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Číslo 1

PROTECTION OF HUMAN IN THE WORKING ENVIRONMENT

Wen-Chin Li & Don Hartus. *Identifying Training Deficiencies in Military Pilots by Applying the Human Factors Analysis and Classification Systém.* S. 3-18.

Without accurate analysis, it is difficult to identify training needs and develop the content of training programs required for preventing aviation accidents. The human factors analysis and classification system (HFACS) is based on Reason's system-wide model of human error. In this study, 523 accidents from the Republic of China Air Force were analyzed in which 1762 human errors were categorized. The results of the analysis showed that errors of judgment and poor decision-making were commonly reported amongst pilots.

As a result, it was concluded that there was a need for military pilots to be trained specifically in making decisions in tactical environments. However, application of HFACS also allowed the identification of systemic training deficiencies within the organization further contributing to the accidents observed.

Jose A. Prieto, Vicente González, Miguel Del Valle & Paloma Nistal. *The Influence of Age on Aerobic Capacity and Health Indicators of Three Rescue Groups.* S.19-27.

The aim of this study was to determine the relationship between age, aerobic capacity ($V_{O2\ max}$) and other health indicators among 3 rescue groups. The type of training and the subjective perception of physical fitness obtained via the Assessment Questionnaire of Physical Fitness were also analysed. To obtain $V_{O2\ max}$, 37 firefighters, 22 lifeguards and 59 mine rescue workers had a treadmill test. Their body mass index and body fat percentage were also calculated. The results show a significant decline in $V_{O2\ max}$ of the older participants, which affects the effectiveness of rescue work. Furthermore, the training of all groups was inconsistent and based on individual needs. Variable training and the decline in $V_{O2\ max}$ with age affected the effectiveness of the rescue tasks of each group.

Markus Melloh, Cornelia Rolli Salathé, Achim Elfering, Anja Käser, Thomas Barz, Emin Aghayev, Christoph Röder & Jean-Claude Theis. *Occupational, Personal and Psychosocial Resources for Preventing Persistent Low Back Pain.* S. 29-40.

The aim of this prospective cohort study was to identify modifiable protective factors of the progression of acute/subacute low back pain (LBP) to the persistent state at an early stage to reduce the socioeconomic burden of persistent LBP. Patients attending a health practitioner for acute/subacute LBP were assessed at baseline addressing occupational, personal and psychosocial factors, and followed up over 12 weeks. Pearson correlations were calculated between these baseline factors and the presence of nonpersistent LBP at 12-week follow-up. For those factors found to be significant, multivariate logistic regression analyses were performed.

The final 3-predictor model included job satisfaction, mental health and social support. The accuracy of the model was 72%, with 81% of nonpersistent and 60% of persistent LBP patients correctly identified. Further research is necessary to confirm the role of different types of social support regarding their prognostic influence on the development of persistent LBP.

Desré M. Kramer, Richard P. Wells, Nicolette Carlan, Theresa Aversa, Philip P. Bigelow, Shane M. Dixon & Keith McMillan. *Did You Have an Impact? A Theory-Based Method for Planning and Evaluating Knowledge-Transfer and Exchange Activities in Occupational Health and Safety.* S. 41-62.

Few evaluation tools are available to assess knowledge-transfer and exchange interventions. The objective of this paper is to develop and demonstrate a theory-based knowledge-transfer and exchange method of evaluation (KEME) that synthesizes 3 theoretical frameworks: the promoting action on research implementation of health services (PARiHS) model, the transtheoretical model of change, and a model of knowledge use. It proposes a new term, keme, to mean a unit of evidence-based transferable knowledge. The usefulness of the evaluation method is demonstrated with 4 occupational health and safety knowledge transfer and exchange (KTE) implementation case studies that are based upon the analysis of over 50 pre-existing interviews. The usefulness of the evaluation model has enabled us to better understand stakeholder feedback, frame our interpretation, and perform a more comprehensive evaluation of the knowledge use outcomes of our KTE efforts.

Linda Drupsteen, Jop Groeneweg & Gerard I.J.M. Zwetsloot. *Critical Steps in Learning From Incidents: Using Learning Potential in the Process From Reporting an Incident to Accident Prevention.* S. 63-77.

Many incidents have occurred because organisations have failed to learn from lessons of the past. This means that there is room for improvement in the way organisations analyse incidents, generate measures to remedy identified weaknesses and prevent reoccurrence: the learning from incidents process. To improve that process, it is necessary to gain insight into the steps of this process and to identify factors that hinder learning (bottlenecks).
This paper presents a model that enables organisations to analyse the steps in a learning from incidents process and to identify the bottlenecks. The study describes how this model is used in a survey and in 3 exploratory case studies in The Netherlands. The results show that there is limited use of learning potential, especially in the evaluation stage. To improve learning, an approach that considers all steps is necessary.

Adam Pościk. ***Determining Ultraviolet Degradation of High-Visibility Warning Clothing With Photochromic Indicators.*** **79-86.**

The main purpose of this study was to select an appropriate photochromic dye and to develop a series of photochromic indicators showing ultraviolet (UV) degradation of selected background materials made from different polymers. The photochemistry of a series of photochromic compounds of oxazine and diarylethenes in thin polystyrene films were studied with spectroscopic methods. This paper also discusses the design and results of tests of UV photochromic indicators for high-visibility clothing.

