

# Elevators

## Introduction

The intent of this manual is to provide information needed to safely and efficiently deal with elevator emergencies. This section includes but is not limited to elevator knowledge and inspection, general operation and safety features. The mission of elevator rescue is to safely remove occupants from an elevator that has malfunctioned and stopped in the hoistway while maintaining the safety and welfare of the occupants and fire/rescue personnel.

## Terminology

**Machine Room:** Normally found on roof of structure above the hoistway if a Traction elevator. The main disconnect for the system is found in the Machine Room. If the elevator is Hydraulic, the Machine Room will be found on the lower level near the elevator.

**Hoistway:** May also be known as the Shaft. The vertical opening that encloses the elevator.

**Car:** The passenger enclosure.

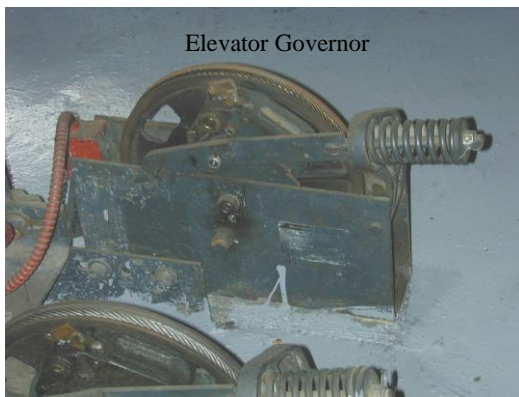
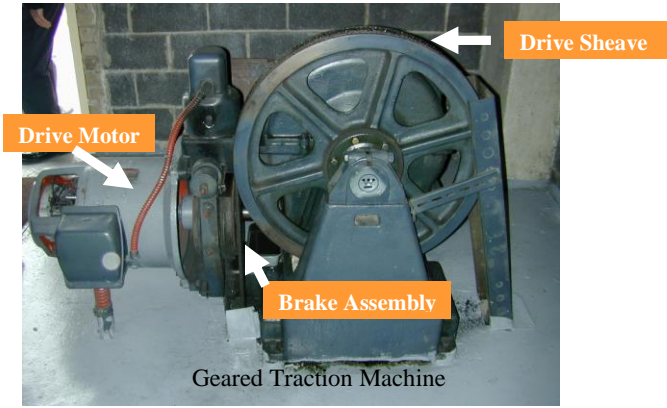
**Landing Entrance:** The elevator doors located on each floor of the structure. This provides the access for use of the keys or pole.

**Pit:** The bottom portion of the hoistway. Contains numerous moving parts.

## Elevator Types

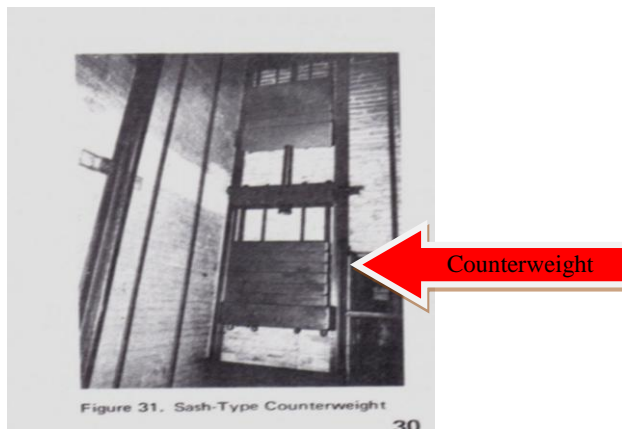
There are two types of elevators, hydraulic and traction. Hydraulic elevators have a motor-driven pump, a hydraulic cylinder and a fluid reservoir. Pressure is put on the cylinder and the car is raised. Gravity lowers the car back to the lowest floor. Traction elevators have a hoisting machine, ropes/cables and a counterweight. Traction is achieved by friction on the driving sheave, which in turn raises and lowers the car.

The traction elevator can either use a geared or gearless traction machine. Regardless of the type it will have a governor, controller and machine disconnect switch.

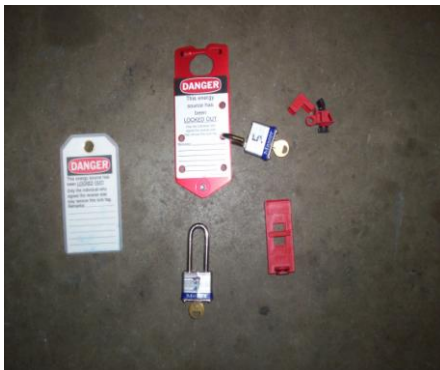


Hoisting ropes are wire cables designed specifically for elevator use. The ropes are designed to carry not only the weight of the car but the live load within the car. Multiple ropes may be used to increase traction. Redundant ropes provide a safety factor for the car. The ropes are all oily and can have burrs on them. Gloves must be used when functioning with the ropes.

