

# OSH

2009. **7**

## RESEARCH BRIEF

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### Policy · Law

OSH Management System in Korea

Chemical Management System in Korea



**OCCUPATIONAL SAFETY AND  
HEALTH RESEARCH INSTITUTE**



Illustrator Kim, Hye Soo

## ***Paul Potts sings at the Seoul Plaza***

*Paul Potts, a famous popera star and the winner of Britain's got talent, astounded the world with his phenomenal voice.*

*His voice, which had been a source of solace when he was bullied, going through adrenal tumor, traffic accident and financial difficulties, illuminated a beautiful and unforgettable evening in Seoul.*

*Thousands of people gathered at the Seoul Plaza to see him perform 'Nessun Dorma'. From Paul Potts' performance, people were reminded to never give up hope despite the economic crisis and political chaos.*

*In acknowledgement of his passionate life...*

# OSH RESEARCH BRIEF

July 2009

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**The contents may include authors' personal opinions which differ from OSHRI's official interpretations.**

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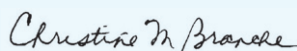
# Congratulations on OSHRI's 20th Anniversary

The National Institute for Occupational Safety and Health(USA) is most pleased to contribute to this special edition of the Occupational Safety and Health(OSH) Research Brief. We are very proud of our long association with KOSHA and applaud the thoughtful and diligent work that has been given to advancing occupational safety and health research. As a matter of policy and practice, KOSHA has relied heavily on science to determine how to use its public resources and authority as well as address critical occupational safety and health concerns globally. Through KOSHA's long partnership with NIOSH we believe that you have strengthened our program here in the United States as well as in the global environment. Recently, and most notable is the strong leadership role that KOSHA played in guiding partners around the globe to commit to the occupational safety and health principles thoughtfully referenced in the Seoul Declaration.

Today, our global occupational safety and health programs continue to evolve to meet the complex challenges that we face in the 21st century. Ensuring that a worker returns home without injury or illness after a day's work keeps our families, our communities, and our global family strong.

We look forward to continued cooperation and partnership.

Christine M. Branche  
Acting Director, NIOSH



The Finnish Institute of Occupational Health (FIOH) would like to extend its warmest congratulations to the Occupational Safety and Health Research Institute of the Korea Occupational Safety and Health Agency on its 20th anniversary. During these two decades, OSHRI and KOSHA have achieved remarkable accomplishments in the field of occupational safety and health, both nationally and internationally.

Over the years, OSHRI has grown into a research institute of international stature. Today, it plays an important role in international networking, particularly within such key professional organizations as the International Social Security Association (ISSA) and the International Commission on Occupational Health (ICOH). And since KOSHA is organizing the ICOH International Congress on Occupational Health in 2015, it will gain an even more visible role. OSHRI and KOSHA also played a pivotal role in bringing about the Seoul Declaration on Safety and Health at Work, which was adopted in June 2008 as a blueprint for constructing a global culture of safety and health at work.

FIOH acknowledges OSHRI's expert contributions in international arenas, and wishes OSHRI all the best in the years to come.

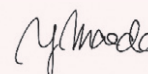
Harri Vainio  
Director General, FIOH



On behalf of all my colleagues in the National Institute of Occupational Safety and Health, Japan(JNIOH), I would like to congratulate the Occupational Safety and Health Research Institute(OSHRI) on its 20th anniversary. It is a great pleasure for me to send this message on this occasion. On April 1, 2009, JNIOH was consolidated as a single, independent administrative institution based on two national institutes formerly known as the National Institute of Industrial Safety(NIIS) and the National Institute of Industrial Health(NIIH) in Japan. In the same year, JNIOH held a mutual research collaboration agreement with OSHRI.

In the past twenty years, NIIS and NIIH had been separately collaborating with OSHRI. In the next decade, however, JNIOH could collaborate single-handedly because JNIOH has come to have research capacity of both safety and health as a result of consolidation between NIIS and NIIH. In this context, we are deeply interested in the journal dealing with not only occupational safety but also occupational health. I believe the journal will continue to be a pathfinder of OSH journal and will bring the new and interesting angle for OSH in Korea and I hope this message would be a new trigger of our brilliant partnership and development of OSH in Korea and Japan.

Yutaka Maeda  
President, JNIOH







# 20th

It is my great pleasure and honor to send you the congratulatory message and best wishes on the occasion of the 20th anniversary of establishment of the Occupational Safety and Health Research Institute(OSHRI) of the Korea Occupational Safety and Health Agency(KOSHA).

Since establishment, OSHRI has played very important role in OSH research and contributed actively to protection of workers' health in Korea as well as in the world. OSHRI has actively participated in international cooperation and made effort to share advanced technologies and experiences in the area of occupational safety and health by reinforcing cooperative activities with many professional organizations in different nations as well as such international agencies as ILO, ISSA and WHO. In addition, OSHRI has also involved in organizing several very important international conferences, such as recently the XVIII World Congress on Safety and Health at Work in 2008 and in the near future the 31st International Congress on Occupational Health in 2015.

In the recent years, OSHRI has had close collaboration with the National Institute of Occupational & Environmental Health (NIOEH) in Vietnam in promotion of health and safety at work and strengthening occupational safety and health research collaboration in our region. I hope that this collaboration will be continued and developed to contribute to global OSH research and implementation of Global Action Plan for workers' health in general and to supporting and implementing Seoul Declaration on Safety and Health at Work dated June 29, 2008 in particular.

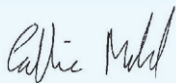
Nguyen Duy Bao

Director, NIOEH



The Health and Safety Laboratory(HSL), an agency of Great Britain's Health and Safety Executive(HSE), is proud of its long standing partnership with the Korea Occupational Safety and Health Agency(KOSHA). We are pleased to congratulate OSHRI of KOSHA as it celebrates 20 years of work protecting workers from injury and ill health. HSL has been proud to host visits by KOSHA specialists to our laboratories in the UK. In addition, a return visit has been made by HSL specialist to KOSHA. This has allowed collaborative work to be undertaken resulting in a paper to the IEA(International Ergonomics Association) 2009 conference. Partnership and collaboration is important to both organisations as sharing knowledge and best practice will both enhance the expertise of our specialist staff and, more importantly, benefit workers internationally. HSL looks forward to the next 20 years working in partnership with KOSHA and meeting our KOSHA colleagues in China in August 2009 for IEA 2009.

Eddie Morland  
CEO, HSL



As President of the Italian Institute for Occupational Safety and Prevention(ISPESL), it is my great pleasure to express my best wishes for the 20th anniversary of the Occupational Safety and Health Research Institute(OSHRI) of the Korea Occupational Safety and Health Agency (KOSHA), for the leading role played so far in OHS research, also considering the bilateral agreement(MAUN) signed between our Institutes in March 2009.

The rapid improvement and growth of industrial technologies make workers and population exposed to new and even higher risks. Therefore, it becomes necessary for all Research Institutes engaged in OHS sector to carry on their effort in keeping abreast of scientific knowledge, conforming and increasing their structures and strategies of study and research, monitoring the ecosystem in order to efficiently support development, scientific discoveries, innovation of processes, tools, methods and models as well as improvement of materials, equipments, machines and products.

Our wish for OSHRI is to continue carrying out in a deeper new way the role of OHS Research Institutes.

Antonio Moccaldi

President, ISPESL

## Looking Back to Prepare for the Future of OSHRI

The Occupational Safety and Health Research Institute (OSHRI), established on July 19, 1989, has come to its 20th anniversary. Our Institute has conducted over 1,000 researches and carried out projects in the fields of safety certification, quality control, epidemiological studies, statistical analyses, and international cooperation to prevent occupational accidents during 2 decades. OSHRI will strive to become a hub of national research as well as a globally recognized organization, based on our experience and expertise.



Director General **Seong-Kyu Kang**,  
Occupational Safety and Health Research Institute (OSHRI)

## Background of Establishing the Institute

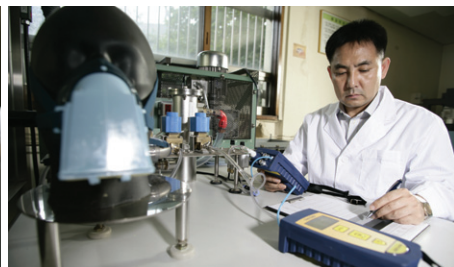
The International Labour Organization (ILO) recommended that the Korean government establish an institute to conduct researches on preventing occupational injuries and illnesses in 1968, when Korea was just about to start industrialization. On December 28, 1974, the government decided to establish an institute for occupational safety and health (OSH) in cooperation with the United Nations Development Program (UNDP). Against this background, the government promulgated the Presidential Decree (No 8522) for establishing the National Institute of Labor Science (NILS) on April 28, 1977. NILS was established under the Ministry of Labor with 36 staff members. The UNDP dispatched experts on OSH to NILS from 1978 to 1982.

OSH has not been a major social concern until the rate of occupational injuries and diseases grew exponentially in the late 80s as a consequence of industrialization, which had begun in the 1970s. Until the mid 80s, the labor policy had focused mainly on economic development, fewer industrial disputes, and promoted the timely supply of skilled labor for the nation's industries. An issue of improving the work environment did not receive attention from policy-makers and employers even after the Industrial Safety and Health Act was established in 1980. As a result, the rapid industrialization caused unforeseen consequences for Korean society and its people, including OSH problems.

## Establishment of OSHRI

### Beginning

In 1987, the Korea Occupational Safety and Health Agency (KOSHA) was established to conduct technical assistance to workplaces for preventing occupational accidents and illnesses. NILS



was closed on February 16, 1989, and transferred its facilities and equipment to the newly established institute, which was called the Occupational Safety and Health Research Institute (OSHRI). OSHRI with 66 employees was established to conduct researches on OSH under KOSHA on July 19, 1989 in Incheon. OSHRI consisted of Department of Research, Department of Certification, and Department of Survey and Statistics.

### Separation into Two Institutes

The outbreak of carbon disulfide poisoning in the late 80s and early 90s brought public attention to workers' health and working conditions. A viscose rayon factory, which exposed workers to carbon disulfide, was responsible for approximately 1,000 cases of carbon disulfide poisoning. In 2008, 28 billion Korean won was spent for the compensation of carbon disulfide poisoning, although the factory was closed in 1993. However, OSHRI in 1990 could not respond adequately to occupational health issues including the carbon disulfide poisoning scandal due to the lack of qualified occupational health professionals and facilities. The Comprehensive Plan for Preventing Occupational Diseases was reported to the President of the Republic of Korea in June, 1991. In accordance with the plan, OSHRI incorporated with the Institute of Occupational Disease Research (IODR) in the Korea Labor Welfare Cooperation (KLWC), to be reorganized into the Occupational Safety Research Institute (OSRI) and the Occupational Health Research Institute (OHRI) in January, 1992.

The IODR, which was established in April, 1989 with 21 staff, succeeded the Institute of Pneumoconiosis which was established in 1985 due to the miners' strike in 1980.

The IODR conducted researches and diagnosis on occupational diseases.

OSRI consisted of Department of Machine and Electricity Safety, Department of Chemical Safety, Department of Construction Safety, and Department of Certification. OHRI consisted of Department of Industrial Hygiene which originated from the Occupational Health and Hygiene Team of OSHRI, Department of Industrial Toxicology, Department of Occupational Medicine, and Center for Occupational Disease Diagnosis, which originated from IODR. The Department of Industrial Toxicology was expanded to the Industrial Chemicals Research Center with inhalation toxicity laboratories in a separate location, the Daedeok Science Town in Daejeon in September, 1997.

### Reunion of Two Institutes and its Organization

OSRI and OHRI were re-merged into OSHRI on December 28, 1998, as a result of the economic crisis in 1997.

Currently, with the several reorganization processes, OSHRI consists of 149 employees in eight units; Department of Safety Management and Policy Research, Department of Safety System Research, Department of Occupational Environment Research, Center for Occupational Diseases Research, Center for Chemicals Safety and Health, Center for Safety Certification and Assessment, Safety and Health Statistics Team and Management Support Team. The major responsibilities of OSHRI include conducting researches and performing various activities for the prevention of occupational accidents and diseases.



## Research

OSHRI conducted researches on various topics including toxicology, epidemiology, biological monitoring, industrial hygiene, health statistics, engineering control, safety engineering, and safety and health policy.

Since its establishment, OSHRI performed 1,057 research projects including 154 reports on occupational health policies and management system, 320 reports on occupational safety, 137 reports on work environment, 270 reports on health effects, and 170 reports on safety and health of chemicals. During the last 5 years, 389 papers were published in peer review journals nationally or internationally and over 1,000 papers were presented at national and international scientific conferences.

Until 2002, research topics were decided solely by the researchers' interests. OSHRI planned to set up the research priorities in 2002. Ideas were collected from OSH experts. Using the analytic hierarchy process, the research priority areas were selected. The long-term strategy for conducting researches was finally settled down in 2005. The strategy was divided into 11 areas with 46 items. The 11 areas are 1) National OSH management system, 2) OSH issues related to changing labor environment 3) psychosocial factors and job stress 4) engineering controls on dangerous equipment and risk evaluation techniques 5) development of prevention technologies for serious accidents 6) ergonomics and musculoskeletal diseases 7) toxicology and hazard evaluation on chemicals 8) work environment risk assessment and control 9) biological effects of hazardous substances 10) diagnosis and surveillance of work-related diseases 11) producing basic database and information dissemination.

In addition to the research priorities, research topics are

regularly collected from academia, workplaces and government to reflect the current problems and practical needs.

## Activities

### • Safety Machine and Equipment

Developing safety devices and equipment never reached the rate of economic development. Being caught and rolled between machines is one of the most common causes of occupational injuries in Korea. These injuries usually occur due to improper devices and equipment. OSHRI received 24 patents on safety devices and equipment, which are related to preventing injuries from being caught or rolled, falling down, and slipping or tripping.

Although safety devices and personal protective equipment (PPE) have been provided from the beginning, the quality of those was not guaranteed. In order to guarantee the quality, the Industrial Safety and Health Act imposes that major safety devices and PPE must be used after testing or obtaining certification. OSHRI has performed testing and issued certification to safety devices



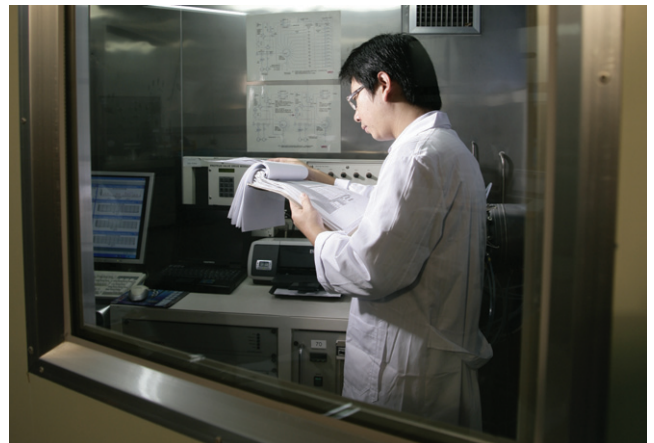
and PPE since its establishment. Furthermore, OSHRI developed a new program called *S mark* in 1997, which is a safety certification system wherein the safety and reliability of harmful or hazardous machines and equipment, component parts, safety devices, PPE, and other items are examined. The *S mark* contributes to the improvement of safety in the process of designing and manufacturing. OSHRI established a mutual certification system with 16 international or multinational agencies such as TUV Rheinland Korea.

OSHRI has been issuing legal certification for electrical machinery and apparatus to prevent accidents involving fire and explosion in the environment with flammable gas, vapor or combustible dust since 1992. In 1998, the certification became valid in the participating countries of the IECEx (explosive) Scheme.

#### • For Non-Hazardous Work Environment

OSHRI provides Material Safety Data Sheet (MSDS) for 50,800 chemicals. MSDS, which is supposed to be produced by the manufactures, has been served and disseminated to workers and even employers for their convenience since 1996. The MSDS editing program was developed in order to produce MSDS for mixed chemicals in 2008. OSHRI has taken a lead in introducing and implementing the Globally Harmonized System of Classification and Labeling of Chemicals (GHS classification) among government agencies and their affiliations. OSHRI also plays an important role in responding to the Registration, Evaluation, Authorization, and restriction of Chemicals (REACH) regulated by the European Union (EU).

Even though there is no sign of health effects, OSHRI



conducts hazard evaluations in workplaces upon voluntary request where unsolved problems by conventional work environment measurements are arising.

#### • Quality Control of Laboratories

In the late 80s and early 90s, the main dispute in chemical exposure and poisoning investigations was the reliability of the results of analyzing biological samples. OSHRI operated the quality control program for environmental and biological samples. We have performed the quality control program for environmental samples with our own standard samples since 1992, while the program for biological samples started in 1995, when the standard sample was developed. Through mandatory quality control program, the ability and skill of analyzing environmental and biological samples of the participating laboratories have improved dramatically.

The problem of inaccuracy of taking and interpreting audiogram and chest radiograph was raised in the mid 90s. As a result, the quality control program for audiogram and chest radiograph started in 1996. OSHRI has invited occupational nurses in charge of taking audiograms to

educate the correct method of measuring the audiogram. The laboratories have been periodically evaluated for their quality of audiogram. OSHRI has also invited radiograph technicians to educate the correct techniques for taking good films and radiologists to educate the ILO standard film for pneumoconiosis. These factors contributed to achieving greater accuracy in diagnosing noise-induced hearing loss and pneumoconiosis.

#### • Health Effects

Before OSHRI was established, there was no public organization to conduct investigation on occupational diseases. The Ministry of Labor had organized the Occupational Disease Deliberation Committee with experts from academia based on the case if necessary. However, it was difficult to reach consensus because there were no good field reports. OHRI, which succeeded ODRI, continued the epidemiologic investigation by the request of the KLWC which is a compensation agency for occupational injuries and illnesses. Through in-depth field investigations, OSHRI had gained the reputation for accuracy and fairness of the investigation from both employers and employees. The epidemiologic investigation was legislated in 1999, where the number of investigation amounted to 2,096 cases by 2008 since its establishment.

OSHRI performs studies on retired workers who have been exposed to carcinogenic chemicals during their employment period. The health examination is conducted by OSHRI or requested to the occupational health service agencies to be carried out. It also runs surveillance programs for specific diseases such as occupational asthma and mesothelioma. Participating clinicians are requested to report their case when suspected to be work-related.



#### • Statistics

The official statistics for occupational injuries and illnesses in Korea comes from the data of compensation. It presumably covers all cases of occupational injuries and illnesses, especially serious injuries, even though it is questionable to report correctly in minor injuries. The statistics are published in the Annual Statistics on Industrial Accidents and Diseases. However, it is somewhat inadequate to reveal the cause of accidents because the data is collected for the purpose of compensation. OSHRI investigates the cause of accidents and diseases from surveys and publishes it in the Annual Investigation on the Cause of Industrial Accidents and Diseases, which was approved as an official national statistics by the Korea National Statistical Office.

#### • International Collaboration

OSHRI has closely collaborated with institutes for OSH in other countries and international organizations such as the ILO and the WHO.

OSHRI hosted various international scientific meetings.



OSHRI hosted the 9th International Symposium on Neurobehavioral Methods and Effects in Occupational and Environmental Health of the Scientific Committee of Neurotoxicology and Psychophysiology of ICOH in 2005, in collaboration with the Korean Society of Occupational and Environmental Medicine. OSHRI hosted the 5th Asia Pacific Symposium on Occupational Safety in Busan from October 30 to November 2, 2007, in collaboration with the Korean Society of Occupational Safety

OSHRI also organized and hosted the 2nd International Meeting of National Institute of Occupational Safety and Health in Asia in 2007, which brought 9 leading institutes of OSH in Asia.

OSHRI is actively participating in the International Standard Organization (ISO) as a Korean representative of the Technical committee (TC) 94 (Personal safety-Protective clothing and equipment), TC96 (Cranes), TC146 (Indoor air quality), TC159 (Ergonomics), and TC199 (Safety of machinery). OSHRI also participates in the International Electrotechnical Commission (IEC)/TC101 (Electrostatics), and TC31 (Equipment for explosive atmospheres). Based on international collaboration, OSHRI


is taking a lead in making guidelines for OSH, named the KOSHA code.

#### • Future of OSHRI

OSHRI is going to pursue its accomplishment based on the experience of the last 20 years.

As a public institute, OSHRI focuses on researching OSH policies and systems in order to provide better and more informed suggestions to the government for safer workplaces. Researchers will develop their ability and potential in the field of newly emerging OSH problems. To exchange knowledge and experience, OSHRI will continue communicating with scientists around the world by publishing articles and participating in international conferences. It will take a lead in scientific publication by 2015. Researchers will be evaluated by the performance of publication and activities related to OSH. The 31st ICOH Congress to be held in Seoul in 2015 will be a good opportunity to reach the goal. OSHRI will host various international conferences and seminars by the 31st ICOH Congress.

OSHRI is going to publish an international scientific journal, which will be preliminarily called 'Health and Safety at Work', from 2010. It will publish original articles, reviews, case reports, field reports, and relevant articles related to OSH.

OSHRI will keep the position as a hub of research on OSH. It will continue to financially support academia and societies in the future. It will also continue to communicate and share the experience with developing countries as well as developed countries through exchanging scientists and hosting international meetings. 



# Mid- and Long-Term Strategy of OSHRI

With rapid changes in industrial environment caused by economic recession, changes in industrial structure, and employment, a new paradigm for research strategies of occupational safety and health is required. In commemoration of the Occupational Safety and Health Research Institute's (OSHRI) 20th anniversary, this paper evaluated the outcomes and problems we have accomplished and encountered since the foundation in 1989. The OSHRI aspires to support other domestic occupational safety and health institutes and develop global strategies for occupational safety and health.



Director Jung, Wan-Soon

Department of Safety Management and Policy Research  
Occupational Safety and Health Research Institute

## Background

The trend of global occupational safety and health is changing to include new hazardous elements such as stress, nanoparticles and toxic biological substances. The trend is also changing from disease prevention to creation of economic profit through improvement of workers' quality of life. To comply with the changes, we are face to provide new plans for a new direction and lead broader scope of businesses for occupational safety and health management. Accordingly, with the 20th anniversary of the Occupational Safety and Health Research Institute (OSHRI), we have set a new vision and strategies to cope with the changes and by taking this opportunity, will strive to develop into a globally recognized institute of occupational safety and health.

## Accomplishments and Challenges

Since the foundation, OSHRI has successfully carried out its role as a public research organization to prevent occupational accidents, conducted researches on occupational diseases, and made every effort to improve workers' quality of life for maximizing both social and economic profit. The number of researches we have conducted amounts to 1,057, indicating our researchers' arduous efforts contributed to preventing occupational accidents [Figure 1]. However, most of the conducted researches are short-term projects concentrated on manufacturing and construction industries, so it is true that we lack feasible policies and practical researches that could be applicable in these fields. Therefore, we need to make medium- and long-term research strategies to optimize our accomplishments and conduct joint researches with domestic and foreign research centers to exchange sources and information.

In addition to conducting researches, we have established numerous projects to improve working environment and protect workers' health. OSHRI's key projects include epidemiologic survey on occupational diseases, provision of Material Safety Data Sheets (MSDS), management of work environment measurement service, provision of asbestos analysis service and special medical examination service, and evaluation on risks and dangers of chemical substances. The projects are legally commissioned by the Ordinance of Industrial Safety and Health Act and the corresponding infrastructures of public organizations are actively utilized. Accordingly, these features made it possible to widen the projects and gain good results in a short period of

time. However, in order to broaden the field of occupational accident prevention projects and occupational safety and health market, civil organizations providing occupational accident prevention services in accordance with the market principals must be further developed. So it is necessary to make civil organizations in charge of responsibilities that can be carried out by them.

OSHRI started with 66 staff members in 4 departments under 2 divisions. Currently, there are 149 staff members with 8 offices and centers. But our institute is still small in size, compared to other internationally renowned occupational safety and health organizations such as the National Institute for Occupational Safety and Health (NIOSH) and the Finnish Institute of Occupational Health (FIOH). To become an internationally recognized occupational safety and health research institute, we need to modulate our research infrastructure (personnel, budget, organization and facility, etc.) to comply with leading occupational safety and health institutes and also find and support excellent researchers.

## Changes and Prospects of Research Conditions

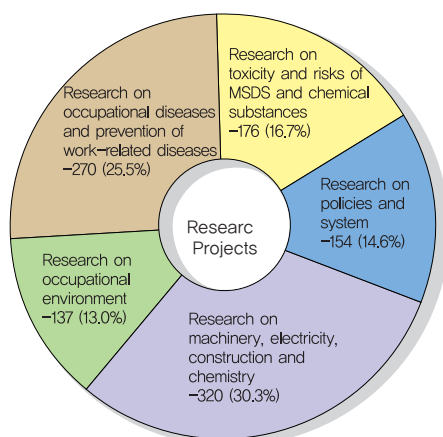
Since 2000, the rate of occupational accidents has plateaued. This is because the structure of the Korean industry has changed with the economic growth. While the rate of primary and secondary industries decreased, the rate of service industry and small businesses continued to increase. Also, economically active population decreased in accordance with low birth rate and increased untrained workers such as female, aged and migrant workers. To solve these problems, three social structures have been closely examined.

Firstly, domestic industrial structure has rapidly changed from

manufacturing and construction industries to service industry. Regarding occupational accidents, the rate of occurrence at manufacturing and construction industries has decreased, but the rates at other industries such as finance, insurance, food, hospitality and sanitation have continuously increased. Also, the type of accident such as new occupational diseases and work stress are being diversified. Therefore, a sector-based approach needs to be carried out in accordance with the changes of industrial structure.

Secondly, the structure of employment is changing rapidly. Female and aged workers are increasing due to aging society and growing gender equality, and migrant workers are continuously growing because many Koreans are unwilling to get employed at small businesses. Diversification of employment type is changing the employment structure from young and male-oriented regular jobs into the female and old-oriented non-regular jobs. Therefore, characteristics of employment structure must be investigated and researches should be conducted on occupational accident prevention in small sized businesses with less than 5 employees where most of the workers are prone to occupational accident.

Thirdly, the government seems to change its plans for occupational safety and health due to pluralistic society and economic recession. Because most of the business owners consider the obligations to safety and health specified in the Industrial Safety and Health Law as regulations, they will continue to ask the government for deregulation. The government is actively coping with the demands of enterprises to overcome this economic downturn. Also, the decision-making processes for safety and health plans are changing from ‘government’, the conventional top-down process, into ‘governance’, the bottom-up process, which means that the decision-making is done with participants from a variety of societies. Therefore, it seems that the government will focus on their administrative capacity to cope with the new paradigm using various methods such as upgrading occupational safety and health law system, strengthening safety and health management system, and expanding the private sector of safety and health market. To keep up with the changes, our institute will start researching government policy on occupational safety and health and carry out medium- and long-term projects that comply with the national agenda<sup>1)</sup>.



[Figure 1] Research Projects Categorized into Different Fields

1) The rate of occupational accident reached 0.54% which corresponds to that of the developed countries.



## Vision and Strategy

To cope with new paradigm changes and develop into an internationally renowned institute for occupational safety and health, we set our vision, 'Institute Leading the World with Creation of New Values', and the objective for the medium- and long-term management, 'To become one of the world's top 5 occupational safety and health institute by 2015'. We also selected 4 strategic objectives and 7 strategic projects [Figure 2].

### Strategic Project 1: Focus the Research on Improving National Policies and Solving Current Social Issues

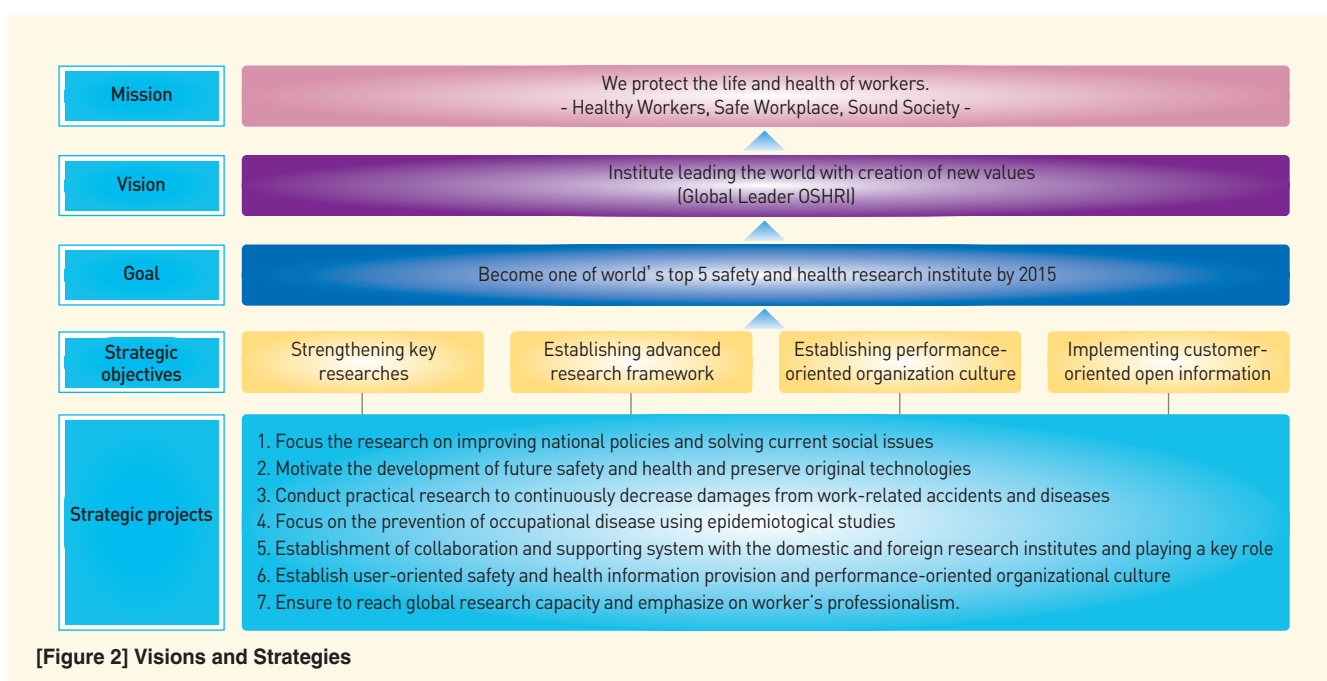
The aim of national policies and the present social issues in the field of occupational safety and health is to make the rate of occupational accidents less than 0.54% by 2012. To do so, KOSHA and OSHRI will fulfill the nation-wide agenda on occupational safety and health to maximize the application of research and project outcomes such as establishment of national policies, improvement of related systems and encouragement of network between social issues and preventive activities of occupational accidents.

#### [Priority Projects]

- Conduct researches on feasibility and economical efficiency

of activities and policies for occupational accidents

- Develop a new index to objectify and measure the levels of safety and health at the workplace to establish new policies
- Conduct researches on advanced legal system for occupational safety and health
- Make a survey and an analysis of legal system and penalties on international occupational safety and health to introduce appropriate system of occupational safety and health for domestic environment
- Conduct researches on social safety net in dangerous societies and policies for protecting workers prone to occupational accidents
- Establish policies to effectively protect workers vulnerable to occupational accidents such as old, female and migrant workers who contribute to the growing number of occupational accidents
- Conduct researches on the countermeasures of changes made to industrial structure and the expansion of preventive measures of occupational accidents
- Conduct researches on individual business type to cope with changes made to industrial structure and make plans to reduce occupational accidents of other industries
- Conduct researches on characteristics of social and psychological environment to find out new methods for preventing occupational accidents



- Suggest methods of approaching occupational accidents from new perspectives by expanding the socio-psychological aspects as well as approaching the existing natural scientific aspect
- Conduct researches on hazardous machines and equipment-related systems such as press and its safety standards
- Develop safety standards for hazardous machines and equipment such as press, conveyors, and injection moulding machines which are the main causes of accidents involving being-caught in the machines' and make plans to include those machines in the safety certification system
- Conduct researches on survey of safety system for hazard and risk prevention plans and on improvement of safety system
- Analyze the outcomes of hazard and risk prevention plans which take effect under the Article 48 of Industrial Safety and Health Act, and make plans to apply the results
- Conduct researches on measurement and analysis of asbestos and methods of asbestos quality control
- Make plans to solve the problems of asbestos; secure the facility for precise analysis on asbestos, cope with issues related to asbestos exposure, assess exposures to asbestos in all business sectors, and make plans of controlling asbestos-related jobs
- Conduct researches on plans for adequate operations of occupational safety and health system such as expanding the efforts to protect workers' health
- Expand the efforts to protect workers' health and make plans to improve working environment and workers' health control system
- Investigate the causes of new occupational diseases and conduct researches on changes of labor structure
- Analyze the causes of new types of accidents and diseases from introducing new production technology, producing new chemical substances and increasing their usage, and increasing socio-psychological hazardous elements and work-stress, and suggest countermeasures for those issues
- Conduct researches on changes made to the policies of international chemical substance system and its assessment control system
- Establish advanced chemical substance control system to cope with trends of international chemical substance control and make a system for transferring data on hazards of chemical substances

## Strategic Project 2: Motivate the Development of Future Safety and Health and Preserve Original Technologies

To develop into a global institute, we will reestablish original technologies to see if they are required to be transferred to the private sectors, and we will continue to conduct researches to obtain other innovative technologies which will help to improve our institute.

