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PROTECTION OF HUMAN IN THE WORKING ENVIRONMENT

Hung-Chang Liao, Shu-Fang Cheng, Ya-huei Wang & Lien-Hsiung Lee. *A Recommended Integrated Mechanism to Enhance OSH Management of Blue-Collar Foreign Workers in Taiwan.*

This study examines the roles and functions of businesses, labor-exporting countries' representative offices in Taiwan, religious organizations, and manpower agencies in promoting occupational safety and health (OSH). It also offers advice to Taiwanese authorities on making policies and improvements regarding the oversight mechanism mandated by the Labor Safety and Health Act, giving them an idea of what to focus on when enforcing control over blue-collar foreign workers' OSH conditions. This study also proposes that Taiwanese authorities may serve not only as an overseer/inspector of those hiring blue-collar foreign workers in Taiwan, but also expand their role to lay down policies regarding a variety of OSH teaching materials in the blue-collar foreign workers' native languages (spoken or written), the qualifications of translators in blue-collar foreign workers' OSH training programs, and regulations concerning the longer hours such training programs take.

Sandrine Schoenenberger, Pierre Moulin, Eric Brangier & Daniel Gilibert. *Patients' Characteristics and Healthcare Providers' Perceived Workload in French Hospital Emergency Wards.*

The aim of this research is to understand how patients' characteristics increase healthcare providers' perceived workload. Patients' characteristics and dependency, technical and relational complexities of care seem to increase healthcare providers' workload. As workload is multidimensional, we examine which dimensions are affected by patients' characteristics. Our methodology is based on 121 patients assessed with the NASA task load index (NASA-TLX) and a questionnaire filled in by 57 health providers in 2 emergency wards in French hospital settings, to evaluate their attitudes to different patients' characteristics. Our results show that physical demand is the dimension most affected by patients' behaviour and characteristics. Next, we observe that workload increases more due to patients' behaviour than their social characteristics. We propose that a regulation mechanism be taken into account in further research, using

methodology based on observations to identify how healthcare providers might adapt their activities to compensate for workload variations caused by patients.

Joanna Martyka & Kazimierz Lebecki. *Safety Culture in High-Risk Industries.*

This paper addresses the question of whether adopting safety culture improves hazard prevention in enterprises characterized by high primary risk. To answer this question, sample underground coal mines were examined to investigate the basic elements of the safety culture of employees. This paper presents the results of a diagnosis of the basic elements of the safety culture of supervisors (midlevel managers) and blue-collar workers in 3 underground coal mines. The study used 2 techniques: a Likert-type scale and a questionnaire. The results indicate the need to introduce changes in the safety culture of underground coal mine employees. This study also presents the conditions for improvement. Special attention was paid to (a) the conditions for improving safety culture and (b) a programme for modifying risky behaviours.

Lidia Zapór. *Evaluation of the Toxic Potency of Selected Cadmium Compounds on A549 and CHO-9 Cells.*

Cytotoxicity of cadmium sulphide, oxide and chloride was tested using A549 and CHO-9 cells. Metabolic activity of cells (MTT test) and cell membrane permeability (NRU test) were used as cytotoxicity endpoints. The results revealed unexpectedly low toxicity of cadmium sulphide as compared to chloride and oxide. This preliminary report does not provide any explanation for this effect, but the result may nevertheless be interesting for future studies of toxicity mechanisms of cadmium compounds. First cadmium compounds caused damage or change in the permeability of cell membranes, then inhibition of metabolic activity of mitochondria. It cannot be ruled out that the cell lysosomes are at first exposed to the effect of cadmium.

