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Toivo Niskanen , Jouni Lehtelä. *Finnish discourses of the stakeholders on development of the implementation of EU legislation concerned with occupational safety and health in computer work.* Pages 413-425.

The overall research objective was to empirically develop the ideas around a system of occupational safety and health (OSH) practices in visual display unit (VDU) work, to describe their relationship with the OSH legislation and to explore how these best practices work to achieve positive results. The aim of the present study was to explore qualitative perceptions of the stakeholders (Finnish Employers' Associations, Employees Organizations and OSH Governmental Inspectorates) concerning the way that the OSH legislation on VDU work is being applied at work. Many stakeholders claim that technological advances require that in OSH the VDU legislation should be updated, especially that it should be clarified, e.g., when does the VDU worker have the right to obtain special eyeglasses needed for VDU work. Many stakeholders believe that additional guidelines concerning practical ergonomic arrangements in VDU work environment and eyeglasses of the VDU workers are needed. In VDU ergonomics, the co-operation between workplace and occupational health care professionals needs to be developed.

- **Keywords:** EU, directive, safety, health, computer, VDU, employers, employees, inspectors, qualitative

Toivo Niskanen. *Investigation into qualitative discourses of the occupational safety and health inspectors in order to promote enforcement.* Pages 426-439.

The aim of this study is to conduct an ex-post evaluation of the OSH Enforcement Act. The focus of the study was to collate the views of occupational safety and health (OSH) inspectors on how the OSH Enforcement Act and the practices of the governmental OSH inspectorate operate from an effectiveness perspective. The questionnaire included open questions addressed to OSH inspectors. The results indicated that there is a tension between the quantitative performance targets, e.g., the number of inspections and the effectiveness of the practical enforcement work. Harmonizing the enforcement practices should be implemented at two levels: OSH local agencies and individual inspectors. OSH inspectors believe that developing the professional skills of OSH inspectors and the monitoring of OSH management systems are important ways of promoting the effectiveness of OSH enforcement.

- **Keywords:** enforcement, inspection, legislation, effects, administration, safety, health

Biljana Blaževska Stoilkovska, Valentina Žileska Pančovska, Goran Mijoski. *Relationship of safety climate perceptions and job satisfaction among employees in the construction industry: the moderating role of age.* Pages 440-447.

This study examines the degree to which construction sector employees perceive that safety is important in their organizations/sites and how job satisfaction affects these perceptions when age is introduced as a moderator variable. Two-way analysis of variance demonstrated that job satisfaction has a strong effect on perceived management commitment to work safety and that this relationship was moderated by respondents' age. Job satisfaction was associated with perceived accident rate and safety inspection frequency, but the proposed role of age in this linkage was not confirmed. Consequently, the findings indicated that by increasing the level of job satisfaction, perceptions of these safety climate aspects proved to be more positive. The conclusion is that these relationships could further lead to a lower percentage of accidents and injuries in the workplace and better health among employees. A significant relationship between job satisfaction, age and perceived co-workers' commitment to work safety was not found.

- **Keywords:** perceptions, safety climate, job satisfaction, construction industry, employees' age

Inna Čábelková , Josef Abrahám , Wadim Strielkowski. *Factors influencing job satisfaction in post-transition economies: the case of the Czech Republic.* Pages 448-456.

This paper presents an analysis of factors influencing job satisfaction in post-transition economies on the example of the Czech Republic. Our research shows that women reported higher levels of job satisfaction compared to men. Education proved to be statistically significant in one of three indicators of job satisfaction. Personal income and workplace relationships proved to be positively and significantly related to all the three indicators of job satisfaction. Most of the occupational dummies were significantly related to two out of three indicators of job satisfaction. In addition, we found that Czech entrepreneurs enjoy and value their job, which indicates strong self-selection for doing business in post-transition economies. However, human capital expressed by the level of education was significant factor for job satisfaction, meaning that well-educated people might not be satisfied with their jobs or feel that their education and experience are wasted in the market economy.

- **Keywords:** job satisfaction, occupational safety, post-transition economies, Czech Republic

Mengmeng Zhao, Kalev Kuklane, Karin Lundgren, Chuansi Gao, Faming Wang. *A ventilation cooling shirt worn during office work in a hot climate: cool or not?* Pages 457-463.