PROTECTION OF HUMAN AT THE WORKSTATION

Marjeta Kovač, Bojan Leskošek, Vedran Hadžić & Gregor Jurak. ***Injuries Among Slovenian Physical Education Teachers: A Cross-Sectional Study.*** **S. 87-95.**

A cross-sectional study was carried out to examine the frequency and types of serious injuries in physical educators throughout their professional career, in relation to their gender, age and teaching level, certain factors causing the injuries and the consequences of those injuries on their working ability. The subjects (n = 468) answered a self-administered questionnaire. In men, one group's higher frequency of injuries was 1.8 (95% CI [1.26, 2.57]) times higher than in women. Every year in age increased the odds for moving into a group with a higher frequency of injuries by 7.6% (95% CI [1.06, 1.10]). The most common injuries for both genders were lower limb injuries. The most common cause of injury was the teacher's own mistake. Over 60% of teachers had to modify their teaching after an injury. It is necessary to further explore preventive strategies to reduce injuries in these workers.

Jeffery Taylor Moore, Konstantin P. Cigularov, Julie M. Sampson, John C. Rosecrance & Peter Y. Chen. ***Construction Workers' Reasons for Not Reporting Work-Related Injuries: An Exploratory Study.*** **S. 97-105.**

Although under-reporting of work-related injuries by workers is recognized as a significant problem in construction and other industries, little is known about the specific reasons for such occurrences. Qualitative and quantitative methods were used in this study to (a) identify reasons why construction workers may choose not to report work-related injuries, and (b) to investigate the frequency of the identified reasons. Twenty-seven percent of a sample of construction workers (N = 135) indicated that they had failed to report a work-related injury. The most frequent reasons given were related to perceptions of injuries as "small" and "part of the job" as well as fear of negative consequences, which may follow injury reporting. These findings are discussed in terms of practical implications. Strategies to overcome these reasons are suggested to decrease the under-reporting of injuries in the construction industry.

Agnieszka Wolska. ***Occupational Exposure to Solar Ultraviolet Radiation of Polish Outdoor Workers: Risk Estimation Method and Criterion.*** **S. 107-116.**

This paper presents occupational skin exposure to solar ultraviolet radiation (UVR) of 122 Polish outdoor workers in spring and summer. In 65% of the cases, it was significant and exceeded 10 standard erythema doses (SED) during a work shift. The results provided grounds for (a) modifying hazard assessment based on the skin exposure factor proposed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and (b) developing a criterion of risk estimation. The modified method uses the UV index (UVI) instead of the geographical latitude and season factor. The skin exposure factor (Wes) of one is the criterion of risk estimation. Risk is low if the estimated value of Wes

does not exceed one. If it does, suitable preventive measures are necessary and a corrected skin exposure factor (Wes *) is calculated to minimize its value to at least one. Risk estimated with that method was high in 67% of the cases.

Zbigniew Dąbrowski & Bartosz Stankiewicz. *Methodology of Selecting the Reference Source for an Active Noise Control System in a Car.* S. 117-125.

At the end of the 20th century, a significant development in digital technologies of signal processing made it possible to apply active noise control methods in new domains. A proper selection of the reference signal source is a main problem in implementing such systems. This paper presents an estimation method based on an indicator of the coherent power level. It also presents a simple system of active noise control in a car, operating according to the proposed method of optimising the positioning of reference sources. This system makes it possible to considerably increase the comfort of work of drivers in various kinds of road transport without a great increase in cost. This is especially significant in the case of trucks and vans. Passive barriers are considerably more expensive in them, which results in a higher level of noise than in passenger cars.

Rafał Młyński & Emil Kozłowski. *Determining Attenuation of Impulse Noise With an Electrical Equivalent of a Hearing Protection Device.* S. 127-141.

Determining the effectiveness of impulse noise attenuation with hearing protection devices (HPDs) is an important part of their selection. Measuring impulse noise parameters under an HPD would involve exposing subjects to impulses with a high peak sound pressure level. This paper presents a computational method of determining impulse noise parameters under the cups of earmuffs. Calculations are done using the transfer function of earmuffs, determined with Shaw's electrical equivalent of an HPD, taking into account the design parameters of earmuffs. The developed method was used for calculations in the presence of impulse noise generated by gunshots. To verify the computational method, the results of these calculations were compared with the results of measurements.

Paul Braunger, Hermann Frank, Christian Korunka, Manfred Lueger & Bettina Kubicek. *Validating a Safety Climate Model in Metal Processing Industries: A Replication Study.* S. 143-155.

This paper attempts to replicate a safety climate model originally tested in Australia to assess its applicability in a different context: namely, across production workers in 22 medium-sized metal processing organizations in Austria. The model postulates that safety knowledge and safety motivation mediate the relation between safety climate on the one hand and safety compliance and participation on the other. Self-report data from 1075 employees were analyzed using structural equation modeling (SEM). The results of the replication study largely confirmed the original safety climate model. However, in addition to indirect effects, direct links between safety climate and actual safety behavior were found.