PROCEEDINGS OF THE REGIONAL SEMINAR ON

### OCCUPATIONAL HEALTH

AND REGIONAL SEMINAR ON

# ERGONOMIC APPLICATIONS IN SAFETY CONTROL



ORGANISED BY

SOCIETY OF OCCUPATIONAL MEDICINE, SINGAPORE AND

THE NATIONAL SAFETY FIRST COUNCIL OF SINGAPORE SEPTEMBER 18-21, 1978

# Proceedings of the Regional Seminars on Occupational Health and Ergonomic Applications in Safety Control

Edited by: P.K. CHEW K.O. ZEE O.Y. CHAN

SOCIETY OF OCCUPATIONAL MEDICINE, SINGAPORE AND NATIONAL SAFETY FIRST COUNCIL OF SINGAPORE 18-21 SEPTEMBER 1978.

#### REGIONAL SEMINAR ON OCCUPATIONAL HEALTH SEPTEMBER 18-20, 1978

#### REGIONAL SEMINAR ON ERGONOMIC APPLICATIONS IN SAFETY CONTROL **SEPTEMBER 21, 1978** SINGAPORE

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#### **PREFACE**

Within the last decade, as industrialization in the countries of the Asia-Pacific region gained momentum, the threat to workers' health has increasingly become an issue of some concern to doctors, nurses, safety professionals, industrial hygienists, ergonomists, scientists, economists, workers, employers and governments. Many of them gathered in Singapore for two Regional Seminars on Occupational Health and Ergonomics from 18-21 September 1978. Collected within this volume are most of the papers presented at these Regional Seminars.

The papers were presented in various sessions and properly grouped. The authors' styles of presentation have been retained and editorial changes were reduced to a minimum.

It is hoped that the records of the proceedings will serve as a source of reference on the current work being carried out on the subjects within the region.

EDITORS October 1979

#### Welcome Address

Professor Phoon Wai-On

Chairman, Organising Committee at the Opening Ceremony of the Regional Seminars on Occupational Health and Ergonomic Applications in Safety Control on September 18, 1978 SINGAPORE

Dr. Lee Chiaw Meng,\* distinguished guests, ladies and gentlemen, it was seven years ago when we held the First Symposium on Occupational Health in Southeast Asia in 1971. At that time, the subject of Occupational Health was still a rather new subject in this part of the world. Nonetheless there was very much enthusiasm on the part of participants who came from near and far to attend that Symposium. We are very glad that some of those participants are here with us this morning.

Looking at the situation seven years later, we see that there has been a radical improvement in the Occupational Health and Safety situation in this part of the world. Most countries in this region have established governmental units to deal with this area of activity. In Singapore, Australia and the Philippines, there are university courses for doctors and others who wish to specialise in Occupational Health. There is a very great increase in the number of nurses and safety officers employed at work sites throughout the length and breadth of Southeast Asia. Perhaps for the first time, the Regional Assembly of the WHO in the Western Pacific Region, has highlighted the great importance of Occupational Health for all the countries in the region. I know that a similar interest is being shown by member countries of other WHO Regions as well.

All these developments are highly gratifying. Nonetheless, much remains to be done. The scourges of occupational diseases and accidents still ravage the health and happiness of hundreds of thousands of workers in our region of the world. Dust diseases of the lungs, noise-induced hearing impairment, cancer due to occupational agents, occupational dermatitis, biological diseases such as infectious diseases (e.g. leptospirosis), poisoning from lead, other metals and carbon compounds and psychological problems of job adjustment are outstanding examples of the wide spectrum

of afflictions which can arise from adverse working conditions or environments. Recently, moreover, there has been more and attention focussed on the increasing body of evidence which suggests that factors in the working environment may also have an important role in the aetiology or aggravation of general diseases such as hypertension, heart disease and mental ill health. In fact, Occupational Health is one of the scientific disciplines which are most rapidly expanding in both scope and dimensions.

On behalf of the Organising Committee, I would like to welcome all of you who have come from within and without Singapore to both our Seminars. We are very glad to note that there are participants from nearly twenty countries, not only in Southeast Asia but far beyond. We hope that new friendships will be established and old friendships strengthened and through these friendships there will be greater efforts in co-operation to improve the standards of Occupational Health and Safety, not only in Southeast Asia but throughout the world.