The aim of the study was to identify whether a ventilation cooling shirt was effective in reducing heat strain in a hot climate. Eight female volunteers were exposed to heat (38 °C, 45% relative humidity) for 2 h with simulated office work. In the first hour they were in normal summer clothes (total thermal insulation 0.8 clo); in the second hour a ventilation cooling shirt was worn on top. After the shirt was introduced for 1 h, the skin temperatures at the scapula and the chest were significantly reduced ($p < 0.05$). The mean skin and core temperatures were not reduced. The subjects felt cooler and more

comfortable by wearing the shirt, but the cooling effect was most conspicuous only during the initial 10 min. The cooling efficiency of the ventilation shirt was not very effective under the low physical activity in this hot climate.

- **Keywords:** ventilation, cooling, heat strain, office work

Fabian O. Ugwu, Ike E. Onyishi, Chidi Ugwu, Charity N. Onyishi. *Type A behavior pattern, accident optimism and fatalism: an investigation into non-compliance with safety work behaviors among hospital nurses.* Pages 464-470.

Safety work behavior has continued to attract the interest of organizational researchers and practitioners especially in the health sector. The goal of the study was to investigate whether personality type A, accident optimism and fatalism could predict non-compliance with safety work behaviors among hospital nurses. One hundred and fifty-nine nursing staff sampled from three government-owned hospitals in a state in southeast Nigeria, participated in the study. Data were collected through Type A Behavior Scale (TABs), Accident Optimism, Fatalism and Compliance with Safety Behavior (CSB) Scales. Our results showed that personality type A, accident optimism and fatalism were all related to non-compliance with safety work behaviors. Personality type A individuals tend to comply less with safety work behaviors than personality type B individuals. In addition, optimistic and fatalistic views about accidents and existing safety rules also have implications for compliance with safety work behaviors.

- **Keywords:** accident optimism, fatalism, non-compliance with safety behaviors, personality type A

Agnieszka Jankowska , Sławomir Czerczak , Małgorzata Kucharska , Wiktor Wesołowski , Piotr Maciaszek , Małgorzata Kupczewska-Dobecka. *Application of predictive models for estimation of health care workers exposure to sevoflurane.* Pages 471-479.

Objectives. The aim of this study was to assess the potential use of predictive models to estimate professional exposure to chemicals in the workplace, such as the operating room, by simultaneous determination of the levels of exposure using a model and measurements. *Methods.* Measurements included determinations of sevoflurane (SEV) in the workplace air of 117 operating rooms of 31 hospitals in one Polish region. Measurements were carried out at the time of various surgical procedures during administration of anaesthetics by endotracheal intubation. The measurement results were compared with the values estimated using two models: ECETOC TRA and Stoffenmanager. *Results.* In one case the ECETOC TRA estimated the exposure concentration almost equal to the measured concentration but, because of the need to maintain a margin of safety in case of modelling, it can be concluded that the model underestimated the concentration. The Stoffenmanager model provided accurate exposure estimates in the examined case, and it can be used as a screening tool for the assessment of occupational inhalation exposure of medical personnel to anaesthetics. *Conclusions.* The results are of particular importance to the circumstances in Eastern Europe, where the levels of anaesthetics often exceed the relevant occupational exposure limits.

- **Keywords:** exposure assessment, ECETOC TRA, Stoffenmanager, sevoflurane

Fatemeh Abareshi, Rasoul Yarahmadi, Mahnaz Solhi, Ali Asghar Farshad. *Educational intervention for reducing work-related musculoskeletal disorders and promoting productivity.* Pages 480-485.

Background and objectives. Work-related musculoskeletal disorders (WMSDs) are the main causes of pain, suffering, absenteeism, disability and reduction in productivity. This research aims to determine the role of training intervention based on protection motivation theory in reducing WMSDs and promoting productivity. *Methodology.* The conducted study was based on a quasi-experimental design (control) that was carried out on 158 employees of the Kabl Khodro factory which were divided into two groups of 79 people. After splitting the 158 workers, an experimental and control group was formed. The data collection instruments were made up of two questionnaires and were analysed using a quick exposure check (QEC) method. *Result.* Before intervention in both the experimental and control groups, there were no significant differences among the average protection motivation theory constructs, productivity and QEC scores ($p < 0.05$). However, following training intervention there was a significant increase in these factors within the investigated group apart from the perceived response costs and efficacy. *Conclusion.* The conducted study shows that ergonomic training based on the protection motivation theory is effective in reducing musculoskeletal risk factors and that increased knowledge of the subject can lead to an increase in productivity.

