of fines and other sanctions; and general legislative provisions relating to the requirement to register enterprises, to keep records, to allow inspectors to enter, etc.

b) Is the enforcement machinery adequate? This question concerns the number of inspectors relative to the number of enterprises and workers; the adequacy of inspector training; the availability of transportation, offices, supplies, etc. for inspectors; the effectiveness of machinery for the prosecution of violations of the legislation; etc.

c) Is full advantage being taken of opportunities to improve the effectiveness of enforcement? Among the possibilities are co-operation with employers' organisations and trade unions; joint programmes with other ministries (industry, public works, mines, agriculture); public information campaigns; and changes in the roles of inspectors.

In answering the above questions, a case study has the advantage of examining some particular problem or possibility in depth. If the country is considering a legislative change or is already examining possibilities for improved enforcement, it may be possible to take advantage of this to carry out a case study. Alternatively, it could be very interesting to study the resources, procedures and effectiveness of the inspectorate in two different regions or districts.

Case studies at enterprise level

The feasibility of reductions in hours of work is in large part an enterprise-level question. Differences in the

hours of work practiced at enterprise level should relate to a number of key variables: organisation and efficiency of the enterprise, productivity, wages, etc. By selecting enterprises at which hours of work differ, but which operate under similar conditions (e.g. the same industry and size of firm), it should be possible to make comparisons which help to identify the underlying causes of excessive hours and the potential for improvements. In addition to "matched pairs" of enterprises, it may sometimes be possible to study a single enterprise "before and after" hours of work are reduced.

Once the enterprises have been identified and the practices concerning hours of work systematically explored with both employers and workers (Form E and Form W for the field survey should be used), the case study should focus a number of issues concerning shorter hours of work, including:

a) The impact on productivity and total production. There is some evidence that reductions in hours of work lead to rationalisation of work methods and greater efficiency. Exploration of this issue requires measurement of the production per worker (per hour of work). In addition it requires an examination of the use of working time (e.g. the proportion of time during which the worker is physically present but not working).

b) The impact on wages and incomes.

c) The impact on work-related accidents and diseases.

d) The impact on the workers' use of time (i.e. are the shorter hours used for leisure or for alternative work activities) and

e) The feasibility of generalising the shorter hours.

ERGONOMICS AND SAFETY

David E. Brown
International Labour Office

As you are aware, the International Labour Office has for over 60 years been concerned with the protection of the worker against sickness, disease and injury arising out of his employment and one of the tools that we use in this unceasing effort to make work safer is the multi-disciplinary science of Ergonomics (or Human Factors Engineering). Today I propose to discuss briefly how the application of Ergonomic principles can reduce the occurrence of accidents and injuries in industry.

Let us start by looking at Ergonomics itself. Ergonomics is concerned with the relationship between man and his work, or the wider environment. Obviously, we cannot have an injury unless a human being is present, this is the first point to note and the second is that machinery is responsible for a large number of the more serious injuries which occur at work. So let me confine my opening remarks then to this relationship between man and the machine.

Man Machine Relationship

In order to understand this relationship, let us consider a relatively simple machine, a typewriter, as it will illustrate the relationship of which we should be aware. The preparation of this Paper like all the others presented at this Workshop had to meet a deadline. It was typed on an electric typewriter operated by my secretary and this Paper displays some of the basic roles and relationship between man and the machine.

This electric typewriter consistently produced clear, easily readable print which is in sharp contrast with the poor legibility and the variability of my handwriting. However, when my secretary had trouble with the ribbon operation the machine could not repair itself and it required her understanding, examination and recall of previous similar experience to clear the fault. But once corrected the machine operated without showing any of the anxieties which she felt lest it should break down again nor my

concern lest the Paper would not be completed by the agreed deadline.

A typewriter is a relatively simple machine but nonetheless even complex machines have characteristics which (still) differ very considerably from modern man so that each has distinct advantages in any situation. There is a relationship and each has its own role to play. Let us examine very briefly, those characteristics of man that differentiate him from the machine.

Man, who tends to use two primary senses, sight and hearing, can use others as well, but can only concentrate fully on one of his senses, sensory inputs we call them, at a time, this he can recognise and often "hold" against the "noise" or disturbance of unwanted signals. He can learn, that is he can change his behaviour and practice by trial and error and by transfer of previous training, for example, the radio-mechanic can quickly understand radar; his learning rate being highest for simple tasks, for tasks which are more fully understood, and for those tasks where he enjoys "feedback", that is an indication of how successful he is in learning the new task. But his motivation can be affected by fatigue, boredom and anxiety, thus changing the quantity and quality of his work.

Let us look first at man as a sensor, that is his ability to receive information through his senses. His range in the various sensory fields is somewhat limited, he cannot, for example, pick up gamma rays or radio waves but within his own range he can display high discrimination. He can smell some air contaminants at the level of 1:2 parts per million which no machine can yet do; the Occupational Hygienist's most sensitive test for certain gases is still his own sense of smell. Man can also, as noted above, hold a wanted signal against interference, for example, you can hear the voice in a telephone receiver against all the background interfering noises being produced around you. He is also superior to a machine at recognition of similar patterns such as looking for an amoeba below a microscope when it may have been sliced in various planes while being mounted on the slide. Man can also give meaning to the incomplete, a skilled doctor does not necessarily require a complete examination to form a diagnosis.

Turning to man's ability to process data, man's speed of recall is slow compared with that of a machine although he is superior in being able to recall generalised patterns and use logical induction. In addition he does not need extensive programming as a machine does. In fact he develops his own programmes, is more flexible, and can deal with the unforeseen exercising judgement, showing the ability to recall relevant facts and methods when presented with a task. He requires no special coding as the machine does.

Now looking at man as a controller we note that the physical forces that he can exert are extremely limited compared with a machine and he is slow in making controlled movements. He takes longer than a machine and he shows considerable time delay in making those movements. He is limited in the range of his physical movements and the precision with which he can apply a given force is limited, so also is the time during which he can apply a given force and man, unlike some machines, is easily overloaded.

As to the working environment, while machines can be designed to operate within wide variations of environmental conditions, man's requirements are such that he can work efficiently (if indeed at all) only within rather limited environmental conditions.

