OCCUPATIONAL SAFETY AND HEALTH IN DEVELOPING COUNTRIES: REVIEW OF STRATEGIES

Christer Hogstedt and Bodhi Pieris

University of Massachusettes, Lowell, in the United States

Abstract

Approximately 45% of the world's population and 58% of the population over 10 years of age belong to the global workforce, i.e. 60-70% of the adult male and 30-60% of the adult female population of the world. The percentage is even higher when home-work and informal work are taken into account. This global workforce sustains the economic and material basis of society, which is critically dependent on their working capacity. The effects of globalization on occupational safety and health have recently been described by Rantanen (1999, 2000 b). Making working conditions safe and healthy is in the interest of workers, employers and governments, as well as the public at large. Although it seems simple and obvious, this idea has not yet gained meaningful universal recognition. Hundreds of millions of people throughout the world are employed today in conditions that breed ill health and/or are unsafe (WHO 1999). The paper therefore is an attempt to review the strategies adopted in implementing occupational health and safety in selected countries in the third world.

Introduction

Each year, work-related injuries and diseases kill an estimated 1.1 million people worldwide, which roughly equals the global annual number of deaths from malaria.

250 million occupational accidents result in more than 300 000 fatalities annually. Many of these accidents lead to partial or complete incapacity to work and generate income.

Annually, an estimated 160 million new cases of work-related diseases occur worldwide, including respiratory and cardiovascular diseases, cancer, hearing loss, musculoskeletal and reproductive disorders, mental and neurological illnesses.

An increasing number of workers in industrial countries complain about psychological stress and overwork. These psychological factors have been found to be strongly associated with insomnia, depression and fatigue, and burn-out syndromes, as well as with elevated risks of cardiovascular diseases.

Only 5-10% of workers in developing countries and 20-50% of workers in industrial countries (with a few exceptions) are estimated to have access to adequate occupational health services. In the USA, for example, 40% of the workforce of some 130 million employees do not have such access.

Even in advanced economies, a large proportion of work sites are not regularly inspected for occupational health and safety.

The health status of the workforce in every country has an immediate and direct impact on national and world economies. Total economic losses due to occupational illnesses and injuries are enormous (WHO 1999).

The International Labour Organization (ILO) has estimated that in 1997, the overall

economic losses resulting from work-related diseases and injuries were approximately 4% of the world's Gross National Product.

In 1992, the direct cost paid out in compensation for work-related diseases and injuries in European countries, reached 27 000 million ECUs.

In 1992, total direct and indirect costs associated with work-related injuries and diseases in the USA were estimated to be US$ 171 000 million, surpassing those of AIDS and on a par with those of cancer and heart disease.

According to a statement by occupational health institutes collaborating with the WHO (1995) the most important challenges for occupational health for the future will be:

Occupational health problems linked to new information technologies and automation; new chemical substances and physical energies; health hazards associated with new biotechnologies; transfer of hazardous technologies; aging working populations; special problems of vulnerable and underserved groups (e.g. chronically ill and handicapped), including migrants and the unemployed; and, problems related to growing mobility of worker populations and occurrence of new occupational diseases of various origins**.**

The ultimate objective of occupational health is a healthy, safe and satisfactory work environment and a healthy, active and productive worker, who is free from both occupational and non-occupational diseases and who is capable and motivated to carry out his or her daily job and is able to experience job satisfaction and develop both as a worker and as an individual. Thus, occupational safety and health can be defined as a multidisciplinary activity aiming at:

- protection and promotion of the health of workers by eliminating occupational factors and conditions hazardous to health and safety at work
- enhancement of physical, mental and social well-being of workers and support for the development and maintenance of their working capacity, as well as professional and social development at work
- development and promotion of sustainable work environments and work organizations

The overall exposure pattern

There is a wide variation in economic structures, occupational structures, working conditions, work environment, and the health status of workers in different regions of the world, in different countries and in different sectors of economies. There are also special occupational settings and types of enterprises, where work and workplace deviate substantially from the norm.

Accidents and physical and chemical agents are the main problems in manufacturing industries, while pesticides and organic dusts, heavy physical work, biological factors and accidents are the occupational burdens of agricultural workers. A number of studies show that in the worst conditions 50-100% of the workers in some hazardous industries may be exposed to levels of chemical, physical or biological factors that exceed the occupational exposure limits applied in the industrial countries. (WHO 1995).