### [Priority Projects]

- Conduct researches on development of protection system monitoring device using ubiquitous technology
- Develop protection system monitoring device which remotely control the protection system installed in the hazardous machines and equipment
- Conduct researches on development of safety standards related to new technologies
- Review wind load on new technology and new construction methods for ACS (Auto Climbing System) and CPB (Concrete Placing Boom) which are primarily used in construction of very tall buildings and main tower of cable-stayed bridges, and develop safety standards
- Conduct researches on assessment technology of fine articles such as nano-particles
- Find out and predict the current conditions of workplaces which are highly exposed to nano-particles, establish an assessment system of nano-particle exposures, and develop related measurements and analysis technology
- Conduct researches on technology of assessing biological factors such as bio-aerosol, etc.
- Establish a system assessing the biological factors such as germs, molds and bio-aerosol, etc. and make a standard of exposure to those factors
- Conduct researches on securing new technologies through development of measuring devices and mechanism of working environment
- Develop automatic analysis system for chemical substances, quick measuring device of ventilation frequency, sampling machine for standard activated charcoal tube and solvents, pumps and flow compensating device for sampling, and system for measuring and analyzing high noise storing MP3 and remote noise
- Conduct researches on establishing precise analysis system



- for the components of raw materials such as new fabrics
- Develop precise analysis methods on various hazardous factors from chemical products, small components at working environment and new occupational disease inducing materials
  - Conduct researches on assessment of physico-chemical hazards and safety of chemical substances
  - Conduct researches on assessment of physico-chemical hazards and safety of new elements of accidents such as increasing new chemical substances and changing processes
  - Conduct researches on establishment and operation of chronic inhalation toxicity test system
  - Make an assessment for chemical substances by establishing chronic inhalation toxicity test system to predict the effects of chronic inhalation toxicity on workers who are exposed to low-concentration of toxic substances for a long time, and by reinforcing the assessment of hazards for unidentified toxic substances

### Strategic Project 3: Conduct Practical Research to Reduce Damages from Work-Related Accidents and Diseases

When we carry out field-oriented practical researches, three frequent accidents amounting to 57.8% of occupational accidents will decrease. To accomplish this, we will develop risk assessment methods and safety models of three frequent accidents, and suggest safety standards. In addition, we will verify the necessity and feasibility of researches, analyze the business sectors which bring about a lot of occupational diseases and fatalities to suggest appropriate countermeasures, make assessment for workers exposed to a variety of hazardous

factors at workplaces, and identify hazardous elements which become social issues in order to find out practical measures.

#### [Priority Projects]

- Conduct researches on three frequent accidents such as being-caught in machines, slip & trip, and falls
- Develop risk assessment methods and safety models for three frequent accidents and suggest safety standard
- Conduct researches on safe design and of hazardous elements
- Predict the safety of production facilities through stress analysis, fatigue assessment on materials, and machine structure and based on it, conduct researches on safe design and function to prevent occupational accidents
- Conduct researches on technology of preventing accidents using ergonomics
- Develop ergonomic technologies to fundamentally prevent conventional and repetitive accidents for improving working procedures
- Conduct researches for safety consciousness, surveys and public awareness enhancement for the people concerned with workplaces
- Develop field training system and customized safety training manual necessary for safety training
- Conduct researches on accident monitoring models for occupational accident based on emergency room
- To improve some unclear aspects of accident overviews on the application form of occupational health nursing, develop models which can be applied to the occupational accident survey table in the emergency room of the general hospital, and make plans for expanding these models



- Conduct researches on expanding the assessment for hazards of chemical substances
- Secure outstanding test technologies through operation of KOLAS (Korea Laboratory Accreditation Scheme) and proficiency test assessment organization to obtain reliable results
- Conduct researches to find out toxic materials related to occupational diseases
- Assess risks of materials inducing occupational diseases and find out toxic mechanism of suspected human carcinogen; for example, inspect risks of chemical substances which have caused problems in tire and semiconductor manufacturing sectors
- Conduct researches on management tools which give practical assistance to workplaces
- Develop models for standardized industrial ventilation and harmful and hazardous materials, and develop a tool applicable in the field; for example, develop real-time monitoring kit to prevent oxygen deficiency in workers
- Conduct researches on development of preventive measures of field-friendly occupational diseases
- Develop plans for health management of occupational diseases; for example, develop indices of measuring the degrees of musculoskeletal system dystrophy and the preventive instructions of brain and cardiovascular diseases
- Conduct researches on improving reliance of assessment technology of harmful factors
- Secure high-level analysis and assessment technology by improving reliance on assessment technology of physical factors such as ability to measure and analyze chemical factors like high toxic substances, technology to assess unknown harmful factors, air quality of offices and physical factors such as noise
- Conduct researches on scientific foundation for preventive measures of occupational diseases
- Establish the cohort of workers exposed to harmful factors by business sector to track and control them in long term, and conduct researches on mechanism of developing occupational diseases by harmful chemical substances

#### Strategic Project 4: Focus on the Prevention of Occupational Disease Using Epidemiological Studies

We will identify the causal relations and suggest the countermeasures prior to occupational diseases occur, by

providing users with academically feasible survey results to determine occupational diseases which become social issues and by reinforcing the epidemiologic survey for preventive measures. In addition, we will detect occupational diseases earlier by establishing a central surveillance system for them.

#### [Priority Projects]

- Reinforce the preventive outcomes of epidemiologic survey and make procedures of the survey available
- Select the sectors which are expected to develop occupational diseases in the future and conduct nation-wide survey for selected sectors and improve the procedures of epidemiologic survey
- Identify the changes of occupational disease trends by establishing a central surveillance system
- Establish central surveillance system for occupational diseases to precisely investigate the occurrences and distributions of occupational disease and work-related diseases that cannot be identified under the current system<sup>2)</sup>
- Make assessment of working environment more efficient
- Make assessment of customized working environment and prepare solutions and control social issues and causes of occupational diseases at large-scale industrial complex
- Select excellent researchers and develop the training programs
- Reassign human resources in short term to improve the productivity of their work, and employ excellent employees in long term to provide customized training programs

#### Strategic Project 5: Establishment of Collaboration and Supporting System with the Domestic and Foreign Research Institutes and Playing a Key Role

As the OSHRI is planning on becoming a global institute, OSHRI is planning on becoming a hub institute by promoting professionals of occupational safety and health, proactively playing a key role and forming new alliances with other organizations. To accomplish this, the OSHRI will share the know-hows and experiences with other domestic institutes and also make more efforts to establish international cooperative networks with the developing countries. OSHRI will also host an

<sup>2)</sup> Gradually expanded the target diseases by adding 4 new diseases in 2008, and 2 new diseases in 2009



international seminar every year for domestic and foreign researchers to have an opportunity to meet and exchange information.

#### [Priority Projects]

- Make new alliances with domestic and foreign institutes
- Make new alliances with domestic and foreign institutes to conclude MOUs to make joint projects and expand mutual exchanges such as joint symposia
- Create a website with the alliance team
- Create a website (AOSHRI) of Asian alliance to secure the initiatives as an Asian hub and based on it, create other websites to work together with the international research institutes to develop into a global hub
- Collect research information on safety and health from domestic and foreign institutes and apply them widely
- Make a foundation to obtain and disseminate significant results and research information for our employees to play a key role in information and knowledge exchange safety and health
- Establish and support management system for working environment to provide high-quality services
- Secure the reliability on analytical quality assurances of the special medical examination service, working environmental measurement service and asbestos investigation service to establish a quality assurance program
- Select and examine international standards related to occupational safety and health
- Establish and amend national standards related to safety in the use of machinery (ISO/TC199), explosion protection of

electrical equipment (IEC/TC31), air quality (ISO/TC146) and ergonomics (ISO/TC159) and carry out proactive responsibility as a coordinator of the domestic and foreign institutes

#### Strategic Project 6: Establish User-Oriented Safety and Health Information Provision and Performance-Oriented Organizational Culture

The OSHRI will establish user-oriented information system. Above all, we will consolidate the survey statistics to analyze the causes of accidents more carefully and suggest preventive measures, develop from simply providing the accident statistics and increase the ranges of statistics for users to analyze them comprehensively. For Material Safety Data Sheets (MSDS), we will not rely on providing its data or information for users, but will promote it as a brand for users to obtain general information on chemical substances.

#### [Priority Projects]

- Strengthen basic statistical surveys for preventive measures of national occupational accidents
- In addition to the rate of occupational accidents, arrange strategic surveys to cope with the demands on various related indices and policies and continue conducting tailored surveys on the causes to accident prone workplaces and vulnerable workers
- Improve reliability of statistics on occupational accidents
- Diversify the methods of statistics, improve the standards of statistics by operating the system of its own quality diagnosis
- Analyze the statistics of occupational accidents and establish the information system
- In liaison with data of occupational accidents, health and employment insurance, provide information on comprehensive preventive measures of occupational accidents to users by analyzing not only the status of occupational accidents in accordance with employment types and demographic characteristics, but also the results of workers' checkups, the assessment of the working environment, the working environment measurement and the information on occupational accident compensation insurance
- Make use of the latest computing equipment and software to make it possible to analyze a variety of statistical information, and make tailored statistical information for users and provide them with efficient services such as basic information for

preventing occupational accidents and analysis of project efficiency

- Establish and operate the center of chemical material safety data
- OSHRI will not rely on providing its data or information on MSDS for users, but will develop into a comprehensive information center for chemical substances and promote it as a brand (KOCIC; KOSHA Chemical Information Center)
- Enhance MSDS information by continuously expanding GHS MSDS DB of basic chemical substances and establishing the latest scientific procedures with the amount of chemical substances used and the number of MSDS utilized
- Amend the laws on chemical substances and establish a system to easily cope with international trends on classifications of toxicity and hazards of chemical substances
- Provide chemical material safety data
- Provide amended information on MSDS such as amendment of laws on chemical substances by operating MSDS website
- Encourage business owners to autonomously control MSDS and support small sized businesses to write MSDS
- Introduce an evaluation system for reliance on MSDS
- Enhance the reliance on each item of MSDS and make an examination of MSDS trade security to guarantee the trade secret of businesses and prevent accidents and diseases arising from chemical substances
- Strengthen publicity activities on the research results
- Divide domestic and foreign customers of the researches and establish medium- and long-term publicity strategies, and create a website for researchers in Korean and English
- Establish an organization suitable for creating new values
- Reorganize the institute to strengthen the functions of research departments and joint and cooperative researches among the offices and centers, and establish a research organization of 200 employees by reinforcing the functions of the Department of Research Plan and Assistance
- Create an autonomous and creative organization culture
- Give responsibilities and rights to the head and directors of the institute and develop programs to make them collaborate by mutually understanding the concerns of all the departments

### Strategic Project 7: Ensure to Establish Global Research Capacity and Emphasize on Worker' Professionalism


We will make our researches internationalized and work to

acquire research capabilities of the developed countries by carrying out joint researches with recognized institutes, publishing international journals on occupational safety and health and hosting international conferences. Also, to gain optimum research results, it is important to create autonomous and creative environment in the organization, so we will try to create cooperation-oriented organization culture.

#### [Priority Projects]

- Carry out joint researches on occupational safety and health with domestic and foreign institutes
- Establish an environment to acquire excellent research capabilities from the developed countries and develop joint researches
- Host international symposia and strengthen presentation skills
- Host international symposia for research members and present their researches
- Issue international journal on occupational safety and health
- Issue an English journal on occupational safety and health twice a year, develop it into SCI-standard journal in the future, and find a way to restart it as a 3 nation joint international journal like Scandinavian Journal of industrial health
- Publish ICOH newsletter
- Publish online newsletters for International Commission on Occupational Health three times a year to continue exchanging information and reinforcing cooperation among members

## Conclusion

Visions and strategies of all organizations are like an ecosystem which frequently changes with environmental changes. The visions and strategies described in this page aimed at producing maximum effect in accordance with the management environment at this moment, but will not produce good results if we don't secure our feasibility. Therefore, we will create visions and strategies to properly cope with the environmental changes, and will check the progress periodically. To accomplish this, every member of the institute will strive to create new values and based on this results, develop our institute into a global institute. 



## Looking Back on XVIII World Congress

The success of the 18th World congress on Safety and Health at Work was a precious opportunity to announce the excellence of safety and health services in Korea and raise the global status of the Korea Occupational Safety & Health Agency. The Seoul Declaration on Safety and Health at Work offered a new turning point for the global OSH community by reinstating that a safe and health work environment is a basic human right. The declaration adopted by the safety and Health Summit is comparable to the Kyoto Protocol, which provided dramatic momentum for global campaign for environment protection.



Secretary general **Lee, Jun-won**

Secretariat for the Seoul Declaration  
Korea Occupational Safety and Health Agency

## Foreword

One year has passed since the successful closing of the 18th World Congress on Safety and Health at Work, a global gathering for professionals of occupational safety and health (OSH). The 18th Congress in Seoul has been recognized as the most successful congress in many aspects including attendance, programs, and satisfaction level.

What is all the more meaningful about the Seoul Congress is that 46 leading OSH figures signed the Seoul Declaration on Safety and Health at Work. Looking back on the last year since the conclusion of the congress, I would like to touch on the outcomes and follow-up measures.

## Outcomes of the 18th World Congress on Safety and Health at Work

### Background

The Korea occupational Safety & Health Agency (KOSHA) jointly hosted the 18th World Congress on Safety and Health at Work with ILO and ISSA at COEX convention center located in Seoul from Jun 29th to July 2nd last year - the largest-scale in history of the World Congress.

The World Congress on Safety and Health at Work is the largest international event in the field of occupational safety and health. The Congress took place every three years since 1955 where the 1st Congress was held in Rome, Italy. The 18th World Congress was the second Congress held in Asia after the Indian Congress.

After winning the bid to jointly host the 2008 World Congress with ILO and ISSA in September 2005, KOSHA set up a preparatory team in January 2006. In January 2007, the agency opened the World Congress Secretariat, leading to the successful opening of the Seoul Congress.

The 18th World Congress on Safety and Health at Work was held with various events and programs for four days with a motto, Safety and Health at Work: A Societal Responsibility. The following are the main topics of the Congress.

- Future strategy and programs for safety and health

- Change in working conditions and their influence on worker protection
- New challenge and opportunity for safety and health at work
- OSH systems

The Congress was a festival where workers gathered together and celebrated, an academic event where recent technology and information was shared, and a forum where national strategies for safety and health at work were discussed.

A whopping 4550 people from all around the world participated, which is the highest number in congress history. The number of international participants also reached 1536, which exceeds 1392 recorded in the U.S. Congress.

The number of participating nations rose from 112 of the previous congress in the U.S to 121. The attendees came from the all six continents, indicating that the global community as a whole took great interest in the Seoul Congress. Especially, with the 24th APOSHO Annual Conference held at the same time, more than 500 people from Asia participated, which provided an opportunity to promote safety and health in Asian countries.

Moreover, a total 81 presentation sessions including Keynote Speech, Technical Sessions, Regional Meetings, and Symposia were prepared in the Seoul Congress, which offered a dramatic chance of information sharing. As many as 466, which is twice that of the 17th Congress made presentations.

The Safety and Health Summit, a highlight of the Seoul Congress, was held on the first day with 46 representatives including 13 government representatives such as the Ministers of Labor of the Republic of South Africa and Malaysia, nine representatives from international organizations such as secretary general of IOE, vice president of ITUC, eight representatives of multinationals such as Dupont, and Samsung, and 13 representatives of global safety and health institutions such as DGUV, EU-OSHA, and NSC. These representatives unanimously adopted the Seoul Declaration and called the global community to implement it.

The survey on how participants felt about the Congress shows that 96% of 490 respondents including 346 foreigners said that they were satisfied with this congress, which far exceeds the expected figure. Participants' satisfaction of the 18th World Congress on Safety and Health at Work was calculated to be 89.2 points, which shows a big jump (15.2 points) from the 74.1 points of the 17th U.S. Congress. The representatives of ILO and ISSA who had experienced several world-class congresses said that the Seoul Congress was the most wonderful one ever.

## Outcomes of the 18th Congress

With the success of the 18th World Congress on Safety and Health at Work, the global status of Korea and KOSHA was significantly strengthened. We can categorize the outstanding





results into the following four themes.

- **An Initiative Role in Establishment of Global OSH Policies and Strategies**

Through the Seoul Declaration on Safety and Health at Work KOSHA made a turning point for Korea to take an initiative role in establishment of global OSH policies and strategies. In particular, Korea strengthened its position as an OSH hub in Northeast Asia by holding an annual general meeting of APOSHO during the World Congress.

- **Strong Cooperative Framework for Developing Countries**

Korea closed an MOU on technical cooperation with Mauritius during the 18th Congress. In addition, Korea established the foundation of the international health and safety support system for developing countries through discussions with national delegations from Malaysia, Iraq and Central Asia.

- **Making a Turning Point for OSH Technology**

The participants shared the latest OSH skills and knowledge with professionals from all over the world. This became a turning point in progress of occupational safety and health management technology.

- **Improved OSH Awareness & Stronger International Image**

During the 18th Congress, domestic media (98times) like KBS, Arirang TV, Maeil daily and foreign media (11 times) like BBC dealt with the Congress. This raised Korea's domestic OSH awareness and international image at the same time.

## Outcomes after the 18th World Congress on Safety and Health at Work

### Dissemination of the Seoul Declaration

The Seoul Declaration is the first international OSH Charter. From December 2005, the Seoul Declaration Drafting Committee consisting ILO, ISSA and KOSHA discussed details and did feedback, leading to the adoption by the Safety and Health Summit on June 29, 2008. This international charter claims that every social member (government, employers, employees) of the world is responsible for occupational safety and health.

As the Kyoto Protocol after the Rio Declaration in 1992 served as a momentum for global campaign of environment protection, the Seoul Declaration on Safety and Health at Work became the turning point in OSH history, reiterating that a safe and healthy workplace is a basic human right.

During last year, KOSHA delivered a variety of activities for disseminating and implementing the Seoul Declaration.

Firstly, we held the 1st Global Forum on the Seoul Declaration on Safety and Health at Work at COEX in Seoul on September 10, 2008. The purpose of the forum was to remember the spirit of the Seoul Declaration and present workable programs. In this forum, various panel discussions and presentations were conducted on the roles and responsibility by the tripartite and OSH agencies to put the Seoul Declaration into practice.





Heongi Baek, Secretary-general of the Federation of Korean Trade Unions and Jihee Kim, Vice chair of the Korean Confederation of Trade Unions made presentations on the role of employees. Youngbae Kim, Vice chair of the Korea Employers Federation and Ramabhardran Srinivasan, Director of Dupont dealt with the role of employers and enterprises. Byung-ok Kim, Acting office director of the Department of Safety and Health in the Ministry of Labor and Doo Young Park, Director of the OSHRI presented the role of the government.

The role of the international organizations was presented by Mr. Seiji Machida Coordinator of the Department of Safety and Health in ILO and Mr Hans-Horst Konkolewsky, Secretary-general of ISSA.

Moreover, at the international conference for follow-up measures in Geneva, Switzerland in November 2008 the participants agreed to make the executive secretariat for the Seoul Declaration. Based on this agreement, KOSHA decided to set up the Seoul Declaration secretariat with an aim to make the promotion plan and build a national executive committee consisting representatives from the tripartite, the academia and OSH organizations.

International efforts continued to spread the Seoul Declaration. On March 27th, 2009, OSH representatives from all over the world adopted and signed the statement of support for the Seoul Declaration in the special session of the 2nd International Forum for Accident Prevention in Las Palmas, Spain.

The members who signed the statement include representatives of 24 OSH bodies like NIOSH, IAPA and INSHPO. The representatives of the joint hosts of the Seoul Declaration including ILO, ISSA and KOSHA also signed. The participants emphasized that this supporting action can be a valuable opportunity to improve the global OSH level. They also stated that the current economic recession can be a great opportunity to implement the Seoul Declaration, an important tool for global OSH progress.

They also announced that their action to spread and practice the Seoul Declaration is more important than a mere signature. With this in mind, they renewed their willingness to make a safe and healthy world by promoting the Seoul Declaration.

KOSHA will actively disseminate the spirit of the declaration

through diverse events including the 1st anniversary of the Seoul Declaration and the 2nd Global Forum of the Seoul Declaration.

KOSHA doesn't want the Seoul Declaration to be a mere document. We are aimed at improving international OSH standards by devising detailed action plans and guidance for the Seoul Declaration.

## Success to Host the 31st International Congress on Occupational Health

The representative case which shows notable global position of Korea and KOSHA is the success of attracting the 31st International Congress on Occupational Health March this year.

KOSHA and the Korean Society of Occupational & Environmental Medicine won the bid for the 31st ICOH in 2015. At the 29th ICOH from March 22, 2009 to March 27, 2009, Seoul was selected as a host for the 31st Congress defeating Melbourne and Dublin.

The International Congress on Occupational Health is one of the largest international events in the health and safety field under the auspices of ICOH along with a host country. This triennial Congress aims to improve occupational safety and health through exchange of policy and information about occupational diseases and health protection for workers.

ICOH (International Commission on Occupational Health) is an international organization, which is composed of about 2000 individual members and sustaining members. ICOH is a nonprofit and non-governmental organization which has the history of 100 years. The purpose of ICOH is to develop and disseminate knowledge related to occupational safety and health.

KOSHA had gained much confidence thanks to the success of the 18th world Congress and decided to bid for the 31st ICOH in July, 2008. With approval from the Ministry of Labor and the Ministry of Strategic Planning and Finance and with support letters from five academic societies including the Korean



Society of Occupational and Environmental Medicine, and the Korea Federation of Trade Unions, KOSHA submitted a host application to the secretariat of ICOH on December 22, 2008.

On Feb 26, 2009, we invited ICOH chairperson and his delegation to show COEX and our preparation work for the Congress. We sent pamphlets and videos to all ICOH members. The pamphlets were translated in English, French and Spanish. Taking the majority of the members in Europe into consideration, Sung-kyu Kang, Director General of Occupational Safety and Health Research Institute visited the Finnish Institute of Occupational Health, the Coronel Research Institute in the Kingdom of the Netherlands, University of Milan, Roman Catholic (Belmont) College, and the Italian Occupational Safety and Health Administration and requested support. We sent e-mails for support to the 350 members who were prospective participants. We also made phone calls directly to the directors of ICOH to request support.

The video for presentation is composed of the introduction to Seoul and Korea, the facilities in COEX and invitation from President of KOSHA, Minki Noh and Mayor of Seoul, Se-hoon Oh. In the council meeting of ICOH, Mr. Noh, Mr. Lee, Executive director of Korea ICOH, and Dr. Kang made speeches. In the council meeting, Korea took up the majority in a secret vote. The directors of ICOH strongly recommended Korea as a qualified venue for the Congress. KOSHA emphasized that Asian nations had more opportunities to host the Congress for geopolitical fairness, and explained its plan to

support developing nations.

KOSHA, Australia and Ireland opened promotional booths. Before departure from Korea, we had requested that our booth be near the entrance. On the first day of the Congress, as many as 420 came to our dinner party, Korea Night, far above our expectation, 200. Even though there was another event, Ireland Night in a pub restaurant, it couldn't draw much attention because the restaurant was too far from the congress venue. Australians provided various pamphlets and Australian wine and held Wine festival during the promoting period. They also promised to offer members from developing nations with discounts for registration by securing enough budget worth ₩700 million.

Korea gained 172 ballots, Australia 127, and Ireland 64 during a four-day-long vote with 363 valid ballots.

The success to win the bid for the 31st ICOH was the result of dedication by every KOSHA member and differentiated promotion work. In addition, it was owing to the experiences and improved KOSHA status, which were made possible by the success of the 18th World Congress.

## Future Challenges

Promotion of the Seoul Declaration on Safety and Health at Work & Establishment of Preventive Safety and Health Culture

From now on, KOSHA will establish a detailed working plan

for the promotion and execution of the Seoul Declaration on Safety and Health at Work. The follow-up plan established jointly by KOSHA, ILO and ISSA is as follows.

First of all, representatives of the ILO, ISSA and KOSHA will constitute the joint international secretariat for implementation of the Seoul Declaration on Safety and Health at Work. OSH professionals from the ILO, ISSA and KOSHA will work for the secretariat, building and implementing action plans for promotion.

The primary role of the joint international committee of the Seoul Declaration on Safety and Health at Work is the promotion of the declaration, general management of international dissemination activities, and management and evaluation of working plans established by the joint executive office. Director, Sameera Al-Tuwaijri of the ILO OSH Department Secretary-General, Hans-Horst Konkolewsky of ISSA and Secretary-General, Lee Junwon of KOSHA will constitute the joint committee and review promotion plans at annual meetings.

Specialists of the ILO, ISSA, KOSHA and others from international organizations will constitute the joint executive secretariat charge of the promotion and execution of the the Seoul Declaration. The primary roles of the secretariat in Geneva, Switzerland are as follows.

1. Establishment of a joint detailed execution plan for the Seoul Declaration on Safety and Health at Work and reporting to the International Committee.
2. Establishment of individual detailed execution plans by each institution
3. Building and operating a dedicated website for the Seoul Declaration on Safety and Health at Work
4. Establishment of the system that promotes best practices among signatories and supporters the Seoul Declaration on Safety and Health at Work
5. Providing Signatory organizations with guidelines for implementation of the Seoul Declaration.
6. Preparation for the Seoul Declaration Global Forum from 2009 to 2011(three rounds)
7. Development and distribution of PR materials for the Seoul Declaration such as best execution practices.

In a nutshell, the secretariat will establish detailed action plans for execution of the Seoul Declaration in collaboration with

international organizations. The joint International Committee will evaluate and approve the plans. After the approval, the ILO, ISSA, and KOSHA will review the progress of the plans and supervise the secretariat.

In addition to cooperation with international agencies, KOSHA has continued to promote diverse publicity activities in Korea so as to firmly establish preventive safety and health culture.

The Seoul Declaration aims to improve the OSH status all around the world.

As stipulated in the Seoul Declaration, a safe and pleasant workplace is a basic human right. Moreover, improving occupational safety and health results in higher productivity. The fundamental principle of the Seoul Declaration is that safety and health at work is a social responsibility.

We are confident that the practice of the Seoul Declaration will bring about safe workplace and healthy society without industrial accidents and occupational diseases.


## Conclusion

The success of the 18th World Congress on Safety and Health at Work was a precious opportunity to announce the excellence of safety and health services in Korea and raise the global status of KOSHA as a top-class OSH agency. However, the accident rate in Korea has been stagnant for more than a decade. Therefore, the nation should redouble its efforts to develop innovative OSH technologies and share best practices.

To achieve this goal, we should strengthen international cooperation activities and nurture experts who can respond efficiently to global challenges like OSH standards, which are falsely considered trade barriers.

Moreover, by making a more elaborate distribution system, we should use the latest international information on OSH, leading to a lower accident rate.

KOSHA will strengthen technical cooperation through global partnerships and supply the latest and qualified international OSH information. We will lead the international activities for disseminating and executing the Seoul Declaration on Safety and Health at Work.

Through these activities, we will play a leading role in improving Workers' welfare home and abroad. 



# Current Status and Research Trends of NIOSH

The National Institute for Occupational Safety and Health (NIOSH) strives everyday to do its work with the determination, commitment to sound science, spirit of partnership, knack for innovation, and unique understanding of the workplaces that has served NIOSH and its stakeholders well for the past four decades. To ensure continued scientific relevance and impact, IONSH is committed to engaging partners and stakeholders throughout the entire research process and continuing its comprehensive efforts in r2p. Also, it is essential that both internal and external scientists, decision makers and policymakers, and other key stakeholders understand and contribute to the mission of NIOSH to generate new knowledge in the field of occupational health and to transfer that knowledge into workplace practice to prevent work-related injury illness and death.

## Background Information about NIOSH

The National Institute for Occupational Safety and Health (NIOSH) is the only federal agency in the United States (U.S.) mandated to conduct research and make recommendations to prevent work-related injury, illness, and death. Specifically, under the Occupational Safety and Health Act of 1970, NIOSH was charged with developing recommendations for occupational safety and health standards; performing all functions of the Secretary of Health and Human Services under Sections 20 and 21 of the Act; developing information on safe levels of exposure to toxic materials, harmful physical agents, and harmful physical substances; conducting research on new safety and health problems; conducting onsite investigations to determine the toxicity of materials used in the workplace; and funding research by other agencies or private organizations through grants, contracts, and other arrangements.

NIOSH was created under the Occupational Safety and Health Act of 1970 and has worked diligently and strategically to protect the U.S. working population ever since. The mission of NIOSH is to generate new knowledge in the field of



Christine M. Branch  
Acting Director  
National Institute for  
Occupational Safety and  
Health, U.S.

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occupational safety and health and to transfer that knowledge into workplace practice. NIOSH is a public health science organization that provides and funds research, information, education, and training in the field of occupational safety and health; is committed to the development and integration of knowledge and intervention; and is dedicated to building and maintaining productive partnerships, nationally and internationally.

To accomplish its mission, NIOSH provides global leadership by conducting scientific research, identifying causes of work-related disease and injury, identifying the potential hazards of new work technologies and practices, creating ways to prevent workplace hazards, developing guidance and authoritative recommendations, and delivering products and services to its various stakeholders including industry, labor representatives, professional associations, academia, and government and nongovernment organizations.

NIOSH has an annual budget of approximately \$300 million and a staff of about 1,200 who represent various scientific disciplines including chemistry, communications, economics, engineering, epidemiology, industrial hygiene, medicine, nursing, physics, psychology, safety, and statistics. NIOSH is headquartered in Washington, District of Columbia and Atlanta, Georgia and has laboratories strategically located throughout the U.S. NIOSH is a center within the Centers for Disease Control and Prevention and is housed under the U.S. Department of Health and Human Services.

Historically, NIOSH research and recommendations have been reflected in the pioneering national initiatives that have made worksites safer and have reduced occupational exposure to hazards such as asbestos, lead, vinyl chloride, and other industrial agents. As the U.S. economy moved from its predominantly manufacturing base towards a more service-providing economy in the 1980s and 1990s, NIOSH

kept pace with its research to address emerging issues such as indoor air quality, latex allergy, musculoskeletal disorders, needlestick injuries, workplace violence, and work-related stress. Around this same time, NIOSH also became keenly aware of the need to expand its partnerships, leverage its resources, and more effectively demonstrate the value of its research. As a result, NIOSH created the National Occupational Research Agenda (NORA) and launched its Research-to-Practice (r2p) initiative.

## National Occupational Research Agenda

NIOSH created NORA in 1996 as a stakeholder-driven process designed to stimulate innovative research and improved work practices. It is the framework that guides prevention efforts of the occupational safety and health community in selected priority research areas. NIOSH and its partners have been actively collaborating in this process to define research priorities for the U.S. and achieve impact in the prevention of work-related injury, illness, and death. NORA is a national partnership effort that has sparked unprecedented public-private accord and has created a culture of priority-driven research in occupational safety and health. In the first decade of NORA, NIOSH and its partners developed a research agenda focused around 21 public health science priority areas that reflected considerable consensus among more than 500 groups and individuals who participated in the NORA priority-setting process. Priority areas included allergic and irritant dermatitis, control technologies and personal protective equipment, fertility and pregnancy abnormalities, indoor environment, low back disorders, organization of work, and special populations at risk.

Before entering its second decade, NORA was restructured as a result of stakeholder input. NORA is now pursuing an industry sector-based approach to prioritize research needs at the national level. NIOSH based its

NORA sector organization on the North American Industry Classification System (NAICS), which provides definitions for 20 industry sectors in order to classify businesses for the purposes of collecting, analyzing, and publishing data. NIOSH aggregated the NAICS sectors into eight NORA sectors based on similarities in workplace safety and health issues. The NORA sectors are Agriculture, Forestry, and Fishing; Construction; Healthcare and Social Assistance; Manufacturing; Mining; Services; Transportation, Warehousing, and Utilities; and Wholesale and Retail Trade. NIOSH and its partners use this sector-based approach to assess the state of occupational safety and health, identify focused priority research needs; move research results into workplace practice; and ensure a direct link between businesses, workers, researchers, and other partners to reduce work-related injury, illness, and death and improve the overall safety and health of workers.

