Elevator Safety:
What to do if someone is trapped

by Sally Wilk

"A 25-year-old man died when he fell down an elevator shaft Monday night as he tried to climb out of an elevator stuck between floors at a new shopping and entertainment complex, a Fire Department spokesman said." – reported by KOMO-TV Seattle, February 20, 2006

"A man's legs were severed early today as he tried to escape from inside an elevator packed with revelers leaving a party... police and witnesses said." – online edition of the New York Post, May 20, 2006

"...a 17-year-old boy attending a football camp at the University of Arkansas became stuck when he attempted to leave an elevator stuck between floors in a campus building." – The Morning News, June 21, 2006

Continued ➤

Public Safety

Elevator Myths & Fears

Myth: Many people believe elevators are held up by only one rope that can break, leaving passengers trapped in a falling car.

Truth: Elevators are supported by multiple steel cables. Each cable alone can support a fully loaded car.

Myth: Some people believe that an overcrowded elevator will fall.

Truth: This will not happen. An overloaded elevator will usually not move. The doors will stay open and a buzzer may ring until enough people get off the elevator to reduce the weight.

Myth: Some people believe that they have been in an elevator where the elevator car fell several floors and then "caught itself."

Truth: This feeling is a mystery. Elevator experts believe people may think this happened because they 1) got on an elevator going in a different direction than expected or 2) saw the elevator floor indicator lights flash by quickly, which gave the visual impression of falling.

Myth: Some people believe that the hall doors will open when an elevator is not there.

Truth: The truth is that the elevator car controls whether the hall doors open. If the car is not at the landing, the hall doors can't open, because their opening can only be triggered by the arriving car engaging an unlocking device after the elevator has stopped at the landing.

Myth: Some people believe that if an elevator is stuck between floors that they are in danger of falling and should try to get out.

Truth: Absolutely not. Leaving the car on your own could result in injury. Elevator cars are designed as "safe rooms". The safest place is inside the car. Ring the alarm and wait for help. Leave the car only with the assistance of professional rescuers.

Myth: Pushing the CALL button repeatedly will make the elevator appear faster.

Truth: The call is registered just once; movement is in response to the elevator controller.

Myth: Pushing the DOOR CLOSE button closes the doors faster.

Truth: It may cause the doors to close sooner, but not faster. However, if a buzzer sounds, the doors may close slower, it is important to get out of the doorway as quickly as possible.

(Source: http://www.eas.org/saferider/myths.htm)
As architects, building owners, elevator consultants, engineers, inspectors and passengers, headlines like those above grab our attention. We ride elevators every day. We may make our living designing, installing and inspecting elevators or elevator components. We don’t like it when people get stuck in elevators. We like it even less when an individual is injured while attempting to escape from an elevator on his or her own.

In the April 2006 edition of ELEVATOR WORLD, a reader suggested that someone write “a how-to article aimed at teaching building managers and tenants what to do when they are stuck in an elevator.” He recommended that the article provide “statistics and examples to drive home the point that jumping out of a car can have fatal consequences” and “recommend a protocol to see if the problem can be cleared.” The three recent incidents cited above provide sufficient evidence to support his request and warrant this article.

**Understanding the Problem**

There are three main causes for elevator shutdowns:

- Loss of building power
- Passenger misuse or abuse
- Electrical or mechanical failure

Power can be lost for minutes or hours, sometimes for days and, in rare instances, for weeks. Reasons for power loss include:

- Anomalies in service from the electric company or electrical storms (i.e., lightning)
- Accidents, such as a vehicle hitting a utility pole and knocking out a transformer
- Energy shortages, such as the energy shortage of 2001 when California experienced rolling blackouts (www.cnn.com, March 19, 2001)
- Human error, such as the blackout of 2003 that “cut electricity from east of New York, north to Toronto and west to Detroit, Michigan” (www.cnn.com, August 15, 2003)
- Natural disasters, such as the long-term outages resulting from Hurricane Katrina in 2005 (www.foxnews.com, August 29, 2005)

Passenger misuse or abuse occurs when elevator passengers tamper with elevator mechanical and electrical systems, including overloading the elevator, forcing the doors open, stopping the elevator and using the alarm buttons (except in emergencies). Elevator abuse poses a serious safety threat.

