



## Florida Department of Transportation Research

### Aging Driver and Pedestrian Safety: Parking Lot Hazards Study

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In 2009, Florida reported the highest rate of pedestrian fatalities in the nation. At 2.51 deaths per 100,000 residents, Florida's rate was nearly twice the national average. These deaths occurred in all age groups, but compared to other age groups, older adults were significantly more likely to be injured or killed in pedestrian crashes. Those aged 65 and up are about 13% of the population, but they sustain 18% of pedestrian fatalities, highest of any age group.

Pedestrian incidents that occur in traffic have been the focus of most research and the target of most new countermeasures designed to protect pedestrians. However, in suburban areas, many people do not walk on busy streets, and a significant number of pedestrian-vehicle collisions occur in nontraffic settings, such as parking lots, often involving a backing vehicle. In a series of three tasks, researchers from Florida State University sought a better understanding of pedestrian and driver behavior related to pedestrian-vehicle collisions.

In the first task, researchers analyzed pedestrian crash data for parking lots in South Florida. They examined data for seasonal and daily variations in crash rates. They also divided the data by age of the pedestrian and driver, the size of the parking lot, parking configurations, and direction of vehicle motion at the time of the collision.

In the second task, the behavior of pedestrians in parking lots was examined by field observers, who recorded pedestrian strategies for navigating parking lots and coping with potential hazards. Special note was made of use of crosswalks, an issue raised in task 1, and distracted walking involving use of mobile phones, talking with other pedestrians, or pushing a shopping cart.

In the third task, the behavior of middle-aged and older pedestrians was observed in open parking lots and parking garages through the use of mobile eye-tracking equipment. This allowed a closer



*This eye-tracking unit allowed researchers to follow what pedestrians saw and paid attention to as they traversed a parking lot.*

examination of pedestrian perception, attention, and multitasking. Pedestrians were assigned to walk specific paths, during which the eye-tracking equipment recorded gaze positions and durations. Data included video recordings from the pedestrian point of view with eye movements superimposed.

Study results suggested that the main age-related contributor to vehicle pedestrian collisions was the speed with which pedestrians were able to react to dangerous situations, making older pedestrians and drivers more susceptible, particularly when backing out of parking spaces where reaction speeds and mobility may be issues. Collisions tended to be more frequent in smaller parking lots. They were also more frequent in the winter and spring months, possibly reflecting the tourist season in the area. Older pedestrians tended to be more vigilant than younger ones, but even when they were aware of a hazard, the inability to react quickly worked against older pedestrians. Study results will help formulate countermeasures and educational programs aimed at reducing pedestrian-vehicle collisions.