Incidentally it is worth noting at this stage in the history of mankind, that man and the machine should not be regarded as competitors but rather the best design sought which will allow each to be the complement of the other. With this thought in mind the roles of each emerge and these can be summarised roughly as follows. The machine would be used for routine tasks involving calculation and the storing of large numbers of facts and details as is exemplified by computers, carrying out calculations or controlling other machines such as automatic lathes. Similarly the machine will be used where large amounts of data have to be sorted and screened e.g. card sorting equipment or tape recorded recall systems for library abstracts. Where large forces have to be applied quickly and smoothly again the machine excels. Machines are preferable for making routine decisions which must always be made in the same way, for example, a ticket vending machine in a railway station. And where the environment is likely to involve stresses the machine can be designed to stand up to these

better than the human. The ticket vending machines are much less affected by intense heat, icy winds than human operators would be if exposed to the same environment. In industry a similar condition sometimes occurs where a machine replaces the man as far as the collection of information is concerned. In certain very noisy areas in the conveyor system of car production, where an inspector would be exposed to excessive noise, a television camera conveys the view to the man who can watch while remaining within an environment for which he is designed. Again, within a gamma ray cell for the irradiation of grain, television cameras can be used where a human being would receive a lethal dose of radiation. Automatic telephone exchanges operate with speed and accuracy which man cannot achieve, and the force required to operate the main tail controls of an aircraft has to be power assisted as no man unaided can provide the force required to pull the plane out of a stall dive.

Man, then, is superior in such situations as the fine discrimination of signals in "noisy" situations as, for example, on radar screens; for pattern recognition and discrimination in a changing field, as for example the examination of micro-organisms under an electron microscope; where discrimination and judgement must be shown as for example rejecting faulty packets of biscuits using fluoroscopic examination; for the flexibility required in maintenance and repair work; for problem solving requiring logical induction; as a monitor with over-riding capabilities in automatic and semi-automatic systems such as on oil refinery plants and in atomic power stations.

Man can also be used where alternative modes of operation may be called for during an operation.

The highly complex man-machine systems of space craft such as the Apollo space vehicles provide many examples of these situations where the machine or the human astronauts were superior and so were given the dominant role. The crowning achievement of the first moon landing illustrates this, when, in the last vital seconds, man had to over-ride the space vehicles own landing system and use human judgement and intelligence to make possible a safe landing on unexpected terrain.

Man Machine Safety

So we see man is indeed endowed with great abilities; he can reason and work out logical conclusions; he can learn in various ways, by repetition or by trial and error; he has a sense of smell which for certain substances is far more sensitive than the most advanced scientific instruments. He can detect the light of a match 50 miles away on a clear night. There are many such examples, illustrating man's great abilities in certain activities.

But, in other activities we have seen his abilities are limited. To point out the obvious, a man can only lift a comparatively small weight, he can only reach out his hand a certain distance, an object has to be fairly large before he can see it clearly. And when it comes to memory, man does not do very well at all, for he has quite a limited ability to sotre and recall facts and figures. How often do you have to check a telephone number you use quite frequently because you cannot quite remember the exact figures.

Another limitation of human beings we have noted is that they tend to be rather slow in moving controls, at least when compared with machines. This may not have mattered a great deal in the past but today when you consider for example the speed of modern aircraft it can matter a very great deal. By the time the pilot of a supersonic jet begins to make a decision, has made the decision and then moves the aircraft controls, that supersonic jet will have travelled quite a long distance.

Another of man's limitations shows up when he tries to learn a new way of carrying out an already familiar routine, he has difficulty, and he often makes mistakes. For example, when you have learnt the gear positions on your car you can change gears quickly and easily without apparently thinking, and then you change over to a new car with different positions for the gears it takes quite some time and effort to learn the new positions. Or, if your horn button was on the end of the trafficator arm on your old car and on your new one it is a ring within the steering wheel, even when you think you have become quite accustomed to the new arrangement

and you very suddenly need to sound the horn, it is likely that you may go back to the end of the trafficator arm - to where the horn button was located on your first car.

When it comes to directions of movements of controls, man has inherited or learnt a whole set of expected directions of movement associated with the initial control movement - (what are called population movement stereotypes). For example, when we turn our car steering wheel clockwise we expect the vehicle to turn to the right and similarly when we turn a water tap anticlockwise we expect the water to start to run out of the tap.

Man is also restricted by the environmental conditions. The hotter the environment the more difficult it is to work. On steel rolling mills in some parts of the world it is quite common to work ½ hour on and then rest for ½ hour. Man cannot work at all in very hot conditions or very cold conditions. Even within the comparative cold of cold storage warehouses fork lift truck drivers seldom drive for more than 20 minutes before coming out to warm up. If they work longer than 20 minutes the accident rate with their fork lift trucks goes up noticeably.

Man cannot stand up to very loud noise, or excessive vibration.

Man begins to make errors if the partial pressure of oxygen falls off or when the carbon dioxide content of the air rises above about 1.5%.

These are just a few of man's limitations and fixed tendencies. Now, it should be emphasised that when an engineer comes to design a machine to be operated by a human being, since the abilities and limitations of the human being cannot be changed - even with special training or acclimatisation human abilites can only be changed a very small amount - since these abilities and limitations of the human being cannot be changed <u>then the machine should be designed to fit the man</u>. The levers to be pulled or pushed should be well within the operator's strength, the temperature and pressure recorders to be read should have digits designed for easy and accurate reading, the direction of movements to be controlled should fit in with human stereotype movements - the expected directions of movement.

In the past not a great deal of thought was given to the need to design the machine or pieces of equipment to fit the worker, to design the machines so as to obey the natural laws of work and man, that is the Ergonomic relationship. In fact one cynic said that the only law obeyed on some machines is the law of gravity!

Now the human being appears to operate most efficiently at or about a certain point within a range of conditions and, as we move away from the optimum point, errors creep in and gradually increase until a condition is reached where the human being cannot operate at all. If the workers on the steel rolling mills continue to expose themselves to the high level of radiant heat for a long time they would soon make mistakes, would probably injure themselves and ultimately they would collapse from heat exhaustion.

Similarly, the fork lift drivers would begin to make more errors if they kept on working beyond the 20 minute spell in the cold storage warehouses, and ultimately we could expect a serious accident to occur.

As another example, the human body can operate efficiently with only a small amount of carbon monoxide in the blood such as is found in cigarette smokers. But increase the carbon monoxide content and soon the man makes errors and if that man happens to be piloting an aircraft the results could be disastrous. This is indeed what is believed to have happened in one of air disaster where a pin-size hole in the heating system allowed carbon monoxide to escape into the flight deck. The pilot misread certain instruments as a result; and crashed the plane into mountains, killing everyone on board.

This is the basic problem, if the machines or equipment are not ergonomically designed so as to be within the range of ability of the human operator, then the human operator will make errors in using the machines or equipment.

And if the working environment is not within certain ranges of temperature, lighting, noise and vibration and so on, likewise the operator will begin to make errors and have accidents.

If the working situations are not ergonomically satisfactory then the human operator may, for example, misread the number of a dial because the digits were not big enough, or the ratio of width to height of the digit was unsatisfactory so that certain digits could not be easily distinguished from each other.

Or he may not notice a dangerous pressure developing because there were far too many dials to look at and far too many pressures and temperature and flow rates and so on to remember. I recall in the late 1940's operating what was then the world's largest distillation unit in an oil refinery in the Middle East. In the control room alone there were about 150 dials, lights, controllers and gauges to be watched. They were located all around the control room so that the operator almost required to have eyes in the back of his head. They were nearly all different and the markings and digit shapes and size varied widely from one instrument to another.

