Elevator/Escalator Emergency Information for the Firefighter Training Program

(

Class Agenda

Morning Session @ 09:00-12:00 hours

Section #1

- **Introduction**
- **Handout review**
- **Overview of problems**
- **4 Rules of Operation**
- **Review of major points in SOG#15'set**
- **Lock out/ Tag out**
- **History of elevators**
- **Families of elevators**
- **Tour of the hoistway**
- **Safety circuit and its importance**
- **Elevator systems components (clutches, LED's, call buttons)**
- **Machine room /contents and locations**
- **Hoistway and its environs**
- **Types of elevator machinery encountered**
- **Geared machines,**
- **Gearless machines**
- **Car Safety systems**
- **Machine Room -Less (MRL's)**
    - **The MRL family**
    - **The Orlando fire!**

Questions?

BREAK (15 minutes)

Section # 2

- **Hydraulic elevator systems**
- **When, where and who?**
- **System design**
- **Family of Hydraulic elevators**
- **Hydro pit and hoistway**
- **Machine Room (MR)**
- **Resculator, Life Jacket**
- **Emergency communications procedures**
- **Emergency Power systems**
- **Types of elevator hoistway doors**
- **Emergency exits**
- **Fatal accident-side exits**
- **Questions?**

LUNCH (1 hour)

Afternoon Session 13:00 – 16:00 hours

Section # 3

- **Car Door Operations**
- **Before you start!**
- **Interlocks-Theory, Objectives and Restrictors**
- **Poling Techniques**
- **Talking them out**
- **What we do not do**
- **The view from *INSIDE* the car**
- **Types of Interlocks**
- **Handicapped Lifts**
- **Private Residence Elevators**

- **Swing Door Accidents**
- **Questions?**

Section #4

- **Freight Elevator Systems**
- **Dumbwaiters**
- **Special Problems (Blind Hoistways, Construction Elevators)**
- **Hoistway Door Unlocking Device Program**
- **Escalator Systems (History, Deaths and Injuries)**
- **History of an Accident (Cohasset Nursing Home)**
- **By Whom and When a Car is Moved!**
- **Forcible Entry Techniques**
- **Responsibility?**

Make Up and Return!

Department of Fire Services
Massachusetts Firefighting Academy

Regional Presentation

Instructors

- Asst. Chief John J. O'Donoghue
- Cambridge Fire Department (Ret)
- Captain Stephen Boyle
- Cambridge Fire Department (Ret)
- Captain John E. Boland
- Worcester Fire Department(Ret)

Handouts/Downloads

- Class Agenda sheet-
- Power Point-2016
- SOG 15 Set (3)
- MBER Memo-9/7/10
- Suggested Operational Guidelines (LOTO)
- Other selected articles

NEVER FORGET!

Goal:

- To provide a safe environment for firefighters when working near elevator equipment.

Did you Lock out/ Tag out on your last elevator call?

Fire Department Response to a Stalled Elevator

- Staffing must be able to handle an incident.
- At least 6-8 firefighters should be present at the incident.

You don't need these to get into trouble!

This one will do the trick!

Emergency
Elevator Procedures

RULES AND REGULATIONS

4 RULES TO FOLLOW!

Emergency Evacuation of an Elevator
Rule # 1

- Whenever possible, leave the occupants in the car until a licensed elevator mechanic arrives.
- They are only locked in a box, and still safe until we arrive and endanger them.
- Typical service contract has a 2 hour response time
- Be patient!

Emergency Evacuation of an Elevator

Rule #2

- **Before** any attempt is made to remove a passenger from an elevator, power must be disconnected at the main power disconnect switch located in the machine room.
- Lock out/ tag out must be performed.
- This rule is not debatable and must be strictly **enforced**.
- This procedure is referred to as "Lock out/ Tag out", and must be **documented**.

Emergency Evacuation of An Elevator
Rule #3

- **Never** move an elevator.
- Only a licensed mechanic should do that procedure.
- The elevator company that showed you how to do it will testify *against* you in court.
- They will deny they ever trained you to do it. Ask them for a letter on company stationary requesting that you do it.
- You will never get it!

DOCUMENTATION
Rule # 4

- The response must be recorded (NFIRS, etc.)
- FM 3502 for Firefighter Emergency Operations (FEO) problems and FM 52E for entrapments/removal of passengers
- Now in one form on-line at Department of Public Safety Web site. Fill it out and email to elevator supervisors.
- Lock out/Tag out must be in writing

INTRODUCING
" THE 15'S "

A series of
Standard Operating Guidelines
for the Fire Service.

STANDARD OPERATING GUIDE # 15

Firefighter Service (3502)
Operating Guideline

Fire Floor at Clearwater, Florida Fire

1st. Due companies should NEVER take an elevator directly to the fire floor!

STANDARD OPERATING GUIDE # 15A

Removal of Passengers from a Stalled Elevator

Do you Lock out/Tag out?

STANDARD OPERATING GUIDE # 15 B

Lock out/tag out Procedures

LOCK OUT/ TAG OUT (LOTO)

- ASME A17.4 Guide for Emergency Personnel (2015) Safety Code
- IUEC Opinion
- OSHA 1910.147 (b)
- **CMR 524 17.39**

Lock out/tag out-
No Choice-it MUST be done!

524 CMR 17.39(e)

The fire department shall utilize a Lock-out Tag-out ("LOTO") procedure on the electrical main line power disconnect of the elevator equipment during fire department operations including extrications. A written procedure relative to removal of the lock shall be printed on the affixed LOTO tag to facilitate speedy removal for an incoming Massachusetts licensed elevator mechanic (effective 7/9/10)

Lock out/tag out-
No Choice-it MUST be done!

DANGER

Emergency
Elevator Procedures

The History of Elevators

- **PAST**
- **PRESENT**
- **FUTURE**

Earliest Known Elevator

- The earliest known elevator was in the Coliseum in Rome. It was used to transport the lions, tigers and humans for the entertainment of the Romans.
- The outline of the hoistway still exists to this day.

Mid –Nineteenth Century (1852)

- Until Elisha Otis Elisha Otis at Crystal Palace Fair performed a demonstration of his "Car Safety", elevators were not considered to be a safe means of transportation for people.
- It is still the basis for all car safeties.

The Bird Cage Style Elevator

1970's through today–solid state CPU's

Another Modern Solid-State Controller

- A modern solid state controller, that is air conditioned, dry and clean of any dust or other environmental problems.
- There is absolutely no need for any firefighter to open these cabinets. The only thing that you will find in here is trouble.
- The Main Line Disconnect will be inside of the entrance door of the machine room itself.

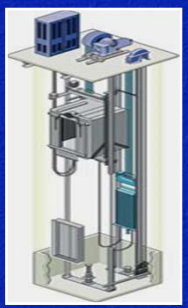
Families of Elevators

1) Traction Elevators
2) Hydraulic Elevators
3) Machine Room-less Elevators (MRL)
4) Freight Elevators

Families of Elevators

Traction

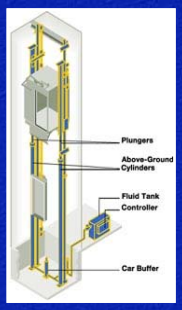
- Geared
- Gearless
- Drum



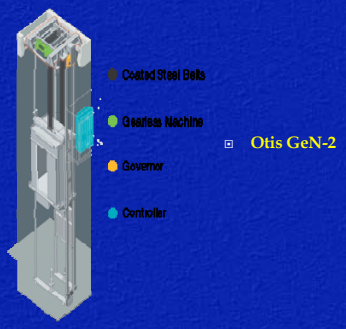
Families of Elevators

Hydraulic

- Holed
- Holeless/Telescopic
- Roped



Families of Elevators (MRL)



Freight Elevators

Freight Elevators

A TOUR OF THE HOISTWAY

Machine Room to the Pit

Geared machine installation

The Elevator Hoistway

Good View / Car System and Equipment

Car attachments

- Counterweights are known as "Silent Death" in the elevator industry.
- This man died, and we will examine his accident later in Section #4,.

