

*Fatigue Management for Ramp Workers*

**ACRP Staff Comments**

The AOC previously discussed a similar problem statement and chose not to fund it.

**TRB Aviation Committee Comments**

**AVIATION SECURITY AND EMERGENCY MANAGEMENT:** The reviewers gave strong support for this problem statement. It is definitely a topic of interest in a domain where fatigue management is not well documented, as it is for controllers or pilots. This is an extremely important and neglected topic in aviation safety. Given that this is the first attempt to develop FRMP for ramp workers, this study offers a good exploratory approach. However, it is not exhaustive, since fatigue is not only associated with sleep disorders. Nonetheless, the outputs of this study will provide good guidance and an important framework for future research in this field. That said, the deliverable is somewhat vague and may need further clarification on contents (Guidebook for Establishing a Fatigue Management for Ramp Workers). This ACRP proposal was developed with staff from Volpe Center, Harvard Medical School, and Sea-Tac Airport, all very reputable. The budget, scope, and timeline appear reasonable. One reviewer expressed support, but cautioned that there are several tools (FAST, FRMS, and others), so the study should focus on the effectiveness of those tools already in use, not just more research on a problem that we know exists.

**Review Panel Recommendation and Comments**

*Not recommended.* The problem being addressed would not directly help airports, as the likely solutions would be beyond the airport's control (such as work-rest rules). SMS would also likely be a way to address this.

**AOC Disposition**

This problem statement was brought up for discussion from the list of Not Recommended problem statements. It was noted that the AOC discussed this problem statement last year. While the topic is important, it was acknowledged that much of this issue is controlled by collective bargaining agreements and is overseen by OSHA, making any findings difficult to implement. After the discussion, the problem statement was withdrawn from further consideration. No funds were allocated.

**1. PROBLEM TITLE** Fatigue Management for Ramp Workers

**2. BACKGROUND** Fatigue is a known risk factor in all aspects of transportation safety, especially aviation. Due to the nature of aviation, fatigue is induced throughout the industry. This fact has been recently highlighted with the reports of air traffic controllers falling asleep at inappropriate times during work. In order for aviation to be safe, fatigue must be managed throughout the entire aviation system, from crewmembers on the aircraft, to controllers directing the flights and to individuals driving vehicles on congested airport ramps or taxiing unoccupied aircraft.

Ramp workers are an overlooked segment of the circle of safety in the aviation industry. Worldwide, it is estimated that there are 27,000 incidents/accidents on airports ramps and 243,000 injuries (9 per 1000 departures) per year. Ramp accidents are estimated to cost major airlines at least \$10 billion annually (2). According to data from the Service Employees International Union, there have been 99 people killed in airport ramp accidents since 2001 (3) The majority of the fatalities were ramp workers; however, the risks extend beyond the ramp and ramp workers. For example, at Seattle-Tacoma International Airport (SEA) a ramp vehicle punctured an aircraft fuselage on the ramp resulting in the departing aircraft experiencing a sudden cabin depressurization on a flight with 142 people on board (1). In 2015, a ramp worker who fell asleep in the cargo hold caused the aircraft to make an emergency landing (4). These incidents demonstrate that ramp accidents extend risks to the flying public.

The Federal Aviation Administration (FAA) implemented new rules to address pilot fatigue, however there are no federal or industry wide standards for ramp operations. Although duty hour restrictions have long been in effect for pilots and flight attendants, there are currently no limitations on the number of hours that ramp workers and other airport ground personnel that operate on the airport surface can work consecutively or in a 24-hour period. It is unknown how many of these employees work consecutive shifts and/or multiple jobs, compounded by the fact that many airports do not employ ramp workers directly, but rather through contractors. Nevertheless, ramp workers directly affect the safety of the airport and fatigue has not been examined in this occupation. Addressing fatigue in ramp workers will likely improve safety and efficiency and reduce costs associated with incidents and accidents.

The Government Accountability Office recommended that the FAA take several measures to enhance runway and ramp safety including working with OSHA and industry to better understand ramp accidents (1). Furthermore, a survey of aviation experts indicated that creating a culture of safety in the ramp area had the greatest potential for preventing ramp accidents (1). The safety culture and any comprehensive Safety Management System for airports must address fatigue of ramp workers and evaluate and mitigate its risk.