Or the human operator may, in a moment of emergency, push the wrong control button because that was where the stop button used to be located on the previous model of the machine which he operated.

Some of these errors will have very minor results. Some will lead to damage to plant, some to more serious accidents and some to injuries and even deaths.

Aircraft have crashed because the pilot operated the wrong control level of two identical control levers located close together.

The writer once had to shut down a large unit in the refinery referred to above because a valve manufacturer had chosen to design his valve to close when it was turned in an anti-clockwise direction contrary to what other manufacturers had done. There were 18 valves on a stretch of pipe-line, 17 opened when turned anti-clockwise and one closed. It took 3 supervisors and 8 hours of work at night to find this out.

So this is a basic need, as highlighted by Ergonomics; an environment such that the worker operates at his most efficient and with least errors, and machines and equipment likewise designed to fit the worker's abilities and make allowances for his limitations. Provide this and production will benefit and the work will be carried out safely. Fail to provide this and production suffers, there will be damage to plant and product and to the worker himself through damage to his health and through personal injury.

NOTES FOR MAIN SPEAKERS

1. IT IS PROPOSED TO DEVOTE ONE HALF DAY SESSION OF 3 HRS TO YOUR PAPER AND ITS SUBJECT AND THE DISCUSSION THAT FOLLOWS.

2. THE SUGGESTED PROCEDURE IS:

   (A) AT THE BEGINNING OF THE SESSION YOU SPEAK ON YOUR PAPER FOR APPROXIMATELY 20 MINUTES OR SO.

   (B) THIS WILL BE FOLLOWED BY DISCUSSION IN WHICH ANYONE CAN TAKE PART, AND THERE MAY OF COURSE BE SOME SPECIFIC QUESTIONS PUT TO YOU WHICH YOU CAN ANSWER THEN OR LATER AS YOU WISH.

   (C) THERE MAY ALSO BE SOME SHORT PREPARED COMMENTS BY ANY ONE OF THE (APPROXIMATELY 12) PARTICIPANTS AS THEY WERE ASKED TO BRING BRIEF STATEMENTS, FOR PRESENTATION DURING THE WORKSHOP.

   (D) YOU CAN OF COURSE JOIN IN THE DISCUSSION AS YOU WISH.

   (E) BUT YOU WILL BE GIVEN THE LAST 10 MINUTES OF THE SESSION TO MAKE ANY SPECIAL COMMENTS OR TO REPLY TO ANY POINTS RAISED EARLIER.

3. AFTER YOUR SESSION, WILL YOU PLEASE PREPARE AS SOON AS POSSIBLE A 1-2 PAGE SUMMARY OF THE SESSION DISCUSSION NOTING IN PARTICULAR ANY CONCLUSIONS OR PROPOSALS ON WHICH THERE WAS GENERAL AGREEMENT.

PROF PHOON AND MR BROWN WILL TAKE TURNS IN CHAIRING THE SESSIONS.

PIACT: An Approach to the Improvement of Working Conditions and Environment

Working document for the ILO Asian Regional Workshop on the Role and Potential of Ergonomics for Improvement of Working Conditions and Environment (Singapore, 13-16 September 1982)

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INTRODUCTION

This working paper first describes the International Programme for the Improvement of Working Conditions and Environment (PIACT) and its general relevance to Asia. It then describes some of the concepts and means of action which are being developed within PIACT to support new initiatives of member States of the ILO[1].

PIACT: The International programme

Conditions of work and occupational safety and health have always been central concerns of the ILO. In the last five years, the Organisation has sought to give a new orientation and a new impetus to its action in these fields through the launching of the International Programme for the Improvement of Working Conditions and Environment (PIACT). The programme had its origin in the Report of the Director-General to the 60th Session of the International Labour Conference on Making Work More Human. That report was aimed at reinvigorating both ILO action and action within member States on an issue which, as the Director-General observed, there had been a temptation "to put off to a better tomorrow". The Conference welcomed this initiative and unanimously adopted a resolution supporting the new programme suggested by the Director-General and solemnly reaffirming that "the improvement of working conditions and environment and the well-being of workers remains the first and permanent mission of the ILO".

After thorough technical preparation and discussion with members of the ILO's tripartite constituency, intergovernmental organisations and specialists from various circles, detailed proposals on an international programme for the improvement of working conditions and environment were submitted to the Governing Body, which at its November 1976 Session approved the broad lines of the programme.

This programme, which has come to be known as PIACT after its French initials, represents a blend of continuity and innovation. Its technical scope covers some of the earliest preoccuptions of the ILO together with some of the newest problems and concerns; its methods of action combine the traditional tools of the ILO with a new approach designed to reinforce their effectiveness in practice.

The approach is new in many ways. Chief among them are that:

- it encourages member States to set definite objectives for the improvement of working conditions and environment;
- it seeks to use in a co-ordinated fashion the different means of action of the ILO to help member States attain these objectives;
- it treats problems of working conditions and environment globally, articulating more closely than before, for example, the traditionally separate fields of conditions of work and occuapational safety and health; and
- it views these problems in the wider context of general economic and social policy.

Under this approach, the scope of working conditions and environment is very broad. It includes safety and health in the work process and at the workplace; ergonomics; hours of work and other problems of working time; specific aspects of remuneration, such as payment by results; work organisation and content; working conditions and choice of technology; and the living environment as it relates to work. The general objective of PIACT can be divided under three main heads, namely:

- work should respect the worker's life and health;
- work should leave free time for rest and leisure;
- work should enable the worker to serve society and achieve self-fulfilment by developing his personal capacities.

Which of these areas, and which of the vast range of specific subjects and problems they encompass are of most immediate concern, will necessarily differ from country to country. The choice of priorities, objectives and methods of action must depend on the level of development, the employment situation, the availability of resources, and other factors.

PIACT is designed to take full account of this diversity: one of its fundamental aims is to bring ILO action on working conditions and environment as close as possible to reality. For this reason, PIACT is bound to have a strong national and regional emphasis. The exchange of experience and information, the review of objectives and of progress made in reaching them, the examination of difficulties and obstacles, the orientation of ILO activities in countries with

similar problems - all this can be done concretely and realistically at the regional level. Hence the importance of discussion at advisory committee meetings and regional conferences.

PIACT means of action

The launching of PIACT, with its emphasis on national policies, multidisciplinarity, global approaches and co-ordinated means of action, has led to the development of innovative means of action as well as the reinforcement of those which already existed. The most important means of action are described below.