It is my great pleasure to express our warm thanks to Dr. Lee Chiaw Meng, Member of Parliament for Farrer Park and Chairman, National Productivity Board for his presence this morning and for kindly consenting to declare the Seminars open. I would also like to thank the distinguished speakers who are going to deliver what I am sure will be extremely informative and thought-provoking papers at these seminars. In addition, I would like to record, on behalf of the Organising Committee, our sincere thanks to the many people who have worked so very hard during the past one year and especially in the past few months to make these Seminars possible.

In conclusion, may I wish all the participants of both the Seminars a very interesting and useful time during the next few days.

<sup>\*</sup> Chairman of National Productivity Board, Singapore and MP for Farrer Park

#### **Address**

Professor Kyu Sang Cho Secretary General-Treasurer Asian Association of Occupational Health

Professor Phoon, Chairman of the Regional Seminar on Occupational Health, honourable guests, friends, ladies and gentlemen!

On behalf of the Asian Association of Occupational Health, I wish to express my sincere thanks to the Society of Occupational Medicine, Singapore Medical Association, for its kindness in inviting me to take part in this meeting.

First of all, I would like to convey to our friends a brief message from Professor Y. T. Choi, President of the AAOH, expressing his congratulation and hope for success of this Seminar.

I know that this country is young with a comparatively small population, but it is a wonderful country with a well-developed social welfare system and rapidly developed industries. I further understand that its occupational health service is well organised and is achieving good results. It is of great significance that a seminar of this nature is being held in this country with many of our colleagues participating.

The recent industrial development has expedited economic development, bringing increased wealth to our lives. However, the mass production and use of various chemical substances generate substances detrimental to our health, and causing harmful effects on the health of workers.

No matter how much industries may become mechanized, the prime mover for production is still human power and the respect for human beings must precede everything else. So, the protection of workers' health and the promotion of their security are most important in our society.

The problem of industrial safety and occupa-

tional health is a matter to be taken into consideration at the time of planning factories. As for injuries and diseases, preventive measures must be studied and taken. Furthermore, every precautionary measure must be studied to promote the health and efficiency of labourers.

With the remarkable progress of science and technology in Asian countries which are on their way to industrialization, occupational health has greater significance than ever before, and mutual cooperation and exchange of information are of paramount importance in our time.

In view of this, the AAOH was organized in 1956 and has ever since held eight conferences in various countries such as India, Philippines, Indonesia and Japan.

At the last meeting in Tokyo, a decision was made at the General Committee to hold the 9th Conference in Korea.

With active cooperation among the member countries, the General Committee organized three subcommittees, Educational Subcommittee, Occupational Health Services Subcommittee and International Liaison with other Organization Subcommittee.

During this Seminar, the Educational Subcommittee, which is chaired by Professor Phoon, will have a meaningful meeting.

I am confident that the great deal of thought and work put into the Seminar will give much help to the AAOH meeting to be held in Korea in 1979.

Thank You.

#### Address

Dr Wan Fook Kee Regional Director of Health Services, World Health Organisation, Western Pacific Region,

On behalf of the Regional Director of the Western Pacific Region of the World Health Organization (WHO), Dr Francisco J. Dy, I wish to thank the Society of Occupational Medicine and the National Safety First Council in Singapore for the invitation for me to be here in this auspicious gathering.

Problems relating to occupational health or worker's health as we call it in WHO are of increasing importance in many countries/areas of the Region. Whether in industries or in agriculture the health of the working population is crucial to social and economic development. There is no doubt that despite some progress in recent years national capabilities for planning and developing occupational health services need to be strengthened.

I am pleased to announce that the Regional Committee of the Western Pacific Region of WHO at its 29th Session held in Manila in August. 1978, adopted resolution WPR/RC29.R14 wherein the Committee

"... URGES Member States to collaborate in developing knowledge and practice in detecting and controlling workers' health problems, including occupational and work-related disease and disability, and measures for the effective prevention of occupational risks and diseases; ...

