

Review Article

# Occupational Health and Safety Situation and Research Priority in Thailand

Somkiat SIRIRUTTANAPRUK\* and Pensri ANANTAGULNATHI

Bureau of Occupational and Environmental Diseases, Department of Disease Control, Ministry of Public Health, Tivanont Road, Nonthaburi 11000, Thailand

*Received December 22, 2003 and accepted January 9, 2004*

**Abstract:** The aims of this article are to review the situation of occupational health and safety and to describe research priority in this field in Thailand. Thailand is one of newly industrialized countries in Southeast Asia. Approximately half of the working population is still in agriculture. The data from Thai Workmen's Compensation Fund showed that incidence rate of occupational injuries and diseases was 3–4% each year. Almost were occupational injuries from various accidents in workplaces. At least 3 relevant governmental agencies, including Ministry of Labour, Ministry of Public Health, and Ministry of Industry, are responsible in occupational health and safety in the country. Nowadays, those agencies collaborate and develop projects and activities to prevent and control of the problems. Because of lack of staff and other resources, research priority is needed and has been developed recently. The framework of research needed focuses on research and development such as how to improve occupational health and safety management at all levels, setting up and development of standard guidelines for health and environmental assessment, and implementation of suitable control measures in workplaces. Finally, improvement of research system in the country is essential to cope with new occupational health problems in the near future.

**Key words:** Thailand, Occupational health and safety, Governmental agencies, Research priority

## Introduction

Thailand is one of the South-East Asian countries. At present, the total number of the population is approximately 63 million<sup>1</sup>. Of this number, 34.5 million (54.7%) are in age group between 15–59 yr old. One quarter (15.9 million) are under 15 yr old and 12.6 million (20.1%) are in age group more than 59 yr old. The data also shows that the trend of Thai population will increase rapidly in elderly group and decrease in age group less than 15 yr. Life expectancy for Thai male is 70 yr old and that for female is 75 yr old<sup>2</sup>. The vital statistics in 2001 showed that birth rate was 12.7 per 1,000 population and death rate was 6 per 1,000 population. The figure also showed maternal mortality rate

was 12.9 per 100,000 livebirths and infant mortality rate was 6.5 per 1,000 livebirths.

In Thailand, labour force or working population is defined by the Labour Act B.E. 2541 as a population whose age between 15–59 yr old. Among these 34.5 million working population, 33.4 million (97%) are employed and 896,300 people (3%) are unemployed<sup>1</sup>. Among these employed workforces, 15.4 million (46%) work in agricultural sector and 18 million (54%) are non-agricultural workers. The non-agricultural sector includes those who work in manufacturing industries (4.8 million or 27%), construction (1.4 million or 8%), trade/business (4.6 million or 26%), and service sectors (6.2 million or 39%). Since Thailand becomes one of newly industrialized countries, the labour force structure will change rapidly to be higher proportions in industrial sector in the near future. Occupational health

\*To whom correspondence should be addressed.

and safety issues, especially in industry, will become more important. The aims of this paper are to review occupational health and safety situation and to describe current planning and activities, particularly in research development, from relevant organizations in the country.

### **The Situation of Occupational and Work-Related Diseases and Injuries**

Occupational injuries and diseases are one of the main burdens of diseases among Thai working population. Approximately 3–4% of workers who registered with the Workmen's Compensation Fund were diagnosed and reported of having occupational diseases or injuries each year during 1992–2001<sup>3</sup>. Almost were occupational injury cases. For example, there were 189,621 cases of occupational injuries in 2001<sup>4</sup>. Of this number, there were 607 deaths, 20 cases of disabilities, 3,510 cases of partial loss of organ, 48,078 cases of over 3 d lost from work, and 137,407 cases of less than 3 d lost from work. On the other hand, only 127 occupational or work-related diseases were reported in that year. Most of them (89 cases) were detected with high blood lead levels. Twenty-four cases were reported of having noise induced hearing loss and 13 cases were diagnosed of having occupational respiratory diseases.

Apart from the Workmen's Compensation Fund, the Bureau of Epidemiology, Department of Disease Control, also run a national disease surveillance scheme in the country. The data shows that average 3,000 occupational disease cases were reported to the scheme each year during 1997–2001<sup>5</sup>. For example, 3,035 cases of occupational diseases were reported to the scheme in 2001. Most of them (87.4%) were pesticides poisoning. The rest included lead poisoning (3.4%), pneumoconiosis (3.4%), petro-chemical poisoning (3.4%), gas and vapor poisoning (1.5%), and other heavy metal poisoning (1.0%).