National policy formulation

In the resolution concerning future action of the International Labour Organisation in the field of working conditions and environment adopted unanimously by the International Labour Conference in 1975, to which reference has already been made, member States were invited "to promote the objectives of an improvement of working conditions and environment with all aspects of their economic, educational and social policy". National policies and development planning are thus a central theme in the PIACT activities of several Asian countries.

Those countries which have chosen to develop national policies within the framework of PIACT have in general begun with a national tripartite seminar or multidisciplinary team. These devices have encouraged tripartite participation in the formulation of policies and the setting up of standing tripartite machinery to oversee follow-up of the seminar and implementation of the policy. National seminars have been held in Bangladesh, India, Indonesia, Sri Lanka and Thailand. Preparations are under way for other countries.

The national seminars and multidisciplinary teams have covered a wide range of information-gathering and analysis in a variety of specific work situations. Reports have covered, for example, various industries, activities of labour inspectorates and occupational safety and health specialists, small and large enterprises and rural areas.

The content of these national policies, of course, varies from country to country, but certain similarities represent emerging trends in the priorities and means of action preferred in Asia for

the improvement of working conditions and environment. One interesting trend is a broadening of the scope of concern of labour administrations. The policies and recommendations tend to include some reference to agricultural work, agro-industry, the urban informal sector, small enterprises and similar work situations which traditionally have been difficult to reach and often have been ignored. In line with this broadening of scope, numerous references are made in these policies to inter-ministerial co-operation, particularly with ministries responsible for industry, agriculture, health and development planning. Since the problems in rural areas are often different from those in industry, some new areas of concern are also mentioned, including nutrition, poisoning from fertilisers and insecticides and ergonomic design of agricultural implements and work methods.

Much of the analysis which has been required to develop policies and programmes for the improvement of working conditions and environment has been multidisciplinary. Contributions have been made from specialists in occupational hygiene, ergonomics, safety engineering, industrial psychology, labour law, economics and other disciplines. This multidisciplinary approach has been applied at the national seminars described above and in numerous other activities. One of the more interesting of these is the multidisciplinary team of consultants, a novel form of technical co-operation called for by the 1975 resolution and offered by PIACT since it became operational. In some cases the terms of reference of such teams have been very broad and they have played a policy development role related to that of the national seminars described above. In other cases the focus of the team's activities was narrower and the selection of specialities involved was consequently more limited.

Improving working conditions and environment through technological choice

The potential to improve working conditions and environment through appropriate technological choice has been an emerging theme in various PIACT activities.

If technology is appropriately chosen and adapted, it can provide opportunities to combine the social objective of improved working conditions and environment with the economic objectives of employment generation and increased productivity. For example, a project on appropriate technology in Philippines forestry illustrated

that certain intermediate technologies for various forestry activities led not only to employment promotion and productivity but also to better posture, less arduous tasks, fewer safety hazards, reduced hours of work - that is, to improved working conditions and environment.

Improving working conditions and environment through action based on productivity improvement

The objectives of improvement of working conditions and environment, in addition to their humanitarian justifications, are known in many cases to make valuable contributions to national economies. The control of heat stress, the scheduling of work to provide adequate rest and recovery time, the provision of adequate lighting, the prevention of dust, the proper seating of workers, the adjustment of machine controls and displays to human factors, the economisation of effort, pre-employment and periodic medical examinations, industrial feeding and nutrition and other principles of improved working conditions and environment are important but rarely recognised necessities for better and higher production through the improvement of work efficiency.

Training and information activities

The activities undertaken within PIACT have clearly demonstrated the key role of training in any strategy to improve working conditions and environment. Training is required at all levels; this includes national policy-makers, financiers, employers' organisations and trade unions, management at the enterprise level and workers on the shop-floor, technical specialists and professionals (engineers, doctors, occupational hygienists, etc.), labour inspectors, industrial and agricultural extension workers, farmers, social security administrators, etc. These many different categories who require training must be reached through the involvement of different institutions and the use of different training methods.

Training methods vary in approach, emphasis and duration. A considerable part of the training would be imparted at school as part of general education; as part of learning particular skills in polytechnics or vocational training institutions; or included in the curricula for doctors, engineers, economists, psychologists, sociologists, etc. Therefore, depending on the target group, the content of the training could be highly specialised in-depth treatment of a specific area or simple information from various disciplines concerning the most urgent problems. This means that different

training materials need to be developed to answer various training needs.

In order to develop more effective training methods and to extend training activities in the diagnosis of problems of working conditions and environment and the implementation of improvements, the ILO, through PIACT, has developed and begun testing an "Introduction to the study of working conditions and the working environment". Given the severe shortage of specialists in training in working conditions, particularly in developing countries, training should also be imparted by other persons who might play a useful role in this field but are hindered by lack of awareness, technical expertise or teaching materials. Recognising the multiplier effect of the "training the trainers" approach, this guidebook endeavours to satisfy the needs of four main categories of actual or potential trainers: specialists in training in other aspects of work (vocational training, management training, labour administration, industrial relations, etc.); trade union officials and staff engaged in workers' education; supervisory staff of undertakings and officials in employers' organisations; and labour inspectors, whose role, particularly in developing countries, is to contribute to the improvement of working conditions by helping with information and advice rather than by merely imposing sanctions.

International co-operation

Improvement of working conditions and environment is fertile ground for international co-operation. The earliest and one of the most effective possibilities in this area is the development of international standards ensuring that competitive advantages in international trade are not based on the exploitation of working people.

In the formulation of new or revised standards, increasing efforts are being made to introduce the degree of flexibility necessary for wide implementation while maintaining the substantive content that gives the standards meaning. For example, the International Labour Conference adopted in 1981 the comprehensive and flexible instruments on safety and health in the working environment whose purpose is to lay the foundations for a national policy to establish, as far as possible, a total and coherent system of prevention, taking into consideration the present-day realities of the working world. This is designed to encourage all member States to promote the progressive

Unlike standard-setting activities, technical co-operation has, by and large, played far too little a role in ILO action for the improvement of working conditions and environment. Some significant programmes and projects have, of course, been carried out, especially in occupational safety and health. Usually the scale of those projects has been small as, in general, technical co-operation has been a secondary form of action in this field. PIACT is intended to correct the balance. It is designed to encourage full participation by governments, employers and workers in the definition, preparation and implementation of new policies for the improvement of working conditions and environment.

Improved technical co-operation and co-ordination of research and activities at regional level could specifically include:

- the preparation or revision of legislation;
- the reinforcement of inspection services and other administrative structures;
- the compilation and publication of labour statistics;
- the preparation of instructional materials, the insertion of conditions of work elements in training projects and other measures to provide education and training to persons concerned with conditions of work and occupational safety and health matters in government, industry and trade unions; and
- the development of special projects for rural workers and other priority groups, industries or sectors.

Activities in some of these areas are much more developed than in others. The ILO is working to promote projects and programmes which cover some of the more important gaps.

International co-operation, co-ordination of research and exchange of information can be particularly effective if they rely on technical co-operation among developing countries.