View of Shackles attachment–Ropes to Car

Car Door Operator Motor and Assembly

Car Top Equipment

- Inspection box
- Car door operator
- Guard rail
- 2:1 roping
- Crosshead Beam

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Slide Guide

- The slide guide is used on low speed-low rise elevators.

Roller Guide

- The Roller Guide is used on mid and high speed-elevators.
- There are 4 sets, two on top and two on bottom of elevator

Elevator Car Door

- A modern Elevator car door showing a shoe clutch and LED doorway protection.
- Note the arm extending off to the left!
- It is connected to the Car Door Restrictor.

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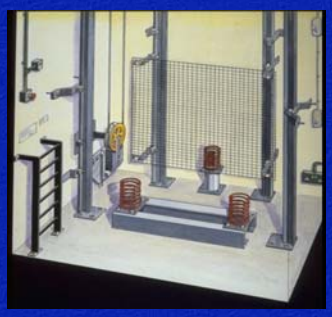
"Jump pit" switch at lowest landing.

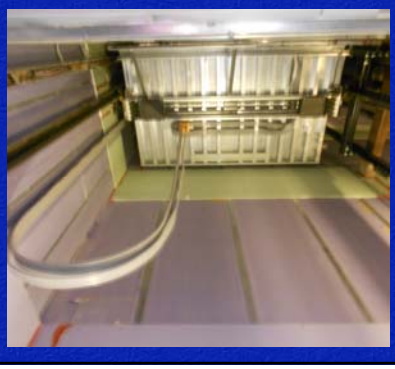
DANGER

The Elevator Pit

- Members are never to enter a Pit unless car is secured by elevator mechanic.

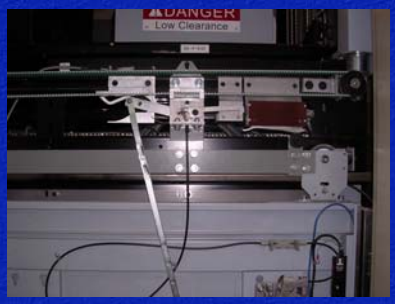


Traveling Cable



Car door with restrictor

Newer equipment. Note the Lateral Door Opener track belt at top of car door.



Hoistway door back view from inside the hoistway.

Equipment includes :
•the door pulley track
• the Interlock lock box
•The keeper

Hoistway view showing Interlocks on back of Hoistway doors

Hoistway Doors

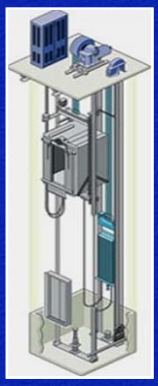
The final part of the system are the **Hoistway Doors** in the elevator lobby. Always account for all of your cars.

Emergency Elevator Procedures

DANGER

SAFETY CIRCUIT

System Schematic



Safety Circuit

Example: Geared Passenger System

HALL CALL STATIONS

Mechanical
and
Destination Orientated

Floor Call Buttons

Mechanical call button

Mechanical car station
(gang)
push buttons

Destination Oriented

- Destination oriented traffic management systems.

Otis-Compass

TKE-DCS

Schindler-Miconic-10

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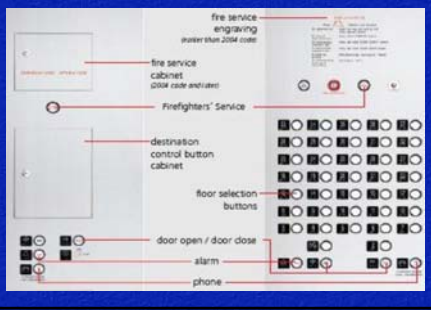
- Comparison of both Pre and Post 2004 COP with a Destination Oriented Traffic Management System.



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FAID Automatic Recall

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SHOE AND VANE CLUTCHES

Photo Electric Eyes and Light Emitting Diode's

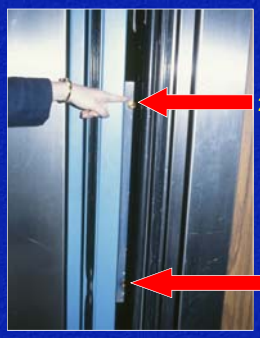
Shoe Clutch and LED Door Protection

- A modern elevator door showing a shoe clutch and LED protection .

LED door protection.
(Light Emitting Diode)

Full doorway opening coverage

Older Style of Photo Electric Eye



Mirror on opposite side of door opening

SHOE CLUTCH

The Shoe clutch is the most common type of clutch installed. The clutch would cover the release rollers attached to the back of the Hoistway Door, and then be used by the **Car Top Door Operator** to open the door.

Vane Clutch

Note:
- 2 shoe clutches
- Car door operator
- Crosshead beam
- Screw drivers in door tracks

MACHINE ROOM

Contents and Locations

Machine Room Contents

- Power Disconnects
- LOTO Procedure
- Precautions to be taken
- Elevator Controller
- Hoistway Vent Exchange Opening

Power in the Machine Room.

Main Line Disconnects here.

110 volt disconnects here.

Where is the machine room?

Up here ?

or

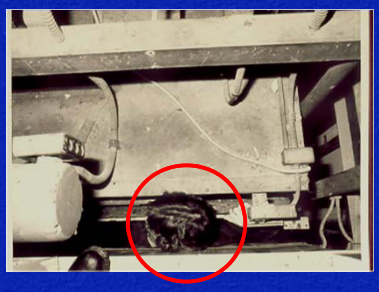
Down here?

Deep in the bowels of building .

Basement Drum Machine

Fatality

Traumatic asphyxia



Do not stand IFO the disconnect!

DANGER

Lock out/tag out-
No Choice-it MUST be done!

DANGER

Sometimes finding the Machine Room is half the battle.

Stairway to the roof

CAUTION!

Roofs are dangerous places.

Watch your footing and the edge of the roof.

Did you Bring the BIG Eight?

1.Flathead axe
2 Halligan Bar
3.Light
4.Radio
5.Lock out/Tag out
6. Poling Tool
7. Hoistway Door Keys
8. Rabbit tool

Winter Hazards!

DANGER– At night, where is your light?

- It would be very easy to walk off the edge of this roof in the best of weather.
- What about *ICE*?

GEARED AND GEARLESS

Traction Machines

Power in the Machine Room.

Main Line Disconnects here.

110 volt disconnects here.

Controller set with Power disconnects

- Note the Main Line power disconnects 18″ from door jamb.

Geared Machine Room–Solid State

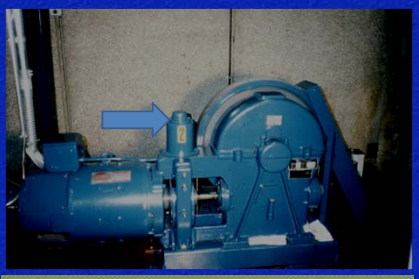
Hoist sheave

Geared Machine

Sheave Wheel

Hoist sheave

Geared Machine



Motor/generator Brake assembly Worm and gear

Gearless Machine-The Present

Gearless Machine–Today

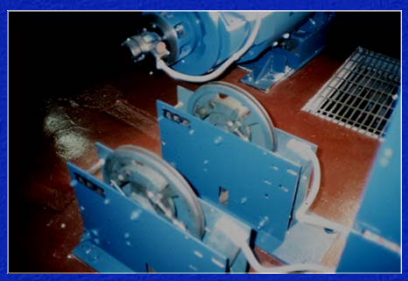
- This is a KONE Gearless Overhead PSPM machine for high rise (36+ stops) installations.

Similar Solid State Machine Room

Large, well lit and clean machine room.