The ability to survey and assess the state of occupational safety and health has improved over time; however, the available surveillance data still have substantial gaps and remain fragmented. Data are often collected for different purposes by different organizations using different definitions. Even with these fragmented surveillance systems, data indicate that workplace injury, illness, and death continues to have a profound impact on the safety and health of working America.

## NORA Sector Programs

Each NORA sector consists of a council of approximately one-third NIOSH researchers and two-thirds external partners from areas such as academia, industry, labor, and government. Each council identifies and promotes priority research needs, critical knowledge needed to fill gaps in occupational safety and health, and innovative partnerships within their sector. Currently, the councils are developing and implementing sector-based research goals, objectives, and action plans for the U.S.

These national research agendas are based on scientific evidence, available data, public testimonies, peer reviews, stakeholder input, and expert consultation. They provide guidance to prioritize work among the many competing safety and health concerns. Agendas aim to highlight the most important research questions, recognize priority safety and health concerns, understand effective intervention strategies, effectively disseminate information, and achieve sustained improvements in workplace safety and health practice. Agendas are intended to inspire decision makers and program planners to adopt these issues as their top priorities, guide researchers to relevant and cohesive topic areas for research proposals, and encourage dialog and partnering among stakeholders on a subset of key issues.

**<Table 1> Fatal and Nonfatal Injury and Illness Data for Private Industry U.S. Workers, 2007**

NORA Sector (NAICS Code)	Number of Employed Workers	Number of Worker Fatalities	Fatality Rate Per 100,000 Workers	Number of Nonfatal Injuries & Illnesses	Rate of Nonfatal Injuries & Illnesses
Agriculture, Forestry, & Fishing [11]	2,045,000	585	27.9	50,500	5.4
Construction [23]	11,416,000	1,204	10.5	380,500	5.4
Healthcare & Social Assistance [62]	16,095,000	115	0.7	670,600	5.6
Manufacturing [31-33]	16,204,000	400	2.5	783,100	5.6
Mining [21]	730,000	183	25.1	21,900	3.1
Services [51-56; 61; 71-72; 81; 92]	51,555,000	1231	2.2	984,200	2.8
Transportation, Warehousing, & Utilities [22; 48-49]	6,116,000	924	15.1	289,600	6.1
Wholesale & Retail Trade [42; 44-45]	20,835,000	555	2.6	822,200	4.6

※ Data was obtained from the Bureau of Labor Statistics, U.S. Department of Labor, 2009



Working in the context of the NORA framework recognizes that each industry sector has unique occupational safety and health risks as a result of their workplace settings (i.e., size, design, location, work processes, organizational culture, and workforce characteristics), and the need for tailored interventions. Below is a brief synopsis of each of the eight NORA sectors and includes the priority areas that the sector councils have identified where focused research and translation efforts are needed.

### Agriculture, Forestry, & Fishing

The Agriculture, Forestry, and Fishing sector is the cornerstone of industries that produce and market food, fiber, and fuel. Each year it generates more than \$1 trillion in economic activity and creates exports exceeding \$68 billion. Workers in this sector perform intense seasonal work, which lead to work-related fatality rates more than seven times higher than all industry sectors and higher incidence of many adverse occupational health outcomes, including hearing loss, respiratory conditions, and skin disorders.

The national research agenda for the Agriculture, Forestry, and Fishing sector outlines five strategic goals: improve surveillance to describe occupational hazards, worker populations at risk for adverse health outcomes, and the nature, extent, and economic burden of occupational illness, injury, and death; reduce excessive adverse outcomes in workers who have real limits to safeguarding their own safety and health; move proven safety and health strategies into workplaces by disseminating information about relevant interventions and promoting the adoption of best work practices through partnerships and collaborations; reduce the number, rate, and severity of traumatic injuries and deaths involving hazards of forestry, commercial fishing, and production agriculture and its support activities; and improve the health and well-being of Agriculture, Forestry, and Fishing sector workers by reducing work-related causes or factors that contribute to acute and chronic illness and disease such as musculoskeletal strains and

sprains, respiratory hazards, toxic chemicals, psychological stresses, animal-borne diseases, new production methods and technologies, environmental issues, and changing workforce demographics.

### Construction

Construction workers represent only about 8% of the U.S. workforce but experience 21% of the fatal injuries. They experience the second highest rate of nonfatal injuries resulting in days away from work and the fourth highest fatality rate. Leading causes of death among construction workers are falls to a lower level; electrocutions; and struck-by, caught-in, or crushed-by incidents.

The Construction sector council identified priority areas that aim to: reduce injury and illness from traumatic injuries, hearing loss, silica exposure, welding fume exposure, and musculoskeletal disorders; improve understanding of factors related to work organization, organizational culture, safety and health management systems, and occupational health disparities; develop, strengthen, and expand training and education; increase the use of prevention through design strategies; and improve surveillance at the federal, state, and private levels.

### Healthcare & Social Assistance

Long hours, changing shifts, physically demanding tasks, violence, and exposures to infectious diseases and harmful chemicals are examples of hazards that put Healthcare and Social Assistance workers at risk for illness and injury as they work to serve the sick and those in need.

The Healthcare and Social Assistance sector council identified six strategic goals as part of its research agenda: conduct surveillance to better understand exposure to hazards, injuries, illnesses, and near-misses; promote the use of existing approaches, techniques, and safe work practices, such as lifting equipment to aid with patient transfers, safer medical devices, and reasonable work schedules and

workloads, to protect these workers from injury and illness; promote safety and health management programs to reduce injury and illness rates; conduct research and develop safe approaches to protect healthcare and social assistance workers; address all types of healthcare settings to ensure workers employed in nonhospital settings are also protected from injury and illness; and build strong partnerships among industry, labor, academia, government, and those who have a stake in protecting the safety, health, and well-being of patients and workers in this sector.

## Manufacturing

Of the eight NORA sectors, manufacturing faces the most diversity in workplace safety and health challenges. Hearing loss, nanotechnology, chemical process safety, management systems, and special populations are some of the priority research areas needed to protect the millions of workers in this sector.

In 2007 the leading causes of death among manufacturing workers were contact with objects and equipment, transportation incidents, and falls. More than 50% of the nonfatal injuries that occurred in this sector resulted in days away from work, job transfer, or job restriction. Of all U.S. industries, 14 reported more than 100,000 nonfatal injuries and illnesses; 3 of these were among the largest of the manufacturing industries.

Priority areas identified by the Manufacturing sector council include: contact with equipment and objects; slips, trips, and falls; ergonomic issues that can lead to musculoskeletal disorders; hearing loss; chemical exposure; work organizational systems and stress; special populations such as contract workers, younger and older workers, immigrants, and women of child-bearing age; nanotechnology; and small business.

## Mining

Mining provides the foundation for the U.S. economy

and standard of living. The mining industry spans all 50 states and the U.S. depends heavily upon it for raw materials and energy. Hundreds of mined commodities play integral roles in everyday products, from medicines to computers. Despite the significant progress made to protect the safety and health of miners, the industry's fatality rate remains more than six times higher than the national average for all industry sectors. High rates of lost work time and permanently disabling injuries plague the industry as do diseases from long-term exposure, such as respiratory illness and hearing impairment.

Priority areas in the Mining sector as identified by NIOSH and its partners include: reducing health hazards in the workplace to reduce respiratory disease; noise-induced hearing loss; repetitive and cumulative musculoskeletal injuries; traumatic injuries; the risk of mine disasters such as fires, explosions, and inundations; and ground failure injury and death. Minimizing the risk and enhancing the safety and effectiveness of emergency responders is also of high importance. It is essential to determine the impact of changing mining conditions, new and emerging technologies, and the shifting patterns of work on worker safety and health to prevent potentially adverse outcomes.

## Services

The NORA Services sector is the most diverse in its job categories and includes industries such as public safety and other government services, automotive repair, hotels and restaurants, education, recreation, and waste collection. U.S. workers in this sector are exposed to a variety of substances such as asbestos, cleaning solvents, carbon monoxide, diesel exhaust, and tobacco smoke; physical stressors such as temperature extremes, overexertion, assaults, and other forms of violence; and safety hazards such as electrocution, motor vehicle crashes, and slips, trips, and falls. Work environments are varied and often uncontrolled, putting these workers at increased risk of sustaining a work-related injury or illness.



To address the diverse safety and health issues in the Services sector, NIOSH developed 2 sector councils, one that focuses specifically on public safety workers and another that focuses on all other Service sector industries. Priority goals address safety and health issues such as: roadway hazards and vehicle crashes for outdoor workers; workplace violence and stress for law enforcement, corrections, and restaurant workers; overexertion and falls from heights for solid waste and landscape workers; effective training programs for youth and immigrant workers and workers with disabilities; fire ground exposures and chronic disease among fire fighters; and patient transfer equipment for emergency medical service workers.

### Transportation, Warehousing, & Utilities

The Transportation, Warehousing, and Utilities sector is very diverse in its workforce, job responsibilities, and hazards. The sector covers all modes of transporting passengers and cargo-air, rail, water, road, and pipeline-as well as support activities related to all modes; establishments engaged primarily in warehousing and storage of goods; and electric power, natural gas, water, sewage, and other systems. In 2007 this sector accounted for 16% of all workplace deaths; transportation incidents alone accounted for 71% of its fatalities.

The sector council identified four priority areas where focused efforts are needed: traumatic injury rates that result in lost workdays; incidence and severity of work-related musculoskeletal disorders; workplace programs and practices that allow workers to engage in healthy behaviors to reduce work-related physiological and psychological stressors, improve the use of healthcare services, and reduce premature death; and chemical, biological, physical, and psychosocial work-related hazards and exposures. Within each priority area, the sector council identified goals and projects to address safety and health issues more specifically within the sector's many subsectors.

### Wholesale & Retail Trade

The Wholesale and Retail Trade sector is comprised of approximately 1.6 million businesses that range from one-person, one-location worksites to a 1.7 million-employee chain store with more than 3,000 worksites. Workers in this sector are increasingly contract, temporary, or part-time, and more than 70% are employed with small businesses. The Wholesale and Retail Trade sector typically employs the youngest and oldest workers-many of whom are culturally and linguistically diverse-which can put them at increased risk of workplace injury and illness.

The Wholesale and Retail Trade sector, as defined by NORA, is expected to grow by 12% throughout the next decade. Workers are potentially exposed to an assortment of occupational hazards including psychosocial factors (i.e., stress from lack of job security and frequent interaction with the public), long workdays, shift work, violence, materials handling, static posture, prolonged standing, repetitive motion, and heavy lifting. Although the potential hazards are varied and the incidence rates are high, the Bureau of Labor Statistics suggests that the overall number of injuries and deaths within this sector may be attributed to a specific subset of high-risk workplaces.

The sector council identified six strategic goals that aim to: reduce chronic musculoskeletal disorders, traumatic

injuries caused by slips, trips, and falls, acute injuries from contact with hard objects, workplace violence, and motor vehicle-related injury and death; improve outreach to small businesses; increase understanding of how vulnerable working populations experience disproportionate risks; and expand the availability and use of effective interventions to reduce injury and illness among this population.

The strategic goals outlined in the national research agendas are intended to be accomplished through new and existing partnerships between NIOSH and its stakeholders over the course of the next decade. To accomplish these strategic goals and achieve sustained reduction in work-related injury, illness, and death, a comprehensive and focused effort involving surveillance, needs assessment, data management, economic analyses, research, interventions, information dissemination, and evaluation is critical.

NIOSH is responsible for managing the day-to-day operations of NORA and facilitating the work of the sector councils; however, partners are essential to conducting new research, assessing the state of the field, and communicating findings to those in positions who can make positive changes in the workplace. Through the cooperative efforts of workers, management, labor, practitioners, and scientists, NIOSH will continue to reduce the economic and personal impact of occupational disease, disability, and death through high-quality research and effective prevention strategies, as well as help ensure research-to-practice success, reduce work-related hazards and exposure, improve workplace safety, and protect workers.

## NIOSH Cross-Sector Programs

The NIOSH program portfolio is comprised of the eight NORA sector research programs (as described above) and 24 traversing programs. These cross-sector programs are managed solely by NIOSH researchers through interdisciplinary steering committees; however, NIOSH may at times

utilize the knowledge, expertise, and experience of the NORA council members to assist in guiding its internal portfolio of research programs. The cross-sector programs are intended to enhance the NORA sector programs, coordinate priorities that affect multiple sectors, support the sectors in accomplishing their goals for the nation, and create an organizational culture that nurtures interdisciplinary research and prevention efforts. The cross-sector programs are organized around surveillance, hazard exposure, interventions, adverse health outcomes, information dissemination, and statutory programs.

NIOSH cross-sector programs are: Authoritative Recommendations; Cancer, Reproductive, and Cardiovascular Disease; Communication and Information Dissemination; Economics; Emergency Preparedness and Response; Engineering Controls; Exposure Assessment; Global Collaborations; Health Hazard Evaluations; Hearing Loss; Immune and Dermal Diseases; Musculoskeletal Disorders; Nanotechnology; Occupational Health Disparities; Personal Protective Technologies; Prevention through Design; Radiation Dose Evaluation; Respiratory Diseases; Small Business Assistance and Outreach; Surveillance; Training Grants; Traumatic Injury; WorkLife; and Work Organization and Stress-related Disorders.

Similar to the sector programs, these cross-sector programs have each identified unique and complementary missions, striving to achieve their mission through a focused program involving high-quality research, effective prevention strategies, and internal and external collaboration. Cross-sectors have identified chief occupational safety and health concerns within their program areas; have identified priority research needs where gaps in critical knowledge must be filled; have developed goals to track injury and illness data and service the Institute, including the NORA sectors; and have established strategic partners to assist in effectively disseminating research finding.

The synergy and cooperation between the eight NORA



sector programs and the 24 NIOSH cross-sector programs fosters an environment where multidisciplinary groups of internal and external stakeholders can collaborate to drive progress in occupational safety and health, reduce potential exposure to workplace hazards, and protect workers from injury, illness, and death. A well-designed and facilitated approach to address critical occupational safety and health issues can increase the likelihood of reducing risks faced daily by the U.S. working population.

## Transferring Research to Practice

Building a solid connection between scientific results and their use is an essential component of high-quality research organizations. NIOSH has built an organizational culture that integrates this value throughout its research portfolio. Along with scientific credibility, quality, and integrity, both relevance and impact are of utmost importance to the Institute.

In 2003, NIOSH launched its Research-to-Practice (r2p) initiative as a way to strategically conduct and support relevant and impactful research. r2p focuses on translating and transferring NIOSH research findings, technologies, and information into effective injury and illness prevention practices used in the workplace; emphasizes that research conducted or funded by NIOSH should be relevant for recognized evidence-based policy and practice; effectively diffuses research outputs to individuals or groups most likely to adopt them; and ensures that outputs are usable by organizations with the power to improve workplace safety and health. Opinion leaders and innovators must be familiar with NIOSH research and understand its utility if the Institute is to have confidence that its research findings and best practices will have impact and prevent work-related injury and illness.

As part of its r2p initiative, NIOSH is both demonstrating and increasing its contribution to science and occupational

safety and health practice to maximize return on the nation's investment. The Institute works closely and extensively with its multiple partners and stakeholders to develop effective prevention products; translate research findings into practical and understandable information; guide tailored dissemination efforts to workers and others; move research findings and technologies out of the Institute and into the workplace; promote the diffusion of products and information; protect workers and reduce cost to employers, workers, their families, and society; and evaluate its effectiveness. Transparency and accountability is crucial for research organizations such as NIOSH, especially in a period of diminishing federal resources.

## Global Collaborations

NIOSH is actively engaged in multiple international collaborations; participates in the global dialogue concerning occupational safety and health issues including silicosis, bloodborne pathogens, hearing loss, nanotechnology, radiation, and mining hazards; and is a national and international leader in occupational safety and health.

Examples of recent international involvement include chairing the WHO Global Network of 65 Collaborating Centers on all continents to assist countries in implementing the WHO Global Plan of Action for Workers' Health; providing training in classifying chest radiographs according to the ILO Classification System; contributing to the International Program on Chemical Safety; participating in ISO to improve the quality and dissemination of occupational safety and health guidance, research, and applications; collecting, analyzing, and sharing employer practices that reduce injuries to workers with high exposure to road traffic; and supporting and participating in partnerships between universities in the U.S. and other countries to provide opportunities for training, research, and policy development to researchers in their home countries and abroad. NIOSH is actively collaborating with many

countries, including Australia, Brazil, Canada, Chile, China, Columbia, Finland, Germany, India, Italy, Japan, Korea, Mexico, Netherlands, Peru, Singapore, South Africa, Sweden, Vietnam, United Kingdom, Venezuela, and Zambia.

NIOSH is committed to strengthening its current national and international partners and seeking new partnerships; to remaining a leader in the global efforts to protect the safety and health of all workers; and working collaboratively with industry and others partners to identify and solve workplace safety and health problems through strategic research and prevention activities.

## Distinct Emphasis Areas in Occupational Safety & Health

In addition to the national initiatives that NIOSH has established, such as NORA and r2p, and its extensive international involvement, NIOSH has several other areas of emphasis that address unique working populations. Two examples are summarized below.

### Disparities in Worker Safety & Health

The composition of the U.S. workforce continues to change and data suggest the importance of addressing health disparities, which exist across many priority working populations. Workers with specific biologic, social, and economic characteristics, such as female workers, younger and older workers, workers with disabilities, immigrant workers, and migrant and agricultural workers, are more likely to have increased risk or work-related diseases and injuries. NIOSH is working diligently to identify and prevent health disparities by identifying effective research methods and disseminating relevant information to the public health community.

### Linking Health Protection & Health Promotion

The healthy workplaces initiative looks at the combined effects of work-related risks (i.e., chemicals, noise,

excessive stress, and other hazardous working conditions) and personal health risks (i.e., poor nutrition, physical inactivity, and tobacco use). Strategies and actions are designed to better understand and promote work environments, programs, and policies that result in healthier more productive workers, reduced disease and injury, and lower healthcare needs and costs. NIOSH is committed to ensuring that workplaces are free of recognized hazards and better work-based health policies and practices are implemented to sustain and improve the health and well-being of workers, and to addressing the complexity of work and nonwork factors that affect health.

## Program Reviews by the National Academies

From 2005-2008 NIOSH requested the National Academies to review eight of its major research programs: Agriculture, Forestry, and Fishing; Construction; Health Hazard Evaluations; Hearing Loss; Mining; Personal Protective Technologies; Respiratory Diseases; and Traumatic Injury. The National Academies are known as the Advisers to the Nation and their reviews are recognized for their independence and rigor.

Within the National Academies, program reviews were managed by the Institute of Medicine and the Division of Earth and Life Sciences. The National Academies recruited eight separate evaluation committees; each committee was made up of top experts. In total, more than 200 scientists external to NIOSH participated in the reviews.

Before the reviews began, the National Academies convened a committee of experts to write a framework of criteria. That framework advised the evaluation committees to examine each program's inputs, activities, outputs, and outcomes; assess its relevance to important workplace safety and health needs; and evaluate its impact on improving worker safety and health. Evaluation committees were also

directed to assess emerging issues for the program, provide recommendations, and score the programs on their relevance and impact. NIOSH programs received a numerical value for both relevance and impact; each score was given on a scale from 1-5. See Table 2 below for program scores.

Recommendations and noted accomplishments varied greatly between NIOSH program reviews, however, the evaluation committees did identify some commonalities. Areas for improvement included partnerships and collaborations, strategic planning, surveillance, dissemination and transfer activities, and extramural research activities. Noted accomplishments included conducting research in high-priority areas, positively affecting workforce conditions, providing excellent training programs for occupational safety and health professionals, and engaging in research translation activities.

Following the National Academies' review, each program was charged with developing an implementation plan in response to the committee's review. Implementation plans address how the program intends to implement their recommendations. In addition to a public comment period, plans are shared with the NIOSH Board of Scientific Counselors or the Mine Safety and Health Research Advisory Committee for review and comment and provided to the National Academies.

NIOSH strives every day to do its work with the determination, commitment to sound science, spirit of partnership, knack for innovation, and unique understanding of the workplace that has served the Institute and its stakeholders well for the past four decades. To ensure continued scientific relevance and impact, NIOSH is committed to engaging partners and stakeholders throughout the entire research process and continuing its comprehensive efforts in r2p. Also, it is essential that both internal and external scientists, decision makers and policymakers, and other key stakeholders understand and contribute to the

**<Table 2> Relevance & Impact Scores Awarded to NIOSH Research Programs Reviewed by the National Academies**

NIOSH Research Program	Relevance Score	Impact Score
Agriculture, Forestry, & Fishing	4	3
Construction	5	4
Health Hazard Evaluations	4	4
Hearing Loss	3	4
Mining	4	4
Personal Protective Technologies	4	4
Respiratory Diseases	5	4
Traumatic Injury	4	4

#### Relevance Score Key

5 = Research is in high-priority subject areas and NIOSH is significantly engaged in appropriate transfer activities for completed research projects/reported research results.

4 = Research is in priority subject areas and NIOSH is engaged in appropriate transfer activities for completed research projects/reported research results.

3 = Research is in high-priority or priority subject areas but NIOSH is not engaged in appropriate transfer activities; or research focuses on lesser priorities but NIOSH is engaged in appropriate transfer activities; or research focuses on lesser priorities but NIOSH is engaged in appropriate transfer activities.

2 = Research program is focused on lesser priorities and NIOSH is not engaged in or planning some appropriate transfer activities.

1 = Research program is not focused on priorities and NIOSH is not engaged in transfer activities.

#### Impact Score Key


5 = Research program has made major contributions to worker safety and health on the basis of end outcomes or well-accepted intermediate outcomes.

4 = Research program has made some contributions to end outcomes or well-accepted intermediate outcomes.

3 = Research program activities are ongoing and outputs are produced that are likely to result in improvements in worker safety and health (with explanation of why not rated higher). Well-accepted outcomes have not been recorded.

2 = Research program activities are ongoing and outputs are produced that may result in new knowledge or technology but only limited application is expected. Well-accepted outcomes have not been recorded.

1 = Research activities and outputs do not result in or are not likely to have any application.

mission of NIOSH to generate new knowledge in the field of occupational safety and health and to transfer that knowledge into workplace practice to prevent work-related injury, illness, and death. For more information about NORA, r2p, the NIOSH program portfolio, or any other occupational safety and health topic, please visit [www.cdc.gov/niosh](http://www.cdc.gov/niosh). 

# Current Status and Research Trends of HSL

HSL's capabilities encompass a wide range of topics including: human factors and risk assessment; fire, explosion and process safety; occupational and environment health; safety engineering, work environment and specialist photographic and technical services. This article gives details of the topics that were discussed between HSL and KOSHA; highlighting HSL's research and forensic investigation work in the important areas of pedestrian safety and personal protective equipment. It also describes some of the other areas of HSL's work which are of mutual interest to our two organizations.

## Cooperation with KOSHA

The Health and Safety Laboratory (HSL) is an agency of Great Britain's Health and Safety Executive (HSE) and employs over 350 risk scientists, ergonomists, engineers, psychologists, social scientists, health professionals and technical specialists. HSL has been leading the way in health and safety since 1911; building a reputation for expertise, an outstanding incident investigation record and long-standing partnerships with both HSE and industry. HSL's capabilities encompass a wide range of topics including: human factors and risk assessment; fire, explosion and process safety; occupational and environmental health; safety engineering; work environment and specialist photographic and technical services. This breadth of expertise underpins HSL's particular strength in creating multidisciplinary teams to solve health and safety problems.

HSL is pleased to collaborate with the Korea Occupational Safety and Health Agency and has hosted two visits from KOSHA staff in the past two years. This article gives details of the topics that were discussed during these visits; highlighting HSL's research and forensic investigation work in the important areas of pedestrian safety and personal protective equipment. It also describes some of



CEO **Eddie Morland**  
The Health and Safety  
Laboratory, UK



the other areas of HSL's work which are of mutual interest to our two organisations.

## Slip Resistance Test for Safety Footwear

Jung Soo Kim, a researcher from KOSHA's Centre for Safety and Hygiene Research, visited HSL for a number of days in September 2007; in particular meeting with researchers and senior scientists from HSL's Pedestrian Safety team. The Pedestrian Safety team focuses on slips, trips and falls, which are the biggest class of accidents reported to HSE. In addition, many other accidents, such as falls from height<sup>1)</sup> or those involving workplace transport, are often initiated by simple underfoot events. This is a considerable burden on the UK economy. More accurate and more easily understood information about how surfaces and footwear perform in terms of slip resistance would help to address this problem. This requires the development and use of accurate and reliable tests and test methodologies to measure friction.

Understanding the underlying causes of slip and trip accidents is vital if companies are to undertake meaningful risk assessments and so reduce the number of accidents occurring each year. HSL has undertaken a significant programme of research to further this understanding

through the investigation of different types of flooring and footwear and the interaction between them. HSL has developed a robust slip resistance testing protocol, using the pendulum test device and supplementary surface microroughness information, which can be used on-site in many different

workplaces as well as in the laboratory. In the laboratory, the HSL ramp test is also used to provide a more in-depth evaluation of surfaces such as industrial flooring<sup>2)</sup>. The latest work in this area has looked at the effects of industrial contaminants such as oil and grease on these kinds of surfaces.

The HSL ramp test also lends itself to testing the slip resistance of footwear. HSE estimates that around 35% of occupational slip and trip accidents occur in industries where the provision of safety footwear is the norm. Given that slip and trip accidents make up the largest single cause of workplace accidents in Great Britain (37,000 reported to HSE in 2007/08), the choice and use of safety footwear are clearly important factors in controlling this risk.

HSL has reservations about the test protocol used in the European Standards for slip resistance of footwear (EN 20344, 20345 & 20346). The pass threshold for the Standard is also very low, making it difficult for the buyer of work footwear to select a shoe that will control the risk of slipping. HSL is currently working on improvements to the test protocol, and lobbying for an increase in the thresholds. Agreement has been secured for an Informative Annex to the Standard, outlining some of the considerations and limitations that are pertinent to the selection of footwear to control slips. The annex should be useful as a short-term improvement, although it is also recognised that any improved test in the future will still have limitations. HSL represents HSE at various Standards groups concerned with both footwear and flooring surfaces, so that it can make the case for better test methods and for thresholds based on



1) Scott, Miller & Hallas (2006) The underlying causes of falls from vehicles associated with slip and trip hazards on steps and floors  
<http://www.hse.gov.uk/research/rrpdf/rr437.pdf>

2) Loo-Morrey & Lemon (2007) A study of the slip characteristics of metal flooring materials  
<http://www.hse.gov.uk/research/rrpdf/rr534.pdf>

people's friction requirements rather than arbitrary limits agreed by committee. Where possible, HSL has made a strong argument for the use of the pendulum and ramp tests for measuring the slip resistance of floor surfaces, as both are considered to generate reliable information<sup>3)</sup>.

HSL provides forensic support to health and safety inspectors for their investigations of workplace incidents, giving them reliable scientific information on which to base law enforcement decisions. HSL's Pedestrian Safety specialists are often called on to undertake slip resistance measurements using the pendulum test and surface microroughness measurements as part of investigations into workplace accidents involving slips. These measurements have been used successfully in numerous legal proceedings, where proving that a contaminated floor surface presented a high slip risk was pivotal to the case. The investigation work also presents a tremendous learning opportunity through examination of the circumstances of specific slip accidents. Through drawing together common themes that have been identified, HSE has been able to develop guidance for the industries involved, thus reducing the rate of accidents over time. For example, the food manufacturing industry had a high level of slipping accidents compared with the all industry average, but with sustained effort over a ten year period has been able to reduce their accident rate substantially.

There is still more work to be done, some of which is to improve peoples' understanding of the causes of slip accidents and the often simple interventions that could help avoid them. To address this issue, HSE commissioned HSL to produce a Slips and Trips E-learning Package (STEP)<sup>4)</sup> to help workers and duty holders to understand slip and trip

risks in workplaces (see [www.hse.gov.uk/slips/step/](http://www.hse.gov.uk/slips/step/)). The STEP tool allows the user to select their level of interest, offering a basic introductory awareness level that takes the user around 15 minutes to complete, a middle level that takes around an hour to complete and a very in-depth high level. The tool has been written for both a general audience, with the key issues that affect most workplaces, and for specific high risk sectors such as the food industry, catering and hospitality, and health care. The sector-specific routes through the tool show the user industry-specific pictures and case studies, making it easier for them to relate to, and apply the information to, their particular workplaces. By making the tool available on the internet free of charge, HSE hopes that it will be used widely as part of a company's training. The package was launched on the HSE website on the 9th February 2009, and by the end of March 2009 over 30,700 people had used it.

Members of HSL's Pedestrian Safety team also deliver awareness training to numerous businesses on behalf of HSE, through seminars and conferences. A recent focus for this has been the residential care sector, where both residents and staff suffer significant numbers of injuries through slips and trips, which could be reduced by simple interventions.

During his visit, Jung Soo Kim witnessed the various tests that HSL use to measure friction for both floors (the HSL ramp test, pendulum test and surface roughness test) and footwear (the HSL ramp test). The reasons for using each of these tests were discussed, including the concerns that HSL has around alternative tests. For example, the Tortus flooring test does not produce the required lubricating film (squeeze film) and therefore tends to overestimate friction in the contaminated (wet) condition. The SATRA EN footwear test suffers from similar (less severe) problems which are exacerbated by the test conditions used (e.g. ceramic flooring with soapy water does not challenge the footwear) and the thresholds (for the steel/glycerol test the pass level in heel mode is a Coefficient of Friction of 0.10

3) HSE Slip Assessment Tool (SAT) <http://www.hsesat.info/>

4) Slips and Trips eLearning package  
<http://www.hse.gov.uk/slips/step/>



whereas bio-technical data suggests that much higher levels are required). Jung Soo Kim was shown some examples of footwear which had performed well using the HSL ramp test along with related case study material developed to support this work. Other areas covered included the site visit work that HSL undertakes in support of

accident / incident investigations and inspector concerns, and access to a wide range of reports along with examples of web-based material.

Steve Thorpe (HSL's Technical Leader for Pedestrian Safety) subsequently met Jung Soo Kim again at the XVIII World Congress on Safety & Health at Work in Seoul in June 2008 and spent time in his laboratory. Steve was particularly interested in a footwear test that they were developing. HSL subsequently did some collaborative work with Jung Soo Kim, comparing data from the HSL ramp test with the new KOSHA test. Kim et al have since submitted a paper to the IEA2009 conference comparing and contrasting the two methods.

## Personal Protective Equipment – Respiratory Protective Equipment

Dong-Chan Kim, manager of the Certification Examination Team of the Centre for Safety Certification and Assessment division of KOSHA, visited HSL in April 2009. He was on a fact-finding mission to assist KOSHA in the setting up and operation of product testing and certification capabilities for Personal Protective Equipment (PPE), specifically for Respiratory Protective Equipment (RPE).

HSE's 2005 survey of workplaces in Great Britain

suggested that about 5.5 million employees in around 224,000 workplaces could be at risk of respiratory disease. Nearly half of the employers specifically asked about the use of respirators reported that they had workers using RPE and the majority of these had received some level of training.

However, other evidence suggests compliance with good practice may be much lower. HSL looked at the use of RPE in brickworks, stonemasonry, quarrying and construction from 2005 to 2008 as part of a baseline survey of workers potentially exposed to silica. This survey indicated that more robust policies are required for face-fit testing of RPE and for staff training to ensure the necessary levels of protection for all the sectors. Selection, training and face-fit testing were often not conducted in the brickmaking and stonemasonry industry sectors. HSE information from other sectors supports these findings including:

- Analysis of seven companies to identify reasons for the failure of control strategies - Five companies had serious failings in understanding the level of protection expected of their RPE, and had cases of incorrect selection, storage or use of respirators. None of the companies provided specific training to their employees.
- A focus group of 17 welders, questioned by Diagnostics and Social Market Research, suggested a low overall awareness and concern for the risks posed by fumes and gases in welding. The risks were perceived as a high priority because the consequences were in the future and employees felt that it was the employers who should control this risk. The research concluded that the best route for HSE to communicate with welders was through their employers, whose awareness and activities also needed improvement.
- A study of poultry farm workers revealed a lack of awareness and correct use of RPE. There was a lack of provision, training and enforcement of RPE use among those questioned in focus groups consisting of

managers and employees. Reasons cited for not providing RPE and not enforcing RPE wearing included expense, time taken to find and put on RPE, confusion over responsibilities, comfort of RPE, lack of understanding about fitting RPE, and having beards.