Dorota Żołnierczyk-Zreda & Sylwia Bedyńska. *Psychometric Properties of the Polish Version of Karasek's Job Content Questionnaire.*

Aim. The objective of this study was to test the psychometric properties of selected scales, namely, Decision Latitude, Psychological Job Demand, Social Support and Job Insecurity, from the Polish version of Karasek's 29-item Job Content Questionnaire (JCQ). Method. The study covered 2626 workers from a wide range of occupations. Estimation of internal consistency with Cronbach's α , and both exploratory factor analysis (with principal axis method) and confirmatory factor analysis were the main statistical methods. Predictive validity was assessed by regressing the outcomes of JCQ scales on the outcomes of Goldberg and Williams's General Health Questionnaire. Results. The internal consistency of the scales was satisfactory, ranging from .60 to .85. The 4-dimensional structure of the measured version was generally confirmed; the 4 dimensions being Decision Latitude; Psychological Job Demands and Job Insecurity merged into 1 factor; Co-workers' Social Support; and Supervisors' Social Support. Fit indexes for this model were satisfactory, it was also proved that this model predicted mental health. Conclusions. The Polish version of Karasek's 29-item JCQ has satisfactory psychometric properties; it is a short, easy method for assessing psychosocial work conditions.

Yong-Ku Kong. *The Effects of Co-ordinating Postures With Shoulder and Elbow Flexion Angles on Maximum Grip Strength and Upper-Limb Muscle Activity in Standing and Sitting Postures.*

Eighteen co-ordination postures with shoulder flexion angles (0°, 45° and 90°) and elbow flexion angles (0°, 45° and 90°) in standing and sitting positions were evaluated to

identify the effects of co-ordination postures on maximum grip strength and muscle activities of the upper limb in this study. Thirty-nine subjects were recruited and their maximum grip strengths were measured. According to the analysis of grip strength, grip strength was shown to be stronger in a standing posture (297.4 N) than in a sitting posture (274.6 N). In addition, grip strength (293.8 N) at 90° shoulder flexion angle was significantly higher than that at 0° and 45° shoulder angles. There was no statistically significant difference in grip strength from the effects of elbow angles in this study. The results of muscle activities for all muscle groups showed a similar trend with the results of grip strength associated with shoulder angles.

Joanna Bugajska & Adam Sagan. *Chronic Musculoskeletal Disorders as Risk Factors for Reduced Work Ability in Younger and Ageing Workers.*

Aims. The aim of the study was to assess the occurrence and intensity of musculoskeletal pain as a risk factor for reduced work ability. **Methods.** In total, 1449 workers participated in the study, 64% were younger workers (<45 years old, M 31.4); 36% were ageing workers (≥45 years old, M 50.3). Their health condition was established on the basis of (a) subjective feeling of health on a 5-point scale, (b) pain in 6 parts of the body in the past year; and (c) intensity of pain on a 100-mm visual analogue scale (VAS). Work ability was assessed with the subjective work ability index (WAI). **Results.** The results of the study showed that although in the both groups, i.e., younger and ageing workers, the occurrence and intensity of pain in the hands/wrists, neck and lower back were a significant factor which decreased WAI, in ageing workers only the occurrence of pain in the lower back generated higher risk factors for reduced work ability (WAI > 37). **Conclusions.** Improving physical and psychosocial working conditions to reduce musculoskeletal complaints, and identifying individuals with such complaints are important in increasing workers' work ability and thus extending their occupational activity.

PROTECTION OF HUMAN AT THE WORKSTATION

Sari Tiainen, Annina Ropponen & Veikko Louhevaarae. *A Quasi-Experimental Study of the Effects of the Erggi Action Model of Musculoskeletal Symptoms and VDU Working Conditions Among University Staff.*

Purpose. The aim of this study was to investigate musculoskeletal symptoms and working conditions of university workers with and without contact with an Erggi action model. **Methods.** A quasi-experimental and longitudinal field study design examined effects of the Erggi action model with 3 types of questionnaires filled by 1000 university workers. The statistical analyses used logistic regression. **Results.** Subjects who had contact with the Erggi action model had a higher probability of weekly musculoskeletal symptoms impairing their work, perceived more possibilities to influence their musculoskeletal symptoms and had lower risk for sick leave compared to those without contact with the Erggi action model. **Conclusions.** The Erggi action model increases the probability of influencing workers' musculoskeletal symptoms, decreases the number of sick leave and increases awareness of musculoskeletal symptoms and working conditions.

