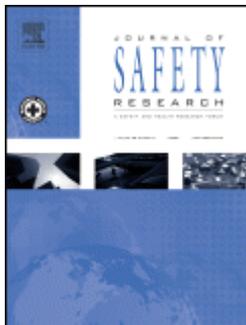


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Marianne Törner, Anders Pousette. *Safety in construction : a comprehensive description of the characteristics of high safety standards in construction work, from the combined perspective of supervisors and experienced workers.* Pages 399-409.

Introduction: The often applied engineering approach to safety management in the construction industry needs to be supplemented by organizational measures and measures based on how people conceive and react to their social environment. This requires in-depth knowledge of the broad preconditions for high safety standards in construction. The aim of the study was to comprehensively describe the preconditions and components of high safety standards in the construction industry from the perspective of both experienced construction workers and first-line managers. **Method:** Five worker safety representatives and 19 first-line managers were interviewed, all strategically selected from within a large Swedish construction project. Phenomenographic methodology was used for data acquisition and analysis and to categorize the information. Nine informants verified the results. **Results:** The study identified four main categories of work safety preconditions and components: (1) *Project characteristics and nature of the work*, which set the limits of safety management; (2) *Organization and structures*, with the subcategories *planning, work roles, procedures, and resources*; (3) *Collective values, norms, and behaviors*, with the subcategories *climate and culture, and interaction and cooperation*; and (4) *Individual competence and attitudes*, with the subcategories *knowledge, ability and experience, and individual attitudes*. **Discussion:** The results comprehensively describe high safety standards in construction, incorporating organizational, group, individual, and technical aspects. High-quality interaction between different organizational functions and hierarchical levels stood out as important aspects of safety. The results are discussed in relation to previous research into safety and into the social-psychological preconditions for other desired outcomes in occupational settings. **Impact on Industry:** The results can guide construction companies in planning and executing construction projects to a high safety standard.

- **Keywords:** Occupational safety; Safety culture; Safety climate; Safety management; Trust; Construction industry

G.L.L. Reniers, A. Audenaert. *Chemical plant innovative safety investments decision-support methodology.* Pages 411-419.

Introduction: This article examines the extent to which investing in safety during the creation of a new chemical installation proves profitable. **Method:** The authors propose a management supporting cost-benefit model that identifies and evaluates investments in safety within a chemical company. This innovative model differentiates between serious accidents and less serious accidents, thus providing an authentic image of prevention-related costs and benefits. In classic cost-benefit analyses, which do not make such differentiations, only a rudimentary image of potential profitability resulting from investments in safety is obtained. **Results:** The resulting management conclusions that can be drawn from such classical analyses are of a very limited nature. The proposed model, however, is applied to a real case study and the proposed investments in safety at an appointed chemical installation are weighed against the estimated hypothetical benefits resulting from the preventive measures to be installed at the installation. **Conclusion:** In the case-study carried out in question, it would appear that the proposed prevention investments are justified. **Impact on industry:** Such an economic exercise may be very important to chemical corporations trying to (further) improve their safety investments.

- **Keywords:** cost/benefit analysis; optimizing safety investments; prevention costs in the chemical sector

Thomas L. Traynor. *The impact of state level behavioral regulations on traffic fatality rates.* Pages 421-426.

Introduction: A state by year panel is analyzed to simultaneously explore the statistical correlation between state level traffic fatality rates and state level behavioral regulations regarding teen licensing, seat belt use, and driving under the influence (DUI) in a model that also controls for other correlates. **Method:** By including measures of all three of these policies, the estimated policy effects should not be overstated due to underspecification bias. The panel includes the 48 contiguous U.S. states for the time period from 1999 through 2003. State fatality rates are measured as fatalities per million miles traveled. Measures of state policies regarding traffic safety related behavior are based on information gathered by the Insurance Institute for Highway Safety. Estimates are calculated via a time fixed effects model that uses the double-log form to allow for interaction effects between the independent variables. **Results:** Least squares estimates indicate that, on average, more restrictive graduated teen licensing and DUI policies significantly reduce traffic fatality rates, while stricter seat belt enforcement policies have a statistically insignificant negative impact on fatality rates.

- **Keywords:** Traffic fatalities; State fatality rates; Driving regulations; Teen licensing; Seat belt use; Driving under the influence; Economic conditions

Claire Laberge-Nadeau, François Bellavance, Stéphane Messier, Lyne Vézina, Fernand Pichette. *Occupant injury severity from lateral collisions : a literature review.* Pages 427-435.

