

hours worked was considered. Furthermore, although people aged 30-39 years were identified as having the highest rates per 1,000 people, children aged 5-9 years and 10-14 years had the highest rates of injury based on total hours worked. The major vehicles of farming-operation-related injuries were livestock, machinery and equipment, and tractors. Potential risk factors for the injury events were identified. Findings were applied to the development of specific state action plans during a comprehensive Agricultural Injury Intervention Strategy Workshop in July 1992.

Conclusions: The Regional Rural Injury Study serves as a model for both regional and national surveillance efforts, enabling the magnitude of the problem and potential risk factors to be identified. Further, it provides a basis for analytical studies that can identify specific risk factors and for developing relevant intervention programs.

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Transportation Injuries on the Job

Aviation: Major Source of Occupational Injury

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Objectives: To determine the size and nature of the occupational mortality problem related to aviation; to suggest potential countermeasures.

Methods: We reviewed and analyzed National Transportation Safety Board (NTSB) data for crashes during 1983-1988 of commuter aircraft and air taxis (in which many deaths of commercial pilots occur) and of National Traumatic Occupational Fatality data from NIOSH.

Results: Air transport is the second leading cause of death in the transportation industry and the third leading cause among public administration workers. Workers at risk include not only pilots and flight crews but instructors, crop sprayers, search and rescue crews, and people traveling on business. Commuter pilots who fly 25 legs weekly during a 20-year career have one chance in five of being involved in a fatal crash. When air taxis or commuter aircraft crash, the chance of death is increased eightfold by fire and fourfold by failure to use shoulder restraints. Bad weather increases both the incidence of crashes and the likelihood of fatal injury.

Conclusions: Greater attention should be given to preventing aviation-related deaths and injuries that occur in connection with work. Relevant preventive efforts range from promotion of shoulder-restraint use to restrictions on travel in bad weather.

Fatal Occupational Injuries in the Alaska Air Transportation Industry Sector, January 1991-July 1992

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Objectives: To describe the epidemiology of fatal occupational injuries in the Alaska air transportation industry for the period January 1991-July 1992.

Methods: Surveillance data from the NIOSH Fatal Accident Circumstances and Epidemiology (FACE) Program and crash reports from the National Transportation Safety Board (NTSB) were used to enumerate occupational air transportation fatalities in Alaska.

Results: During the 19-month period January 1991-July 1992, there were 34 occupational air transportation fatalities in Alaska. Exactly half (17) of workers who died were pilots, while the other 17 were from other occupations traveling as passengers. Four of the workers who died were females (one pilot and three passengers). The mean age for all victims was 38 years. Five multiple-fatality events accounted for 25 deaths. One incident was responsible for two deaths, a second for four, and a third for five; two incidents each accounted for six deaths. Two multiple-fatality helicopter crashes accounted for seven deaths. Most fatal events took place during the summer months (May-September). Weather was mentioned as a contributing factor in more than one-third of all fatal events. The 1991 estimated fatality rate for pilots in the Alaska air transportation industry sector was 100/100,000 workers, three times the state average for all occupations and 12 times the national average.

Conclusions: Pilots and other workers flying in Alaskan skies face a substantially higher risk of fatality than the majority of other Alaskan workers.

Factors Related to Occupant Crash Survival in Emergency Medical Service Helicopters

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Objectives: To determine the occupational risk of serious or fatal injury among EMS helicopter crew members in survivable crashes; to suggest preventive measures.

Methods: A nonconcurrent cohort study design was used to evaluate exposure and relative risks of serious injury and death for occupants involved in crashes of EMS helicopters com-

pared with occupants of similar non-EMS helicopters. Data were obtained from crash records maintained by the National Transportation Safety Board and from responses to a mail questionnaire for crash survivors.

Results: Main-cabin occupants of EMS helicopters are at approximately 4.5 times the risk of injury in survivable crashes with an adjusted odds ratio of 4.4 (95% CI = 1.7, 11.6) when compared with a comparable population of non-EMS helicopter main-cabin occupants. There was no significant difference demonstrated in injury risk for EMS front-seat occupants compared with non-EMS front-seat occupants. This supports the hypothesis that the medical interior modification, which is limited to the main cabin, is strongly associated with injury risk. Additionally, when injured, EMS occupants in the main cabin experience significantly more serious injuries than non-EMS main-cabin occupants with mean ISC scores (a derivative injury summary score based on the Injury Severity Scale) of 5.65 compared with 2.13 for the non-EMS main-cabin occupants. There was, however, no significant difference demonstrated in injury scores for front-seat occupants. Main-cabin EMS passengers were at higher risk for serious back injuries with an unadjusted relative risk of 3.10 (95% CI = 1.37, 7.03) and at significantly greater risk for serious head injuries with an unadjusted relative risk of 10.9 (95% CI = 1.40, 84.3).

Conclusions: The findings from this study indicate EMS helicopter occupants, specifically main-cabin occupants, are at greater risk for serious injury and death in survivable crashes than a comparable population of non-EMS helicopter occupants. The modification to the EMS interior for the transport and care of pa-

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May 20-23, 1993 – Atlanta, Georgia