Hoistway vent exchange opening

Governor sheave wheel



Governor Sheave

Tightening Sheave in pit

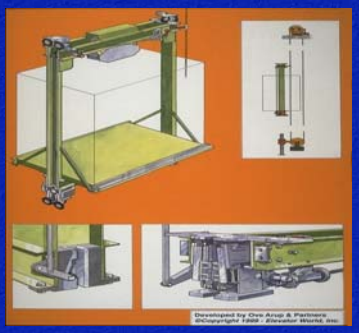
Car safety device actuating arm and governor rope

CAR SAFETY SYSTEMS

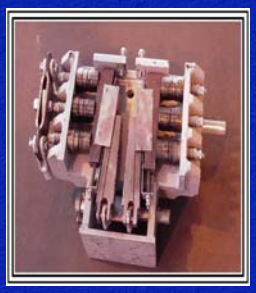
Gradual or Instantaneous

Car Safeties-

- Car sling
- Governor loop
- Car safety
- Safety Plank and attached car safeties

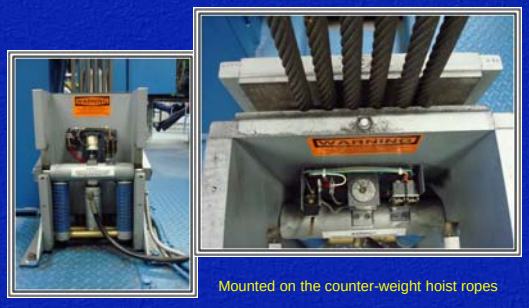


Car Safety Device Jaws



- The steel jaws of the Car Safety Device will grasp the guide rail like a vice, and bring the car to a safe but violent stop.
- There are two types of Safeties-Instantaneous and Gradual.

Up Direction Rope-Grippers



Mounted on the counter-weight hoist ropes

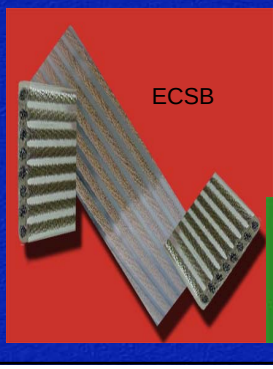
Up Direction Rope Safeties

Activated mechanically and reset is hydraulic

Mounted on the car hoist ropes

The Machine Room-less Elevators-(MRL)

Hoist Rope Variety



KONE "Monospace" Pilot (E7)

- The first MRL in MA was located in the closed quarters of Engine Company # 7 of the Cambridge Fire Department. It is now "The Kendall Inn".

MRL Identification in Lobby

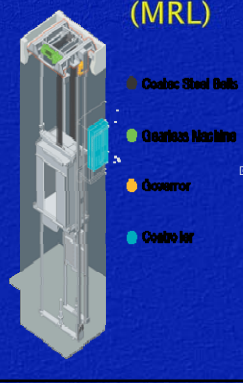
Machine Room-less Elevators (MRL)

- The typical penthouse is gone
- All drive machinery located *in* the hoistway
- Main line disconnect in control room
- room may be on top/lower floor
- Control Room Door is locked by company key
- Arrange for key to be in Knox box or Gamewell

The MRL Family

- Otis-*GeN2* –machine in the overhead of hoistway
- Fujitec-*Talon*-machine is in the overhead of hoistway
- KONE-*Monospace*-machine under guide rail at top floor
- Schindler 400A-machine is located in the overhead

Otis Machine Room–less Elevator (MRL)



- Otis GeN-2

Otis Machine room–less elevator (MRL)

- Otis GeN-2L
- Targeted for replacement of existing hydraulic units

Otis Machine room-less elevator (MRL)

The Fire!

Dynetech Building Orlando, Florida

11/2/07

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Otis GeN2 ECSB burning in Orlando

- The belts are Poly-urethane coated steel wire in a flat or laid out manner rather than twisted wire rope.

Otis GeN2 Elastomeric Coated (PU) Steel Belts (ECSB)

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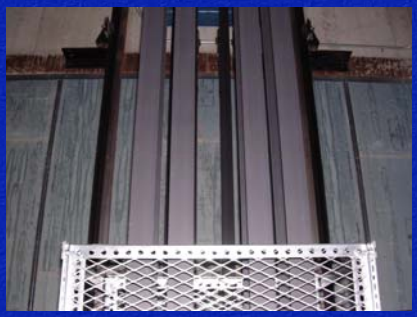
Otis GeN2 in position

- The belts are Polyurethane zinc-coated steel wire in a flat or laid out manner rather than twisted wire rope.

GeN2 Front View



KONE "Monospace" MRL

Notice: the machine is located under the guide rail inside the hoistway.

KONE "Monospace" PM motor and closet

Schindler Closet / Machine Room

- Remember, that except for the Pilot installations around MA (25), they are in Control Rooms
- It may appear to be a closet door, but this is the Control Closet (CC).

Global-Tardif MRL Closet Controller Fire

There have been **8** recent fires in the controller used for this product.

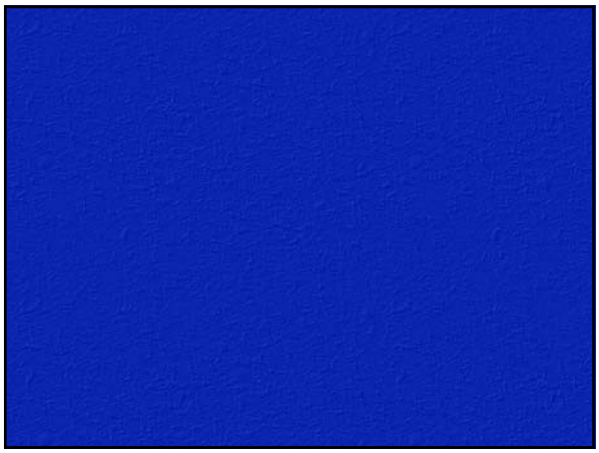
2 in MA and **6** in Ontario, Canada (3 of those in one day)

Lock out/tag out- No Choice-it **MUST** be done!

DANGER

QUESTIONS?

End of Segment # 1



Emergency
Elevator Procedures

Hydraulic Elevator Systems

ESTCO

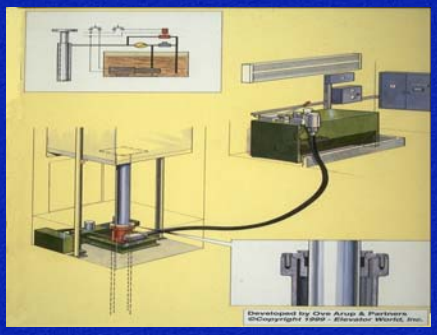
Emergency Services
Training Company

Emergency
Elevator Procedures

Hydraulic Elevator Systems

Hydraulic Elevators

Hydraulic Elevator System



Hydraulic Elevator Systems

- Hole-less variety-no drilling required
- Direct In-Ground-Holed-type drilled down its height
- Cantilever hung
- Platform slung
- Roped assist
- Water driven
- Machine room locations

Major Problems

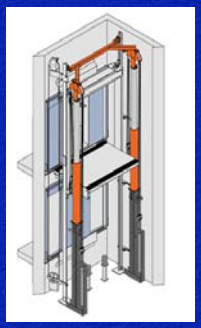
- Hydraulic units bring with them the problems of noise and odor.
- Poor performance in hot and cold environments.
- Environmental impact of hydraulic fluid spills.
- Electrolytic corrosion of single casing cylinders in-ground causing catastrophic collapses. This is not the case with installations that comply with A17.1.
- The cost of pulling those cylinders, inspecting and replacing them. ($100,000)

The Big Differences

- No counterweights
- No hoist Ropes (Except. Roped hydraulic)
- No car safety devices
- No Car Safety Plank (**PROBLEM!**)
- Hydraulic fluid supply -200 gallons (average)
- Remote locations of Machine Room
- Usually 6 floors/stops or less

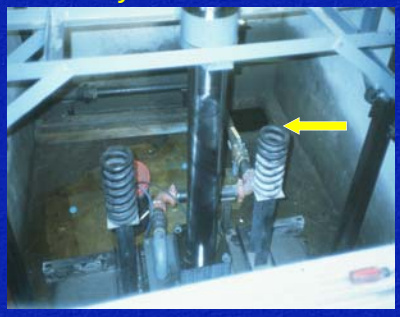
Hydraulic Family of Elevators

Roped Hydraulic Sheave Wheel



Direct Acting In-Ground Piston

Hydraulic Pit



Above ground piston from underside of car

Cover Off!

Pump Unit

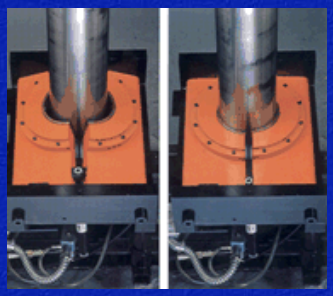
Lock out/tag out-
No Choice-it MUST be done!