Problem: Side impacts are a serious automotive injury problem; they represent about 30% of all fatalities for passenger vehicle occupants. This literature review focuses on occupant injuries resulting from real lateral collisions. It emphasizes the interaction between injury patterns and crash factors, taking into account type of injuries and their severity. It highlights what is known on the subject and suggests further studies. **Method:** We reviewed papers identified by searches in two electronic databases for the 1996-2009 publication period, and in specific journals and conference proceedings. **Results:** Studies on the Primary Direction of Force (PDOF) have revealed that fatal crashes occur most frequently when the PDOF is at 3 or 9 o'clock. The risk of serious injury is two to three times higher for the near-side occupant than for the far-side occupant. Head injuries predominate in oblique impacts and thoracic injuries in perpendicular ones. A few results are also reported on side airbag protection.

Conclusions: This literature review presents an overall picture of the injuries caused by lateral collisions, though each of the papers or articles examined focuses mostly on some particular aspect of the problem. The incidence of specific injuries depends on the data source used. Very few population-based analyses of lateral collision injuries were found.

Impact on industry: New studies are needed to evaluate new protective devices (e.g., lateral airbags, inflatable curtains). Without interfering with their care duties, Emergency Medical Technicians could be systematically trained to observe the collision's specific characteristics and to report all their relevant observations to the emergency physicians to increase the likelihood of prompt diagnosis and proper care.

- **Keywords:** Side impact; Side airbags; Type of injury; Injury prevention

Richard Roth, Paul R. Marques, Robert B. Voas. *A note on the effectiveness of the house-arrest alternative for motivating DWI offenders to install ignition interlocks.* Pages 437-441.

Introduction: The effectiveness of ignition interlocks at reducing drunk driving has been limited by the ability of driving-while-intoxicated (DWI) offenders to avoid court orders to install the devices. **Methods:** In a pilot program in New Mexico, four Santa Fe County judges imposed home confinement (via electronic monitoring bracelets) on offenders who claimed to have no car or no intention to drive. Interlock installation rates for Santa Fe County were compared with all other counties in New Mexico over a 2-year program and 2-year post-program period. **Results:** During the two program years, 70% of the drivers convicted of DWI in Santa Fe County installed interlocks, compared to only 17% in the other counties, but when the program was terminated, the Santa Fe installation rate fell by 18.8 percentage points. **Summary:** Mandating the alternative sanction of house arrest led to the highest reported interlock installation rate for DWI offenders. **Impact on Industry:** Impaired driving is a substantial expense to employers, particularly when it bars driving that interferes with employment. Interlocks provide a method of protecting the public while permitting the offender to drive sober. This study was directed at increasing interlock use by DWI offenders.

- **Keywords:** Interlocks; DWI; Recidivism; Drunk Driving; House Arrest

Mike A. Males. *Poverty as a determinant of young drivers' fatal crash risks.* Pages 443-448.

Problem: U.S. teenaged and young-adult drivers' elevated rates of fatal traffic crash involvement typically are attributed to biological and developmental risk-taking associated with young age. However, young drivers differ from older ones along several sociodemographic dimensions, including higher poverty rates and greater concentration in poorer areas, which may contribute to their risks. **Method:** Using Fatality Analysis Reporting System, Census, and Federal Highway Administration data for 1994-2007, bivariate and multivariate regression analyses were conducted of fatal motor-vehicle crash involvements per 100 million miles driven by driver age (16 through 74) and state along with 14 driver-, vehicle-, and state-level variables. **Results:** Driver age was not a significant predictor of fatal crash risk once several factors associated with high poverty status (more occupants per vehicle, smaller vehicle size, older vehicle age, lower state per-capita income, lower state population density, more motor-vehicle driving, and lower education levels) were controlled. These risk factors were significantly associated with each other and with higher crash involvement among adult drivers as well. **Summary and Discussion:** The strong association between fatal crash risk and environments of poverty as operationalized by substandard vehicle and driving conditions suggests a major overlooked traffic safety factor particularly affecting young drivers.

- **Keywords:** Adolescent health; Mortality; Motor-vehicle fatality; Socioeconomic conditions

Virginia Routley, Joan Ozanne-Smith, Yu Qin, Ming Wu. *Taxi driver seat belt wearing in Nanjing, China. Pages 449-454.*

Objective: To determine and validate patterns of seat belt use and attitudes of taxi drivers on wearing a seat belt following national and provincial seat belt legislation in 2004-2005. **Design:** Roadside daylight seat belt observation and interview survey methods were used, as well as observations from inside taxis during routine trips and a taxi driver focus group. The setting was Nanjing, Jiangsu Province, PR China in April of 2006 and 2007. **Main outcome measures:** Prevalence of seat belt use and attitudes to wearing a seat belt were determined, as were vehicle and driver characteristics, and comparisons with other motor-vehicle driver's seat belt use and attitudes. **Results:** Taxi drivers interviewed were predominantly male and aged 30-39 years. They spent more hours per week in their vehicles and had more driving experience than other drivers. Over half (56.2%) of taxi drivers interviewed reported that they *always wore* seat belts, while observation of taxi drivers showed lower wearing rates (i.e., roadside observation was 43.8%, and observation from inside taxis was 36.2%). **Belt tampering** was a practice of 12-15% of taxi drivers. "Fine avoidance, safety, high speed and long trips" were given as important reasons for *wearing* and "feeling trapped and uncomfortable" for *not wearing*. Seat belt reminder signs in taxis were common (82.6% of taxis), but did not appear to impact on driver seat belt use. **Conclusion:** The four research methods found taxi drivers to have consistently low "correct wearing" rates. **Impact on industry:** As in several other countries, taxi drivers are particularly resistant to seat belt use. Innovative strategies, including occupational health and safety approaches, may be required to achieve increased levels of seat belt use.