The least developed countries that still employ the major part of the workforce in agriculture and other types of primary production face occupational health problems that are different from those experienced in the industrial countries. In the least developed countries the

occupational factors are aggravated by numerous non-occupational factors such as parasitic and infectious diseases, poor hygiene and sanitation, poor nutrition, general poverty and illiteracy.

Small-scale industrial and service enterprises often have few resources, heavy workloads and multiple tasks for each worker. Work usually takes place in an environment that does not always meet required standards. Family members of the entrepreneurs and workers, including children, pregnant women and elderly people, share the work in small-scale enterprises, such as home industries, small farms and cottage industries, particularly in developing countries. In such situations, most workplace exposures also affect family members because most of the time is spent in the combined home and work environment. It has been estimated that two thirds of the workers of the world still work in conditions that do not meet the minimum standards set by ILO.

Detailed information on occupational exposures can be found in a number of recent textbooks (e.g. Levy, Wegman, eds, 2000). This paper presents a modified and up-dated summary from a WHO document (1995).

Accidents

Mechanical factors, unshielded machinery, unsafe structures at the workplace and dangerous unprotected tools are among the most prevalent hazards in both industrial and developing countries. They affect the health of a high proportion of the workforce. Most accidents could

be prevented by applying relatively simple measures in the work environment, working practices, and safety systems and ensuring appropriate behavioural and management practices. This would significantly reduce accident rates within a relatively short period of time. Accident prevention programmes are shown to have high cost-effectiveness and yield rapid results. However, unfortunately, ignorance of such precautions, particularly in sectors where production has grown rapidly, has led to increasing rates of occupational accidents (WHO 1995).

Prevention is the only sustainable strategy for controlling the accident epidemic. Some countries can demonstrate very positive effects of accident prevention programmes. For example, in the 20-year period between1973 and 1993, Finland was able to reduce its number of accidents by 68%. In Sweden, the development was even more positive: an 85% reduction in fatal accidents between 1955 and 1995 and a 72% reduction between 1975 and 1995 (Rantanen 2000).

Chemical and organic exposures

About 100,000 different chemical products are currently in use in work environments, and the number is increasing constantly. The extent of exposure varies widely according to the industry, activity and the country.

Metal poisoning, solvent damage to the central nervous system and liver, pesticide poisoning, skin and respiratory allergies, cancers and reproductive disorders are among the health effects of such exposures. Pesticide exposure is the major chemical hazard in developing countries

where personal protection is particularly difficult and other preventive means should be implemented (Wesseling et al 1997). The major threat posed by pesticides in many developing countries is acute poisoning itself. A recent estimate by the WHO puts the annual number of severe poisonings at 3 million, with about 220,000 deaths.

Sweden has had only a few new cases of silicosis or asbestosis during the last decade. This is due to the fact that a major national campaign was launched in the 70s on the prevention of dust exposures with high content of silica and the banning of asbestos import in 1975. However, asbestos-induced mesothelioma and lung cancers continue to occur and the incidences have even increased due to long induction periods for cancer. Eventually, the incidence will decrease to null. Furthermore, it has been estimated that in the future, the present occupational exposures in Sweden will cause less than a hundred cases out of 40-50 000 total cancer cases annually (Järvholm, ed, 1996).

Biological agents

Many biological agents, viruses, bacteria, parasites, fungi, moulds and organic dusts have been found to occur in occupational exposures. In the industrial countries around 15% of workers may be at risk of viral or bacterial infection, allergies and respiratory diseases. In many developing countries the number one exposure is to organic and biological agents. The Hepatitis B and Hepatitis C viruses and tuberculosis infections (particularly among health care workers), asthmas (among persons exposed to organic dust) and chronic parasitic (particularly among agricultural and forestry workers) are the most common occupational diseases that result from such exposures (WHO 1995).

Physical exposures

Workers may be exposed to several physical factors such as noise, vibration, ionizing and non-ionizing radiations and microclimatic conditions that are known to affect their health. Noise-induced hearing is one of the most prevalent occupational diseases in both developing and industrial countries, although many preventive means are available. Preventive strategies have also been developed for other physical factors, particularly for localized vibration and ionizing radiation.

