

Speakers' Corner

[SC01] General Safety

June 30, 12:15 - 13:15
Room: 203, COEX

Moderator:

Alain Marchand

University of Montreal, Canada

[SC01-01]

Who is More Participatory on Safety and Health Education at Work?: Implications Based on PRECEDE Model

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The purpose of this study was to analyze the educational infra-characteristics associated with workers' participation on safety and health education at work (SHE) based on the diagnosis constructs of PRECEDE model. A total of 627 workers (521 manufacture and 106 construction) in 204 companies successfully participated in the self-administered survey. Five-questionnaire pack was delivered to the safety and health manager in each company randomly selected from the mailing lists of the Korean Occupational Health Conference and the SH managers distributed the five questionnaires to the workers in their companies. The questionnaire asked social (demographics) characteristics, injury and illness history, health risk behaviors, safety and health environments at work, perceived participation on SHE at work and educational infra-characteristics (predisposing, enabling and reinforcing constructs) based on the diagnosis steps of PRECEDE model. The companies of which were located in metropolitan areas were 28.0% and female workers were only 16.2%.

Based on hierarchical regression analysis, social characteristics explained 11.0% variance of the workers' participation on SHE. The total explanation power of educational infra-characteristics was 31.0% on workers'

SHE. Predisposing factors explained 20.0% variance of workers' participation on SHE and the other enabling and reinforcing factors explained 9.0% and 2.0% each on workers' SHE. Predisposing factors were stronger than enabling and reinforcing factors in describing workers' SHE participation. Woman and illness/injury experience related to work were significantly related to better health education participation. Positive efficacy on SHE, frequent experience of case-based lecture, and less preference of SHE by internet were significantly associated with better participation. Employed in the company which assigned at least a safety and health supervisor, great educational competencies of current in-service educators, and SHE interests and support from owners and government agencies were meaningful enabling and reinforcing factors.

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[SC01-02]

How to Ensure Effective OHS Training with Practical and Sustainable Outcomes

Phil Wadick

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I am studying for a PhD at Monash University, and my main research question is: *What is the role of OHS training in making workplaces safer?* Some sub questions are: *How does the OHS trainer ensure that their course is effective? How does the trainer know that the course is effective? What does good ohs training look like? What barriers to safe working do the trainees face once they return to the workplace after the training?, and, how do the trainees navigate and negotiate these barriers?*

I firstly consider learning theory and its implications for how OHS training is conducted. I then suggest the types of methods and styles of training that may help training participants learn to be effective ohs ambassadors. People learn theory in the classroom, but it needs to be put into practice back at the workplace to make the workplace safer, and this is not always easy, because there are many potential barriers. By OHS training, I mean any type of training designed to give people the knowledge skills and attitudes to improve the safety performance of their workplace. This could mean any or all of the following: their own safe behaviours, influencing the safe behaviours of others, influencing decisions made by management about health and safety, reporting and follow up of incidents (near misses and actual hits), and participation in risk assessments and ohs consultation at work. In the final part of this paper, I am inviting anyone who is interested in



contributing their ideas to this research to contact me on the details provided. I would love to either interview you or have you answer some survey questions, or generally provide input from your experiences. You may be an OHS trainer, have participated in OHS training, or somehow have experience of OHS.

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**[SC01-03]
Training Program in Increasing Knowledge on
Chemical Risks at Workplaces**

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In Thailand, the workers are exposed to various Chemicals used in their workplaces without knowing the original substances, health hazards and the corrective preventive measures. A training program was designed as a pilot study to educate the workers' representatives to be able to.

1. recognize the exposed chemicals
2. adjust the chemical survey checklist
3. to apply both the checklist and the

questionnaires try those items (2), (3) as instruments for their workplace investigation.

Twenty five worker's representatives from 25 chemical factories were selected to participate in this training program. Active learning method was used and practical works were assigned and monitored through out the study period. Immediate educational, evaluation was made for the effectiveness of input, process and output, with instruments designed for this. Descriptive data analysis was done. The output showed satisfactory results in terms of knowledge, skill and attitude. The training program was successful and could be used as a training model for the workers education in this country.

Recommendation from the workers' representatives were in there main items. These were

1. giving education to the workers in view of chemical hazards and protection,
2. joint cooperation between the manager and the workers should be fully urged,
3. facilities for environmental assessment and health monitoring of satisfactory standards were to be developed in order to control the hazardous situation.

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**[SC01-04]
Healing on Education-Overview on Teacher
Burnout**

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Burnout results from the chronic perception that one is unable to cope with daily life demands. Given that teachers must face a classroom full of students every day, negotiate potentially stressful interactions with parents, administrators, counselors, and other teachers, contend with relatively low pay and shrinking school budgets, and ensure students meet increasingly strict standards of accountability, it is no wonder many experience a form of burnout at some point in their careers. Efforts at primary prevention, in which teachers' jobs are modified to give them more control over their environment and more resources for coping with the demands of being an educator, are preferable over secondary or tertiary interventions that occur after burnout symptoms have surfaced. However, research reviewed here indicates each type of prevention can be useful in helping teachers contend with an occupation that puts them at risk for burnout.

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**[SC01-05]
A Critical Evaluation of Workers' Compensation
Schemes in Malaysia**

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BACKGROUND: Workers' compensation schemes for occupational injuries and diseases vary among countries. Many countries have reformed their systems to suit to changing demands from workers and employers. In Malaysia, some changes had been made since its first introduction in 1929. A quick review reveals that a much better system is desirable, one that can provide a fair and speedy compensation to injured workers in the country. In view of this a critical review was embarked that specifically looked at workers' coverage, workers access to common law and use of list for compensable occupational diseases. **METHODS:** The review involved two methods (i) the gathering of information from official publications about workers' compensation schemes in different countries, and



(ii) a critical review performed on their implementation.
FINDINGS: The first statutory no-fault workers' compensation scheme in Malaysia was enacted in 1952, and was modeled after the British System. In terms of coverage, it was similar to other countries such as Canada, Australia and the USA. Singapore was the exception. The scheme, however, excluded the self-employed. Under the no-fault compensation scheme, injured workers are not entitled to claim under the common law. The same practice is found in some regions in Australia. Malaysia, as in Great Britain and Australia, uses the list of prescribed occupational diseases for compensating the injured workers.

CONCLUSION AND RECOMMENDATIONS: Clearly, there are advantages and limitations in different workers' compensation coverage, access to common law and the use of occupational disease list. Although Malaysia's workers' compensation schemes are comparable with some other countries, there are justifications for further reform to address issues relating to fairness and speedier process.

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[SC02] General Health

June 30, 12:15 - 13:15
Room: 208, COEX

Moderator:
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[SC02-01] Program Nutrition Training for Catering to Sonatrach

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Objective:

It is about a prevention program by the food, written down like important project bound to the function human resources in Sonatrach for the improvement of the

conditions of work and life in a worry to preserve the health of the workers of Sonatrach and to improve the food thus.

Method:

- Choice of an external survey office specialized in dietary nutrition
- Nutritional investigation on a pilot site chosen by the General Direction
- Development of a food plan
- Conditions of success of setting in work
- Program of formation

Results:

The setting in work of the food plan is tributary of key factors of success between other the formation, which answers the following criteria.

- Identification of the population concerned (actors of the restoration)
- Definition of the families by population (physicians of work, managers of the restoration and the technicians of the restoration)
- Choice of the formation site
- Organization of the educational and material logistics
- Establishment of the program to the card according to the profile of every population
- 167 actors of the restoration benefited from this action of formation

Key words:

- Program of prevention by the food
- Formation in nutrition
- Actors of the restoration

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[SC02-02] Biopsychosocial and Psychoactive Drug Abuse among Workers Suffering Work - Related Musculoskeletal Disorders and Exposed to Workload

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Background: The biopsychosocial model is an explanatory framework that recognize the importance of psychological

and social factors in determining how musculoskeletal sufferers cope with their conditions. The occupational health professionals should assess the interplay between the biological e.g. Musculoskeletal disorders (MSDs), the psychological e.g. anxiety, depression and the social e.g. work demands and drug abuse.

Objectives: To find out the proportion of the psychological disorders and drug abuse among the studied groups, to find out the proportion of drug abusers among the examined cases with MSDs and suffering psychological disorders, and to find out the factors determined the drug abuse among the cases group.

Subjects & Methods: Case - control study was conducted. 171 workers with MSDs (cases) and another 171 were selected (controls). Both groups were subjected to interview sheet to assess general characteristics, workplace ergonomic status, psychological disorders, factors determined drug abuse and laboratory investigation for drug abuse.

Results: 22.8% and 2.9% of cases and controls were suffering depression respectively. 26.9% and 3.5% of cases and controls were suffering anxiety respectively. 71.9% and 19.9% of cases and controls were abusing tramadol respectively while 34.5% and 45.6% of both groups were abusing Cannabinoids respectively.

Conclusion: cases with work related MSDs might be complicated with psychological disorders and drug abuse as a result of interaction between the disease, unsafe ergonomic workplace and persistent work load.

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[SC02-03] Occupational Health Developments and Initiatives in the United Arab Emirates

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The United Arab Emirates (UAE) is a rapidly developing country in the Gulf region. The petroleum industry, construction and tourism are among its major industries. Industrial development has been accompanied by an increasing interest in occupational health and safety. Some identified challenges for the region are:

- Improving the infrastructure for health and safety
- Training of health and safety professionals
- Collecting better data for occupational morbidity and mortality
- Dealing with an influx of foreign labour
- Encouraging a health and safety culture

- Reviewing, updating, and enforcing health and safety legislation
- Re-focusing occupational health and safety activity on preventive action.

Initiatives that have started within the past year include:

- Developing occupational health and safety as part of a wider public health program.
- Building up networks and multidisciplinary teams within and between universities, government agencies (such as health authorities, the Department of Labour, and the Environment Agency) and industry.
- Cooperating with established institutions in neighboring Gulf Cooperation Council (GCC) states and in developed countries with special expertise in public health and occupational health.
- Improving death certification and collecting better data on hospital discharges
- Encouraging relevant screening and occupational health surveillance
- Starting training programs within the medical faculty of the national university, including continuing professional development events. There are opportunities within the region for post-graduate training leading to internationally-recognized qualifications.

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[SC02-04] Northwest Anatolia Hardcoal Basin (Turkey) Geologic Factors Causing Occupational Diseases

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Northwestern Anatolia Hardcoal Basin (Turkey) covers approximately 13.500km² area in the Black Sea region. In this basin, 45 pieces of coal seams which dates back to Carboniferous aged have been calculated as 1,00x10⁹tons of coal reserves. The industrial and cokengability coals between 2,00x10⁶tons and 7,00x10⁶tons have been produced annually since 1900, from surface to -560m depth.

Coal production has been carried out since 1941 by Turkish Hardcoal Enterprise (TTK). 450km underground galleries in basic coal rocks have been excavated for coal production by TTK. The numbers of workers ranging between 10.000 and 45.000 were recruited between the years 1961 and 2007 for coal production on surface and

underground. In this period, while no vocational diseases were observed on surface workers, the workers in underground were diagnosed with silicosis/pneumoconiosis in rates between %0,04 and %3,56.

The coal basic rocks in the basin are made up of conglomerate, sandstone, siltstone, clay stone, shale and coaly shale. These detritus sedimentary rocks are composed of maximally %77 quartz, magmatic rock fragments, clay, silica, organic matter, by cementing the above cited. The coal bands are separated into sandstone, siltstone, clay stone, shale and coaly shale; and the cleats have been observed to be full with such materials clay, pyrite and marcasite.

In the galleries opened to prepare for the coal production, the progress of ha been made with explosive excavation method. The uniaxial strength of basic coal rocks vary between 36MPa and 144MPa. Meanwhile, 0-5 μ dimensional particles are founded, in which there are also fragmented angular, sub angular and sub rounded quartz and rock fragments affecting the workers.

In this study, the relationship between the vocational diseases such as silicosis/pneumoconiosis among workers in Northwestern Anatolia Hardcoal Basin and the coal production workers, coal production, progress by excavation, the mineralogical-petrographic structures of coal basic rocks established.

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**[SC03] Occupational Medicine,
Epidemiology**

June 30, 12:15 - 13:15
Room: 304, COEX

Moderator:
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**[SC03-01]
Nickel Associated Health Manifestations among
Electroplaters**

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Background: Electroplating processes result in the emission of aerosoles of soluble nickel compounds that is a recognised health hazard.

Aim of the work is to investigate health hazards associated with exposure in a nickel in electroplating workshop environmental air assessment at the workshop.

Methodology: Environmental air sampling was performed for nickel electroplating work shop that include 50 workers. For every worker personal interview, clinical examination including otolaryngeal examination was done. The results were compared to those obtained from 30 matched controls. Investigations involved urinary and serum nickel, kidney and ventilatory function tests, IgA and IgE immunoglobulins.

Results: Serum urea, creatinine and retinol binding protein were statistically significantly higher in exposed workers compared to the controls. Low levels of IgA and high levels of IgE were reported among our exposed workers. Reduction of spirometric measurements but not to the level of significance, was also demonstrated. The concentration of nickel in urine of workers averaged (2.9Ug/L) and in serum averaged (3.4 Ug/L). Statistically significantly positive correlation was found between serum levels of urea, creatinine, retinol binding protein and IgE and serum and urinary nickel of exposed workers.

Recommendations: We recommended periodic medical examination including chest and nasal sinuses x-rays annually. Nickel concentration in plasma and urine are helpful for screening and the biologic TLV of nickel in urine is considered as 150 Ug/L. Complaining cases should undergo sputum cytology and nasal mucosal biopsy. Patients who developed allergic asthma or who were suspected to be at increased risk of developing allergic asthma should be given a validated respiratory disease questionnaire and pulmonary function testing yearly.

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**[SC03-02]
Prevalence of the Metabolic Syndrome Using the
International Diabetes Federation Definition for
Workers in Japan, China and Mongolia**

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Mutombo¹, Tsendsuren Oyunsuren², Hui Song³**

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A clustering of insulin resistance, hypertension and dyslipidemia has been labeled as metabolic syndrome. Asians have a lower frequency of obesity than do Caucasians, but have an increasing tendency toward metabolic syndrome. Most data on metabolic syndrome are based on studies from Western countries with only limited information derived from Asian populations. We conducted a cross-sectional study of individuals aged 18–60 yr in workplace settings. We examined and analyzed the health data of 1,564 Japanese, Chinese and Mongolian for metabolic syndrome based on the International Diabetes Federation (IDF) definition. The Japanese, Mongolian and Chinese men were 10%, 50%, 39% \geq 90 cm WC, and the Japanese, Mongolian and Chinese women were 12%, 54%, 24% \geq 80 cm WC, respectively. The Mongolian men and women had significantly higher values for WC, followed by the Chinese men or the Japanese women, and then the Japanese men or the Chinese women. The prevalence of obesity in the Chinese showed a remarkable diversity by gender, compared to the Japanese and Mongolian. The prevalence of metabolic syndrome was 7% and 6% for Japanese men and women, 22% and 24% for Mongolian and 23% and 9% for Chinese, respectively. Japanese has a lower frequency of visceral obesity than do Chinese and Mongolian, but have an increasing tendency toward obesity-related metabolic disorders. Obesity and metabolic syndrome are increasing in Asian workers with their social-economical development, but obesity-related metabolic disorders are remarkably different relative to ethnicity.

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[SC03-03] Pneumoconiosis Mortality and Morbidity Trends in the United States, 1968–2004

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Objective: To describe trends in pneumoconiosis in the United States during 1968–2004.

Methods: The National Center for Health Statistics multiple cause-of-death records were used to derive numbers of deaths and death rates for asbestosis, coal workers' pneumoconiosis (CWP), and silicosis. Morbidity data on CWP from a large national worker monitoring program were used to derive CWP prevalence defined as presence on the chest radiograph of small opacities category 1/0 or

greater or large opacities, as determined by at least two National Institute for Occupational Safety and Health (NIOSH) readers.

Results: Overall, annual asbestosis deaths increased over 19-fold from 78 in 1968 to 1,493 in 2000 and then declined to 1,470 in 2004, due mostly to a drop in asbestosis deaths among those aged \leq 74; deaths continue to increase among individuals aged \geq 75. Silicosis deaths decreased nearly 6-fold from 1,065 in 1968 to 178 in 1998; no substantial change was observed thereafter in all age groups (mean 166 deaths/year for 1999–2004 overall, with a mean of 4 deaths/year among individuals aged 15–44 years). CWP deaths peaked in 1972 ($n=2,910$), and then declined more than 4-fold to 703 in 2004. After 1998, the number of CWP deaths continued to decline among those aged \geq 65, but appeared to increase among younger individuals (15–44 years old). CWP prevalence in working coal miners with \geq 20 years of tenure increased nearly 3-fold from 3.2% in 1995–1999 to 8.3% in 2005–2006.

Conclusions: The slight decline from 2000 through 2004 in asbestosis deaths suggests that asbestosis mortality has peaked in the U.S. Mortality data for silicosis indicate a continuing occupational risk, even in younger workers. The increase in both CWP mortality and CWP morbidity suggests that past gains in disease prevention are being compromised.

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[SC03-04] Malaria in Quarry Mines in Western India District of Jodhpur, with Emphasis on Safety And Health of Workers

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Quarry-mine malaria is a serious health problem in western Rajasthan, particularly the Thar Desert district of Jodhpur, where a sizable population ($> 10\%$ of total cases in the state population of 35 million) is annually affected by malaria especially the parasite *Plasmodium falciparum*. These quarry mines, with an estimated labourer force of 0.2 million engaged in mining works, span over 70,000 sq. km., bracing Jodhpur along its southwestern flank. These are generally filled with rainwater abounding in breeding by mosquitoes. Thousands of quarry-mine labourers, with per-capita income below poverty line and often hailing from

far off areas, are settled in poorly maintained hutments in the vicinity of waterlogged quarry-mines, suffering ceaselessly with both the obnoxious mosquito biting and deadly malaria infection. A high slide positivity rare (21.83%) and predominant *P. falciparum* (59.8%) are sufficient evidence to exhibit the continued malaria associated maladies of the quarry-mine workers, who by virtue of their occupation are already exposed to serious health hazards due to silicosis and tuberculosis. Most malaria positive cases were contributed by 1-14 yr age group, with an alarming infant parasite rate of 8.0%. Interestingly more males were positive for malaria infection than the female population (4:1). Malaria mosquitoes commonly breeding in quarry-mines include the primary vector species like *Anopheles culicifacies* and *An. stephensi*, besides secondary vectors such as *An. subpictus* and *An. annularis*. In India, *Anopheles culicifacies*, a rural species, is responsible for nearly 70% malaria transmission, while *An. stephensi*, an urban species, transmits nearly 30%. Both these malaria mosquitoes orient to bite on man both indoors and outdoors in the night; men clothed minimally are bitten most! Pregnant and lactating women as well as children are vulnerable to the quarry-mine malaria. Insecticide-treated bed nets have proved highly successful and socially acceptable in preventing malaria transmission in the Thar Desert.