HSE believes that where there are failings they are most likely to be in:

- incorrect equipment;
- badly fitted equipment;
- incorrect usage;
- lack of training; and
- incorrect storage.

During his visit Dong-Chan Kim met with senior members of HSL's PPE team who described and demonstrated some of the key test and assessment facilities which are needed for RPE testing, including:

- breathing machines;
- inward leakage measurement using both particle and gas challenge agents;
- measurement of rebreathed carbon dioxide using the conventional time-averaged method and the breath-by-breath method which may be imported from diving equipment testing;
- fit testing methods for face masks<sup>5)</sup>;
- assessment of field of vision for full face masks;
- testing of closed-circuit breathing apparatus; and

- equipment for environmental conditioning of test samples.

The HSL staff involved found it both useful and challenging to explain the historical development of the test methods and procedures that we use in the UK and Europe, and how this has led to HSL's current testing technology. In this context HSL was also able to discuss its participation in the developing ISO Standards for RPE. HSL has maintained communication with Mr Kim, and this is proving to be a useful collaboration for both parties.

HSL is involved in a wide range of PPE evaluation<sup>6) 7) 8)</sup>. A new and increasing risk in the UK requiring health and safety research is from illicit drug laboratories (IDLs) - where people are manufacturing illegal drugs in domestic premises. By their very nature, clandestine or illicit drug laboratories present many hazards to the police and fire services and to other law enforcement professionals. Methamphetamines and their production products are of particular concern. Ventilation in IDLs is often restricted to minimise the chance of detection through fumes or odours escaping into the local community. The quantity of toxic waste produced can be as much as five times the drug yield, and the tendency to stockpile waste creates further risk.

The UK's Home Office Scientific Development Branch (HOSDB), Serious Organised Crime Agency and the Metropolitan Police Service have provided operational advice and guidance for police officers needing to enter IDLs. To support development of this guidance, HOSDB commissioned HSL to help them set national guidelines for the selection and use of PPE to enter



5) Clayton M and Vaughan N (2005). Fit for purpose : The role of fit testing in respiratory protection. *Annals of Occupational Hygiene* 2005 49, 7, 545-548

6) Vaughan N, (2008). Impact of REACH Regulation on the selection and use of PPE. *Proceedings of the 9th Seminar on PPE in Europe, Kittila, Finland, 29-31 January 2008.*

7) Vaughan N, (2008). Standard test methods for the real efficiency of PPE. *Proceedings of the 9th Seminar on PPE in Europe, Kittila, Finland, 29-31 January 2008.*

8) Vaughan N (2006). Save your breath... *Health and Safety International*, October 2006, 97-103



IDLs. Worst-case concentrations of hazardous materials were assessed and the PPE most likely to provide the necessary degree of protection determined. Practical studies assessed the interaction between the police officer, their PPE and the chemical hazard, enabling the real protection levels offered by various PPE options to be defined. PPE performance was measured in simulated work tasks in a specialist containment chamber that represented a realistic IDL working environment. These experiments took account of the different phases of an operation, such as entry into premises, evidence logging, the removal of material, the disposal of remaining hazards and decontamination. Weaknesses were identified in the interface between the Respiratory Protective Equipment (RPE) and the PPE coverall's hood and a different coverall suggested. Testing showed that the new coverall's RPE-hood interface provided improved protection for IDL tasks.

HOSDB is now using the report which specifies the hazard analysis, protection data and calculated 'workplace protection factors' that can be safely applied in IDL working, to inform their guidance to police officers on selection of appropriate PPE.

## Applying Geographical Information Systems (GIS) to Health and Safety

The Geographical Information Systems (GIS) team at HSL provide a wide range of support to HSE and other parties interested in health and safety. This ranges from general GIS and digital mapping support, through to development of bespoke spatial solutions to help with, for example, Land Use Planning decision making, societal risk estimation and demographic modelling, and tools to help manage incidents and outbreaks of notifiable diseases.

An important tool that HSL hosts, maintains and runs is HSE's National Population Database (NPD) tool<sup>9) 10) 11)</sup>.

This is being used to provide a valuable new dimension to population density and distribution estimation. HSE requires population data to inform its risk assessment work, for example when estimating societal risk from major hazard sites. National, robust and sufficiently detailed population data have not been available in the past. The NPD is a GIS-based tool that is used to identify and estimate population density and distribution for a range of population types and categories. It provides population data from a local to a national level for England, Scotland and Wales. Populations are available on a 100m grid or on an individual building level and include residential, workplace, retail, transport system, leisure populations and sensitive populations such as children or the elderly. This detailed breakdown allows a greater level of analysis to be performed, including the identification and estimation of populations that may be more susceptible to harm or difficult to evacuate following a leak from a major hazard site for example.

The NPD has been used for a range of tasks including detailed societal or 'off-site' risk calculations, identification of certain 'at risk' populations and scenario planning<sup>12) 13)</sup>. It has a greater coverage of population types and a better level of spatial resolution than any other databases currently available. It has a flexible and user-friendly interface, which provides for many different potential uses by HSE and other government bodies and departments, and it has already proved itself an essential and powerful part of HSE's

9) HSE, (2005), A National Population Data Base for Major Accident Hazard Modelling. Health and Safety Executive Research Report Series, No. 297 2005  
<http://www.hse.gov.uk/research/rrpdf/rr297.pdf>

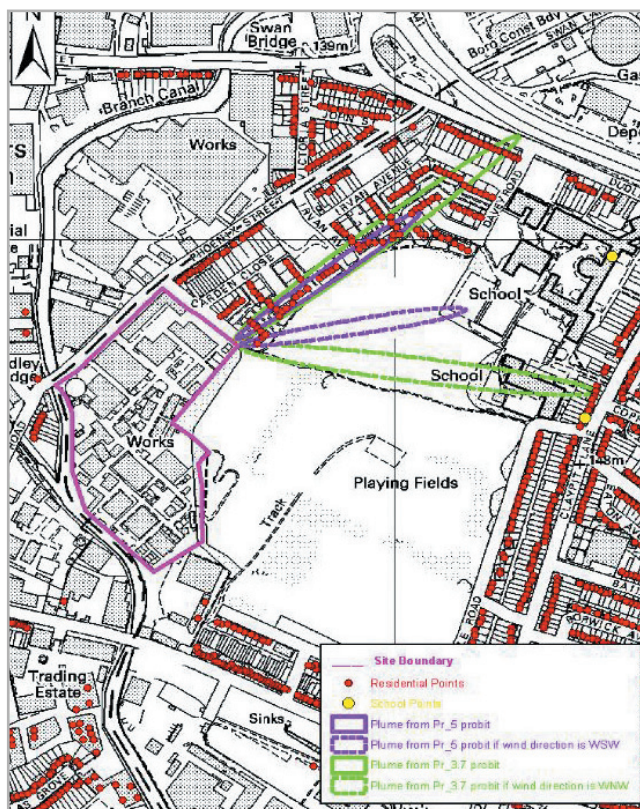
10) HSE, 2008, Updating and improving the National Population Database to National Population Database 2. Health and Safety Executive Research Report Series, No. 678 2008 <http://www.hse.gov.uk/research/rrpdf/rr678.pdf>

11) Balmforth, H, McManus, H and Fowler, A (2005). Assessment and management of 'at risk' populations using a novel GIS based UK population database tool. Safety and Security Engineering, Editors C. Brebbia, T. Bucciarelli, F. Garzia and M. Guarascio. WITpress

technical development work for regulating on-shore major hazards.

An example of the work undertaken is shown in [Figure 1]. A hazardous site boundary is shown in pink. The red dots represent the local residential population with numbers obtain from Government census data. A hypothetical hazardous incident is modelled as shown by the toxic plumes for varying concentrations of release and prevailing wind conditions. This analysis allows recommendations to be made with respect to the substances and operations allowed on the hazardous site and for major incident planning.

In addition to these areas, the GIS team is also working on ways to improve the availability of maps and spatial data internally across the organisation and externally out to other regulators and interested parties. The aim of this work is to develop methods for easier and more joined up working and data sharing, particular with respect to incident response scenarios. Readily accessible and interactive mapping helps HSE inspectors to respond more quickly to incidents and carry out their work more efficiently. The GIS team has developed specialist applications that allow data and bespoke maps to be delivered to a user's PC in a standard web browser without any plug-ins. The user can interact with the data and use fundamental GIS functionality, including searching, panning, zooming and querying,



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Populations that may be potentially at risk from a release of a hazardous substance from a major hazard site (shown in pink) are illustrated. The toxic plumes have varying extents, which are dependent on the harm criteria used. Different wind directions show that different populations of varying sensitivity may potentially be exposed.

[Figure 1] Example of the NPD

without the need for specialist GIS software and training. The data and the mapping are stored centrally at HSL, to enable regular updates and maintain quality control, and are immediately accessible across HSE nationally and also out to external parties such as other government departments. The web-based mapping service can be accessed 24 hours a day, 7 days a week and has been tailored to the specific requirements of different HSE divisions.

One of the first applications is a customised mapping tool for one of HSE's regional office to help inspectors manage their response to an outbreak of Legionellas disease. Specialist inspectors are able to access detailed and up-to-

12) HSE, (2002). The derivation and use of population data for major accident hazard modelling. Health and Safety Executive Contract Research Report Series, No. 410, 2002  
[http://www.hse.gov.uk/research/crr\\_pdf/2002/crr02410.pdf](http://www.hse.gov.uk/research/crr_pdf/2002/crr02410.pdf)

13) Balmforth, H, McManus, H and Fowler, A (2005). Use of a National Population Database to aid major hazard modelling and risk estimation. Conference Proceedings of the Society for Risk Analysis

14) Ferreira, Gray, Hunter, Birtles, Riley (2008) Development of an assessment tool for repetitive tasks of the upper limbs (ART)  
<http://www.hse.gov.uk/research/rrpdf/rr707.pdf>

date mapping and inspection data, overlay data sets and interrogate them spatially to provide tailored information. This enables HSE to significantly increase its initial response time to an outbreak and also greatly improve many aspects of the management and analysis of future outbreaks.

## Muscular Skeletal Disorders

Muscular Skeletal Disorders (MSDs) are a priority health and safety topic worldwide, and HSE has made continuing efforts to address the problem through annual publicity and inspection campaigns. The first major MSD initiative of its type was HSE's 'Better Backs' campaign in 2005, and this theme has continued in various forms through to 2009. HSL staff played a significant role, working alongside their specialist inspector colleagues, in providing the technical input during the development of the campaign materials each year, delivering presentations, undertaking inspection visits and supporting enforcement action. Last year saw a switch of attention to upper limb MSDs and the piloting of a new risk assessment tool<sup>14)</sup> by non-specialist inspectors during the inspection visits phase of the campaign. HSL was also pleased to be able to host the visit of Jung-Wan Koo, Associate Professor of Preventative Medicine at the Catholic University of Korea, and his colleagues in 2008. Jung-Wan Koo was able to meet with HSL specialists and an HSE specialist MSD inspector to review the way that the MSD-related regulations are enforced in Great Britain.

Besides supporting HSE's operational work, HSL has been undertaking scientific research to support policy decisions. A study of the 1991 NIOSH lifting equation<sup>15)</sup> sought to evaluate the lifting equation in terms of its ability to predict injury and musculoskeletal symptoms from job factors. A longitudinal study followed up more than 500 workers over an 18 month period, collecting data about their tasks and musculoskeletal health. The results suggest that elements of the 1991 NIOSH lifting equation are, in fact, not

good indicators of risk. This finding has implications for the EN and ISO Standards derived from the 1991 NIOSH lifting equation. There is a need to develop better methods of assessing risk of lower back pain from manual handling, focusing on ways of combining risk factors and exposure to multiple tasks.

The feasibility of carrying out an ergonomics intervention study to prevent the incidence of musculoskeletal disorders<sup>16)</sup> has been investigated. This work considered the existing evidence for the effectiveness of ergonomics interventions in the workplace to reduce the risks of musculoskeletal ill health. Reviewing existing literature against rigorous scientific standards suggests that the strength of evidence is low, because few studies to date have been designed to fulfil the standards. The work also discussed and began to scope out a possible design for a study that would meet the necessary, scientifically defensible standards. However, the scale of study needed is likely to require international collaboration.

HSL often undertakes research in partnership with other organisations. One such study looked at ways to reduce the risks associated with the manual handling of air passenger baggage<sup>17) 18)</sup>. This was undertaken in partnership with the UK aviation sector health and safety steering group (Revitalising Health and Safety in Air Transport - RHSAT). In the UK the majority of baggage handling is contracted

17) Riley (2008) Literature review update: Reducing the risks associated with the manual handling of air passenger baggage for narrow bodied aircraft  
<http://www.hse.gov.uk/research/rrpdf/rr674.pdf>

18) Oxley, Riley and Tapley (2009) Musculoskeletal ill-health risks for Airport Baggage Handlers: Report on a stakeholder project at East Midlands Airport  
<http://www.hse.gov.uk/research/rrpdf/rr675.pdf>

15) Pinder and Frost (2008). The evaluation of the 1991 NIOSH lifting equation HSL Report ERG/08/44 in press.

16) Pinder and Wegerdt (2008) Feasibility of carrying out an ergonomics intervention study to prevent the incidence of musculoskeletal disorders

out from the airline to ground handlers and is often viewed as a ‘standalone’ part of the aircraft turn-round process. Little consideration has been given to the design of the interface between the aircraft (airline carrier), airport (operator), handling equipment (supplier/manufacturer) and those persons undertaking the baggage handling work (ground handlers). Unless these factors are dealt with at an early stage, there is often little or no opportunity for the ground handler to address and reduce the risks. Fully effective risk reduction during the baggage handling activity will only be achieved if all the parties involved actively work together.

While there has been significant focus on the common low back and upper limb disorders, the third largest group of musculoskeletal disorders, Lower Limb Disorders (LLDs, 18% of total) has also been studied by HSL<sup>19)</sup>. Appreciable evidence was found of a causal association between occupational kneeling/squatting, stair and ladder climbing, heavy lifting, walking and standing, and slip and trip hazards as risk factors for LLD. The evidence of a causal association was less clear for jumps from height (e.g. from a vehicle’s bed or cabin to the ground), driving and sitting. There was also evidence that occurrence of LLD is associated with other MSDs, primarily of the low back. Further work is recommended to clarify the interrelationship between disorders experienced in different regions of the body, and to provide more detailed risk criteria for occupational exposure to factors such as kneeling, standing, jumping, driving, and strategies to reduce lower limb MSD risks.

19) Okunribido (2008). Lower limb MSD - Scoping work to help inform advice and research planning  
<http://www.hse.gov.uk/research/rpd/rr706.pdf>

20) Health and safety in the motor vehicle repair (MVR) industry <http://www.hse.gov.uk/mvr/>

21) Biological monitoring for isocyanates  
<http://www.hse.gov.uk/pubns/guidance/p47.pdf>

## Reducing Exposure to Isocyanates in Motor Vehicle Repair

HSE identified that asthma was a major cause of ill-health in the motor vehicle repair (MVR) industry<sup>20) 21)</sup>. Two-pack paints are used extensively in primers and lacquers and although the paints are ideal for vehicles, the isocyanates in them present risks to operators, especially during application when spray mist and vapours containing isocyanates may cause asthma or worsen an existing condition. To address the lack of awareness of the potential risks among employers and sprayers, HSL and HSE inspectors worked with trade associations to develop simple and clear guidance. This was delivered through a series of multi-media presentations at Safety and Health Awareness Days (SHADs), 28 of which were held across the country in a sustained campaign between 2004 and 2007. A range of experts provided information at these events about the hazards and risks associated with spraying isocyanates and how to control exposure to prevent ill-health. A video of an interview with an asthma sufferer brought home the life-changing consequences of the condition. Scale models developed by HSL’s ventilation specialists used a smoke generator to show how ventilation systems in spray enclosures work and how long it takes for paint mist to clear after spraying. Industry speakers gave presentations on paints and equipment, and an HSE inspector gave a clear message about legal requirements.

Scientists from HSL’s biological monitoring team distributed sampling kits, enabling sprayers to collect a urine sample after spraying for analysis of isocyanate metabolites using an analytical method developed by HSL. This provided a simple check on whether the exposure controls were working properly.

Overall the SHAD campaign was highly successful; post-event questionnaires by HSL’s occupational psychologists showed improved awareness, with well over



90% of attendees pledging to make improvements. Quantitative data from urine samples showed that exposure levels were lower in workers who had attended the SHAD events than those who had not. Where levels of isocyanate metabolites in urine were above the Biological Monitoring Guidance Value, the sprayer was advised to look again at control measures, make improvements and repeat the test. These follow-up samples revealed lower levels of metabolites and a reduction in exposure.



A further significant demonstration of the effectiveness of the campaign has come from HSE statistics, showing that the incidence of occupational asthma in vehicle spray painters in 2004 - 2006 was approximately half the rate of 2001 - 2003.

## Preventing the Spread of Influenza


The UK is preparing for the possibility of an influenza pandemic. The virus is primarily spread through direct contact with the large droplets which come from the nose or throat when an infected person coughs or sneezes. The relative importance of respiratory aerosols (fine droplets that remain airborne) in transmitting flu is considered to be minor, but cannot be ruled out. Current UK Pandemic Influenza Infection Control Guidance recommends that healthcare workers should minimise procedures likely to generate aerosols and where unavoidable, wear surgical masks to reduce exposure to large droplets when in close contact with patients.

It is standard practice for healthcare workers to limit the

spread of seasonal flu outbreaks by wearing surgical masks; although, this is primarily to protect the patient from the wearer. In recent years, surgical masks have also been advocated as a method of protecting the wearer from the patient too. However, these masks are not intended to protect against infectious aerosols. HSE asked HSL to evaluate the relative protection provided against aerosols by both surgical masks and respirators. Tests to measure how effectively surgical masks reduced exposure to both inert particles and live aerosolised influenza virus were undertaken. This research showed that, although this kind of protection does, on average, reduce exposure by six times, the level of protection varied depending on the design and construction of the mask. In contrast, other tests showed that properly-fitted respirators can reduce exposure by at least 100 times.

This work will help those responsible for undertaking national risk assessments for pandemic influenza outbreaks to better, and more cost effectively, equip and protect front-line medical staff when dealing with such an outbreak.

## Summary

Research and support in relation to occupational health and safety is most valuable when shared internationally to maximise the benefits to all workers. HSL is proud to partner with international Health and Safety organisations to enhance information exchange and promote best practice. While national legislation and culture create diversity in the local approach to health and safety, all workers require protection against workplace injury and ill health. HSL will continue to seek international collaboration and to publish its work via peer review journals, conference proceedings or the easily accessible HSE web site. 

# Current Issues and Research Trends of OSH in Finland FIOH Profile

The Finnish population is now aging rapidly. And, due to small young cohorts and large ageing cohorts, the labour force will decrease dramatically. Against this background, the government aims to raise the average age of exit from the labour market by at least three years, to reduce the average age of entry into the labour market of the youth, and to encourage people to stay in the labour market longer. This report introduces FIOH's strategy and future measures in response to various social challenges and OSH issues like the current global recession and a growing number of mental patients.

## Work Life in Finland

### Challenge: Longer Work Careers

In 2008, Finland had a labour force of 2.7 million people. The employment rate of persons aged 15-64 years was 70.6% while the unemployment rate was 6.4%. (Statistics Finland.)

The Finnish labour force has increased in recent years. People over 55 in particular have participated in work life more actively. For a long time, the supply of the female labour force has been almost as high as that of men, and most women work full-time.

However, the Finnish population is now ageing rapidly, and the number of working-age people will soon begin to decline. Due to small young cohorts and large ageing cohorts, the labour force will decrease relatively fast during the next couple of decades. Immigration and a rise in the present employment rate may compensate for some of the loss, but cannot turn the downward trend back up again. The supply of labour force is further reduced by the fact that Finns tend to stay rather long in



Harri Vainio  
Director General  
Finnish Institute of  
Occupational Health

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education, and that the actual average retirement age is relatively low (59.4) while the official retirement age has for a few years now been between 63 and 68.

The Finnish Government has set a goal to boost the employment rate to over 75% and to improve productivity in all fields of activity. The aim is to eventually raise the average age of exit from the labour market by at least three years, to reduce the average age of entry into the labour market of young graduates, and to encourage people to stay in the labour market longer (Government mid-term policy review, 2009.).

Longer work careers and staying on longer at work generated heated discussion at the beginning of 2009. The Prime Minister's suggestion of raising the general retirement age was widely rejected, but brought well-being at work firmly onto the political agenda. Both public authorities and the media have now become very interested in FIOH's expertise.

A lot can be done to extend work careers even without raising the general retirement age, such as making work life more attractive to people of all ages, and reducing people's exit due to sick leaves and disability pensions.

A relatively large amount of working-age Finns are on disability pension. The two major causes of disability pension are musculoskeletal diseases and mental disorders. The share of disability pensioning due to musculoskeletal diseases has stayed rather stable, but the number of people on disability pension due to mental disorders has increased from 59,000 in 1996 to 82,000 in 2007.

This increase is almost exclusively attributable to depressive disorders. The number of sick-leave days per employed person has also increased. There was a 22% increase in 2000~2007, with a 38% increase in sick-leave days due to mental disorders. There is no marked increase in the prevalence of mental disorders in the overall Finnish

population, thus the above-mentioned developments seem to be related to changes in work life practices and requirements.

## Challenge: Coping with the Worldwide Recession

At the beginning of 2008, Finland was confident that its companies, funding institutions and public sector economy were in good form, and that competitiveness was strong. However, this did not stop the global economic decline extending its powerful grip to Finland at the end of the year. Between April 2008 and April 2009, the number of unemployed job seekers rose by 31% and the number of laid-off employees rose by as much as 403%. The recession has particularly hit on the employment of men and youths. (Ministry of Employment and the Economy.)

The young are finding it difficult to enter work life, and some of the ageing are finding it difficult to stay there. The problems caused by the recession have in some occasions been dealt with by transferring older people to unemployment pension or other early retirement schemes. The economic situation is, for now, undermining the efforts to support longer work careers.

## FIOH Profile and Trends in R&D

The health and safety of workers depends on how well occupational health organizations perform both scientifically and organizationally. The Finnish Institute of Occupational Health (FIOH) was established in the 1940s as a scientific organization to generate new knowledge in the field of workers' safety and health, to transfer that knowledge into everyday practice, and to educate professionals in the field of occupational health services (OHS).

In 2006, FIOH underwent a transformation to add practical value to its research, and to provide performance orientation for all its R&D and service activities.

## FIOH's Mission and Strategy

FIOH's mission is to promote work safety and health as part of good living. Together with our partners and clients, we seek out the most effective solutions for promoting occupational health and safety. Our strategic goals are:

- The management of occupational health hazards at work as part of management practices and corporate risk management
- Innovative, regenerative and healthy work communities
- Each citizen equipped to ensure his or her occupational safety and well-being
- Providing authorities with information for promoting occupational safety and health
- Smoothly flowing work processes, safe and easy to use working methods and tools
- Solutions for increasing participation in work life
- Controlling new occupational hazards, exploiting new opportunities.

We offer specialist advisory services in the following areas:

- Organizational development
- Occupational medicine
- Work process and equipment development
- Occupational health services development and work

ability promotion

- Work environment development

We create solutions for our clients, and learn and develop together with our partners. We create an overview of the needs of work life, and gather feedback to help guide our operations.

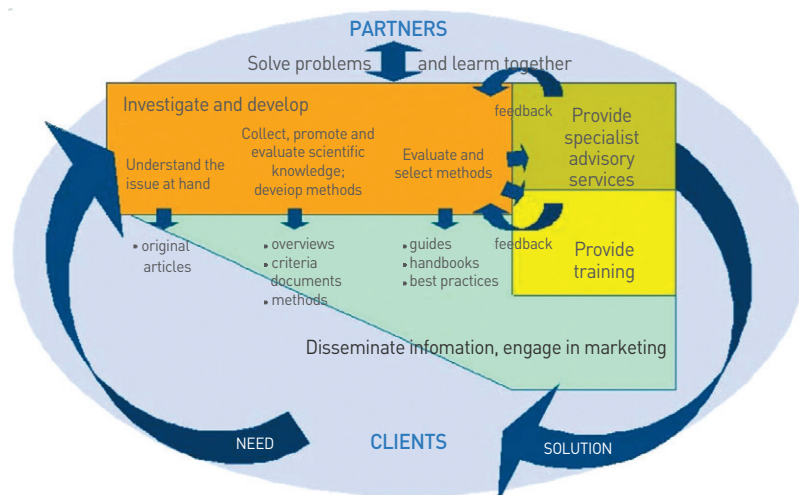
The Finnish government's report on innovation policies was approved by parliament in 2008. According to this report, innovation is no longer merely good inventions which may possibly be used by someone at some time, but increasingly a question of solutions to clients' needs. The government wants public sector research institutes to become multidisciplinary, high level international players, producing research knowledge which is relevant to society. Many perspectives of the report are mirrored in FIOH's own strategy; these are the goals that we have been striving to achieve for the last three years.

The following gives some examples of FIOH's interests and operations.

### Solutions for Increasing Participation in Work Life

FIOH is doing its best to react quickly to changes in society. At present, we are 'mobilizing forces' in order to put our knowledge, models and products more efficiently into practice and thus support longer work careers.

Critical points during a work career are the transitions between different stages of work and life: from education to work, from one occupation to another, from unemployment back to work, from sick leave to work, etc. We have developed several methods to help overcome these transitions, such as the 'Towards working life' and 'From training into work' methods to support school



[Figure 1] FIOH's Mode of Operation



graduates, the ‘Career path breaker’ group method to promote career management in today’s changing organizations, and the ‘Age as a resource’ work life training programme.

In order to tackle the rising curves of disability due to mental health problems, we have created guidelines for preventing and handling stress at work, and developed good practices for OHS for the recognition and treatment of mental disorders.

Increasing flexibility is necessary in order to accommodate people with particular life situations or health problems in work life. Based on our studies on long term absence and return to work, we have developed a mental health orientated workplace survey and a co-operation model for well-timed and safe return to work. We also studied the potential of part-time sick leave as a facilitator between complete sickness absence and return to full-time work.

Faced by the economic recession, we updated what was learned from the recession of the early 1990s. Based on that knowledge, we are now tailoring information packages, services, and training for our clients. We provide advice on how to work a way out of crises at workplaces through joint efforts, on what support is needed in the face of multiple lay-offs and redundancies, on how to survive at workplaces in which most of the work community is disappearing, and on how to survive if one suddenly loses ones job. At the same time, FIOH itself must be prepared for tougher times and adapt its operations accordingly.

### Management of Health Hazards as Part of Leadership

In Finland, 100,000 workplace accidents occur every year. The number of occupational diseases reported annually is about 6,000, but in addition to these, work is associated with the occurrence and symptoms of various other diseases, as well as with the resulting disability. We are developing new methods for safety management, both for small and

large enterprises.

Occupational accidents began to rise two years ago; in the construction industry in particular, where work processes are being split between different organizations and constantly changing workers. FIOH’s Zero Accident Forum has shown that there are means to improve this situation, but that this requires determination and the right attitude. The number of accidents at workplaces that belong to the Forum has decreased, despite figures for the country on the whole being on the rise. Members take the goal of zero accidents seriously, and learn from each other.

The EU’s new chemicals legislation, REACH, and new classification and labelling system (CLP/GHS) bring new tools and obligations for chemical risk management at workplaces. We have been active in providing information regarding the effects of REACH and CLP on workplaces by, for instance, training events targeted at workplaces and OHS units.

We have developed good practices for renovation processes in hospitals, through which the indoor environment of hospitals will improve, as will the health of thousands of hospital employees and patients.

### Innovative, Regenerative and Healthy Work Communities

A need has arisen to improve work and organizational factors in order to promote employee well-being and expertise. Meaningful work and work engagement have become crucial issues. Good management and organizational social capital seem to have a vast significance. Moreover, preparedness to meet crises and changes in organizational structures are required in organizations. In collaboration with other EU countries, we have created and collected easy-to-use methods in order to improve work and well-being, and to prevent stress at work.

As regards international collaboration, we participated in

developing a European framework for the management of work-related risks including violence, bullying and harassment at work. We also contributed to improving the understanding of the effects of organizational restructure on health and well-being. Tools, instruments and good restructuring practices were reviewed in various European Member States, on the basis of which policy recommendations and proposals for good practice at the European level were formulated.

### Each Citizen Equipped to Ensure His or Her Own Occupational Safety and Well-being

Through our personal choices, we influence not only our own well-being, but also that of our co-workers and those closest to us. Knowledge on factors which promote or endanger health supports our decision-making. Each citizen can actively develop health and safety at his or her workplace. FIOH disseminates information on health promotion to citizens via the internet, printed guidebooks and the media.

Society's alcohol-related problems are on the rise. To help prevent them, we support OHS professionals in the early identification of alcohol-related problems and promote bringing up alcohol-related issues during a patient's ordinary medical appointment. The aim is to focus on alcohol consumption at the earliest possible stage. We also published health-related information on the subject and challenged workplaces to bring these issues out into the open. Since 2007, we have challenged Finnish OHS units and workplaces to take part in the national 'Alcohol-free January' campaign.

FIOH contributed to the renewal of the tobacco legislation in Finland. Partly due to our expert opinions and recommendations, restaurants in Finland are now smoke-free. At present, we are creating the criteria for a health-promoting workplace. Our aim is that the criteria will be established as an essential part of management, planning

and follow up of actions, and everyday life at workplaces.

### Providing Authorities with Information for Promoting Occupational Safety and Health

Interaction between FIOH and public authorities is active. We participate in working groups with ministries and other public organizations, thus sharing our expertise and know-how in occupational health. We participate actively in the development and realization of the government's political programmes.

The National Audit Office reported that OHS are in need of development; according to the report, OHS has become curative rather than preventive, even though its primary task is to help prevent problems related to work ability, and to promote workers' health. An increasing number of employers offer curative services today. However, behind all this are the primary health care service problems which have been ongoing for some time now. In order to clarify the preventive role of OHS, and to make the task of employers' ordering of occupational health care services easier, we created a comprehensive guide as to what kind of health services different companies should offer their personnel and how. We also concentrate on increasing the comprehensiveness of OHS; the development of small enterprises' OHS in particular.

With the help of the Ministry of Social Affairs and Health, we are building an occupational health guidance model for primary health care. The aim is to make similar services available to the unemployed as are already in place for the employed. These services support the promotion and maintenance of the work ability of the unemployed.

### Smoothly Flowing Work Processes, Safe and Easy-to-Use Working Methods and Tools

We live in a 24-hour society. Working hours have diversified, and shift work and overtime have become more common. Long working hours may have a negative effect

on cognitive performance. We also sleep less than before, which is unfortunate, since short sleep affects our cognitive capacity, immunosystem, and even mortality rate.

Work time autonomy and ergonomic shift planning mitigate adverse consequences and decrease accident risks. We have produced new research information to minimize the disadvantages caused by shift work and long working hours. We have helped initialize good, healthy working hours in hospitals in particular, through development projects, education, information-sharing, and effective co-operation with trade unions.

In co-operation with the Finnish Heart Association, professional drivers' organizations, and service station restaurants, we are promoting exercise and a healthy diet for professional drivers in the heavy transport sector in order to promote their alertness at the wheel. In addition, we have prepared a guide for professional drivers' occupational health care units, and organized educational meetings with drivers.

### Controlling New Occupational Hazards, Exploiting New Opportunities

Technical and social reforms change work and the way in which it is organized. Scientific progress is deepening our understanding of how work-related factors affect our health, and new observations can challenge our previous understanding. Improvements in work life and advancement in science may help to remove occupational health hazards and improve the well-being of people. Yet, the development of work life may also give rise to new types of risks.

We systematically analyse work life in order to better understand and predict the direction of its development. We follow the latest research data and techniques, and assess the possibilities for utilizing them in our field. In 2008, we highlighted the potential health effects and safety issues of nanotechnology, in using biomedicine in the prevention and

treatment of hypersensitivity and musculoskeletal diseases, and in researching how the brain copes at work.

## Future Challenges

FIOH's strategic priorities and goals are to be refocused in view of the rapidly changing environment and the ever-increasing complexity of change. Our current strengths are related to high competence, multidisciplinary, close connections to stakeholders and social partners, innovative research and development (R&D), and national and international networks. Our biggest challenges are related to our ability to obtain appropriate distribution for our evidence-based practical tools, and to resource fluidity.