During the 1990´s there was intense concern about the possibility of increased cancer risk from electromagnetic fields (EMF). There may also be a small risk increase of leukemia among children, but the exposures have to be high (NIEHS 1999). It is still too early to evaluate the potentially harmful effects of the exposure to cellular phones and large research efforts are ongoing.

Ergonomics and musculoskeletal exposures

Between 10% and 30% of the workforce in industrial countries and between 50% and 70% in developing countries may be exposed to heavy physical workload or to unergonomic working conditions such as lifting and moving of heavy items or repetitive manual tasks. Repetitive tasks and static muscular load are found in many industrial and service occupations. In many industrial countries musculoskeletal disorders are the main cause of both short-term and permanent work disability, which can cause economic losses that may amount to 5% of the GNP.

Most exposures can be eliminated or minimized through mechanization, improvement of

ergonomics, and better organization of work and training. In particular, the growing numbers of elderly workers and the female workforce require constant vigilance from those responsible for the work organization.

Psychosocial exposures

Up to 50% of all workers in industrial countries judge their work to be “mentally heavy”. Psychological stress caused by time pressure, hectic work, and risk of unemployment has become more prevalent during the past decade (Isaksson et al 2000). Other factors that may have adverse psychological effects include jobs with heavy responsibility for human or economic concerns, monotonous work or work that requires constant concentration. Others are shift-work, jobs with the threat of violence, such as police or prison work, and isolated work.

Psychological stress and overload have been associated with sleep disturbances, burn-out syndromes, stress, nervousness and depression. There is also epidemiological evidence of an elevated risk of cardiovascular disorders, particularly coronary heart disease and hypertension. The EU Commmission has recently distributed a guide on work related stress, subtitled "Spice of life or kiss of death" (EU 2000). The guide provides a checklist for work related sources of stress, recommendations for and examples of successful intervention programs.

Occupational safety and health management and strategies

Occupational diseases and injuries are, in principle, preventable. Among the approaches to preventing these include, developing awareness of occupational health and safety hazards

among workers and employers, assessing the nature and extent of hazards, and introducing and maintaining effective control and evaluation measures. Sometimes these approaches are undertaken solely by employers and workers within a specific workplace. Other times external involvement is needed. This can range from encouragement by appropriate individuals or agencies outside the specific workplace to the promulgation and rigorous enforcement of occupational health and safety regulations.

Working conditions, type of work, vocational and professional status, and geographical location of the workplace also have a profound impact on the social status and social wellbeing of workers. Historically, occupational health programmes have been developed handin-hand with the improvement of social conditions for underserved and unprivileged workers. Although there is an abundant literature on more or less simple solutions to many work place hazards, e.g. in the ILO Encyclopaedia on Occupational Health and Safety (Stellman, ed, 1998), societies need adequate, systematic approaches to manage and make sure that such solutions are implemented.

UN agencies

There are several agencies dedicated to improving occupational safety and health. The most important of these are the International Labour Organization (ILO), and the World Health Organization (WHO). Occupational safety and health was also an important issue for the United Nations Conference on Environment and Development (UNCED). The UNCED adopted Agenda 21, in Rio 1992. The Agenda also has a section that discusses the increased role of workers and trade unions. Among the targets to be reached by the year 2000

mentioned in this chapter were:

- to promote the right to establish trade unions
- to promote ratification of relevant ILO-conventions
- to establish mechanisms with two and tripartite composition for safety, health and sustainable development
- to increase the number of treaties between the labour market partners on the environment
- to reduce the number of work accidents and occupational diseases and to improve the statistical reporting of those
- to increase training for employees, particularly in occupational safety and health

A five year evaluation of the results of the UNCED process was performed in 1997 at a special UN General Assembly meeting (UNGASS) but the more long-term evaluation remains. The WHO summarized the health experiences for the 1997 meeting.

The International Labour Organization

The *International Labour Organization* (ILO) is a member of the United Nations family of organizations whose special mandate is the promotion of safe and decent work in all countries of the world. The ILO formulates international labour standards in the form of Conventions and Recommendations, which set minimum standards of basic labour rights. To be effective those standards must be adopted by the member countries and implemented in practice.