DANGER

Resculator

- Many companies manufacture products that will safely lower a hydraulic elevator after checking the safety conditions of the car.
- They eliminate entrapments and repeat calls for extrications.

"Life Jacket" Piston Grabber



Emergency Elevator Procedures

COMMUNICATIONS SYSTEMS

Fire Alarm Panel
Elevator Status Board
Emergency Power Panel

Emergency
Elevator Procedures

ESTCO
Emergency Services
Training Company

COMMUNICATIONS SYSTEMS

Fire Alarm Panel
Elevator Status Board
Emergency Power Panel

Fire Command Center

Required in MA by 524 CMR section 780, the high rise building code

In the Fire Command Room

In the Fire Command Room

EMERGENCY POWER GENERATORS

Required by 524 CMR in buildings 70 feet or higher built after December 31, 1981.(MA)

Emergency Power Selector

Emergency Generator Power

- Will take over after a 25 second drop in Primary power.
- Will select cars following an automatic selection plan.
- One car at a time will be brought to the DL or AL.

- If selected car does not move after 25 seconds, it moves on to next car.
- Full load (weight) capability.
- May move at a reduced rate of speed.

Older telephone system

- Out-dated phone system

Lucky if it was there

- If you did not know the numbe r to dial, you were out of luck.

Modern in-car systems

Press button for help and await return response

Emergency
Elevator Procedures

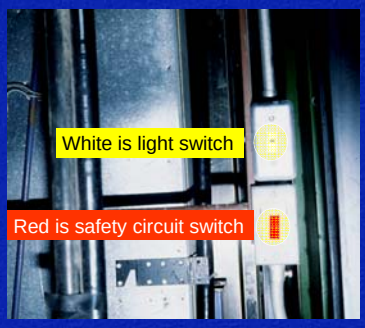
Emergency Exits

Emergency
Elevator Procedures

Emergency Exits

No safe exit here

Uppermost and Lowest Floors



The Car top-danger area!

DANGER

Car top emergency exit

DANGER

View showing light baffles

DANGER

Note the wing nuts on corners

DANGER

Corner Exits

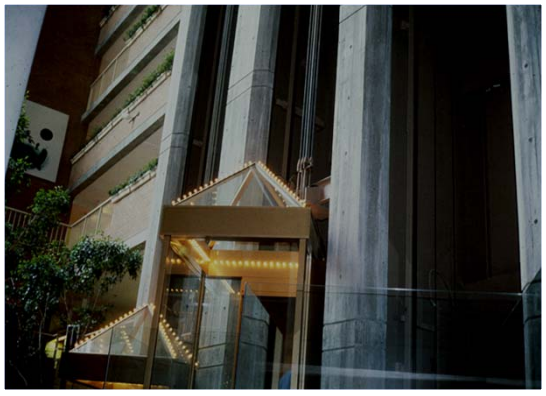
Circular Emergency Exit

- Safety Circuit Plug

Other views of emergency exits

Hyatt Regency at FDIC–Indianapolis

- There will be no emergency exits from the top of the car in atrium hoistways
- Unless cars are enclosed in a glass hoistway.



Lock out/tag out-
No Choice-it MUST be done!

DANGER

Lunch!

ESTCO

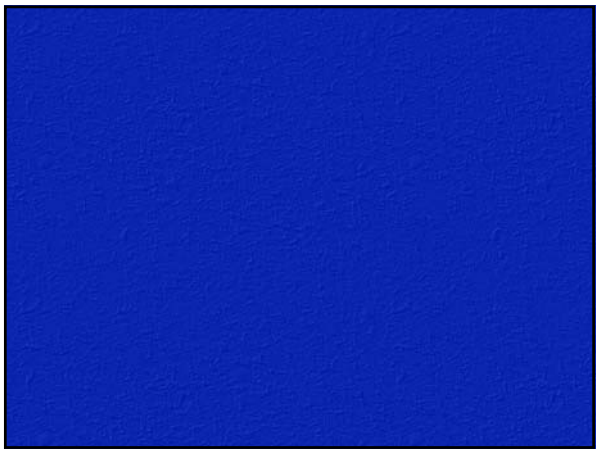
Emergency Services Training Company

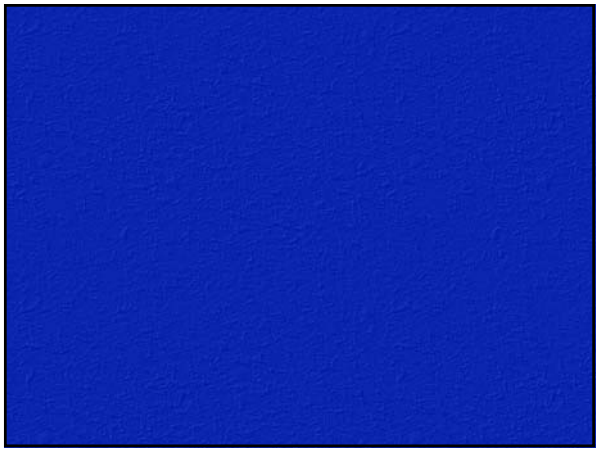
Emergency
Elevator Procedures

End of Segment

Emergency
Elevator Procedures

End of Segment





EMERGENCY
ELEVATOR PROCEDURES

Car Door Operations

EMERGENCY
ELEVATOR PROCEDURES

Car Door Operations

Before you start!

- Confirm name of Elevator Service Company and their 24 hour emergency response telephone number
- Have Fire Alarm/ECC call that number
- Tell them that the fire department is IFO the building
- Ask them for an estimated time of arrival
- If you can, wait a reasonable amount of time (20min)
- If you can't, continue with Lock out/ Tag out
- Once machine room members confirm it has been performed, take the action that you deem necessary

Emergency
Elevator Procedures

Types of Hoistway Doors

Emergency
Elevator Procedures

Types of Hoistway Doors

Swing Doors

GAP

Retiring Arm and Cam

Emergency
Elevator Procedures

Single Speed Side-Slide

Emergency
Elevator Procedures

Single Speed Side-Slide

Single Speed Side-Slide

- Which way does this door open?
- To the right?
- To the left?

Interlock side is easy to tell in this case

Center Opening Doors

Emergency
Elevator Procedures

Two Speed Side-slide

Emergency
Elevator Procedures

Two Speed Side-slide

Two-speed side-slide

- This is the two-speed side slide hoistway door. Never put a tool between the high and low speed panels.

2-Speed with False Panel

False Panel

- Note how the false panel is stationary.
- It actually does not move, but serves as an anchor.

Reseated Door Set

Emergency
Elevator Procedures

Two speed - center opening

Emergency
Elevator Procedures

Two speed - center opening

Also called the cattle car

Fully opened hoistway door

- Used when there is insufficient space for normal opening set of hoistway doors.

Emergency
Elevator Procedures

Bi-Parting Doors (Freights)

ESTCO

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Emergency
Elevator Procedures

Bi-Parting Doors (Freights)

Bi-Parting Freight Door

Bi-Parting Freight Door

- This is what the system actually looks like.
- A car door and a car gate.

What Type of Doors?

What Type of Doors?

Which car is number 3?

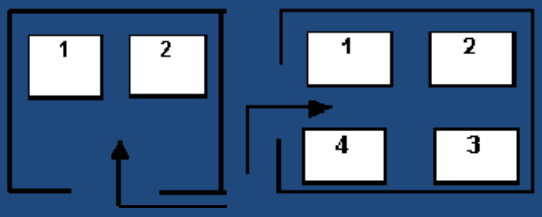
Standard. (A17.1)

Elevators are numbered from left to right in a clockwise direction. Standard. (A17.1)

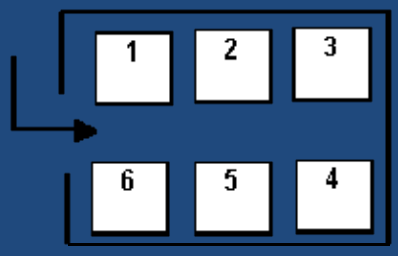
If marked differently, it must be marked as such.

