C46 Human Factors Evaluation of Entry Step Switch in a Recreational Vehicle

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After attending this presentation, attendees will gain an understanding of human-machine interface issues related to the arrangement and coding of controls, as well as insight into human perceptual and cognitive capabilities and limitations that often interact with engineering issues.

This presentation will impact the forensic science community by demonstrating the practical application of human factors research in the evaluation of a litigated personal injury case.

The findings of a human factors evaluation of an incident in which a woman was seriously injured when she stepped out of her Recreational Vehicle (RV) at night, not realizing the power entry step was locked in the retracted position will be presented.

The evaluation included analyses of the plaintiff's operation of the entry step control, the design and operational logic of the entry step control, the arrangement of the entry step control, and the adequacy of warnings adjacent to the entry step control.

Evaluation of the plaintiff's behavior and the operational logic of the power entry step control revealed the following:

Wvnd she fell to the ground.

A different operational logic design could have prevented this incident. A later version of this RV provided an operational logic that made it impossible to lock the power entry steps in the retracted position.

Evaluation of the entry step control revealed that it was a rocker switch located near the door and adjacent to three other rocker switches, one of which controlled the porch light. Analyses of previous human factors engineering research and human-machine interface design guidelines, which will be discussed during the presentation, revealed that the arrangement of the entry step switch, as well as the similar coding for the four switches, made accidental operation of the entry step switch a foreseeable event.

Three of the switches controlled power to three different lights, and the fourth controlled power to the entry steps. Pressing the entry step switch ON did not extend the steps as the ON position of a light switch turned on a light; however, the plaintiff thought of the entry step switch in the same way as one would think of a light switch. The different operation of the entry step switch required that it be arranged and coded differently from the light switches to facilitate user understanding; however, it was not.

Given the confusing nature of the different switch operations, a warning would have been useful. However, the existing label warned about accidentally retracting the steps by turning on the engine ignition switch while the RV was parked, but failed to mention other ways to cause the entry steps to retract, such as switching the entry step power OFF. Other issues with the failure to provide format, content, and location of an effective warning will be provided during the presentation.

This injury incident was primarily caused by: (1) a poorly designed operational logic; (2) the similar coding and close proximity of controls for the entry step and porch light; and, (3) the failure to warn.

Human Factors, Human-Machine Interface, Warnings

 ** Presenting Author*