The ILO Conventions and Recommendations on occupational safety and health define the rights of the workers and allocate duties and responsibilities to the competent authority, the

employers and workers in the field of occupational safety and health. The policy on occupational health and safety is essentially contained in two international Conventions and their accompanying Recommendations. They provide for the adoption of a national occupational safety and health policy and describe the actions needed at the national level and at the enterprise level to promote occupational safety and health and to improve the working environment.

The ILO Occupational Health Services Convention 1985 (No. 161) and Recommendation (No. 171), provide for the establishment of occupational health services which will contribute to the implementation of the occupational safety and health policy and will perform their functions at the enterprise level.

A major objective of the ILO in relation to occupational safety and health, is to enable countries to extend social protection to all groups in society and to improve working conditions and safety and health at work through its InFocus Programme which covers working conditions. The objectives of the SafeWork Programme are, 1) to create worldwide awareness of the dimensions and consequences of work-related accidents, injuries and diseases; 2) to promote the goal of basic protection for all workers in conformity with international labour standards; and 3) to enhance the capacity of member States and industry to design and implement effective preventive and protective policies and programmes.

The Programme aims to create worldwide awareness of the dimensions and consequences of work-related accidents, injuries and diseases; to place the health and safety of all workers on the international agenda; and to stimulate and support practical action at all levels. The

programme will conduct research, statistical work and media-related activities, and will support national action through a global programme of technical assistance. The Programme will promote, as a policy and operational tool, the value of prevention as an efficient and costeffective way of providing safety and health protection to all workers.

The Safe Work Programme will focus on hazardous work and give primary attention to workers in especially hazardous occupations in sectors where the risks to life and safety are manifestly high, such as agriculture, mining and construction, workers in the informal sector, and those occupationally exposed to abuse and exploitation, such as women, children and migrants. It will adopt an integrated approach, including non-traditional aspects of workers' health and safety such as stress and HIV-AIDS.

Within the ILO is also the International Safety and Health Information Centre (CIS) in Geneva, Switzerland. The major objective of CIS is to be a worldwide service dedicated to the collection and dissemination of information on the prevention of occupational accidents and diseases.

The World Health Organization and the Global strategy for occupational health for all

The *World Health Organization,* since its inception in 1948 has recognized the utmost importance of improving the health status of working populations and has been developing international cooperation in this area. WHO has a strong network of collaborating centres. It also has an occupational health programme with emphasis on data collection and analysis,

research, formulation of strategies and recommendations for hazard prevention and control, human resource development with special emphasis on developing countries. However, in terms of staff, occupational health is not demonstrated as a high priority for WHO.

Wide experience from many countries show that a healthy economy, high quality of products or services and long-term productivity are difficult to achieve in poor working conditions with workers who are exposed to health and safety hazards. The available scientific knowledge and practical experiences of enterprises and countries, which have achieved the best results in the development of occupational safety and health indicate the value of several principles.

Because of the numerous health problems associated with work, the need for occupational health is evident in all countries including the least developed ones. The way to solve such problems may, however, vary substantially according to the national and local needs and conditions, cultural influences, resources and other local factors. Regional cooperation between neighbouring countries for training, research and information could be resource saving and a step towards establishing effective national systems.

A network of occupational health institutes assigned as WHO collaborating centers published in 1995 a "*global strategy for occupational health for all*" with 10 priority objectives, later adopted by the World Health Assembly. These objectives are presented below.

Strengthening of national policies for health at work and development of policy tools

Major traditional occupational health needs prevail among the global workforce. In addition, due to the rapid changes in economic structures, technologies and demography, new occupational health needs have appeared and should be taken into consideration in policies.

National policy and programmes for the further development of occupational health should be reviewed and prepared in collaboration with government and social partners. Special concern should be devoted to enhance the possibilities to integrate the continuous improvement of the work environment in the overall development of enterprises and organisations.

Successful prevention requires: a) information on the causal relationship between risk factor and health outcome, b) knowledge of the mechanism of action of hazardous factors and conditions, c) knowledge of how the causal relationship can be broken, d) resources, tools and mechanisms for the implementation of preventive measures, and e) political, managerial and target group support for the preventive programme.

Development of healthy work environment

Without prejudicing the primary responsibility of the employer for ensuring safety at work, government policy, legal actions and enforcement are needed to ensure minimum levels of health and safety in all sectors of the economy, including small-scale enterprises, the informal sector, agriculture and the self-employed. Occupational health programmes should be considered as integral components of socio-economic development.