The figures of occupational disease cases may not represent the real situation in the country because many surveys conducted by Bureau of Occupational and Environmental Diseases showed high levels of hazardous exposure in working environment and many cases of early abnormalities in workers' health. Under-report of cases maybe due to the lack of work history taken from patients, unawareness of physicians, and difficulty in making diagnosis of the diseases. This is one of major topics in relation to occupational health that needs to be improved.

### **Occupational Health and Safety Agencies and Regulations in Thailand**

At present, occupational health and safety in Thailand still mainly emphasized on industrial sector. Three main ministries involving in occupational health and safety issues in the country are as follows<sup>6</sup>;

1. Ministry of Labour: The Ministry of Labour is a governmental organization that has functions and responsibilities in enactment of legal issues, enforcement of occupational health and safety standards as well as inspection and promotion of safe working environment. Three major organizations under the Ministry of Labour relevant to occupational health and safety including Department of Labour Protection and Welfare, Social Security office, and Occupational Safety and Health Committee.
2. Ministry of Public Health: The Ministry of Public Health is a main governmental organization responsible in all public health in the country. It also has roles and functions in occupational health and safety such as the provision of occupational health services in all sectors through its technical unit and health care network system. The major technical unit that is responsible for occupational health activities is the Bureau of Occupational and Environmental Diseases under the Department of Disease Control (Former name was called Division of Occupational Health). Its main functions include policy development, setting up standard and guidelines for occupational health services and management, and development of occupational health and safety surveillance system.
3. Ministry of Industry: Ministry of Industry has roles and functions in issuing of permission for factory construction, enactment and enforcement of the Factory Act, setting up machine safety standards, and site inspection for permission of factory establishment. The major units regarding occupational health and safety include Department of Industrial Works, Office of the Permanent Secretariat, and Industrial Estates Authority of Thailand.

Although Ministry of Agriculture does not have a direct duty to take care of farmers' health, Department of Technical Development in Agriculture under the Ministry has been established to control imported and use of pesticides and other agricultural chemicals in the country. Regulations issued under the Ministry also require all sellers to register all products in their shops with local authority. Since consumers concern and increase awareness of pesticide

contamination in food products, a lot of campaigns have been conducted by both Ministry of Agriculture and Ministry of Public health to stop and reduce using of pesticide and other chemicals in farms.

### **Current National Policy and Highlight Issues**

National policy in occupational health and safety issue has been developed for 30 yr since the establishment of Division of Occupational Health, Ministry of Public Health. At the beginning of the establishment of the division, most of activities were in research and capacity building. After many incidents of workplace accidents such as the fire breakout at the Kader Factory, the concern of occupational health and safety in workplaces increased enormously from both government and non-government agencies<sup>7)</sup>. Since then, there has been a lot of improvement in legislation and enforcement, research activities, and occupational health services. Currently, Ministry of Labour has announced the national policy to decrease the incidence rate of occupational injuries in workplace by 10% in each year<sup>8)</sup>. Ministry of Industry also enforces all high-risk workplaces to conduct risk assessment and management to protect chemical incident in workplaces. In addition, Ministry of Public Health by the Bureau of Occupational and Environmental Diseases has conducted several national programs and activities in occupational health such as the active disease surveillance program, the silicosis elimination project, and the Healthy Workplace project<sup>9)</sup>.

### **The active Disease Surveillance Program**

The Bureau of Occupational and Environmental Diseases has one main duty to set up and develop occupational health and safety surveillance systems in the country. The aims of the scheme are to identify high-risk groups, describe occupational disease situation, and lead to further disease control and prevention. The diseases under the surveillance scheme focus on 8 groups of diseases such as silicosis, byssinosis, asbestosis, lead poisoning, noise induced hearing loss, solvent poisoning, pesticide poisoning, and occupational injuries. The criteria for selection of those diseases depend on the severity of the diseases, high number of workplaces, and public health concern. All levels of governmental agencies under the Ministry of Public Health collaborate in the scheme. The procedures of the central agency include development of guidelines for health and workplace environmental monitoring, training, funding allocation, and annually program evaluation. The duties of local health

agencies, including provincial health offices and hospitals, are to conduct workplace survey, early disease detection, and providing suitable control measures at enterprise level. Recently, Ministry of Public Health initiated a co-operation with Ministry of Labour and Ministry of Industry to conduct the survey in workplaces. This leads to an improvement of the surveillance system in the country.

