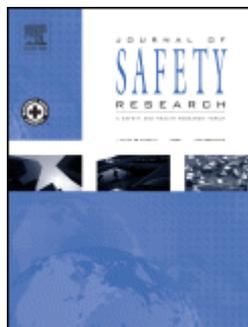


Journal of Safety Research – rok 2009, ročník 40

Číslo 3



Helmut W. Paschold, Alexander V. Sergeev. *Whole-body vibration knowledge survey of U.S. occupational safety and health professionals.* Pages 171-176.

Problem: Whole-body vibration (WBV) is an occupational issue of concern due to adverse health effects or simple discomfort and annoyance. Unlike in Europe, WBV is an emerging topic in the U.S. safety and health (S&H) professional community. We hypothesized that at least one-half of the U.S. occupational S&H professionals knew little or nothing about WBV. **Method:** We conducted a cross-sectional study (survey) of WBV knowledge among members of the American Society of Safety Engineers. A Likert scale (1-none to 5-expert) was used to determine WBV topic knowledge levels (KL₁₋₅). **Results:** Analysis of 2,764 responses revealed that 69.5% of the participants self-reported a less than basic WBV understanding. The WBV KL₁₋₅ mean for all participants was 1.94 ± 1.00 , corresponding to an awareness of WBV without a depth of understanding. **Summary:** Many at-risk U.S. workers may not be supported by occupational S&H professionals with adequate WBV knowledge. **Impact on Industry:** A significant number of U.S. workers may be exposed to unhealthy levels of whole-body vibration. However, the U.S. occupational safety and health community is generally unprepared to anticipate, monitor, and control the whole-body vibration hazard.

- **Keywords:** Whole-body vibration; Occupational safety and health professionals; Survey

Noreen McDonald, Matthew Trowbridge. *Does the built environment affect when American teens become drivers? : evidence from the 2001 National Household Travel Survey.* Pages 177-183.

Problem: Motor vehicle crashes are the most common cause of death for American adolescents. However, the impact of where teens live on when they begin driving has not been studied. **Method:** Data from the 2001 National Household Travel Survey were used to estimate the effect of residential density on the driver status of teens aged 16 to 19 years after matching on demographic characteristics. **Results:** Controlling for demographic characteristics, 16 and 17 year old teens in high density neighborhoods had driver rates 15 percentage points below teens living in less dense areas ($p < 0.001$). The effect for 18 and 19 year olds was a 9 percentage point decrease ($p < 0.001$). **Summary:** These results suggest teens living in less dense and more sprawling communities initiate driving at a younger age than comparable teens in compact areas, placing them at increased risk for crash related injuries. **Impact on Industry:** The role of

environmental factors, such as neighborhood walkability and provision of transit, should be considered in young driver programs.

- **Keywords:** Teen driver; Safety; Sprawl; Built environment

Ibrahim A. Al-Darrab, Zahid A. Khan, Shiekh I. Ishrat. *An experimental study on the effect of mobile phone conversation on drivers' reaction time in braking response.* Pages 185-189.

Introduction: This paper presents an experimental study in which the effect of three factors (distance between cars, mobile call duration, and time of driving (day or night)) on drivers' reaction time in braking response was investigated. **Methods:** The experiment was performed in a real driving environment in which 27 male adults between the ages of 22 and 24 years participated. Three levels of the first two factors (i.e., distance between cars and call duration) and two levels of the last factor (i.e., time of driving) were selected to conduct the experimental study. A full factorial design of experiment with 18 treatment combinations and three replicates of each combination were used. Fifty-four trial runs were performed in a random manner and for each run drivers' reaction time in braking response was measured, which served the data for further analysis. Analysis of variance (ANOVA), interaction effect analysis, and various model adequacy tests were carried out using Design Expert software. **Results:** The results of the study indicated that the most important factor affecting the drivers' reaction time in car braking response was the mobile call duration followed by the time of driving, with a high level of interaction between the two factors. It was also found that the distance between cars did not seem to have a significant effect on the reaction time in braking response. It is to be noted that these response times are expected to be higher under normal driving conditions where awareness of experimental environment is not present. **Impact on Industry:** The findings of this study would help mobile phone industries in improving safety of mobile phone users in driving environment.