Development of healthy work practices and promotion of health at work

Many occupational hazards can be avoided and controlled through the adoption of appropriate working practices by the worker. This is possible by providing him or her with information, tools, work organization and work aids that enable a safe and decent workplace. This requires knowledge of health hazards at work and how to avoid them. In some instances personal

protective devices may be needed.

Workers lifestyles may have specific or general impact on their occupational health and safety and working capacity. Health education on avoiding the combined effects of lifestyle factors and occupational exposures should be effectively provided.

Strengthening of Occupational Health Services (OHS)

The emerging problems of occupational health call for the development of OHS for all workers in all sectors of the economy and in all enterprises, as well as for the self-employed.

- Modern occupational health services should draw from relevant professions, e.g. occupational medicine and nursing, occupational hygiene, work physiology and physiotherapy, ergonomics, safety and work psychology.
- The preventive approach should be given the highest priority.
- Due consideration should be given to the needs of OHS for the self-employed, agricultural workers, persons employed in small-scale enterprises, migrant workers and those in the informal sector. Sometimes such services can be provided by primary health care units specially trained in occupational health.

Establishment of support services for occupational health

Many countries have organized such services in institutes of occupational health but many others rely on services provided by universities, large industries or individual consultancies.

- Governments and authorities responsible for occupational health should ensure the availability of expert services for OHS by guaranteeing the availability of institutions with the necessary capacity and manpower.

- The potential shortage of such experts should be considered in the planning of the training curriculae and programmes for occupational health.

- A national quality assurance and quality management element should be included in occupational health programmes and appropriate training should be provided to responsible personnel.

Development of occupational health standards based on scientific risk assessment

To ensure minimum levels of health and safety at work are applied, standards which define the safe levels of various exposures and other conditions of work are needed. The standards also serve as references for assessment of the result of monitoring and provide guidelines for planners. In the further development of standards the high variation in workers´ sensitivity to occupational exposures should be considered. A relevant scientific basis for setting standards should be ensured through collaboration with research organizations.

Development of human resources for occupational health

There is a universal shortage of both expert resources and training in developing and newly industrialized countries in the South. This is due to three main reasons:

a) lack of effective legislation and lack of requests from authorities and employers make the employment opportunities for such experts minimal

b) in the absence of requests, the vocational training institutions and universities have not organized and developed curricula for the training of experts in occupational health.

c) in some instances, where training is available, it is oriented to clinical occupational

medicine only which, though important, does not give a full response to the needs for expertise in a preventive workplace-oriented occupational health service.

- Each country should include, in its national programme on occupational health, an element of training of sufficient numbers of experts to implement the national programme and to ensure sufficient personnel resources for OHS.
- Governments should ensure that the necessary elements of occupational health will be included in the basic training curricula of all who may in the future deal with occupational health issues.
- Training in occupational health should also be given in connection with vocational training and in training programmes for workers, employers and managers.
- In all training the need for a multidisciplinary approach in occupational health should be taken into consideration, ensuring involvement of occupational medicine and nursing, occupational hygiene, ergonomics and work physiology, occupational safety, work organisation and other relevant fields.

Establishment of information systems

Analysis of reliable data and establishment of trends in occupational health as well as recognition of priorities at national and local levels are of utmost importance both for decision-making on policies and for occupational health practices.

- Each country should review its data and registration systems of occupational diseases and accidents. The comparability of data should be ensured by collaboration between the countries.

Strengthening of research

- Each government should establish or strengthen its national centre for occupational health and, if appropriate, the network of centres.
- Such a centre should be given the responsibility of carrying out research, information, training, and if appropriate advisory and analytical and measurement services in support of occupational health practices.
- The national research programme for surveying the occupational health and safety situation, for developing competence and methodology in occupational health and for responding to national occupational health programme.
- Effective international collaboration in research should be ensured.

Development of collaboration in occupational health and with other activities

Tripartite collaboration between government, employers and trade unions in implementation of occupational health activities should be ensured by the establishment of formal links with these bodies.

Occupational safety and health activities have several links with other parallel activities, such as environmental health and environmental protection, primary health care and specialized hospital-based health care. In all such collaborative links the role of occupational health experts is to provide expert knowledge on potential hazards in the work environment and their effects on the health of those exposed to them.