- **Keywords:** ergonomic training, work-related musculoskeletal disorders, productivity, protection motivation theory

Antonio López-Arquillos, Juan Carlos Rubio-Romero, Alistair Gibb. *Accident data study of concrete construction companies' similarities and differences between qualified and non-qualified workers in Spain. Pages 486-492.*

The aim of this paper is to discuss findings from an analysis of accidents in concrete construction companies in Spain and to compare the accident rates of qualified and non-qualified workers. A total of 125,021 accidents between 2003 and 2008 involving both blue-collar and white-collar workers were analysed, comparing the variables of occupation, age, company staff, length of service, location of the accident, together with the severity of the accidents. Results showed that lack of experience in the first month is more significant in non-qualified workers and experienced supervisors and that head injuries are more likely to lead to fatalities. The most remarkable similarity was that fatal accidents to and from the worksite are a problem common to both groups of workers.

- **Keywords:** construction, accident, white-collar, blue-collar, qualified worker, Spain

Naser Dehghan, Alireza Choobineh, Mohsen Razeghi, Jafar Hasanzadeh, Moslem Irandoost, Samaneh Ebrahimi. *Assessment of functional parameters and comfort of a new computer mouse as compared with other types of input devices. Pages 493-497.*

Background. This study was conducted to assess functional parameters and comfort of a new computer mouse (Ergomice) as compared with three other input devices. *Materials and methods.* Functional parameters (i.e., task completion time and error rate) of each device were assessed by 10 participants using standardized software based on Standard No. ISO 9241-9:2000. Comfort evaluation was also undertaken for each device using the visual analogue scale technique. Statistical analysis including the Wilcoxon signed-rank test and the Friedman test was performed using SPSS version 16. *Results.* The functional parameters of the standard mouse were better than those of the other devices. However, no significant difference was observed between this mouse and Ergomice. Overall comfort evaluation showed that the standard mouse and Ergomice were more comfortable to work with. The comfort level of hand/wrist posture in the Ergomice was higher than that of the other three devices. *Conclusion.* The design features of Ergomice

could improve its functional properties. Hand/wrist posture comfort of Ergomice was judged to be high compared with that of the other devices.

- **Keywords:** computer input devices, mouse evaluation, upper limb disorders, ISO 9241-9:2000

Andrzej Dąbrowski. *An investigation and analysis of safety issues in Polish small construction plants. Pages 498-511.*

The construction industry is a booming sector of the Polish economy; however, it is stigmatised by a lower classification due to high occupational risks and an unsatisfactory state of occupational safety. Safety on construction sites is compromised by small construction firms which dominate the market and have high accident rates. This article presents the results of studies (using a checklist) conducted in small Polish construction companies in terms of selected aspects of safety, such as co-operation with the general contractor, occupational health and safety documents, occupational risk assessment, organization of work, protective gear and general work equipment. The mentioned studies and analyses provided the grounds to establish the main directions of preventive measures decreasing occupational risk in small construction companies, e.g., an increase in engagement of investors and general contractors, improvement of occupational health and safety (OSH) documents, an increase in efficiency of construction site managers, better stability of employment and removal of opposing objectives between economic strategy and work safety.

- **Keywords:** small construction plants, safety, injuries, prevention

Andrzej Dąbrowski. *Kickback risk of portable chainsaws while cutting wood of different properties: laboratory tests and deductions. Pages 512-523.*

Portable chainsaws are associated with substantial risk and can cause serious injury to operators, especially during kickback. This paper presents new results from research and analyses conducted regarding the impact between the different properties of wood on this occurrence. In an open area, such differences may include: wood species, humidity, temperature and the facing angle of the wood fibres in relation to the kerf and shape of the wood surface that comes in contact with the tip of the guide bar. This paper investigates chainsaw kickback including the research results on kickback and wood-cutting energy, saw chain speed and the efficiency of the chainsaw engine. It also presents conclusions drawn from the tests that can be useful for chainsaw users, showing the dependencies between the different properties of wood and the risk of injury.