Dariusz Pleban. *The Use of a Global Index of Acoustic Assessment for Predicting Noise in Industrial Rooms and Optimizing the Location of Machinery and Workstations.*

This paper describes the results of a study aimed at developing a tool for optimizing the location of machinery and workstations. A global index of acoustic assessment of machines was developed for this purpose. This index and a genetic algorithm were used in a computer tool for predicting noise emission of machines as well as optimizing the

location of machines and workstations in industrial rooms. The results of laboratory and simulation tests demonstrate that the developed global index and the genetic algorithm support measures aimed at noise reduction at workstations.

Elżbieta Łastowiecka-Moras, Joanna Bugajska & Beata Młynarczyk. *Occupational Exposure to Natural UV Radiation and Premature Skin Ageing.*

The skin is the part of the human body most vulnerable to ultraviolet (UV) radiation. The spectrum of the negative effects of UV radiation on the skin ranges from acute erythema to carcinogenesis. Between these extreme conditions, there are other common skin lesions, e.g., photoageing. The aim of this study was to assess the skin for signs of photoageing in a group of 52 men occupationally exposed to natural UV radiation. There were 2 types of examinations: an examination of skin condition (moisture, elasticity, sebum, porosity, smoothness, discolourations and wrinkles) with a device for diagnosing the skin, and a dermatological examination. The results of both examinations revealed a higher percentage of skin characteristics typical for photoageing in outdoor workers compared to the general population.

Shilei Lu, Huaiyu Peng & Ping Gao. *A Body Characteristic Index to Evaluate the Level of Risk of Heat Strain for a Group of Workers With a Test.*

The purpose of this study was to develop a body characteristic index (BCI) based on the distribution of maximal oxygen uptake per body mass ($VO_{2max}/mass$), body surface area per body mass ($BSA/mass$), and percentage of body fat (Fat%) to evaluate the relative level of individual physiological responses to heat strain in a group of workers. BCI was based upon the data obtained from 10 males and 10 females exercising for 60 min on a treadmill at 2 relative exercise intensities of 25% and 45% VO_{2max} in mild, warm wet, and hot dry climate condition, separately. BCI was developed into 2 formulas, which were proved to be better predictors for heat strain responses than each individual characteristic, and more sensitive than body type to describe the distributions of individual characteristics and distinguish the differences in physiological responses to heat.

Madbuli H. Noweir, Abdullah O. Bafail & Ibrahim M. Jomoah. *Noise Pollution in Metalwork and Woodwork Industries in the Kingdom of Saudi Arabia.*

This study was conducted in metalwork and woodwork industries in Jeddah Industrial Estate. The purpose of this study was to assess the magnitude of industrial noise exposure and to propose remedial actions. Noise was measured at different times of a day in 28 randomly selected factories and workshops. Results indicated that noise levels varied according to the type and size of a factory, and the type and number of machines used. Mean noise levels in metalwork factories were higher than those in woodwork factories. The highest noise levels were observed while manufacturing cans and forming steel reinforcement for concrete, where noise levels exceed 90 dB(A). All mean noise levels in all studied metalwork factories and in 50% of studied woodwork industries were higher than the standard level of 85 dB(A).

Narges Arsalani, Masoud Fallahi-Khoshknab, Malin Josephson & Monica Lagerström. *Musculoskeletal Disorders and Working Conditions Among Iranian Nursing Personnel.*

This study investigated the prevalence of musculoskeletal disorders (MSDs) and associations with organizational, physical and psychosocial working conditions among

520 nursing personnel in Tehran, Iran. The results of the cross-sectional study on aids and different educational levels of nurses showed that the participants experienced 88% of MSDs in at least one body region during the past 12 months. The 3 most prevalent body regions were the low back (65.3%), knee (56.2%) and neck (49.8%). The participants reported inflexible work schedule, poor quality of devices for transferring patients, overexertion and job dissatisfaction. Physical and psychosocial exposure revealed an elevated odds ratio (95% confidence interval) of MSDs. The results showed a combination of high physical and psychosocial work demands along with low control over the work which increased work-related stress and enhanced the risk of MSDs. This study findings could help to understand work-related MSDs among nursing personnel in a developing country where the work situation and sociocultural context differ from other countries.