

R E P O R T S

XIV ASIAN CONFERENCE ON OCCUPATIONAL HEALTH BEIJING, CHINA, 15–17 October, 1994

Health protection and promotion in the workplace was a leading topic of the XIV Asian Conference on Occupational Health which took place in Beijing, China on 15–17 October, 1994.

The Conference was organised by the Assian Association of Occupational Health, the China Preventive Medical Association, the Chinese Academy of Preventive Medicine, the Chinese Society of Occupational Health and the Institute of Occupational Medicine.

The Conference was sponsored by the World Health Organization and the International Labour Organization.

Twelve subject blocks were presented and discussed during the Conference: pneumoconioses, industrial toxicology, environmental and biological monitoring, industrial poisoning, physical factors, work physiology, pesticides, organic dusts, occupational epidemiology, ergonomics, work stress and occupational health services.

Altogether, 165 papers and 254 posters were presented during plenary and workshop sessions.

The Conference was attended by over 650 participants from 36 countries and all continents. Participants from China predominated (over 330 participants) and another large group of participants was from Japan (almost 100 people).

The plenary session opened with a paper presented by Professor *Jorma Rantanen* (The Finnish Institute of Occupational Health, Helsinki) and this evoked much interest. The paper was devoted to the prevention of occupational health hazards. At the very beginning, the speaker stressed the great variation in the level of health and safety at work in different countries, in various sectors of the economy and in different occupations.

The effect of various well-known risk factors has been significantly reduced or eliminated but new ergonomic problems, the psychic work load and the organization of work in changing conditions, have become the present issues under discussion. The remarkable health hazards potentially caused by genetically manipulated organisms, observed in the workplace of people employed in new areas of biotechnology, also belong to this same group of issues. The continuous introduction of new chemicals in production processes creates yet another problem. At the moment about 100 000 chemical products are found in the European Chemical Database and the number grows almost daily. Many of them create potential hazards for both industrial users and consumer. The same applies to certain new physical factors such as, for example, the laser. The growing incidence of occupational allergies in industrialized countries is also alarming.

The author focused on the fact that a growing number of occupational hazards has contributed to advances in hygienic measurements and analysis, such as analytical chemistry, the measurement of physical factors, the development of new detectors and sensors as well as in the research technique for the long-term monitoring of chemicals and the multichannel recording of physiological responses aided by a new generation of computers. The development of the toxic equivalence concept in the assessment of risks of the various polychlorinated biphenyls, dibenzofurans and dioxins has made it possible to assess the risks of combined exposure to all of these three groups of compounds with a total of over 400 isomers. Similar methods have been developed for the analysis of other complex mixtures, such as polycyclic aromatic hydrocarbons.

New epidemiological methods – the pooling of data, multi-center studies, internationally standardized study protocols, cluster analysis and meta-analyses – have provided tools to increase the force of studies.

New methods of cytogenetics and molecular biology as well as the analysis of oncogenic activation make it possible to assess the genetically mediated risk of about 5000 carcinogenic agents found in working and living environments. New methods in immunochemistry have opened up new paths for research into allergic susceptibility and the allergenic properties of about 3000 allergens which have been identified in our environment. More intensive mental work has become considerable psychological burden. Finnish occupational health psychologists have developed a job stress questionnaire method to be used in occupational health service practice in order to identify stressogenic factors and evaluate their magnitude in the workplace.

Occupational health services should above all focus on the recognition, analysis and monitoring of risk factors in the workplace and their effect on workers exposed to them. This very often calls for multidisciplinary collaboration between specialists in order to provide adequate risk assessment and take appropriate preventive actions. Generally speaking, Occupational Health Services should deal not only with the in-depth analysis of workplaces and the effect of various hazards on workers' health but also with analysis of their effect on the environment.