I would like to conclude this paper with a thought regarding the indicators on occupational safety and health. The end-effects, such as occupational accidents or occupational diseases caused by exposures at work, are just the 'tip of the iceberg'. We should not limit our horizons by concentrating merely on lagging indicators, 'proximal' causes, and individual risk factors. Occupational safety and health is embodied in the successes and failures of a society as a whole. In order to rise to the challenges posed by today's changing and globalizing work life, and to prepare ourselves for the upcoming demands on safety, health, and well-being at work, we need to widen our perspectives and concentrate on making them more future-orientated. 🌐

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# Current Issues and Research Trends of OSH in Italy and ISPESL Profile

As of 2007, the number of workers in Italy was around 23.2 million. According to the statistics released by the INAIL, the number of work-related accidents and illnesses rose 2.2% (914,500) and 7% (28,497) year on year respectively. However, the number of deaths went down by 171 to 1,170.

In addition, Italy is now facing a variety of changes including a larger foreign workforce, confrontation between contract and regular workers, illnesses related to psycho-social factors, occupational cancer, and asbestos. Accordingly, OSH approaches are changing the focus from social security and post compensation toward voluntary participation and comprehensive prevention measures. In response, ISPESL is launching various projects and researches, which are introduced in this paper.

[Coauthor] Bruna Rondinone, ISPESL

## The Labour Market in Italy

On the basis of the results of the Survey on Workforce periodically carried out by the Italian Institute for Statistics (ISTAT) in 2007, the number of employees was a little more than 23,200,000, with a 1.0% increase as compared with 2006, a mitigated dynamics as compared with previous year (+1.9%).

Foreigners largely contributed with two thirds of employment overall growth in 2007 with an increase of foreign workers over the total number of employees from 5.9% in 2006 to 6.5 % in 2007.

As to gender differences, both male and female employment is growing by 0.8% and 1.3%, respectively, though with a slowed-down growth rate as compared with 2006.

Besides, the overall employment growth continues to synthesize diversified trends by age. In the younger range (15-34 years) on average in 2007, employment shows a 2.1% tendential drop mainly due to residential population decrease in this



Sergio Iavicoli  
Director General

The Italian National Institute for  
Occupational Safety and  
Prevention, Italy



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range. In the central range (35-54 years), employed show a 2.1% growth on yearly basis. In the older range (55-64 years) the increase is 4.9%. One reason is the higher progressive permanence of people as workers due to the gradual age rise and compensation requirements to retire.

On average in 2007, employment growth is due to employee job showing a 1.5% increase whereas self-employed slightly diminish.

The sector-based level exhibits a 5.9% decrease in agriculture. Industry, strictly speaking, after a substantial stability in 2006, shows a slight employment increase (0.4%). Construction, after the long dynamic expansion along 7 years and the standstill in 2006, continues to increase with good rates and an average 2.9% increase. Though it is half as compared with 2006, the tertiary growth rate proves to be positive with a 1.4% prospective development.

Though employment has increased in Italy in the past years, with economic crisis progress, the labour market conditions in 2008 have deteriorated, involving differing consequences be it the “standard” or the atypical labour market. The latter identified a rather huge and heterogeneous reality kept together by the lack of at least one standard working factor: indefinite duration and/or full time job.

The information gathered by the Survey on Workforce enable to subdivide employment according to the (full or part) time table and according to the (permanent or temporary) job. Combination of these two parameters, as well as activity autonomy degree, can identify three groups of workers:

- (full time and indefinite duration) standard workers include full time employees with indefinite duration work and self-employed workers with full time and indefinite duration job;
- (part time and indefinite duration) partially standard workers include reduced working time jobs

concerning both indefinite time contract and self-employed workers;

- (temporary job) atypical workers including temporary employees and collaborators for full time and part time jobs.

In 2008 standard works involve approx 18 million people, i.e. 77% of the total employees. Partially standard workers include approx 2.6 million people. Atypical workers are nearly 2.8 millions.

## Trend of Accidents at Work in Italy

On the official recording date of April 30, 2008, the accident balance for 2007 is no doubt more positive than in 2006 as regards the phenomenon overall trend and above all fatalities which obviously are the events having higher social and emotional impact.

To this date, in fact, the Italian Workers' Compensation Authority (INAIL), received 912,615 accident reports occurred during 2007: approx 15,500 cases less than in 2006 with a 1.7% drop higher than the 1.3% decrease in 2006. Out of the 912,615 reported accidents, 6.3% of the total occurred in agriculture, 90.5% in industry and services and 3.2% within civil servants.

The accident decrease was higher, as usual, in agriculture (-9.4%) and rather high however also in Industry and Services (-1.2%) whereas for civil servants the increase was 1.5%.

Commuting accidents increased on the whole from approx 92,500 cases in 2006 to 94,500 in 2007 (+2.2%). The 1.7% overall decrease is anyhow more significant if we consider that in 2007 the number of employees increased by 1%: hence, in relative terms, the real improvement is approx 2.7%. But, as already mentioned, the most interesting result concerns fatalities. In April 30, 2008 recording, 1,170 accidents with fatalities were reported as occurred in 2007: of these, 98 in agriculture, 1,058 industry and services and 14 within civil servants.

As compared with the previous year results (1,341 reported cases), there is at present an overall decrease of 171 fatalities as a result of a significant drop in agriculture (-26 cases) and in industry and services (-147 cases), whereas there is an increase of 2 cases (12 to 14) for civil servants as a result of the increase of commuting fatalities, from 4 cases in 2006 to 9 cases in 2007.

However, while the 2006 figures are final, the number of fatalities in 2007, recorded on April 30, 2008, is not at all definite and is going to rise above all because of the technical times necessary for recording statistical criteria.

As to the phenomenon gender composition, the percentage of women affected by accidents at work is substantially steady, also for 2007, around 27.5% values. The drop of accidents at work in 2007 as compared with 2006 is to be nearly fully ascribed to males (-2.5%) while for females there is a 0.6% growth.

For both genders, nearly 80% of accidents affect the central age ranges (18-34 and 35-49 years) with a marked prevalence of 35 to 49 year range, specially for females.

Instead, as to fatalities, though taking into account the provisional nature of data, the females' presence is much more limited (approx 8% of cases in 2007) as compared with males' presence (92%) thanks to employment in clearly less hazardous jobs and sectors.

The fall of 171 fatalities recorded in 2007 as compared with 2006 as a whole (-12.8%) was nearly fully to be ascribed to males (169 fatalities for males and 2 cases for females). The most affected range by fatalities is the 35-49 year range for males (39.2% of cases in 2007) and females (43.3%) followed by 18-34 year class (27.5% for males and 32.0% for females). The 50-64 year range exhibits on the contrary higher values for males than for females (27.5% against 23.7%).

Another interesting issue for this analysis is concerned with the worker's contract form because of the wide diffusion of "atypical" jobs.

In fact it is only the two main forms of atypical work

(temporary or project workers) and consultants, that exhibited remarkable increases in terms of accidents (+ 23.6% and 5.6% as compared with 2006). The situation is nearly the same for the trend of fatalities even if statistically speaking they are small figures and mostly concerning commuters.

At sector-based level, the decrease of accidents at work in 2007 seems to be higher in industry than in services, which occurs also for fatalities.

As to fatalities, in 2007, though the figures are still provisional, a high drop in Agriculture, Textiles and clothing, processing of non metal minerals, and health. Victims at work diminish also in Construction where on the other hand foreign workers' presence becomes increasingly important, with 30% of fatalities with 73 cases over a total of 244 in the last year.

## Trend of Work-Related Diseases in Italy

To the recording date of April 30, 2008 INAIL received 28,497 reports of work-related diseases appeared in 2007, with a 7.0% increase as compared with 2006 and a 13.0% increase if compared with 2003.

In industry and services, incorporating approx 93% of occupational diseases, there is a 6.4% increase. Instead Agriculture and civil servants exhibit a remarkable percentage increase, by far higher than in Industry and Services. In Agriculture the 200 additional cases as compared with 2006, represent a 14.0% increase. An even higher percentage increase is reported within civil servants: 319 cases in 2006 to 391 cases in 2007 (+22.6%) and 162 reports more than the 229 reports in 2003 (+70.7%).

Data analysis can be further detailed distinguishing between those included in special list (with legal presumption of cause) diseases and those not included in such list i.e. work-related pathologies whose demonstration

of causal link is up to the worker.

The most frequent are hypoacusis and deafness whose incidence however has been decreasing over the years (on definite cases) from 29% of reported cases in 2003 to 23% in 2007. In fact others are the diseases that have even doubled if not tripled the number of reported cases: tendinitis (+131% in 2007 as compared with 2003 and a 14% incidence over the overall figure), intervertebral disc disorders (+ 180%), arthrosis (+113%) and carpal tunnel syndrome (+48%).

For many years by now, we have witnessed a transition from “traditional” diseases like hypoacusis and silicosis to “emerging” diseases, in particular by physical agents affecting the musculoskeletal apparatus. Viceversa, the moving back of some “historical” diseases proves that also the interventions of regulations applied in the past in the field of prevention have been quite effective and emphasize the importance of the continuous updating of such initiatives to face the evolution of productive technique and working environment. Diseases not included in special list comprise also respiratory diseases (with a 8% decrease between 2007 and 2003). Among diseases included in special list, on top of the list in industry and services and civil servants there still are silicosis (300/400 cases per year) and asbestosis (500/600 cases per year).

Special attention has been recently focused on psychosocial work-related diseases denominated “work-related psychosocial disorders”.

Another serious disease worth being investigated separately, also because of its human and social implications, is work-related cancer. A prior statement is appropriate and namely that there is diffused sensation that INAIL data do not fully represent the phenomenon size. The difficulties to assess the causal link with cancerogenic substances or working conditions, still unknown and neglected causing factors, lack of report induce experts to believe that INAIL is acquainted only with some cases and hence, reports would be a priori under-evaluated. According

to some investigations on cancer diffusion in Italy, 4% to 8% of cancers have an occupational cause. Cancers are the first on the list of work-related diseases reported to INAIL. On the whole, including diseases in special list and those not in special list, the number of reported cases exceeded 1900 cases in 2005 and 2006, up to 1,700 reports in 2007. These values exhibit however a growing trend as compared with the approx 1500 cases of 2003 and 2004.

Nearly half of the cases still concerns asbestos neoplasias with continuously growing values up to 2007 with, provisionally 728 cases against 851 cases in 2006. But the incidence on the neoplasia overall phenomenon has reduced in the past five years being replaced by cancers not included in special list. In addition to respiratory apparatus cancers (trachea, pleura and larynx) quite numerous are for example the cancers whose report has more than doubled in the past 5 years (approx 200 cases in 2007 against 79 in 2003) as well as multiple myelomas (55 reported cases in the last year).

## The Italian National Institute for Occupational Safety and Prevention (ISPESL)

The evolution of the employment productive scenario and related risks is the ground for thinking about the role to be played in Italy by research institutions with a prevention-oriented mission in for Occupational Safety and Health (OSH) of workers.

The Italian National Institute for Occupational Safety and Prevention (ISPESL) is the technical and scientific research Institute of the Italian National Health Service whose mission is to promote accident prevention, occupational safety and health protection in living and working environments. The Institute, with its expertise in the field, is a reference point for companies, workers and citizens. ISPESL has more than 1200 employees, who are Researchers, Technicians and Administrative personnel, etc.

### Specifically, It:

- conducts scientific research activities. In addition, through cooperation agreements with important national and international institutions, it conducts research in the fields of accident prevention, occupational safety, health protection, safety and reliability of processes related to production, industrial accident prevention and environmental protection;
- carries out inspections to ensure the safe operation of products and industrial plants;
- establishes technical-scientific standards for risk assessment methods and procedures, as well as guidelines and protocols for health and safety protection in living and working environments;
- participates in Community and international technical committees and bodies;
- carries out information and training activities for public and private bodies as well as consultancy activities for companies, in particular small and medium enterprises;
- disseminates the results of analytical methods and scientific communications produced and collected for the benefit of occupational health and safety via scientific publications, seminars & conferences and other events;
- conducts research, consultancy, studies, planning and development of technical-scientific methods for preventing and mitigating major accidents and for addressing environmental compatibility issues of production plants with human settlements to improve the safety and protection of the health of workers and population;
- conducts exposure assessments for physical, chemical and biological agents in living and working environments;
- conducts inspections for the safe installation of pressure and lifting equipment. Conducts on-site compliance inspections of grounding systems and atmospheric discharge protection systems.

### ISPESL Includes:

#### Technical-Scientific Area Consisting of

- Central Departments (Department of Occupational Hygiene, Department of Occupational Medicine, Department of Safety Technology, Department of Production Plants and Human Settlements and Department of Certification and Standards of Products and Plants);
- 9 National Research Centres;
- 20 Local Agencies for technical support and consulting.

#### Organization Processes Area Including:

- Department of Organizational Processes

#### Administration and Accounting Area

- Department of Budget, Human Resources and General Affairs
- Local Structures and Research Centres.

ISPESL has a wide-ranging activity plan on three-year basis with an overall budget of 55 million euros covering lines and programmes developed also in collaboration with a huge network of national and international institutions. Activity is focused on wide-ranging topics in OSH at workplace following identified priorities that will be illustrated here below.

Moreover, ISPESL actively participates in a large number of research projects and programmes financially supported by the main national research institutes and the European Commission.

## International Cooperation of ISPESL

ISPESL has promoted over the years its numerous collaborations with akin European Institutes in OSH [Figure 1], strengthening at the same time its contacts with European and international organizations.

Of great relevance is its role as national Focal Point of the European Agency for Health and Safety at Work and as Collaborating Centre and Italian Focal Point of the World





**[Figure 1] Direct Collaborations with Akin Institutes in Europe**

Health Organization (WHO CC) for workers' health, the support to General Secretariat of International Commission on Occupational Health (ICOH) and participation in international working groups of International Social Security Association (ISSA). Moreover, ISPESL has bilateral collaboration agreements with some of the main akin institutes such as National Institute for Occupational Safety and Health (NIOSH) the U.S., l'Institut National de Recherche et de Securite (INRS) of France, Central Institute for Labour Protection of Poland (CIOP), and the Korea Occupational Safety & Health Agency (KOSHA).

In particular, the Department of Occupational Hygiene has joined two European projects in the field of exposure to electromagnetic fields: “Effects of the exposure to electromagnetic fields: from science to public health and safer workplace (EMF-NET)”, financially supported within the VI Frame Programme and Italy-Poland Twinning PHARE, Strengthening of State supervision and monitoring system of exposure to electromagnetic fields.

The Department of Occupational Medicine, in addition to the already mentioned international collaborations in

occupational health and activities such as WHO CC, has joined the “Promotion for European Research in Occupational Safety and Health” (PEROSH) network as well as the research and training group of Mediterranean Countries “Mediterranean Training and Research in Occupational Safety and Health Network” (METRONet).

In addition to the Working Groups within ISSA, the Department of Safety Technology has been engaged in 2007, in “Process Oriented Integrated Quality Management Internet Services for SMEs” (PROMIS) project.

A relevant activity of the Department of Certification and Standards of Products and

Plants is the participation in International Confederation of Inspection and Certification Organisations (CEOC). The Department of Production Plants and Human Settlements completed in 2007 the Sharing experience on Risk Management, Health, Safety and Environment to Design Future Industrial Systems (SHAPE-RISK) European Programme, within the VI Frame Programme of European Commission. Besides, it has joined the “Filtering of Asbestos fibres in Leachate from hazardous waste Landfills” (LIFE-FALL) project and the “Working Group of Organization Economic Cooperation and Development” (OECD) on chemical accidents in view of Guidance for the Implementation of Integrated Management of SHE&Q project.

Finally the Department of Organizational Processes, beside the activities performed within the European Agency for Safety and Health at Work, such as the 2007 European Campaign and participation in Topic Centre Work Environment, has actively collaborated as a partner of the European NEW OSH ERA project as well as a member of the European Network on Education and Training in OSH

(ENETOSH). At international level it has participated in an Italy-Kenya-Guatemala collaboration project and CIS information centre network of International Labour Office.

Within the Network of WHO Collaborating Centres for workers' health, the Department of Occupational Medicine contributed to preparatory works of the Global Plan of Action on Workers' Health. Besides, the Department carried out the reporting activity needed to be re-designated as a Collaborating Centre for the next four years. Within the 2006-2010 Network Plan, the Department has pursued the activities regarding the following projects: 1) Child labour: strategies for prevention; 2) National analysis of Disability Adjusted Life Years (DALY) in relation to occupational diseases and injuries and indication of prevention strategies in workplaces; 3) Stress at work: risk perception and strategies for prevention; 4) METRONet: joint training programme.

In the frame of the collaboration agreement with European akin Institutes Promotion for European Research in Occupational Safety and Health (PEROSH), the Department of Occupational Medicine identified the representatives within the Network 6 working groups as indicated in the meeting of the partner Institute presidents.

Within the research and training working group of Mediterranean Countries, METRONet, the Department contributed to the Italian translation of the White book of risk from biological agents, processing of network website contents ([www.metronet-osh.org](http://www.metronet-osh.org)), and organization of the third advanced training course on working exposure to biological agents.

The Department continued the collaboration activity with the Finnish Institute of Occupational Health (FIOH), resulting, among others, into the co-organization of EuroNanOSH 2007 conference, on health and safety issues of nanotechnologies at work.

The Department continued to support the General Secretariat of International Commission on Occupational Health, also participating in the ICOH State-of-the-Art Conference on Health Care Workers 2007.

## OSH Regulations in Italy

Not only did the labour market significantly change but also the approach to health and safety at work underwent a dramatic change with evolving OSH regulations. There is an increased demand for professional skills and a need for multidisciplinary. Between the end of the 19th century and early 20th century, the legislation in OSH was dealing only with social security-treatment-compensation issues and since a prevention-oriented policy did not exist, inspection bodies did not exist. It is in this period that some Agreements of ILO are ratified.

In the 30s, the Criminal Code contained two articles 437 and 451 aimed at sanctioning plant tampering, hence preventing hazards at work.

In the 40s, Act. 2087 of the Civil Code provides a basic rule for protection of worker's psychophysical integrity and art. 32 of the Constitution states the need for a solidarity toward the whole collectiveness.

At the same time, WHO issues the definition of "health" meant as a "state of physical, psychic and social well-being".

In the 50s, Law decrees DPR 547/55 and DPR 303/56 outlining technical prevention methods were issued: the legislator's focus on technical-objective factors induced the worker to get just the knowledge of risks associated with his/her activity and consequent adjustment to the machine.

In the 60s the European Economic Community was born and in Italy the social security-compensation issue is strengthened with the TU 1124/65 of compulsory insurance against work accidents and work-related diseases.

In the 70s, the Workers' Statute (L 300/70) reasserted the collective impact of workers' health interest giving workers' representatives the right to check normative application for accident and work related prevention. The Italian National Health Service reform law (L 833/78) transferred some governmental competences to the Regions and in particular supervision of safety regulations at work.

In 80s and 90s, the European Community issued a

number of regulations and Italy incorporated a large number of European directives.

A social security-compensation-repression approach turned into a participative-preventive-multidisciplinary-management approach and hence from the concept of “technical prevention” to the concept of “Global security” [Figure 2].

The novelties introduced in Law Decree. N. 81/08 focus on the following items:

- Extension of OSH coverage to all worker categories (including temporary workers and volunteers);
- Development of National Integrated Information System;
- Implementation of the “OHS organization and management model”;
- Stronger cooperation of public institution in the field of prevention;
- Implementation of medical surveillance based on ethical principles;
- Field employees representative (RLST);
- Stronger emphasis to psychosocial risk factors;
- Promotion and development of collective agreement, codes of conduct and good practices with respect to the CSR principles;
- Promotion of safety and prevention culture at school level.

collaborations provided interesting methodological cues to a study model allowing to identify and orient research demand in the field.

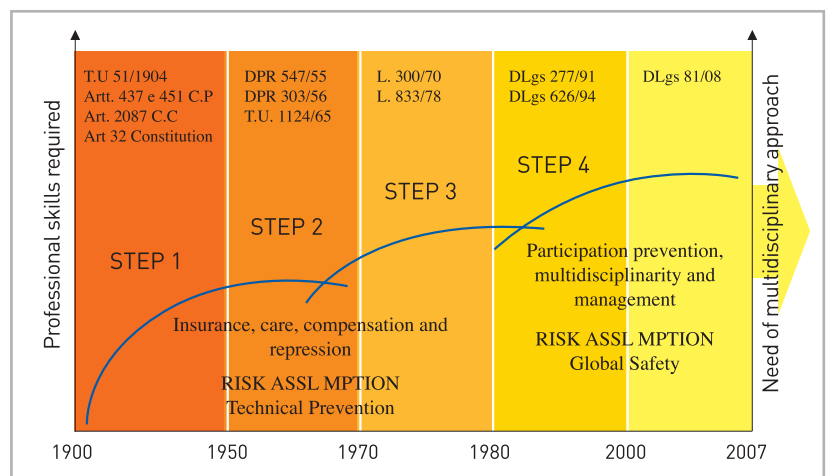
Ever since 2000, ISPESL has conducted a national investigation on research priorities involving qualified witnesses from University, Prevention Departments of National Local Units and stakeholders. Identified priority areas (occupational carcinogenesis, quality control in occupational health, training, information and participation and new work-related diseases) were useful suggestions for the scientific community.

In 2007, in view of a more accurate definition of research areas of the new three-year plan of ISPESL, a study was launched in order to assess the new trends and tendencies as to past priorities as well as identify possible emerging areas needing-according to interviewed subjects-implementation within research and transfer knowledge.

Among priority topics, “Occupational carcinogenesis” and “Work accidents” were assigned absolute priority. For research they held respectively first and second position, with scores of 4.20 and 4.19; they were the other way round for transfer knowledge, as “Work accidents” had a score of 4.30 as compared with 4.16 for “Occupational carcinogenesis”. Priority was also high for issues related to “Organisation, strategies and optimisation of prevention and safety services

## Research and Transfer Knowledge Priorities in OSH in Italy

Research and transfer knowledge priorities in OSH in Italy The Department of Occupational Health of ISPESL has developed for several years study method-ologies aimed at identifying and assessing research and action priorities in Occupational Safety and Health. Extensive experiments conducted in some countries and scientific international



[Figure 2] Evolution of OSH Regulations in Italy

**<Table 1> Research and Transfer Knowledge Priorities for the 27 Topics. Mean Scores and (rank); Comparison with the Results Achieved in the Previous Study**

(*)	Topics	Research priority (2007)	Research priority (2007)	Transfer knowledge (2000)
D	Occupational carcinogenesis	4.20 (1)	4.32 (1)	4.16 (2)
A	Work accidents	4.19 (2)	3.75 (9)	4.30 (1)
E	Organisation, strategies and optimisation of prevention and safety services at the workplace	3.93 (3)	3.87 (5)	3.93 (3)
E	Worker information, education and exposure	3.92 (4)	3.89 (4)	4.11 (3)
D	Exposure to low doses and multiple exposure	3.86 (5)	4.00 (3)	3.68 (9)
E	Quality in occupational medicine	3.81 (6)	4.15 (2)	3.77 (6)
A	New work-related diseases	3.80 (7)	3.77 (7)	3.67 (10)
E	Work organization and new types of work	3.77 (8)	3.66 (11)	3.69 (8)
A	Musculo-skeletal and repetitive trauma disorders	3.73 (9)	3.64 (12)	3.85 (5)
E	Biological monitoring: identification of markers for low-dose exposure	3.65 (10)	3.83 (6)	3.54 (13)
E	Medical surveillance and work ability criteria	3.65 (10)	3.7 (7)	3.72 (7)
C	Health-care and hospital sector	3.61 (12)	3.61 (13)	3.66 (11)
B	Asbestos substitute fibres	3.46 (13)	3.55 (14)	3.50 (15)
E	Methods of assessing and measuring occupational stress	3.45 (14)	3.29 (25)	3.34 (19)
B	Occupational exposure to urban chemical pollutants	3.44 (15)	3.32 (22)	3.46 (16)
B	Load handling	3.44 (15)	3.36 (20)	3.61 (12)
C	Special populations at risk (elderly, minors, disabled people)	3.44 (15)	3.33 (21)	3.53 (14)
D	Mechanism of action of occupational stress and occurrence of disease	3.41 (18)	3.32 (22)	3.34 (19)
D	Individual susceptibility and development of susceptibility indicators	3.28 (19)	3.53 (15)	3.18 (25)
C	Agriculture	3.26 (20)	3.38 (19)	3.37 (18)
B	Biological agents	3.24 (21)	3.44 (17)	3.38 (17)
C	Air quality and indoor environments	3.23 (22)	3.14 (26)	3.26 (23)
A	Occupational allergies	3.17 (23)	3.46 (16)	3.29 (22)
A	Occupational asthma and respiratory diseases	3.16 (24)	3.43 (18)	3.24 (24)
A	Reproductive and pregnancy	3.16 (24)	3.31 (24)	3.30 (21)
B	Electromagnetic fields	3.05 (26)	3.69 (10)	3.16 (26)
D	Mechanisms of skin absorption of xenobiotics	2.85 (27)	2.93 (27)	2.86 (26)

※ The first column specifies the macro-sector: A) Diseases and work accidents; B) Risk assessment; C) Work environment, workforce and working sector; D) Mechanism of action and development of indicators; E) Research methods, approaches and strategies.

at the workplace”, which held the third place for research and the fourth for transfer knowledge; “Worker information, education and participation” was given third place for transfer knowledge and fourth for research. “Exposure to low doses and multiple exposure” was assigned higher ranking for research (5th position) than for transfer knowledge, where it was relegated to ninth. Other topics ranked higher for research than transfer knowledge included “New work-related diseases” (7th position for research, 10th for transfer knowledge), “Biological monitoring” (10th and 13th positions), “Methods of assessing and measuring occupational stress” (14th and 19th), “Individual susceptibility and development of susceptibility indicators” (19th and 25th).


Comparison of the mean scores shows which problems were considered more important for transfer knowledge than for research. For example, “Musculo-skeletal and repetitive trauma disorders” hold 5th rank for transfer knowledge but 9th for research; “Medical surveillance and work ability criteria” are at 7th and 10th positions; “Load handling” holds 12th rank for transfer knowledge, 15th for research; “Biological agents” are 17th and 21st, “Reproductive and pregnancy disorders” 21st and 24th. Among new research and transfer knowledge priorities we have “Risks associated with nanotechnologies and exposure to nanomaterials” holding top priority for research, whereas they are at 11th position for transfer knowledge. The second research priority, though top for transfer knowledge, was “Assessment of psychosocial and organizational risk”, with scores of 4.63 and 4.81. Another topic that attracted substantial attention among respondents was “The role of Occupational Health in accident management and prevention, with special reference to Construction”, which held 3rd place among research priorities and 2nd for transfer knowledge.

Relevant were also considered problems connected with “Migration and work” (4th place for research, 3rd for



**<Table 2> New Priority Areas for Research and Transfer Knowledge; Mean Scores and Rank**

Topics	Research priorities	Transfer knowledge priorities
Risks associated with nanotechnologies and exposure to nanomaterials	4.92 [1]	4.23 [11]
Assessment of psychosocial and organizational risks	4.63 [2]	4.81 [1]
Role of Occupational Health in accident management and prevention with special reference to Construction	3.57 [3]	4.67 [2]
Migration and work	3.54 [4]	4.61 [3]
Health promotion	4.49 [5]	4.49 [5]
Chemicals	4.40 [6]	4.58 [4]
Cost/benefit analysis prevention	3.40 [6]	4.35 [9]
Subjects previously exposed to carcinogens	3.37 [8]	4.37 [8]
Information flows and recording systems	3.34 [9]	4.41 [7]
Ergonomics	4.05 [10]	4.23 [11]
Noise and vibrations	4.00 [11]	4.27 [10]
Epidemiologic studies and diagnostic protocols for work-related diseases	3.95 [12]	4.43 [6]
Alcohol, drug addiction and work: legislative issues, prevention strategies and intervention models	3.83 [13]	4.15 [13]
Assessment and management of occupational psychosocial risks: development of intervention and applicability models	3.56 [14]	4.05 [14]

transfer knowledge) and “Health promotion”, which held 5th place in both lists. Other topics assigned high priority included “Cost-benefit analysis prevention”, and problems related to “Workers previously exposed to carcinogens”, and “Information flows and recording systems”. At the bottom of the research and transfer knowledge lists were the issues related to “Alcohol, drug addiction and work”, and “Assessment and management of occupational psychosocial risks”. 

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# Current OSH Situation in Vietnam and Research Trends in NIOEH

In the last 10 years, Vietnam has gone through a rapid economic development to meet the demands of construction in industrialization and modernization period. However, besides the benefits of technology transfer, industrialization and modernized processes, there have been a lot of challenges for OSH in Vietnam.

Many work related diseases were generated from newly introduced chemicals and asbestos. In addition, backward technologies and wastes have been imported into developing countries, in particular to Vietnam, generating great effects on worker' health. Therefore, this paper describes the status of occupational safety and health and up-to-date research trends in Vietnam and the key responsibilities of NIOEH.

[Coauthor] Nguyen Bich Diep, NIOEH

## Current OSH Situation in Vietnam

### General Information

Vietnam is located in South East Asia, bordered by Cambodia, Laos, and China with the total area of 330,991 km<sup>2</sup> and 63 provinces. The population is 84 million (2007) in which rural population is 61 million (72.9%). The GDP in 2007 was VND 1,144,015 billion, growth rate of GDP in 2008 was 8.5 % and the GDP/capital in 2007 was USD 835.

The number of enterprises is 112,952 (according to 2006 data of General Statistic Office), where non state enterprise consists 93.1%, state enterprise 3.6% and foreign investment enterprises 3.3%. Enterprises involved in the field of trade, hotels and restaurant account for 44%, industries 25.3%, and construction 13.5%. The total number of workers in 2007 was 44,171,900. Proportion of small and medium sized enterprise account for more than 95%.

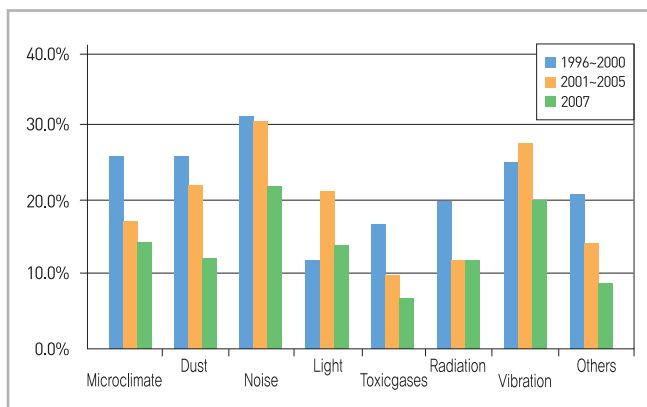


Nguyen Duy Bao  
Director General  
National Institute of Occupational  
& Environmental Health

## General OSH Situation in Vietnam

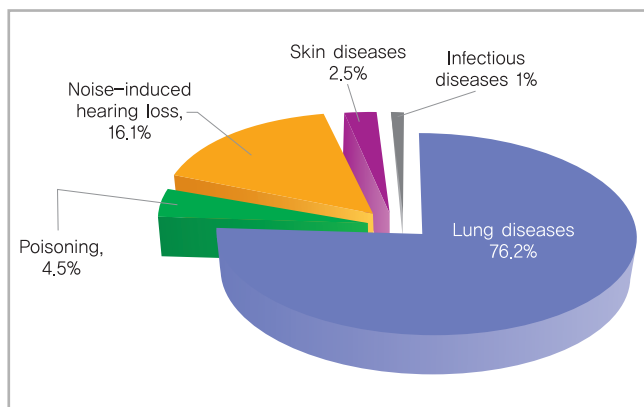
During the last decade, Vietnam has gained great achievements in the development of social-economics by implementing the renovation policy and promoting industrialization and modernization. With the open renovation policy initiated by the Vietnam Government for economic development, a series of technologies and modern machines have been imported into Vietnam to contribute greatly to the rapid social-economic development which have created new jobs and increased income for the employees. Many industrial zones, foreign joint-venture, and

foreign capital enterprises and companies have been established. However, besides the benefits of technology transfer, industrialization and modernized processes, there have been a lot of challenges for OSH in Vietnam. Many new risks and hazards were generated during the introduction of new chemicals in different industries. In addition to the traditional occupational diseases (pneumoconiosis, noise induced deafness, chemical poisoning, etc.), work-related diseases also occurred, e.g. musculoskeletal disorders, diseases caused by occupational stress and psychosocial factors, SARS and bird flu. Furthermore, in the context of

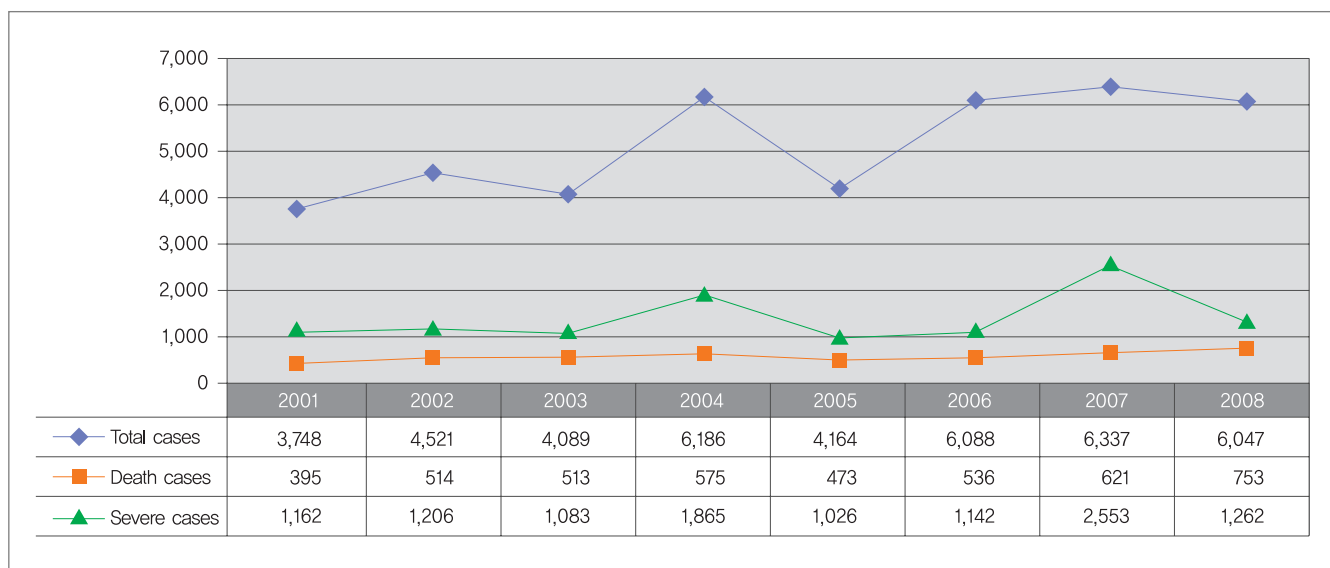


[Figure 1] The Working Environment Samples Exceeding the Standards (%)

※ Research conducted with 2,000~3,000 enterprises



[Figure 2] Types of Occupational Diseases (1996-2008)



[Figure 3] Occupational Accident Cases (2001-2008)

“global technology break out,” many dirty and backward technologies and wastes have been imported into developing countries, in particular to Vietnam, generating great effects on workers’ health.

