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EDITORIAL

The WWDU (Work With Display Units) Conference as a Platform for Occupational Health and Safety in the Past—And as a WWCS (Work With Computer Systems) Conference in the Future

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Nowadays, almost 90% of all computer work places are insufficiently equipped and arranged and thus hold danger of occupational diseases. Permanent computer work often leads to symptoms of fatigue and backache; eye impairment or thrombosis are only some of the consequences that may occur. This is the reason why since 2000 in Germany trade supervisory centers have the authority to impose a fine of up to €25,000 when the investigated enterprises have not designed their computer work places according to the so-called display work place regulation (Bildschirmarbeitsplatzverordnung), a standard formulated as a ministerial order.

In this context, the WWDU (Work With Display Units) conference has always been a platform for occupational safety and health and at the WWDU 2002 in Berchtesgaden, Germany, a series of new results in this field were presented. Due to the enlargement of the complexity of the computer systems people are working with nowadays, a modification had to be made in the title of this conference. From 2004 on, WWDU will be renamed into WWCS, that is, Work With Computer Systems, to emphasize the fact that it no longer solely focuses on work with displays but that furthermore an all-embracing consideration and examination of common work with computer systems is intended as a conference topic and agenda.

The following articles for this special issue of the *International Journal of Occupational Safety and Ergonomics* (*JOSE*) "Risk prevention at VDU workplaces" were chosen from the presentations at WWDU 2002 for full-length publication because they are all based on experimental research and their results proved to be useful for the future design of such work places. According to their different foci they are divided into subcategories. The three articles of the first category deal with human beings and their physiological systems and subsystems that are affected while working with computer systems. Fountain studies the relationship between RULA's (Rapid Upper Limb Assessment) postural scoring system and measures of surface electromyography (EMG), self-reports of discomfort, and job attitude questionnaires, and concludes that the perceived discomfort results prove that RULA is able to identify high risk postures. Mitsuya et al. investigate the methods most effective in preventing Deep Vein Thrombosis. The results show that an occasional reclining posture with a footrest, a 10-min walking break every 50–60 min and stretching once in a while proved to be effective preventive measures. Toomingas et al. compare the musculoskeletal health of operators at a call center to that of a group of professional computer users in other occupations. They found out that call center operators were more symptom-loaded than other professional users although they were younger and had been less exposed to computer work. Muscle tenderness and nerve affections belong to the most common symptoms and diseases.

The second category of articles focuses on technical components such as monitors, keyboards, and illumination. Oehme et al. investigate different kinds of displays for the application of Augmented Reality by focusing on the strain indicator HRV (Heart Rate Variability). Their empirical test revealed that there was no difference in the user's HRV in laser retinal technology and LCD (Liquid Crystal Display) technology, and that consequently, concerning the display types, there seemed to be a comparable user informational strain allowing different levels of performance. Wolska, on the other hand, investigates the influence of different lighting on the user's visual strain and preferences, with the conclusion that concerning visual fatigue indirect and compound lighting systems are best. Wolska also calls attention to the fact that regardless of the lighting system 1.5 hrs of VDT work can already cause small to medium asthenopic symptoms. Also referring to visual complaints, Stüdeli and Menozzi use an ergophthalmological tool to investigate the effects of subjective and objective workload. The tool they developed helps to achieve almost continuous measurements of asthenopic complaints, psychological strain, and objective work load, and is thus regarded as an useful

instrument in diagnosing asthenopic complaints. Omori et al. also concentrate on subjective complaints of asthenopia and investigate whether a minibreak, during which VDT workers view an imaginary distant view, can lead to fewer complaints. By using Stretch Eye™, they show that it is effective in easing visual fatigue and it improves eyesight under working conditions. Ullmann et al. conclude in their article that a new computer mouse with a pivoting pen-shaped handle decreases static tension when working on fine-motor, high precision tasks that are normally done with finger movements with the forearm at rest. Their results demonstrate that this new technology can significantly reduce muscular tension.

In the last category of articles, organizational aspects such as recovering conditions and affective effectiveness are investigated. Hirose and Nagasaka investigate how to take an effective rest in order to prevent a decline in alertness at work. They also study the relationship between alertness during the rest period and subsequent task performance. Their results show that for an effective rest it is necessary to reduce alertness during the resting period to Stage 2 sleep as soon as possible and to maintain it until the rest is over. Also, after the rest period is over, methods that restore alertness for promoting subsequent performance should be used. Robertson concentrates on the worker's knowledge about office ergonomics. Her hypothesis is that an office ergonomics training program would allow workers to use their workplace more effectively. By increasing the workers' office ergonomics knowledge, self-reported and work-related musculoskeletal disorders decreased significantly. In her article, Ziefle proves that visual display unit (VDU) users follow a rather intuitive rationale when adjusting their work setting to minimize muscular load and optimize performance. The results show that when VDU workers can freely choose their sitting posture and adjust their work setting themselves, performance is significantly better and muscular load is rated lower. The same work group tests the anisotropic characteristics given in TFT-LCD (Thin-Film-Transistor-Liquid Crystal Display) screens. Their results show that TFT's anisotropy is a crucial factor that lowers performance. Noro et al. suggest recommendations for establishing a theoretical basis and design criteria for choosing office layouts based on the prevailing work style. Using the method of eye movement measurements, their results show that the office layout can affect workers' ability to perform their tasks. A far-reaching investigation is done by Zimmermann et al. By pointing out the key roles in human communication—recognizing, interpreting, and expressing emotions—they emphasize the importance of considering that humans also tend to interact with computers in a natural and even social way. In their

paper, a feasibility study of a new behavioral method for measuring user affect with an inexpensive standard computer device is described.

For the WWCS 2004, which will be held in 2004 in Kuala Lumpur (Malaysia), we are hoping and expecting to gain more results concerning the improved design of user-friendly workplaces for work with computer systems. In a world, in which coping with one's work without computers has become unimaginable and almost impossible, research in this field must continue and be strongly supported in order to guarantee humane conditions of work.

Further information about the coming conference can be found at http://www.wwcs2004.org.