



D8 Visibility and Lighting Aspects of Perceiving a Liquid Slip Hazard on a Walkway Surface: A Case Study

James B. Hyzer, PhD*, Hyzer Research, 1 Parker Place, Ste 330, Janesville, WI 53545-4077

The goal of this presentation is to discuss how visibility and lighting influence human ability to visually perceive a liquid slip hazard on a walkway surface.

This presentation will impact the forensic science community by illustrating how conspicuity, expectancy, lighting, and measurable floor surface properties, such as gloss, influence the probability that an individual will visually perceive a liquid slip hazard in time to avoid a slip-and-fall accident.

A common cause of slip-and-fall accidents is liquid on floors. Accident avoidance in such cases, in the absence of prior warning, requires that the individual is able to visually perceive and avoid the hazard before stepping on it. At a minimum, the visual detection of a liquid hazard on the walkway requires that it be either more or less luminous than its immediate background and with sufficient contrast to be distinguishable from its background; however, it will be shown that even though a hazard may be in plain sight and visible, to be seen in sufficient time by all individuals, it must also be conspicuous relative to its surroundings. An object is *conspicuous* if it attracts or tends to attract the attention of an observer so as to be readily discovered. Conversely, an object is *inconspicuous* if it is not readily noticeable or discoverable. The term *conspicuity* refers to the capacity of an object to stand out in relation to its background so as to be readily discovered by vision. Liquid hazards that are more conspicuous are going to be perceived more quickly and therefore at greater distances than hazards that are less conspicuous. At the extremes, hazards that are highly conspicuous should be seen at the greatest possible distances and hazards that are perfectly camouflaged will not be seen at all. For example, colored liquids are generally more conspicuous than liquids that are clear.

It will be shown that the type and orientation of overhead lighting are significant factors affecting the conspicuity of liquids. In particular, some clear liquid hazards can only be seen as a reflection of overhead lighting, and then only when the overhead lighting is in an optimum orientation relative to the individual who will benefit from perceiving the hazard.

A case study involving a slip-and-fall accident at a retail shopping facility exemplifies the points made. At issue was whether the plaintiff should have been able to visually perceive a pool of clear detergent on what defense documents described as a “wet-look” commercial vinyl tile floor. It will be shown that a clear liquid hazard on a “wet look” high-gloss floor would be visually camouflaged under the lighting conditions that are typical in a large retail facility. Additionally, an individual exercising reasonable care regarding where they are walking would not visually perceive an unexpected clear liquid hazard on the surface of a “wet-look” high-gloss floor.

Numerical characterization of wet-look high-gloss floors will be discussed. “Gloss” is quantified in Gloss Units (GU) using an instrument called a glossmeter. Gloss quantifies the shininess of a surface; waxed and polished smooth tile floors have high gloss and unwaxed non-polished floors have low gloss. The GU for the subject “wet-look” dry floor was measured at 75GU-80GU. When wet with clear detergent, it measured 69GU-72GU. The unfinished tile measured 11GU and a typical commercial ceramic tile measured 2.2GU.

It will become obvious that some floors and floor finishes are better suited for exposing liquid slipping hazards



Engineering Sciences - 2017

by rendering them more conspicuous. The analogous case of ice on outdoor pavement will also be discussed.

Visibility, Lighting, Slip-and-Fall