Studies investigating work environment of Vietnamese workers showed that the percentage of working environment samples exceeding the permissible limit was 14.4% on average. Noise accounted for the highest percentage with 22%, followed by dust 12.1%, and toxic gas 7%. In the past years, occupational diseases (ODs) have been showing an increasing trend in both the number of suffering workers and the types of ODs. With increasing ODs, work related diseases have newly occurred in some occupations, such as skin ulcer and varicose in sea food processing industry and HIV/AIDS, SARS, and H5N1 bird flu in health sector. However, only 10% of the enterprises with high risks of ODs organized OD examination for their employees, indicating that the number of workers suffering from ODs will be much higher in reality than in reported cases. The total amount of OD compensation paid by the social insurance during 2000~2004 was VND 50.81 billion and in 2004 VND 14.28 billion. Currently, there are 28 compensated ODs, but by 2010, at least 10 new ODs will be added to the list, and 30,000 new OD cases and more than 200,000 work-related diseases are expected to be reported.

Every year, 4,245 occupational accidents involving 4,415 people and 480 casualties occur. The number of occupational accidents is increasing by 17.38% every year. However, this number is believed to be underestimated. According to scientists, the actual number of occupational accidents would be 10 times higher than the reported data. Occupational accidents not only cause loss of workers but also economic losses. According to the report written in the period 2000~2004, the average annual cost for occupational accidents paid by the employers was VND 17.38 billion. But, according to the survey conducted by the Ministry of Labour, Invalid and Social Affairs from 2000~2002, the total cost was estimated

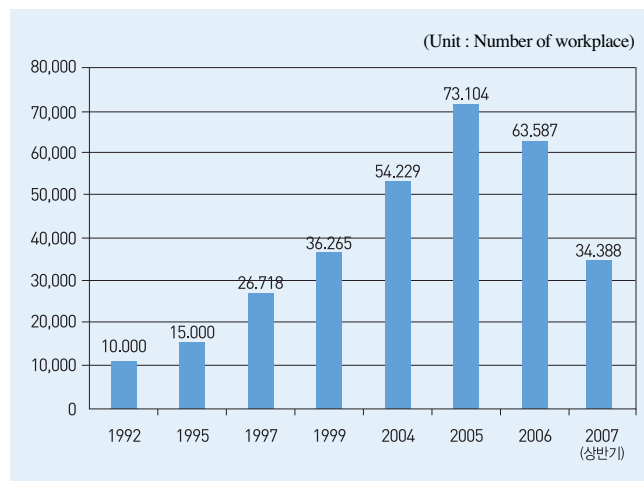
to be approximately VND 240 billion annually. The total compensation for occupational accidents paid by the social insurance in 2000~2004 was VND 197.2 billion. This indicates that the total economic losses caused by occupational diseases and accidents in Vietnam would be a thousand billion dong each year.

## Specific OSH Problems

### Asbestos Exposure

The production and usage of construction materials are increasing in Vietnam, especially those containing asbestos, to meet the demands of construction in industrialization and modernization period. The annual consumption of asbestos in Vietnam is approximately 50,000~60,000 tons, where most are imported from other countries. Asbestos cement slate products constitute major use of asbestos (95%). There are 41 companies producing asbestos cement slates with backward manufacturing process and approximately 10,000 workers are estimated to be directly exposed to asbestos.

Exposure to asbestos has been found to significantly increase the risks of asbestosis, lung cancer and mesothelioma. In Vietnam, asbestosis became one of compensated ODs in 1976. However, only 10 cases have been accepted as



[Figure 4] Quantity of Imported Asbestos



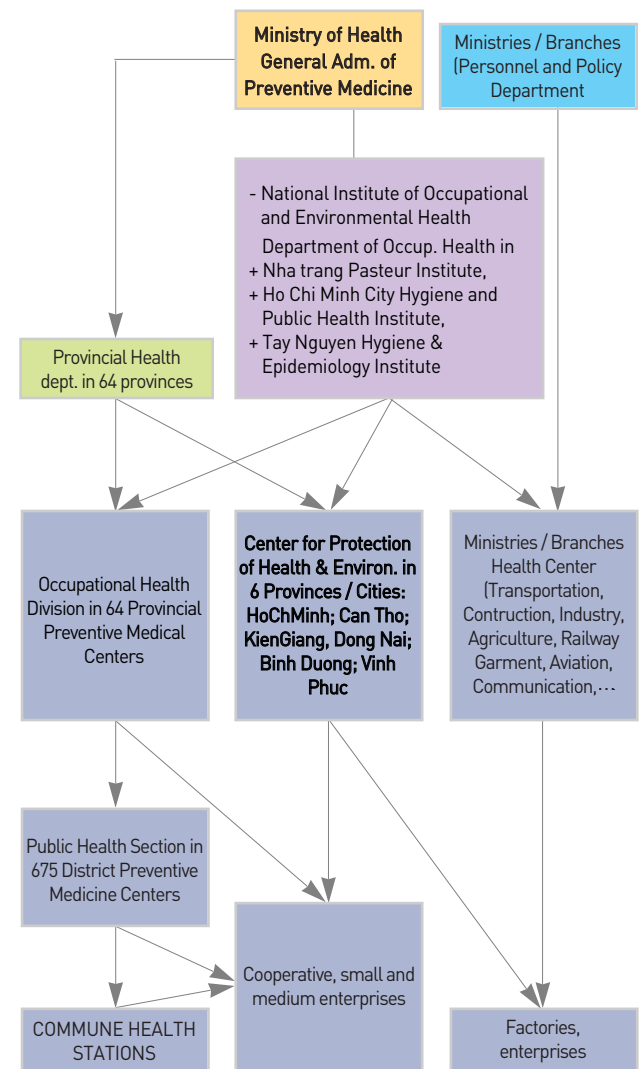
asbestosis among workers working in fiber asbestos construction and asbestos-cement slates production since June 2008, although the number of workers exposed to asbestos continues to increase. According to a survey conducted in 23 factories producing asbestos-cement roof tiles in 2005, 10 factories exceeded the standard (4.2~5.6 fiber / cm<sup>3</sup> air) by 2~11 times. During 1976~2007, 3 cases of asbestosis out of 25,000 pneumoconiosis cases were reported. In 2005~2006, a national report on mortality cases revealed that there were 270 cases of mesothelioma. The diagnosis of asbestosis and asbestos related diseases is still a big problem in Vietnam. One of the reasons is lack of specific equipment for work environment surveillance such as asbestos sampling and fiber analysis instrument. Also, the capacity of occupational health (OH) officers in our network in working environment surveillance and diagnosis of asbestosis are limited.

### Health Care Workers (HCWs)

Vietnam has a very strong health care system to ensure good health care services to all people. The total number of health care facilities is 10,830 with the health care workforce of 200,000 medical officers and over 136,500 hospital beds. However, according to the results of the national survey conducted in 132 health care facilities and 9,437 HCWs, the working environment of HCWs was found to be polluted by various toxic factors. Approximately 6.7~13.1% of toxic gas samples exceeded the standard by 1.1~33.3 times and 59.3% microorganism samples were over the standard. In addition to the traditional aforementioned categories of occupational hazards, HCWs were also found to experience a lot of stress for being directly responsible for very sick and dying patients which, coupled with increasing workload, seriously threatened their health and well-being. It was found that 54.4% of hospital HCWs suffered from occupational stress.

### Basic Occupational Health Service (BOHS) System

BOHS are mostly implemented by the whole system.



Basic Occupational Health Service System

At national level, there are General Department of Preventive Medicine and Environmental Health of MOH, the National Institute of Occupational & Environmental Health and 3 research institutes in 3 regions.

At provincial level, there are 13 health centers of ministries / sectors and 45 provincial Centers of Preventive Medicine with occupational disease clinics and nearly 600 OH specialized staff.

At district level, there are 509 district centers on prevention but 57 % of them do not have enough equipment.

At community level, there are Commune Health Stations.



At enterprises, the coverage is low. Only 11% of enterprises have health stations and 12% have health staffs. Among 8,800 occupational health staff, only 15% are physicians. There are less than 10% of enterprises, mainly large scale enterprises, which have access to basic occupational health services.

## The Key Research Projects of NIOEH in Dealing With OSH Problems in Vietnam

During the past 5 years, the National Institute of Occupational & Environmental Health (NIOEH) in Vietnam has conducted many practical and valuable research projects. These research projects focused on dealing with urgent and prioritized issues of society such as prevention of occupational and work-related diseases, health care for workers, OSH in different industries to contribute to promoting health care, protecting workers' health and ensuring safe and healthy workplaces. The NIOEH has also contributed to the development of appropriate OSH policies, OSH standards,

adding new occupational diseases to the list of compensated occupational diseases, developing health criteria for pre-employment and periodic medical examination and occupational diseases examination.

The main research priorities are as follows:

- Effects of Traditional Hazards (dust, noise, chemical, ionizing radiation, etc) on Workers Health in High Risk Occupations: Since occupational silicosis constitutes the highest rate of ODs in Vietnam, a state level research project on occupational silicosis was conducted to study occupational hygiene standards, standards for diagnosis of silicosis and development of measures for prevention of silicosis at high risk occupations. The results of this project contributed considerably to establishing a national program on silicosis prevention and elimination.

In addition, more research projects were conducted on occupational pneumoconiosis, occupational byssinosis, exposure to ionizing radiation, low frequency whole body

vibration and risks of industrial chemicals. The results of all these research projects aimed at proposing measures to minimize occupational exposure, protect workers' health and detect occupational diseases at earlier stages.

**- New Occupational Diseases and Work-Related Diseases:** Research projects on occupational cadmium poisoning, CO poisoning, occupational asthma, low frequency whole body vibration, occupational HIV and more were conducted in order to add new ODs to the list of compensated ODs and to develop health criteria for diagnosis and examination of ODs.

**- Risk Factors and Preventive Measures for Common Occupational Diseases (occupational pneumoconiosis, skin diseases, and noise induced deafness):** The surveys were conducted to determine the prevalence and incidence of common occupational diseases and evaluate their risk factors. The output of this activity helped to develop standard questionnaires, methodologies and guidelines on assessment and surveillance of common occupational diseases.

**- Basic Survey on Workers' Health in 12 Groups of Hard, Hazardous and Dangerous and Extremely Hard, Hazardous and Dangerous Occupations:** The survey results were used to develop health criteria for periodic medical examination and occupational disease detection were developed.

**- Working Conditions and Health impacts in Informal Sector (traditional trade village):** Research projects on traditional trade villages were conducted. These studies revealed that most enterprises in these villages were small to medium sized enterprises and household business. The premises were small and narrow, machines and equipment were backward and unsafe, employees' recruitment was unsystematic and employees were temporary and sometimes involved child and aged labors. The study also

showed that the violation of law and regulations were common in these enterprises and occupational accidents were under reported. Based on these data, preventive measures were proposed to reduce the hazards and improve working conditions for the employees.

**- Specific Working Conditions and Occupational Health of HCWs:** The risk assessment for HCWs is only very limited. A nationwide study was conducted on specific working conditions, risk assessment of occupational injury, especially needle stick injuries, work related and occupational diseases (HIV, occupational hepatitis B, tuberculosis) and implementation of OSH regulations and policies with 10,000 HCWs in 132 health care facilities. The working environment was evaluated as well as the workload, occupational stress and risks of musculoskeletal disorders. Furthermore, more than 2,000 HCWs in these national health care facilities were examined for HIV, hepatitis B and tuberculosis. Approximately 10,000 HCWs and managers from 132 health care facilities were interviewed about the OSH regulations and policies currently implemented in their health care facilities. Based on the project results, several recommendations were made in order to improve working conditions, promote health of HCW as well as to promulgate better and more suitable OSH regulations and policies. Some regulations and policies related to HCWs were also developed and promulgated in collaboration with the General Administration of Preventive Medicine.

A study on occupational HIV infection was carried out in HCWs in high risk departments. The results showed that HCWs were infected with HIV due to needle stick injuries (14%), splash of body fluids on skin (19%), and on mucous membrane (16.1%). These study results recommended adding occupational HIV disease to the list of compensated occupational diseases in Vietnam.

A survey on needle stick injuries conducted with 1,000 HCWs in three hospitals illustrated real situation of needle

stick injuries in HCWs and working conditions in these hospitals. Based on the results, regulations on management of needle stick injuries and sharp object wastes were developed.

· **Working Conditions and Workers' Health in Specific Occupations in Agriculture:** The risk of transmission of diseases from cattle to human is becoming a big problem in Vietnam. Studies on working conditions and workers' health in cattle breeding contributed to establishing risk assessment and identifying risk factors of contracting diseases among cattle breeders. The aquatic product processing industry has been developed rapidly recently due to increasing exported sea food products. NIOEH in collaboration with the Ministry of aquaculture conducted several studies on working conditions and common diseases among these workers. The aim of this study was to add new diseases which have occurred in this industry to the list of compensated occupational diseases in Vietnam.

· **Implementation of Health Promotion Program in Specific Types of Enterprises:** Evaluation of OSH and working conditions, survey on health situation of workers, and health care services in informal sector was conducted. Based on the study results, a health promotion program was developed and piloted in enterprises in two provinces, then expand into other provinces. Later on, the program on healthy workplaces was implemented in joint-venture and foreign capital companies and traditional villages and agricultural settings. The results of this activity encouraged other industries to implement health promotion program in order to improve working conditions and workers' health.

· **Prevention of Accidents and Injuries Including Child Accidents and Injuries, Traffic Accidents, Occupational Injuries in Construction and Metallurgy Mechanical Workers, in Household Business and in Community :** NIOEH has been involved in the national program on injury prevention for the period 2002~2010.

A project on development of reporting system for occupational injuries in Vietnam has been established in collaboration between the NIOEH and Liberty Mutual Research Institute for Safety (LMRIS) in US. Training courses on first aid and OSH were conducted by the project team for the people responsible for OSH in enterprises in the Commune. Furthermore, project team developed simple instruments for safety risk assessment in enterprises. The project anticipates to develop a model for injury surveillance in community to contribute to the implementation of national policy on injury and accident prevention stage 2002~2010 to reduce incidence of occupational injury and accident.

## Research Trend and Orientation in the Next Period

In the next period (2010~2015), following will be the research priorities of NIOEH in accordance with the implementation of national action plan of occupational diseases prevention, accident and injury prevention, OSH promotion in health care facilities and asbestosis and asbestos related diseases prevention.

### Prevention of Occupational Diseases

- Research new occupational diseases, preventive measures and policies on occupational disease prevention and work-related diseases generated during industrialization and modernization such as occupational musculo-skeletal diseases, occupational stress, and occupational cancers

### Prevention of Asbestosis and Asbestos Related Diseases

- Epidemiological investigation on prevalence and incidence of asbestosis among workers exposed to asbestos
- Development of technical guidelines for work environment monitoring and workers' health surveillance



- Development of measures for reducing the use of asbestos and the number of exposed people, raising awareness about the health risks and other negative consequences of using asbestos, substitution of asbestos with safer materials or employing other technological alternatives to asbestos-containing products

### Health Care Workers

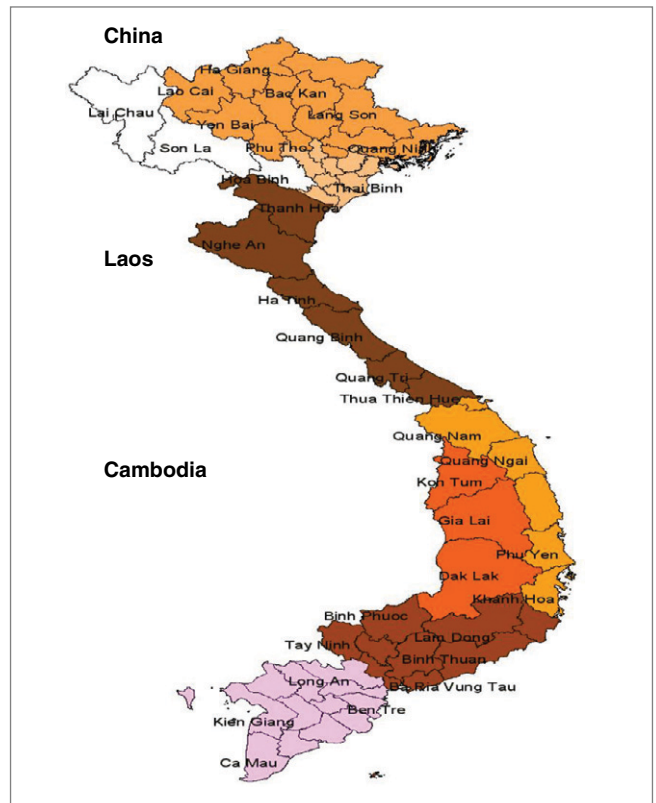
- Research on the list of hard, hazardous and dangerous tasks and jobs in health care sector
- Development of health criteria for pre-employment, periodic health check up for health care workers
- Research and develop measures for strengthening OSH activities and OH services in health care facilities and apply the intervention model for reducing occupational diseases among HCWs

### Basic Occupational Health Services (BOHS)

- Investigation on actual situation of BOHS in Vietnam
- Application of WHO basic guideline in development of BOHS in Vietnam
- Development of training materials and courses on BOHS

### Research and Development of Technical Measures

- Researches on ergonomic solutions for the improvement of working conditions and prevention of occupational accidents, especially in SSEs, MSEs, private companies and agriculture and development of pilot models for OSH and OD prevention in high risk industries such as coal and mineral mines, metallurgy, chemical, construction and agriculture
- Researches on models for work environment monitoring and recording industrial accidents based on available occupational health system and development of response models in dealing with industrial environmental pollution



- Applied research on the process of HIA for some development projects, research on impact of industrial environmental pollution on community's health, especially the relationship between industrial waste and new diseases occurring in surrounding habitants
- Research, develop and apply modern techniques and methodologies for work environment monitoring, workers' health surveillance, diagnosis of occupational diseases and work-related diseases

## The Profile of NIOEH

The National Institute of Occupational & Environmental Health (NIOEH) is a government funded institute established based on the Decision NO. 370 signed on April 22, 1984 by the Ministry of Health. It became the national institute by the Decision No. 230/1998/QĐ-TTg of the Prime Minister on November 30, 1998. NIOEH seeks to contribute

to the growth and development of the national economy by maintaining and improving safety and health conditions for workers at workplaces.

There are 74 staffs in total, in which the number of researchers is 61.

NIOEH is composed of 5 departments, 1 central laboratory, 1 environmental monitoring station, 2 centers, and 5 administrative bureaus (see the organizational chart below).

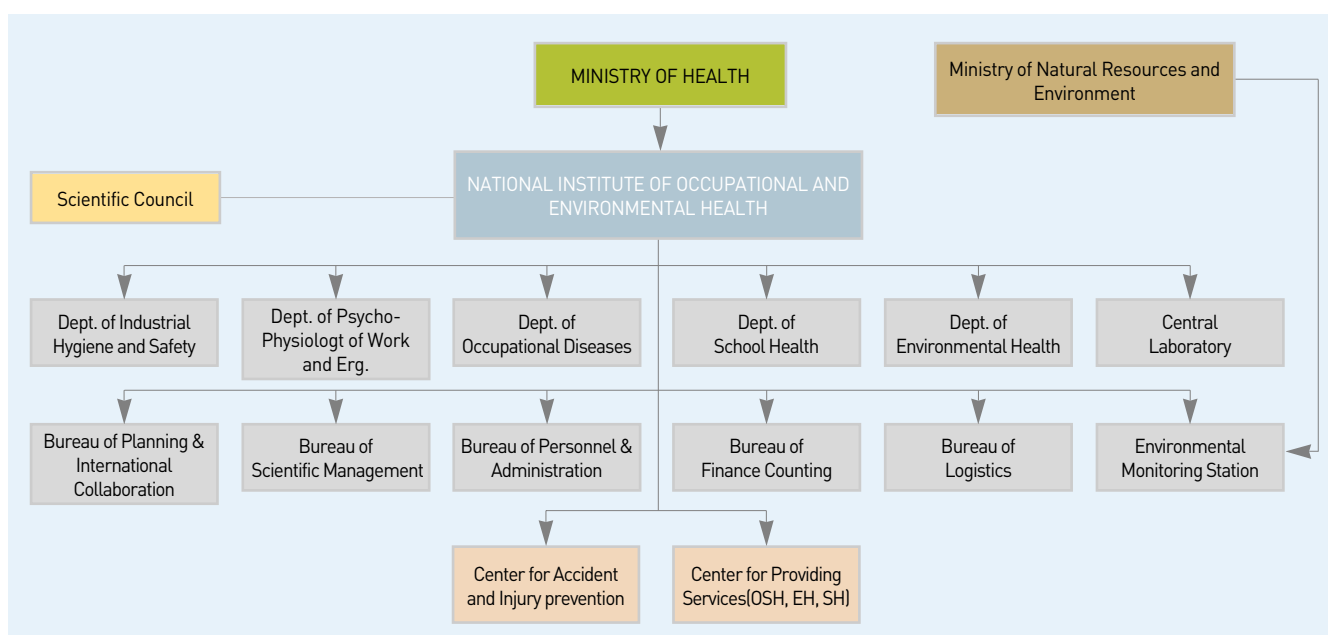
Main functions and tasks of NIOEH are as follows:

### Scientific Research

- Research, monitor and assess working environment and develop measures to control and improve working environment
- Research psycho-physiology of work and ergonomics, set up allowable limit values at workplaces and recommend measures for adapting to working condition
- Research occupational and work-related diseases and its measures for prevention and treatment; establish methods and criteria for diagnoses and identify new

occupational diseases in the process of industrialization and modernization; add new occupational diseases to the compensation list

- Research environmental health, risk factors of soil and water and air pollution directly affecting human health; develop technical measures to improve environmental hygiene and techniques of environmental health monitoring
- Research school environment, psycho-physiological characteristics of students and diseases affecting students; develop methods and techniques for assessing and monitoring school environment and measures for improving study conditions of students of all grades
- Study and establish criteria for occupational, environmental and school health; develop and apply methods of assessing and monitoring working conditions and environment and set up health criteria for workers in specific job
- Participate in establishing guidelines, regulations and policies for workers and communities



**Organizational Structure of the National Institute of Occupational & Environmental Health**

## Training

- Participate in graduates and post-graduates training on occupational, environmental and school health
- Provide re-trainings and continuous training on occupational, environmental and school health and develop specialties for the state, cities, provinces and industries
- Compile documents for training, education and communication and disseminate knowledge and information on occupational, environmental and school health

## Coordination of Network on Occupational, Environmental and School Health

- Assist the Minister of Health to direct and coordinate activities on occupational, environmental and school health, and organize and implement national and international programs
- Monitor, supervise, catalyze, and assess the implementation of professional activities in institutions working on occupational, environmental and school environment
- Organize and implement health education and communication, and disseminate knowledge and information on occupational, environmental and school environment to the communities

## International Collaboration

- Establish and maintain relations with other countries, organizations and individuals working on occupational, environmental and school environment
- Collaborate with different organizations and countries to organize training courses, scientific conferences and workshops; exchange staffs for training and experience in this field

## Scientific and Technical Services


- Carry out scientific and technical services on occupational and environmental health to raise funds

for the institute's activities as well as to improve the quality of staffs' lives under the current regulations

## WHO Collaborating Centre in Occupational Health:

NIOEH has been recognized as a WHO Collaborating Centre in Occupational Health since 1985.

## International Collaboration:

- The University of Washington:** Research and train on occupational safety and health, occupational diseases (silicosis, pesticide poisoning); applied ergonomics; cost-benefit, health impact assessment and environment impact assessment, etc
- Liberty Mutual Research Institute for Safety (LMRIS):** Research and train on occupational injuries
- The National Institute of Occupational Safety and Health, US (NIOSH):** Memorandum was signed in 4 areas: information exchange, organizing training courses, researches and conferences
- The Institute of Industrial Ecological Sciences, University of Occupational & Environmental Health, Japan:** Exchange of experiences, research information and staffs on occupational health
- The Finish Institute for Occupational Health (FIOH):** Research and train on occupational health (work ability, OSH profile, etc)
- Korea Occupational Safety and Health Agency (KOSHA) in Korea:** Exchange staff, information and experiences on occupational safety and health
- Royal Veterinary and Agriculture University (KVL) in Denmark:** Conduct joint projects and postgraduate trainings
- Thailand agencies in Occupational & Environmental Health:** National Health Commission, Healthy Public Policy Foundation: organize Health Impact Assessment (HIA); Chulabhorn Research Institute: conduct joint research projects 



# Current Status and Research Trends of OSHRI

The Korea Occupational Safety and Health Agency (KOSHA) was established on December 9, 1987. On July 6, 1989, the Occupational Safety and Health Research Institute (OSHRI) was established as an affiliated research institute of KOSHA. In commemoration of OSHRI's 20th anniversary, an international seminar and ceremonies for the 20th anniversary and vision declaration will be held by OSHRI on July 6, 2009. OSHRI is composed of 8 divisions with 149 staff members, where it conducts researches and projects to prevent occupational injuries and illnesses. This paper will introduce the organization of the Institute and the priority areas of each division.

## Introduction

Korea's rapid growth in the 1960s and 1970s paved the way for raising the standard of living and improving the quality of life, but it was also a major cause for the rapid increase of industrial accidents. In connection with this, Dr. M.A. Batawi, a safety and health expert from the International Labour Organization (ILO), submitted a proposal for the establishment of a research institute for the prevention of industrial accidents in Korea to the ILO on Sep. 15, 1968.

Recognizing the need, the Korean government agreed to set up a national labor science research institute as part of a project under the United Nations Environment Programme (UNEP) agreement on Dec. 28, 1974, and opened the National Labor Science Research Institute with 36 researchers on Apr. 19, 1979. The research institute contributed greatly to the prevention of occupational accidents through R & D activities in the occupational safety and health field. In particular, it played a leading role in establishing occupational accident prevention systems in Korea by adopting advanced countries' occupational accident prevention methods and systems. Among other things, it introduced a national performance test system to



keep workers safe from dangerous machines and tools by applying protective equipment.

As the Korea Occupational Safety & Health Agency (KOSHA) was established on Dec. 9, 1987, it performed specialized functions for occupational accident prevention. The National Labor Science Research Institute was closed on Feb. 16, 1989, and the Occupational Safety & Health Research Institute (OSHRI) was established as an organization affiliated with KOSHA on Jul. 12, 1989. OSHRI consisted of Research Statistics Section, Machine & Electricity Research Team, Chemistry Research Team, Civil Engineering & Construction Research Team, Occupational Health & Hygiene Research Team, Protective Equipment Test Section, Safety Device Test Section, and Analysis Office with a total of 66 researchers. After this, the government devised comprehensive countermeasures for occupational disease prevention and established an occupational health research institute by consolidating with the Occupational Disease Research Institute affiliated to Joongang Hospital of the Korea Workers' Compensation & Welfare Service on Jan. 18, 1992, in order to strengthen related research functions. It triggered separation of OSHRI into the Occupational Safety Research Institute (OSRI) and the Occupational Health Research Institute (OHRI).

The Center for Chemical Substance Safety & Health affiliated with OSHRI was established on Sep. 5, 1997,

where it evaluated harmful chemicals and conducted experiments and researches on industrial toxicity. On Nov. 18, 1998, OSRI and the OHRI were consolidated under the office regulations, and accordingly the name of OHSRI was regained. Currently, OHSRI consists of 3 departments, 3 centers and 2 teams with a total of 149 staff members.

OSHRI, the only specialized occupational safety & health research institute in Korea, is divided into Department of Safety Management and Policy Research, Department of Safety System Research, Department of Occupational Environment Research, Center for Occupational Disease Research, Center for Chemicals Safety and Health, Center for Safety Certification and Assessment, Safety and Health Statistics Team and Management Support Team. In addition to this, there are sections for testing personal protective equipment and safety devices for dangerous machines and tools and for analyzing the causes of occupational accidents and calculating the statistics. Since September 2007, OSHRI published Research Brief monthly, which illustrates safety and health research trends. The Brief aimed at introducing the latest safety and health research trends at home and in advanced countries and policies which are becoming social issues.

## Roles of OSHRI

OSHRI is an organization affiliated with KOSHA and its organization chart is shown in [Figure 1]. OSHRI researchers actively conduct scientific researches for the purpose of contributing to the country as well as workers by creating a safe and decent work environment; by preventing occupational accidents and diseases; and by protecting workers' health. The researchers' activities are divided largely into prevention of occupational accidents and disease, performance test of protective equipment and safety devices, and study and analysis of occupational accident and disease statistics in each field. Their major tasks are as follows.



- Conduct comprehensive and multilateral researches in occupational safety and health for occupational accident prevention
- Research on the development of the Ministry of Labor's strategies and governance system for occupational accident prevention; establish related laws and regulations, technical standards and guidelines, etc.; conduct statistical research on occupational accidents; and support governmental activities for preventing occupational accidents
- Conduct cooperative researches in close association with societies related to safety and health, universities, public research institutes, and testing agencies in order to ensure effective and efficient research
- Accept and reflect research requirements from workplaces, business groups, workers groups, and academic circles and contribute to the development of the organization through technical support and publication of research results

- Contribute to occupational accident prevention by having protective devices and equipment of excellent quality which have gone through performance test of dangerous machines and tools, protective devices, and personal protective equipment.

## Organization and Research Activities of the OSHRI

### Department of Safety Management and Policy Research

The Department subdivided its research areas in order to improve safety & health policies and systems. The subdivided areas are: national safety & health management system research; research on safety & health problems caused by work environment changes; and investigation of actual conditions for producing basic data and information. The Department promotes efficient research by utilizing joint studies involving industries, academic circles, and researchers and outside research manpower; distributes research results; and manages cooperative business with outside organizations. In addition, the Department improves the quality of research through research planning and evaluation and publishing Safety & Health Research Brief monthly. See <Figure 2>.

### Department of Safety System Research

The Department efficiently conducts researches by using joint studies comprising industries, academic circles and researchers and outside research manpower after the work field was divided into machinery, electricity, construction, and human engineering. In 2008, the Department conducted researches with “Half the Deaths and High Frequency Accidents” as the slogan. Currently, the



[Figure 1] Organization Chart of OSHRI



[Figure 2] OSH Research Brief

Department is making efforts to enhance the on-the-spot practicality of such research results. In addition, the Department determines the order of priority of research tasks by analyzing high frequency accidents by type and promotes performance prediction type research by applying itemized weight. In

the mid-long term, the Department

will contribute to occupational accident prevention through research in engineering countermeasures against accident risk factors, safety evaluation methods, human engineering application, safety countermeasures by physical factor, and major accident prevention techniques, etc. The Department's major research tasks this year are as follows.