- **Keywords:** Road safety; Seat belt; China; Taxi; Safety belt; Seatbelt; Restraint

Susan M. Moore, William L. Porter, Patrick G. Dempsey. *Fall from equipment injuries in U.S. mining : identification of specific research areas for future investigation. Pages 455-460.*

Introduction: The objective of this study was to evaluate the circumstances leading to fall from equipment injuries in the mining industry. **Method:** The 2006 and 2007 Mine Safety and Health Administration annual injury databases were utilized for this study whereby the injury narrative, nature of injury, body part injured, mine type, age at injury, and days lost were evaluated for each injury. **Results:** The majority of injuries occurred at surface mining facilities (77.6% 60%) with fractures and sprains/strains being the most common injuries occurring to the major joints of the body. Nearly 50% of injuries occurred during ingress/egress, predominately during egress, and approximately 25% of injuries occurred during maintenance tasks. The majority of injuries occurred in relation to large trucks, wheel loaders, dozers, and conveyors/belts. The severity of injury was independent of age and the median days lost was seven days; however, there was a large range in severity. **Impact on industry:** From the data obtained in this study, several different research areas have been identified for future work, which include balance and stability control when descending ladders and equipment design for maintenance tasks.

- **Keywords:** Mining; Fall from equipment; Ingress/egress; Maintenance

Wei-Chung Liu, Ji-Liang Doong, Sing-Ling Tsai, Ching-Huei Lai, Ming-Chang Jeng. *Integrated model of simulated occupant injury risk and real medical costs. Pages 461-468.*

Introduction: The purpose of this study was to develop an integrated methodology that links occupant injury risk functions, estimated in the laboratory, with real world medical treatment costs by using the abbreviated injury score (AIS). Using our model, the

expected medical treatment costs for crash injuries to various body regions and of different severities can be investigated. **Methods:** First, the simulation results are compared with NHTSA crash data. We used a modified kinematics simulation model that incorporates an $F = E^b$ function as a supplement to the previous Steffan's model to obtain a more accurate acceleration history $a(t)$. Second, head injury criteria HIC_{36} can be calculated from $a(t)$, and we use the injury probability P as a function of HIC_{36} , as proposed by Kuppa, to obtain the injury risk function for various AIS values. Third, medical treatment cost models for various AIS values can be calculated by using a regression cost model with real world data. Finally, the injury risk function and medical treatment cost models are linked through AIS values. We establish an integrated methodology and predict medical costs and car safety data using real world police reports, medical treatment costs, and laboratory simulation results. **Results:** Using head injuries in frontal crashes as an example, we focus on simulation parameters for different vehicle models, with and without airbags. We specifically examine impact closing speed, Delta-V, and impact directions. **Conclusion:** Simulation results can be used to supplement insufficient real crash data, in particular ΔV , and injury risk results from police crash reports. **Impact on industry:** The proposed integrated methodology may provide the vehicle industry with a new safety assessment method. Real crash data coupling provides consumers with more realistic and applicable information.

- **Keywords:** integrated model; modified kinematics simulation model; injury risk; medical cost

Laurie F. Beck, Ruth A. Shults. *Seat Belt Use in States and Territories with Primary and Secondary Laws : United States, 2006. Pages 469-472.*

Problem: Motor-vehicle crashes are a leading cause of death in the United States. In the event of a crash, seat belts are highly effective in preventing serious injury and death. **Methods:** Data from the 2006 Behavioral Risk Factor Surveillance System were used to calculate prevalence of seat belt use by state and territory and by type of state seat belt law (primary vs. secondary enforcement). **Results:** In 2006, seat belt use among adults ranged from 58.3% to 91.9% in the states and territories. Seat belt use was 86.0% in states and territories with primary enforcement laws and 75.9% in states with secondary enforcement laws. **Discussion:** Seat belt use continues to increase in the United States. Primary enforcement laws remain a more effective strategy than secondary enforcement laws in getting motor-vehicle occupants to wear their seat belts.

- **Keywords:** Seat belt; Injury; Motor vehicle crash; Motor vehicle; Surveillance