J. Jeyaratnam (Singapore) devoted his paper to occupational health and national development. He stressed that Occupational Health Services are not able to cope with the dynamic development of the national economy in countries, which have rapidly become industrialised, such as Singapore, Korea, Hong Kong and Taiwan. In newly industrialized countries such as Hong Kong and Singapore, approximately two-thirds of their gross domestic product comes from the service sector, tourism in particular, and very little or nothing from agriculture.

With the development of health services, the disease pattern has changed. This is reflected in, among others, a large decrease in death from infectious diseases and a large increase in deaths from cardiovascular diseases and cancers. The countries of the developing world have access to advanced technology while their Occupational Health Services are not able to keep pace with all those advances. Often, they adopt standards and legislation from developed countries but suffer from a lack of trained personnel to enforce them and to properly implement preventive measures. On the other hand, such standards are often inappropriate and do not take into account the considerable differences occurring in Asian nations, for example, the nutritional status, the genetic predisposition, exposure levels and work schedules.

The pollution of rivers, soil and underground water by industrial wastes is another serious problem. It should also be remembered that developing countries are often the recipient of hazardous wastes from the developed world. Lead, mercury and cadmium have contaminated water sources in India, Thailand and China. The concentration of industrial investment in the Ulsan complex brought about a rapid population influx to Ulsan City. In 1962, the population was 100 000; within 30 years it had increased to 600 000. As a result of such high population densities in or around industrial complexes, the risk of pollution, hazardous wastes, fires and accidents is greatly multiplied. The health and future of children living in overcrowded cities is in great danger.

The situation is also complicated by the fact that in developing countries many workers who handle new technologies and industrial processes come from rural areas and are inadequately trained. This contributes to a general state of ignorance of health risks and safe workplace practices. Hazardous industries and unsuitable technology in developed countries are often transferred to the developing countries. It is cheaper to transfer the entire production to a country where the environmental and health regulations are more easily met.

Health services in developing countries face more problems because of the poor health status of the population who suffer from common nutritional deficiencies, parasitic and infectious diseases. Workers with nutritional anaemias are often very sensitive to very low levels of inorganic lead.

The author exemplified some of the legal regulations, drawn up by the Ministry of Public Health in cooperation with the Ministry of Environmental Protection in Singapore, aimed at reducing the magnitude of health hazards. It should, however, be recognised that the enforcement of all regulations is not easy in the present situation.

The presentation by Dr R. Wang (Japan) on "Modulation of Hepatic Cytochrome P-450 and Glutathione S-Transferases by Hepatotoxicants in Rats" is worthy of mention. The author discussed an experimental study on the toxic effect of 1,1-dichloroethylene, ethyl alcohol, bromobenzene and N,M-dimethylformamide on P-450 cytochrome liver isoenzymes and glutathione transferase in rats. The first two compounds evoked a ten-times increase in the activity of alanine aminotransferase in blood serum while an immunochemical analysis, in which monoclonal antibodies were used, indicated that those two compounds induced significant P-450 cytochrome isoenzymes. The comparative study proved that the activity of aminotransferase is a better marker of hepatic toxicity than glutathione transferase.

The paper given by M. Ikeda (Japan) focused on an issue of great significance, namely on biological monitoring and biomarkers: concepts and application in occupational health. Biological monitoring is defined as the measurement and assessment of workplace agents or their metabolites either in tissues, secretions, excreta, expired air or any combination of these in order to evaluate exposure and health risk. The author classified biological monitoring into three categories: exposure biomarkers, effect biomarkers and susceptibility biomarkers. In the author's opinion biological monitoring should not only be limited to the population in workplaces but it should also apply to the population exposed to harmful factors in the environment. He gave special attention to biomarkers which play an important role in the early detection of a toxic effect, namely in the assessment of the activity of cholinesterase in exposure to phosphoorganic insecticides.