REOUESTS the Regional Director to intensify the World Health Organization's efforts in the Western Pacific Region towards cooperation in: (1) improving preventive occupational health services at the national level and in work places, with the participation of workers themselves: promoting the coordination of occupational health services between ministries concerned and national health programmes:

(2) developing criteria and guidelines for the evaluation and prevention of occupational health hazards:

(3) stimulating the monitoring of work environment and workers' health and promoting the application of occupational health epidemiology."

The Western Pacific Regional Office of WHO will be pleased to consider any request from Member States for collaboration in this important

area of Occupational Health.

A Seminar such as this, is an important group educational activity for the exchange of experience and expertise and I must congratulate the organizers for the excellent choice of a wide range of topics which are not only cater to many varied interests but also cover the currently most important areas of concern in the field of occupational health. I am sure the outcome of the discussions in the next few days will constitute another step forward in meeting our common objective of promoting workers' health.

Finally, on behalf of Dr Dy, the Regional Director of the WHO Western Pacific Region, I wish you all a most successful seminar.

#### **Opening Address**

Dr Lee Chiaw Meng, MP Chairman, National Productivity Board, Singapore.

In Singapore last year there were 20,086 cases of occupational accidents resulting in injury and 147 resulting in death. In addition, there were 734 confirmed cases of occupational diseases notified to the Ministry of Labour. There is no doubt that occupational accidents cause a very heavy annual toll of disability and death in many occupations. Annual compensations and medical costs for preventable injuries due to accidents amount to very large sums of money. The loss to the society due to the unnecessary disabling of economically active persons is even greater, not to mention the anguish and hardship brought to the individual concerned.

There are certainly many problems of occupational diseases in all countries, whether developed or less developed, agricultural or industrial. In agricultural societies there is often an excessive occurrence of poisoning by pesticides and accidents among agricultural workers. In manufacturing industries there are frequently risks of poisoning by chemicals and physical agents such as noise, radioactive substances and heat. In all countries health problems of small workplaces can be even more serious than those at large industries as health hazards are often not controlled and can be excessive.

It is therefore important that experts and all those interested in the fields of Occupational Health and Safety should gather together from time to time to exchange information concerning the disciplines. It is also important that workers and managements should be well educated in health protection and in safety at the workplace. In developing countries, health education of workers is of paramount importance in order to facilitate their adaptation to the often faced with new machines, production methods and processes which are strange to them. Under these circumstances, workers have often to use machinery about which they do not quite understand and to handle appliances and chemicals without a proper

knowledge of the necessary safety or health precautions which should be exercised.

In the reckoning of many developing countries, industrialization is held to be the key for economic development. During the past few decades, several countries in our region of the world, including Singapore, have spent much effort in industrialisation. Rapid growth rates have been achieved. Together with this rapid development, however, occupational accidents and diseases have also increased. These problems can have a serious effect upon the welfare and economic productivity of the entire country. Inadequate control of occupational hazards will produce negative effects on the workers' health and productivity. This can perpetuate a vicious circle.

There is a strange view held by some that a high standard of occupational safety is achieved at the expense of productivity. In fact, the reverse is much closer to the truth. For example, a proper ergonomically designed machine and layout will not only increase the productivity through better functional relation of man and machine, it will also reduce unnecessary stress on the operator and produce a much better and safer working environment. But both workers and managers need to be convinced.

I am happy to learn that participants come from so many different countries and include physicians, nurses, safety officers, personnel managers, trade unionists, supervisors and many others. I am sure that the exchange of views between so many different categories of persons all of whom are vitally interested in Occupational Health and Safety would certainly enhance standards of Occupational Health and Safety in all the countries represented here today. May I therefore thank the Organising Committee for so kindly inviting me and may I extend to all of you my best wishes for two very successful seminars. I now have pleasure in declaring these seminars open.

#### Message

DR. M.A. EL BATAWI Chief Medical Officer Office of Occupational Health WHO

On the occasion of the Regional Seminar on Occupational Health, Singapore, September, 1978, I wish to convey my cordial greetings to all the participants, members of the Organizing Committee and the Sub-Committee.

