NHTSA reconstruction reports of selected fatal incidents.

Results
From 1991-2000, there were 300 fatal crashes involving ambulances. In these incidents, 82 occupants were killed, of which 27 were EMS providers. Of these, seven were in the patient compartment, five in the right-front passenger seat, 11 in the driver's seat, and four were uncoded.

Discussion
Ambulance drivers experience the majority of less-severe injuries (coded "Possible" and "Non-Incapacitating Evident"), while patient compartment occupants (EMS providers and civilians) are most likely to suffer "Incapacitating" and
"Fatal" injuries. In incidents involving fatalities to EMS providers, failure to wear seatbelt restraints appears to be the primary factor. Seat belts do not allow complete access to patients who need appropriate medical attention.

Conclusions
Improved restraint systems are needed for the patient compartment that permit workers to stand and attend to the patient, yet still protect workers during sudden stops or avoidance maneuvers. Also, restraints should be used by all occupants, including the driver and front-seat passenger.

E3.4

Title: Road Compactor Overturn Injury Risk Factors
Author: Myers ML

The Occupational Safety and Health Admistration (OSHA) promulgated a ROPS standard for construction vehicles in 1972 that did not include compactors, and OSHA has yet to promulgate this standard. The specific aims of this project were to:

1. Identify the machine, evironmental, and human factors that contribute to compactor overturns,
2. Identify design defects of ROPS that result in them crushing operators/drivers during an overturn,
3. Evaluate the likely consequences of overturns of ROPS-equipped compactors if they had not been equipped with a ROPS,
4. Evaluate the potential of ROPS and seatbelt-equipped compactors in preventing injuries as a result of falls from or collisions of the machines if a seatbelt had been used, and
5. Evaluate OSHA's application of the General Duty Clause to enforce the use of ROPS on compactors.

This project addressed the need to protect compactor operators and drivers from injury in the event of an overturn of their equipment. Many of these workers have been killed or seriuosly injured over the last 30 years, and they contunue to be killed or injuried by compactor overturns each year. Most of these injuries occur on compactors that lack a ROPS, but some occur with ROPS-equipped compactors.

The research design is to use OSHA and NIOSH investigation reports of compactor overturns and runovers to determine the risk factors related to these incidents. Data from these reports were placed into a Haddon matrix to analyze the role of machine, environment, and human factors and the temperal demension (prior, during, and after) of the incident. In addition, a flowchart was constructed for each incident to understand the anticedent factors leading to and the characteristics of the overturn.

E3.5

Title: The Work Zone Analysis System: A Tool to Evaluate Worker Exposure Around Hazardous Equipment
Author: Schiffbauer WH

Worker injuries and fatalities in industrial work zones are a major concern to the National Institute for Occupational Safety and Health Administration (NIOSH). Highway workers (SIC 1611) are at great risk from passing motorists, and construction vehicles. The Mine Safety and Health Administration (MSHA) maintains a database that has identified a high number of mine workers killed or disabled as a result of working near vehicles. Surface drilling operations have been investigated by the Occupational Safety and Health Administration (OSHA) to determine how many workers have lost or have had their hearing impaired by working close to drill rigs. Dust exposure in industrial work environments has also been heavily investigated. NIOSH has developed a research tool called a Work Zone Analysis System (WZAS), which can greatly enhance data collecting and analysis in efforts to mitigate the aforementioned hazards. The basic components of the WZAS are: differential mode GPS receivers, machine vision processors, wired and wireless video links (ground and air-borne), proximity determination devices, and data analysis tools. The WZAS is housed in a mobile trailer which includes: power, a 58 foot mast, a satellite internet dish, and numerous other features. The WZAS will enable NIOSH researchers to perform detailed task analyses of outside work environments. This information will help identify what remedial actions could benefit worker safety. Expected outcome variables include: incidence of workers-on-foot (WOF) within vehicle blind spots; amount of time a WOF is in a blind spot, or within a specified distance of a vehicle; number of WOFs in proximity to operating vehicles; amount of time a vehicle backs up per hour of operation; process operational efficiency; intervention feasibility; areas of exposures to high noise levels; and areas of exposures to high dust levels.

NOIRS 2003 ABSTRACTS

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