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**[SC03-05]
Risk of Hospitalization by Pneumonia in Workers Exposed to Crystalline Silica: A Record Linkage Study**

Dong-Hee Koh, Kyung-Sun Koh, Ki-Tae Moon, Jung-Yeon Kim, Sung-Won Choi

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Background: Many workers are exposed to crystalline silica which is a well-known oxidative stress promotor. The authors studied the relationship between pneumonia and occupational exposure to crystalline silica.

Methods: The cohort comprised 38,410 silica-exposed workers and 417,067 workers exposed to only noise, who underwent specific health examinations from 2000 to 2004 at 120 medical service institutes in Korea. Hospitalization and deaths by pneumonia during the period of 2000-2005 were also investigated. The hospitalization rate ratio(HRR) of this group was analyzed comparing with noise-only exposed workers.

Results: The risk of pneumonia hospitalization in crystalline silica exposed workers was significantly higher than that of noise-only exposed workers (RR=1.22 , 95%CI:1.18-1.26). We also computed RR by industrial classifications. There was increased risk of pneumonia hospitalization in foundry, ceramic, and cement industries.

Abstract Conclusions: There were correlation between crystalline silica exposure and pneumonia hospitalization. This is just a record linkage study, and further research is needed including other factors such as related disease, smoking, and socioeconomic positions

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**[SC03-06]
Distribution of Occupational Diseases in the Zonguldak Coal Basin**

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Coal mining has an important share within the distribution of occupational diseases according to the sectors in the world. Zonguldak Hardcoal Basin is ranked to be the first in the regional distribution of occupational diseases in Turkey. In this study, following the definitions of occupational diseases encountered in the region, their distribution according to the years has been determined. Then, these distributions according to the years has been determined. Then, these distributions have been investigated by the aid of variable and constant base indexes. As a result, it has been observed that distributions show great differences. Especially, it has been determined that occupational diseases have increased in certain years. The reasons for the increases in such years should be studied and the preventive measures should be taken without delay.

Measures to be taken in order to prevent occupational diseases very according to level of labour, enterprise and country. However, it is a must that a society should be provided with knowledge of industrial health in order to prevent industrial diseases really. Two way communication networks based on reciprocal cooperation among employee, employer and public sector should be established. One of the most important conclusions that we have reached and which should be always borne in mind is the fact that maintaining of occupational health is much more cheaper than bearing the consequences of occupational diseases.

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[SC04] Construction Safety

June 30, 12:15 - 13:15
Room: 320, COEX

Moderator:

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claiming that the situation is going to get worse instead of better. It is known that several other alterations are coming up.

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[SC04-02] Measuring Safety and Productivity in Construction

Sang Choi

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[SC04-01] The Application of the Convention 167 (Construction) in Brazil

Marcelo Tacitano, Lie Liung

Ministry of Labour and Employment, Brazil

The Specialised Services on Safety and Health at Work (SESMT) are organised by the companies to promote the worker's health and integrity. Such services were launched in Brazil in 1972 due to the pressure of the ILO and some international financial organisms in function of the Brazilian high number of occupational accidents. In 1991, Brazil ratified the Convention 161—Occupational Health Services. The composition of the SESMT in Brazil depends on the economical activity (risk degree) and the number of workers in a company. According to the norm can be part of this service, vocational and graduated professionals. Due to the SESMT rules, it takes place in just about 1.5% of the companies, although it is known that they employ about 35% of the formal country's workforce. However, the other companies (the major part) are not provided with the services, therefore their commitments with Safety and Health at Work (SHW) need to be done by outsourcing professionals, whose quality control is difficult.

The aim of this paper is to show the difficulties and limitations that SESMT faces, to present some statistics of the registrations of these services in the Ministry of Labour and Employment, and also the alterations that have been proposed to improve the text of the current norm. In this sense, it was recently published the Ordinance n° 17/2007, that seeks to enlarge the covering and to turn the services more effective, with the possibility of inclusion of the outsource companies and also the definition of SESMT for a group of companies of the same economical activity at the same district. However, due to the lack of clear procedures in the new Ordinance, some professionals are

The construction industry is one of the largest industries and continues to lead the private sector in having the highest number of workplace fatalities [U.S. Bureau of Labor Statistics]. One of the most hazardous areas in the construction industry is roofing. Not only does the higher rate of injuries and fatalities in the roofing industry cause a major concern for health and safety, but it also imposes a large economic burden on many employers and insurers. The purpose of this study thus was to investigate the role of safety, costs of injuries and productivity measurement in the roofing contracting industry. A questionnaire survey was designed and sent to seventy eight different residential and commercial roofing contractors in the Midwestern United States. The study findings indicated that larger roofing companies are generally better organized from a safety standpoint than smaller roofing companies. Over the years, the insurance premiums and the workers' compensation costs have been considerably increased. The survey results pointed out that the most expensive injuries were those pertaining to the back. The study also revealed that the productivity in roofing jobs has been determined by taking the number of hours worked per week and dividing into the square footage of work completed. Loss of productivity was determined to be the highest expense to a company when an injury occurs. Methods of measuring accident costs and productivity in construction are demonstrated in the paper.

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[SC04-03] Pattern of Injury among Building Construction Workers in Iddo Local Government Area, Oyo State, Nigeria

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In Nigeria, workers on construction sites mainly belong to the informal labour sector. This study was conducted to document injury experiences among construction workers in a newly developing area in Oyo state.

Qualitative research methods (in-depth interviews) were utilized. Consent was obtained from the foremen at the sites visited and interviews conducted in the local language and tape recorded.

Twenty-four workers on 7 building sites consented. Their ages ranged from 18 to 69 years, only one woman, (a daily paid labourer) was interviewed. There were 15 bricklayers, 4 carpenters, 2 building block-moulders, 1 electrician and 1 welder. The respondents had been working for a range of 1 to 53 years. The respondents worked for an average of 8.2 (S.D \pm 1.6) hours a day, mostly for 6 days in the week and made about N 200 (about \$1.67) to N 3,000.00 (\$25.00) per day. In all, 16 (66.7%) workers had sustained injuries. These were mainly lacerations, nail puncture wounds, falls and crush injuries. One worker, an electrician said he once passed out while laying electrical wires in the ceiling of a house. The injuries had prevented the respondents from working for between a few days to over a month. Only one had his treatment bill picked up by his employer. None had suffered any permanent disability. About half knew of colleagues who had suffered from severe accidents such as some who were victims of collapsed buildings and falls from heights.

The study showed that construction site workers are exposed to injuries leading to lost days of work and income. More research is required to further quantify the magnitude of the problem and design appropriate preventive measures.

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[SC04-04]

The European OH&S Network in the Construction Sector: The Case of the Directive 92/57/EEC

Francesca Ravetta

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Problem definition:

The European Union includes 27 countries (EU-27), of which 15 are the old Member States (EU-15), 10 joined the EU in 2004 and 2 in 2007. More countries are in the

process either of presenting their candidacy to join the EU or complying with the requirements to be accepted.

The new countries shall transpose in their national legislation system the EU Directives in order to harmonize them. In fact nowadays in Europe we have one market characterized by free exchange of goods and services.

In the construction field, the Directive 92/57/EEC "on the implementation of minimum safety and health requirements at temporary or mobile construction sites" is the main directive and it has introduced an innovative approach regarding OH&S management, a new professional subject (safety and health coordinator) and new responsibilities of the subjects involved.

Method:

The paper will focus on the importance of the cooperation between "old" and "new" countries.

In fact the historic countries could share their:

- a) knowledge and expertise
- b) methodologies, procedures and tools
- c) lessons learned
- d) cases study

The new countries have to deal with:

- e) the integration between European and national legislation
- f) the comprehension of the new approach
- g) the training both of the new professional subjects and of clients, designers and contractors

The exchange of expertise and information related to OH&S is a big value which could be done at different levels (national, regional, working categories and groups) and in different ways (seminars, publications, internet, etc).

Conclusions:

The paper will highlight how OH&S matters and in particular safety and health coordination activity (92/57/EEC) could benefit from the exchange of expertise and information among Europe.

Keywords:

Directive 92/57/EEC, innovative approach, OH&S training and information; exchange of expertise and information.

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[SC04-05]

Zero Electric Accident in the Construction Industry: A Possible Objective - Report of a Successful Strategy

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The work deals with an action developed in João Pessoa city, located in the Northeast of Brazil, with the aim of reducing, in the Construction, the high incidence of labor accident caused by electric shock, something which, in the years 2003 and 2004, reached 60% of the total of deaths in the sector. Identified as basic causes of the problem, the improvisation and the lack of planning started to be fought through the demand for the carrying out of a project of electric installations in the constructions by means of: a) Labor Inspection in their supervisions; b) the local energy dealer, as a requirement for attending the requests for connecting energy to start the work. This strategy was conceived by the Regional Permanent Committee About Conditions and Labor Environment in the Industry of Construction in Paraíba (CPR/PB) – which comprises 19 workers' organizations, entrepreneurs and the Government. The work started late in 2004, and presents as main results: a) the formal exigency of an electric project in 100% of new or inspected works; b) the non-occurrence, in the Construction, since 2005, of fatal accidents caused by electric shocks, with the corresponding diminution of 60% of deaths in the sector, overcoming the goal established by ILO, in 2006, for the countries in the Americas and the Caribbean – a reduction of 20% of the accidents in a period of 10 years. We can affirm that the reported action: a) due to its simple format presents a great potential of being refuted in the various regions of Brazil and other Latin-American countries; b) induces the cultural change translated by the move from the practice of improvisation to the planning and effective management of occupational safety; c) confirms the idea that an articulated inter-institutional work multiplies efforts and makes results possible.

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**[SC04-06]
Musculoskeletal Symptoms of Ironworkers in Highway Construction: Implications for Ergonomic Assessments**

Sang Choi

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For years the U.S. construction industry has been associated with increased rates of work-related musculoskeletal disorders (WMSDs). This study is to investigate the potential risks of WMSDs for the type of activities that the ironworkers encounter on a daily basis in highway construction. Eleven right-handed male field workers participated in this study. The ergonomic

assessment tools included BodyMap instrument for measuring potential ergonomic concerns, and handgrip dynamometer for measuring the maximum voluntary contraction (MVC) and applied grip force of the rebar-tying tasks. Results from the BodyMap indicated that the mid-to-lower back and right hand/wrist for deck tying task recorded greater frequency and discomfort levels. For pier tying, the BodyMap recorded the right shoulder clearly stood out in terms of the perception of the frequency and discomfort level. Furthermore, the current deck rebar-tying operation comprised excessive applied grip forces & awkward body postures, and this could result in damage and fatigue in the upper extremities and back of the workers. This study suggests that there is a significant risk of injury and musculoskeletal disorders of ironworkers performing these designated tasks. By properly using the ergonomic assessment techniques, valuable information on work design and hand tool selection may assist in the early intervention of work related musculoskeletal disorders.

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[SC05] Psychosocial Factors

June 30, 12:15 - 13:15
Room: 321, COEX

Moderator:
Kyung-Yong Rhee
KOSHA

**[SC05-01]
Environmental Stressors in the Iron and Steel Industry. Current Status and Future Plan of Industrial Hygiene Surveys in the Visakhapatnam Steel Plant**

Prabhakara Murty Potharaju

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Environmental stressors in the iron and steel industry are large in number and typically they include, noise, vibration, extreme temperatures, ionizing and non-ionizing radiation, inadequate illumination, inhalable agents (vapors, gases,



dusts and fumes), exposure to pathogens (e.g. legionella), exposure to carbon monoxide (CO) gas, skin contact with chemicals (allergens, irritants & sensitizers), working in confined spaces, ergonomic hazards, exposure to asbestos, slips, trips, falls from height and same level, falling objects, electric shock, burns related to electrical and accidental contact with hot molten metal, inadequate ventilation, unguarded machinery, fire and explosion, workplace violence, odor pollution, inadequately trained health and safety professionals, lack of effective supervision on usage of personal protective equipment (PPE), manual handling and repetitive work, inadequate emergency rescue facilities, inadequate occupational safety and health training and lack of effective communication and coordination among the various professional groups. Forethought in identification of leading and lagging indicators by an occupational health and safety (OHS) professionals will lead to better performance and sustenance of good work practices. Risk management at the working environment is a challenge to frontline manager, health and safety professionals in an organization. Teamwork, cooperation, coordination, trust and openness among various professional groups, effective communication on risk control methods implemented at workplace are the assets to an organization working to improve workplace risk management. The struggle for reducing and controlling risk needs comprehensive hazard identification, risk assessment, risk communication and risk management. Industrial hygiene surveys conducted during the period 1996-2007 in the Visakhapatnam steel plant is summarized and future plans are discussed. This proactive study has enabled to identify the possible workplace hazards and scope for improvement in risk assessment and risk control measures at working environment. Safe and decent work is the ultimate goal for risk assessors in the Visakhapatnam steel plant.

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[SC05-02]

Assessment of the Psychosocial Environment in Different Romanian Work Fields Using the Romanian Version of the Copenhagen Psychosocial Questionnaire

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The psychosocial work environment is generally considered to be one of the most important work environment issues in contemporary and future societies. A tool for the assessment of the psychosocial work environment – The Copenhagen Psychosocial Questionnaire (COPSOQ) – was adapted and validated in Romania, in order to develop a standardized method to be used in research of the psychosocial factors.

Objectives: [1]. to adapt and validate the Romanian version of the COPSOQ. [2]. to assess the work environment in different work fields in Romania.

Methods: The adaptation process was based on the translation and back translation method. A group of 30 subjects were involved in the pilot study, in order to verify the comprehensibility of the translated terms and the acceptability level of the questionnaire. Therefore, a representative population based survey of the employed population in different Romanian work fields was developed. The psychosocial risk factors and stress symptoms were assessed.

Results: The Romanian version of the COPSOQ “CCEFPs” is equivalent to the original English version, with good validity, reliability and concordance between the two versions.

The assessment of the work environment emphasized medium and high psychological demands for all investigated occupational categories. The health profile is good for all the occupational categories and stress level appeared to be low.

Conclusions: The COPSOQ gives a comprehensive and multi-faceted picture of the work environment in different Romanian work fields. Regarding the psychosocial environment, this seems to be better for the white-collar employees. the emotional demands seem to be apparently professional specific, but studying the enterprise specificity and inter-organizations researches are important.

Keywords: *psychosocial work environment, assessment methods, stress.*

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[SC05-03]

Fatal Cases Resulting from Work-Related Accidents in Brazil: An Overview

Celso Salim

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Objective: The purpose of this study is to analyze the trends and differentials of fatal cases resulting from work-

related accidents in Brazil from 1990 to 2006. For all that, the present work comprises two related aspects of a question: a critical appraisal of the official registers of mortality from work, and the arrangement of some proposals orientated to an intervention for this matter of great concern.

Methodology: At first, it aims to analyze the figures as well as the variability in the profiles of death at work from the 1990's to the beginning of this century according to the official information that cover the whole relation correspondent to health, labor and social security in Brazil. Thereafter, besides some difficulties in qualifying round fatal occupational accidents among the set of external causes of mortality, profiles of them are made according to the three class categorization of the violence at the workplace: 'workplace accidents', 'transport accidents' and 'working illnesses'.

Results: Some proposals are suggested to improve both effective identification and new characterization of mortality in the workplace entirely as a condition to overcome the risk of major violence against the worker. That way mortality resulting from accidents in the informal labor market is considered as well as some hypothesis to overcome this serious obstacle and to get effectiveness in injury prevention and safety promotion policies.

Conclusions: By reason of the emergency of high social and economic costs involving work accidents in Brazil, this study searches to provide input for the comprehension of this issue as well as for the government to draw specific policies orientated to minimize the violence of the fatal risks in the workplace.

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[SC05-04] Unemployment and Its Adverse Effect on Health Status in China

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In China there are only few studies concerning the effect of unemployment on the health status, and all relevant research has been carried out in social sciences or psychology, not in medicine. There is some research available concerning mental health of unemployed persons based on questionnaires, such as SCL-90 or others.

According to the results, the prevalence of mental health problems among unemployed persons varies from 5% to 70%. The self-respect decreases dramatically due to unemployment. However, age has a considerable impact on the influence of unemployment. Some factors modify the change of mental health status caused by unemployment. Unemployed persons in the age group 35-44 are more sensitive than those in other age groups. The results indicate that the job loss itself causes the strongest negative impact on mental health. If the job search turns out to be unsuccessful, the mental health status worsens again. Social support, in particular family support is an effective measure against the negative impact of unemployment on mental health. The mental health of the unemployed persons with such support was only slightly affected. Besides helping unemployed people to find new jobs, we should put more attention to their mental and physical health status when they remain in the situation of unemployment for a longer duration.

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[SC05-05] Alternative Pathway of Impact of Work-Related Stress on Worker's Health

Kyung-Yong Rhee

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This study examined the alternative pathway of the impact of work-related stress to worker's health. Work-related stress is one of the psycho-social factors of ill-health among workers in workplace. There are various work-related stressors in the workplace for example physical factors, psycho-social factors, etc. Work demand and decision latitude is the most important factors of work-related stress as psycho-social factors of worker's health. But it is very difficult to identify the mechanism of the impact of work-related stress to worker's health as unilateral pathway through the damage of the endocrine systems. This study identified another pathway of stress effect on health by unhealthy behavior such as drinking and smoking. Worker's health is influenced by unhealthy behavior due to work-related stress controlled by other ill-health factors. Finally work-related stress have two different pathways of effect on worker's health; one is the physiological damage, and the other is the behavioral change.