M. Maroni and A. Fait (Italy) dealt with the risk assessment and health surveillance of exposure to pesticides. The author stressed that the first step in the effective management of health risks at work is to identify and make an inventory of the pesticide products to which workers are exposed, as well as to identify the carrier solvents or other "inert ingredients" and note their specific toxicity. When two or more pesticides are used simultaneously, they may interact and become more or less toxic, depending on their mechanism of action. This might be potentiated by interaction or reduced when antagonism occurs. The biological monitoring of pesticide exposure provides information on the concentration of a given pesticide and/or its metabolites not only in blood and urine but also in adipose tissues.

Exposure to pesticides is most common in agricultural workers who are exposed either indoors during mixing and loading or outdoors where exposure is less harmful. Special attention should be given by people involved in the assessment of exposure, to the use of personal protection devices, contamination of the skin and/or clothes and the availability and use of personal hygiene facilities.

Pesticide exposure of workers employed in the manufacture and formulation of pesticides is more harmful. However, conditions of exposure are generally more stable and therefore easier to monitor.

Adequate information and instruction designed for pesticide exposed workers in agriculture and manufacture plants are of particular significance.

It is essential to establish proper tools for recording data provided by the occupational health program. Moreover, records should be filed and kept for at least 30 years in order to be able to identify health trends and to detect as early as possible the effect of newly introduced pesticides and assess their harmfulness. First aid is crucial and so, health services workers should ensure that an adequate supply of first-aid kits is available and they should also be responsible for training and instructing personnel in the use of such kits in an emergency. Local hospitals medical personnel should also be trained to recognise the early symptoms of overexposure and poisoning in order to provide diagnosis and treatment.

G.R. Wagner from the Institute for Occupational Safety and Health (USA) devoted his paper to the screening and surveillance of workers exposed to mineral dusts. At the beginning, he pointed out that diseases resulting from overexposure to mineral dusts persist in both developed and developing countries. Disease prevention can be achieved through the control of workers' exposure by application of engineering principles. Medical screening denotes the use of medical testing for presumptive identification of disease in an individual at a time before medical care would ordinarily be sought, and when an available intervention can favorably affect the health of the individual. Periodic medical screening of workers must be tied to intensity efforts at environmental monitoring and control. Screening and control supplement each other in preventive procedures.

Similar issues were raised by *Li Yurui* from the Institute of Occupational Medicine and Chinese Academy of Preventive Medicine (China) in his paper on "The Prevention and Treatment of Silicosis in China". He stressed that silicosis is one of the most serious occupational diseases which affects worker's health in China. The present epidemiological studies have revealed that the number of pneumoconiosis cases accounted for 394 thousand workers. Of this number 46.5% of workers were employed in coal mines. The relevant authorities have taken emergency measures aimed at lowering the dust concentration by providing wet operation and air



ventilation in mines. Due to these measures, the number of new cases of pneumoconiosis has dropped considerably. The improvement in radiological techniques has contributed to early detection of morbid changes.

J. LaDou (USA) listed a group of harmful factors observed in the microelectronics and semiconductor industries. He discussed the effect of numerous carcinogens, solvents, acids, photoactive chemicals as well as ionize and nonionize radiation, ergonomic factors and stressors related to immobility in a sitting position which increases the risk of spontaneous abortion by up to 50% in women employed in the semiconductor industry.

Due to the rapid development of industry, Malaysia has become the largest semiconductor exporting country in the world and the world's third largest producer of integrated circuits, after Japan and USA. The author highlighted the poor protection of workers in developing countries and inadequate health education among workers employed in the microelectronics industry.

K. Saito (Japan) dealt with the effect of occupational stress on workers' health. He gave attention to the fact that in technically innovated modern industries workers are particularly exposed to a great number of stressors which cause excessive fatigue and stress-related diseases such as hypertension, cardiac and mental diseases. In some instances it is difficult to identify the mechanisms which evoke stresses in the workplace, their identification does however play, an essential role in the prevention of stress-related occupational diseases.

A keynote speech was given by Professor *Wai-On Phoon* (Australia) a former President of the Asian Association of Occupational Health, on the future trends in occupational health in Asia.