Tripartism and the institutional framework

The above means of action encouraged within PIACT should not result in losing sight of the importance of tripartite machinery or of the crucial role of labour administration and inspection. All PIACT activities naturally aim at strengthening tripartite mechanisms: this is a basic purpose of the present seminar.

The role of employers and workers and their organisations is vital. To enable them to play their full role, the provision through workers' education, management development and assistance to employers' and workers' organisations of information, advice and training related to working conditions and environment is indispensable.

In co-ordinating the action of governments and employers' and workers' organisations and in formulating policy, much can be achieved through tripartite machinery. Several African countries use standing or ad hoc tripartite bodies to discuss policy, determine priorities, prepare legislation and generally seek a consensus on major problems and possible solutions. Tripartite machinery with more specific tasks also exists in some countries. The tripartite approach to the solution of problems is especially relevant to the field of occupational safety and health, in which joint action by government, management and workers is almost always necessary for the creation and implementation of effective and realistic programmes. A substantial contribution has been made by tripartite safety councils which carry out promotional activities, such as the production of posters and pamphlets, the holding of safety weeks or educational activities such as the organisation of training courses and lecture sessions; or even operational activities, such as the provision of safety consultants. The strengthening of tripartite machinery of different kinds, or its creation where none exists, will be an invaluable means of pursuing the objectives of PIACT.

A DYNAMIC MODEL OF WORKING CONDITIONS AND ENVIRONMENT IMPROVEMENT

The diagram below illustrates some of the basic steps in an on-going system for the improvement of working conditions and environment. It consists of four main steps: planning, implementation, monitoring and evaluation. Each of these activities has an important function in the development, operation and improvement of policies and projects in this field.

As the arrows indicate, these activities are meant to be carried out in a dynamic way. That is, each activity is carried out continuously and is related constantly to the other activities through the feedback loops shown.

It should be kept in mind that this is an extremely simplified model, intended only to illustrate certain activities which may not always be thought about during the consideration of working conditions and environment improvement. The categories of activities are very general, and apply to a broad range of projects, programmes and policies. For example, the activities could be carried out by an enterprise-level working conditions and environment committee, by a national-level committee or by an institution such as a ministry of labour.

Planning. It seems trivial to say that one should begin by planning, but it is surprising how rarely this is done in a serious way. Moreover, there is a tendency to assume that a planning exercise is something to be gone through one time, after which it can be forgotten. The lack of a serious planning group in continuous operation is one of the most common weaknesses, for example, of ministries of labour. This usually means that any new PIACT-oriented activities cannot rely on an existing planning framework. In fact, one important PIACT activity could be to set up an appropriate planning function.

Planning should be based on accurate information about the existing situation. In the field of working conditions and environment, this is almost never available. Accurate statistics on such subjects as the number of workers in various categories, the number and size of enterprises in different industries, the rates of occupational accidents and diseases, the length and arrangement of working time, etc. are necessary at national level. Even within enterprises, in developing countries it is rare to find accurate statistics on absenteeism, turnover or even occupational accidents. To be fully useful, such information is required for specific occupations, which is almost never the case.

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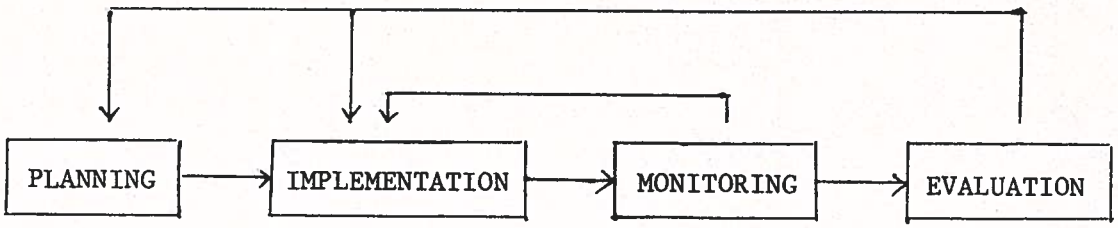

Statistics	Legislation	Statistical reporting	Goals reached?
Surveys	Enforcement	Referrals	New priorities
Research	Collective bargaining	Use of time	New means of action
Pilot-studies	Training	Tripartite feedback	
Goal-setting	Vocational training Management training Workers' education Training trainers Public information Information exchange Cross-training of inspectors Checklists Interministerial co-operation		

Where statistics are not available or are of poor quality or otherwise inappropriate, sample surveys can be a very useful planning technique. A survey of enterprises in a sample geographic areas complemented by a survey on a household basis can give much useful information. The results of such surveys should be compared, for contradictions are often useful sources of information. For example, if the number of enterprises registered with the Ministry of Industry is larger than the number of enterprises registered with the Ministry of Labour, there may be a serious problem of registration, especially since the Ministry of Labour definitions are usually broader. If the length of working time reported by enterprises is shorter than that which emerges from household surveys, the enterprises may well be understating the length of working time.

Another important planning function is research. The need for research is almost always underestimated, with two important results: new means of action are rarely developed; and nation-wide programmes are sometimes started without a limited trial. In overcoming these problems, a particularly important form of research is the pilot study or case study. Such studies need to be completed by more general analytical research into the location, severity and causes of the most important working conditions and environment problems.

A final planning activity of considerable importance which is almost always neglected is that of goal setting. A plan of action without concrete goals does not give a proper basis for evaluation. In setting goals, it is very important to have a clear picture of the existing situation as a base line, and it is equally important to have a good idea of the likely effects of the means of action which have been chosen. Thus, the setting of a concrete goal such as a reduction in the number of occupational accidents for a specific industry or category of workers, or a reduction in hours of work in small enterprises, require both reasonably good statistics and some pilot research. Goal setting is therefore the basis of planning.

Implementation. The many different problems of working conditions and environment in developing countries require an array of possible means of action. The appropriateness of different means of action will vary from country to country and from context to context. This section lists some means of action which can be considered in programmes for the improvement of working conditions and environment.

Two means of action are particularly important in that they exist in almost all countries and they usually form the primary means whereby working conditions and environment are determined. These are the enactment and enforcement of legislation, and collective bargaining. Many means are available to strengthen national legislation and the enforcement operations of the inspectorate, as also to make collective bargaining more effective in this area.

Two important principles for the design of PIACT activities should be mentioned. The first of these is that measures for the improvement of working conditions and environment should be designed

in relation to the concrete problems of the working population of the countries concerned. These concrete problems have multiple characteristics. For example, a worker may be exposed simultaneously to occupational hazards, long working hours, physically demanding work, a difficult working environment and an absence of appropriate social services. Under these conditions, appropriate action - whether through legislative or other means - can only be established by a multidisciplinary analysis which takes into account the various factors involved. Otherwise, there is a risk of ignoring the most important problems or even of exacerbating some problems while solving others. Moreover, a multidisciplinary approach is required to assure that the proposed solutions will in fact be effectively applied.