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[SC05-06]

Urban Lighting and Security: The Artificial Light in the Nocturnal City

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As we understand cities as built environments that should promote safe movement for twenty four hours per day, we can't deny the role of artificial lighting in the accessibility of public spaces at night time. Deficient urban lighting directly affects the conditions for walking at night and makes the pedestrians the main victims of the "blackout". In conditions of low luminosity, the visual driving distance to see a person, brake and stop the car before running someone over is reduced by 30%. It is the good quality of illumination that will promote the visualization of passers-by when crossing the streets and also the detection of pavement conditions. When reduced, precarious or nonexistent; urban lighting increases the risks of walking by obscuring the space of relative factors such as holes, culverts, unevennesses, amongst others; inhibiting or hindering the visualization of pedestrians, cyclists and drivers. Regarding crime, urban lighting, when quantitative and qualitatively projected, can be a powerful tool to mitigate the committing of offences in public spaces, thereby inserting itself in the public security politics of the urban centers for the prevention of crime. The objective of this paper is to explore the correlation between security and the placement of urban lighting, comparing them with the attributes of projects of public illumination that incorporate procedures to make the environment's lighting accessible as they relate to the necessities of security and comfort. In this way, a brief history of the illumination of public spaces up until the recent management plans of urban illumination is presented as an overview of the urbanistic and lighting project trends towards safe movement. Finally, some policies and politics of urban illumination are presented, being directed towards the creation of a friendlier city for the pedestrian and, therefore, more insurance.

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[SC06] New Technologies on Safety and Health

June 30, 12:15 - 13:15
Room: 330, COEX

Moderator:

Maria Petrou
ANSTO, Australia

[SC06-01]

Development of a Model Regarding a National Information Network in the Field of Occupational Health and Safety in Romania: National Campaign «Partnership For Employees' Health»

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Introduction

Within the Phare Project RO 2003/005-551.04.07: "Improvement of the efficiency of the Romanian system for OH surveillance and control of occupational diseases, work-related diseases and injuries due to occupational risk", one component was focus on information and communication activities.

Objectives of the Campaign

Evaluation of the current situation regarding the information activities in the field of occupational health and safety;

Development of a model regarding a national information network.

Target Group

The target group of the national campaign was made up of representatives of: public institutions, employers' associations, trade union organisations, employers.

These representatives were later grouped in 2 types of beneficiaries:

Direct beneficiaries – participants to regional conferences

Indirect beneficiaries – the 2225 enterprises that received information packages.

Description of the Conferences

Six regional conferences were organised, everyone had a different discussion topic (the target group was the same):

Chemical agents at workplace: prevention and good practices for information and communication (Bucharest);



Occupational risk factors with impact on the respiratory system (Cluj);

Working at heights: prevention of the occupational risk (Iasi);

Communication of the Occupational Risk (Sibiu);

Physical hazards- risks that can be reduced: prevention and good practices (Timisoara);

Noise as an occupational risk factor (Tg. Mures).

Press conferences were organised within the regional conferences in order to raise public awareness regarding the messages.

The promotional materials used during the campaign were: posters, leaflets, fact-sheets with specific topics.

Results

Establishing alliances for local partnership in the field of OHS in order to create healthy workplaces for healthy and efficient workers.

Raising the level of information of active institutions.

Promoting the role of occupational physicians within a modern occupational health and safety system.

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[SC06-02]

New Complementary Methods for Prevention and Treatment of ARDs (Asbestos-Related Diseases) & Other Occupational Diseases

Joy Manglani

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Problem: Occupational diseases eg. those related to Asbestos (including its remediation) are usually progressive & diagnosed late, when available treatments are found ineffective. There are no known good solutions.

Solution proposed is fundamentally novel and is being further developed eg. to counter ARDs and Silicosis etc.. The solution includes;

1. Industrial Hygiene;

- a. Deriving new hygiene standards of the environment at work site and outside eg. by adding certain vital parameters currently being neglected and thereby causing severe diseases.
- b. Accordingly developing and adopting new "safework" technologies which should also be suitable for;
 - i. Economy
 - ii. Ecology

2. Early Diagnosis:

- a. New monitoring techniques .
- b. Accordingly new enhanced health and health monitoring standards.

3. Early non-invasive Treatment: Promoting the conception, development and adoption of new complimentary health enhancing systems using certain novel applications of bio-techniques to meet the above requirements.

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[SC06-03]

A Study on the Special Analysis of Injuries of Low Falls and the Development of the Safety Devices

In Yong Song, Se Gyun Jeong, Bo Hyuk Ryu, Woon Chul Shin, Sang Won Choi, Hyung Seok Kim, Choong Lyul Lee

KOSHA, Korea

In 2006, according to the analysis of injuries of falls, low falls¹⁾ occupied 70.5 % of falls that the number of injuries due to low falls occurred 8,238.

This study is to analyze the characteristics of low falls, and to confirm the relevance between consciousness for the safety and unsafe behavior of workers by survey.

Also from the viewpoint of worker's safety, we developed the safe and useful safety helmet, safety belts and worktables so as to prevent injuries from low falls.

1) Low falls mean that injuries due to falls occur under 3 meters in height of workplace, it is defined based on the height of one floor (approximately 3 meters) of buildings generally.

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[SC06-04]

Development of Slip and Trip Assessing Robot System

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A prototype portable slipperiness test device, lab-base test equipment and robot system for whole workplace, designed for such routine testing and evaluate flooring and outsole



materials, have been described and are preliminarily evaluated in this study. The prototypes are capable of measuring such frictional properties of floor surfaces, outsole materials using three different test devices and one modes of operation, dynamic loading. A previously developed portable slip meter is used as starting point for designing a slipperiness assessing robot system. A portable slipperiness test device, consisting of digital indicator, sensor unit, weight, fiber optical sensor and servo motor systems, is introduced as assessment equipment for slipperiness hazard. Lastly, we develop automatic slip and trip hazard assessing equipment which is consist of a high precision linear strain gauge, ultra mobile personal computer, slip measuring sensor, 2-D laser scanner, ultra sonic sensor, indoor GPS system, motor driving system and blue-tooth telecommunication system. It measures the dynamic coefficient of friction (DCOF) of a whole workplace. This robot system can be adjusted to modify its driving modes while maintaining a constant 0.2 m/s forward speed.

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[SC06-05] An Improvement of Welding Method for Corrugated Stainless Steel Tubing(CSST)

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The Corrugated Stainless Steel Tubing, CSST, for the fuel gas piping system can be installed easily and quickly, and it is constructed under the ceiling and the wall. It has a good flexibility and installation instead of iron pipe. However, the quality of CSST is determined to depend on the stainless steel tubing welding skill. In this study, it was tested by controlling jet point of Ar as inert and cooling gas and compared the bead state of welding point and the performance. As a result, it has the best condition when the jet point of Ar is located behind 5 mm ~ 10 mm of the welding point.

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[SC07] Electrical Safety

June 30, 12:15 - 13:15
Room: 334, COEX

Moderator:

Bo-Hyuk Ryu
KOSHA

[SC07-01] To Relentless Pursue the Paths to Zero

Ted Vandevs

Electrical & Utilities Safety Association, Canada

Electrical & Utilities Safety Association in Ontario, Canada has approximately 1000 member companies comprising 77,000 electrical and telecommunications workers. In 2000 the Board of Directors had the courage to declare the Association and its members were going to *Relentlessly Pursue the Paths to Zero* and reach zero by 2011.

Back in 2000 the membership consisted of 23,000 member employees, and since that time has grown three times in size to 77,000 employees while the number of lost-time injuries has dropped from 950 to 385 in 2007. Some of the reason for the drop is attributed to the increased volume and alignment of legal, financial and social motivators, however it is felt the most significant reason for the drop in injuries at the same time as a huge increase in membership is by having a vision of zero injuries and developing interventions such as ZeroQuest® to drive injuries down.

This presentation will discuss the paths Electrical & Utilities Safety Association has taken toward zero injuries and the progress the industry has made thus far. 2011 is only three years away and the Association and its members are on track toward zero. Come and hear how we are doing it.

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[SC07-02] Managing Occupational Risks Caused by Electromagnetic Radiation from Mobile Phone Base Stations



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Occupational exposure to electromagnetic radiation (EMR) transmitted by mobile phone base stations (MPBS) is a complex subject and arouses political, social, economic and scientific incompatibilities.

In current scientific studies thermal health effects are only evidenced in short-term exposures to high levels of EMR. However, there is no conformity regarding the non-thermal adverse effects, which result from long-term exposure to low levels of EMR.

Due to these scientific uncertainties special thought should be given to workers' continuous exposure to high levels of EMR in MPBS near-fields regions.

Challenges concerning occupational exposure to EMR at workplace include, among others, initiatives on risk management. An example of this is the establishment of the European Directive 40 in 2004, which delegates to the employers the responsibility of adopting preventive risk control measures.

Another example is the Brazilian Regulation 09 (NR 9) established by the Ministry of Labor and Employment in 1994, named "Programa de Prevenção de Riscos Ambientais"- PPRRA (Environmental Risks Prevention Program), which force employers to implement actions to identify, measure and control environmental risks, including non-ionizing radiations, at workplace.

This study aims at presenting a qualitative research concerning management of occupational EMR risks, held in Brazil in 2007 at a big telecommunication company. At the same time it is a critical analysis on both the EU 40 and the NR 9.

The Brazilian research concluded that the company did not consider EMR as an occupational risk, did not have proper evaluation strategies, nor control measures at the MPBS.

The comparison between the two regulations, EU 40 and NR 09, shows that both lack clear technical recommendations to guide the telecommunication companies on managing occupational risks caused by EMR coming from MPBS.

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[SC07-03]

Introduction of the Correct Use of Lockout Tagout in Brazil

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Lockout Tagout is a safety tool regulated by OSHA 1910.147 (U.S.A.). In Brazil its use is only recommend and it is not normalized by Brazil's Work Department. Most of times it is used only as an assist tool and is partially used, reducing its effectiveness considerably.

The safety and health legislation in Brazil is regulated by a labor law (CLT) with specialized rules ("NR") that details most of the formal work, and is nowadays divided into thirty-three different rules.

The goal of this paper is to suggest specific legislation for energy isolation systems that includes methodologies to provide safe work, following the example of the recently published specific rule for confined spaces (NR33).

The working methods with zero energy started with the edition of the specific rule for work in electricity (NR10), despite Brazilian standard regulations.

This represented an advance for work in electricity, however it caused confusion in other applications where maintenance services are not executed and also in tasks where other energy manifestations are present.

It is necessary to establish a specific rule to standardize work with "lockout tagout" in the whole Brazilian territory in order to avoid damages to the health. It must also provide equipment and facilities where zero energy can be effectively executed.

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[SC07-04]

Application of a Systematic Approach for the Design of Electrical Motors Type of Protection Flameproof Enclosure

Ha-Dong Kim

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An electrical equipment of equipment group II of category 2 for use in potentially explosive atmospheres must follow an EC-type examination procedure, according to which a notified body must certify that the equipment fulfils the requirements of the directive 94/9/EC of the European Parliament. In spite of the long tradition of the flameproof design, the design is mainly based on empirical knowledge and the basic concept of the design has not changed. A test item for electrical motors type of protection flameproof enclosure which does often not fulfil the requirements according to the standards IEC 60079-1 is the flame propagation test. Almost all of the failures occur due to



flame transmission through the cylindrical joint between motor shaft and bearing shield, although manufacturers fulfil the requirements concerning width of joint and gap between motor shaft and bearing shield according to international standard IEC 60079-1. Using first a systematic approach for design of electrical motors type of protection “d” IIC is useful for solving the current problem. Throughout the whole process of a product development cycle as a systematic approach it is possible to find proper methods which use a flame stop cage or a flame stop blocker. Especially, a “market survey” and a “requirement list” which are essential parts of a systematic approach can help to concrete an idea. The concurrent engineering is preferred at the development stage. This dissertation scrutinized using a flame stop cage or/and a flame stop blocker against flame transmission. This investigation includes reviewing technologies and applications. Based on the gained knowledge by the investigation, a general design methodology employing the two ideas mentioned was proposed.

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[SC07-05] Methods of Reducing Electromagnetic Susceptibility Applied to Industrial Apparatus

Jeong-Jae Hong

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The use of electronic circuit for industrial machinery makes it necessary for diverse circuit to operate in proximity. Therefore all these circuits affect each other adversely. Recently, as the control circuits of industrial machinery have become smaller and more sophisticated, these circuits are being crowded into small space. Thus the occurrence of industrial accident is increasing because of malfunction of the control circuit composed of electronic components into industrial machinery, in addition electromagnetic interference(EMI) has become a major problem for equipment designers, and it is likely to become severe in the future more and more.

Unfortunately, it has not prepared the regulation of electromagnetic immunity for industrial machinery, which is very huge in Korea until now. The results of Electromagnetic susceptibility tested at KOSHA show the reason that the regulation and test of Electromagnetic immunity for industrial devices is essential.

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[SC08] Social Security

June 30, 12:15 - 13:15
Room: 336, COEX

Moderator:

Chitaranjan Saran

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[SC08-01] Ampliation of the Health Services in the Brazilian Companies

Marcelo Tacitano, Lie Liung

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The Specialised Services on Safety and Health at Work (SESMT) are organised by the companies to promote the worker's health and integrity. Such services were launched in Brazil in 1972 due to the pressure of the ILO and some international financial organisms in function of the Brazilian high number of occupational accidents. In 1991, Brazil ratified the Convention 161–Occupational Health Services. The composition of the SESMT in Brazil depends on the economical activity (risk degree) and the number of workers in a company. According to the norm can be part of this service, vocational and graduated professionals. Due to the SESMT rules, it takes place in just about 1.5% of the companies, although it is know that they employ about 35% of the formal country's workforce. However, the other companies (the major part) are not provided with the services, therefore their commitments with Safety and Health at Work (SHW) need to be done by outsourcing professionals, whose quality control is difficult.

The aim of this paper is to show the difficulties and limitations that SESMT faces, to present some statistics of the registrations of these services in the Ministry of Labour and Employment, and also the alterations that have been proposed to improve the text of the current norm. In this sense, it was recently published the Ordinance n° 17/2007, that seeks to enlarge the covering and to turn the services more effective, with the possibility of inclusion of the outsource companies and also the definition of SESMT for a group of companies of the same economical activity at the same district. However, due to the lack of clear



procedures in the new Ordinance, some professionals are claiming that the situation is going to get worse instead of better. It is known that several other alterations are coming up.

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[SC08-02] To Prevent or To Insure

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There is an ongoing discussion on how much prevention should be done by insurance companies dealing with occupational accidents and diseases. In this paper we present different answers to this question.

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[SC08-03] Mutual Aid Response Group (MARG)

Jayendra Motghare, Vijay More, Suresh Karande

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1. Concept

- The concept of mutual understanding, triggered the idea of mutual aid response group - MARG.
- The concept of mutual aid response group – MARG, first time originated in Chembur industrial area of Mumbai, capital of Maharashtra state, in the year 1980.
- A legal understanding between Government undertakings M/s. Bharat Petroleum Corporation Limited and M/s. Hindustan Petroleum Corporation Limited to render help to each other in case of emergency.
- This understanding first time came in operation in the year 1980 and proved very useful in case of handling emergencies.
- It is a voluntary initiative among the neighbouring units in the industrial pocket.

2. Objective

- The objective this group is to tackle the emergencies in industries to minimize loss to human life and Properties.

- To utilize each others resources in mitigation operation.
- Preparation of green book containing information and resources available with factories. Such as Name of the Expert, available resources (PPE) etc.,
- Prevention of accidents by safety motivation activities such as awareness campaign, seminar, training, display of hoardings on highways etc.,
- To assist Government agencies in case of Off-site Emergency.

3. Achievements

- This group is actively involved in preventing accidents and handling emergencies.
- The group is organises safety related training program for police authority, fire brigade, revenue officials, managers, supervisors, workers, tanker-truck drivers and awareness programs for neighbouring society.
- This group is handling emergencies even on the highways / roads & godowns.
- 15 groups of MARG are operational in the state of Maharashtra, India.

4. Recognition

- The success of MARG in preventing accidents & handling emergencies has been recognized by the National Disaster Management Authority, Government of India, and included above scheme in their guidelines for chemical disasters in their issue in April 2007.

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[SC08-04] Integrated Preventive Care: Improving the Cooperation between Occupational Health Management and the Preventive, Curative and Rehabilitative Measures Taken by Patients' Local Physicians Using a Regionally Integrated Care Model

Holger Pfaff, Christoph Kowalski, Anne Brinkmann

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Background:

In Germany, preventive care provided within the occupational setting is largely unlinked to the preventive, curative and rehabilitative care provided by general practitioners and rehabilitation hospitals. Cooperation



between the different physicians and hospitals is poor and models of regional collaboration are rare. This lack of integrated care affects both the individual health of the workers as well as the insurance system.

Objectives of the project:

The first objective of the project is to develop prevention-oriented, indication-specific health pathways for reducing morbidity and increasing the effectiveness and efficiency of care. Special attention is paid to illnesses that are of particular sociomedical relevance. The second objective is to establish precise and stable cooperation between occupational health management and the preventive, curative and rehabilitative care provided by patients' local physicians.

Method:

In the first step of the project, we developed an ideal model based on substantial qualitative surveys of different participants (general practitioners, occupational physicians, patients, health insurance companies, etc.) conducted using various methods (guided interviews, group discussions with experts, the Delphi technique) and on the results of literature research in order to identify best practice both in Germany and abroad. This model will optimize the integration of preventive care. In a second step, this ideal model was then developed into a reality-adapted model, taking the existing regulatory framework into account.

Results and implementation:

The prevention and treatment pathways developed in this project serve as a basis for an integrated care contract. These pathways describe the interaction between the company and the health care system outside of the company. Prevention and treatment pathways are defined in this project using trigger criteria. The pathway describes the steps to be taken in an ideal typical treatment process. It is intended to implement the integrated preventive care model within large-scale German companies.