- Analysis on causes of fall accidents in the manufacturing industry and its preventive measures
- Analysis of characteristics of fall and collapse accidents in the construction industry and its preventive measures
- Research on safety model development for preventing fall accidents on small construction sites
- Analysis of accident characteristics for preventing

constriction accidents and its preventive measures

- Thorough analysis of slip and collision accidents and its preventive techniques

### Department of Occupational Environment Research

The Department obtains technology sources in the field of industrial hygiene and conducts researches focused on practicable application. To do so, the Department strives to prove the need for and the validity of the appropriate research; evaluate harmful factors which became a social issue and the exposure of various kinds of harmful factors related to work; and propose effective improvement plans. In addition, the Department conducts quality assurance projects regarding work environment measurement samples and asbestos analysis for improving the analysis capability of work environment measuring organizations. It also carries out researches for quality assurance techniques, errors and accuracy improvement plans, etc. The Department's major research tasks this year are as follows.

- Research on characteristics of the occurrence of rubber fumes in tire plants and carcinogenic substance exposure evaluation
- Evaluation of irregular construction workers' work in chemical industrial complexes and harmful factor exposure characteristics
- Development of standard samples for quality assurance

<Table 1> Researches for Improving Safety & Health Policies and Systems

Classification	Details
National safety & health management system research	Research for proving the effectiveness of related laws and systems by establishing and presenting occupational safety & health policy direction; analyzing operations and periodically evaluating them. The effectiveness of occupational safety & health policies should be analyzed so that safety & health management models suitable for the characteristics of each workplace can be developed; methods for applying such models should also be developed
Research on safety & health problems caused by work environment changes	Research on safety & health problems in workplaces caused by work environment changes. The research aims at improving the quality of working life and health; providing social safety net in dangerous societies; and protecting vulnerable workers' health
Investigation of actual conditions for producing basic data and information on safety & health	Investigation of the actual condition of national-level safety & health. The investigation seeks to producing basic data and information on safety & health, and research on occupational accident prevention policies aims at adjusting to globalization

- of asbestos analysis
- Analysis of major causes of asphyxiation accidents by job category in confined space and research its preventive measures

## Center for Occupational Disease Research

The Center has investigated the causes of work related diseases and pathogenesis and conducted preventive researches in the development of diagnosis techniques for early detection of occupational diseases in a systematic and continuous manner for 20 years. In 2008, the Center divided into Health Research Team and Epidemiological Investigation Team for more efficient operation. The Center's major research tasks for this year are as follows.

- Research based on an epidemiological investigation in workplaces regarding harmful factors such as dust, heavy metals, harmful chemicals and physical factors, etc.

- Research conducted in terms of management for forecasting and preventing recurrence; including investigation of causes and occurrence patterns of occupational diseases by using accumulated data on the occupational diseases which have occurred in the past

- Research diagnosis methods based on occupational medicine and system improvement methods for accurate diagnosis of unidentified occupational diseases

- Research on the development of analysis techniques ensuring accurate measurement of the concentration of harmful factors and that of metabolic products

- Research on the work related disease prevention field including the development of job stress evaluation tools; job stress management; the development of human engineering harmful factors evaluation tools; preventive management of musculoskeletal disorders in workplaces; work related disease prevention policies and systems; and protection of





workers prone to occupational accidents

## Center for Chemicals Safety and Health

The Center was set up to systematically conduct research on chemical substance management policies, harmfulness and toxic mechanism, hazardousness and safety. The Center consists of Chemical Substance Information Team, Toxicity Research Team, and Risk Evaluation Team.

### • Chemical Substance Information Team

The Team conducts various kinds of researches related to chemical substance analysis, along with researches in chemicals' harmfulness and dangerousness, information transmission, and chemical substance management policies. Recently, in response to international chemical substance management policy changes, the Team carried out researches related to the improvement of material safety data sheet reliability, chemical substance information transmission systems in the area of occupational safety & health, and exposure scenarios, etc. for safe use of chemical substances.

### • Toxicity Research Team

The Team grasps the toxic mechanism of various kinds of harmful chemical substances used in workplaces, conducts researches in inhalation toxicity and skin toxicity of organic solvents and heavy metals, and carries out researches for the development of biological exposure and biological effect indicators for the workers who handle harmful chemical substances, using genetic toxicity and biochemical techniques. Using toxicity research techniques regarding genetic toxicity, skin toxicity, and inhalation toxicity, etc., the Team strives to provide data on toxicological exposure standards for work environment management, develop toxicity test methods, and produce data on toxicity of harmful substances. Recently, the Team expanded its research scope to harmful chemical substances such as asbestos, welding fumes, and metal working fluids

while continuously conducting researches on genetic toxicity and inhalation toxicity regarding organic solvents.

### • Risk Evaluation Team

The Team conducts researches on the development of safety countermeasures for controlling the risk factors of chemical substances likely to cause fire or explosion in workplaces and minimizing the damage. Its major activities include identifying the main causes of explosion and fire by applying physiochemical characteristics test and fire explosion characteristics test. Recently, the Team also promoted researches for identifying the characteristics of grain and metal dust and developing risk evaluation techniques.

## Center for Safety Certification and Assessment

The Center encourages and provides excellent safety devices with safety ensured by the performance test and the S mark safety certification system. The performance test of protective devices and protective equipment aims to determine whether produced or imported products meet the test standards by testing their performance, material, and structure etc. with respect to the protective devices of dangerous machines & tools and the protective equipment worn by workers. Currently, with respect to 14 kinds of protective devices and 11 kinds of personal protective equipment, new test, main test, preliminary test, and retest,



[Figure 3] Performance Test and Safety Certification Marks

etc. are being conducted.

In order to encourage manufacturers to produce excellent products by themselves, the grand prize for the quality of protective devices and personal protective equipment has been awarded since 1997. The grand prize contributes to accident prevention on industrial sites by receiving competition applications from domestic protective devices and protective equipment producers and comprehensively evaluating product performance and quality so that outstanding products can be identified and supplied. The award-winning products were put on display in OSHRI exhibition booth during the 18th World Congress on Safety and Health at Work.

### Safety and Health Statistics Team

The occupational accident statistics are one of the most important data in establishing accident prevention policies and implementing research tasks and projects. Therefore, it is positively necessary to maintain the reliability of statistical data and build a fast support system in order to meet various demands in a rapidly-changing information-oriented society. To keep pace with this trend, Safety and Health Statistics Team performs the following tasks:

- Occupational accident compensation statistics: statistics showing workers' occupational accidents recognized through workers' accident compensation insurance
- Statistics of occupational accident causes: statistics from analyzing causes of occupational diseases and accidents

**<Table 2> Details of the Operation of the Occupational Disease Monitoring System**

Classification	Details
Occupational disease monitoring system by disease	Diseases such as skin disease, musculoskeletal disorder, leukemia, asthma, and lung cancer
Occupational disease monitoring system by region	Regions such as Incheon, Gumi, Ulsan, Changwon, and Busan, etc.

- Fatal accident statistics: statistics on accidents involving casualties and major accidents set forth in the Occupational Safety & Health Act

- Statistics on work environment measurement: results based on workers health examination made public annually

## Other Activities

In order to provide policy-based institutional support for occupational accident prevention and improve preventive ability on industrial sites, the OSHRI performs various operations.

### Operation of Quality Assurance Management of Work Environment Measuring Organizations for Ensuring the Reliability of Assay Data

Since 1992, OSHRI has been conducting the quality assurance management of work environment measuring organizations twice a year in order to verify the reliability of work environment measurement analysis of work environment measuring organizations and to improve the analysis capability of each measuring organization. OSHRI also operated a training program for improving the ability of analysis experts.

### Operation of Quality Assurance Management with Respect to Special Health Examination Organizations

The purpose of analysis quality assurance management is to identify and use the exposure level of harmful substance when diagnosing an occupational disease by accurately analyzing biological samples such as blood and urine in the short term and to establish new preventive health management methods for workers prior to the occurrence of occupational diseases by monitoring the exposure level of harmful substances using biological monitoring in the long term. Currently, Center for Occupational Disease Research conducts analysis for voluntary items in addition to mandatory quality assurance



management such as 9 items of organic analysis and 5 items of inorganic analysis.

### Operation of Quality Assurance Management System

Pneumoconiosis quality assurance management was introduced to prevent confusion caused by diagnosis of pneumoconiosis. Since 1997, the quality assurance management has been applied to special health examination organizations or radiation experts in health examination, medical specialists in the department of radiology, lung function examiners, and doctors who assess lung function examination results, and relevant trainings has been provided semiannually.

### Operation of Hearing Quality Assurance Management System


It is known that, in case of worker's hearing test, accuracy of the machine, measurement environment, technique, and cooperation of the workers subject to the test have effects on the reliability of the test. Therefore, OSHRI

operates hearing quality assurance management system in which various factors affecting the hearing test have been standardized in order to ensure that the hearing test results can be accepted as reliable.

### Operation of Occupational Disease Monitoring System

The occupational disease monitoring system is operated for an earlier detection of occupational diseases. This helps to accurately grasp whether or not occupational disease has occurred. As shown in <Table 2>, monitoring is performed under the occupational disease monitoring system by disease and region.

### Running of a Laboratory for Thorough Analysis of Asbestos and Chemical Substances

OSHRI has a laboratory for thorough analysis, operated by relevant experts, in order to thoroughly analyze physiochemical characteristics of domestic asbestos and chemical substances. 



# OSH Management System in Korea

Although legal measures are recommended as the most efficient method to reducing occupational accidents, its effectiveness cannot be assured due to insufficient supervisors compared to the number of target workplaces. Accordingly, “establishment and implementation of self-regulated Health and Safety Management System” is considered the most efficient method. This paper introduces analysis outcomes and future methods for further development and dissemination of KOSHA 18001 project.

## Current Status

It is known that health and safety was of an interest even at the time of the ancient Egypt when building pyramids. However, the question of “What is occupational health and safety?” came around only about a century ago in the period of the Industrial Revolution. Increased economic activities owing to the rapid development of the Industrial Revolution caused occupational accident and occupational diseases. After the World War II, the risks of occupational health and safety increased because the scale of industries such as electrical/electronic, petrochemistry, and heavy industry grew and industry processes and facilities became more diversified.

Workers are taking more interest in preventive measures of occupational health and safety due to more advanced standard of living, influenced from the labor unions. Accordingly, study results indicated that compulsory managing methods were inefficient in the perspective of administrative effectiveness. Therefore, companies are encouraged to actively implement occupational health and safety management.

Health and Safety Management System refers to systematic health and safety activities established to continually improve health and safety using the P-D-C-A



Director Kwon, Hyeok-Myeon  
Technical Experts Department  
KOSHA





cycle. In the P-D-C-A cycle, CEOs introduce health and safety policy in business policies, make an action plan (Plan), implement and operate (Do), inspect and evaluate (Check), and examine the results (Action). In other words it means “Establishment of health and safety as a core value of corporate management, foundation of implementing organization, and systematic and continuous improvement”.

KOSHA 18001 was established by the Korea Occupational Safety and Health Agency (KOSHA) and was currently added to the Health and Safety Management System Certification among other preexisting certification systems

such as OHSAS 18001, K-OHSMS 18001 and KGS 18001. KOSHA has awarded KOSHA 18001 Certification to about 430 workplaces since 1997.

## Health and Safety Performance at Certified Workplaces

Health and safety performance of 322 workplaces was examined before and after the KOSHA 18001 certification. The results showed that the accident rate decreased in most workplaces after the certification and OSH performance such as implementation of Health and Safety Management System and increased international awareness and employer awareness was at an outstanding level.

In other words, we found that the KOSHA 18001 certification results in reduction of occupational accidents and enhancement of safety level at workplaces.

### Reduction of Accident Rate

Analyses on accident rate before and after the KOSHA 18001 Certification showed that the accident rate decreased

**<Table 1> Status of Health and Safety Management System Certification (as of Feb. 2009)**

Category	Quality (ISO 9001)		Environment (ISO 14001)		Health and safety (KOSHA/OHSAS)	
	Local	Overseas	Local	Overseas	Local	Overseas
Total	38,550	897,866	10,658	129,199	870	24,552
Registered institutes at Korea Accreditation Board	15,150		5,458		120	
Other certification institutions	23,400		5,200		320	
KOSHA	-		-		430	

with an average of 24% after the certification. The subdivisions of the results are as follows.

- The number of workplaces with reduced accident rate: 88 workplaces (27%)
- The number of workplaces with plateaued accident rate:

167 workplaces (52%)

- Workplaces with increased accident rate: 67 workplaces (21%)

In addition, 156 workplaces (46%) had no occupational accident during the last 3 consecutive years (2005 ~2007).

<Table 2> Health and Safety Performance after Certification

(No. workplace)

Category	Average out of 5	Strongly agree (5 score)	Agree (4 score)	Moderate (3 score)	Disagree (2 score)	Strongly disagree (1 score)	No response
① Health and Safety Management System is established	4.5	74 51%	58 40%	8 5.5%	- -	- -	5 3.4%
② International awareness is increased	4.2	60 41.4%	54 37.2%	15 10.3%	8 5.5%	- -	8 5.5%
③ Communication is improved	3.9	27 18.6%	70 48.3%	28 19.3%	3 2.1%	- -	17 11.7%
④ Accident is decreased	3.9	27 18.6%	56 38.6%	33 22.8%	6 4.1%	- -	23 15.9%
⑤ Investment in health and safety is increased	3.8	25 17.2%	56 38.6%	34 23.4%	7 4.8%	- -	23 15.9%
⑥ Productivity and sales are increased	3.3	12 8.3%	29 20.0%	58 40.0%	17 11.7%	1 0.7	28 19.3%

<Table 3> Changes in Health and Safety Awareness after the Certification

(No. workplace)

Category	Average out of 5	Strongly agree (5 score)	Agree (4 score)	Moderate (3 score)	Disagree (2 score)	Strongly disagree (1 score)	No response
① Awareness of employer is improved	4.4	74 51.0%	51 35.2%	11 7.6%	1 0.7%	- -	8 5.5%
② Awareness of middle management is improved	4.3	48 33.1%	77 53.1%	8 5.5%	3 2.1%	- -	9 6.2%
③ Awareness of site management is improved	4.1	33 22.8%	72 49.7%	18 12.4%	3 2.1%	- -	19 13.1%
④ Awareness of workers is improved	3.9	27 18.6%	65 44.8%	28 19.3%	7 4.8%	- -	18 12.4%

<Table 4> Motive for Certification

(No. workplace)

Category	Average out of 5	Strongly agree (5 score)	Agree (4 score)	Moderate (3 score)	Disagree (2 score)	Strongly disagree (1 score)	No response
① Employer's positive encouragement	4.5	90 62.1%	30 20.7%	13 9.0%	4 2.8%	- -	8 5.5%
② Voluntary participation from health and safety related department	4.5	78 53.8%	30 20.7%	10 6.9%	3 2.1%	1 0.7%	23 15.9%
③ Recommendation from the government (Ministry of Labor, Agency)	3.5	23 15.9%	30 20.7%	22 15.2%	6 4.1%	10 6.9%	54 37.2%
④ Request from the labor union	2.6	8 5.5%	14 9.7%	29 20.0%	22 15.2%	21 14.5%	51 35.2%
⑤ Request from other social organization	2.4	7 4.8%	8 5.5%	28 19.3%	17 11.7%	28 19.3%	57 39.3%

## Improvement of Performance and Health and Safety Awareness at Work

From a survey conducted on health and safety performance and awareness of certified workplaces, the results showed that 91% of the workplaces established Health and Safety Management System at Work and 78.6% have had improved international awareness. Other details are shown in <Table 2>.

Additionally, in the category “change in health and safety awareness,” the results showed 86% of positive response for “awareness of the employer and middle management has been improved” and 72.5% positive response for “awareness of site management has been improved.”

Added to that, motive for certification was mainly employer’s encouragement or voluntary participation from health and safety related department. As shown in <Table 4>, employer’s encouragement accounted for 82.8 % and voluntary participation from health and safety related department accounted for 74.5 %. This indicates that the most decisive factor in applying for the certification is the employers’ will.

## Good Practices on KOSHA 18001 Certification

### Daughter Company of a Larger Company

In Sungam Industry, a daughter company of Posco with 270 workers, the main business is land-loading. They lost 2 workers in 1996 and 1998 from occupational accident. In 2001, the company recognized the necessity of Health and Safety Management System due to rapidly increasing occupational accident and in 2002, adopted KOSHA 18001 system.

After the certification, the company has accomplished zero accident as of 2008 except for one accident which occurred in 2007, as shown in <Table 5>. The company also

saved 745 million won in worker’s compensation over the 5 years as shown in <Table 6>.

Moreover, KOSHA 18001 certification of Sungam Industry have had an effect on introducing KOSHA 18001 Certification to about 50 partners of Kwangyang Steelworks of Posco.

### Small & Medium Sized Workplaces

Jechon Plant of Asia Cement Co. Ltd manufactures cement and has 237 workers. Since the plant had suffered from high accident and fatality rates which were nearly twice as high as the mean rates of the companies of similar business, the company introduced Health and Safety Management System in order to find and remove the root causes of occupational accidents.

After the certification, the company saved 320 million won in workers’ compensation for the last 6 years and the accident rate reduced by approximately 25%. In particular, the company is now a workplace with no fatalities as shown in <Table 7>.

**<Table 5> Comparison of Accident Rate with Sungam Industries and Companies of Similar Business (Sungam Industry / Companies of Similar Business)**

Category	2003	2004	2005	2006	2007
Victims	0/1597	0/1339	0/1332	0/1468	<b>1/1484</b>
Accident rate	0/1.68	0/1.46	0/1.48	0/1.58	<b>0.4/1.54</b>

**<Table 6> Reduction of Worker’s Compensation**

Category	2003	2004	2005	2006	2007
Reduction ratio (%)	42	42	48	50	50
Amount saved in compensation (million won)	86	158	155	171	175

**<Table 7> Fatalities per Million People**

Category	2001	2002	2003	2004	2005	2006	2007
Asia Cement	38.61	0.00	0.00	0.00	0.00	0.00	0.00
Companies of Similar Business	4.21	6.74	9.58	5.50	4.07	2.75	8.80

(%)

Additionally, the company transformed the system from manager-oriented safety management to systematic operation by registering 1 manual, 16 directives, and 25 procedures as company regulations. Also, it developed 35 standard operating procedures and 116 work standards for each individual work and for each process at site.

## Large Workplaces

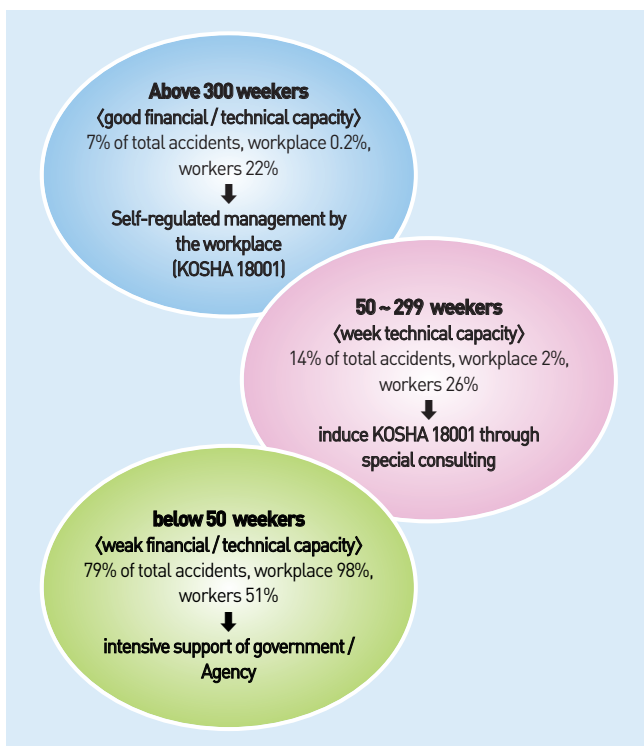
Doosan Heavy Industries and Construction Co. Ltd is a

<Table 8> Occurrence of Occupational Accident (DOOSAN Heavy Industry)

Division	2004	2005	2006	2007	2008
Accident rate (%)	1.82	1.49	0.84	0.34	0.38
Fatalities (person)	101	72	30	12	14

<Table 9> Occurrence of Occupational Accident (SCFC)

Year	2003	2004	2005	2006	2007	2008
Cases	3	9	11	8	2	0



[Figure 1]

large company with 3,595 workers, where they manufacture atomic power and generating facilities. Every year, around 100 cases of occupational accidents occur. The labor and the management jointly decided to introduce Health and Safety Management System.

After the certification, the company has conducted health and safety activities to prioritize 1,500 cases of hazards for preparatory elimination of potential hazards. As a result, the rate of occupational accident reduced dramatically as shown in <Table 8>.

Moreover, the company started to separately operate an indicator to assess Health and Safety Management System activities of 50 partner workplaces to maintain consistent system with the parent companies.

## Public Institutions

The Sungnam City Facilities Corporation (SCFC) manages physical training facilities, libraries, parking lots and others for Sungnam City, and it consists of 717 workers. The labor and the management of the SCFC jointly promoted Occupational Health and Safety Management System to disseminate safety culture due to increasing occupational accidents and lack of employees' awareness on health and safety.

After the certification, the corporation saved 80 million won in workers' compensation in 2006, and in 2009, achieved zero accident for 1.5 million hours for the first time in history of KOSHA 18001 since the establishment in 1997. <Table 9>.

Furthermore, the corporation also introduced BSC performance management system and implemented Health and Safety Management System by reflecting 10% of performance rating, 20% of individual performance and by reforming 200 cases of high-risk tasks every year through risk assessment.



## Future Direction

Supervision & direction through legal measures is recommended to be the most efficient method for reducing occupational accident. However, there are insufficient supervisors compared to the number of workplaces. Added to that, it has not been proven to maintain the level of safety management at work outside the supervision period.

Accordingly, we know that the most efficient method is “self-regulated establishment and management of Health and Safety Management System” considering above mentioned outcomes of KOSHA 18001 Certification.

In order to reduce the rate of occupational accident through the establishment of self-regulated Health and Safety Management System at work, KOSHA 18001 should be introduced and implemented. KOSHA 18001 focuses on manufacturing and service industries, public institutions, traffic, schools, and others. The agency plans to establish differentiated prevention policies for different corporate sizes so that we can focus on weak workplaces.

For workplaces with more than 300 workers, we plan to induce self-regulated Health and Safety Management System by introducing KOSHA 18001 for the entire workplace under the agreement between labor and management.


Since workplaces with below 300 workers have insufficient technology, many dangerous machines / apparatus, and many temporary / migrant / female / senior workers, occupational accidents occur frequently. Thus KOSHA plans to support health and safety of workers by providing consultations.

Workplaces with less than 50 workers tend to have weak financial and technical capabilities and access from the private institutions. Thus KOSHA plans to select high-risk workplaces in order to provide intensive educational /



technical data, financial and technical support, and inspection linking all of them together. These will dramatically elevate the effects of accident prevention.

Establishment of Health and Safety Management System can be welcomed by both the labor and the management because it will help to organize Health, Safety and Management System, reduce workers' compensation costs and increase international awareness. Therefore, we need to disseminate Health and Safety Management System certification in the future, where the role of the local certification institutions will be important.

KOSHA has made agreements with an international Certification institution, DNV, and 5 local certification institutions including the Korean Foundation for Quality to issue a joint certification of KOSHA 18001 / OHSAS 18001. Added to that, the agency is planning on making agreements with 7 other institutions such as UL Korea for a joint certification this year. 



# Chemical Management System in Korea

The laws related with chemical control and GHS were reviewed focusing on the Industrial Safety and Health Act (ISHA) and Toxic Chemical Control Act (TCCA). The newly revised TCCA on notification of new chemicals was summarized. The ISHA, which deals with classification and labelling and safety data sheets was first revised in accordance with GHS in December 2006. The Ministry of Environment (MOE) amended the Toxic Chemical Control Act (TCCA) in November 2007. The National Emergency Management Agency (NEMA) published the amendment of the Dangerous Goods Safety Management Act (DGSM), implemented regarding GHS on November 2008. The major three authorities have finished the amendment of legislation in accordance with GHS in Korea.

## Introduction

After rapid economic growth, OSH became a hot social issue in the early 1980's in Korea. In particular, a carbon disulfide poisoning (1981~present) in a rayon manufacturing company that caused 640 workers to be diagnosed with occupational diseases, raised great social awareness on hazardous chemicals. The Industrial Safety and Health Act (ISHA) was strengthened on hazardous chemical control in 1991 after the case. The Material Safety and Data Sheet (MSDS) for chemical hazard communication was introduced in 1995.

In 2006, Korea ranked 8th in terms of the use of chemical substances. The nationwide survey conducted for substances (>100kg / year) & mixtures (>1 ton / year) shows that the number of products rose to 25,479 (18.4% increase) and that of enterprises to 16,405 (19% increase) compared with 2002. The amount of current chemicals also dramatically increased to 417.9 million tons (45.4% increase).

Korea started to prepare GHS as a strategic plan to improve the national chemical control and hazard communication system. The Inter-Ministerial GHS



Director Yang, Jeong-Sun  
Center for Chemicals Safety  
and Health, OHSRI



Committee with 6 ministries cooperated closely for coordinating regulations related with GHS. The Industrial Safety and Health Act (ISHA), which deals with chemical hazard communication, was first revised in accordance with GHS in Dec. 2006. The Ministry of Environment (MOE) revised the Toxic Chemical Control Act (TCCA) related with GHS implementation for Toxic Chemicals in Nov. 2007. The National Emergency Management Agency (NEMA) published the amendment of the Dangerous Goods Safety Management Act (DGSMa) implemented regarding GHS on November 2008. The major three authorities completed the amendment of legislation in accordance with GHS in Korea.

- The Toxic Chemical Control Act (TCCA) issued by the Ministry of Environment (MOE)
- The Dangerous Goods Control Act (DGCA) issued by the National Emergency Management Agency (NEMA)
- The High-Pressured Gas Safety Control Act (HPCGCA) issued by the Ministry of Knowledge Economy (MKE)
- The Agricultural Chemicals Control Act (ACCA) issued by the Ministry for Food, Agriculture, Forestry and Fisheries (MFAFF)
- The Ship Safety Act (SSA) & The Civil Aviation Act (CAA) issued by the Ministry of Land, Transport and Maritime Affairs (MLTMA)

## Chemical Control Laws

The laws related with chemical classification and labels in Korea are as follows:

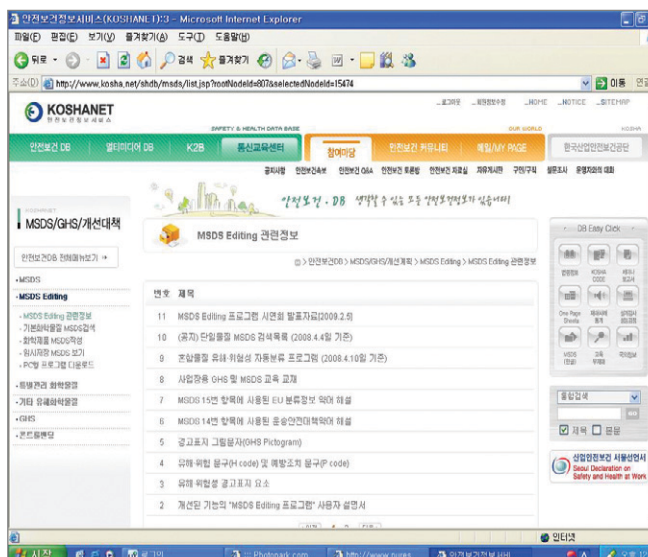
- The Industrial Safety and Health Act (ISHA) issued by the Ministry of Labor (MOL)

## Chemical List

The MOL lists the regulatory chemicals in the ISHA & regulations as follows.

- Article 37. Substances prohibited from manufacturing (7 substances)
- Article 38. Substances requiring permission (14





substances)

- Article 39. Substances noticed the Occupational Exposure Limit (>698 substances)
- Article 42. Chemical substances requiring workplace environmental monitoring (>168 substances)
- Article 43. Workers' special health examination (>168 substances)
- ISHA Standard Appendix 7: Controlled hazardous substances (>168 substances)

The MOE lists regulatory chemicals in the TCCA & regulations as follows: (<http://ncis.nier.go.kr/main/Index.jsp>)

- Observational chemicals (36 substances)
- Restricted (25 substances) or banned chemicals (93 substances)
- Accident precaution chemicals (56 substances)
- Toxic chemicals (>558 substances)

## Notification of New Chemicals

All new chemicals must be reported before they enter into the market. The ISHA by MOL and the TTCA by MOE regulate new chemical notification. The documents of Notification can be submitted to MOL or MOE. The MOL & MOE share the submitted documents for evaluation. The

data needed for new chemical examination by ISHA are ① a report on risk assessment, ② information on occupational safety & health, ③ information on manufacture, usage and treatment and ④ a flowchart on manufacture or use. KOSHA makes comments and suggestions on each item after the submitted document is reviewed.

But not all new substances or chemicals are required to notify. There are some exemptions such as ① Substances in quantities of less than 100 kg / year per manufacturer or importer, ② Site limited, non-commercial substances for R&D, ③ Substances listed in Korean Existing Inventory (KECL, <http://ncis.nier.go.kr/main/Index.jsp>), ④ Chemicals not listed in the inventory but were placed on the market before the implementation of TCCA in Feb. 1991, and ⑤ Block copolymer & graft polymer, if each block or stem is listed in the KECL, etc.

The MOE newly revised the TCCA and the required data increased from 6 items to 9 items. (from July 2009). The test data for skin irritation, eye irritation and skin sensitization were newly added.

## GHS Implementation

### Amendment of relevant legislations

The MOL first started to revise the existing C&L system to GHS. The MOL initiated the Inter-ministerial GHS committee in July 2004. The open discussion was held in May 2005 to hear from the experts and the public on implementation of GHS in Korea. The MOL started to revise the ISHA. The open workshop for public hearing on revision of ISHA was held in March 2006. After 6 months of public hearing, the MOL published the first revision of ISH Regulation on GHS in Sep. 2006. The detailed ISHA Notice on C&L and MSDS was published in Dec. 2006. The second revision of ISHA Notice under harmonized Korean building block was published on January 2008. (Information on the relevant Notice : [www.kosha.or.kr/english/](http://www.kosha.or.kr/english/))



legis/legis01\_list.jsp?menuId=1)

MOE amended the Toxic Chemical Control Act (TCCA) in November 2007. The National Emergency Management Agency (NEMA) newly published the amendment of the Dangerous Goods Safety Management Act (DGSMA), which was implemented regarding GHS on November 2008. The DGSMA was amended so that the labels according to IMDG or GHS can be accepted. If GHS can't cover DGs' classified under DGSMA, a DGSMA label should be attached for the DGs. The major three authorities have finished the amendment of legislation in accordance with GHS in Korea.

## Timeline

The ISHA set the transition period until June 30, 2010, for substances and June 30, 2013, for mixtures. The transition period for the TCCA was set until June 30, 2011, for substances and June 30, 2013, for mixtures.

## Building Blocks

We do not adopt all hazard classification building blocks of GHS as written in the Purple Book. The building blocks which are different from the Purple Book are summarized in <Table 1>. All other hazards are same as the Purple Book.

## Awareness Activities

KOSHA has been preparing the GHS implementation in Korea. KOSHA provides GHS classification results & labeling and MSDS of 6,314 substances. KOSHA has also provided training courses and many other awareness activities as described in <Table 2>.