Although the active disease surveillance program has been conducted throughout the country for years, the scheme still faces many problems such as lack of staff and equipment, poor co-operation with employers, and poor coverage of the program. Lack of national standard guidelines for health assessment and environmental monitoring is also another major problem. Therefore, Bureau of Occupational and Environmental Diseases needs to pay attention on research for guideline development in order to assist local health agencies to accomplish the program. At present, at least 3 active disease surveillance schemes have been implemented and conducted effectively throughout the country. They are lead poisoning, silicosis, and pesticide poisoning surveillance programs. The annual report in 2002 showed that 171 workplaces joined into the survey of blood lead surveillance program. The data also reported that of 3,876 lead-exposed workers, only 73 workers had blood lead levels higher than 60 micrograms/dl and 257 had the blood lead levels between 40–60 micrograms/dl.

Pesticide poisoning among farmers is still one of the major health problems in the country although Ministry of Public Health put a lot of effort to control the problem. The data from the surveillance scheme showed that 33,858 out of 115,105 farmers who attended health-screening program for pesticide poisoning had high blood levels of organophosphate/carbamate exposure. The implementation of control measures included health education, alternative methods for pest control, and using of health books for individual self-assessment. In 2003, the Thai government announces the national policy to control the use of pesticides and other chemicals in agriculture. All relevant organizations collaborate to set up a strategy to prevent contamination of pesticide in food by monitoring at the stage before the chemical use in farms to the stage of marketing of food product for consumers. This maybe an effective way to solve the problem in the country.

### **Silicosis Elimination Program in Thailand**

Silicosis is an occupational disease caused by exposure to silica dust. The high-risk occupations in Thailand are rock grinding and crushing, ceramic and sand blasting

industries<sup>10)</sup>. With the concern of workers' health in such industries, Bureau of Occupational and Environmental Diseases has developed an intensive national surveillance program called "Silicosis Elimination Program in Thailand" since the year 2001. The objectives of this project are to identify silicosis situation and problems, develop information system of risk group, and control of silicosis through network collaboration within 10 yr. In the early phase, Bureau of Occupational and Environmental Diseases has developed collaboration with Department of Mineral Resources, Ministry of industry and Department of Labour Protection and Welfare, Ministry of Labour through Memorandum of Understanding (MOU) among these organizations. The meetings among responsible staff of these agencies were held to clearly identify each organization's roles, functions and responsibilities in prevention and control of silicosis.

Outcomes of the program implementation conducted by occupational health staff of regional environmental health centers, provincial health offices, regional and general hospitals in fiscal year 2002, showed that 246 high risk enterprises (48% of target group) with 5,224 workers participated to the project. Of this amount, 99 enterprises (40%) with 925 workers (18%) reported of using respiratory protection devices. The results of dust measurements showed that of 234 samples for respirable dust measurement, 58 had the dust levels over the national standard. Regarding workers' health assessment, totally 3,263 workers were joined the studies. The health assessment procedures included having history taken, physical examination, performing lung function test, and having standard chest x-ray. The survey could identify 34 silicosis cases and other 35 TB cases. The results of lung function test from 4,204 examined workers also found that 1,633 workers had abnormal results.

### Healthy Workplace Project

In 2000, Division of Occupational Health, the former organization of Bureau of Occupational and Environmental Diseases, has set up a project called "Healthy Workplace" in order to promote workers' safety and health in every establishments throughout the country. The Healthy Workplace project is an integrated project based on WHO Healthy Work Approach. The aims of the project are; 1) to raise awareness on workers' health promotion in all types of industry, 2) to develop partnership and participation of continuous improvement in workplaces, and 3) to develop safety and healthy working environments. Implementation of this project requires collaboration between all relevant agencies and network both inside and outside Ministry of

Public Health. Ultimate goal of this project is to develop clean, safe, non-hazardous, and lively workplace. The gold, silver, or bronze certificate issued by the Department of Health and the governor of each area will be awarded to those well-practiced enterprises that can accomplish the setting criteria. Until the year 2002, approximately 2,443 establishments joined with this project on voluntary basis.

