

use the adult learning principles taught in their future delivery of the foreman orientation materials.

Conclusions: Interventions targeted at employee injury prevention in a construction setting should involve both the foreman level and the support of site-level management. We argued that training supervisors on how to support safety communication will have an impact on worker perceptions and injuries on the job.

D1.4

Title: Demonstration of Proximity Warning Systems (PWS) to Reduce Worker Exposure to Asphalt Trucks at Highway Paving Operations

Authors: **Beaupre JE**, Merinar TR, Fosbroke DE

Introduction: Between 1992 and 1998, the Census of Fatal Occupational Injuries (CFOI) reported 841 fatalities in the highway and street construction industry (Standard Industrial Classification 1611), accounting for 11% of all construction deaths over this period. The majority of fatalities in this industry occurred in work zones with 95% of the fatal events involving vehicles and equipment. In 318 of these fatalities (38%), a worker-on-foot (WOF) was struck by a vehicle, typically while backing (51%). The primary injury source for these WOF fatalities was a truck (61%). The objective of this study is to evaluate the efficacy of proximity warning systems (PWS) in reducing WOF exposure to dump trucks at asphalt paving operations.

Methods: The project involved the installation and evaluation of PWS on asphalt delivery trucks. Control and treatment data collection occurred for 6 to 8 days at each company. PWS, including sonar, radar, and camera, were installed on eight asphalt trucks at each of three companies. Data collection methods included global positioning system (GPS) receivers, video observations, and direct observations with the addition of alarm activation data on the treatment sites.

Results: Based on preliminary analysis of direct observation data, the site exposure rate declined by 18.8% from the preintervention rate of 30.3 (95%CI: 35.5–25.1) exposures per hour to the post-intervention rate of 24.6 (95%CI: 29.6–19.6) exposures per hour.

Discussion: Data show a reduction of WOF exposure to equipment, based on preliminary results gathered from direct observations at the site level. Though not statistically significant, these site-level results provide evidence that installation of PWS on asphalt delivery

trucks can reduce worker risk to backing construction equipment. More detailed analysis of truck level video, alarm activation, and GPS data are being conducted.

Session: **D2.0**

Title: Examining the Risk Factors Associated with Slips and Falls

Moderator: Wen Chang

D2.1

Title: Bilateral Lower Extremity Response to Unexpected Slips

Authors: Moyer BE, Redfern MS, **Cham R**

Introduction: Slips that occur at heel contact have been shown to be associated with the greatest risk of falls. Previous slip research has primarily focused on the response of the perturbed leg. The goal of this talk is to present an overview of bilateral lower extremity responses to unexpected slips, focusing on the characterization of the trailing leg's biomechanics.

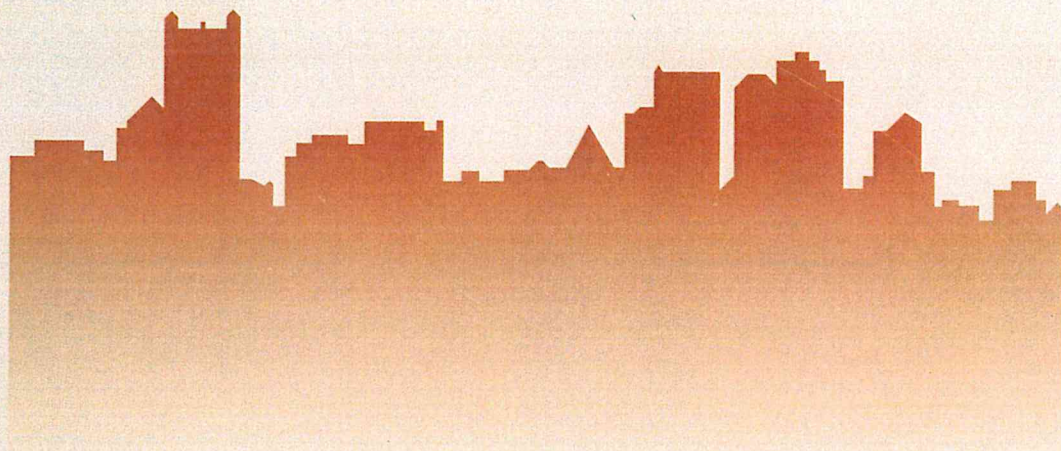
Methods: Twenty-eight healthy participants, divided into a younger (20–33 years) group and an older (55–67 years) group, were exposed to two conditions. First, baseline gait trials (a known dry environment) were collected. Second, a slip was unexpectedly induced at heel contact of the leading foot using a diluted glycerol contaminant. Bilateral force plate and motion data were collected to conduct inverse dynamics analyses.

Results: Four slip-related trailing leg strategies were identified. These strategies included responses ranging from a minimal disruption of swing phase to a premature (~50 ms after toe off) interruption of the trailing leg's trajectory. The trailing leg response was found to be associated with the corrective reaction generated at the knee in the leading/slipping leg. Intra-limb coordination between the hip and the knee was also evident in the trailing leg. The response of the leading/slipping leg preceded that of the trailing limb. Finally, determinants of trailing leg strategy included normal walking patterns and the dynamics associated with early stance during slips. These findings were similar in both age groups.

Discussion and Conclusions: In summary, both the leading/slipping leg and the trailing leg actively contribute to whole-body recovery responses to slips. Inter-limb and intra-limb coordination play an important role in maintaining dynamic stability in response to slips.

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