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Personal Injury

Escalators not always a walk in the park

Despite safety standards, most injuries caused by falls

By **Robert Parkinson and Brittany Sinclair**

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(May 8, 2017, 7:33 AM EDT) -- "*An Escalator can never break: it can only become stairs. You should never see an Escalator Temporarily Out of Order Sign, just Escalator Temporarily Stairs. Sorry for the convenience.*" – *Mitch Hedberg*

The above quote by the late comedian Mitch Hedberg indicates, as many believe, that escalators are just moving stairs. However, when walking on an escalator, people are exposed to the potential of tripping and falling. The Technical Standards and Safety Authority (TSSA) reported that from 2012 to 2014 there were more than 800 injuries associated with escalator passengers in Ontario, and the Consumer Product Safety Commission (CPSC) estimated that 75 per cent of escalator injuries in the U.S. resulted from falls.

Escalator design, maintenance and operation are governed by safety standards to ensure safe use for the public. The American Society of Mechanical Engineers (ASME) "Safety Code for Elevators and Escalators" (A17.1) and the Canadian Standards Association (CSA) "Safety Code for Elevators" (B44) are the leading standards applied in Canada and provide dimensional requirements for escalator design. However, escalator design requirements differ from publicly accessible staircase design, which is governed by the Ontario Building Code.

The Ontario Building Code provides the minimum building standards required for public safety, and as such, can be compared to the ASME/CSA standards to evaluate the "safety" of walking on escalators. Specifically:

- Escalator step treads are required to be between 22 and 40 inches (560 to 1,020 mm) wide, with handrails on both sides, whereas stairs require handrails on both sides only when the stair width exceeds 43.3 inches (1,100 mm).
- Handrails can be 1 inch (25 mm) higher on an escalator than on a staircase.
- Escalator step treads are allowed to have a depth greater than 15.75 inches (400 mm), whereas tread depths on stairs are limited to 10 to 14 inches (254 mm and 356 mm).
- The rise between treads on an escalator is required to be less than 8.5 inches (220 mm), while stairs can have a rise between 5 and 7.9 inches (125 mm and 200 mm).

Clearly, escalator dimensions are not the same as that of publicly accessible stairs. Further, at the beginning and end of an escalator, tread depths and rise heights are variable by design. These variations in stair dimensions could constitute a tripping or misstepping hazard, which may cause a fall. Despite these differences, many people walk on escalators, abiding by the "unspoken rule" of standing on the right and walking on the left. Standing while on an escalator reflects its intended use, while walking up the moving treads reflects a user choosing to use the escalator as a set of "moving stairs." In this instance, the person is required to adapt to both increased tread dimensions and the relative movement of the treads and their body.

Thankfully, people watch where they walk and look for cues along their path of travel. Cues can influence people's behaviour when they convey information about the nature of a hazard and are

sufficiently distinct (i.e., demarcated, think colour contrast) from their environment to capture attention.

Using cues, people are able to negotiate height transitions, such as curbs and stairs, but they must adapt their normal walking behaviour to do so. When approaching an escalator, people adapt their walking behaviour by altering their step length, the angle at which their foot contacts the moving surface, and their speed to match that of the moving surface, all of which help maintain stability. However, if people are unable to detect cues or identify the tread dimensions, they may be more likely to trip or misstep and fall.

Under normal visibility, the moving steps of an escalator would be expected to provide an obvious cue for a person to adapt their walking behaviour to successfully navigate the moving surface. Additionally, as per the ASME/CSA standards, escalators are required to be equipped with caution signs at the top and bottom landings to cue people that they are approaching a moving surface. The steps are required to be demarcated with yellow strips along the back and sides and green step demarcation lights are required at the top and bottom landings. Together, these cues help passengers safely navigate escalators.

Therefore, although escalator steps are not dimensionally equivalent to public staircases, people can safely navigate these differences if they pay attention to their path and properly adapt their walking behaviours. Given the aggressive metal edges of escalator treads, falls on these surfaces may have serious injury outcomes. Of course, users can choose to simply stand on the escalator and enjoy the ride, reducing the risk of a fall by removing the need to adapt their walking behaviour.

Mitch Hedberg wasn't entirely wrong: escalators are *like* stairs — but people need to be attentive and adapt their walking behaviours to navigate escalators successfully.

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