Important point is -where is the accepted front of the lobby.

Clockwise examples



Clockwise examples



EMERGENCY
ELEVATOR PROCEDURES

Interlocks
- Theory
- Objectives
- Restrictors

EMERGENCY
ELEVATOR PROCEDURES

Interlock Theory and Objectives

This is where it is located!

- This "Keeper" is what keeps the door closed, by monitoring both mechanically and electronically.
- It is mounted on the back of the hoistway door.

This is a keeper!

- A closer view of "The Keeper".

Center-Opening Door Interlock

Lock out/tag out-
No Choice-it MUST be done!

DANGER

RESTRICTORS

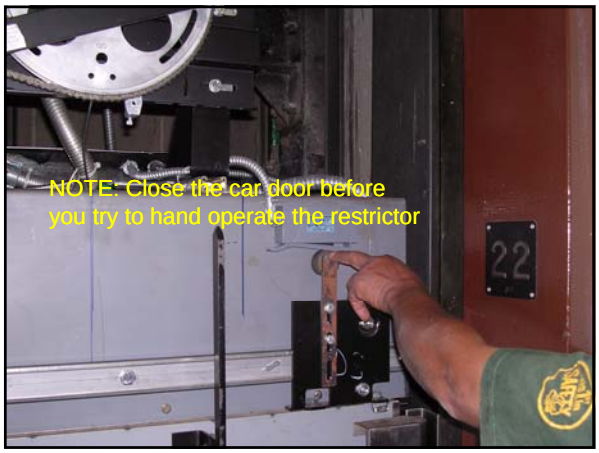
- These are Otis Elevator Company Restrictors
- Electric and Mechanical varieties
- Meant to keep the public safe by keeping them **in** the car
- Allows door to be opened a maximum of 4 inches.

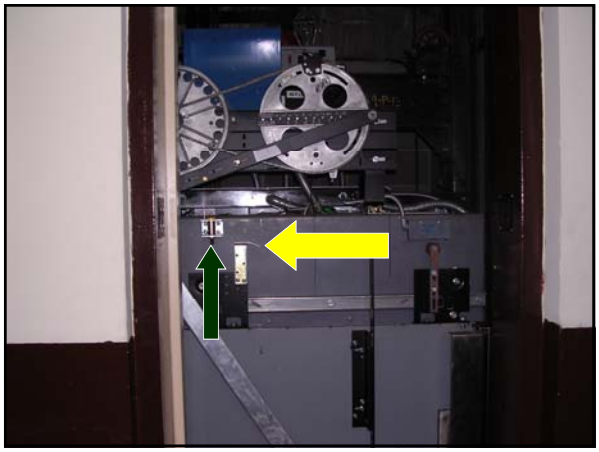
EMERGENCY
ELEVATOR PROCEDURES

Electrical Restrictor

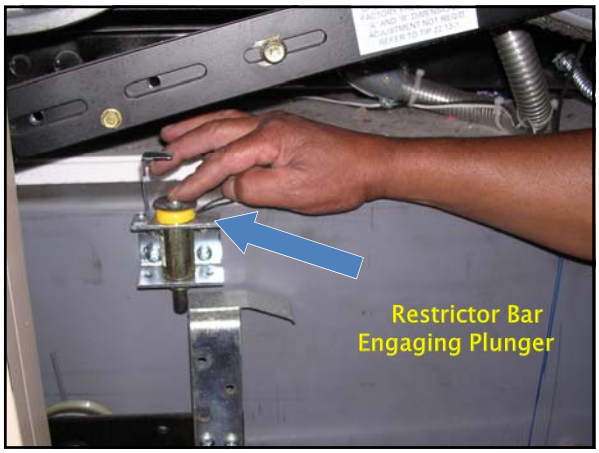
EMERGENCY
ELEVATOR PROCEDURES

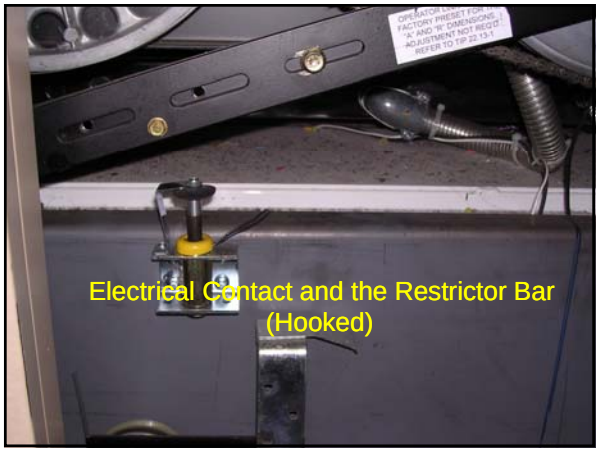
Electrical Restrictors


NOTE: Close the car door before
you try to hand operate the restrictor
22




This car is out of unlocking zone (3”-18”)
from a level stop. Restrictor is Active



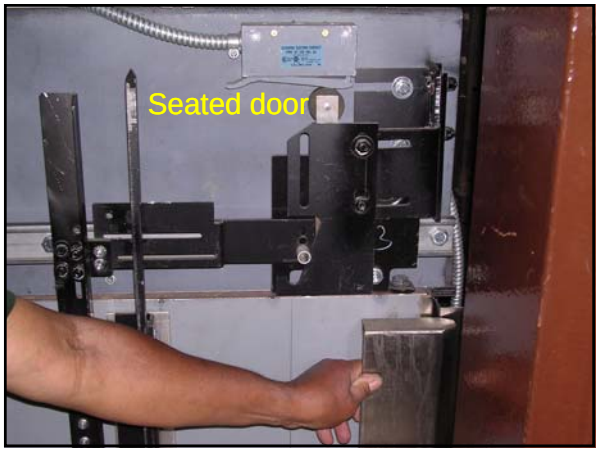


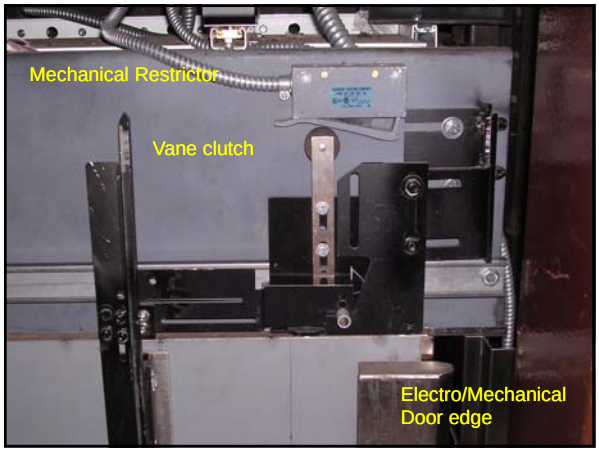
EMERGENCY
ELEVATOR PROCEDURES

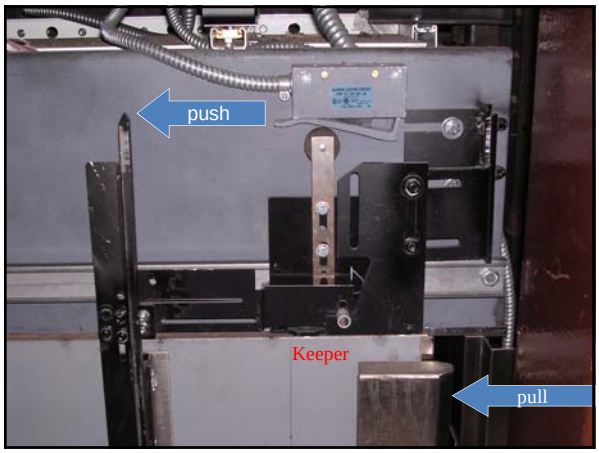
This series will be covering the Mechanical Restrictor

EMERGENCY
ELEVATOR PROCEDURES

Mechanical Restrictors







RESTRICTORS

- GAL restrictor
- Car is in unlocking zone
- Restrictor NOT active.

