

The Impact of Building Design on Evacuation of Persons with Disabilities

by Keith Christensen and Patricia Salmi

Individuals with disabilities represent a significant, although often overlooked, portion of the population in emergency evacuations from buildings. Americans with Disabilities Act guidelines require that provisions for accessible evacuation or exit must be made; however, failures in meeting the evacuation needs of individuals with disabilities continue to occur (Christensen et. al., 2007). These failures may be attributed to evacuation policy and planning that emphasizes

tible information, tolerance for error, low physical effort, and size and space for approach and use (Story et. al., 1998). The list of suggestions in this article incorporates Universal Design principles and can be used by individuals, their families, and service providers to evaluate buildings for clarity and ease of movement to safety during times of emergencies.

Spatial Organization

Spatial organization or building layout is critical during building evacuation, either facilitating or inhibiting movement to safety, and relates to the Universal Design principles of equitable use, simple and intuitive, flexibility in use, and tolerance for error. Key points to look for in spatial organization include:

- **Destination zones.** Determine if a larger building or building complex has destination zones, which are the easily-identified areas in a building. Examples of this might include a food court in a shopping mall or a cafeteria or central atrium in an office complex. Destination zones can be useful in designating areas for sheltering people within the building and for providing orientation points in giving directions; they should be clearly marked and discussed during emergency evacuation practices.
- **Equitable means of accessible exit.** The same options for getting out of a building should be available for all of the population, including those with disabilities. While it is allowable by building codes, providing alternate accessible emergency exits can be very confusing. To avoid confusion, every emergency exit should be accessible. If it is impossible to make the exit accessible, on the second floor of the building for example, safe areas for sheltering people within that area

need to be provided. These areas should be located in close proximity to the inaccessible exits to permit better visibility of individuals who might need assistance.

- **Spatial overview opportunities.** Does the building have spatial overview opportunities, which are places where one can “look over” the area. Spatial overview opportunities allow people to gain building information quickly about various parts of a building, including exits and corridors that lead to exits, as well as paths that lead to destination zones and/or places of shelter within a building and reduce the possibility of errors during exiting.
- **Spatial layout.** How is the building laid out? Is the layout confusing? Is it easy to get lost? Symmetrically laid out buildings (i.e., one side mirrors the other) need clearly differentiated sides (i.e., the sides need to be clearly marked in different manners). Confusing layouts in which it’s easy to get lost benefit from the judicious use of color, lighting, landmarks, and signage to clearly mark exiting areas and destination zones designated as places of shelter. Also helpful in differentiating spatial layout are architectural features such archways, columns, and windows (and possibly doors) that make a particular space memorable.

Use of Signs

Signs are useful in communicating necessary information and are an important element for emergency building evacuation related to the Universal Design principle of perceptible information. The following describes building sign placement and desirable characteristics:

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helping an individual with disabilities adjust to the environment, rather than adjusting the environment to accommodate the individual (Hahn, 1985). During evacuations, it is the design of the environment that creates the majority of evacuation barriers. For individuals with disabilities, their families, and service providers, it is important to evaluate environments for clear and easy movement to safety during emergencies.

Universal Design is a useful tool for evaluating and designing buildings to better support the emergency evacuation needs of individuals with disabilities. Universal Design is an approach to make buildings usable by the broadest group of users possible, and is based on seven design principles: equitable use, flexibility in use, simple and intuitive, percep-

- **Placement of signs.** Building information signs, including signs providing direction to destination zones, should be clearly visible from the path of travel, above eye level, and lit appropriately. Evacuation signs should appear at regular intervals, particularly at decision points, to let people know they're going the right direction.
- **Readability of the information.** All information signs should be readily legible in adverse conditions. The text of the sign should be large, easily readable, and have a high contrast with the background. The signs should be carefully lit to prevent any glare that causes them to be unreadable. The text should be paired with a graphic image that is clearly understood, a feature that is useful to non-readers. Additionally, raised images, text, and Braille should be incorporated in the sign in a consistent manner. Color should be used only as a reinforcing cue and related to the environment. For example, if there is more than one destination zone and/or exiting area, use signage that is paired with a graphic and reinforced with a color such as orange. The orange color should be obviously repeated in the destination zone as well as the accompanying exit.

Landmarks

Use of landmarks is important during evacuation and provides useful and accessible building information to people with disabilities. Desirable characteristics of landmarks that help mark a path and make the space memorable include the following:

- **Distinctive landmarks.** Landmarks that are distinct in shape, color, and appropriately lit are memorable and can serve to orient people in the space, as well as provide an effective way to direct them to exits.
- **Types of landmarks.** Distinct destination zones and large artwork can serve as landmarks, especially if they

are colorful, well-lit, provide an interactive feature, and contain distinct architectural features such as decorative columns, archways, or photographs.

- **Landmarks and signs.** Landmarks should be paired with appropriate signage to convey important information and guide evacuation decisions.

Conclusion

Exiting a building during an emergency can be a difficult experience for anyone. By following the recommendations provided and the principles of universal design, buildings can more readily accommodate the broadest group of users, to the greatest extent possible. Building universally designed exit features into environments not only makes good sense, but also offers the promise of increasing the safety and welfare of all, including persons with disabilities.

References

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Resources for Information

The following may be useful for further information about disaster preparedness in relation to people with disabilities:

- **Emergency Evacuation: Safe Egress of Persons with Disabilities from Transit Systems (www.projectaction.org).**

This fact sheet provides information for transit agencies and for people with disabilities about planning for safe evacuation from public transportation during an emergency. Prepared by Easter Seals Project ACTION and the National Organization on Disability Emergency Preparedness Initiative.

- **Project Safe EV-AC (<http://evac.icdi.wvu.edu>).** The Web site of this project at West Virginia University has resources for emergency responders as well as people with disabilities and those who support them. The focus is improving evacuation from buildings, vehicles, and other settings during emergencies by providing training materials on the evacuation and accommodation of people with disabilities.

- **U.S. Access Board, Resources on Emergency Preparedness and Evacuation (<http://www.access-board.gov/evac.htm>).** This Web site on emergency preparedness includes extensive resources on accessibility issues in evacuation planning and response. It's operated by the Access Board, a federal agency committed to accessible design, that develops and maintains accessibility requirements for the built environment, transit vehicles, telecommunications equipment, and for electronic and information technology under several different laws, including the Americans with Disabilities Act (ADA).