In developing occupational health practices for special groups, such as farmers, the selfemployed, small-scale industries and home industries, collaborative links may be needed with

various extension organizations, industrial associations and several types of nongovernmental voluntary organization. Such links may facilitate the implementation of occupational health programmes among economic activities that are more informal and more difficult to reach than conventional well-organized industry and service enterprises.

Trade Agreements

Multilateral free trade agreements have been developed throughout the world during the second half of the 20th century. These agreements aim to facilitate international trade by lowering and in some cases removing trade barriers. To the extent that these agreements incorporate related social issues such as working conditions, they may help to advance occupational safety and health. On the other hand, trade agreements that ignore labour standards may have a negative impact (Frumkin 1999). Several major free trade agreements serve as important examples.

The European Union (EU) has paid attention to occupational health and safety in its efforts to develop the social dimension of working life. A comprehensive Framework Directive (391/89) on the minimum requirements for health and safety at work has been approved and has been supplemented with some 16 special directives. General duties placed upon the employer include duties of awareness, duties to take direct action to ensure safety and health, duties of strategic planning to avoid risks to safety and health, duties to train and direct the workforce, duties to inform, consult and involve the workforce, and duties of recording and notification.

The North American Free Trade Association (NAFTA) of the USA, Canada and Mexico has initiated a programme for occupational health and is planning to improve the collection of information, research, and the training and education of experts, workers and employers within the framework of the new Association.

The Subcommittee on Social Security and Occupational Safety and Health within the Employment and Labour Sector (ELS) of the Southern Africa Development Community (SADC) was established in 1996 to promote employment and productivity, and harmonise labour and social protection. The Subcommittee plans to implement the Codes on the Safe Use of Chemicals and HIV/AIDS in the Workplace, as well as monitoring OHS activities in the region, harmonisation of social security schemes and the development of training institutions in the relevant fields (SADC Website).

Different approaches

There are many different systems for supervising and improving occupational safety and health. Gustavsen (1996) has suggested that they could be grouped into three categories:

- a *specification* model, where laws and regulations are at the core and where the main actors are various types of experts
- a *procedure-based* model, where the potential of a rational systems approach is at the core and the line organisation is the main actor, e.g. internal control
- a *developmental* model, where the principle of continuous improvement is at the core and the activity is distributed as widely throughout the whole organisation as possible.

The *specification model* involves the social partners in many industrial countries and has been

shortly described above. In several Latin American countries, as well as in Spain and Germany, social insurance schemes play an important role. A few examples are given below. The Scandinavian model for occupational health was built upon joint agreements between the social partners rather than on specific legislation on occupational health services. In Sweden, the Working Environment Act provides for the establishment of a safety committee that plans and supervises safety activities. It also provides for the appointment of one or more workers' safety delegates who have wide powers of inspection and access to information. This combined force is authorized to order work to be suspended when it considers a situation to be dangerous, pending a ruling by the labour inspection service and despite opposition by the employer. No penalty can be imposed on a safety delegate whose decision to have the work suspended is not confirmed by the labour inspector, and the employer cannot claim any compensation for the suspension from the safety delegate or trade union organization.

In Germany there is a safety and health system of the statutory accident insurance funds (Gesetzliche Unfallversicherungsträger - UVT) alongside the public system. All companies, establishments and administrations are subject to compulsory membership which ensures insurance coverage in the event of industrial accidents and occupational diseases for all employees in Germany. The UVT is financed through employers' contributions. One of the tasks of the UVT, is to take any suitable action to prevent industrial accidents, occupational diseases and work-related health hazards and to ensure effective first aid. Monitoring and

enforcement of the regulations as well as consultancy for employers and employees is the

responsibility of each UVT.

In the past decade there has been an active process of legal reform in occupational health and safety law in most of the Southern African region, motivated by both national and international pressures. These laws give more focus to the occupational health and safety system, particularly the tripartite roles and responsibilities (Loewenson 1996).

According to the Asian Pacific Newsletter on Occupational Health and Safety (2000) a number of steps have been taken recently in many Asian countries to improve the national system for occupational safety and health. For example, in 1994 a new OSH Act became effective in Malaysia that expanded the safety and health protection to all employed persons from the limited coverage of the previous Factories Act. Other key features of the new Act include: establishment of a national tripartite advisory body; clear definition of employers to protect their employees; responsibilities of manufacturers, importers, and suppliers of a plant; establishment of safety and health committees; and requirement of safety and health officers.