### Training and Capacity Building in Occupational Health and Safety

Thailand has a large number of institutions providing training in occupational health and safety. For example, six universities throughout the country arrange the training course for B.Sc. (Occupational health and safety) degree and Master degree to occupational hygienist. Three universities award Master degree in occupational health nurses. Only one university arranges residential training program in occupational medicine for occupational physicians. Apart from that, several short-course training programs are arranged by the Universities and Ministry of Public Health each year such as 8-wk or 2-wk courses for occupational physicians, 2-wk course for occupational health nurses, and 1-wk course for health officers. Regarding the Labour Act B.E. 2541, all enterprises with more than 50 employees are required to provide safety officers in their workplaces. For this reason, training courses for safety officers has been arranged throughout the country by both governmental and private organizations under supervision of Ministry of Labour.

### Research Priority and Development

Up to now, more than 500-research papers relating to occupational health and safety has been published in national or international journals<sup>11)</sup>. From the national academic meetings, the survey estimates that Thai researchers in this field from several institutions conduct at least 50 projects each year<sup>12)</sup>. There are also a variety of research topics. For example, the Bureau of Occupational and Environmental Diseases conducted 12 studies in 2001<sup>9)</sup>. Five studies focused on the situation and identification of occupational health problems in some particular occupations. Four studies involved in training course development and the rest were projects in research and development of occupational health guidelines. In addition, the data from the Thailand Research Fund showed that of those current 11 projects funded by the agency, 8 studies focus on model development of OHS services for several working groups<sup>13)</sup>. The other topics

**Table 1. Framework of high priority research topics in Thailand from 2 funding agencies**

The Workmen Compensation Fund	Bureau of Occupational and Environmental Diseases
<ol style="list-style-type: none"> <li>1. OHS legislation and management               <ol style="list-style-type: none"> <li>1.1 Research and development on administrative process in OHS legislation and enforcement.</li> <li>1.2 The improvement of impairment evaluation in compensation system by setting up the independent medical examination.</li> </ol> </li> <li>2. Occupational Injuries and diseases               <ol style="list-style-type: none"> <li>2.1 Characteristics and causes of occupational injuries, especially in small and medium scale enterprises.</li> <li>2.2 Situation of chemical and waste disposal in large, medium, and small scale enterprises.</li> <li>2.3 Risk assessment and risk management.</li> <li>2.4 Development of standards and guidelines for health assessment in various types of industries.</li> <li>2.5 Engineering approach for accident prevention.</li> </ol> </li> <li>3. Promotion of OHS service system               <ol style="list-style-type: none"> <li>3.1 Set up or develop guidelines and models of OHS service system in workplaces.</li> <li>3.2 How to improve performance of safety committees at enterprise level.</li> <li>3.3 Model development for the roles and function of OHS personnel in the workplaces.</li> </ol> </li> </ol>	<ol style="list-style-type: none"> <li>1. Researches on identification of situation, magnitude of problems, causes and related factors in OHS</li> <li>2. Research for models development:               <ol style="list-style-type: none"> <li>2.1 appropriate models for major occupational health surveillance system and appropriate prevention and control measures for occupational health problems.</li> <li>2.2 models for integration of occupational health management in healthy city project.</li> <li>2.3 appropriate models for worker's health promotion.</li> <li>2.4 quality control system for occupational health services in private sector.</li> </ol> </li> <li>3. Development of information system</li> <li>4. Research related to standards development and its practical use               <ol style="list-style-type: none"> <li>4.1 Research related to development of occupational health standards and guidelines.</li> <li>4.2 Research related to factors effected on legal enforcement of occupational health legislation and other relevant health legislation.</li> <li>4.3 Research related to development of occupational health laboratory standards.</li> </ol> </li> <li>5. Development of occupational health training curriculum for health personnel and local authority personnel</li> </ol>

include health risk assessment in particular occupations (2 studies) and the development of tools for health measurement (1 study).

Currently, there are at least 5 main national funding agencies in this field such as the Thailand Research Fund, Thai Health Promotion Foundation, Health System Research Institute, the Workmen's compensation Fund, and Bureau of Occupational and Environmental Diseases. All of these agencies support all Thai researchers and post-graduate students from several institutions to conduct research in occupational health and safety and other related topics. In order to support the most urgent topic research, those funding agencies set up the framework of high priority research topics to fund. Table 1 shows the framework of high priority research area in OHS in the country set up by the Workmen's Compensation Fund<sup>14)</sup> and the Bureau of Occupational and Environmental Diseases<sup>15)</sup>. The framework for research priority from both organizations scopes on the topic of research and development and that of how to implement all knowledge of occupational health and safety into practice at all levels.