Restrictors

GAL Restrictor-

- **This car is out of the unlocking zone.**
- **The Restrictor IS Active.**

Restrictors

GAL Restrictor- Trip the restrictor by squeezing the components as shown.

EMERGENCY ELEVATOR PROCEDURES

POLING

Lock out/tag out-
No Choice-it MUST be done!

DANGER

EMERGENCY
ELEVATOR PROCEDURES

POLING

Pole from Car # 2

Poling Procedure

- After removing power to all cars involved, reach between the front of car and the back of the hoistway door and trip the release rollers.

EMERGENCY
ELEVATOR PROCEDURES

Talking them out

EMERGENCY
ELEVATOR PROCEDURES

Talking them out

Talking Them Out

- **Implement Rule #1 if appropriate.**
- **Rule # 2- Power down before instructing passengers- lock out/ tag out!**

Talking Them Out

- One voice only!
- Make your instructions clear.
- Condition of those in the car?
- Find out their last actions.
- What happened?
- Reseat all hoistway doors.
- Have them press button for a floor call.

Car is in the landing zone

Rolling both doors through

Car is outside the unlocking zone

Occupant is engaging the Interlock extension to open floor doors

When all else fails

Flathead, Halligan and strength

A safe removal!

What we do not do!

What we do not do!

What we do not do!

What we do not do!

- When the firefighters moved into position to remove her, they had this huge space to deal with.
- One step, and they are all gone.

What we do not do!

EMERGENCY
ELEVATOR PROCEDURES

The view from
inside the car

Center Opening Door
from inside the Car.

Car was at the unlocking zone.
Both doors opened

EMERGENCY
ELEVATOR PROCEDURES

Types of Interlocks

EMERGENCY
ELEVATOR PROCEDURES

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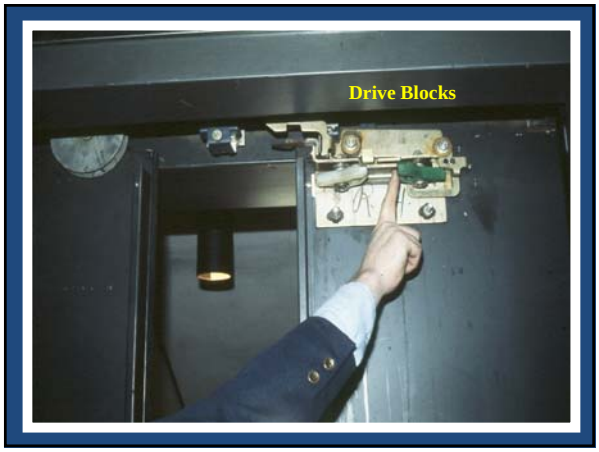
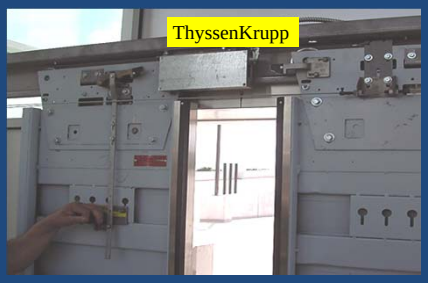
Types of Interlocks


Westinghouse
now Schindler


Drive Blocks

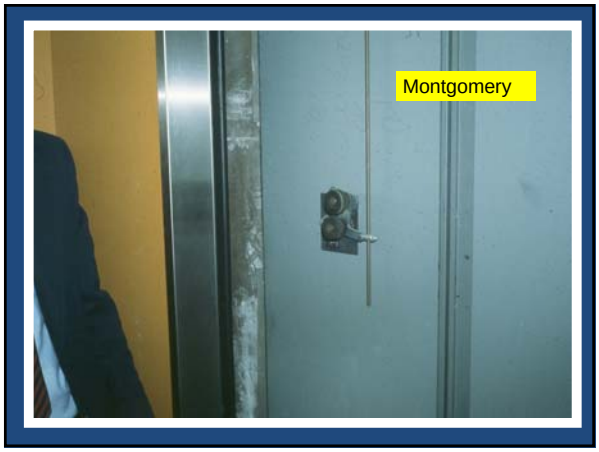
Center-Opening Door Interlock

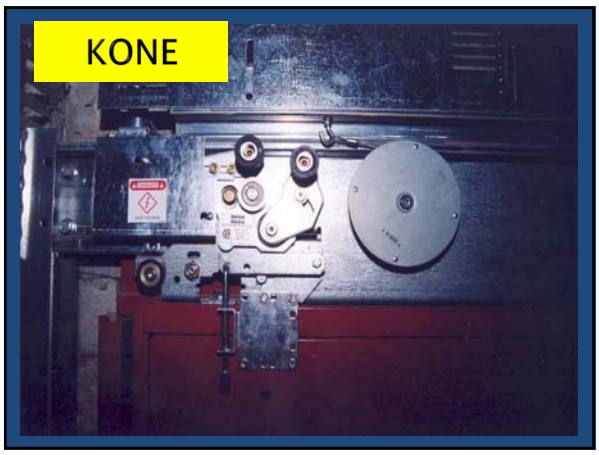


ThyssenKrupp

G.A.L.

Fujitec


Montgomery


KONE

EMERGENCY
ELEVATOR PROCEDURES

HANDICAPPED LIFTS

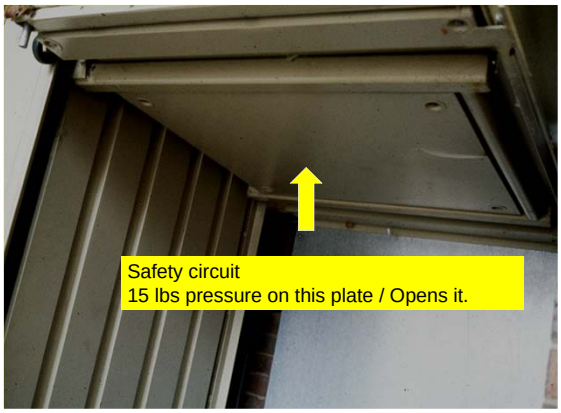
EMERGENCY
ELEVATOR PROCEDURES

HANDICAPPED LIFTS

Operating panel

Note! As of May 5, 2010 keys will not be required for these units-per DOJ.

Lift in upper position



Safety circuit
15 lbs pressure on this plate / Opens it.

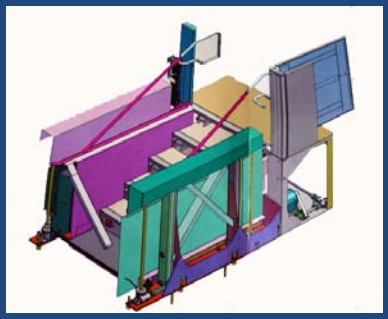
Lift in lower position

The newer versions–Hogan

- Stairs are available during normal usage.
- When needed, the unit becomes a wheel chair lift.

The newer versions–Hogan

- The steps collapse under the frame, creating flat surface for wheelchair



PRIVATE RESIDENCE ELEVATORS

Range from very safe to disasters waiting to happen

PRIVATE RESIDENCE ELEVATORS

Range from very safe to disasters waiting to happen

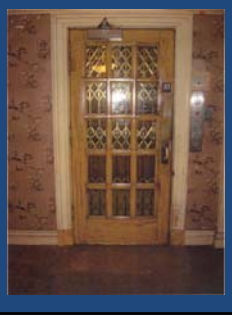
A modern safe system

MRL Style

Joseph Tucker Smith

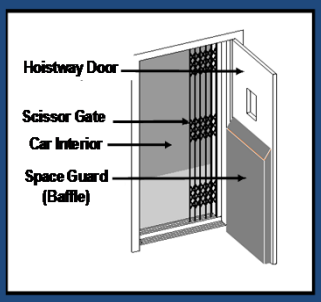
"On August 23rd 2001, eight-year-old Joseph Tucker Smith became entrapped in the space between the collapsible gate and the swing door on a circa 1929 elevator in Maine. The elevator responded to an up-directional call, and the ascending elevator fatally crushed the child."

