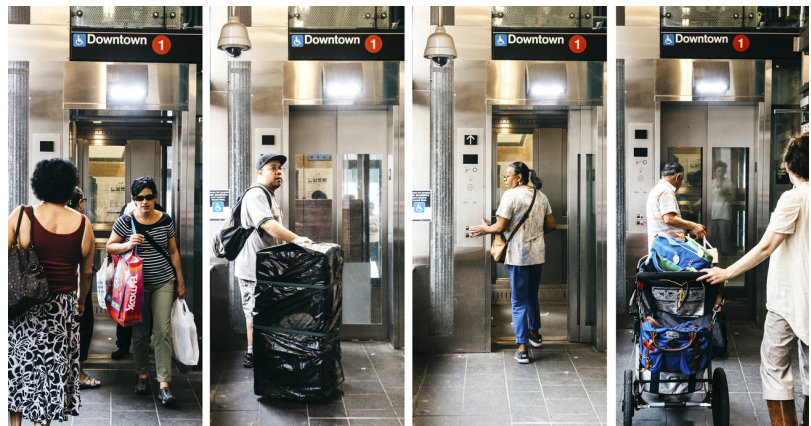## 3.10  Elevators

1 Credit: Implement 3 of 6

- All elevators have sufficient space for all people to enter, operate controls, and exit.
- All elevators have doors on both ends and controls positioned to allow people to use the elevator without turning around inside.
- All elevators allow people who use a wheeled mobility device to complete a 180-degree turn inside.
- All elevators with security access controls (e.g., swipe card, key fob, biometrics, etc.) allow floor selection before and after authorization, and provide clear feedback when access is not authorized.
- All elevators have an adjacent waiting area at all discharge levels that does not conflict with the circulation space.
- All elevators are monitored by an employee who can provide assistance if needed.

## 1.     Overview

A passenger elevator is typically the most convenient form of travel between floors of a building for those who cannot, or prefer not to, use stairways or escalators. Some accessibility issues that should to be addressed with elevators include: *size of cabs, placement of cabs, placement of navigation panels, door opening size, and opening and closing time*. In multi-story buildings, underground spaces, and raised spaces, elevators are an essential means of access between levels for all building users. According to the NIH (National Institute of Child Health and Human



*An elevator within the NYC metro system gives all people access to the platform. Photo courtesy of NPR*

Development), 2.2 million Americans depend on a wheelchair for day-to-day tasks and mobility, and 6.6 million Americans use a cane, walker, or crutches to assist in mobility (n.d.). Elevator availability is one indicator of the accessibility of a space. Like many other aspects of accessible building design, the use of elevators improves the usability of a building beyond those with disabilities. People with strollers, wheeled carts, and other heavy objects benefit from the availability of elevators. According to the National Elevator Industry the average American uses elevators 4-5 times per day (n.d.).

## 2.      Issues to Consider

*Types of Users in the Building*: A low-rise apartment building and a large healthcare facility have different types of users. The apartment building may require an elevator large enough for families and for moving of tenant furniture in and out of the building. Healthcare facilities require elevators that accommodate multiple wheelchair users or people with physical impairments. Considering the number and types of people who utilize a building helps designers and building owners assess the size, type, and number of elevators needed in different areas.

*Type of Equipment in the Building*: Also important is the type and size of equipment that may be moved about the building.  A low-rise apartment building may only need one large elevator to accommodate people as they move in and out. The occurrence of people moving in and out of the complex may not happen with such regularity that more than one large elevator is needed. However, a person elevator should also be included so users are not disrupted by elevator usage during busy moving times. A healthcare facility, on the other hand, needs to accommodate moving hospital beds, medical equipment, and medical waste. The designers of the healthcare facility may choose to put several elevators in the building to ease the strain on the transport system. The healthcare facility may also choose to have elevators that open in two directions. This makes transporting beds and equipment about the building easier.

*Restricted Access*: Not all elevators may be intended for patron usage. For example, an art museum may restrict use of an elevator that is reserved for moving art throughout the building. For this reason, a freight elevator may be placed conveniently so someone could use it to access the entire building. The freight elevator should be placed near the bay where new art is delivered or near art storage locations. Signs should indicate what the elevator is used for. It should be clear to visitors that the elevator is for organizational use only. Placing a sign that indicates where the nearest visitor elevator is located would help with wayfinding.

Similarly, an apartment building may require its tenants to use swipe cards to use the elevator. Card readers help restrict who has access to different floors in the building. However, elevator etiquette may yield swipe access as ineffective.  For example, if someone holds the elevator door open or presses the floor buttons for others they may inadvertently give someone access they should not have. These established ways to use an elevator can lead swipe card access to be less successful than having a different means of security (NIH, n.d.). Choosing different restriction methods, such as a security guard, depends on the tenants in the building and the client.

*Location in Relation to Other Egress Methods*: Varying egress methods should be placed near each other in a building. Placing other means of egress, such as stairs, far from an elevator may lead to one method being overused. Placing different egress options together allows the user to choose which service they prefer, rather than the method they can find. Reference *isUD Solutions* Chapter 3, especially *3.1 Wayfinding*, for more information on how to place means of egress in a building.