The second important principle in the design of PIACT activities is that of leverage of multiplier effects. It is commonly agreed that in most developing countries the number of inspectors, technical experts, and other persons necessary to implement effective improvement programmes is extremely limited. It is therefore necessary to choose means of action which multiply to the greatest extent possible the quantity and quality of the actions of these individuals. Such means of action include:

(a) The inclusion of working conditions and environment concerns in vocational training programmes, management training programmes, workers' education and other training activities. To the extent that instructors for such training programmes have themselves received training concerning working conditions and environment, a multiplier effect may be applied (the training the trainers approach);

(b) The use of public information and information-sharing activities. Public information activities may reach a much broader audience of employers and workers than would be possible through inspector visits. Information exchange activities can extend the effectiveness of reports, training materials and other information through sharing them;

(c) the use of cross-trained inspectors. It is often the case that only one inspector will visit an enterprise over a period of years. In such cases, it is important that this inspector pays attention to various working conditions and environment concerns. One effective way of assuring this is the development

of checklists which specify the various concerns and give information both about possible corrective measures and about cases which should be referred to technical experts;

(d) interministerial activities. In many countries various ministries other than the ministry of labour have the potential to play an extremely important role in labour protection. In addition to the obvious cases of the Ministry of Industry for industrial workers and the Ministry of Agriculture for rural workers, joint activities can be envisaged with ministries of public works (construction activities), public health (occupational health), trade (concerning transfers of technology), etc. It is usually very important to involve the Ministry of Planning.

Monitoring. It is surprising how many activities are carried out without careful and continuing monitoring of their effects. In the short run, it is difficult to see how performance can be improved without reasonably frequent and accurate feedback concerning the actual rate of implementation and its impact. This is reflected in the diagram by the feedback loops between monitoring and implementation.

As noted earlier, statistics are invaluable in providing a means of monitoring progress. However, it is necessary to do more than just monitor the statistics which are produced concerning accidents, hours of work, etc. In addition, the quality of such statistics must be monitored. It is not at all uncommon for an improvement in reporting procedures to result in an increase in the number of reported accidents or in the reported cases of excessive hours of work. This may mean that reporting is getting better rather than the situation getting worse. A very careful monitoring process is needed to differentiate between these two possible interpretations.

In the particular case of ministries of labour, it is also necessary to monitor the effectiveness of the activities of inspectors and other personnel. This can be done by examining, for example, the number of inspection reports produced, the categories of problems to which the reports refer, the number of cases in which there are referrals to specialised experts and, in general, by an examination of the use of time of inspectors and other personnel (proportion of time used in general inspections, answering complaints, follow-

One of the most important ways of monitoring the implementation of activities for the improvement of working conditions and environment is through tripartite feedback mechanisms. This is sometimes done through a formal device such as a standing tripartite committee, but it can also be done through regular contacts with trade unions and employer organisations. In either case, it is necessary to assure that the national organisations of employers and workers have thoroughly informed their membership about the need for feedback concerning the effectiveness of various programmes or projects.

Monitoring also is required at enterprise level. The procedures in this case are usually much simpler, but it is nevertheless necessary to assure that the necessary channels of communication are open.

Evaluation. From time to time, preferably at regular intervals decided in advance, it is necessary to undertake a full-scale evaluation exercise, not to be confused with the monitoring activities described above. The purpose of such an exercise is to answer three basic questions:

- Have the goals established in the planning stage been reached?
- Are there any new priorities?
- Are any new means of action available?

Of course, it may be the case that a new problem will emerge with such force or a new means of action with such manifest effectiveness that they should be immediately taken into account. In a sense, evaluation can be an ad hoc or even a continuing activity. However, it is also necessary to schedule larger evaluation exercises as a means to focus attention on the over-all effectiveness of existing activities.

The answers to the three questions listed above may require only minor changes in existing programmes or they may require a major new planning exercise. Thus the diagram shows feedback loops both to planning and to implementation.

Getting started. One question which immediately arises from the circular structure of the design model presented schematically above is where to begin. It would be possible to begin with planning, but then of course it can always be argued that an evaluation

of existing activities is necessary prior to the planning process. Evaluation, however, presupposes both concrete goals set in a planning process and experience over time in implementing programmes and monitoring them in order to realise these goals. The ILO's promotional and support activities within the framework of PIACT are designed to overcome these dilemmas. As an example of how this could be done, the action of a multidisciplinary team followed by a national tripartite conference can be considered. Multidisciplinary teams have usually been able to assist countries in exploring the possible elements of a national policy for the improvement of working conditions and environment. The teams are in a position to give a relatively objective view of the existing situation and to propose priorities and means of action which are likely to be effective. The multidisciplinary teams cannot, however, establish priorities by themselves. Such priorities should be based not only on the objective conditions of the national situation but on the priorities established at the national level for various historical and subjective reasons. While a multidisciplinary team can do analytic work, the national policy which results should be locally appropriate and therefore capable of attracting the support of the various parties concerned. One way of assuring the appropriateness of a policy is to use a national tripartite seminar as part of the process of establishing it. This gives all those concerned an opportunity to express their views and priorities. At the same time, it provides an opportunity to associate many different persons and institutions with the policy development process and thereby to mobilise the necessary resources to implement the policy. This is not merely a question of raising the awareness of the various participants and observers present at a seminar. The new policy is likely to require the active participation of various ministries and other institutions and it will almost certainly require new resources. The use of multidisciplinary teams and national tripartite seminars has proved particularly effective in achieving this mobilisation.

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1. For further information, see especially ILO: Asian Development in the 1980's Report of the Director-General to the Ninth Asian Regional Conference (Manila, December 1980) and the Resolutions

"ERGONOMICS in a changing environment"

M. Mizuno
Manpower Development Manager
Mobil Sekiyu K. K.
Tokyo, Japan

For many years since its establishment, the ILO has been greatly contributing to the improvement of working conditions and the environment through the development of international conventions and recommendations backed up by research work in various fields including Ergonomics.

Ergonomics has been especially well known for its important role in analyzing humans from a physiological viewpoint and in applying the results to job design.

In Japan, after the first technical innovation period from the end of the 1950's to the early 1960's, Ergonomics has been firmly established in industry, supported by the gradual progress of friendly cooperation and mutual understanding between employers and employees and of employers' consideration for effective management and administration of people.

Experience has shown that the application of Ergonomics should be considered in relation to the economic growth level and degree of urgency for economic growth, industrial relations, actual living standards, etc. Also, we should recognize that we are likely to misunderstand that Ergonomics is applicable to any related thing because of its scientific approach.

Based on the above, when we discuss it from an international viewpoint, the level of application of Ergonomics in a certain country is to be determined by the government, employers and employees of that country after considering the economic situation and industrial relations environment.