Swing Door Accidents



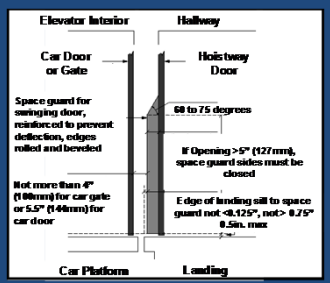
Swing Door Accidents

- Children get between hoistway door and car gate.
- The door is closed, safety circuit is made up.
- Car moves.



Swing Door Accidents

- The corrective action eliminates the space between door and gate.



Lock out/tag out-
No Choice-it MUST be done!

DANGER

EMERGENCY
ELEVATOR PROCEDURES

End of Segment

EMERGENCY
ELEVATOR PROCEDURES

End of Segment

EMERGENCY
ELEVATOR PROCEDURES

Freight Elevator Systems

EMERGENCY
ELEVATOR PROCEDURES

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Freight Elevator Systems

Automatic Bi-Parting Freight

Hydraulic Freight

- This happens to be a hydraulic unit, but many are traction /drum machines

Freight Car and Gate Panel

- **If the car gate is not closed completely, the Safety Circuit is open, and car will not run.**

Older freight elevator

Must have:

Car Gates
Landing Doors
Use History
Stop Switch
Alarm System
Public Excluded
Annually Inspected

Modern Freight Systems

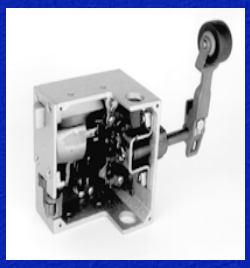
Manual Doors

Power Operated Doors

Freight Door Activation System

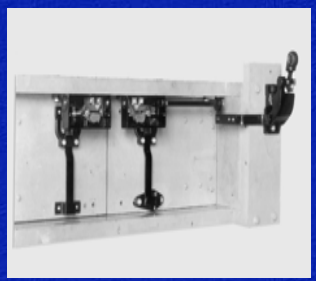
- Retiring Arm- moves in or out to answer floor request.
- Cam runs onto it and is bent in direction of travel.
- This action lifts the keeper on the door.

Freight Door Activation System

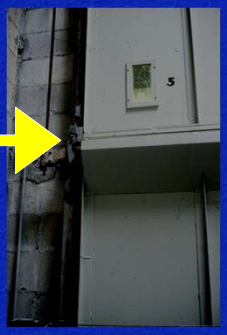


Swing Arm Interlock and Cam

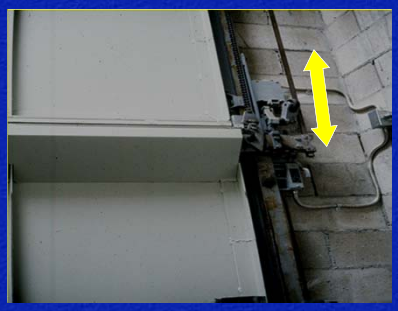
- Swing Cam Arm and Interlocks it controls.



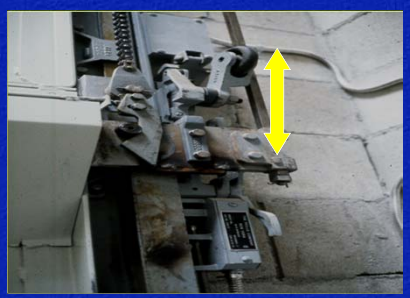
"Free side"
Lock
2" of movement



Interlock side
with cam arm



Up close picture of cam arm



EMERGENCY
ELEVATOR PROCEDURES

Dumbwaiters

EMERGENCY
ELEVATOR PROCEDURES

Dumbwaiters

Kitchen Dumbwaiter

Small Freight Systems

Bi-parting car door

Bi-parting car door/ Hoistway

There is no help here!

The Elastic Man

EMERGENCY
ELEVATOR PROCEDURES

Special Problems

EMERGENCY
ELEVATOR PROCEDURES

Special Problems

EMERGENCY
ELEVATOR PROCEDURES

Blind Hoistways

EMERGENCY
ELEVATOR PROCEDURES

Blind Hoistways

25 stories down

- In a true blind hoistway, there would be no hoistway doors.
- There would be an emergency exit every 42 feet

- What are your options?

EMERGENCY
ELEVATOR PROCEDURES

Construction Elevator Systems

EMERGENCY
ELEVATOR PROCEDURES

Construction Elevator Systems

Lock out/tag out-
No Choice-it MUST be done!

DANGER

Construction Elevators

Construction Elevators

- Construction Elevator attached to building via tower and braces.
- Cab and counterweights can be seen on the tower.
- Motor is located on the roof of the cab.
- These type of units have been the scene of a number of accidents.

Construction Elevators

- Construction Elevator attached to building via tower and braces.
- Cab and counterweights can be seen on the tower.
- This is a fatal accident scene involving the counterweight.

Construction Elevators

- Construction Elevator attached to building via tower and braces.
- If you look closely, you can see the outline of a man who has just been killed by the counterweight.

Construction Elevators

- This man was part of a 2 man team who regularly worked on these units. He looked out of the tower just as the counterweight came down.

Construction Elevators

- Firefighters gain access to him where the para-medics amongst them declared him to be beyond help.
- They then proceeded to secure both him and themselves to allow for his removal.

Construction Elevators

- They secured the victim and ran a belay line that can be seen below.

Construction Elevators

- The elevator mechanic them moved the counterweight in the up direction.
- This then allowed access for the firefighters to remove his body.

Construction Elevators

- More of the removal sequence.

Construction Elevators

Working on removal of deceased

- Firefighters have moved onto the roof of the cab to secure the deceased worker and remove him to the ground.
- All members should be secured with body harnesses and life lines.

Down to the ground

- Deceased is removed to the ground by elevator mechanics moving the cab to the ground electrically.
- Once at the ground, the stokes stretcher was slid down ground ladders laid against the cab.
- He was then transported by the medical examiner.

EMERGENCY
ELEVATOR PROCEDURES

Hoistway Door Unlocking Device Tool

EMERGENCY
ELEVATOR PROCEDURES

Hoistway Door Unlocking Device Tool

Procedure to Follow

- Upon arrival secure proper key tool.
- Always work with another firefighter at scene.
- Confirm with machine room team that lock out/tag out has been performed.
- Determine approximate location of car in hoistway.
- Use tool to open hoistway door.
- If at wrong level, shut door and test for locking.
- If at proper level, gain access to car.

Lock out/tag out-
No Choice-it MUST be done!

Hoistway Door Unlocking Device Keys

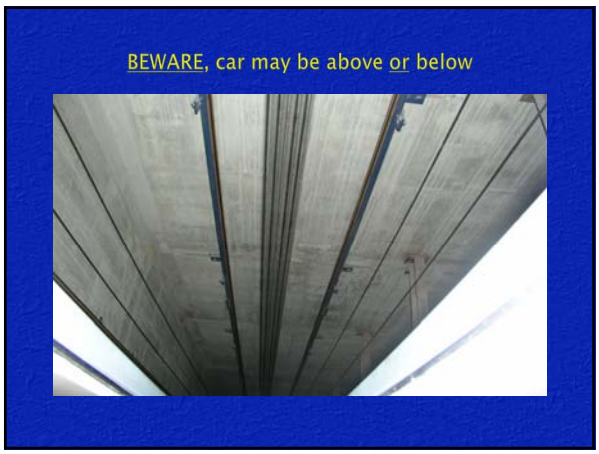

Look before
you spread


Insert key half way
and pull down on key


Inserted key lifts bar up
releasing lock


Standing to one side,
SLOWLY open door


LOOK in hoistway
as you open door


BEWARE, car may be above or below

Single Drop Key

Single Drop Key


3

Drop Key Action

Proper procedure using the tool

- Always have another firefighter work with you when opening the door.
- Make sure that you remove your hand and the tool after you have cleared the keeper from the lockbox.
- If you don't, you will slam your hand into the door frame as it opens fully.

Elevator "UP" in the hoistway

- This elevator is in a dangerous position because it is "UP" in the doorway.
- The exposed hoistway is an invitation to fall **under** the car and down the hoistway.
- Always guard such openings with a ground ladder or other obstruction.