- **Keywords:** Mobile phone conversation; Braking; Drivers; Reaction time; Design of experiments; ANOVA

Stephanie J. Tuttle, James R. Sayer, Mary Lynn Buonarosa. *The conspicuity of first-responder safety garments.* Pages 191-196.

Introduction: This study compared the conspicuity of three types of first-responder safety garments (NFPA 1971-2007 turnout gear coats, and ANSI/ISEA 107 and 207 safety vests). **Method:** Participants drove instrumented vehicles on a closed track during both daytime and nighttime, indicating when they could first detect pedestrians in a simulated emergency response scene. Pedestrians wore one of the safety garments and stood on either side of the emergency scene, facing or perpendicular to oncoming traffic, and either stationary or walking in place. **Results:** All three garment standards provided equal levels of conspicuity, in that the distances at which the pedestrians were detected were equivalent. Time of day was a significant factor, with longer mean detection distances being observed in daytime. Pedestrian orientation was significant, with mean detection distances being longest when facing traffic. Pedestrian motion did not result in significant differences in detection distance. **Discussion:** The results suggest that all three garment types studied are equivalent in making first responders conspicuous as pedestrians when working an emergency response scene in close proximity to traffic. **Impact on Industry:** Whether an NFPA or ANSI/ISEA compliant is worn, first responders are equally likely to be detected by passing motorists, and as such these garments should be considered to be equivalent.

- **Keywords:** Conspicuity; First responder; Pedestrian; Personal protective equipment and clothing (PPE); Turnout gear

Anders E. af Wåhlberg, Lisa Dorn. *Absence behavior as traffic crash predictor in bus drivers. Pages 197-201.*

Problem: Various indicators of health have been shown to be associated with traffic crash involvement. As general health is also related to absence from work, the latter variable may be more strongly related to crashes, especially for professional drivers.

Method: Bus driver absence from work was analyzed in association with their crash records. Two British samples and one Swedish sample were used. **Results:** One of the British samples yielded fair correlations between crash record and absence, while for the other the effect was restricted to the first three months of driving. The Swedish data had effects in the expected direction but these were not significant. **Discussion:** The use of an indirect, overall measurement of health, may be a viable method for predicting the traffic crash involvement for professional drivers, although replications are needed in larger samples and other populations. **Impact on industry:** The use of absence records for the identification of at risk drivers would seem to be a simple and useful method for companies with major fleets, and it also shows the importance of promoting employee health and well being at work as a potential method of reducing the cost, not only of absenteeism, but also of crashes in company vehicles.

- **Keywords:** Traffic crash; Accident; Bus driver; Absence; Exposure

Simo Salminen, Maarit Vartia, Terhi Giorgiani. *Occupational injuries of immigrant and Finnish bus drivers. Pages 203-205.*

Problem: With baby boomers reaching retirement age, Western countries may need more immigrant workers to ensure productivity. Many studies have suggested a higher occupational injury frequency among immigrant workers, which could considerably reduce their contribution to society. The aim of this study was to examine whether immigrant workers have a higher injury frequency compared to Finnish workers when performing the exact same tasks under the same working conditions. **Method:** A total of 176 Finnish and 130 immigrant bus drivers were asked about their occupational injuries during the past 12 months via a questionnaire. In addition, the data contained 134 injuries reported by the transport firm to an insurance company. **Results:** There was no significant difference in reporting occupational injuries by self-reporting or by company-records. Because there were more accident-repeaters among Finnish drivers, their injury frequency (114) was higher than that of immigrant drivers (78). **Application/Impact:** This study showed that immigrant workers did not have a higher injury frequency than other workers when they worked in the exact same conditions. Immigrant workers can work as safely as native-Finnish workers, when their working conditions and job contracts are at the same level as those of the original population. Immigrant workers can compensate for the shortage of workforce caused by an aging population.