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[SC08-05]

The Insertion of the Health and Safety at Work in the Social Responsibility in the Brazilian Enterprises

Lie Liung, Marcelo Tacitano

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The Social Responsibility appeared at some European countries in the 1970's, such as France and United Kingdom, through the call "Social Accountability" that, little

by little, would globally be adopted due to the growth of the communication and power of the press.

In Brazil, with the end of the military regime and of political repression, the exercise of the citizenship, until then repressed, wins a great jump through the organized civil society that starts to act actively in the promotion of social politics, among them a great number of non-governmental organizations.

The private companies have as common attributes the generation of jobs, the payment of taxes, the production of goods and services that the society needs and the last but not the least the maximization of the profit. However, starting from 1990's, with the globalisation process, the companies begin to notice that the world is becoming a great village, that it is a product of that village and, therefore, it cannot stop considering the society in their relationships and in their plans mainly in yours neighbourhoods. The respect and the help for society in which is inserted is basic obligations that the company should achieved.

The Social Responsibility is an emerging field in continuous development being the objective of this work to show the Brazilian model of the social balance, standing out that it has as differential the inclusion of the racial issue, besides the progress of the small, medium and big companies in ethics subjects, sustainability, transparency, "sweet spot", and mainly, the synergy in the work to generate a health and safety environment to the workers. It is also pointed out that there are companies in Brazil that have adhered to the Global Compact about the Social Responsibility of the UN.

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[SC09] General Safety

June 30, 12:15 - 13:15
Room: 402, COEX

Moderator:

Antonio Terracina
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[SC09-01] Information and Communication Strategies in Prevention

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Crucial points of successful occupational safety (OSH) work are effective and efficient information and communication. When developing OSH strategies it is essential to include an integrated information and communication strategy. All relevant OSH information such as regulations, guidelines, recommendations, good practice examples etc. have to be transferred to the enterprise level. Communication and information networks should be established. Due to these information and communication needs in OSH in the first step it is indicated to take stock in order to assess the current situation on the existing communication and information systems and data. Consequentially necessary improvements can be identified and deduced. Following this systematic approach the information flow from OSH institutions to public in general and among the OSH institutions, and their functions and role in the communication and information system should be assessed in detail. In this presentation the major elements of the new Latvian OSH strategy which was developed in the framework of an EU financed PHARE assistance project are presented as an example.

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[SC09-03] New Challenges and Opportunities for Occupational Safety and Health: From the Perspective of a Developing Country and Lessons for the World

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With both the rising population and rising unemployment, with a majority of unskilled workforce, the norm is to compromise safety and health.

With limited national budgets for labour, hence limited resources for even basic safety and health interventions, epidemics such as the recent Ebola outbreak in western

Uganda and natural occurrences such as floods in eastern Uganda, which claimed lives and also of those at the fore front of saving lives of others, offer opportunity to indirectly address occupational safety and health concerns in the wave of national emergency.

Further, for those countries like Uganda in the Commonwealth, hosting acclaimed events such as the recently concluded Commonwealth Heads of Government Meeting in Uganda, presents enormous opportunity to address safety and health issues on most fronts.

Therefore, in situations of purported limited resources, the unfortunate occurrences of epidemics and disasters and the excitement of hosting major events, provides opportunity to find resources for occupational safety and health without questioning and use is made of the existing institutions with conscious participation of all

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[SC09-04] Economic Incentives: Are We Doing the Right Thing?

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Workers' Compensation Systems (WCS) have sought different solutions to the question of how economic incentives can effectively achieve two key objectives that is, guaranteeing financial stability for the insurance dynamics, and promoting prevention. This session will present the results of an analysis of ten different WCS across the world and highlight the important elements in designing and implementing pricing systems and economic incentives. This presentation will also reflect on the "divorce" of economic incentives with financing, prevention and compensation of occupational accidents and diseases.

It could be concluded that an ideal economic incentive model should include, in addition to the aspects that will be discussed, two different scenarios: a short-term and a long-term one.

The short-term scenario would include most events arising from occupational accidents and some short-latency occupational diseases, while the long-term one would include long-latency occupational diseases.

The long-term scenario should be exempt of discounts, because their calculation would be technically inadequate and would require other supplementary measures, outside the insurance premium, to encourage prevention.

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**[SC09-05]
The Pattern of Personality among Manufacturing Workers Experienced Accident**

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OBJECTIVE: Identify the psychological disorders of the workers who experienced accident and others related factors, and its association with the accident frequency.

METHODS: The cross sectional design using self completed questionnaire of Minnesota Multiphasic Personality Inventory-2 (MMPI-2) and individual characteristic data were applied to the 111 workers who have experienced accident. The frequency of accident was obtained from the medical record of the factory clinic. The data was analyzed to look at the personality pattern, the characteristic of the study subjects and its association with the frequency of accident.

RESULTS: The majority of the study subjects (63.1%) have experienced more than one accident and 36.9% of the subjects have experienced accident for the first time. The MMPI-2 test shows that there were seven psychological disorders which their prevalence more than 50% found among the study subjects. These consisting ego weakness (66.7%), feminine (62.2%), anxiety (54.1%), dependent (54.1%), obsessive compulsive (52.3%), family problem (51.4%), and low self esteem (50.5%). The cross tabulation analysis shows that some variables are the risk factors of more than one experienced accidents including over controlled personality (OR=5.9; 95%CI=0.72 – 48.39), male (OR=2.56; 95%CI=1.08 – 6.04), the service up to 5 years length (OR=2.7; 95% CI=1.20 – 6.30), and the age of the study subjects who were more than 30 years old (OR=4.0; 95%CI=1.39 – 11.49).

The result of logistic regression shows that only variable of the study subjects' age as the determining factor of more than one experienced accidents (OR=3.40; 95%CI=0.96 – 16.20)

CONCLUSIONS: Future research is needed to look at the association between the personality of workers and the frequency of accident, which involves more number of the study subjects and more type of job.

KEYWORDS; accident, workers, personality, MMPI-2.

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[SC10] General Safety

June 30, 12:15 - 13:15
Room: 403, COEX

Moderator:

Elaine Posluns
IAPA, Canada

**[SC10-01]
Central Recording of H&S Management - A New Tool for the Systematic Supervision of Facilities as well as for Motivation and Information**

Torsten Kunz, Sabine Menne

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Supervision services tend to have a capacity problem: as they are responsible for a large number of facilities, on-site inspections can only be conducted at long intervals. Such supervision is limited in its ability to reduce accident figures throughout their area of responsibility.

Wanting to achieve a clear area-wide reduction of accident figures, Unfallkasse Hessen (the public service accident insurers for the German state of Hesse) has developed a computerised system whereby details of health and safety at the various facilities are recorded centrally at annual intervals via questionnaires completed by each facility. As each of the 38 questions comes with information for executives on the technical and legal background of those questions, the procedure also serves to provide information for decision makers. The questionnaires are signed by senior management.

The results of the survey are entered into a database, whereupon they are electronically analysed and are then translated into a traffic light colour scheme that reflects the general quality of organisation. Each facility is sent a letter in response to completing the questionnaire, specifying their classification, accident figures, shortcomings and recommended remedies. Implementation of these



recommendations is monitored, so that some supervisory pressure is created which is largely automatic, while ensuring that the decision makers receive information and are motivated to address the relevant issues.

Supervisors are notified of the results at the facilities under their care. They become active if specific requirements are not implemented or if a facility is particularly poorly organised and if it has high accident figures.

So far, a specially developed questionnaire has been in use for small to medium-sized facilities and is currently being adjusted for use at bigger facilities and schools.

The presentation provides information on the "central recording" system, on its tools, its workflow and on the results and their validation.

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**[SC10-02]
Improving Health and Safety for "Very-Small",
Small and Medium Enterprises (SME) in France:
Two Types of Efficient Tools**

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Due to their organization, small and medium enterprises meet some difficulties in integrating health and occupational safety in their practices. Regulatory treatments only apply to companies with more than 50 employees. Yet many "SME" have less than 50 employees. Our interventions have allowed us to implement two different tools that focus the debates on health and safety.

The Enterprise Club: based on the difficult subject of MSD, it gathers 12 companies from various sectors and sizes. Managers or safety agents represent these companies.

The joint commission for health, safety, and work conditions is composed of companies' managers and workers representatives. It deals with health and safety problems in its own specific fields, and is helped by experts to do so. Our intervention was focused on this subject and especially dealt with work hazards in the horse sector and was located in the region of "Orne" (Normandy, France).

These tools are interesting since they both gather decision-makers. Through the organised gatherings and exchanges with their colleagues, they have been able to discover other "good practices" implemented within other companies ? what kind of difficulties could be encountered while implementing a specific action, etc.). The knowledge

brought by lecturers during these gatherings allows to create and implement a common safety language and a common view of the subject involved. Meeting with workers (for one of the tools) contributes to enhance the dialogue between management and employees.

Based on the principle of a collective action, the enterprise Club and the joint commission for health, safety and work conditions generate the sharing and gathering of actions and, thus allowing to implement new actions which could not have been invented otherwise. At last, this sharing permits to set up a coherent action within the companies involved, in order to improve health and safety.

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**[SC10-03]
Risk Management in SMEs - Practical Guide and
Help in Internet**

Christian Schenk

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Workplace Assessment and Risk Management is one of the key demands in the Framework Directive for the Improvement of Safety and health at work designed by the European Union. In Austria this demand was met on legal basis by the "ArbeitnehmerInnenschutzgesetz – ASchG" (Law for the Protection of Workers at Work).

Every enterprise – down to one employee – has to identify and evaluate risks at work and take care for appropriate measures against those risks. This whole process of risk assessment has to be documented according legal regulation. In case of revision by Labour Inspectorate or in case of accident this documentation plays an essential role, rendering the OSH – policies of the enterprise.

Especially small enterprises do have problems transposing these legal requirements about risk management. For helping especially SMEs in this task AUVA worked out together with the social partners, approved by Labour Inspectorate, an internet platform (www.eval.at) designed to deliver an easily understandable and praxis oriented help for fulfilling legal demands.

Key point of the site are the so called "Grundevaluierungen" (basic documents), which are about 450 documents for typical machines, workplaces and activities. These documents deliver on the one hand a basis "check" – identification of hazards – and form on the other hand the basis of the enterprise's own documentation. Furthermore the site offers special (hazard oriented) checklists, an overview of the legal demands, special



documents for “noise” and “explosion”, a so called “Guided Tour” with general information and an encyclopaedia of about 500 notions related to safety and health at work.

The site is well known in Austrian enterprises and used as a standard reference for carrying out workplace assessment and documentation.

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[SC10-04]

The Correlation between Human Health and the Natural and Constructed Environment

Sonia Marino¹, **Maria Donisi**², **Renato Gurin**², **Marco Testasecca**¹

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On June 2007 WHO issued their first report on impacts of environmental conditions on human health, “Country profiles of the environmental burden of disease”. The report highlight that into WHO region Europe, up to 20% of deadly disease could be avoided intervening on environment.

Further papers demonstrated that, in highly technologically developed countries the air available in non industrial buildings (schools, offices, houses, etc.) is more polluted then the air outside and, adding to this that these are the places where population lives up to 90% of the time, this data highlight the importance and extension of the issue.

Pollution, outdoor and indoor, is the original cause of many pathologies and psycho physical sicknesses of human being; but human being and their activities have been demonstrated to be the main factors of the presence of the above mentioned polluting agents.

This paper extend the principles on which Ergonomic physic is based, which is mainly focused on the correct design of working emplacement and possible critical situation which non ideal microclimate condition may contribute to create in any given working place, ignoring issues concerning and deriving from a wrong design of the shell , both for human health and environmental equilibrium.

This study highlight, thanks to the cross check of data from various international studies, a strong connection existing between health and psycho physic well-being of human being and a salubrious environment, outdoor and indoor; but, also, the existence of a vicious circle where the outdoor environment degradation lead to buildings indoor pollution and non eco-sustainable buildings new erections worsen the outdoor environment.

The challenge for the future is to guard natural environment and to achieve buildings suitable for human being needs and demands and in harmony with natural environment.

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[SC10-05]

The Effects of the Organizational and Personal Characteristics on Occupational Safety

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Recent reviews of occupational safety and health literature emphasize the influence of organizational factors. Using the current studies on the relations of the organizational climate and the performance, this study attempted to develop the mechanism of the effect of the safety climate as the organizational characteristics, and the safety knowledge and safety motivation as the personal characteristics on safety performances such as safety behavior and occupational accidents. It replicated the safety climate - safety behavior model of Griffin and Neal(2000) to Korean workers, and expended the model to accidents. Griffin and Neal's model fitted well, and also provided the more appropriate model to Korean workers. In the expended model applied to total workers, the relations from safety behavior to accidents are not significant. But in the model applied to productive workers, which has higher risk level, it revealed a significant path. Because of the rareness of accident and the reverse effect of accident to safety behavior, the effects of safety behavior on accidents are low

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Speakers' Corner

[SC11] General Safety

July 1, 12:15 - 13:15
Room: 203, COEX

Moderator:

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[SC11-01]

The 30 Years of the Safety and Health at Work Legislation in Brazil - A New Glance

Lie Liung, Marcelo Tacitano

Ministry of Labour and Employment, Brazil

In 1978 the Brazilian government regulated the Act nº 6514/77 enacting the 28 ordinances about Safety and Health at Work that is, in spite of some alterations, until today almost the same, therefore a 30 year-old legacy.

Over these 30 years, deep innovations were introduced, mainly in the Constitution of 1988 that enlarged the initial steps of 1934.

Under political aspect, the approved labor laws represent a larger commitment with the social rights.

Under the social prism, it gave answers for most of the relative claims like improving life conditions, health protection and so on.

Under juridical prism, it was constituted in a model that admits the collective autonomy, stimulating the union freedom, the self-organization of the associations and the collective negotiation.

Hence, with the coming of the Constitution of 1988, although in an subtle way, the workers and the entrepreneurs begin becoming aware and prepared about subjects related with the Safety and Health at Work.

In the 1990's, aiming the improvement of the environmental conditions at work, the Ministry of Labour and Employment (MTE) introduced the tripartite system, legitimating actions of Protection to the Work.

The evolutionary stages of the work, specially the Safety and Health, mentioned previously, the commitment of the citizenship takes for this beginning of the XXI Century, to a new one glance, or a new stage known as the Protection of

the Worker's Rights Enlarged that will be the "life quality in the work".

The 30 years of the safety and health at work legislation in Brazil - a new glance seeks to synthesize the evolutionary stages of the Work in Brazil, its legislations, the statistical data of the occupational accidents and diseases and the unionization.

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[SC11-02]

Trend Analysis of Work-Related Disabilities in Insured Workers in Iran During 1996- 2005 and Its Economic Burden on Social Security Organization

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PROBLEM DEFINITION

Data demonstrate that occupational injuries cause thousands of fatalities in the different sectors of Iranian industries every year. They have major impact upon human integrity, but they also bring about high costs for a Social Security system.

OBJECTIVES

The aim of this study is to describe trend of work related disabilities over the course of time& its causes for setting priorities for improving safety standards. Meanwhile their total direct costs for Social Security were estimated.

METHOD

The trend analysis of occupational disability was studied retrospectively. A 10-year period was selected. Data were obtained from the bureau of statistics of Social Security and also from records of 35 medical commissions in 2006. The disability rates were analyzed despite its causes, by age, sex, work experience, economic activities.

RESULT

There were 43601 cases of disabilities over the period of study, 21.6% of them were work-related. Disabilities by age bracket is mainly in 35 to 40 years bracket and although males with 99% predominate. 22.8% of cases had up to one year experience. Metals and electrical machines industries were the most important economic activities in terms of work-related disabilities. Carelessness and over time working of workers and unsafe guarding of mechanical tools were the most significant cause of disability. The upper extremities injury were the most frequent description of bodily part injured. Besides of the

days lost and medical expenses, direct total costs for Social Security system per disability case, include an average of 180 million Rials as disability pension payment.

CONCLUSION

Work-related disability reporting is poor in Social Security System. By analyzing the rates of disability in the different sectors, appropriate targets and priorities for increased strategies to prevent fatal injuries can be suggested. Pre-employment medical examination of workers and comprehensive rehabilitation programs for disabled workers should be encouraged.

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[SC11-03]

Major Depression in Canada: Variations Across Occupations and Industries

Alain Marchand, Melissa Murray, Pierre Durand, Marcel Simard, Andree Demers, Marie-Eve Blanc, Elyse Picard

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This study examined the role of occupations and industries on the risk of major depression in the Canadian workforce. Data came from Cycle 2.1 of the Canadian Community Health Survey (CCHS) of Statistics Canada (2003) containing 32 279 workers nested in 139 occupations and 95 industries. The prevalence of major depression was estimated at 8% with point estimates of 5% for males and 10% for females. Adjusting for work conditions, family situation, social support outside the workplace, and personal characteristics, logistic regressions analyses revealed lower risk of major depression, compared to cashiers, for workers in the following nine occupations: managers and directors in public administration; protective services; construction and transportation; clerical supervisors; childcare and home support workers; other sales and related occupations; heavy equipment operators; trades helpers and labourers; machine operators and related workers in textile processing. Concerning industries, mining, oil and gas extraction workers were found at lower risk of major depression compared to workers in educational services, while higher risk of major depression was observed for workers in non-store retailers, information services and data processing services, rental and leasing services, and social assistance. The results also indicated that gender was not moderating the relationships. Overall, the study highlighted implications for actors and policymakers and identified potential targets for intervention in specific segments of the work market.

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[SC11-04]

Towards Advances in OSH for SME in Brazil: A Fundacentro Survey on Work Related Accidents and Illnesses in Three Industrial Branches

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Introduction: This paper aims to present and discuss the results of an unpublished survey carried out by FUNDACENTRO (Brazilian Institute for Occupational Safety and Health), with the support of SESI (Social Service of Industry), in the small and medium enterprises (SME) of three Brazilian industrial branches - furniture, footwear and clothing production, in order to promote better work environments. The research identified and measured the occurrence of work accidents and occupational illnesses, by way of fact gathering over a three years period from 2002 to 2004.

Methods: The research was carried out in the worker compensation branch of the National Institute for Social Security (INSS) and it was based on a thorough content analysis of the official work accident reports. The data were analyzed considering the characteristics of the accident and its consequences; the worker characteristics; and the size and the industrial branch of the enterprises.