Counterweights are specifically designed weights on the opposite ends of the hoisting rope from the car. The counterweight equals the cars' total dead weight plus 40% of the cars' designed live load



Lock-out/tag-out is the process of locking/removing power from the machine and declaring a safe work area.



## Elevator Car Rescue

If a patient needs to be rescued from a car that is not in working order, access to the car will need to be made. This access can be made in one of three ways. First, using the elevator keys, disengage the door interlock mechanism. Second, use an elevator pole to disengage the door locking mechanism. If neither of the first two options work, use standard forcible entry tools to break and remove the doors.

When beginning any elevator rescue, locate the car and contact the occupants. Check the fireman's service first to see if the car will move. Attempt to use the keys and pole prior to using forcible entry. Finally, remember to ALWAYS protect the hoistway.

Only remove patients from a non-working elevator if it is safe to do so. Remember to follow all standard safety policies. Perform Lock-out/Tag-Out. Remember to stay within the hoistway of the rescue operation. Prior to performing the rescue, determine which exit will be safest for both the occupants and the rescuers: car top, side exit, through the doors. Do not have any more than two rescuers on top of the elevator car.

**Important: Always follow Lock-Out/Tag-Out procedures for the main power disconnect prior to entering an elevator hoistway for rescue.**

**Comment [CU1]:** What about power control?

## Fireman's Service

The Fireman's Service button is activated by utilizing the key switch in the lobby of the building. Once the key has been turned to the On position, the elevators will all come to the lobby and park with the doors open. This function will only work if the elevator is activated. Phase 1 of this function is completed when the elevator is in the lobby or at the desired floor. This will prohibit residents from utilizing the elevator during an emergency. Below is a picture of the fireman's service button found in the lobby of a building.



Once inside the elevator, observe the fireman's service button. If lit, the elevator is in fireman's control. By accessing the key switch inside the elevator, Phase 2 of the elevator control begins and the fire department will have control of the elevator. Test the door open/close buttons to make sure that they still work. This will prevent the elevator from stopping at the wrong floor. Remember to stop the elevator several floors below the reported fire.

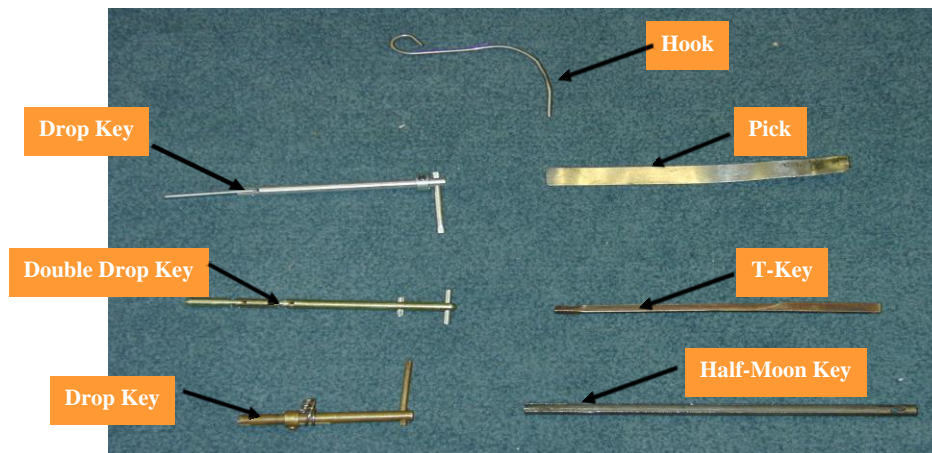
**Comment [CU2]:** Explain how firemen's service functions