- **Keywords:** Immigrants; Foreign workers; Occupational accidents; Finland

Xunpeng Shi. *Have government regulations improved workplace safety? : a test of the asynchronous regulatory effects in China's coal industry, 1995–2006. Pages 207-213.*

Problem: Empirical studies on the effectiveness of workplace safety regulations are inconclusive. This study hypothesizes that the asynchronous effects of safety regulations occur because regulations need time to become effective. Safety regulations will work initially by reducing the most serious accidents, and later by improving overall safety performance. **Method:** The hypothesis is tested by studying a provincial level aggregate panel dataset for China's coal industry using two different models with different sets of dependent variables: a fixed-effects model on mortality rate, which is defined as fatalities per 1,000 employees; and a negative binomial model on the annual number (frequency) of disastrous accidents. **Results:** Safety regulations can reduce the frequency of

disastrous accidents, but have not reduced mortality rate, which represents overall safety performance. **Discussion and summary:** Policy recommendations are made, including shifting production from small to large mines through industrial consolidation, improving the safety performance of large mines, addressing consequences of decentralization, and facilitating the implementation of regulations through carrying on institutional actions and supporting legislation. **Impact on industry:** Until recently, about 4,000 coal miners perished annually in China, demonstrating that workplace safety in China's coal industry is an urgent and important issue. This research provides evidence that safety regulations have asynchronous effects and identifies the priorities in improving safety in China's current coal mining. This may assist the Chinese government to design more effective safety improvement policies and improve the effectiveness of safety regulations and safety performance.

- **Keywords:** Asynchronous effects; Safety regulations; Mining safety; Coal; China

Tova Rosenbloom, Adar Ben-Eliyahu, Dan Nemrodov, Ariela Biegel, Amotz Perlman. *Committing driving violations : an observational study comparing city, town and village. Pages 215-219.*

Introduction: This article compares observed driving behavior in a city, a town, and a village. **Method:** Unobtrusive observations were made at intersections in each residential type. Five violation types were observed: (a) not wearing a seat belt (seat belt violation); (b) not using a safety seat for a child (safety seat violation for children); (c) not using a speaker while speaking on the phone (on-phone violation); (d) failing to comply with a 'give way' sign ('give way' sign violation); and (e) stopping in an undesignated area (undesignated stop violation). It was expected that in accordance with the anonymity hypothesis that the bigger residential areas' rate of traffic violations would be higher. The effects of the residential type, drivers' gender, and age were assessed using the multiple regression model. The stepwise method of evaluation was employed. The model converged on step 3 (Adjusted R square = 0.039). Residential type and gender contributed significantly to the model. **Results:** Consistent with prior research, male drivers committed more violations than female drivers. Chi-square analyses were used to test the distribution of violations by the settlement types. Overall, more drivers committed violations in the two small residential areas than in the city, with 30% of city drivers, 43% of town drivers, and 51% of village drivers committing at least one violation ($\chi^2 (2) = 37.65, p < 0.001$). Moreover, in the town and the village, a combination of one or more violations was committed more often than in the city ($\chi^2 (1) = 34.645, p < 0.001$). Accordingly, more drivers committed violations in the two small settlements (48.4%) than in the city (30.6%). Possible explanations for the observed results were provided in the Discussion section. **Impact on Industry:** The conclusions of this paper are that drivers in small villages tend to disobey traffic laws. Therefore, efforts have to be made in companies to take this issue in consideration while running fleets in companies located in small places far from the center.

- **Keywords:** Road use; Traffic; Civilization type; Violations

Laura K.M. Donorfio, Lisa A. D'Ambrosio, Joseph F. Coughlin, Maureen Mohyde. *To drive or not to drive, that isn't the question : the meaning of self-regulation among older drivers. Pages 221-226.*

Problem: This research examines older drivers and how they rationalize and cope with their own changing psychological and physical functioning vis-à-vis self-regulation and driving. **Method:** A national survey was mailed to a sample of drivers over the age of 50. An overall response rate of 53.11% was achieved, with 3,824 valid responses returned. This paper discusses the qualitative findings of the open-ended questions in this survey. **Results:** A rich, multidimensional description of self-regulation emerged from the data. Driving self-regulation was not simply a checklist of behaviors performed but a