*People with Anxiety or Vertigo*: Some people feel anxious or claustrophobic in small spaces, which can cause panic attacks. People who have claustrophobia can feel an increased sense of dread when they use an elevator (Silva Consultants, n.d.). Healthcare facility patients, for example, may experience higher levels of stress than other building users because they may be worried about health issues. This environment can intensify mental pressure on the patient.

Using larger elevators may ease some feelings of stress, and is useful for moving equipment and furniture throughout a building. Elevator interiors can also be used to ease a patient's stress. Some companies, such as DIGIGAGE and LiftEye, install screens inside of elevators.

These screens can be programed to show a view outside of the building or reflect an alternative environment. This may be a fun way to make users feel more at ease in an elevator.

For people who experience vertigo, or height-triggered anxiety, materials like glass and open styled elevators may be an issue. Conversely, those with hearing loss may benefit from seeing space around the elevator cab. A closed elevator should always be available, however.

## 3.	Related Standards

ICC A117.1 2017 Standards - 407 Elevators standard 407.4.9 requires a means of emergency communication be included in all elevators.  The standard details proper location for access to emergency call buttons, however, it does not indicate that knowledgeable staff be available on site to respond to emergency situations.

ADA 2010 Standards - 407 Elevators lists several codes which align closely with this section of *isUD Solutions.* Advisory 407.2.1.3 suggests that clear floor space should be located at call buttons for elevator usage. This particular advisory may be difficult to enforce, especially as small crowds might collect outside the elevator doors. One way to provide the necessary clear floor space is to ensure it is outside of the path of travel. Additionally, an adjacent waiting area allows for patrons to wait for the elevator without interfering with the path of travel (see Figure 1).

Anthropometry of Wheeled Mobility Project completed by the IDeA Center, collected data on how different wheeled mobility devices performed in different spaces. The center set up spatial barriers for participants to maneuver through, and a shelved area for them to touch or place an item on (Steinfeld, 2010). The study enrolled 235 participants and the data collected is the basis for some *isUD Solutions.*

Other *isUD Solutions* which are important to understand in relation to *3.10 Elevators* are *2.1 Clear Floor Space*, *2.2 Turning Space*, and *2.4 Reach Targets*. These basic building blocks allow designers to decide the level of access they give to different types of wheeled mobility users.

The following *isUD Solutions* sections also apply to *3.10 Elevators:*

- *3.2 Signs*
- *3.6 Doors*
- *4.1 Illumination*

## 4.	Measurement and Verification

Elevators can be verified for their conformance to isUD standards by measuring the following factors: clear floor space, maneuvering space, access to controls and emergency equipment, floor products, visibility of glazing, lighting, and visibility of floors and walls. Floor materials should meet the current ANSI/NFSI B101 standard for walkway safety. Contrast in glazing should meet the requirements for people with low vision. Critical information should stand out in the visual field and should not overpowered by floor and wall patterns. Perceptual distortion by floor and wall patterns can cause users to miss critical information. Long corridors or accessible routes should also have adjacent waiting areas for wheeled mobility device users.

## 5.	Design Considerations

1. *(Required): All elevators have sufficient space for all people to enter, operate controls, and exit.* If the elevator has one door, then there should be a large enough space for a

wheeled mobility device user to turn around. If an elevator has doors on two sides, then operating controls should be located adjacent to both doors. *Chapter 2 Space Clearances* of the *isUD Solutions* is an important reference for choosing the appropriate elevator. The amount of traffic in the building also determines what elevator best suits the needs of the users.