**Comment [CU3]:** Explain Phase 1 & 2



### Elevator Keys

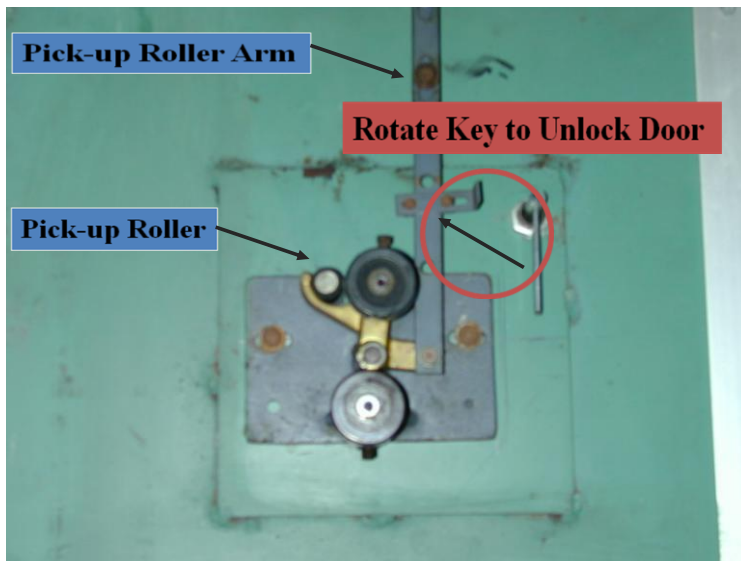
Below are examples of various elevator keys used to access the hoistway doors.



Insert the appropriate key through the hole on the front of the car door until the tip drops.



Once the key drops through the backside of the car door, turn the key until it catches on the pick-up roller arm. Continue to turn key until car door opens.

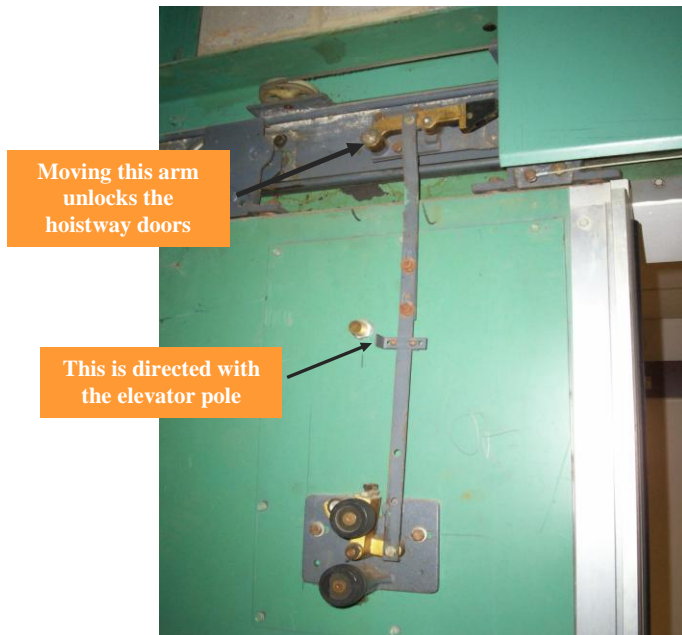


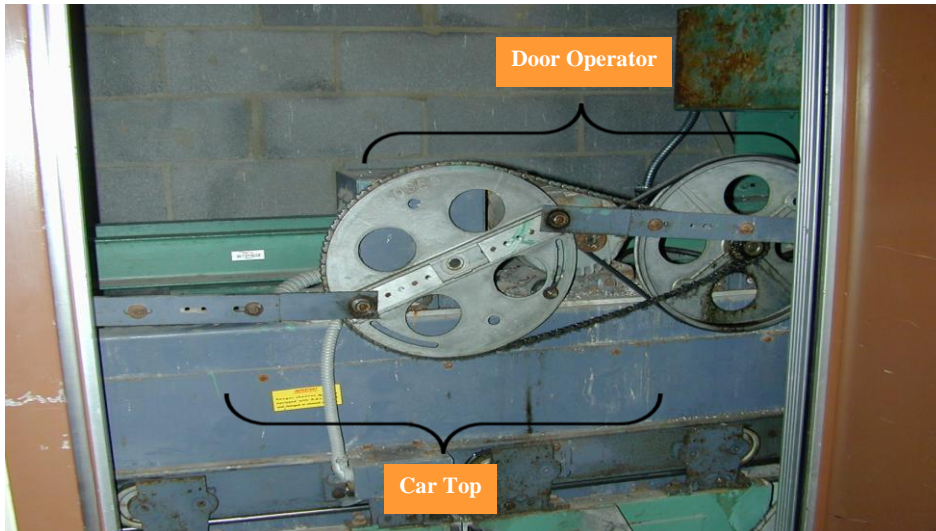


## Poling the Elevator



If poling the elevator is necessary, use the hook and access from the closest door using the appropriate elevator key. Using the pole, unlock the hoistway door above. Additional personnel stationed at the elevator above will open up those doors, pull up the pole and utilize that pole to open the door above.