**3. OBJECTIVE** A Fatigue Risk Management Program (FRMP), specific to the needs of ramp workers, will be developed and implemented in at least one airport with the feasibility, acceptability and efficacy of the program evaluated. An implementation schedule should then be devised to provide a successful program to ramp workers in major airports across the country.

**4. PROPOSED TASKS** The goal of the FRMP for ramp workers is to reduce the adverse consequences of fatigue on the ramp workers' health, safety, and performance. The FRMP will include: (a) initiation of a sleep, health and safety education and training program to include fatigue countermeasure recommendations and caffeine re-education; (b) screening of all ramp workers for common sleep disorders via an efficient web-based survey instrument; and (c) measurement of outcomes to assess the feasibility, acceptability and efficacy of the program.

**5. ESTIMATED FUNDING** Based on development and implementation of FRMPs in other occupational groups, \$400,000-500,000 will be needed to complete this research.

**6. ESTIMATED RESEARCH DURATION** This research could be completed in two years, including 3 months for review and revision of a draft final report.

**7. RELATED RESEARCH** The deleterious effects of fatigue are readily observed in a wide range of safety-sensitive professions including a 168% increase in motor vehicle crashes and a 464% increase in near miss motor vehicle crashes (5). There is a 73% increase in risk of self-injury when working extended hours (6) and resident physicians made 36% more serious medical errors, 464% more serious diagnostic errors and the risk of a medical error resulting in the death of the patient increased 300% when a first-year resident worked more than one extended shift per week (7,8).

Recently almost 5,000 North American police officers and nearly 7,000 firefighters received sleep health education and were screened for common sleep disorders. Of these first responders, 39% screened positive for at least one sleep disorder; 84% were undiagnosed. Those prospectively identified as screening positive for a sleep disorder had a 41% higher risk of reporting a serious administrative error, a 50% higher risk of falling asleep while driving (9), twice the risk of a motor vehicle crash (10) and a 53% increase in making an error or safety violation attributed to fatigue (9). Those working long shifts and those at high risk of a sleep disorder were significantly more likely to fall asleep while at work, while stopped in traffic, during meetings, and while on the telephone, indicating a profound level of fatigue (5, 8-11). They were also 137% more likely to have cardiovascular disease, 91% more likely to have diabetes, 210% more likely to have depression and 281% more likely to have anxiety (11). Preliminary data indicate that there were 10% fewer reported injuries ( $p < 0.05$ ) and nearly half the rate of injury/disability days ( $p < 0.01$ ) in fire stations that employed a FRMP.

These data demonstrate that FRMPs can identify vulnerable individuals most at risk for adverse health and safety outcomes. However the approach and material must be individualized for the targeted occupational group. For example, the railroad industry is a more disparate group of employees, more similar to the ramp workers. In that group, we developed and implemented a very successful on-line fatigue risk management education and screening program, A Railroaders' Guide to Healthy Sleep, available at <https://www.railroaderssleep.org/>.

**8. PROCESS USED TO DEVELOP PROBLEM STATEMENT** The Harvard Work Hours, Health and Safety Group (HWHHSG) had informal discussions with investigators at the Volpe National Transportation Systems Center and Mr. Mark Coates, Senior Manager, from Airport Operations at Seattle-Tacoma International Airport. We discussed the problem of fatigue in ramp workers and the best approach to mitigate it in order to improve the health and safety of all airport ground personnel that operate on the airport surface.

**9. PERSONS SUBMITTING** This problem statement was developed by Drs. Laura K. Barger and Charles A. Czeisler, founding member and director, respectively, of the HWHHSG. Formed in 2000, the mission of this multidisciplinary group is to quantify the interaction between work hours, sleep, fatigue, health and performance in real-world occupational settings for both the employees and the general public with whom they interact. The group aims not just to quantify these interactions but also to devise and test objectively direct practical interventions to alleviate fatigue-related adverse events and health decrements. The HWHHSG has focused on developing, implementing and evaluating fatigue management programs in safety-sensitive occupations including resident physicians, law enforcement officers, including federal air marshals, firefighters, astronauts and flight controllers.

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This problem statement is submitted on March 18, 2016 by Charles A. Czeisler, Ph.D.,M.D. and Laura K. Barger, Ph.D. (See contact information listed above).

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