In the second half of the twentieth century and particularly, during the last fifteen years, great advances in occupational health have been observed in Asian countries. It is due to the dynamic and rapid economic development and industrialization of many countries in this region. It can be expected that during the coming century workers who are now occupationally exposed to asbestos, solvents and other toxic substances will suffer from occupational diseases caused by overexposure. A two- and three-shift working system, which is particularly wide-spread in developing countries, will most probably yield many psycho-social problems in the future. Various patterns of occupational diseases due to genetic, structural and socio-cultural differences can also be anticipated. All these factors should be carefully analysed by workers in occupational health services. They also require scientific cooperation at the local, national and international level, giving special regard to the specific nature of employment in individual branches of industry.

The next plenary lecture delivered by *Seung Han Lee* (Korea) focused on health protection in the small/scale industries of industrializing countries. It is well known that the workers in small-scale industries in industrialized and newly industrializing countries are exposed to a higher health risk than those in large industrial plants. Moreover, the occupational health service in small-scale industries is far from being satisfactory. Exposure to harmful agents in small factories is, in certain cases, very high because of contact with a large variety of toxic materials concomitant with the use of old, traditional working methods and equipment. In addition, work hours are much longer and contribute to the higher incidence of occupational diseases. Small scale industries very often employ children, women, old people and immigrants.

Children are more sensitive to the toxic effect of chemicals than adults. Exposure to these chemicals may cause retardation in growth and mental disorders. Female workers, faced with a double burden of work, both at home and at work, become more susceptible to accidents, diseases and reproductive disorders due to increased stressogenic conditions. The problems of aged workers, which started with the influx of retired workers from large-scale industries into small-scale industries and later became universal owing to changes in the general population structure, have resulted in their decreased physiology as well as their higher susceptibility to toxic materials. Small enterprises are very often dirty, dangerous and work there is very difficult, therefore, alien workers are very often employed there. They are quite frequently illegal immigrants who are excluded from formal safety, health and welfare programs, and may even, in the case of ill-health, find it difficult to get access to medical facilities due to their language problems.

The author stressed the need for a greater awareness of the growing risks, and for developing appropriate field studies covering all small-scale industries throughout the country, occupational health legislation and exposure standards. Special law enforcement bodies should be set up and given the power to control and fine those who fail to follow the law. Occupational health service workers should be trained and information on risk factors should be broadly disseminated. At the same time occupational health services should deal not only with large-scale industries but also with small ones which very often use old technology harmful to the health of the workers employed there.

Three researchers from the Beijing Medical University, *Bao Yu-Shu*, *Zhou Shu-Sen* and *Zhao Shu-Fen* presented the recent developments in the research of occupational health for working women in China. The research results showed that exposure to lead, mercury, manganese, chromium, benzene, toluene, carbon disulfide, chloroprene, dimethyl formamide, a high intensity of noise (over 90 dBA) and whole body vibration could produce menstruation disturbances, infrequent menstruation etc. These kind of disorders occurred in 27.3 to 55.6% of women depending on the exposure factor. Vinyl chloride, lead, noise up to 100–104 dB, benzene, toluene and xylene mixtures are sometimes responsible for hypertension during pregnancy. An increased risk of spontaneous abortion was observed in women exposed to lead, benzene, toluene and xylene mixtures, carbon disulfide and chloroprene. This was also seen in women engaged in the production of antineoplastic drugs and in those exposed to whole body vibration and excessive noise especially during pregnancy.

The authors also carried out studies of the effect of various harmful factors in the workplace on foetus development and they revealed that prenatal occupational exposure to such chemical factors as solvents, carbon disulfide as well as work in rubber factories yielded a higher percentage of developmental defects than in the control group.

Prenatal exposure to lead, benzene, toluene and xylene mixtures, chloroprene and excessive noise is responsible for low birth weight. The authors have drawn up requirements that have to be satisfied if women are to be employed, based on the results obtained.