### The New Challenges

Occupational health and safety situation in Thailand is in a transition stage. We are in the period of facing both old

(or classical) and new occupational health problems. At present, many traditional health hazards in workplaces, such as silica, lead, or unsafe work practice, still exist. All of these health risk factors cannot be eliminated or controlled effectively. At the same time, many new hazards in newly working environments, e.g. stress at work, are emerging. On top of that, working organizations are also changing from large-scale enterprises to small-scale enterprises and are changing from formal employment to contract or informal employment. All of these kinds of working populations make the management of occupational health and safety more difficult.

Although all relevant organizations put a lot of effort to improve occupational health and safety management system in Thailand, it is still a very long way to achieve the goal. There are a lot of strength and weakness points in our organization under the Ministry of Public Health. One of the strength points is that there is a very good collaboration and networking system among central organization and local health agencies in the Ministry of Public Health. This enhances the effectiveness of capacity building, technology transfer, and public health surveillance system and it will lead to improve the coverage of occupational health service provision. The weak points include shortage of staff in this field and poor co-operation among other governmental agencies, employers and employees. In addition, we are

facing the government policy to down-size all governmental organizations and this will make the situation worse. Therefore, it is so urgent for all relevant organizations including academies to get together to discuss and plan for these new challenges.

In the near future, non-governmental agencies, especially private sectors, have to play a major role in provision of occupational health and safety services. Good participation of employers and employees has to be encouraged by both well legal enforcement system and voluntary basis. In addition, the academic institutions have an important duty to assist the system by improving research-based knowledge and capacity building. Although many studies are done each year, very few have an impact to the national policy and lead to an improvement of occupational health and safety management in workplaces. At present, the most important research questions we need to answer or to know are not to identify a new occupational health hazard but are to find appropriate measures to implement all known knowledge into practice.

## Conclusions

Occupational health and safety issue becomes more important in Thailand. High risk occupations are in both agricultural and industrial sectors. Occupational injuries seem to be the leading problem but occupational diseases, especially pesticide and other chemical poisoning, are still needed to pay attention by improving the diagnosis and reporting system. Although all relevant organizations collaborate to solve or alleviate the problems, other effective control measures, particularly suitable measures at the enterprise level, are essential. Research also plays a key role in occupational health and safety development in the country. Because of limited resources, setting up of research priority in the country is very important. The direction of research topics should focus on occupational health and safety management at all levels, development of standard guidelines for health and environmental assessment, and how to implementation of suitable control measures.

## References

- 1) National Statistical Office, Ministry of Information and Communication Technology (2003) Report of the Labour Force Survey. Whole Kingdom Quarter 4: October-December 2002. Bureau of Statistical Forecasting Print, Bangkok.
- 2) Ministry of Public Health (2001) Public Health Statistics A.D. 2001. Ministry of Public Health Print, Nonthaburi.
- 3) Social Security Office, Ministry of Labour (2002) Annual Report 2002. Social Security Office Print, Nonthaburi.
- 4) Thai Workmen's Compensation Fund, Social Security Office (2002) Report of Activities in 2002. Statistic and Report Section Print, Bangkok.
- 5) Bureau of Epidemiology, Department of Disease Control, Ministry of Public Health (2001) Annual Epidemiological Surveillance Report 2001. ETO Press, Bangkok.
- 6) Thai Government Gazette (2002) The Regulations of Governmental Agency Reform 2002. **119**, 14–34.
- 7) Social Security Office, Ministry of Labour (2003) Stop! Labour tragedy. Social Security Office Print, Nonthaburi.
- 8) Ministry of Labour (2003) Moving to the second year. Ennac Publication, Bangkok.
- 9) Division of Occupational Health (2002) Annual Report 2002. Bunasilp Press, Bangkok.
- 10) Bureau of Occupational and Environmental Disease (2001) Report of Occupational Health and Safety Statistics 2001. Bunasilp Press, Bangkok.
- 11) Wanwaree S (2001) Database Development of Research on Compensation Fund. Workmen Compensation Fund Print, Nonthaburi.
- 12) Ministry of Public Health (2003) Proceeding and Abstracts for the 11th National Public Health Conference in 2003. Ministry of Public Health Print, Nonthaburi.
- 13) Thailand Research Fund. Table of Research Planning in 2003. Thailand Research Fund Print, Bangkok.
- 14) Division of Research and Development, Social Security Office (2003) Criteria of proposed research selection for grant: Manual for Research Committee. Social Security Office Print, Nonthaburi.
- 15) Division of Occupational Health. Framework for Research Planning during 2001–2002. Division of Occupational Health Print, Nonthaburi.