We have noted with pleasure the progressive development of occupational health in Singapore which has actually been considered a model for a typical development in a rapidly industrializing country. At present, the University of Singapore has a regular postgraduate course leading to a Master of Science in Occupational Medicine; and the Department of Occupational Health of the Ministry of Labour in Singapore is demonstrating a high level of competence in the identification and the control of occupational health problems in that country. WHO is particularly pleased to have very good collaborative relations with these programmes and their leaders and is keen to continue and strengthen these relations.

I regret I have not been able to participate personally at the Seminar because of the pressure of work in Geneva, but wish you all every success.

Cordial greeting, EL BATAWI Geneva.

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## INTERFACE BETWEEN PUBLIC HEALTH AND OCCUPATIONAL HEALTH AND ITS APPLICATION

### Interface between public health and occupational health and its implications

Prof M. J. Colbourne\*

#### SUMMARY

The Public Health generalist often develops an interest in Occupational Health in a somewhat illogical sequence:— the diseases associated with specific industrial processes, the environment at the place of work with its effects on health and thirdly the care of the individual worker, the last having both preventive and curative aspects.

The individual public health worker may also have more specific fields of interest. Planning of occupational health measures demands accurate assessment by epidemiological techniques, Notification is a method of obtaining information in many health fields, but it may present special problems in occupational medicine. Rehabilitation used to be primarily associated with reemployment after injury. To-day it has a much wider objective, aiming at all disabled people to make the best use of their abilities. Men at work have long been regarded as particularly vulnerable to injury and disease. Protection of such groups in the community is now felt to be more effective if members of the community themselves take an active part in the planning and organisation of such services. This change of attitude may affect both employers and employees.

It is hoped that these points will stimulate discussion during the seminar.

When Professor Phoon was kind enough to ask me to open the session on the Interface between Public Health and Occupational Health and its Implications, I thought "that is very kind of him but surely I did something like that at a meeting in Singapore only a short time ago." When I looked up the address which had been published in the Singapore Medical Journal, I found it was dated September 1968. (Colbourne, 1968) How time slips by. With some hesitation, I read again the article that I had written ten long years ago. This is a dangerous thing to do. It may prove that you get wiser as you get older only in the sense

that the previous base-line was set at a very low level. I found that the article contained a lot of trivia, some rather dubious definitions and something on training which may be irrelevant to our discussion to-day. It said nothing about rehabilitation, the epidemiological approach or the place of Occupational Health in a coordinated scheme of personal health services. These are three fields in which I have had some experience in the past ten years and I shall say a few words about them.

There were however a few paragraphs which do seem relevant to our session to-day and which I think are worth repeating.

"My own ideas of Occupational Health have developed through three stages.

At first I thought it involved only the particular hazards of industrial life and their prevention. The picture in my mind was that of diseased jaws in those making phosphorus matches, cancer of the scrotum in mule spinners in the cotton industry and, in Singapore, silicotic lungs in those working in quarries.

I then realised that this definition was much too narrow and that the hazards of the whole occupational environment should be included in the field of occupational health. Falls on the factory floors are just as important and preventable as the more exotic industrial hazards. A Typhoid carrying cook in the factory canteen (or in the eating house patronised by the workers) is also an occupational risk in this wider view.

The final stage of my understanding of the scope of the subject was attained when I realized that the environment is not everything and that there is also a personal aspect of occupational health. I learnt of the value attached to preplacement examinations and heard agruments for and against their usefulness. A colour blind engine driver is obviously a risk to himself and others. At a higher level we must not forget a manager with high blood pressure."

No doubt these aspects will be developed further later in the session.

To leave the past and to return to the three item I mentioned above.

<sup>\*</sup>Head, Dept of Community Medicine, University of Hong Kong, Hong Kong

Rehabilitation has to me always been particularly associated with occupational health - especially the restoration of the best possible function after an occupational injury. This obviously much too narrow a concept to-day. In Hong Kong now we are working hard on the improvement of rehabilitation services for all the disabled and we include all forms of disabilities, whether they were caused by accident or disease, whether they have been acquired or have existed since birth or whether they are physical or mental. Social disabilities and their rehabilitation are closely connected and are one of many fields where medicine and social welfare meet, but must, I think, fall outside the bounds of medical rehabilitation. Some may disagree with this broad definition of rehabilitation but there seems no clear advantage in narrowing it.