On the other hand, our environment has been rapidly changing. For example, as shown in Table 1, the total number of employed persons in primary industries has

decreased by 27.5% during the past 26 years and we now have 90% in the secondary and tertiary industries. Also, significant technical changes have been observed in these two types of industries.

Table 1

BREAKDOWN OF THE TOTAL NUMBER OF EMPLOYED PERSONS

Year	Total	Primary Industry	Secondary Industry	Tertiary Industry
1955	40.90million	15.36	9.97	15.57
	(100%)	(37.5%)	(24.4%)	(38.1%)
1965	47.30 million	11.13	15.07	21.09
	(100%)	(23.5%)	(31.9%)	(44.6%)
1975	52.23 million	6.61	18.41	27.10
	(100%)	(12.7%)	(35.2%)	(51.9%)
1979	54.79 million	6.13	18.81	29.76
	(100%)	(11.2%)	(34.3%)	(54.3%)
1980	55.36 million	5.77	19.26	30.20
	(100%)	(10.4%)	(34.8%)	(54.6%)
1981	55.81 million	5.57	19.39	30.74
	(100%)	(10.0%)	(34.7%)	(55.1%)

Source: Prime Minister's Office, Labor Force Survey.

Notes: (1) Primary Industry — Agriculture, forestry, and fishery.
Secondary Industry — Mining, construction, and manufacturing.
Tertiary Industry — Wholesale and retail, finance, insurance, real estate, transportation, communication, electricity, gas, water, services, and public service.

(2) The total for each year does not necessarily agree with the sum of the breakdown figures, because the breakdown figures have been rounded off and the total includes figures for industries not classified as in the above.

Table 2 shows that the average weekly work hours per employee have been shortened by nearly three hours in the manufacturing field during the last decade and hourly wages have increased 3.5 times during the same period.

Table 2

AVERAGE WEEKLY SCHEDULED WORKING HOURS PER WORKER (MANUFACTURING INDUSTRY)

(hours : minutes)

	Average	More than 1,000 Workers	100 to 999 Workers	30 to 99 Workers	Hourly Wages (for reference)
1969	44 : 30	42 : 46	45 : 12	46 : 32	¥286.8
1970	44 : 02	42 : 07	45 : 05	46 : 53	335.9
1971	43 : 56	41 : 50	44 : 59	46 : 51	388.2
1972	43 : 44	41 : 31	44 : 46	46 : 48	451.7
1973	43 : 06	40 : 54	44 : 04	46 : 19	563.3
1974	42 : 00	40 : 00	42 : 43	45 : 25	748.0
1975	41 : 35	39 : 42	42 : 10	45 : 11	866.6
1976	41 : 29	39 : 32	42 : 09	44 : 59	932.8
1977	41 : 35	39 : 39	42 : 15	45 : 13	1,016.0
1978	41 : 32	39 : 36	42 : 17	45 : 08	1,079.7
1979	41 : 25	39 : 29	42 : 06	45 : 03	1,121.3
1980	41 : 14	–	–	–	1,194.3

32,24 FF

1.326 AV

Source: Ministry of labor. General Survey on Wages and Working Hours System.

Notes: 1) For 1969 to 1971, figures were estimated by Nikkeiren.

2) Wages in the reference column represent wages per actually worked hour by production workers in manufacturing industry.

5→36/m

To cope with such changes, employers have introduced factory and office automation and we are now entering the "robot age."

Under these circumstances, employees are subjected to a high level of pressure and stress which may lead to low motivation and even mental abnormalities.

For example, in an oil refinery, the only thing highly educated refinery engineers have to do now is to simply watch a panel of gauges. However, they are required to handle problems in an emergency by effectively utilizing their skills and knowledge of refining technology. To relieve this tension and stress, many companies have some light physical exercises outdoors twice a day and some of them organize small groups to discuss better ways of managing their refinery instruments and how to better the quality of the refinery products (Q.C. circle activities.)

In such a changing environment, Ergonomics obviously has a much more important role to maintain and improve the quality of working life of employees. At the same time, however, we should emphasize the aspects of employees' mental and psychological conditions to find ways for them to relax and to motivate them to meet organizational requirements.

As stated above, for better job satisfaction for employees, we should not forget to analyze the mental and psychological aspects of humans. Otherwise, we will lose the effectiveness of Ergonomics.

The ILO has an advantage with many specialists in both fields of Ergonomics and personnel management. We hope the ILO will integrate and harmonize Ergonomics with all aspects of the management of people, such as management innovation, industrial relations, job design, job enrichment, etc.

With these ILO activities, we can envision our next step, that of achieving the challenging objectives of PIACT.

MINISTÈRE DES UNIVERSITÉS
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Département des Sciences de l'Homme au Travail
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THURMAN
SINGAPORE
Sept 82

Should ergonomics for developing countries emphasise work design (see attached distinction between Tayloristic and "alternative" work design principles)?

If so, population data are needed on power distance, need for affiliation, etc. and enterprise data are needed on worker-supervisor interaction, worker co-worker interaction, etc. Is this practical?

On the other hand, is the anthropotechnological approach really a solution allowing "alternative" organisation design?

Advantages of alternative design:
- lower absenteeism, turnover
- flexibility in work processes (very important in developing countries)
- skill acquisition of population

But:
- higher initial cost
- more demanding on management
- violates privileges of high-power groups (supervisors)

Tayloristic design principles:

- fill work time with productive activity
- minimise training time required
- minimise skill requirements (minimise wage bill)

⇒ one worker, one job
one job, one ~~skill~~ simple skill
responsibility, communication, decision-making
by management only

alternative work design principles:

- jobs include both operations and responsibilities, cooperation, communication, decisions
- multi-skilling, careers
- group work, group responsibilities
- completion of meaningful work (closure)

11 September 1982

ILO Asian Regional Workshop on the Role and Potential of Ergonomics for Improvement of Working Conditions and Environment, Singapore, 13 - 16 September 1982

Welcome to Singapore!

The following are the arrangements for the Workshop:

Registration of Participants

Monday, 13 September 1982	0900 am	Registration Counter (1st Flr)

Opening Ceremony

Monday, 13 September 1982	0930 am	Conference Rm 'A' (1st Flr)

ILO Reception

Monday, 13 September 1982	1730 pm - 1900 pm	1st Floor Reception area

W. O. Phoon

A.M. (S'pore), M.B., B.S. (Malaya),
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Dr. W. P. Wan
Sen. Lecturer

6th July 1982

Professor W. O. Phoon
Head Department of Social Medicine
Faculty of Medicine
University of Singapore
OUTRAM HILL SINGAPORE 0316

Dear Pr Phoon,

I have learned with much pleasure that you are the coorganizer, with Dr Purswell, of the Singapore Workshop on Ergonomics. I enjoy this occasion to know your country and your laboratory.