Electrical or mechanical failures of an elevator can be compared to electrical or mechanical failures of an automobile. The difference is that when failures occur, passengers riding in an elevator are more likely to become trapped than passengers riding in an automobile.

There are an estimated 600,000 passenger elevators in the U.S. (ELEVATOR WORLD, June 1996). Over 120 billion riders travel on elevators each year (ELEVATOR WORLD, June 1996). A subset of all elevator-related injuries and fatalities is provided in Figures 1 and 2, and is taken from the U.S. Bureau of Labor Statistics and the Consumer Product Safety Commission.

**Appropriate Actions**

Many people believe that they can safely climb out of an elevator. Jumping and/or climbing out of an elevator is extremely unwise. Many elevator-related accidents occur when people attempt self evacuation.

Elevator experts and others in the industry have the following advice for elevator passengers who become entrapped:

- Stay in the elevator. The elevator will not go into a state of freefall. It is safe. You are safe.
- Keep people inside of the car. Elevator passengers should not pry the doors open. They are closed for a reason. Prying the doors open may prevent the elevator from being moved to evacuate the passengers.
- Do not worry about air. The elevator car is not airtight. You will not run out of oxygen.
- Do not worry about being in the dark. Most elevator lighting will still work when the elevator stops. Even if normal electrical power is lost, many elevators have a battery-backup system for emergency lighting.
- Be calm and patient. Try to keep others calm.
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- Communicate with people outside of the elevator.
- Move away from the doors in case they are opened by rescue personnel.
- Sit on the floor. This will keep you from losing your balance if and when the elevator starts moving again.

Most of us are familiar with the ASME A17.4 Guide for Emergency Personnel. Section 1.1 of the guide states, “It is recommended that any evacuation of passengers from elevator cars be performed under the direct supervision of elevator personnel, as their experience and expertise assure the resourcefulness necessary to cope with the various complex hazards that may arise . . . Under emergency conditions, the passenger evacuation must be performed by personnel who are carefully selected and trained . . .” (emphasis added by author).

The words that were italicized in the above quote were done so to emphasize several points. Elevator manufacturers strive to design and build elevators that are user-friendly, and have been successful in gaining the confidence of the riding public. The apparent simplicity of pushing a button and arriving at the appropriate floor can be misleading. Elevator-control-system logic, operation and mechanics are extremely complicated. Passenger evacuation must be performed by qualified personnel who have been carefully selected and trained. ASME A17.4 leaves no room for independent interpretation; trapped passengers who are not qualified should not attempt to exit an elevator and should not help someone who is trapped to exit an elevator. There are seven pages at the beginning of ASME A17.4 that list all of the members of the ASME A17 Elevators and Escalators Committee. These people are industry experts. We would be wise to take their advice.

Communication Is Key

Let’s examine how someone trapped in an elevator can effectively communicate with the outside world:
- The alarm bell within the elevator
- The emergency phone located within the cab
- Good-old-fashioned yelling and banging on the elevator door
- A cell phone

The alarm bell provides limited information to people outside of the elevator. It indicates that an elevator is stuck somewhere in the building and that someone is inside the elevator. The emergency phone will connect the elevator occupant with a knowledgeable, trained individual. If for some reason the emergency phone is not working, one should never underestimate the power of yelling and banging on the elevator door. Someone who will respond may be walking by the elevator. When there is clear reception, cell phones are very useful.

Once verbal communication has been established, the elevator occupant should provide the responder with the building name, elevator number (this can often be found on the car-operating panel above the buttons or inside the door to the telephone or intercom), the floor where the elevator is currently located (if known), a short description of the problem, the number and condition of all people within the elevator (including any medical needs or emergencies) and any other helpful information.

Emergency-phone responders are trained to dispatch the appropriate qualified personnel. However, when emergency-phone communication is not possible and someone outside of the elevator has responded by shouting through the doors or answering a call placed via cell phone, the elevator occupant can help the responder contact the appropriate people.