It is worth posing one question. Should we try and establish who was responsible for the disability and should therefore be responsible for the rehabilitation? Or should we accept that each disabled individual in the community should be entitled to the best possible rehabilitation?

These questions embrace both Public Health and Occupational Health. The attempt to allocate blame and responsibility and the consequent fight for compensation has many disadvantages for the disabled individual.

Epidemiological principles are equally valuable in Public Health and in Occupational Health. There is no need to emphasise this point. The notification of disease, however, does pose some problems. It is important not only for collecting figures to illustrate trends of disease but for the recognition that a problem actually exists.

I.L.O. Recommendation No. 97 (1953) gave four objectives for notification of occupational disease:—

- Initiating measures of prevention and protection and ensuring their effective application;
- (2) Investigating the working conditions and other circumstances which have caused or are suspected to have caused occupational diseases;
- Compiling statistics of occupational disease; and
- (4) Allowing the initiation or development of measures designed to ensure that the victims of occupational diseases receive the compensation provided for such disease.

The fourth objective is the one that may cause the trouble. If the notification is going to involve the notifying doctor in time consuming administrative procedures involved with compensation, he is tempted not to notify conditions such as dermatitis, where the occupational basis may be doubtful. This may lead to an understimation of the importance of a real problem, as these conditions are not recognised as being of occupational origin.

There are certainly examples from general Public Health where such an administrative procedure has influenced the apparent incidence of a disease. I can recall the reduction of malaria by insisting that each notification had to be substantiated by a positive film and of influenza by demanding the submission of answers to a three page questionaire — in duplicate.

However these are relatively uncommon problems in general public health. The difference may deserve further discussion on how to ensure that notification of occupational disease achieve its stated objectives. Linking notification with compensation may interfere with the achievement of the other objectives.

Another interface between occupational and community health is the place of the worker in the "cradle to the grave" concept of personal health services. We aim to give special care to the mother — antenatally and postnatally — to the infant, the school child and to the aged. How does the worker fit into this scheme? Certainly workers are an important group in the community and may be particularly vulnerable to hazards to his health.

An experimental health project is being conducted in an industrial area in Hong Kong with the object of getting the cooperation of the community in the organisation of their own health services, in association with the Medical Care Services - respresented by a new hospital. One of the aspects of this service is a scheme to presuade local factory managers to subscribe to an participate in providing preventive and simple curative services for their staff. It has made a start but many managers have not yet realised the difference between this service and the simple curative care provided by General Practitioners. To quote the Director of the Health Project, "We had hoped to launch the Occupational Health Programme on a basis of a prepaid system which would include an annual health status screen (lung function and hearing for example) and regular sickness and injury care. However, factory managers have not accepted this but require sickness and injury care with payment per service item. This is the basis on which we shall be starting work, but trying all the time to move to a more "preventive basis." (Paterson, 1978) . . .

I am reminded of another extract from my address 10 years ago. "Recently I spoke to an industrialist and asked him his opinions on the subject

of occupational health. His reply was that, in some industries, it was a very important subject, especially where line production was concerned. A sick man could upset the whole of the production output of modern complicated industrial processes.

This idea of occupational health appreciates that in some situations, health is important in producing an efficient industry.

I think it is much too narrow and that we have much more to offer. Ill health will result in expensive inefficiency wherever it occurs. Its results are more obvious on the production line but we think they occur also in all factories and in the office and in the board room.

As doctors, our thoughts tend to turn rather to social benefits than to economics. But we see that an occupation or an industry that cannot sell its

over-priced products is not healthy. It seems to me that if we accept this limitation we are more likely to be accepted as a help towards economic development rather than as a hindrance."

At the moment the project I described is very much in the trial stage. I mention it to underline that the worker is one of the groups in the community whose health demands protection. How are preventive and primary care services for this group to be integrated with those for the rest of the community?

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