Results: The data showed that the relative number of accidents was higher in the furniture-manufacturing branch, followed by the clothing and shoe industries. The furniture branch showed the higher relative number of typical accidents while the shoe industry showed the higher relative number of occupational illnesses and the clothing industry the higher relative number of transport accidents. Considering the size of the enterprises, it was observed the large and medium size enterprises, and not the micro-sized industries that were responsible for the relative majority of accidents.

Discussion and conclusions: As a whole, its results indicated that the general existing conditions in SME need to be improved for injury prevention and safety promotion in the face of the multitude of these enterprises distributed in the vast Brazilian territory. News paradigms are necessary for carrying out further research and for the development of a specific public policy for SMEs to achieve better performance on OHS.

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[SC11-05]

Activities of the Central Institute for Labour Protection - National Research Institute (CIOP-PIB) as the Polish National CIS Information Centre

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The Central Institute for Labour Protection-National Research Institute (CIOP-PIB), the OSH leading research institute in Poland, fulfils the role of the Polish National CIS Centre since 1960 - only one year after the creation of the International CIS Centre and the whole network. Taking part in the activities of the worldwide network of the institutions, acting as CIS Centres, gives a possibility to acquire the latest, valuable information on international developments, events and good practice in the field of OSH, as well as to disseminate information on national achievements in this area in other countries.

CIOP-PIB is a leading institution determining the scientific foundations for the Polish Government in the scope of shaping the OSH policy as well as designing solutions for healthy and safe working conditions. Among others the Institute is a coordinator and performer of multi-annual research projects.

The activities of CIOP-PIB are briefly described, as research and development determination of exposure limits; standardization in line with the requirements of European and international standards; testing and certification of machinery and manufacturing devices as well as personal and collective protective equipment; implementation and certification of OSH management systems; certification of the competence of personnel and educational bodies active in OSH; education and training, consultations, promotion and publishing. Library and information activities are also described, with the emphasis on CIS activities and on the cooperation with CIS Centres network, among others in the common elaboration of the international information sources (eg. CISDOC database, electronic newsletters, websites), thesauruses, exchange of documents and information. To promote OSH in the Polish and foreign societies the Polish National CIS Centre develops the website in Polish and English, prepares the database in English on Polish OSH literature, promotes in Poland documents and information acquired from CIS network, runs information activities for Polish and foreign users.

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[SC11-06]

The Korean Life Change Unit Model for Prevention on the Workers of Major Accident Area

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Behavior models have provided an accident proneness concept based on life change unit (LCU) factors. This paper describes development of the Korean Life Change Unit (KLCU) model for workers and managers to Korean major accident area, and to evaluate its application. This model is based on intensity analysis of stress caused by LCU factors from an eastern perspective. The result of the paper shows that the death of parents is the highest stress-giving factor to the employees. The next stress-giving factors are the death of spouse and the loved ones, followed by the death of close family members, the death of close friends, changes of family members' health, unemployment, and jail term. It turned out that these factors have a serious effect on industrial accidents and work-related diseases. The death of parents and close friends are ranked higher in KLCU model than in that of Western society. Crucial information for industrial accident prevention in real fields will be provided. Therefore, the provided information will be useful in the safety management program for accident prevention.

Key Words: Proneness Concept, LCU factors, Intensity Analysis, Industrial Accident Prevention, Safety Management Program

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[SC12] General Health

July 1, 12:15 - 13:15
Room: 208, COEX

Moderator:

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establishment of (at best quantified) targets of which the relevant indicators are planned to meet within the campaigning period. In this presentation major elements of the EU and the German OSH strategies are presented.

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[SC12-02] Challenges in Producing Criteria for Diagnosis of Occupational Diseases

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[SC12-01] Strategic Approaches in Occupational Safety and Health

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Due to the fast developing globalization there is a worldwide tendency to strengthen strategic approaches in occupational safety and health (OSH). On the global level this tendency is strongly enforced by strategic position papers of the International Labour Organisation (ILO - Promotional Framework for OSH) and the World Health Organisation (WHO - Global Plan of Action on Workers' Health 2008-2017). This is the same for regions of the world such as the European Union (EU) and its member states.

In order to become a success story these strategies should be on every level in major parts in line with all relevant policy fields such as health, labour market policy, demography intervention, corporate social responsibility etc. Nonetheless OSH strategies of course have to be adapted to the individual needs of national or regional societies and economies. For a sustainable success of these strategic approaches in OSH it is essential to implement all relevant stakeholders in order to reach the goal of safe and healthy workplaces all over the more and more globalized world.

Also in Germany - under the auspices of the federal ministry of labour - all relevant actors in OSH including the German Social Accident Insurance (DGUV) are on the way to establish a joint OSH strategy. The German OSH strategy (GDA) is an integrative part of the European Union (EU) Community Strategy for OSH 2007-2012. Very important in the framework of the strategic planning of the German OSH strategy in the first campaigning period 2008 to 2012 are the identification of priority areas of application and measures. Another important aspect is the

The prevention of occupational diseases is aided by their early recognition. In order to recognize occupational diseases, agreed criteria are necessary. Clear criteria also enable consistency in collecting data on the occurrence, extent and trends in occupational diseases, and allow suitable comparison of experience between countries and regions. The European Union (EU) convened an expert group to produce and update criteria for a range of occupational diseases on an agreed list. Difficulties encountered and limitations apparent in the preparation of the EU criteria include:

- a) Selection of the process for determining criteria. While evidence-based reviews have been advocated as the gold standard for management of many clinical entities, there is limited availability of such evidence for occupational diseases. Consensus opinion supported by access to experts in academic institutions was used.
- b) Agreeing the list of occupational diseases. Comparison of the EU list with those produced by other agencies (e.g. ILO) and different countries show variation in the number and nature of conditions listed.
- c) Use of diagnostic criteria. While clinical criteria will aid in management of individual cases of diseases, there are concerns in using these criteria for determining eligibility for compensation. This is especially for diagnosis of conditions based primarily on a history of symptoms with no available confirmatory tests.
- d) Competing occupational exposures and non-occupational causes that can both lead to the same entity.
- e) Deciding on levels of exposure necessary to cause occupational diseases for respiratory or skin sensitizers and for malignancies.
- f) Relevance and use of occupational hygiene data in diagnosing disease.

This description of the EU expert group's experience can allow other organizations to consider similar or alternate

strategies for lists of occupational disease and criteria for diagnosis.

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**[SC12-04]
International Comparison/Recognition of
Occupational Diseases: Are We Prepared for the
Oncoming Challenges?**

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Occupational diseases (ODs) attract the attention of many interest groups. All of the parties concerned agree that victims of ODs should receive just and fair compensation for their health condition. However, after analyzing more than 10 different ODs insurance models across the world, we conclude that in addition to the already known difficulties with diagnosing ODs, differences of opinion also exist on the means of designing appropriate compensating mechanisms, what brings difficulties when coping with labour market mobilisation and flexibilisation, emerging occupational risks, prevention and compensation.

In our analysis of more than 10 different systems around the world we found that, in comparison with the past, occupational accidents are under much better control than occupational diseases. All workers' compensation insurance systems worldwide are challenged with the possible financial burden of occupational diseases, and have sought different solutions to cope with this challenge, going from full retention of the risk to complete exclusion. However, as daily life combines with working conditions, for instance stress and musculoskeletal disorders, there is a major difficulty in coping with these risks, especially to establish the scope of coverage as well as for prevention, compensation and rehabilitation under workers' compensation systems.

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**[SC12-05]
Respiratory Symptoms and Pulmonary Function
Amongst Workers in a Rubber Wood Sawmill
Factory in Nakhon Si Thammarat Province**

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Background and aims: Expansion of rubber wood industries in Thailand results in increasing number of workers potentially being exposed to some rubber wood dust. However, it is still unclear whether rubber wood dust exposure can cause obstructive airways diseases.

Objectives: To study prevalence of respiratory symptoms and abnormal pulmonary function and potential factors associated with those abnormalities among workers being exposed to rubber wood dust.

Design: Cross-sectional study was used in this study.

Materials and methods: The study subjects were 340 workers working in a rubber wood sawmill factory in Nakhon Si Thammarat province. Data was collected by respiratory health questionnaires and spirometric testing according to the ATS 1994 criteria. Workers were classified into three groups: low wood dust exposure (≤ 1.9 mg/m³); moderate wood dust exposure (2.0–4.9 mg/m³); high wood dust exposure (≥ 5.0 mg/m³).

Results: The response rate was 82.1% which the majority was female workers. The means age and work duration were 36.7 years (SD=8.48) and 6.2 years (SD=4.07) respectively. The prevalence rate of upper and lower respiratory symptoms were 67.0% and 63.1%, respectively. The prevalence of abnormal spirometric testing was 20.6% (obstructive type 4.4%, restrictive type 10.5%, and small airway diseases 5.71%). The prevalence rate of possible and probable asthma was 64.2% and 2.5%, respectively. These prevalence rates were not significantly different according to exposure levels. Factors, which were potentially associated with the upper respiratory symptoms, were female (OR 2.03, 95%CI 1.10, 3.78) and being atopic (OR 3.63, 95%CI 1.88, 7.0). The factors, which were associated with the lower respiratory symptoms, were having history of asthma in family (OR 3.95, 95%CI 1.32, 11.9).

Conclusion: Workers who were exposed to rubber wood dust, especially female or atopic diseases were highly likely to develop obstructive airway disorders. Further investigation should be carried out in order to justify a definite diagnosis.

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**[SC12-06]
Prevention of Work Related Musculoskeletal
Disorders in Hotel**

Chi Won Chong



Novotel, Korea

Objective: Work-related musculoskeletal disorders (WMSDs) have been researched in various occupational groups but little in hotel workers. By the labor law, the company has a duty to study the hazard factor of WMSDs every 3 years from 2004. At mid-level hotel, Kitchen cook, Food and beverage (F&B) waiter & waitress and Front desk receptionist & bell are studied for their work risk factors. Alternative plan is made, carried out and evaluated.

Methods: For hazardous factor study, Ergonomic Awareness Check-list by interview, Questionnaires for Musculoskeletal Disorder Symptom Survey and ergonomic tools (RULA, REBA) and for satisfaction research, self-administered questionnaire made by researcher is used.

Results: There are 6 tasks which have risk factors by the Ergonomic Awareness Check-list. The 6 tasks are reception, video display terminal (VDT), in Front desk receptionist, luggage handling in Front desk Bell attendant, food handling and cooking in Kitchen cook, and handling in F&B waiter & waitress. The ergonomic tools, REBA & RULA analysis showed same results with the check-list. Mostly these are action level 3, it indicates action is necessary soon & now. The self-administered questionnaire showed the increase of physical burden degree.

The alternative plans are implemented as ergonomic, managemental, and medical. The ergonomic plans are handsfree, mat for relieving fatigue, moving carts, etc. The managemental plans are physical exercise training to prevent injury. The medical plans are early detection, treatment and rehabilitation. Survey of self-administered questionnaires is used for evaluation of implementation. The satisfaction ratio is more than 70%.

Conclusion: The relationship between the performance of hotel work and WMSDs is evident. Further studies for cook, waiter & waitress, and other hoteliers are needed for prevention and recognition of WMSDs. Reduction of exposure and effect to WMSDs needs work organization and voluntary involving of individual workers.

Keywords: WMSDs; hotel worker: ergonomic tool

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[SC13] Improvement of Working Conditions / Physical Hazards

July 1, 12:15 - 13:15
Room: 304, COEX

Moderator:

In-Seop Lee
KOSHA

[SC13-01] Hazards in Match Stick Producing Factories and Safety Concern for Industrial Hygienist

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Safety matches are essential consumer commodity considered necessary by all segments of the general public. Today 500 billion matches are used each year. In India the production of safety matches industry dates back to 1910 where the technology learnt from immigrant Japanese families settled in Calcutta were shifted to Virudhunagar district in southern India due to dry climate, cheap labour and availability of raw material from neighboring states. Match stick producing factories are largely located in this district in India. 55 to 60 % of country's requirement is met from this place. Nearly 55 % of workers are employed in these sectors. The Match making is labour intensive. Mechanized, semi mechanized and cottage type industries are involved in this process. Many women, children, elderly and particularly handicapped persons are employed in these sector.

Match is a small stick containing solidified mixture of flammable chemicals deposited on one end. The chemicals like phosphorous, sulphur, glass powder and various other oxidative chemicals are used in producing the match head and match box. The primary process involved is processing timber logs for veneers and splints, waxing, preparing head chemical and side coating of the box using different chemical ingredients. The hazards associated with producing these match stick and match box were identified as an industrial hygienist. The occupational hazards like total and respirable dust exposure, heat stress, illumination and noise during the work were studied. Based on the field



study conducted in these types of industries the safety and precautionary methods followed including the possibility of using potential sustainable raw materials will be discussed in detail in the conference.

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[SC13-02]

Approach for the Improvement of the Work Conditions in the Oil Industry

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Organisation: Sonatrach human resources

Objective:

It is about a survey on the conditions of work in view of to carry an objective analysis on the existing and to project possible improvements after diagnosis and assessment in an unit of production of Sonatrach in the south.

Method:

- Survey achieved by the analysis of the existing based on a state of the places by a validated questionnaire and of the indicators of approach decrees by the group of work: Card of identification.
- Multidisciplinary team: Physicians of work, engineers security and managers Human Resources
- Choice of the pilot sites different of by the nature of the activity and the process
- Type of work station: Exploitation, maintenance, security, health, laboratory of analysis of the hydrocarbons
- Lasted 12 months

Results:

The survey allowed us to have exploratory results on the conditions of work to the level of the six units investigated relative to:

- The physiological organization of work, and to hygiene
- Protective means and of evacuation
- Assessment of the sensitization to hygiene and to the security
- Feature bound to the nuisances and inherent risks to the conditions of work
- Particular works

- Investigations epidemiological retrospectives

Key words:

- Conditions of work
- Investigation
- Multidisciplinary team

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[SC13-03]

Monitoring of Dust Levels and Health Effects at the Bazhenovskoye Chrysotile Asbestos Deposit

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80 years Yekaterinburg Medical Research Center carried out monitoring of dust levels and health effects at the world's largest Bazhenovskoye chrysotile asbestos deposit. During this period established that all the technological operations of chrysotile asbestos mining and milling are accompanied by the formation of high-disperse asbestos-contained disintegration aerosols. All the identified fibres belonged to chrysotile asbestos. The analysis of dust content at the miners and ore dressing working places has proved to the fact that the concentration at the absolute majority of the working places in mines for the last 37 years (1970-2006) were at the level or below of Russian maximum allowable concentrations (RMAC) – 4.0 mg/m³ and fibres concentration was 0.2 f/cm³. At ore dressing at the working places exceeded concentrations 2-3 times the RMAC (2.0 mg/m³) and fibres concentration was 1.8 f/cm³. Improvements of technological processes along with medical and preventive measures taken at the Bazhenovskoye deposit during the past 46 years (1960-2006) resulted in a 10 to 100-fold decrease in MAC concentrations and, therefore, in the lowering of asbestosis, lung and stomach cancer risks. From 1981 till 2006 only 8 mesotheliomas was diagnosis.

The efforts to control the health hazards of various chrysotile dust concentration have focused on a strategy of clinical surveillance and controlling exposures yielding results that indicate controlled using. The experience obtained in the course of medical and hygienic studies carried out by Yekaterinburg Medical Research Center at Bazhenovskoye deposit may serve as a good basis for substantiation of safe allowable controlled application of chrysotile asbestos.

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**[SC13-04]
Pulmonary Function Status among Vocal and
Blow Instrument Musicians**

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Aims and Objectives: 1) To assess the pulmonary function status of vocalists and blow instrumentalists and correlate with duration of practice; 2) To compare their pulmonary function status with the general sample population who are matched for age and sex.

Methodology: Musicians were recruited for the study based on the inclusion and exclusion criteria from various music academies in Chennai, India after obtaining institutional ethical clearance and informed consent. Age and sex matched controls were separate for each arm of the study. Spirometry was performed and FVC, FEV₁, FEV₁/FVC and PEFR were recorded. Data analysis was performed using a statistical package.

Results: All four spirometric parameters considered in this study were significantly higher in vocalists than their control group: FVC ($p=0.048$); FEV₁ ($p=0.013$); FEV₁/FVC ($p=0.039$); PEFR ($p=0.012$). In case of blow instrument musicians FVC ($p=0.034$); FEV₁ ($p=0.001$) and PEFR ($p=0.011$) were significantly better whereas no significant difference was observed in FEV₁/FVC ($p=0.748$) as compared to their control group. Duration of practice in terms of hours per week was 20.25 and 18.8 in vocal and blow instrument musicians respectively. Duration of practice was positively correlated with FVC and FEV₁ both among vocalists and blow instrumentalists in a significant manner.

Conclusion and suggestions: Pulmonary function status is significantly better in terms of FVC, FEV₁, FEV₁/FVC and PEFR among vocalists. In case of blow instrumentalists FVC, FEV₁ and PEFR are significantly higher than the controls but FEV₁/FVC shows no significant difference. The better pulmonary function status among musicians may be due to breath control and ventilator muscular training. Hence, it is suggested that music therapy is likely to increase the exercise capacity and pulmonary volumes in patients with chronic obstructive pulmonary disease (COPD). Moreover these findings should be considered during clinical evaluation of musicians.

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**[SC13-05]
An Optimized Ventilation Plan for
Microelectronics Cleanrooms by Using
Computerized Fluid Dynamics**

**Hyun-Hee Park, Eun-Kyo Chung, Jung-A Shin, Jae-Kil
Jang**

KOSHA, Korea

Aims : To investigate information on chemical use and exposure control, specifically for performance of ventilation in high-tech microelectronics cleanrooms

Methods : Site-visits of 10 high-tech microelectronics include semi-conductor chips and liquid crystal display(LCD) manufacturing company provided data of process chemical use. one liquid crystal display(LCD) company was examined for evaluating the relationship between workplace concentration and ventilation rate efficiency by using computerized fluid dynamics (CFD).