- **Keywords:** chainsaw, kickback, saw chain, kickback energy, kickback angle, safe use, wood cutting, wood characteristics

Shankar Subramaniam , Shanmugam Murugesan. *Investigation of work-related musculoskeletal disorders among male kitchen workers in South India. Pages 524-531.*

Objective. This study aims to quantify the prevalence of work-related musculoskeletal disorders (MSDs) and risks among male kitchen workers in the catering industry. *Method.* Data were collected with the help of the Nordic musculoskeletal questionnaire and by direct observations. *Results.* In total, 114 male kitchen workers from various hostels of a college in South India were considered for this study. The average age and mean years of employment of the workers are 26.4 (*SD* 7.7) and 7.8 respectively. The statistical analysis carried out reveals that 67.5% of male kitchen workers reported MSDs during the past 12 months. The highest prevalence rate has been found in the lower back

(65.8%) and shoulder region (62.3%). Among different categories of kitchen work analyzed, it is evident that chief cooks suffer more from MSDs (79.2%) than assistant cooks (74.3%) and kitchen aides (30.0%). Workers in the older group, i.e., ≥ 41 years, and workers with 6–10 years of experience suffer with higher risk of MSDs, i.e., 93.9% and 87.5%, respectively. *Conclusion.* The male kitchen workers who participated in this research were found to possess both MSDs and ergonomic hazards.

- **Keywords:** work-related musculoskeletal disorders, male kitchen workers, occupational health, risk factors

Denis Kintu, Michael Kyakula, Joseph Kikomoko. *Occupational safety training and practices in selected vocational training institutions and workplaces in Kampala, Uganda.* Pages 532-538.

Several industrial accidents, some of them fatal, have been reported in Uganda. Causes could include training gaps in vocational training institutions (VTIs) and workplaces. This study investigated how occupational safety training in VTIs and workplaces is implemented. The study was carried out in five selected VTIs and workplaces in Kampala. Data were collected from instructors, workshop technicians, students, workshop managers, production supervisors, machine operators and new technicians in the workplaces. A total of 35 respondents participated in the study. The results revealed that all curricula in VTIs include a component of safety but little is practiced in VTI workshops; in workplaces no specific training content was followed and there were no regular consultations between VTIs and industry on safety skills requirements, resulting in a mismatch in safety skills training. The major constraints to safety training include inadequate funds to purchase safety equipment and inadequate literature on safety.

- **Keywords:** occupational safety, training and practices, vocational training institutions, workplaces

Kyaw Thu Soe, Orapin Laosee, Suwassa Limsatchapanich, Cheerawit Rattanapan. *Prevalence and risk factors of musculoskeletal disorders among Myanmar migrant workers in Thai seafood industries.* Pages 539-546.

A cross-sectional descriptive study was conducted with self-administered questionnaires among 368 Myanmar migrant workers to investigate the prevalence of and to determine the risk factors for musculoskeletal disorders (MSDs) in the Thai seafood industry. The results showed the prevalence of MSDs was 45.1% occurring in the last 7 days. Marital status, number of dependents, other health problems, working hours, repetitive hand movements, awkward posture of wrists, prolonged standing, and manual handling of heavy loads were found to be associated with MSDs. Multiple logistic regression indicated that the workers who were married, had more than two dependents, and had more exposure to awkward wrist postures were at significantly increased risk of MSDs. The study findings suggest the need for adequate knowledge of ergonomics and for awareness campaign programs focusing on prevention of MSDs, especially low back pain, to be initiated in industries for earlier detection of symptoms among seafood processing workers.

- **Keywords:** work-related musculoskeletal disorders, Myanmar workers, Thai seafood industries

Salami Olasunkanmi Ismaila , Olusegun Gabriel Akanbi , Wasiu Olaoniye. *Model for predicting peak expiratory flow rate of Nigerian workers in a cement factory in Itori, Ogun State, Nigeria.* Pages 547-550.