combination of attitudes and behaviors, including important social and psychological processes and automobile attributes. Household composition played an important role in determining what one's options were for getting around and how serious they were in enforcing self-regulation behaviors. **Discussion & Summary:** As a society, we must realize the importance of driving in maintaining independence, feelings of self-worth, and being connected to life and society. This research presents the qualitative findings of a nationwide survey of drivers over the age of 50. The results revealed that older drivers define self-regulation as much more than the changes in behaviors due to declining health and ability. The older adults in our research strongly emphasized the psychological processes surrounding independence, self-worth, remaining connected to life and society, and what role the automobile plays. Household composition impacted decisions related to self-regulation. For instance, those from a two-person household were more willing to let their partner drive or share in the driving, while those who lived alone were less likely to self-regulate their driving. **Impact on Industry:** Education programs targeting older adults need to be expanded to include not only the behavioral components of self-regulation, but also the psychological factors that play an equally meaningful role. Legislators devising policy programs need to reconsider what are viable transportation options for the older adult.

- **Keywords:** Older Drivers; Aging and Driving; Self-Regulation; Meaning of Driving

Melissa L. McCarthy, Peilin Sheng, Susan P. Baker, George W. Rebok, Guohua Li. *Validity of police-reported alcohol involvement in fatal motor carrier crashes in the United States between 1982 and 2005. Pages 227-232.*

Objective: To examine the validity of police-reported alcohol data for drivers involved in fatal motor carrier crashes. **Material and Methods:** We determined the availability of blood alcohol concentration (BAC) and police-reported alcohol data on 157,702 drivers involved in fatal motor carrier crashes between 1982 – 2005 using Fatality Analysis and Reporting System (FARS) data. Drivers were categorized as motor carrier drivers if they operated a vehicle with a gross vehicle weight rating of greater than 26,000 pounds. Otherwise, they were classified as non motor carrier drivers. The sensitivity and specificity of police-reported alcohol involvement were estimated for both driver types. **Results:** Of the 157,702 drivers, 18% had no alcohol information, 15% had BAC results, 42% had police-reported alcohol data, and 25% had both. Alcohol information varied significantly by driver, crash, and vehicle characteristics. For example, motor carrier drivers were significantly more likely (51%) to have BAC testing results compared to non motor carrier drivers (31%) ($p < 0.001$). The sensitivity of police-reported alcohol involvement for a BAC level ≥ 0.08 was 83% (95% CI 79%, 86%) for motor carrier drivers and 90% (95% CI 89%, 90%) for non motor carrier drivers. The specificity rates were 96% (95% CI 95%, 96%) and 91% (95% CI 90%, 91%), respectively. **Conclusions:** The sensitivity and specificity of police-reported alcohol involvement are reasonably high for drivers involved in fatal motor carrier crashes. Further research is needed to determine the extent to which the accuracy of police-reported alcohol involvement may be overestimated because of verification bias. **Impact on the Industry:** Based on the results of this study, the federal government should continue to work with states to strengthen their strategies to increase chemical testing of all drivers involved in fatal crashes.

- **Keywords:** Alcohol; Motor carriers; Police reports; Blood alcohol concentration testing; Fatalities

Sean Gallagher, Susan Moore, Patrick G. Dempsey. *An analysis of injury claims from low-seam coal mines. Pages 233-237.*

Introduction: The restricted workspace present in low-seam coal mines forces workers to adopt awkward working postures (kneeling and stooping), which place high physical demands on the knee and lower back. **Method:** This article provides an analysis of injury claims for eight mining companies operating low-seam coal mines during calendar years 1996-2008. All cost data were normalized using data on the cost of medical care (MPI) as provided by the U.S. Bureau of Labor Statistics. **Results:** Results of the analysis indicate that the knee was the body part that led in terms of claim cost (\$4.2 million), followed by injuries to the lower back (\$2.7 million). While the average cost per injury for these body parts was \$13,100 and \$14,400, respectively (close to the average cost of an injury overall), the high frequency of these injuries resulted in their pre-eminence in terms of cost. Analysis of data from individual mining companies suggest that knee and lower back injuries were a consistent problem across companies, as these injuries were each among the top five most costly part of body for seven out of eight companies studied. **Application/Impact:** Results of this investigation suggest that efforts to reduce the frequency of knee and low back injuries in low-seam mines have the potential to create substantial cost savings.

- **Keywords:** Mining; Knee disorders; Low back disorders; Restricted workspace; Posture; Musculoskeletal disorders; Injury costs