Hoistway doors provide protection for the hoistway opening. They may be single speed or two speed horizontal, bi-parting vertical, or swinging. Swinging doors are normally found on residential elevators. The doors operator will open the car doors which will then allow access to the passengers. The car doors are the only doors that are powered.

**Comment [CU4]:** Insert car top control procedures.

#### Emergency Hatch Access

If access through the door of the non-working car is not available, use the cartop of the adjacent car for your inspection. To move the working car in-line with the stuck car, have a rescuer enter the working car. The rescuer then takes the working car down below the stalled car. Open the hoistway door of the working car and locate the car top inspection station. On the inspection station, move the stop switch to Off and the Inspection/Automatic switch to Inspection.



Have the rescuer exit the working and then close the doors using the wheel on the door operator. Close the hoistway doors and while standing in the middle of the car top, push the direction button to move the elevator into position next to the stalled car. Open the emergency hatch of the stalled car, and, using a folding ladder, rescue any trapped individuals.





When hatch is opened, the safety switch activates and prevents the elevator from moving.

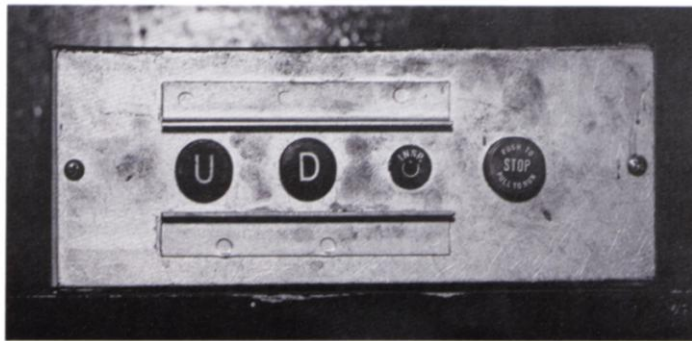
**Comment [CU5]:** Insert step by step recluse sequence.

**Comment [CU6]:** Insert recommended forcible entry techniques

**Comment [CU7]:** Insert pictures an info on all interlocks.

## CAR TOP INSPECTION STATION

**Car Top Inspection Station:** A control panel on top of an elevator car which, when activated, removes the car from normal service and allows the car to run at inspection speed from the car top station only.



### Steps for Elevator Rescue

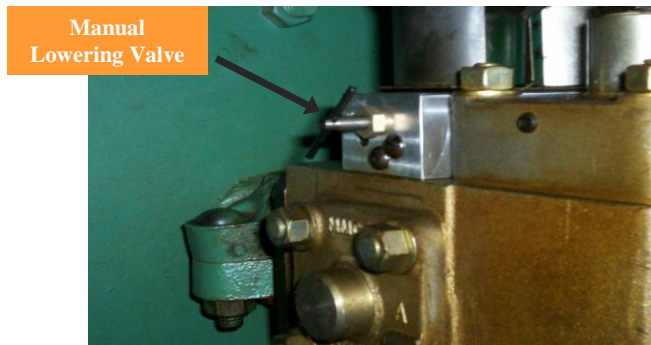
1. Locate the elevator in the hoistway. Check the position indicators and relay to officer.
2. Determine if any medical emergencies exist inside the stalled elevator.
3. Lockout/Tagout main line disconnect in machine room.
4. Determine what is best access for rescue.
5. Open hoistway doors using elevator keys or by poling the elevator. Open the car doors – use the door operator if necessary.
6. If no access to the doors is available, use the adjacent elevator to access the car top.
7. Do not place too many people on top of the working elevator when performing a rescue. Move them to the nearest hoistway door for exit.

### Forcible Entry

If forcible entry through a hoistway door is necessary,

### Hydraulic Elevator Emergency Access

If a hydraulic elevator is stuck between the floors, you may have to manually lower the elevator in order to perform a rescue.



First, using lock-out/tag-out, ensure that the power has been shut off and place a firefighter at the lower hoistway opening with the doors open. Open the valve at the top of the car until the elevator moves. When the car reaches the same level as that of the firefighter at the lower hoistway, close the valve. This will stop the elevator and allow access for the rescue.

### Elevator Fires

If an elevator has had significant fire damage, do not get on or into the elevator. Extinguish the fire using long hooks to remove any debris. If the cables have been exposed to high heat, they may fail causing the elevator to drop into the pit.