Deaths among Passengers Using Elevators while at Work by Cause, 1992-2001

Deaths among Passengers Using Elevators while Not at Work by Cause, 1997-2003

Note: Total of 51 deaths. An example of a passenger death while at work is a suicide in a warehouse or a passenger in an office building. “Other” includes being struck by an elevator or closing elevator doors.

Source: U.S. Bureau of Labor Statistics

Note: Data through 10/2003. Total of 39 elevator deaths.

Source: Consumer Product Safety Commission data

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An appropriate request might be, “Please get some help. We are trapped in the elevator on the 14th floor of the XYZ building. The elevator number is A12. There are five people in the elevator and everyone is fine. Please contact the building manager and ask him to contact the elevator company.”

If there is an emergency situation, such as a trapped passenger who is suffering from ill health, ask the responder to call 911 right away. When using a cell phone, the elevator occupant should call 911 directly if there is an emergency. (Note that when using a cell phone to call 911, the caller should identify his or her location with as much detail as possible, since the 911 operator cannot identify the location of a cell phone as he or she can a regular local-area-network line or standard telephone.) In non-emergency situations, the elevator company will know the most efficient way to handle the situation and should be contacted first.

Building Managers Should Act and React

Building managers and the general public can help trapped elevator passengers by requesting the information outlined above, and by contacting the appropriate qualified personnel to resolve the problem. All information should be communicated by the building manager to the elevator company (for non-emergency situations) or to 911 (for emergency situations). Most building managers are not qualified to help people safely exit an elevator. Both the trapped passengers and the building manager should wait for trained, qualified people. While everyone is waiting, building managers should communicate with the trapped passengers, keep them calm and assure them that assistance is on the way. This is a very important task.

Section 1.3.1 of ASME A17.4 states, “the responsible personnel in the building should immediately communicate with the occupants of the elevator car to inform them that they are safe, [that] steps are being taken to evacuate them . . . , [that] they should stand clear of the doors since they may be opened [and that] they should refrain from smoking.” Continued communication is important to ensure that passengers remain calm and relaxed.

More Steps Building Managers Can Take

Building managers and owners can plan for and prevent cases of elevator entrapment related to loss of power by:

- Using a generator to provide standby power for the elevator. A generator may be used to power lighting systems, phone systems, computer systems and specialized equipment requiring uninterrupted power, in addition to powering elevators.
- Installing an elevator emergency return unit (ERU). An ERU is less expensive than a generator, and performs one specific function: helping to ensure that power will be applied to an elevator during a power outage so that passengers may safely exit the elevator car. Many elevator companies offer ERUs as an option, and elevator contractors also offer models such as the Reynolds & Reynolds Electronics Powervator® as elevator add-ons or retrofits. When normal building power is lost, the ERU senses the loss and simulates normal power by creating a sinusoidal-like power source derived from 12-VDC batteries. The ERU then sends a signal to the elevator controller informing it that normal building power has been lost. The controller responds accordingly by bringing the elevator to an appropriate floor and opening the doors.

- Implementing proper evacuation procedures and training employees to follow them. “Training should always be done with experienced, qualified elevator personnel present.” For additional information related to this topic, readers can obtain a copy of ASME A17.4 Guide for Emergency Personnel from the American Society of Mechanical Engineers (ASME). ASME offers courses on the emergency evacuation of passengers from elevators as well as videos on this subject. For more information on the ASME continuing-education courses, visit website: www.asme.org.

Where to Get More Information

In addition to ASME, a good source of information on elevator safety is the Elevator Escalator Safety Foundation (EESF). The Foundation’s mission is to educate the public on the safe and proper use of elevators, escalators and moving walks through informational programs (www.eesf.org). An excerpt from its webpage entitled “Elevator Myths & Fears” accompanies this article. The EESF website also offers a program with steps to be taken if someone becomes trapped in an elevator (www.asaferide.org). There are many good ASME A17 Evacuation Guide instructors. One of them, Dennis Chandler at Continental Hoisting Consultants (www.chelevator.com), provided some very useful reference material for this article. Reynolds & Reynolds Electronics’ website (www.reynoldselectronics.com) contains useful information about ERUs.

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