Results : Acetone concentration in cleanroom for LCD inspection process was 40ppm ($n=55$) as geometric mean, ranged 7.8~128.7ppm and weakly correlated with ventilation rate efficiency($r=0.44$, $p<0.05$). Resulting from computerized fluid dynamics (CFD), acetone concentration can be reduced 62% when install booth type local exhaust system, the most efficient way among 10 other different ventilation methods like increasing volume of general ventilation, changing the location of workers, supply or exhaust diffusers and install downstream type local exhaust system, etc

Conclusion : we found that volatile organic compounds in cleanroom can be a matter of adverse health effects and the concentration was correlated with ventilation rate efficiency. the most optimized plan to control the contaminants in solvent cleaning work in cleanroom is booth type local exhaust system.

Key words : Ventilation, Cleanroom, Computerized Fluid Dynamics (CFD), Microelectronics

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**[SC13-06]
Musculoskeletal Disorders among Sitar (Indian
String Instrument) Players**

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Background: Playing Sitar (Indian String Instrument) requires a unique and a difficult posture and strenuous activity of the muscles of the upper limb. This study was undertaken to highlight the musculoskeletal problems encountered among Sitar players owing to their music practice.

Objectives: 1) To determine the prevalence of musculoskeletal disorders among Sitar players and elicit the reasons for the same. 2) To determine the gender variation.

Methodology: An observational study was conducted during the academic year 2007-2008 in the Music Department of Panjab University, Chandigarh, India. The test group and controls were requested to fill a pre-tested questionnaire which tried to elicit their health problems specially their musculoskeletal problems. This was followed by clinical examination by a physician after receiving an informed consent. The data was analysed using simple descriptive statistics with regard to the objectives.

Results: A significant proportion of the Sitar players suffered from muscle aches and sprains. More than one fourth were suffering from prolapsed of inter-vertebral disc. The most important cause pointed out was the unique posture of practice.

Conclusion and Suggestions: Sitar players are at a higher risk of developing musculoskeletal disorders than the general population specially prolapsed inter-vertebral disc. Keeping this in mind special exercises should be designed to improve the health status of Sitar players.

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[SC14] Chemical Safety

July 1, 12:15 - 13:15
Room: 320, COEX

Moderator:

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[SC14-01]

Asia's Asbestos Time Bomb

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Asia has experienced many industrial catastrophes: calamitous outbreaks of cadmium and arsenic poisoning, toxic levels of air pollution, killer epidemics of Minamata disease and the explosion of 40 tonnes of methyl isocyanate gas which caused thousands of deaths in Bhopal. Until fairly recently, however, the worst industrial killer in Asia, asbestos, has remained invisible, hidden behind a smoke-screen of industry propaganda and government impotence.

Mobilization of asbestos victims in Japan succeeded in exploding the national asbestos scandal onto the public consciousness. As a result of the "Kubota Shock," the on-going epidemic of asbestos-related disease became front page news and the Government was finally forced to assess the legal and medical needs of the injured. Unfortunately the action taken to date has been inadequate and many of those affected remain marginalized. The efforts of groups such as BANJAN, JOSHRHC and the Japan Association of Mesothelioma and Asbestos-Related Disease Victims and their Families will be discussed.

As Japan is the only country in Asia to have banned the use of asbestos, developments elsewhere in the region lag behind. The response of other Asian governments to the asbestos hazard covers a broad spectrum from total denial (Sri Lanka, Pakistan) to unenforced regulation (India, China) to a modicum of progress (Korea, Thailand). The differences in national responses will be discussed and comparisons will be made with the experiences of industrialised countries in North America and Europe.

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[SC14-02]

The Role of Trade Union in the Elimination of Asbestos-Related Diseases

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In accordance with the article 15 of the Russian Federation constitution, in the Russian labour legislation, international principles and norms are more often implemented in the field of regulating safety at work: Conventions and Recommendations of ILO, ISO standards, etc. Within the framework of the agreement about partnership and cooperation with the European Union came into force since 1997, Russia aspires to compatibility of its legislation with that of the European Union, including occupational safety and medicine. It acquires much more importance in connection with the processes of globalization of the economy and prospects of joining Russia to the World Trade Organization (WTO).

At the 60th World Health Assembly, held on 13-23 May 2007, "The global plan of action on workers' health 2008-2017" was adopted.

Preventive medicine at enterprises fulfils the tasks of workers' health safety, medical sanitary support of industrial manufacture, diseases prevention and rehabilitation of workers' health condition, ensuring system co-ordinated action of subdivisions in solving problems of safety at work and health of the personnel.

The participants of Moscow International conference "Trade unions and chrysotile", the representatives of the trade unions organizations from different parts of the world, having listened the world leading specialists on medical-biological problems of chrysotile, exchanged their experience on ensuring safety working conditions at this industry and came to the unanimous opinion about controlled use of chrysotile.

Scientific studies confirm the possibility of decreasing occupational asbestos-related diseases with the help of prevention. The position of trade unions is based on a wide spectrum of the international and Russian scientific studies, confirming the possibility of the controlled use of chrysotile.

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[SC14-03]

Exposure to Chrysotile Fibre in an Asbestos - Cement Factory from 1999 to 2004, Harare, Zimbabwe

Benjamin Mutetwa

National Social Security Authority, Zimbabwe

A study to review, describe and analyse data on chrysotile exposure levels obtained in a chrysotile-cement manufacturing factory, in Harare, Zimbabwe, from 1999 to 2004 was undertaken. The study compared fibre levels obtaining in the factory to local and international

occupational exposure limits. 571 results were based on personal sampling while 678 were based on static sampling. Mean chrysotile levels ranged from 0.12 f/ml to 0.16 f/ml for personal sampling and from 0.05 to 0.08 f/ml for static sampling.

The results show that chrysotile exposure levels in the factory were well below the Zimbabwe occupational exposure limit of 1 f/ml over the six year period of monitoring. Furthermore only 4.7% of results exceeded the South African OEL of 0.2 f/ml. The majority of results (90.7%) show that they exceeded the American Conference of Governmental Industrial Hygienist (ACGIH OEL) of 0.1 f/ml. Notwithstanding the fact that most of the results exceeded the ACGIH OEL, the chrysotile fibre levels observed in this factory are quite low and may possibly not pose any health risk to exposed workers, as recent bio-persistence studies indicate that at an exposure concentration of 5000 times greater than the ACGIH of 0.1f/ml, chrysotile produces no pathological response. Another study has shown that there is no evidence of increased cancer risk from chrysotile exposure at levels of about 1f/ml. The low levels in the factory may also suggest that the risk of developing asbestosis, lung cancer and other asbestos related diseases may be quite low, since duration it takes to attain a cumulative exposure of 25 f/ml-years, below which asbestosis may not progress to clinical manifestation, invariably range from 156 to 208 years for personal sampling mean chrysotile values and 312 to 500 years for static sampling mean chrysotile values.

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[SC14-04]

The Needs for Toxicological Research into Industrial Chemicals

Brondeau Marie-Therese

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There are a great many chemicals used at the workplace and chemical risks are a constant public concern, which often receives broad media attention. In order to better manage these risks, they must be properly assessed, and to do this knowledge in the field of toxicology is required. Such knowledge enables the **hazards** (the intrinsic toxic properties) and **exposure** to be better assessed. Regulatory toxicology, in particular the European system known as REACH – Registration, Evaluation and Authorization of Chemicals – has led to progress in this

field through the input of toxicological data, obtained using conventional methods.

However there remains a considerable need for more toxicological research, both human and involving the use of experimental models.

Regarding the identification of **hazards**, efforts should focus on finding dose-dependent effects, in particular at low exposure levels, and the development of effective alternative methods (3 Rs : reduce, replace, refine), including for the demonstration of percutaneous penetration of substances. An understanding of the mechanisms according to which toxic substances act can also allow for better extrapolation to humans.

As regards measurement of **exposure**, the scope of human biological monitoring at the workplace should be enlarged. For new bio-indicators to be validated, sensitive analytical methods must be used and minor metabolic pathways must be taken into consideration for organic substances and speciation for metals. Particular stress is laid on the need to propose guideline values that can be used in occupational medicine.

For INRS, the French National Research and Safety Institute, the priority research areas in the above-mentioned areas are carcinogenic, mutagenic, reprotoxic, neurotoxic and sensitising substances, nanomaterials, and multi-exposures. These priorities are also shared at the international level.

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[SC14-05]

Pesticide Exposure and Health Risks among Women of Agricultural Communities in India - Setting the Research Agenda

Sukanya Rangamani

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Women agricultural workers in India are exposed to pesticides while working during processes of cultivation or processing of crop, when spraying occurs simultaneously. Working in recently sprayed fields without knowledge of pesticide toxicity also places them at risk. Sometimes, women help in mixing pesticides and washing pesticide-contaminated clothes of their husbands. Most agricultural labor live near the fields and are inadvertently exposed to pesticides in the living environment.

In reality the health risk due to pesticides is through the life cycle of a woman, with increased vulnerabilities during pregnancy, lactation and for the developing child. In all of these instances, they are never considered being at risk of exposure. Moreover, there are no estimates of the burden of, and the range of health effects, especially reproductive and endocrine effects due to pesticides among women in agricultural work and living in agricultural communities.

Therefore, epidemiological research on estimates of acute and chronic health problems; identification of markers of functional damage; explaining interactive effects of under nutrition and multiple chemical sensitivities and pesticide related health risks is necessary. Also, systematic documentation of exposure patterns in agricultural work and understanding risk perception among women becomes crucial to understand health risks. Gendered research to analyze the vulnerabilities of women to pesticide exposure in the context of sexual division of labor, women's double burden of productive and reproductive roles and power structures in a liberalizing economy also becomes essential.

All of this would help in developing intervention frameworks that empower women to be protected from pesticide exposure. It is also important to identify the deficiencies in treatment practices and resources of health systems. This would help place the policy agenda to create systems for health monitoring that are responsive to the health needs of women affected by pesticide exposure in agricultural communities in India.

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[SC14-06]

Mapping of Chemical Concentrations in a Confined Workplace

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Occupational exposure to airborne volatile organic compounds is governed by the source strength and dispersion of the chemical into workroom air. Air sampling methods to determine this exposure concentration are expensive and time consuming and ignore crucial factors like height of liquid in the container and location of windows. Hence, modeling is preferred.



The purpose of the present paper is to use modeling as a tool for the exposure calculation. It focuses on modeling the exposure to chemicals by volatilization or surface evaporation and dispersion phenomena. The main objective of the investigation is to get a clear picture of the concentration distribution under three cases namely no window and ventilation (box type), only window and no ventilation, both window and ventilation. Extensive literature study was done to find out the various surface evaporation models and concentration distribution models that were available. But systematic evaluation of the performance of the models is needed to use modeling as the standard tool for exposure assessment. In order to validate the models, the concentrations of organic compounds of different volatilities were measured at various locations in the workroom air in the industries and compared with the modeled data.

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[SC15] Occupational Safety and Health Management System

July 1, 12:15 - 13:15
Room: 321, COEX

Moderator:

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[SC15-01]

OH&S Economic Analysis: An Evaluation Tool

M I Barra, Paolo Fioretti, Giuseppe Morinelli, Antonio Terracina

INAIL, Italy

Work-related accidents and illness are still a major safety and health problem in Europe. Workplace accidents can mean pain and disability and can affect the worker's life, both in and out of work and represent a considerable economic burden to employers, employees and to society as a whole. Some of these costs, like lost workdays or lost income, are clearly visible and can readily be expressed in monetary value. For a large part however, economic consequences of accidents are somewhat hidden.

Nevertheless, it is possible to get an adequate insight into the costs of accidents, the visible and hidden one, and the potential benefits of accident prevention. A better understanding of these costs would support the implementation of effective health and safety policy at company level.

The aim of this study is to provide a complete analysis of the parameters impacting on cost/benefit analysis, taking into account the ones that can readily be expressed in monetary value, as well as hidden parameters which cannot be easily costed

Purpose of this project is making employers and decisions makers realize that improving safety work conditions results in an wider improvement for their business.

We develop user-friendly tool for assisting companies in their efforts to evaluate the costs of prevention implementation in workplace providing at the same time the estimation of reduction of occupational injury and illness related costs.

This calculation has been developed on Italian industries' system. Moreover a sample of 500 Italian companies certified OHSAS 18001 has been analysed, through INAIL (Italian Workers' Compensation Authority) database, showing a significant cost reduction compared with the other Italian companies of the same branch. As far as we know it is the first time that such a comparison is realized.

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[SC15-02]

Training and Developing H&S Managed System Consultants Who Are Implementing OHS Managed Systems in Brazilian Industry

Elaine Posluns¹, Fernando Coelho²

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This session will focus on the introduction of a three-tiered approach to the development and implementation of an Occupational Health and Safety Managed System (OHSAS 18001) to small and medium sized firms in 6 selected sectors in Brazilian industry. The project included the development of consulting and facilitation skills in health and safety professionals plus others not trained in health and safety. The approach used was to train, mentor and have the trainees apply their knowledge and skills within enterprises that they were working with...the "just-in-time" training was synchronized with the work that was occurring in the firms. The intent was to build capacity within the firms and change the culture of the organizations to become more health and safety conscious. The



implementation method used was a three-pronged approach that focused on senior management involvement and commitment, a cross-functional team that worked on developing the infrastructure, and quick win teams that involved workers and gave immediate results. An interim evaluation study was conducted by Dr. Susan Silver, a professor uninvolved in the project at Ryerson University, Toronto, which indicated that the project was very successful at meeting the expectations identified at the beginning of the project.

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[SC15-03]

The Use of OSH-MS and Best Practices at Company Level for Strengthening Corporate Global Competitiveness by the Joint Study of the Employers' Organizations in the Asian Region

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The Joint Study on the use of occupational safety and health management systems (OSH-MS) and enterprise-level best practices was undertaken jointly by the employers' organizations in 13 countries in South and East Asia and the Nippon-Keidanren International Cooperation Center (NICC). The study was aimed at examining the features of ongoing "best practices" in occupational safety and health management in Asian countries and discussing necessary support measures through employers' organizations in the region. Two questionnaire surveys conducted in 2005 of selected sixty-five enterprises and of 13 employers' organizations. The study results clearly indicate the increasing awareness about the importance of securing management-worker commitment for safety and health of workers and about establishing action-oriented procedures for effective risk management. It is found essential to provide multifaceted support measures for ensuring "best practices" in both these aspects. The major factors identified by the study with respect to the enterprise-level best practices need to be addressed in further promoting their spread in different local situations. It is noted that over 95% of the employers' organizations in South Asia and East Asia agree that the "good practice approach" is recognized widely as an important future approach in promoting occupational safety and health. They also consider that the importance of "safety culture"

promotion is recognized widely as one of essential future activities in occupational safety and health. The results of the joint study may be used as relevant source materials for promoting occupational safety and health programs among the members of the employers' organizations and for developing international cooperation by the initiative of employers' organizations in the Asian region. Note: The study was supported by the grant aid of Ministry of Health, Labour and Welfare, Japan. More information: NIPPON-KEIDANREN International Cooperation Center (NICC). Home page: <http://www.nicc.or.jp/en/index.html>

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[SC15-04]

How to Engage Through Change: A Success Story of Changing an Organisation's Occupational Health, Safety and Environment Management System

Maria Petrou, Karen Wolfe

ANSTO, Australia

Are you looking for a way to motivate and engage staff in your Occupational Health, Safety and Environment Management System(OHSEMS)? Is twenty percent participation a measure of a successful initiative?

These were typical challenges faced by ANSTO when changing the organisation's OHSEMS; a new approach had to be taken. Reaching for the stars, we hoped for seventy percent attendance for the launch of the new system. Our reality, one hundred percent participation; a strain on our catering, but what a success!

Monitor and review is a fundamental part of a system. ANSTO's system was dated and not consistent; staff wanted a change. A working group was set up to develop a new user friendly system.

The successes of this project are attributed to the engagement of the end user from the beginning of the process. The critical steps were:

- Identifying the problem and creating a vision – The working group, through consultation, developed a clear understanding of problems with the existing system and developed a new framework.
- Project management –A planned and systematic approach with clear goals and timeframes.



- Staff involvement/network – Champions from across the organisation represented their peers and reviewed external organisation's systems.
- Keep them interested –A Safety Pocket Guide was issued in the middle of the process to keep up staff interest.
- Excite the senses – Flowcharts, checklists, colour coding and branding of the documents were used to capture the audience's attention.
- Celebrate the success – The launch of the new systems was a celebration; food, drinks and presents were handed out.

The success is still evident today; staff are continuing to provide feedback. It is not a system that was imposed upon them but one that they own.

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[SC15-05]

The Economical Facilitate for the Adoption of a Safety Management System in the Italian Welfare System

Lucina Mercadante, Antonio Terracina

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Health and safety at work (OH&S) represent more and more a social issue as well as a competitive factor for companies. In fact the correct management of OH&S elements lead to a reduction of the cost associated to injuries and occupational disease, and can represent a considerable return on the prevention investment.

In a broaden view the real challenge is going towards a social responsibility approach to develop an integrated management system, focused on a "total quality", considered an investments with both relevant social and economic return.

To convince employers and decision-makers of the profitability of improving working conditions, an effective way is provide economic and financial incentives for improving OH&S and corporate social responsibility behaviour.

Authors believe that a Safety Management System (SMS) is one of the most powerful method to achieve this important tool, actually not widely understood among the employers.

Both for CSR and SMS there is not such a means as a ISO standard, as well as for quality or environmental

management system; Regarding CSR an ISO standard is currently being written, while for SMS Italian companies more and more use this prevention tool referring to two standards:

- UNI – INAIL guidelines on occupational health and safety management system (SGSL)
- BSI: OHSAS 18001

INAIL, Italian Workers' Compensation Authority, could represents one of the means capable to diffuse the SGSL adoption, by granting a premium reduction for "safe companies".

Among this funding activities, INAIL, since 2000, provide a premium reduction to companies which adopt an SGSL; the reduction is 10% or 5% depending on the size of the company.

The paper show the trend of companies which are adopting a SGSL using INAIL funds, and therefore it explains how a governmental prevention policy can have a real positive impact on safety and health at work.

