KEEPING ASSEMBLY VENUE EGRESS PATHS USABLE

By Ron Coté, P.E., Principal Life Safety Engineer

Large assembly venues are characterized by crowd packing where patrons often are not familiar with egress paths other than the main entrance/exit through which they entered the facility. Exhibit 1 depicts the level of crowd packing common in assembly venues. Compliance with applicable building, fire and life safety codes at time of construction provides facility operators – upon initial occupancy – with the features and systems needed to protect patrons' lives from fire and similar emergency. These systems and features must be kept in working order. Changes, as might be made to accommodate function after the facility is up-and-running, need to be evaluated relative to their potential to adversely impact the existing life safety systems.

Exhibit 1. *Assembly venue crowd packing.*

Attractions, like a concert by a musical group or competition between rival sports teams, draw patrons to assembly venues. Providing good line-of-sight of the attraction is paramount to the success of the venue. Tiered seating is provided to help assure line-of-sight.

Patrons traverse the multiple seating elevations via stepped aisles which create potential for trips and falls. The model codes, like NFPA 101® – *Life Safety Code*®, where used to construct the facility, provide a safe and usable stepped aisle, complete with handrails to help arrest a fall in its initial stage. But, the aisle floor coverings and the cues to safe aisle use, such as cautionary marking striping at the leading edge of each tread, must be maintained. Exhibit 2 depicts tread nosing marking attempted with the use of tape that is set back from the nosing or leading edge of the tread. Note that the tape is not permanent and has peeled back from the tread. Had the tape been positioned at the nosing or leading edge of the tread, it would have been subject to greater wear by users and would have failed earlier. Exhibit 3 shows nosing marking accomplished by the contrasting floor covering used at the leading edge of the tread. Its presence and effectiveness is expected to last for years.

Exhibit 2. *Stepped aisle nosing marking attempted with nonpermanent tape. (Photo courtesy of Jake Pauls)*

Exhibit 3. *Stepped aisle nosing marking accomplished with permanent flooring material. (Photo courtesy of Jake Pauls)*

Small elevation differences, as might be created by a couple of risers, create an additional tripping hazard as the presence and of the treads is not as obvious, to the approaching occupant, as that presented by a full flight of stairs. In Exhibit 4, the small elevation difference is mitigated, as required by NFPA 101, by stair treads with an exaggerated depth, complete with a handrail at one side, but the patterned carpet obscures any indication of tread edge location – the stairs are not seen as separate stepping surfaces.

Exhibit 4. *Patterned carpet obscures any indication of tread edge location. (Photo courtesy of Jake Pauls)*

Exhibit 5 depicts a small elevation, similar to that shown in Exhibit 4. The stair treads have the requisite exaggerated depth; the presence and location of each step is marked with contrasting tape; handrails are provided at both sides of the stair; and a placard stating "please watch your step" is provided as an extra precaution.

Exhibit 5. *Small elevation change effectively marked with striping tape and caution sign. (Photo courtesy of Jake Pauls)*

Assembly venues often control access by limiting entry to that provided by the main entrance where admission tickets can be collected or patron identification verified. The main entrance will serve as the main exit and is re-

ferred to in NFPA 101 as the main entrance/exit. Yet other exits are required. They take the form of doors and exit stair enclosures that are not used on a regular basis. The exit enclosure needs to be inspected as it is an inviting place to store things. Exhibit 6 depicts rolled carpet stored within an exit stair enclosure. The storage encroaches on the required egress path and introduces combustibles that could burn so as to prevent the use of the stair enclosure as an egress route.

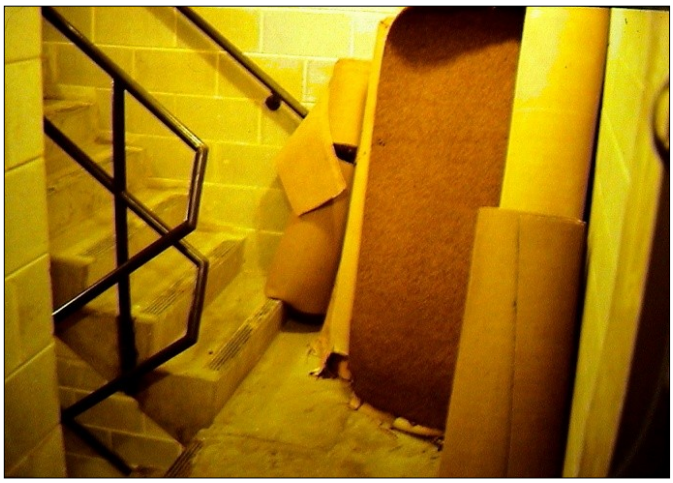

Exhibit 6. *Rolled carpet stored in an exit enclosure. (Photo courtesy of Jake Pauls)*

A well-designed egress system can be compromised by a lack of visual cues or inconsistent/incorrect user information. NFPA 101 requires exit signs, directional exit signs, and NO Exit signs to provide occupants with sufficient information to make effective use of egress routes with which the occupants might have no familiarity. The problem of conflicting or incorrect information can be worse than providing no information. Exhibit 7 depicts signage on a door equipped with delayed egress locking hardware. The sign directing the user to "Push Until Alarm Sounds…" is required by NFPA 101. The sign advising that a security code must be inputted prior to exiting via the door might be correct for non-emergency, day-to-day use by authorized personnel but is incorrect relative to the operation of the door under fire or similar emergency. The conflicting information might cause a person to leave the area in search of another exit door rather than attempting to open this door.

Exhibit 7. *Door with delayed egress hardware and conflicting information placards.*

Assembly venue egress systems, although code-compliant when installed, must be vigilantly inspected and maintained in order to perform as designed in time of fire or similar emergency.

The author thanks the renowned stair use and people movement researcher, Jake Pauls, for use of photos from his technical library. For expanded commentary and additional photos, see the *Life Safety Code® Handbook - 2012* available from NFPA at:

http://www.nfpa.org/catalog/product.asp?title=2012-NFPA-101-Life-Safety-Code-Handbook-Set&pid=101ST12&target%5Fpid=101ST12&src%5Fpid=10112&link%5Ftype=cross%5Fsell&order%5Fsrc=C331