2. *All elevators have doors on both ends and controls positioned to allow people to use the elevator without turning around inside.* Turning would require more space in an elevator for a wheeled mobility device user. Having an elevator the size of the one pictured in Figure 1, may be appropriate for certain offices and apartment buildings. A larger elevator with doors on both ends also benefits buildings where large equipment is moved about, such as in a hospital.
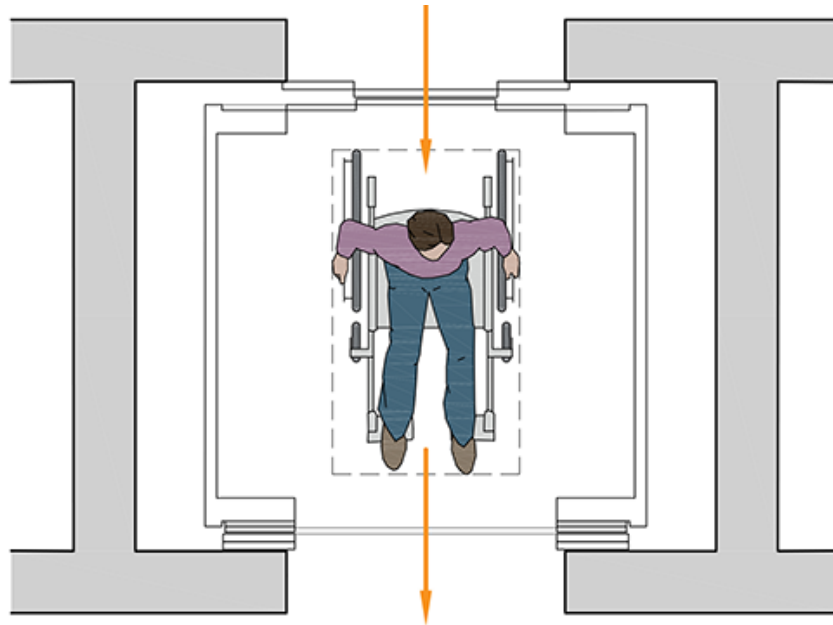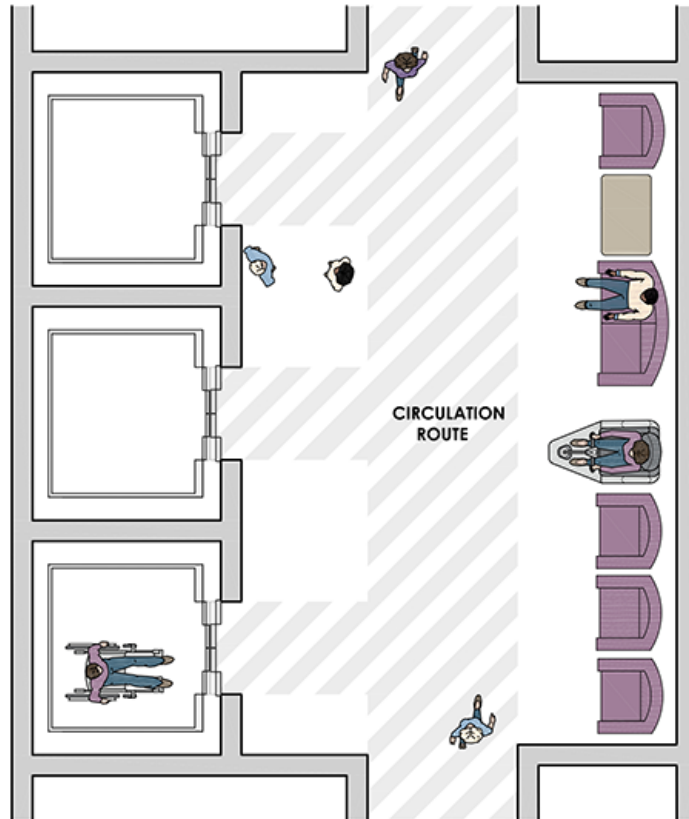


*Figure 1: Pass-through elevator*

3. *All elevators allow people who use a wheeled mobility device to complete a 180-degree turn inside.* Elevators which allow for 67" of turning space for 180-degree turns accommodate 95% of power and manual wheelchairs (Steinfeld, 2010). Wheeled mobility device users are not always accompanied by another person. If the device users are not able to maneuver their around in the elevator they may have to back out, which could be dangerous. If they try to turn in the elevator, their device may become stuck. Pass-through elevators allow wheeled mobility device users greater independence while traveling throughout a building.

4. *All elevators with security access controls (e.g., swipe card, key fob, biometrics, etc.) allow floor selection before and after authorization, and provide clear feedback when access is not authorized.* The access controls should be placed such that a wheeled mobility device user can see clearly whether or not they have access to the elevator. If swipe access is placed away from the elevators, wheeled mobility device users may need to unnecessarily navigate around the space to negotiate access. The power wheelchair user may have to back up to try again, creating congestion. The controls

should also be placed so that a wheeled mobility device user can travel directly into the elevator.

5. *All elevators have an adjacent waiting area at all discharge levels that does not conflict with the circulation space.* Providing adequate space at elevator banks in particular allow for users to effectively enter and exit an elevator. This may reduce congestion, allowing for smooth-flowing people traffic.



CIRCULATION ROUTE

*Figure 2: Elevator waiting area*

6. *All elevators are monitored by an employee who can provide assistance if needed.* Communication systems within the elevator, such as two-way telephone systems or speaker panels with microphones, should connect to in-building personnel that can assist in the event of an emergency. Employees should be trained and equipped to assist those in need.

## 6.    Definitions

The following definitions are adapted from Anthropometry of Wheeled Mobility Project.

| Anthropometry | Measurement of the physical characteristics and abilities of people. |
|---|---|
| Claustrophobia | The fear of enclosed spaces, such as elevators (Silva Consultants, n.d.) |
| Clear Floor Length | Measurement of the horizontal distance between the forward-most point and the rear-most point on the wheeled mobility device or occupant, whichever is larger.  This includes accessories attached to the device. |
| Clear Floor Width | Measurement of the horizontal distance between the side-most points of the wheelchair or participant on the right and left sides. |
| Wheeled Mobility Device (WMD) | This includes devices such as manual wheelchair, power chair and scooters. |

## 7.    References

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