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[SC16] General Safety

July 1, 12:15 - 13:15
Room: 330, COEX

Moderator:

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[SC16-01]

Building Bridges, Breaking Barriers for SMEs to Improve Safety, Health, Ergonomics and Environmental Protection (SHEEP)

Chitaranjan Saran

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Small and medium size enterprises (SME) employ over ¾ of the workers. This presentation builds bridges, breaks barriers to cross communication. Local SMEs including ethnic food and beverages industries will be contacted to identify occupational safety and health challenges faced by

them in cross cultural communication is critical in ethnically diverse work force and owners of such enterprises.

People from different cultures perceive the same hazard differently. They act upon their perception. This perception is based upon their socio-cultural and ethical values. There are no 'right' or 'wrong' values. What may be right under one society's norms may not be so in a different society. These cultural divides may include gender, age, sexual orientation, languages, ethnicity, management-labor relationships, disciplines/professions, socioeconomic status, geopolitical boundaries and others.

Expectations, motivations and goals of multi-cultural workforce and corporate boardrooms of the global village/ community will be identified and analyzed. Improving SHEEP (Safety, Health, Ergonomics and Environmental Protection) will improve the bottom line.

Limited resources require their wise and cost effective allocation for each component of SHEEP. It is a balancing act for the competing needs of SHEEP, society, and development. This balancing act is based upon the perception of the decision makers of the various needs.

Unprecedented progress in communication, technology, transportation, biotechnology in the 21st century will make the barriers/divides obsolete. In an increasingly diverse workforce and corporate boardrooms, it is essential that the two a) communicate with each other and b) understand the expectations, motivations, and goals of each other. SHEEP challenges of accidental injuries, illnesses, and pollution affect the bottom line and the quality of life. SHEEP factors affecting the bottom line include: workers' compensation, medical and health expenses, environmental cleanup and disposal, lost wages, productivity, quality, morale, work ethics, physical capabilities, and others.

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**[SC16-02]
Development of the Worker's Safety Assessment Model Using Work Analysis and Accident Mode Effects Analysis**

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Characteristics of safety accidents that have occurred in work places, most of them are caused mainly by worker's habit, and facility and management factors and this implies that any safety and health management system can not fully realize its efficiency regardless of its real quality unless its effects reaches at the level of detailed processes.

Therefore, this research suggests a solution to build a worker's safety assessment model for detailed processes and unit tasks for improvement in current safety management systems.

The worker's safety assessment model refers to a system to optimize the efficiency of safety management systems by identifying risk and safety characteristics through AMEA and building an associated worker's safety assessment system to improve worker's awareness on safety issues.

Worker's safety will be improved through worker's safety assessment and associated task analyses and AMEA systems and this worker's safety assessment model will contribute to further development of safety culture in work places and prevention of possible industrial disaster

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**[SC16-03]
Stakeholders' Commitment in Occupational Health and Safety**

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Stakeholders' commitment in Occupational Health and Safety (OH&S) within an organization or company is important and vital. Without commitment, implementation of OH&S may remain as a dream that never comes true. Commitment must crystallize at every level of the management system. It must address planning, implementation, measurement and evaluation, monitoring and review processes.

OH&S management system is an inseparable part of an organization's management system. The organization, of course, will have their own people with their vested interest, namely stakeholders. Consequently, if somebody asks who should actually have the commitment to OH&S management system, the answer would be the people who have the commitment to the company management system.

There are many ways to ensure that commitment is present within an organization. The easiest way is to see it from the individual perspective, but can also be recognized in group dynamics.



Every organization must carry out periodical evaluations for every step taken to ensure commitment takes place. In addition to measuring the results, evaluating the process is fundamental.

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[SC16-04] Effectiveness & Implementation of PSM in Korea

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In Korea, PSM(Process Safety management) system for the prevention of major industrial accidents was introduced in December 1994 by amending Industrial Safety and Health Law , and this system has been enforced from January 1, 1996.After adopting the system, KOSHA has been focusing on actual tasks such as assessment and confirmation of the report, executing state check, technological guidance, and providing education to engineers in the business, etc. in order to settle the system. Finally, KOSHA has analyzed on its results of implementing the tasks such as decreasing of major industrial accident in the business in the same field after performing PSM system

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[SC16-05] Risk Assessment and Management

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Risk Assessment and Management is a structured tool to manage Risks especially in Health and Safety and is the key to achieving healthy and safe operation. Risk Assessment generally involves:

Identifying – recognizing hazards and significant risks
Evaluate – identify who or what might be harmed, by what means and the severity
Control – the risks, ensure controls are in place, are adequate or whether more should be done. Take action-Hierarchy of control/contingency plans
Record – Document your findings

Monitoring & checking

Review your assessment – have the risks or controls changed.

The key to this process is ultimately behaviour!

The process structurally goes through the various stages of identifying the hazards and assessing the impact or effects the hazard will have upon release. The probabilities of this occurrence are discussed based on available data from experience. The impact of these risks is then evaluated.

For long term, it is desirable to explore a common legislative framework for standardization across borders. The unsafe acts or conditions that can cause the release of the hazards are then identified and preventive control measures instituted. Should any of these controls fail and incident occurs, containment and mitigation measures must be in place. The process logically assists in getting these in place.

All the above information is then compiled into a Hazard register that is utilized before any critical activity is carried out.

However, this is not enough. The controls must be maintained to ensure that they work all the time. So there must be a process in place to ensure this. If this process is separate then it becomes an expensive option for the organization for additional process to be implemented.

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[SC16-06] The Cochrane Occupational Health Field Collects and Disseminates Evidence on Occupational Health and Safety Interventions

Irja Laamanen, Jos Verbeek, Marika Lehtola, Jani Ruotsalainen, Riitta Sauni, Merja Jauhiainen, Iris Pasternack, Maritta Kinnunen-Amoroso

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Nowadays, it is a widely held view that the practice of medicine should have some basis in effectiveness research. The recently developed paradigm of *evidence-based medicine* states that the choice of a specific intervention should be influenced by evidence of its effectiveness. This contrasts with the historical development of health care and occupational health services and the traditional means of eliminating health risks for workers in that context. The



current organization of occupational health services is largely based on consensus between social partners who are guided by the necessity of organizing preventative and/or curative care for workers. This course of action has a solid foundation in a large evidence base on the negative health effects of a wide range of risk factors at work. The problem is that it is assumed that the conventional working methods of occupational health services, such as pre-employment examinations or health surveillance, will always suffice for the elimination of these health risks. At this point, evidence of effectiveness should be used more effectively by occupational health services. There seems to be a discrepancy between the practice of occupational health services and evidence on topics such as advice and instructions for manual materials handling, stress management, and safety interventions. To overcome this problem, occupational health services should become more 'intervention oriented' and use scientific evidence to underpin their interventions. The Cochrane Occupational Health Field has been developed to stimulate the gathering and synthesis of scientific evidence on occupational health interventions. The Field can support occupational health and safety professionals apply research evidence in their work and increase the use of intervention methods.

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[SC17] General Safety

July 1, 12:15 - 13:15
Room: 334, COEX

Moderator:

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[SC17-01] An Explicative Model of Safe Work Behavior - Revealing Areas for Intervention

Dong-Chul Seo, Earl Blair, Mohammad Torabi

Indiana University, United States

This study attempted to test an explicative model of safe work behavior originally suggested by Seo (Safety Science, 2005, pp. 187-211) to reveal the mechanisms by which the following contributory factors influence safety behaviors of

individuals at workplaces: (a) Perceived safety climate, (b) perceived hazard level, (c) perceived work pressure, (d) perceived risk, and (e) perceived barriers. Perceived safety climate was operationalized as management commitment to safety, supervisor safety support, co-worker safety support, employee participation, and competence level. The safety climate was measured by the SSCS (Seo Safety Climate Scale), a validated scale used in more than 10 different countries (Journal of Safety Research, 2004, pp. 427-445). Because the model was validated only in US grain industry, this study attempted to cross-validate the model in another industry, specifically in a service industry that performs leak repairs, hot taps, valve repairs, and the like. Data were collected from 699 employees in 2007 from a US based company. The second-order factor model to explain safe work behavior was tested using hierarchical analysis of nested models in structural equation modeling (SEM). The original explicative model of safe work behavior was cross-validated except a few links. The results indicated that perceived safety climate affected safe work behavior in three paths: (a) Indirectly through the sequential influence of other mediating factors of perceived work pressure and perceived risk, (b) through the mediation of perceived barriers, and (c) direct influence on safe work behavior. Perceived hazard also affected safe work behavior through the mediation of perceived risk. The final model yielded acceptable fit indices (Normed Fit Index = 0.96, Comparative Fit Index = 0.97, Incremental Fit Index = 0.97, and Root Mean Square Error of Approximation = 0.05).

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[SC17-02] Towards a Valid and Reliable Measurement of Safety Climate at Workplaces

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For more than two decades, safety researchers attempted to construct a reliable and valid safety climate scale, which resulted in at least 17 different safety climate scales published in peer-reviewed journals. As this lack of a consistent factor structure of safety climate was due, in part, to the exploratory factor analytic strategy which does not take into account inter-relationships among different constructs, Seo et al. (Journal of Safety Research, 2004, pp. 427-445) used the confirmatory factor analytic approach in developing the SSCS (Seo Safety Climate Scale)-SF (short form) where associations were allowed



among management commitment to safety, supervisor safety support, coworker safety support, employee participation, and competence level. The SSCS is widely used in more than ten different countries, including Australia, Belgium, Canada, China, India, New Zealand, Peru, Turkey, UK, and USA. However, because SSCS was validated only in US grain industry in published reports, it would be necessary to cross-validate the scale in another industry. This study tested robustness of SSCS using confirmatory factor analysis in a service industry that performs leak repairs, hot taps, valve repairs, and the like. Data were collected from 699 employees in 2007 from a US based company. The confirmatory factor model fit the data very well (Normed Fit Index = 0.99, Comparative Fit Index = 0.99, Incremental Fit Index = 0.99, Goodness of Fit Index = 0.93, Standardized Root Mean Square Residual = 0.033, and Root Mean Square Error of Approximation = 0.036). The findings affirmed that management commitment to safety and supervisor safety support are the two core dimensions that affect other dimensions of safety climate. Also, SSCS score was associated with workers' compliance with safety rules and experience of injuries and near-misses.

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**[SC17-03]
Developing an Australian Research Centre for Occupational Health and Safety: Local Knowledge, National Impact and Global Benefit**

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The *WorkCover New South Wales Research Centre of Excellence (WRCE)* was first established in 2004 as a joint venture between WorkCover New South Wales (NSW) and the University of Newcastle in Australia. The centre's main goal is to undertake expert research projects and provide research training to minimise and prevent workplace injury and diseases, as well as ensuring that high quality education and training opportunities in injury prevention, management and rehabilitation are available. Establishing mechanisms for achieving 'best practice' in occupational health and safety, injury management and rehabilitation are also high priorities. Current projects include local initiatives such as: Pathways for facilitating effective return to work, Safety of the ageing workforce, Safety interventions to prevent falls from heights, as well as the Provision of quality assurance to, and academic management of, the

WorkCover NSW Assist Applied Research grant scheme. International projects have included a contracted review of the current International Labour Organization (ILO) chemical conventions and its associated recommendations. With this important research, the WRCE is forging ahead with clear and practical initiatives to improve the occupational health and safety of workers, both in Australia and around the world.

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**[SC17-04]
Safety and Health at Work in Garments Factories: Bangladesh Perspective**

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Socioeconomic development cannot be achieved without addressing occupational safety and health. The right of safe and healthy work environment falls far short in Bangladesh. In 2005, there were 141 deaths, 1578 injuries and 31 rape cases in garments sector alone. Among them 121 deaths and 1150 injuries occurred due to accidents (Bangladesh Institute of Labor Studies, 2006). Garment industries have become one of the largest export earners in the country. About 75% of the total working forces are women. This study was conducted with the objectives to assess the environmental and hygienic condition of the workplace, health status of the workforce, to analyze the risk of occupational hazards and to provide policy guidelines to planners and policy makers. The study was conducted April-June, 2007 in 30 randomly selected export oriented garment factories in and around capital city of Dhaka.

All the 30 factories were export oriented and private in nature with an average space 7,000 square feet. The major working forces are females with male-female ratio 1:2.80. The average working space is 30.8 square feet, which is far less than international standard (100 square feet). Only the first-aid medical facilities are available in 80% of the surveyed factories with no graduate physician. 70% of the factories are average to well-ventilated. 60% have hygienic toilets. 70% of the factories had no emergency escape. 100% had central water supply system with only 30% water filters. 5% of the workers are child labor. 30% of the workers had burning micturation, and 20% had a history of

jaundice during last one month. A strong correlation was found between history of injection and jaundice ($P=0.035$). There is absence of social compliance and factory rules and acts are not properly implemented. Immediate measures need to be taken to reduce the occupation hazards and maintain health.

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**[SC17-05]
A Comparative on the Occupational Safety & Health Institution System of an Asian Countries**

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Recently it is the manufacturing enterprise of our country is investing abroad nation. And It is becomes which will increase steadily abroad nation investment. Also the abroad nation investment of the Asian countries increases steadily and will be occurring problem of labor relationship and problem of occupational safety and health of enterprise. This is will causes effect decrease of abroad investment enterprise profit and decrease of our nation profit.

So it is necessary the study of the Asian countries labor relationship and occupational safety and health act.

This is study the Asian countries of occupational safety and health act.

The Asian countries is selected China, Vietnam, Indonesia, Malaysia, Thailand, Philippine and the selecting reason is the abroad nation investment order.

I will be able to think that this research will be able to attain the two objective.

First. The research of Asian countries of occupational safety and health act will be able to necessary for our enterprise of abroad investment profit and our nation profit from to disputes solution of multi type of asian investment countries.

Second. When we research legal or asian countries of occupational safety and health culture, the comparative study of asian countries of occupational safety and health act will be able to provide legal base data of occupational safety and health, it will be able to apply most efficiently.

Key Words : Abroad Investment, Occupational Safety and Health Culture, Disputes Solution, Legal Base Data, Research, Act

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**[SC17-06]
Assessment of Worker's Perceptions of**

Occupational Safety and Health in Small Businesses

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Managements in Korean small businesses, frequently, have no resources to facilitate improvements of safety and health program at the workplaces. In this regard, small businesses having fewer than 50 employees account for 70 percent of all work related accident occurrences and 90 percent of increased accidents compared to the previous year in 2005.

One of the assisting programs to small sized companies is a financial loan for employers to invest in making safe dangerous equipment and hazardous work environment through replacing dangerous facilities and equipment, putting in safety devices, installing ventilation systems, modifying job process to be more ergonomics friendly, etc. The recipient of the financial loan achieved that their work related accident occurrences were decreased to 20.6 percentages compared to their before and after financial. Also, a cost-benefit analysis revealed that the loan project created 6.34 times benefit from the financial program.

It can be assumed that the workers at the companies having financial investment to improve the safety and health status may have benefits from the investment and change their safety and health perceptions on the workplaces.

The purpose of this research is to make an assessment of worker's perceptions of occupational safety and health in small companies between two groups, one had received financial grant for improving dangerous or hazardous working condition and the other had not received. The methodology and procedures applied to this study were designed to assess employees' safety and health perceptions between two groups of small-sized companies in order to understand the overall impact of safety assistance from government on the occupational safety and health of workers. This study is also to assess what types of safety assistances from outside of the small companies are sought by front line workers.

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[SC18] Chemical Safety

July 1, 12:15 - 13:15
Room: 336, COEX

Moderator:

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[SC18-02] Development of MSDS Editing Program

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[SC18-01] A Systematic Survey of Acute Pesticide Poisonings in Rural Areas China, 1991-2003

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Aims: To analyze and summarize the circumstances of acute pesticide poisonings (APPs) in rural areas China between 1991 and 2003. **Methods:** We collected the data concerning APPs in rural areas China from the papers and literatures published in the accredited Chinese journals, systematic analysis was conducted. **Results:** Of 50,805 poisoning cases founded, 14,442(28.4%) were occupational poisonings and 36,363 (71.6%) were non-occupational cases. There was obvious seasonal variation in the occupational pesticide poisoning while no significant difference in the non-occupational poisoning cases. Suicide attempts or intentional self-poisoning was the dominant poisoning reason, followed by accidental ingestion, inappropriate protection during loading, mixing, spraying pesticide, and accidental exposure. Organophosphate insecticides were the most frequent inducer of poisonings (74.1%), followed by carbamates (6.8%) and mixed formulations (6.2%). Besides, paraquat induced approximately 3,221 cases poisonings and 1,372 deaths in the period of 1991 and 2005 in rural areas China. Most of the individuals used it for suicide intentions (95.6%), among whom 64.1% were females; accidental ingestion and occupational exposure only accounted for 3.8% and 0.6% respectively of the total cases.

Conclusions: APPs are still a serious public health problem in China. Proper application and protection measures needed to be strengthened, so for the management of pesticides and the existing acute pesticide poisoning reporting system.

The Ministry of Labor (MOL) revised the Industrial Safety and Health Act (ISHA) relating to the GHS in 2006 and the detailed notification was announced on Dec 12, 2006. The notification of globally harmonized system of classification and labeling of chemicals (GHS) has become effective since then and existing hazard communication system was allowed until Jun 30, 2008. To facilitate the implementation of GHS in Korea, we developed a program named Material Safety Data sheets (MSDS) Editing program. The program is composed of two modes Supervisor mode and workplace user mode. In the supervisor mode, MSDSs of chemicals can be made and revised through 7 modules, such as chemical management, GHS hazard classification, unit control, standard phrase, MSDS editing, MSDS searching and MSDS revision control. In the workplace user mode, workplace users can search MSDSs of chemicals and make MSDSs of mixtures by combining MSDSs constructed by Korea Occupational Safety and Health Agency (KOSHA). At present, we supply the databases of 3,410 chemicals for hazard classifications and 1,148 for full MSDSs. We are constructing and updating MSDS databases and plan to offer MSDS according to GHS and hazard classification of more than 20,000 chemicals until 2015. We are also developing the PC-based editing program for workers who use chemicals that were not included in web-based database. With PC based editing program, workplace users can make their new MSDSs by using existing chemical databases and standard phrases provided in the program, and also edit the MSDSs of mixtures by combining MSDSs already kept in workplace with downloaded MSDSs from KOSHA web site in their PC without web interface.