<Table 1> The Building Blocks which are not Adopted in Korea GHS

Hazard	categories
Flammable liquid	Category 1~3 (not adopt 4)
Acute Toxicity	Category 1~4 (not adopt 5)
Skin Corrosion/Irritation	Category 1 & 2 (not adopt 1A, 1B, 1C & 3)
Serious Eye Damage/Eye Irritation	Category 1 & 2A (not adopt 2B)
Aquatic Toxicity(Acute)	Category 1 (not adopt 2, 3)

<Table 2> KOSHA's Activities on GHS Implementation in Korea

Year	GHS implementation milestones (workplace)
2005	<ul style="list-style-type: none"> <li>- Research projects to analyze the impact of GHS implementation</li> <li>- Creation of an inter-ministerial Committee to coordinate the process of harmonization of existing legislation with the GHS</li> </ul>
2006	<ul style="list-style-type: none"> <li>- Publication of the first edition of the GHS in Korean</li> <li>- Amend Industrial Safety and Health Regulation</li> <li>- Amend Notification of Standard on the Classification, Labelling and Material Safety Data Sheet of Chemicals (12.12.2006, The MOL public Notice No. 2008-01)</li> <li>- Publication of Standard KSM 1069:2006 (Labelling of Chemicals based on GHS);</li> <li>- GHS classification and labelling project started for 910 regulated substances</li> <li>- Open seminars on GHS awareness (attend over 300 people)</li> </ul>
2007	<ul style="list-style-type: none"> <li>- Launching of a GHS classification and labelling project for 2500 chemicals</li> <li>- Providing open seminar and training program for more than 2200 people</li> <li>- Revision of the Toxic Chemical Control Act in accordance with GHS by MOE</li> </ul>
2008	<ul style="list-style-type: none"> <li>- Amend Notice: Prolong transition period until 2010/6/30 for substance and 2013/6/30 for mixture (2008/6/27)</li> <li>- Provide GHS classification information for 3,410 substances (information only, not mandatory) through www.kosha.net</li> <li>- Provide MSDS editing tools that could compose GHS MSDS (only in Korean) and label (in Korean and English): until now 1,149 MSDS and 3,410 GHS classification have been informed through www.kosha.net (Korean, members only)</li> <li>- Build intensive GHS MSDS course under KOSHA (16 hr, 10 times, 438 people)</li> <li>- Amendment of the Dangerous Goods Safety Management Act in accordance with GHS</li> </ul>
2009	<ul style="list-style-type: none"> <li>- Provide GHS classification information and MSDS for 6,314 substances (2009/1, Information only, not mandatory, via www.kosha.net, members only)</li> <li>- Provide MSDS editing tools that could compose GHS MSDS using MSDSs from KOSHA.NET DB or customized MSDSs made by user through web or PC based Program</li> <li>- Provide intensive GHS MSDS course or seminar to accelerate GHS implementation</li> <li>- Launching of a GHS classification and labelling project for 5000 chemicals</li> </ul>
2010~2011	<ul style="list-style-type: none"> <li>- GHS would be fully implemented for substances until 2010/6/30</li> <li>- Provide GHS classification results and MSDS for 16,300 chemicals</li> </ul>



## Label

Preparation of label in Korean is described in detail in ISHA Notice, newly revised in Jan. 2008. The number of pictograms is limited to 4 in ISHA. The pictograms for “Danger” have priority to “Warning”. The size of pictogram should be over 1/40 if the number of pictograms is below 3, while it should be over 1/20 if the number of pictograms is 4.

Exemption for preparation of Label in Korean (under ISHA) can be applied for chemicals for R&D (English label acceptable) or in the case of over 200ℓ single drum with UNRTDG label.

## MSDS

The ISHA article 41 deals with MSDS as chemical hazard communication. The MSDS shall be prepared in the Korean language except for the chemical substances or mixtures for R&D (English label acceptable). The test data should be conducted in compliance with Good Laboratory Practice (GLP). When translating the MSDS, list the issuing date and name of the body which initially prepared the MSDS for its reliability. The sources or references shall be indicated. The MSDS shall provide the information in each section in full extent if possible. But in case where the information can not be obtained, it shall indicate ‘No data’ and in case where it is not possible to apply or not applicable it shall state “Not applicable”.

Hazards of mixture shall be determined in accordance with the GHS guideline. If the mixtures are composed of the same ingredient, have less than 10% variation in composition of ingredients, or have similar hazard properties, it may cover those products by one representing MSDS:

Chemical substances or mixtures needed to prepare MSDS under ISHA include all hazardous substances which can be classified as one of 16 categories of physical hazardous substance, 11 categories of health hazardous substance and environmental hazardous substances. Mixtures containing more than 1% of hazardous substance (in the case of carcinogen & mutagen: 0.1%, respiratory sensitizer: 0.2%, reproductive toxicant: 0.3%) should prepare MSDS. But an article which has no risk of being exposed to workers (but not carcinogen) can be exempted from preparing MSDS.

Business confidentiality can not be applied for the chemical substances and preparation which potentially cause significant health hazards to workers as defined by the Minister of Labor prescribed in Article 41. The list and the number of chemicals which can not be applicable to confidentiality related with MSDS section 3 in ISHA Article 41 are summarized in <Table 3>.

## Gap Analysis of Classification Analysis

There are some differences between classification results of authorizations (<Table 4> & <Table 5>). Even though the same guideline is applied, this gap could have occurred due to different data source and referred reliability & priority. The direction of administrative strategy may be affected. So, more international cooperation is needed for better

**<Table 3> Chemical Substances that can not be Applied for Business Confidentiality**

Group of Substances	N.o of substances
Substances prohibited from manufacturing	7
Substances requiring permission	14
Controlled hazardous substances (ISHA Standard Appendix 7)	> 168
Toxic chemicals by TCCA (newly added on revised ISHA in Jan. 2008)	> 558

**<Table 4> Gap Analysis of the Classification Results between KOSHA and EU for Acute Toxicity (oral)**

Classification result	N	Ratio
KOSHA > 4 level higher than EU	1	0.2
KOSHA > 3 level higher than EU	2	0.3
KOSHA > 2 level higher than EU	18	3.1
KOSHA > 1 level higher than EU	124	21.5
KOSHA & EU matched	368	63.8
KOSHA < 1 level lower than EU	53	9.2
KOSHA < 2 level lower than EU	8	1.4
KOSHA < 3 level lower than EU	3	0.5
Total	577*	100.0

\* Among 3,410 results of KOSHA and 3,158 of EU, there are 710 overlapped cases. Among 710 cases, the 577 cases that the KOSHA & EU both have the classification results for acute oral toxicity were finally compared.

**<Table 5> Gap Analysis of the Classification Results between KOSHA and EU for Carcinogenicity**

Classification result	N	Ratio
KOSHA > 3 level higher than EU	4	1.2
KOSHA > 2 level higher than EU	7	2.0
KOSHA > 1 level higher than EU	50	14.5
KOSHA & EU matched	260	75.1
KOSHA < 1 level lower than EU	20	5.8
KOSHA < 2 level lower than EU	5	1.4
Total	346*	100.0

\* In case of carcinogenicity, the 346 cases, which were overlapped with KOSHA and EU were compared.

harmonization of GHS classification.

## Conclusion

Cooperation among relative ministries accelerated the implementation of GHS in Korea. The MOL, which deals with chemical hazard communication, leads the implementation of GHS in Korea. The present classification & labeling can be used during the transition time until the new system settles in. The nationwide education program helps, especially small & medium enterprises, to understand the new system and to change their labels & MSDSs. The gap analysis of the classification results between KOSHA & EU shows that even with the same classification criteria, there still remains discrepancy. The priority of data source used may affect the classification result. Also, the strategy of each country for chemical control can influence the “strictness” of classification. ☺

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# Correlations between Occupational Injury and Illness Index and Composite Indices of Business Indicators

This paper is to provide basic data needed to select a target group for effective prevention by suggesting short-term prospects. To this end, the correlations between the industrial accident index and the composite indices of business indicators were evaluated.

## Introduction

Occupational injuries and illnesses occur due to unstable conditions of the workplaces and unsafe behaviors of the workers exposed to these environments. As a result, they bring inconveniences to workers such as health problems, leading to medical treatment and compensations. Accordingly, the seriousness of industrial accidents is closely related to workers' exposure to hazards at workplaces. The unstable conditions at workplaces are expected to be related to the production index by industry and capacity rate. The size of worksites is also anticipated to have correlations with the number of employees from non-agriculture sectors and the number of salaried employees. This paper is to provide basic data needed to select a target group for effective prevention by suggesting short-term prospects of the industrial accident index after analyzing the correlations between the industrial accident index and the composite indices of business indicators.

## Objectives and Methods

The monthly number of victims from industrial accidents is the sum of net numbers for the previous 12 months. For example, the monthly number of victims in January 2005 is the result of the sum of victims from February 2004 to January 2005, and the number of victims of February 2005 is the result of the sum of victims from March 2004 to February 2005.



**Choi Sungwon**  
Accident Statistics  
Analysis Team  
Occupational safety and  
Health Research Institute



Monthly index of industrial accident victims is the result of the arithmetic mean of the number of victims of 2005 as calculated above and its relative index. The monthly index is used as a source of analysis.

In the case of composite indices of business indicators, the coincident composite index (Year 2005 = 100), which is released by the Korea National Statistical Office (KNSO) every month is used, and in the case of paid employee index, result of seasonally adjusted employed persons by status of employment is used from the results of the survey conducted on economically active population.

A relative analysis is made among i) the index of monthly industrial accident victims (total victims and total victims except for ones from pneumoconiosis, injured from occupational accidents and the occupational diseases) and ii) coincident composite index and iii) paid employee index (the total paid employee index and the index of regular employee). After the relative analysis, the linear regression analysis is applied to the variables which show statistically

significant correlation to identify increasing or decreasing trend (+/-), size of regression coefficient, and degree of suitability of trend line using coefficient of determination.

## Changes of Industrial Accident Index

To understand the changes of industrial accident occurrence, the data of occupational injury compensation is primarily used based on the data on approved nursing care (about 98% of total data), and it is closely related to the increase of economically active population and industrial development. When the Korean economy started to grow in the early 1960s, the industrial accidents were fewer in number. The number of victims in 1964 was no more than 1,489 (rate of accident 1.82). However, when the Korean economy headed towards stable growth in the 1970s, the industrial accidents were considered a critical social problem, and the number of victims increased to 139,242

<Table 1> Occupational Accidents by Year

Years	Number of establishments	Number of Workers	Number of victims [Rate of accident : %]	Number of deaths [Accident rate]	Number of diseases	Economic loss [Presumed: 1 Million Won]rit	Severity	Frequency
1987	83,536	5,356,546	142,596(2.66)	1,761(3.29)	1,623	1,206,030	2.90	9.77
1988	101,445	5,743,970	142,329(2.48)	1,925(3.35)	2,150	1,484,973	2.52	9.26
1989	118,894	6,687,821	134,127(2.01)	1,724(2.58)	1,561	1,846,527	2.19	7.47
1990	129,687	7,542,752	132,893(1.76)	2,236(2.96)	1,638	2,696,757	2.15	6.70
1991	146,284	7,922,704	128,169(1.62)	2,299(2.90)	1,537	3,507,570	2.16	6.35
1992	154,820	7,058,704	107,435(1.52)	2,429(3.44)	1,328	4,657,820	2.65	6.02
1993	163,152	6,942,527	90,288(1.30)	2,210(3.18)	1,413	4,362,655	2.41	5.18
1994	172,871	7,273,132	85,948(1.18)	2,678(3.68)	918	4,992,814	2.47	4.69
1995	186,021	7,893,727	78,034(0.99)	2,662(3.37)	1,120	5,667,887	2.10	3.90
1996	210,226	8,156,894	71,548(0.88)	2,670(3.27)	1,529	6,776,685	2.19	3.49
1997	227,564	8,236,641	66,770(0.81)	2,742(3.33)	1,424	7,780,210	2.32	3.28
1998	215,539	7,582,479	51,514(0.68)	2,212(2.92)	1,288	7,255,330	2.29	2.79
1999	249,405	7,441,160	55,405(0.74)	2,291(3.08)	1,897	6,371,130	2.11	2.92
2000	706,231	9,485,557	68,976(0.73)	2,528(2.67)	2,937	7,281,330	1.88	2.89
2001	909,461	10,581,186	81,434(0.77)	2,748(2.60)	4,456	8,722,695	2.12	3.13
2002	1,002,263	10,571,279	81,911(0.77)	2,605(2.46)	4,190	10,101,675	2.13	3.19
2003	1,006,549	10,599,345	94,924(0.90)	2,923(2.76)	7,740	12,409,070	2.35	3.68
2004	1,039,208	10,473,090	88,874(0.85)	2,825(2.70)	9,183	14,299,570	2.48	3.51
2005	1,130,094	11,059,193	85,411(0.77)	2,493(2.25)	7,495	15,128,855	2.67	3.25
2006	1,292,696	11,688,797	89,910(0.77)	2,453(2.10)	10,235	15,818,800	2.65	3.31
2007	1,429,885	12,528,879	90,147(0.72)	2,406(1.92)	11,472	16,211,300	2.26	3.15
2008	1,594,793	13,489,986	95,806(0.71)	2,422(1.80)	9,734	17,109,400	2.53	3.41

(rate of accidents 4.48) in 1978.

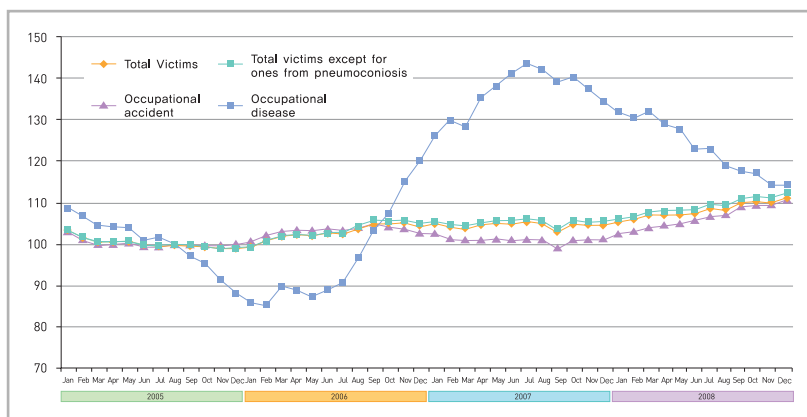
In the 1980s, the Korean industrial structure changed rapidly due to the innovation of industrial technology, but working conditions and environment were not up to the standard, which led to occupational accidents and diseases. As a result, in 1984, the number of victims reached a record 157,800 (rate of accidents 3.60).

These figures astounded the Korean government and encouraged them to prepare policies related to industrial accident prevention and to recognize the need of an agency to take care of industrial accidents and diseases. Accordingly, the Korea Occupational Safety and Health Agency (KOSHA) was established in 1987. Since then, the rate of occupational accident continued to decrease, and

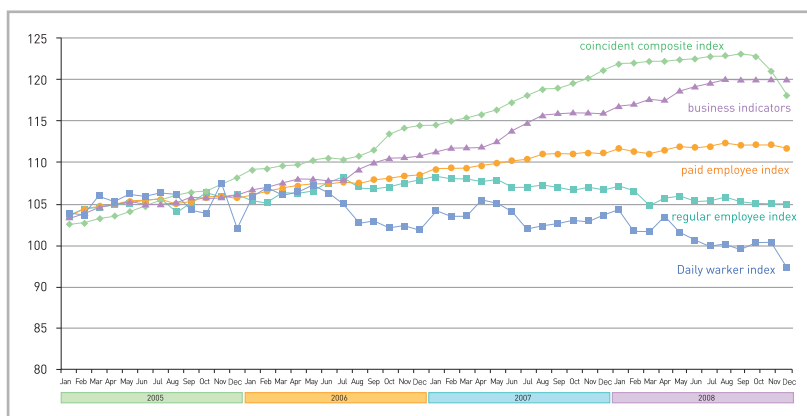
finally it recorded 0.99% in 1995. From then on, the rate of accidents was stagnant at around 0.7%, but the estimated amount of annual economic loss kept growing from 1,200 billion won in 1987, 7,700 billion won in 1997 to 15.8 trillion won in 2006 (see Table1).

Based on the monthly number of occupational injuries and illnesses from 2005 to 2008, the index changes of total victims, total victims except for ones from pneumoconiosis, the injured from occupational accidents, and the occupational diseases are shown in Figure 1. The indices of total victims, total victims except for ones from pneumoconiosis and injured from occupational accidents show similar trends to one another, representing a slow increase. In the case of occupational disease index,

accidental low back pain was dealt by preventing occupational diseases, so the index showed a sharp increase from June, 2006 and started to decline from the second half of 2007.



[Figure 1] Trend of Changes of Industrial Accident Index by Year



[Figure 2] Changes of Coincident Composite Index of Business Indicators and Paid Employee Index

## Changes of Composite Indices of Business Indicators

The changes of monthly composite index of business indicators, coincident composite index, paid employee index, regular employee index and daily worker index based on the index of 2005 (100) from 2005 to 2008 are shown in Figure 2. The coincident composite index increased constantly until the end of 2007, plateaued until January 2008, and decreased from October 2008. The regular employee index shows a continuous increase, but the temporary and daily worker indices show a fluctuating trend. The paid employee index which includes regular employee, temporary and daily workers is on a slow rise.

## Relations Between Industrial Accident Index and Composite Index of Business Indicators

After reviewing industrial accident index and composite index of business indicators independently the results are shown in Table 2 which has the analysis of correlation among coincident composite index of business indicators, paid employee index, regular employee index, total victim index, total victim except for ones from pneumoconiosis index, injured from occupational accidents index, and occupational diseases index. The total victim index shows strong correlations with total victim except for ones from pneumoconiosis index. In particular, they have strong correlations with the regular employee index.

After the linear regression analysis was applied to observe the victim index, all of the total victim index, total victim except for ones from pneumoconiosis index, injured from occupational accidents index, and occupational diseases index showed positive (+) regression coefficient with coincident composite index of business indicators, paid employee index, and regular employee index, and their model acceptance was considered statistically significant. In the case of the total victim index and the total victim except for ones from pneumoconiosis index, they showed strong explanatory adequacy (0.723~0.838), but the injured from occupational accidents index and the occupational diseases index showed relatively low explanatory adequacy (0.314~0.521) as shown in Table 3.

## Conclusion

As explained above, the total victim index showed close correlation (0.850~0.909) with the coincident composite index of business indicators, the paid employee index and the regular employee index and in consideration of peculiarities of victims from pneumoconiosis who got approval from occupational health nursing after having being exposed for a long time, the total victim except for

ones from pneumoconiosis index showed the strongest correlation (0.859~0.916). After dividing the victims into the ones from accident and diseases, it showed that the injured from occupational accident index and occupational disease index had statistically significant correlations, but after linear regression analysis was applied, the explanatory adequacy was relatively low, around 31.4% - 52.1%, meaning that it is somewhat insufficient to support the strong correlation theory.

For all victims, the correlations between coincident

**<Table 2> Correlations between Industrial Accident Index and Composite Index of Business Indicators (2005~2008)**

Classification	Coincident composite index of business indicators		Paid employee index		Regular employee index	
	Correlation coefficient (r)	p-value	Correlation coefficient (r)	p-value	Correlation coefficient (r)	p-value
Total victim index	0.850	0.000	0.871	0.000	0.909	0.000
Total victim except for ones from pneumoconiosis index	0.859	0.000	0.880	0.000	0.916	0.000
The injured from occupational accidents index	0.560	0.000	0.584	0.000	0.651	0.000
Occupational diseases index	0.719	0.000	0.722	0.000	0.692	0.000

**<Table 3> Results of Linear Regression Analysis (2005~2008)**

Classification		Regression coefficient (B)	Explanatory adequacy (R <sup>2</sup> )	Model acceptance (p-value)
Total victim index	Coincident composite index of business indicators	0.415	0.723	0.000
	Paid employee index	1.062	0.759	0.000
	Regular employee index	0.545	0.826	0.000
Total victim (except for pneumoconiosis)	Coincident composite index of business indicators	0.468	0.739	0.000
	Paid employee index	1.199	0.774	0.000
	Regular employee index	0.614	0.838	0.000
The injured from occupational accidents index	Coincident composite index of business indicators	0.245	0.314	0.000
	Paid employee index	0.639	0.341	0.000
	Regular employee index	0.351	0.424	0.000
Occupational diseases index	Coincident composite index of business indicators	1.961	0.517	0.000
	Paid employee index	4.921	0.521	0.000
	Regular employee index	2.322	0.479	0.000

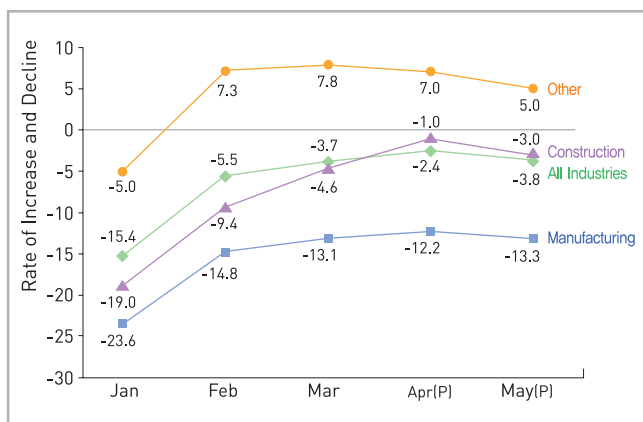
composite index of business indicators and paid employee index and their relations with linear regression were shown to be relatively significant, so it is assumed that they will be used as a basic data for short-term prospects. On the basis of these results, it is possible to roughly prospect the increase and decline of the size of entire occupational injuries and illnesses as of December 2009 compared with those in 2008, utilizing the provisional data on industrial accidents from January to May, 2009.

The number victiming from monthly industrial accidents in 2009 was declined to about 700~800 compared with that of last year, but in May, it increased to 1,440 victims. However, figure3 shows that construction industries which contribute significantly to the reduction of industrial accidents showed

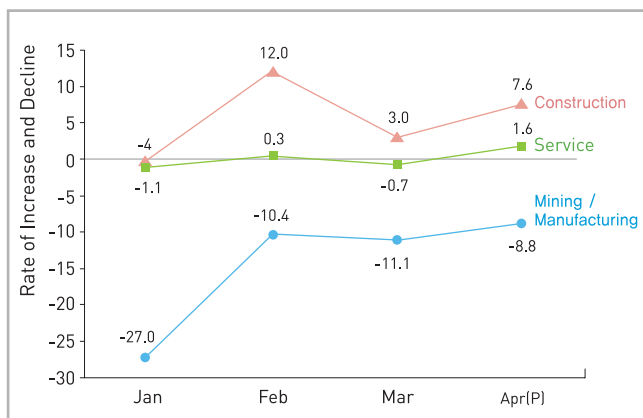
a slow decline, and other industries which are mostly related to the service industry started to increase from February and maintained 5~7% increase rate.

In addition, according to industrial trends (March and April 2009) released by the KNSO, the manufacturing industry which led to the reduction of industrial accidents showed that from the composite indices of business indicators, the reduction of the index of mining and manufacturing industries have diminished compared to that of last year (-25.5 in January, -10.0 in February, -10.5 in March, -8.2 in April), and in the automotive industry, the reduction of the production index also diminished (-49.2 in January, -20.2 in February, -26.3 in March, -22.6 in April). Overall, it is assumed that the production activities will increase in the manufacturing industry and diminish the reduction of industrial accidents. The completed construction showed reduction in January, but it was steadily on the increase starting from 12.0% in February, 4.8% in March and 7.6% in April. The service industry showed fluctuation of production index compared with those of last year, but overall, the production index was slowly on the increase (-1.1 in January, 0.3 in February, -0.7 in March and 1.6 in April), which indicates that the industrial accident will continuously increase as shown in Figure 4.

Accordingly, if the sum of reduced victims remains at 1,442 based on the data from January to May 2009, the size of reduced industrial accidents as of the end of December is expected to be 3,461 victims  $((1,442/5)*12)$ . But if you consider business surveys on the service and construction industries, the industrial accidents are expected to increase, and the size of reduced industrial accident is expected to fall under 3,461. ☹



[Figure 3] Rate of Increase and Decline of Monthly Industrial Accident Compared with 2008 Rates (2009)



[Figure 4] Changes of Monthly Industrial Activity Trends (2009)

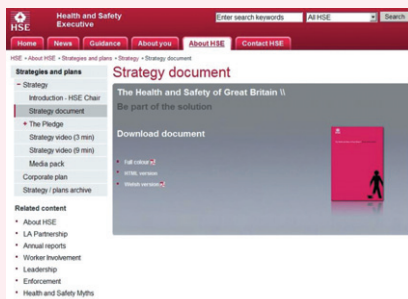


# National and World News on OSH

## World News

### HSE announces 'Be Part of the Solution' as a strategy for new safety and health

The HSE announced 'Be Part of the Solution', which is a new plan for safety and health established during the conference held among labor, management and government on June 3, 2009. This plan encourages people from all walks of life to actively participate in the improvement of safety and health and reduction of hazards at workplaces. Through this plan, the HSE will work to strengthen the competitiveness in the industrial fields. In addition, the HSE said, "We can reduce occupational accidents and diseases only if all people work together with municipal governments to implement this plan with an integrated strategy for regulations of safety and health."



- 1) HSC and HSE were consolidated into HSE on April 1, 2008. This strategy was first to be established since its incorporation, where it marked a new direction for safety and health.
- 2) Employers, a group of employers, self-employed persons, workers, a group of workers, HSE, municipal governments, main competent central government authorities, main research institutes and specific organizations, etc.

#### ■ Background of the Strategy

The rate of industrial accidents in Britain is low compared to other countries, but for the last 35 years, the reduction of deaths, injuries and diseases in the workplaces has slowed significantly.

According to the statistical data of 2007/08, 229 workers died from occupational accidents, 136,771 workers got seriously injured and about 2 million workers have suffered from diseases. The number of lost days amounted to 34 million, resulting in economic loss of approximately 2 million pounds(2% of GDP in Britain).

The problems caused by occupational accidents and diseases were too significant to be acceptable economically, socially and lawfully, and it was time to find a new method.

#### ■ Objectives

The HSE suggested 5 key objectives to accomplish this strategy.

- Make surveys on occupational accidents and illnesses and establish a variety of regulations to prevent accidents and secure safety using all necessary means
- Secure a strong leadership to promote occupational safety and health to the general level of common sense
- Manage the risks efficiently and reasonably by improving competitiveness for safety and health
- Improve safety and health of small, medium and large companies by encouraging workers to recognize the serious consequences of this problem and to receive a lot of consultations

- Establish and carry out customized plans to comply with safety and health of small and medium sized companies

## National News

### International seminar on Occupational Cancers and their Management System

A seminar on 'Occupational Cancers and their Management System' will be held at COEX on July 6, 2009, to share findings from conducted researches and experiences.

In commemoration of the Occupational Safety and Health Research Institute's (OSHRI) 20th anniversary, this international seminar will invite 4 presenters; Harri Vainio, the director of Finnish Institute of Occupational Health(FIOH), who will talk about Finnish Management System for the Workers Exposed to Carcinogens, Ken Takahashi, a professor at the University of Industrial Environment and Health in Japan, who will make a presentation on Occupational Cancer in Japan: Claims, Diagnosis, Compensation and Management, Andreas Kranig, a professor at the German Social Accident Insurance(DGUV: Deutsche Gesetzliche Unfallversicherung) who will inform us about Occupational Cancer in Germany, and Eun-A Kim, the director of Occupational Disease Research Center who will give a presentation on Occupational Cancers in Korea: Strategies of Cancer Management for the Future.

# OSHRI News

## ● Agreement on Supporting Cooperation Organization for Standards Development (COSD)

**Title :** Development of Standardized Roadmap for Explosion Protection of Electrical Equipment and Safety of Machinery  
**Date :** Jun 1, 2009~Dec 21, 2009  
**Person in Charge :** Ryu Bohyuk

## ● Conference on Semiconductor and LCD Manufactures

**Date :** Jun 2, 2009 (Tues)  
**Venue :** Conference room of Safety Certification Evaluation Center

## ● The 5th Forum on Damage Policy

**Date :** Jun 3, 2009 (Wed)  
**Venue :** 4th floor of Korea Center for Disease Control and Prevention

## ● Forum on Epidemiological Survey of Sudden Deaths of Workers in Hankook Tire Co.

**Date :** Jun 5, 2009 (Fri)  
**Venue :** College of Medicine, Hanyang University

## ● Exhibition of Protective Equipment

**Date :** Jun 9, 2009 (Tue)  
**Venue :** Conference room of Safety Certification Evaluation Center

## ● Research Seminar on Affiliated R&D Institutes

**Date :** Jun 10, 2009 (Wed)  
**Venue :** Lotte Hotel in Ulsan

## ● Committee Meeting for Establishing an Industrial Hygiene Field under the KOSHA Code

**Date :** Jun 10, 2009 (Wed)  
**Venue :** Conference room on the 2<sup>nd</sup> floor of the Institute

## ● Conference on Establishing S Mark Certification

**Date :** Jun 10, 2009 (Wed)  
**Venue :** Hanhwa Resort at Haewoondae, Busan

## ● Summer Academic Seminar for the Korean Association of Social Security Law

**Date :** Jun 12, 2009 (Fri)  
**Venue :** Kookmin University  
**Subject :** Plans for protecting workers in the special area under the law of individual industrial relations

## ● A Public Hearing on Finding Plans of Safety & Health Management System for Public Officials in the Special Areas

**Date :** Jun 29, 2009 (Mon)  
**Venue :** A private meeting room in the Assembly Members' Office Building

## List of Contents for OSH Research Briefs Published in English

### July 2008

#### Special Issues

- Occupational Health and Safety in Korea
- Risks and Safety of Korean Society

#### Research Trends

- The 1st Korean Working Conditions Survey
- Asbestos Exposure and its Health Effects in Korea
- Analysis of the Characteristics of Fall Accidents and R&D of Safety Devices
- Study on Nerve Toxicity Caused with an Organic Solvent Exposure
- Report on early Diagnosis and Prediction of Asbestos Related Diseases
- Current Status and Research Trends of the OSHRI
- OSH Societies in Korea(KOSOS, KSOEH, ESK, KSOHN)

#### Policy -Law

- Implementation of WHO Global Plan of Action on Workers' Health in Europe
- Workers' Health Surveillance in Europe: strengths and weaknesses, opportunities and threats

#### Epidemiological Survey

#### Statistics Prism

- Occupational Injury and Illness Statistics in Korea

### Mar 2009

- New Paradigm for OSH in Korea

- Developing a Nationwide Occupational Disease Surveillance
- A Research on Services to Prevent Occupational Accidents in the Service Sector
- Study on Blood-Born Diseases of Healthcare Workers
- Research on Chemical Control for Female Workers

- Introduction of the New Safety Certification and Safety Inspection System
- Medical Screening System for Occupational Disease : A 6-Year Experience in Korea
- The Past and Future of Work Environment Evaluation System

- Lymphohematopoietic Cancer Incidence and Mortality of Semiconductor Workers
- Epidemiologic Research on Sudden Cardiac Deaths and Cancers at a Tire Manufacturer

- Occupational Injury and Illness Statistics in Korea
- Analysis on the Type of Occupational Accident & Disease of the Aged Workers for Recent 10 Years

The contents of two OSH Research Briefs published in English by OSHRI are listed above.

Full text of the Research Brief can be viewed on [www.oshri.kosha.or.kr](http://www.oshri.kosha.or.kr) - "OSH Reserch Brief"

# The 20th Anniversary of OSHRI

International Seminars &  
Declaration  
Grandball Room, COEX  
Monday, July 6, 2009

## 1st Section

### International Conference on Research for Occupational Cancer and the Management System

- Date: 14:00~17:00, Monday, July 6, 2009
- Venue: Grandball Room, COEX
- Theme: Occupational Cancer and the Management System
- Presentations
  - Finnish Management System for the Workers Exposed to Carcinogens at Workplaces (Prof. Harri Vainio, FIOH, Finland)
  - Occupational Cancer in Japan: Claims, Diagnosis, Compensation and Management (Prof. Ken Takahashi, UOEH, Japan)
  - Investigation of Occupational Cancer in Germany (Dr. Andreas Kranig, DGUV, Germany)
  - Occupational Cancer in Korea: Management Strategies for the Future (Dr. Eun-A Kim, OSHRI, Korea)

## 2st Section

### Ceremony for 20th Anniversary of OSHRI & Vision Declaration

- Date: 17:30~18:00, Monday, July 6, 2009
- Venue: Grandball Room, COEX

## Seminars

### Hazards of Fibers

- Date: 09:00~12:00, Tue, July 7, 2009
- Venue: Room No. 304, COEX

### The Future Systems for Asbestos Exposure and its Quality Control

- Date: 13:30~16:30, Tue, July 7, 2009
- Venue: Room No. 304, COEX

### An Ergonomic Prevention Strategy in the Occupational Safety Field

- Date: 09:30~11:30, Wed, July 8, 2009
- Venue: Room No. 310, COEX





“KOSHA will devote itself to  
the benefit of mankind”

Korea

KOSHA would like to extend our deepest gratitude for  
supporting us to host the 2015 ICOH Congress in Seoul.

Korea has cherished *the humanitarian ideal* throughout its  
entire history.

Our noble desire to build a safe and healthy world will be  
realized at the Seoul ICOH Congress in 2015.

● The 31st ICOH Congress ● Date: May of 2015 ● Venue: COEX, Seoul