The final plenary lecture prepared by three researchers from the Shanghai University, *You-Xin Liang*, *Zhi Su* and *Xue-qi Gu*, was devoted to occupational health services in small-scale enterprises in China.



By 1992, according to the statistics, there were 22 million township and village owned enterprises with a total number of 105 million workers. In order to reveal the real scale of occupational problems and the demands on the occupational health services in small-scale enterprises, intensive surveys were jointly conducted by the Ministry of Public Health and the Ministry of Agriculture in the 1980s to early 1990s. The survey covered over 29 000 enterprises with over 2 100 000 workers.

The survey revealed that over 82% of enterprises and more than 28% of workers covered by the study were excessively exposed to various occupational hazards. Workers in small-scale enterprises were, in general, exposed to higher concentrations of toxic substances than workers employed in large state enterprises. Moreover, the former group of workers had only limited access to health care. The authors stressed the need to solve this problem which is particularly intense in small rural enterprises.

The session devoted to the organization of occupational health services proved to be extremely interesting.

Gold (Bangkok) presented a broad regional programme on occupational health in the Asian and Pacific regions, approved by 21 states. The programme is based on the provisions of the 161 Convention on occupational health adopted by the International Labour Organization in 1985. The programme is aimed at improving safety in the workplace and at disseminating information on detailed programme and broadly designed training in the area of working conditions. The main objective of the programme is to draw the attention of individual governments to the legislative aspects of a broad spectrum of issues related to occupational safety. It is the intention to promote the programme among employers and employees' organizations.

Zhi from the Chinese Ministry of Public Health presented the main objectives of occupational health in China. Occupational Health Services have been developed in this country for 40 years, with the main task being to control occupational diseases and to promote safety at work. The Chinese Government has devoted much time and energy to establishing and advancing a whole network of occupational health service units that can now be found in almost all large plants. In 1983, the Chinese Academy of Preventive Medicine Institute of Occupational Medicine became the National Centre for Prevention and Treatment of Occupational Diseases. The Centre supervises seven regional units. Industrial medicine in China embraces industrial hygiene and focuses on the monitoring of risk factors in the workplace, the health protection of workers exposed to various harmful agents, the treatment of occupational diseases, the setting of hygiene standards as well as the promotion of occupational health legislation and the health education of workers.

The author stressed that the significant changes which are now occurring in the national economy and the dynamic development of industry are causing numerous health problems in the workplace. Workers employed in small enterprises, in rural areas and in certain foreign enterprises have no access to adequate health care. An increasing number of pneumoconiosis patients, occupational poisoning and work accidents is being observed. Workers are not yet fully aware of occupational hazards and their self-protection is still inadequate. The negligence of the basic principles of occupational safety by employers is another problem of great significance. Therefore, the Ministry of Public Health has dedicated much of its work to drawing up legal regulations specifying the responsibility of employers in this area. Much attention

is also given to the development of a health service infrastructure and the promotion of health education in rural areas.

Phanprasit discussed similar problems observed in Thailand. Rapid economic progress during the last few decades has contributed to an increasing number of occupational health problems. The speaker stressed the need for improving occupational safety in agriculture. In order to carry out an in-depth study of the rural health service and its problems, the researchers have selected two villages in the north of Thailand. The study was followed by the intensive training of volunteers in the field of health education. After completing the training, they started to promote health education in their villages. A team of specialists in rural hygiene then initiated studies on the prevalence of diseases related to work in agriculture.

Nine Japanese scientists presented the results of a questionnaire survey. The questionnaires were sent to 395 plants in 1993. Responses were obtained from 232 plants. Of this number, 76% of the questionnaires were completed by plants employing over 300 workers. The questionnaire was aimed at identifying factors which hinder health promotion in the workplace. The results of the survey indicated a shortage of occupational health service workers and financing, a lack of interest in health programs among workers and inadequate understanding of the significance of health promotion in the workplace among employers.