Key words : GHS, Korea, Editing program, PC based, mixture

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[SC18-03]

Platelet Dysfunction Can Be a Biomarker for Occupational Exposure to Neurotoxins

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Previous studies reported that the intracellular accumulation of 1-methyl-4-phenylpyridinium ion (MPP⁺), the metabolite of neural toxin, MPTP (1-Methyl-4-phenyl-1,2,3,6-tetrahydropyridine), is well correlated with a rapid depletion of ATP level, which results in the loss of neuronal cell viability. Since ATP plays an important role in platelet physiology and function such as aggregation and cytotoxicity, we investigated the effect of MPP⁺ on platelet aggregation and cytotoxicity. Treatment with MPP⁺ to rat platelets inhibited agonist-induced platelet aggregation in dose-dependent manner. The inhibition of aggregation by MPP⁺ was mediated by decreased ATP secretion and intracellular ATP contents as well in a dose dependent manner. Different from previous reports, MPP⁺, however, did not affect intracellular levels of glutathione and Ca²⁺. The combined treatment with MPP⁺ and 2-deoxyglucose, an ATP depleting agent, showed the additive effect in anti-aggregation. Consistent with these findings, inhibitory effects of MPP⁺ on platelet aggregation was significantly enhanced by the treatment with 2-deoxyglucose. On the other hand, another neurotoxin, salsolinol, did not affect platelet aggregation by itself, but significantly increase agonist-induced aggregation in a concentration-dependent manner in human platelets. The salsolinol-induced platelet activation is mediated by 2-adrenergic receptor binding and resultant attenuation of cyclic AMP. The salsolinol-enhanced platelet aggregation could induce thrombosis in animal models which is similar to the events observed in Parkinson's diseases and alcoholism. In summary, each neurotoxin attenuates or enhances platelet aggregation induced by agonists mediated through different mechanism. All these dysfunctions in platelets could be used as a biomarker to predict cellular toxicity by neurotoxins in occupationally exposed workers.

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[SC18-04]

Examination System of Hazard and Harmfulness on New Chemical Substance in Korea

Hae-Won Cho, Kab-Bae Kim, Jung-Kyu Kim, Hyeon-Young Kim

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Examination system of hazard and harmfulness on new chemical substances in Korea is to protect worker's health from new chemical substances. New chemical substances imported or manufactured in Korea have to be reported to the Ministry of Labor by the industrial safety and health act. The number of new chemical substances which has been reported to the Ministry of Labor until 2007 was 4,820 since the examination system of hazard and harmfulness on new chemical substances began in 1991. In 2007, the number of new chemical substances imported or manufactured in Korea was 547. Among them, 158 chemicals(28.9%) were reported from the manufacturing industry and 389 chemicals(71.7%) were reported from service sectors. The number of workers dealing with new chemical substances was 1,858 and the number of chemicals whose agents were not identified was 91(16.6%). The amount of new chemical substances distributed in 2007 was 6,808.2ton. New chemical substances classified into hazard or harmfulness were 135(24.7%). The majority of them, 77 chemicals(14.1%), were serious eye damage substances and skin irritation substances were 61, eye irritation substances were 20, skin sensitizer substances were 19 and acute toxicity substances were 25, respectively.

Key words:hazard and harmfulness on new chemical substances, serious eye damage

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[SC18-05]

Comparison of Two Aerial Dispersion Models for the Prediction of Chemical Release Associated with Maritime Accidents Near Coastal Areas

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The quantities of hazardous chemicals being produced, transported and utilized in Asia-Pacific countries is increasing at a rapid rate. In the event of an accidental or intentional release, these chemicals and mixtures of them can result in a major threat to human health, the environment and property. Considerable effort is being made in many countries to develop emergency response

capabilities to cope with such situations. Estimation of the magnitude and rate of movement of the resulting chemical plumes, under various scenarios, can help in preparing for appropriate emergency response. Two computer models for predicting the aerial dispersion from chemical releases were compared: the U.S. Environmental Protection Agency's (EPA) Aerial Location of Hazardous Atmospheres (ALOHA) model and the Release (modeling) Integrating Terrain Effects (RITE) emergency response model. A sector of the geographical area for which the model was developed, which most closely resembles the coastal, urban terrain of Singapore, was chosen to test the models. Two chemicals, chlorine and propane, were used to simulate accidental releases. The plume travel directions and maximum plume travel distances for Immediately Dangerous to Life and Health (IDLH) air concentration values from the source were predicted by the models. Significant differences were found between the models in the predicted chemical plume angles and in predicted maximum distances for IDLH air concentration levels. The maximum differences between the models in predicted angle were an average of 9.3 and 8.7 degrees for chlorine and propane, respectively. The differences between the models in predicted maximum distances from the event for IDLH air concentration levels were an average of 5 and 36 kilometers farther, for chlorine and propane, respectively, using the RITE model. Adapting the RITE model to the topography of land masses near Asian Pacific waterways could be very useful in planning for possible chemical release events.

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[SC19] General Safety / Social Security

July 1, 12:15 - 13:15
Room: 402, COEX

Moderator:

Joy Manglani

Only Nature Endures, India

[SC19-01] The Global Campaign on Challenge of Social Security and the Worker Safety

Swapneshwar Goutam

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It cannot be denied that the workers are the ultimate goal for development and also most effective tool for development of any country. Therefore modern working conditions for the welfare of the worker calls for the relatively new approach for improving health and protection of rights at the workplace against all type of exploitations. This Paper deals with challenges on social security this paper also analysis ordeal new approach toward eliminating the challenges of social security to open up access and monitoring initiatives by national States to extend exposure of social security. Lastly examines the relationship between health and employment and work-related factors among workers.

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[SC19-02] The Regional Emergency Plan Requirement: Application of the Best Practices to the Brazilian Case

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The importance of emergency plans is clear whenever a catastrophic accident happens that requires efficient emergency procedures. Despite efficient risk management, in many cases catastrophic events cannot be avoided over the lifetimes of enterprises. Moreover, some of these are triggered by natural catastrophes such as hurricanes, landslides and earthquakes, other by terrorist attacks.

Catastrophic events are characterized by social and environmental damage and losses to industry. These kind of events are more frequent in some particular industries such as oil and gas, aeronautics and the nuclear sector. Therefore, safety management has had to take catastrophic events as being possible and implement strict procedures that have been improved following a history of accidents over the last number of decades.

International studies (Moraes et al 2004) reports claim that more than 500 million people were affected by natural catastrophes between 1970 and 2000 and that there are more than 200,000 deaths in workplaces every year. Therefore, emergency plans, which is a part of safety management, is not well applied in many cases.

In Brazil, there were catastrophic accidents previous year in the oil and gas industry resulting in the need to create emergency procedures, improve risk management and for increase precautions in new projects. The P-36 and Guanabara Bay accidents forced the Brazilian government to be much stricter in regard to safety and environment requirements, creating new laws for the oil and gas industry. Despite improvements following these accidents, the regional and national emergency plans were not evaluated and remain a critical point for the Brazilian safety system in relation to the oil and gas industry.

That paper will discuss the approaches used in different countries around the world in order to propose the best practices to be applied in a regional Brazilian emergency plan.

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**[SC19-03]
Outcomes of Road Crashes among Commercial Motorcyclists in Ibadan North Local Government Area, Oyo State**

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Riding of motorcycles for commercial purposes is becoming increasingly popular in Nigeria. The commercial riders are registered with the motorcyclists division of the Road Transporters union, however, most are self-taught, un-licensed and often have reckless riding habits. This study (which was part of a larger study on incidence of accidents among commercial motorcyclists) sought to determine the outcomes of road crashes among commercial motorcyclists in Ibadan North LGA, Oyo state.

A cross-sectional survey was conducted using a multi-stage sampling technique and a semi-structured questionnaire administered to the respondents.

A total of 185 respondents (all men); with a mean age of 34.2 (\pm 8.8) years were interviewed. Majority, 70 (37.8%) reported that they taught themselves how to ride a motorcycle and 124 (67.4%) had been riding for commercial purposes for less than 3 years. On the average, the riders worked for 6.0 (S.D \pm 1.04) days per week. Thirty-one (16.8%) had been involved in an accident since they commenced commercial riding; 22 (71.0%) of whom sustained injuries following these crashes. The commonest site of injury was the lower limb and the commonest types

of injury sustained were bruises/abrasions 15 (68.2%). Twenty-one (67.7%) were unable to return to work immediately after the accident occurred and the median number of days of work lost was 14 (range = 1 – 150) days. Six (19.4%) riders were admitted; for a minimum of 14 days and a maximum of 90 days and one respondent suffered a permanent disability following the accident.

The study showed that road crashes lead to a significant number of days of work lost by the commercial riders. Concerted efforts must be put in place by the leadership of the commercial motorcyclists associations in conjunction with other road safety stakeholders to ensure the safety of commercial riders in their chosen occupations.

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**[SC19-04]
Trends in HIV/AIDS-Related Perception among Peer Educators After an Educational Intervention among Artisans in Ibadan, Nigeria**

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Objective: A basic level of knowledge about HIV/AIDS could go a long way in curbing the spread of this disease among the general population. This is due to the fact that many artisans work on the outdoors all day, have access to many customers per day and have a steady flow of disposable income because of the nature of their jobs.

Methods: A baseline cross-sectional survey of artisans in Ibadan was carried out with the use of interviewer-administered questionnaires. The questions addressed issues related to HIV infection, its mode of transmission, stigma and management of AIDS patients. Twenty-three peer-educators were subsequently recruited and trained over a 3- day period.

Results: A total of 23 artisans out of the 28 that had been initially trained as peer-educators were surveyed. They were all males with age ranging from 18 to 49 years, mean 26.2 \pm 6.8. Three respondents (8%) had no record of having spoken with at least one of their colleagues about HIV in the past 6 months. The rest had counseled an average of persons. Eleven (45%) of those counseled had agreed to seek access to Voluntary Counseling and Testing (VCT) services available in the local health center. Knowledge of peer educators about HIV and AIDS had



increased from a mean of 6.5 +/- 2.5 to 7.4 +/- 1.5. Fifteen peer educators (60%) said they would “move away” from identified HIV-positive persons in public places. There was a statistically significant association between the knowledge of HIV and the number of persons the peer educators had counseled.

Conclusion: Knowledge about HIV was generally poor among the peer educators despite the educational intervention. Educational intervention among the peer educators should be more detailed with short term evaluation systems built into the process to assess the impact of their work.

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**[SC19-05]
Risk-Based Inspection of Refinery Units : A
Practical Application**

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Recently, regulatory bodies quite often encourage to adopt risk-based inspection(RBI) and management programs because they can enhance safety simultaneously with deregulation in Korea. FBI is an integrated methodology that factors risk into inspection and maintenance decision making. This paper describes an example of how to use known risk assessment codes (API 580, API 581 BRD) to address such safety analysis requirements for risk management in the refining industry. specifically, this paper reports the methodology and the results of application to the refinery units using the RBI program, The results of the risk and reliability assessment using RBI program are useful in determining whether the detected defects are tolerable or required to be repaired. The subsequent decisions are to manage the future inspection, repair and maintenance planning in the risk reduction control.

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**[SC20] Occupational Safety and Health
Management System / General
Health / Construction Safety /
Ergonomics**

July 1, 12:15 - 13:15

Room: 403, COEX

Moderator:

Ted Vandevs

Electrical & Utilities Safety Association, Canada

**[SC20-01]
The Minex Award as a Reference to the Brazilian
Mining Occupational Health and Safety
Management System**

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It was studied the National Minerals Industry Excellence Awards for Safety and Health – MINEX Award, which has been taking place annually by the Minerals Council of Australia as part of its safety and health leadership program which aims to eliminate industries fatalities, injuries and diseases.

The MINEX award is conceived from a systemic point of view, which places the occupational health and safety management effectiveness as an interaction from the best practices of the following categories: leadership, safety and health management, people, information and analysis, safety and health process and performance.

The goal of this study was to verify how Brazilian mining companies identify themselves with the best practices suggested in the categories and items of the Minex award in order to satisfy their occupational health and safety necessities.

A survey was conducted among the biggest mining companies in Brazil, in order to identify the possibilities of the MINEX award as a prospective model to be used by the Brazilian mining companies.

The results showed that the Brazilian mining companies have among their practices, initiatives analogous to the best practices suggested in the MINEX award model, but it was identified that they lack strength in their application offering wide possibilities to improvement. Also, the companies placed high importance to the MINEX award best practices as a reference to be used by mining companies in Brazil to model their occupational health and safety system.

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**[SC20-02]
Ergo Analysis of the Urban Bus Driver From the
City of Recife, PE, Brazil**

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Around the world people depend on public transport for moving around cities. In Brazil it is estimated that only in the city of São Paulo around nine million people per day commute from their homes to their work. Already in the city of Recife, PE, this percentage has reached one and a half million passengers making 24 thousand trips per day. The drivers of urban buses are key actors in the full operation of the transport system, where every person unquestionably gives their life to these professionals. Despite the fact that the occupation of the bus driver is covered by law, they still suffer physical and cognitive overload which affects their ability to do the work. The survey aimed to carry out an analysis, focusing on ergonomics, of the work of bus drivers for a large company in the metropolitan area of Recife, PE, Brazil. The focus was on physical and environmental conditions, and the constraints faced by drivers such as: traffic chaos, the insecurity of urban streets, vibration, noise, temperature, organizational pressures, as well as the grave issue of urban violence. The sample was composed of 100 male drivers, aged between 25 to 64 years old, randomly divided into five groups according to the mileage of the journey they made. All the drivers answered a questionnaire adapted from MORAES (2002) "Method of Analysis System HUMAN - TASK - MACHINE" and applied to the scale of discomfort adapted from IIDA (2000), and using the methods of RULA and OWAS. Our results with this OWAS method demonstrated that 58% of the drivers maintain a sitting position in which a rotation of the torso is necessary in order to improve the working conditions of these professionals.

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**[SC20-03]
Integration in School and the Correlation with
Ergonomics in the School Environment**

**Sonia Marino¹, Maria Donisi², Renato Gurin², Massimo
Fiori³, Adriano Papale²**

Subject study has been carried out in two schools in Rome, one primary school, where a mentally retarded child is present, and one junior high school.

Objective of this project is the analysis of the ergonomics of the school environment.

In the primary school a secondary objective is to verify the degree of integration within the children and the hypothetical reciprocal relations of environment and socializing, either irrespective of the disability and in comparison to the disability.

In the junior high school a secondary objective is to check the children's needs and safety perception with respect to school environment.

The first step has been the measurement of the dimensional and structural features of the classrooms considered, their furniture and work-posts.

Pictures and videos have been shot so as to have a deep analysis of the ergonomic level of the work-posts and, at the same time, an inquiry to understand the needs of the students with respect to the environment "classroom", the work-posts and didactical tools utilized, by means of a multiple answers questionnaire, drawing, and the implementation of the shared design method.

Applying with the young users the creative sharing design method it have been produced the "diagnosis paper", where the problems and the criticalities relevant to the wellbeing and healthiness of the users of the school environment have been listed.

The data obtained have been then the subject of an exact and deep analytical and statistical examination carried on by the multi-discipline work group.

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**[SC20-04]
A Study on the Activation Method of Safety
Education Connected with Hand on Experience in
Construction Field**

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The problems of safety and health is a significant issue in the whole industries.

Many discussion, research data, and policy suggestions have been made to solve this problem, and a factor that is given a great deal of weight on these data among concrete



alternatives is education.

This study targets the construction field among the whole industries and focuses upon the case of Construction Safety Hands-on education Center being operated by KOSHA. In this study, the following problems and the solutions are suggested to maximize the effect of hand-on safety education in connection with safety education in the construction field:

First, hand-on experience program is required to be developed and improved in consideration of processes by field and characteristics by subjects of participation.

Second, participation by laborers is low among subjects of participation.

As alternatives to this situation, both indirect method of continuous P.R. and enlightenment of this matter and direct method of strong directions to prime contractor's behavior through cooperation by the Ministry of Labor in supervision are required to be executed at the same time

Third, the enterprises' sense of participation is low due to self-directed participation.

As an alternative to this situation, legal and institutional instrument is necessary to activate construction safety hand-on education.

Fourth, the quality problem of hand-on education is required to be solved as the number of subjects of education is increased,

From a long-term point of view, a sufficient number of instructors shall be secured and at the same time well-organized continuing education program suited to the trainees' level shall be newly established in order to get high educational effect and systematically cultivate trainees.

Fifth, the current outdoor hand-on educational facilities shall be converted into indoor ones. All-weather educational facilities shall be prepared without being influence by weather conditions

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[SC20-05]

Musculoskeletal Disorder Symptom Features and Control Strategies in Korean Hospital Workers

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To examine features of association between sets of musculoskeletal disorder (MSD) symptoms and factors, and then to accordingly suggest controls of MSD symptoms identified, a questionnaire study was conducted in Korean hospital workers. A questionnaire survey was undertaken in a university hospital, Gyung-In region, in September last year. The data were used to get descriptive statistics and to test three hypotheses with respect to 3 factors (job/occupation, task/activity and psychosocial factors).

A total of 1,091 workers were finally determined for data analyses. Among them, male and female workers were 23.7%, 76.3% with average ages of 32.5, 31.6 years, respectively. Prevalence rate of MSD symptoms for the whole body was 72% and, among six body parts, the highest was 49% for the shoulders. The symptoms were significantly different by job/occupation and task/activity factors across body parts whereas they were significantly different by job stress factors in only certain body parts, depending on gender. In the logistic regression analyses performed for MSD symptoms by body part and each of 3 factors, odds ratio values varied, ranging from 0.7 to 3.3. The controls for reducing the symptoms were discussed.

Conclusively, the study results show that the MSD symptoms can remarkably vary by each of the 3 factors and, in particular, can be highly differentiated by the task/activity factor. This study suggests that MSD symptom features be examined by using various factors and then higher differential factors be primarily utilized in the control of such symptoms.

Key words: Musculoskeletal disorder symptoms, Hospital worker, Job/ occupational factor, Task/activity factor, Psychosocial factor

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