The main aim of the study was to propose a model for predicting the peak expiratory flow rate (PEFR) of Nigerian workers in a cement factory. Sixty randomly selected non-smoker and healthy workers (30 in production sections, 30 in the administrative section of the factory) participated in the study. Their physical characteristics and PEFR were measured. Multiple correlations using SPSS version 16.0 were performed on the data. The values of PEFR, using the obtained model, were compared with the measured values using a two-tailed *t* test. There were positive correlations among age, height and PEFR. A prediction equation for PEFR based on age, height, weight and years of exposure (experience) was obtained with $R^2 = .843$ ($p < 0.001$). The developed model will be useful for the management in determining PEFR of workers in the cement industry for possible medical attention.

- **Keywords:** peak expiratory flow rate, lung function, respiratory disorders, dust, age, height, weight

Seyed Shamseddin Alizadeh, Seyed Bagher Mortazavi, Mohammad Mehdi Sepehri. *Assessment of accident severity in the construction industry using the Bayesian theorem. Pages 551-557.*

Aim: Construction is a major source of employment in many countries. In construction, workers perform a great diversity of activities, each one with a specific associated risk. The aim of this paper is to identify workers who are at risk of accidents with severe consequences and classify these workers to determine appropriate control measures. *Methods:* We defined 48 groups of workers and used the Bayesian theorem to estimate posterior probabilities about the severity of accidents at the level of individuals in construction sector. First, the posterior probabilities of injuries based on four variables were provided. Then the probabilities of injury for 48 groups of workers were determined. *Results:* With regard to marginal frequency of injury, slight injury (0.856), fatal injury (0.086) and severe injury (0.058) had the highest probability of occurrence. It was observed that workers with <1 year's work experience (0.168) had the highest probability of injury occurrence. The first group of workers, who were extensively exposed to risk of severe and fatal accidents, involved workers ≥ 50 years old, married, with 1–5 years' work experience, who had no past accident experience. *Conclusion:* The findings provide a direction for more effective safety strategies and occupational accident prevention and emergency programmes.

- **Keywords:** construction sector, Bayesian, accident consequence, posterior probabilities

Robert Gałązkowski , Władysław Wołkowski , Marcin Mikos , Sławomir Szajda , Arkadiusz Wejnarski , Stanisław Paweł Świeżewski. *The strategy of training staff for a new type of helicopter as an element of raising the security level of flight operations. Pages 558-567.*

In 2008, the Polish Medical Air Rescue started replacing its fleet with modern EC135 machines. To ensure the maximum possible safety of the missions performed both in the period of implementing the change and later on, the management prepared a strategy of training its crews to use the new type of helicopter. The analysis of incidents that occurred during 2006–2009 showed that both the human and the technical factors must be carefully considered. Moreover, a risk analysis was conducted to reduce the risk both during general crew training and in the course of particular flight operations. A four-stage strategy of training pilots and crew members was worked out by weighing up all the risks. The analysis of data from 2010 to 2013 confirmed that the risk connected with flying and with all the activities involved in direct support aircraft operations is under control and lowered to an acceptable level.

- **Keywords:** training strategy, risk analysis, safety on the job, Helicopter Emergency Medical Service, Medical Air Rescue

Peyman Hossein Mohseni , Ali Asghar Farshad , Roxsana Mirkazemi , Rouhangiz Jamshidi Orak. *Assessment of the living and workplace health and safety conditions of site-resident construction workers in Tehran, Iran. Pages 568-573.*

Objectives. The purpose of this study was to assess living and workplace safety conditions of construction workers in Tehran, Iran. *Methods.* This cross-sectional study was conducted among 410 construction sites in a municipal area of Tehran whose municipal building permits were issued in 2011. Data on ventilation, workplace safety and hygiene were collected by direct observation and interviews with site foremen. Noise levels were estimated from 10 sound-level-meter stations in the municipality area. *Results.* Lack of ventilation in the workers' rooms was abundant. Bathrooms were unhygienic and minimum requirements such as lighting and ventilation did not exist in 80% of the cases. In nearly 50% of large construction sites, sewage and garbage disposal were inappropriate. Elevator safety was poor at all sites and no measures for fall prevention were present in over 88% of active construction sites. This study showed that the mean 24-h equivalent continuous sound level L_{eq} was over 70 dB in 80% of the sites during weekdays. *Conclusions.* The results of this study revealed poor health and safety living and working conditions of construction workers in Tehran.

- **Keywords:** construction workers, health and safety condition, noise pollution