The Japanese Ministry of Health initiated a campaign in 1988 in order to improve health conditions for all workers. All these initiatives were designed to increase the employers' awareness and to convince them to allocate funds for health promotion programmes.

A further problem was also highlighted, namely, the occurrence of about thousand minor and major accidents in Japanese nuclear power stations. Most of them were insignificant but several serious failures in the nuclear systems have been noted. The authors mentioned inaccurate technical data on the kind, magnitude and gravity of individual accidents. The present situation calls for a unification of reports on such accidents as well as for the application of uniform measures for preventing nuclear accidents and removing consequences in the case of their occurrence.

Researchers from South Korea, on the basis of a three-year study, outlined the training requirements with regard to occupational nurses – front-line health service workers taking care of workers employed in the rubber industry. They also presented their recommendations on training programmes designed for physicians and hygienists involved in the complex issues associated with the dynamic development of industry.

Similar problems are faced by the industrial health service in Singapore. *Phoon* criticised the statistical data on occupational diseases as this applies only to advanced and sometimes irreversible health impairments evoked by long-term occupational exposure. The statistical data is even less reliable if we take into account the long latency of certain occupational diseases. In such cases, the health effects diagnosed apply to working conditions experienced in the past and do not provide information on present health hazards. Therefore, the Ministry of Labour has given particular attention to the monitoring of risk factors which are now occurring in order to prevent the incidence and development of occupational diseases. The significance of regular check-ups among exposed workers in the early detection of pathological changes was strongly stressed.

Schäke (Germany) discussed the health effects on workers exposed to heavy metals, aliphatic, aromatic, halogen derivative and polycyclic aromatic hydro-



carbons, and biphenyls. The study presented covered 354 workers exposed to different hydrocarbons. However, hematological changes were not revealed, the increase of liver enzymes ranged from 15 to 30% in almost all cases. The presence of phosgene during the welding process with halogen derivative hydrocarbons was noted.

McDonald (UK) quoted some statistical data on some new cases of work-related respiratory diseases. Such diseases accounted for 3 500 cases from 1992 to 1993. At least 50% of occupational diseases were related to asbestos exposure, and a large number of different allergens were responsible for 40% of occupational asthma, very common in the chemical and plastics industries.

Abeytunga (Canada) presented the wide-ranging use of computer techniques for collecting information about various occupational exposure factors and its transfer to the bodies responsible for making both medical and technical decisions in order to prevent the harmful effects of occupational hazards.

The session devoted to occupational epidemiology proved to be extremely interesting. A team of Chinese epidemiologists have carried out retrospective cohort studies of mortality due to stomach, lung and liver cancer in workers employed in the fur industry.

The study covered 1 832 workers under control for 26 years (4 730 man years). A significant difference in mortality was found between the subjects under study — $419/10^5$ and the general population — $71/10^5$. The highest mortality — $833.3/10^5$ — was found in workers affected by the highest level of exposure to animal hair. The increased mortality due to cancer during the years under study (1961–1979) was an alarming observation.

The concentration of chromium in the cutting room accounted for $16.0 \mu\text{g}/\text{m}^3$, while in the tannery it was equal to $3.565 \mu\text{g}/\text{m}^3$. In the tanneries the concentration of nitrates in the tanned skin accounted for 16.22 mg/kg. The studies revealed that an increased mortality due to cancer was evidently related to exposure to nitrosoamine and chromium compounds.

Wong (USA) presented epidemiological data on mortality due to cancer in workers exposed to vinyl benzene. The study covered 16 000 exposed workers. During the period between 1948–1989, there were 1 628 deaths, but, no significant difference was observed between the mortality in the group under study and the general population.

Cheon (Korea) investigated the incidence of angina pectoris in workers exposed to different organic solvents. A group of 10 339 workers employed in 351 factories were examined. Symptoms of angina pectoris were found in 104 subjects. The figures were statistically significant in comparison with the general population. In the author's opinion exposure to organic solvents may be responsible for the occurrence of angina pectoris.