My contribution will arrive very late, for I am informed only since a week, of the exact nature of the subject I have to discuss.

Would you be so kind to reserve for me a single room at the residence where we attend the meeting. I will arrive sunday 12th September and leave Friday morning (and not evening as it is written in my travel schedule). I would like also to receive the name, address and phone number of the residence.

I send you, under the same cover, a book composed of a few papers of mine written or translated in english.

Truly yours,

A. Wisner

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Réf. BIT/ILO nº PIACT 1-0-158-6

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Monsieur le Professeur A. Wisner,
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Département des Sciences de
l'Homme au Travail,
41, rue Gay-Lussac,
75005 PARIS (France)

20 APR 1982

Cher Professeur et Ami,

Je vous remercie de votre lettre du 8 janvier 1982 - dont j'ai pris connaissance il y a à peine quelques jours - et de l'envoi du fascicule d'antropotechnologie que je compte lire attentivement et - j'en suis convaincu - avec profit.

Lors de mon récent voyage à Mexico, j'ai découvert que le Gouvernement mexicain s'intéresse au Colloque international sur l'ergonomie et souhaiterait étudier la possibilité de l'organiser au Mexique. Une réponse officielle nous sera envoyée d'ici à la mi-mai. Quant à l'Inde, le ministère du Travail s'est déclaré dans l'impossibilité de se charger de l'organisation de cette réunion.

Vous recevrez dans les jours qui viennent l'invitation officielle concernant votre participation à l'atelier sur l'ergonomie qui se tiendra à Singapour (12-16 septembre 1982). Je vous remercie d'avoir d'ores et déjà accepté de nous aider.

Veuillez agréer, cher Professeur et Ami, l'expression de mes sentiments cordiaux.

G. Spyropoulos,
Chef du
Département des conditions et
du milieu de travail.

aaw.0072 (3)

22nd.12. 1982

Monsieur A.S. SUNGAIMIN
MP Div - MINDEF
Personnel Research Dept
Departure Hall
Paya Lebar Airport
SINGAPORE 1953

Dear Sir,

Thank you for your letter of 7/12/82. I am not sure to have completely understood your question.

Anyway, I send you a book where my last paper written in english have been collected. Some are related to mental load and fatigue. We have lot of other texts written in french; but I am not sure that you read my language.

With my best regards.

Truly your,

A. WISNER

Cable Address:
Your Reference :
Our Reference : MINDEF 4-0(5)/24

Date : 7 Dec 82

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et D' Ergonomie
41 Pue Gay-Lussac
75005, Paris
France

Dear Prof A Wisner,

I am a psychologist working at Ministry of Defence, Singapore. I have been doing a research on Skill Fatigue and Human Performances. Unfortunately, there are very few studies, literature or articles on such nature that can be found here. Therefore, I hope you could assist me on my research by sending a copy of your studies,if any, or related articles in these fields. Perhaps, you can also direct me as to who to consult in this particular field. In addition, I have been searching for a method to measure "Skill Fatigue" or "Mental Fatigue".

I am looking forward to hear from you in the near future. Thanking you for your assistance.

Yours sincerely,

A. Sungaimin

ANDREAS S. SUNGAIMIN

NOTE: I got your address from ILO ASIAN Regional Workshop or Ergonomics Conference held in Singapore, 1982.

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41 Rue Gay-Lussac
75005, Paris
FRANCE

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del 7.12.82

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MR ANDREAS S. SUNGAIMIN
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Paya Lebar Airport
Singapore 1953

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Prof. A. Wisner
Ministère des Universités
Conservatoire National des Arts et Métiers
Laboratoire de Physiologie du Travail et d'Ergonomie
41, rue Gay-Lussac
75005 PARIS
(France)

Dear Professor Wisner,

I have pleasure in sending herewith the report of the Asian Regional Workshop on the Role and Potential of Ergonomics for the Improvement of Working Conditions and Environment which you attended in Singapore last September.

I hope that you will find it useful for your future work in this field. Further copies are available if you should require them.

I should like to take this opportunity of expressing once again my appreciation of your collaboration in yet another PIACT project to achieve our common goals of the improvement of working conditions and environment everywhere. I hope that we will have many more opportunities of working together towards this purpose.

Yours sincerely,

G. Spyropoulos,
Chief,
Working Conditions and Environment Department.

INDIA 5
INDONESIA 2
JAPAN 3
NZ 1
PAK 1
PHIL 2
SING 2
GB 2
F 1
VS 1
SW 1

ILO ASIAN REGIONAL WORKSHOP ON THE ROLE AND POTENTIAL OF ERGONOMICS FOR IMPROVEMENT OF WORKING CONDITIONS AND ENVIRONMENT, SINGAPORE, 13-16 September 1982

31

ASIA 25

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Date : 7 Dec 82

REPUBLIC OF SINGAPORE

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Laboratoire de Physiologie du Traxail
et D' Ergonomie
41 Pue Gay-Lussac
75005, Paris
France

Dear Prof A Wisner,

I am a psychologist working at Ministry of Defence, Singapore. I have been doing a research on Skill Fatigue and Human Performances. Unfortunately, there are very few studies, literature or articles on such nature that can be found here. Therefore, I hope you could assist me on my research by sending a copy of your studies,if any, or related articles in these fields. Perhaps, you can also direct me as to who to consult in this particular field. In addition, I have been searching for a method to measure "Skill Fatigue" or "Mental Fatigue".

I am looking forward to hear from you in the near future. Thanking you for your assistance.

Yours sincerely,

A. Sungaimin

ANDREAS S. SUNGAIMIN

NOTE: I got your address from ILO ASIAN Regional Workshop or Ergonomics Conference held in Singapore, 1982.

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Ministère des Universités
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41, rue Gay-Lussac
75005 PARIS
(France)

Dear Professor Wisner,

I have pleasure in sending herewith the report of the Asian Regional Workshop on the Role and Potential of Ergonomics for the Improvement of Working Conditions and Environment which you attended in Singapore last September.

I hope that you will find it useful for your future work in this field. Further copies are available if you should require them.

I should like to take this opportunity of expressing once again my appreciation of your collaboration in yet another PIACT project to achieve our common goals of the improvement of working conditions and environment everywhere. I hope that we will have many more opportunities of working together towards this purpose.

Yours sincerely,

G. Spyropoulos,
Chief,
Working Conditions and Environment Department.

INDIA 5
INDONESIA 2
JAPAN 3
NZ 1
PAK 1
PHIL 2
SING 2
GB 2
F 1
VS 1
SW 1

ILO ASIAN REGIONAL WORKSHOP ON THE ROLE AND POTENTIAL OF ERGONOMICS FOR IMPROVEMENT OF WORKING CONDITIONS AND ENVIRONMENT, SINGAPORE, 13-16 September 1982

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ASIA 25

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