A *procedure-based* model for improving the work environment, called "internal control" was introduced in Norway and Sweden during the 1990´s. In principle, it is a system for monitoring the work environment and for defining remedial action, with a strong resemblance to modern quality control systems (Gustavsen 1996). The idea is to identify errors and rely on the ordinary line organisation to correct them. Essentially, the point is to bring health and safety into the orbit of ordinary managerial concerns and actions. In return for this involvement, management is given a certain authority to use its own discretion in defining problems and priorities. The role of the labour inspection is defined as systems supervision

where the primary point is to ensure that each enterprise has an adequate system in place.

In general, it would seem that the participation of workers in the inspection of working conditions and the working environment will continue to increase, particularly in countries that have introduced "self -inspection regimes" or internal control. Such regimes depend, however, on effective and agressive workers' organizations and their active involvement in the audit process at the enterprise level, which is the centrepiece of any such "self inspection". Very few studies on the effectivesness of this approach have been published. A study from Norway (Saksvik, Nytrö 1996) indicates that the system provides a reasonable frame of reference if there is a willingness on behalf of management to actively incorporate health and safety in its workplace. The system itself, however, does not solve the basic motivation problem.

The increasingly pressing nature of the issue of management involvement has brought forth a third type of approach: to see health and safety as subject to *development* and to a principle of continous improvement.

Does the continuous improvement approach give advantages lacking in the two other approaches? Gustavsen (1996) argues that it does, based on a study of about 1300 Swedish workplaces. The study suggested that if there is broad active involvement, there will be strong positive improvements in work environment conditions as well as in productivity. When health and safety was part of an overall process of improvement and integrated with efforts to promote productivity there was a clear management motivation.

The idea of continuous improvement is widespread in working life today. Originally introduced by the Japanese, it has become a globally accepted practice and in most versions active participation from all concerned is a part of the concept.

In sum, all three approaches described above are important. While expert competence is necessary in dealing with, for instance potentially toxic substances, work postures can hardly be changed without some kind of participation from those concerned. The question is the balance between the two. In recent years there seem to be a drift towards the developmental approach in Europe, primarily for work organiztion and including the work environment aspects (Ennals, Gustavsen 1998).

Concluding remarks

This limited review of the major occupational safety and health problems and strategies for prevention is followed by some selected case studies and a limited bibliography from a few journals 1995-1999. Taken all together the major impression is that very little has been published on occupational safety and health from developing countries where 80% of the workers are exposed. Furthermore, although a few strategies have been published there is very little material on the evaluation and effects of such strategies. It is our sincere hope that much more material will be published and made available for an extended review sooner rather than later.

In October 2000 the International Conference on Health Research for Development, with more than 700 participants from more than 100 countries, organized by the WHO and the World Bank, agreed upon a declaration that stated:

"The conference reaffirms that health is a basic human right. Health research is essential for improvements not only in health but also in social and economic development. Rapid globalization, new understanding of human biology, and the information technology revolution pose new challenges and opportunities. Social and health disparties, both within and between countries, are growing. Given these global trends, a focus on social and gender equity should be central to health research."

These statements are as true for occupational health research as for health research in general.

Case Study

The structure and function of the occupational health system in Thailand

Worker safety and health problems were given special attention in the Fifth National Economic and Social Development Plan (1982-1986). The first national plan was created in 1966, and that plan and each plan thereafter served as a temporary blueprint for guiding development. The fifth plan called for the protection of workers from occupational injuries and diseases as well as the provision of better working conditions. In response, the Department of Labour in 1983 established two new divisions at the central level, the National Institute for the Improvement of Working Conditions and Environment (NICE) and the Division of Safety Inspection. The creation of the NICE, represented an important step toward improving occupational health and safety in Thailand. Its activities, which are focused on encouraging employers to ameliorate hazardous working conditions, include:

- disseminating occupational health and safety information through public relations activities, training seminars, safety exhibitions and other means;
- conducting research on how to improve working conditions and prevent occupational diseases and injuries

- providing industrial hygiene and safety services; and,

- developing recommendations to improve regulations and standards.

In order to provide access to occupational health and safety services, the plan also called for the establishment of ten regional centers located in industrialized areas throughout the country by the year

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