Some extremely interesting results, obtained from a retrospective cohort study of mortality due to cancer in workers employed in 9 Chinese petroleum refineries, were presented by *Wang* (China). The study covered 51 889 workers. A significant difference in the incidence of stomach and liver cancer between the group under study and the general population was observed, while the incidence of cancer of other organs did not show any statistical significance.

Similar studies were discussed by *Li* and *Wu* (China). They applied to workers ($n=3908$) employed in 5 rubber plants. The results obtained from the study were

compared with the cancer mortality rate in the general population of a given province. A significantly higher incidence of neoplastic diseases was found in workers employed in the curing departments.

Researchers from Tokyo presented two papers on the concentration of organic solvents in the workplace, taking into account the highest and mean levels of concentration at a given time at a given workplace.

The highest levels were found in printing houses. In Japan, a special regulation has been established, according to which the use of 47 different organic solvents is permitted, and concentrations of individual solvents in ambient air must be checked every six months.

The University of Pittsburg, in cooperation with the University in Shanghai, has carried out a six-month study of leucopenia in workers employed in small enterprises and exposed to benzene. The results were compared with a control group, and they indicated that exposure to benzene significantly increases the incidence of leucopenia.

A group of Japanese researchers have performed a 17-year prospective cohort study of 1 193 workers occupationally exposed to chromium. The mortality studies also covered workers employed in factories in which other substances were used for plating. After eleven years of research they found a significantly higher incidence of lung cancer in all workers engaged in plating (16 deaths observed per 8.9 expected deaths in comparison with the lung cancer mortality in the general population). However, no significant differences were observed in the subgroup of workers exposed to chromium.

The Chinese retrospective cohort studies carried out in a group of 6 635 workers occupationally exposed to gas pitch revealed a significantly higher incidence of lung and liver cancer in workers with a higher level of exposure, while in the group with a medium level of exposure a lower rate of lung and esophagus cancer was found.

Similar studies have been performed in eight Chinese chemical plants employing 1 393 workers. The results obtained were compared with data on 1 298 workers employed in the machine building industry. During the period under study 11 persons died in the machine-building industry including two deaths due to cancer. The results were statistically significant in both industries in comparison with the general population living in the reference province.

Lung cancer was most frequent in chemical industry workers, while cancer of the liver was less frequent and there were only a few cases of stomach cancer.

Participants from Poland presented three papers. Dawydzik (The Nofer Institute of Occupational Medicine) discussed the reform of Occupational Health Services as a result of the economic transformation process which began in 1989. He stressed the significance of the pluralistic system of health service organization which provides a frame-work for cooperation among both employers and employees.

Barański presented studies, carried out together with Sitarek and Szymczak, on the risk of neoplastic diseases in workers employed in the dyeing industry. A cohort study covered 8 523 males and 2 006 females exposed to benzidine in particular during the years 1945–1974. The mortality study covered an even longer period from 1945 to the end of 1991. Exposure to benzidine considerably increased the risk of different malignant neoplasm, in particular, malignant neoplasm of the bladder in males. In addition, chronic liver disease was observed in this group of workers.



Exposure to other chemical factors in the dyeing industry does not significantly increase the risk of neoplastic disease, although it increases mortality due to mental disorders.

Tomaszunas (the Institute of Marine and Tropical Medicine, Gdynia) presented a broad spectrum of issues concerning the health protection of sea-men, taking into account, among others, the working conditions in Asian fleets.

Due to the great efforts of the organizers, the Conference was a great success scientifically as well as socially. The presence of many outstanding scientists from other continents is really noteworthy.

The majority of papers presented showed that in Asiatic countries much has to be done to satisfy all the demands in the area of occupational health and that dynamic economic development together with expanding industrialization entail new health hazards.

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