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Falls are the second leading cause of accidental pedestrian deaths (after road traffic collisions) and are a major cause of personal injury.[1,2] The annual number of falls on public footpaths in England and Wales that require admission to a hospital has been estimated to lie between 20,000 and 190,000 representing a cost of between £0.12 billion to £1.2 billion[3].

Falls happen when the pedestrian is unable to recover their balance from unexpected changes to gait. This may be the foot striking an unexpected object (a trip) or the pavement surface friction being less than expected (a slip). While there is some research about lighting and trip hazard detection[4-7] there is little research about lighting and slip hazards. One possible reason for this is that the papers by Caminada and van Bommel[8] that founded the task-based approach to research of lighting for pedestrians, referred to “detection of obstacles” but did not mention slip hazards.

Safe walking requires a degree of friction between footwear and the ground: slips happen where there is insufficient friction and the pedestrian does not have sufficient time to recover their balance. Common causes of slips include icy, snowy, wet or oily surfaces. Slipping may be more common than tripping.[9] Slips are often reported by postal delivery workers and are a common cause of injury in cold countries.

A question that needs to be addressed is whether road lighting can help with slip detection? We might expect lighting to enhance slip hazard detection if visual perception is able to distinguish between floor surfaces with different levels of friction. The visual cues include a surface’s reflectance, specularity, colour and shading and the density of visual patterns. One study suggests significant correlations between ratings of perceived slipperiness and ratings of perceived surface quality (reflectance, texture, traction) with reflectance yielding the higher correlation.[10] As to whether visual cues are reliable predictors of actual slipperiness, there was significant correlation between subjective ratings (of reflectance, texture and traction) and the coefficient of friction as determined using a slip meter. While reflectance

ratings correlated most strongly with perceived slipperiness, texture ratings correlated most strongly with the measured coefficient of friction. Lighting that enhances the ability to evaluate reflectance and texture could therefore contribute to raising awareness of potentially slippery surfaces. Another study has found that changes in illuminance on the floor affected judgements of floor slipperiness,[11] although it is not clear whether it was the change in floor illuminance that led to the different slipperiness evaluations or some other parameter of lighting such as the spatial distribution. Further research is required to confirm how road lighting might be used to enhance the detection of slip hazards and, if it can, what benefits this might bring to human health and well-being. .

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