Elevator "UP" in the hoistway

- This elevator is in a dangerous position because it is "UP" in the doorway.
- The exposed hoistway is an invitation to fall **under** the car and down the hoistway.
- Always guard such openings with a ground ladder or other obstruction.

Elevator "Down" in hoistway

- This is a dangerous situation to be confronted with.
- How would you take a passenger out?
- Top-of-car exit?
- Out the door exit?

EMERGENCY
ELEVATOR PROCEDURES

Escalator Systems
- **History**
- **Injuries**
- **Deaths**

EMERGENCY
ELEVATOR PROCEDURES

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Escalator Systems
- History
- Injuries
- Deaths

Escalator Accident Figures

- 50% of 1000 side-wall entrapments involve children under 5 years of age.
- 6,000 hospital ER visits annually.
- Escalators experience 18 times as many accidents as there are involving elevators.
- Most involve hands or footwear being caught in an escalator combplate or sidewall.

Basic Escalator Layout

Escalators–(then) The "Reno"

- Very noisy
- Uncomfortable
- One person across
- Discharged passenger 2″ in air.
- Very aware!

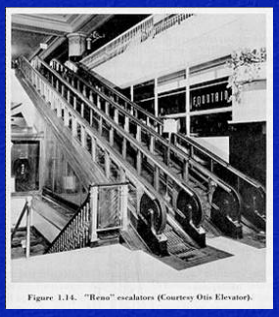


Figure 1.14. "Reno" escalators (Courtesy Otis Elevator).

This is the Truss

- Note the steps running on the return rails inside the Truss.
- The steps are actually upside down at that time.
- The MR is at the TOP of the unit, and pulls the system.

Escalators–(now)

- Very Quiet
- Room for 2+ people
- Smooth glide landing
- Lack of awareness
- Many distractions

BEFORE

After

Where are the emergency stop buttons?

Emergency stop button

- Located at both the **top and bottom** of every escalator

Nearly all escalator accidents are in the down direction

Watch out for rollback

Note: Emergency stop switch on right

Open Floor Access

Escalator Dangers

- Porter Square "T"
- Numerous falls or entrapments
- Deepest subway station in U.S. (140')

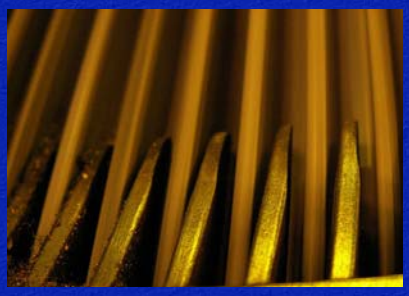
Fatal Accident

- Young man fell on down trip, and was fatally strangled when his necklace was caught in the comb plate.
- Young women was strangled to death when her winter poncho caught in the combplate.

Areas of entrapment

- The comb plate is a major area of entrapment

Combplate and Step Interface



Combplate segment

Areas of entrapment

- Side panel entrapment-now with the installation of the Side-Skirt Deflector, it is hopefully ended.

The Future?

30 foot fall from top?

A High-Deck Escalator

A Number of High-Deck Escalators

Is this a High Deck Escalator?

The Discharge Side of The Escalators

YES! This is an Escalator!

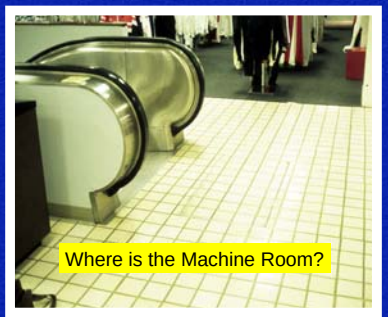
Side of Step Entrappements

- Side of step entrappements are some of the most difficult to resolve
- Due to position of injured person 40 feet in the air, with no side access due to height.

Toes are Everywhere!

- Toes, as beautiful as some can be, are in danger anytime one rides an escalator.

More Toes!



Machine space opened for maintenance

Everyday at the Mall

- The next time you are out shopping, stop off at the 2nd or 3rd floor of your local mall.
- Look down at the escalator, and you will see parental neglect every day.

EMERGENCY
ELEVATOR PROCEDURES

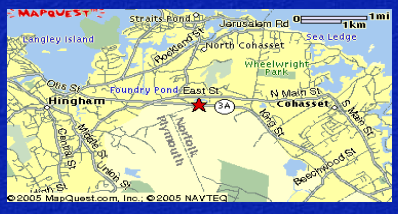
History of a Rescue

EMERGENCY
ELEVATOR PROCEDURES

History of a Rescue

COHASSET ELEVATOR INCIDENT

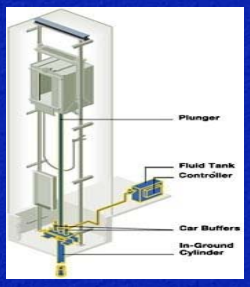
Cohasset Knoll Nursing Home



Cohasset Elevator Incident

- Date-Tuesday, 9/07/04
- Time-1131 hours
- On duty strength?
- Level of training in elevators?
- ICS used?
- Resulting performance?

Hydraulic System Design



Hydraulic Elevator Pit

Elevator Resting on Flange

In the Elevator Pit

- **Hydraulic supply line has separated and the car has dropped**

Cohasset Incident

- Car is down below its normal final limit switch.

Gaining Access to Victims

- Cutting side panel
- Mechanic #1 standing in space

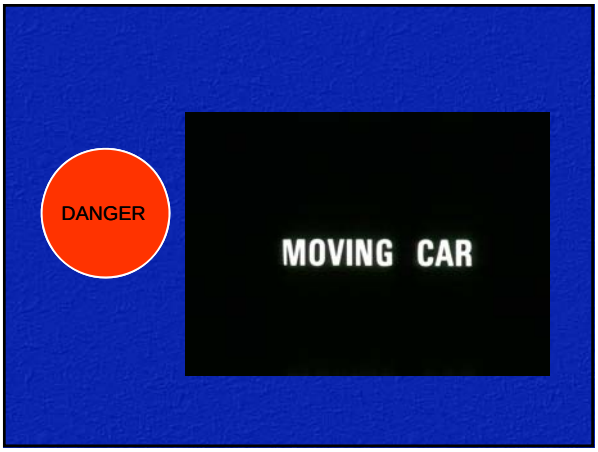
Removal of mechanic # 2

The Outcome

- Both mechanics surveyed for injuries in the pit.
- Both removed on long board to EMT-P group in hallway.
- Bleeding controlled, wounds dressed and boarded.
- Mechanic # 1 transported by ground.
- Mechanic # 2 transported by air.
- Neither lost consciousness
- ICS in place

Cohasset Elevator Incident

- Date-Tuesday, 9/07/04
- Time-1131 hours
- On duty strength? 4-5 plus mutual aid
- Level of training in elevators?- *Adaptive!*
- ICS used?- *Excellent*
- Resulting performance - *Outstanding!*



Good view of car system and equipment

EMERGENCY
ELEVATOR PROCEDURES

Forcible Entry

EMERGENCY
ELEVATOR PROCEDURES

Forcible Entry

Tools to top leading edge corner

A safe removal!

Extrication Equipment Needed!

- If you don't have it at hand, call for Mutual Aid.
- The next town or city may well have just what you need.
- Call early- you can always send it back!

All the Tools!

Use the tool to fit the occasion!

RESPONSIBILITY

RESPONSIBILITY

DANGER

Remember “POWER DOWN” and LOTO
-Lock out/ Tag out-

Above all, stay safe!

ESTCO
Emergency Services Training Company

DANGER

Remember “POWER DOWN” and Lock out/ Tag out.

Above all, stay safe!

Commonwealth of Massachusetts
Division of Professional Licensure
Office of Public Safety and Inspections
FIREFIGHTER'S EMERGENCY ELEVATOR OPERATION AND ELEVATOR EXTRICATION RESPONSE

E-mail completed form to elevator.supervisor@state.ma.us

Date:	Time:	Incident #:	State Elevator ID#:

Indicate whether you are reporting an Emergency Elevator Operation ☐ or an Elevator Extrication Response ☐

Location Name & Street Address:

Location City/Town:

EMERGENCY ELEVATOR OPERATION: Please provide the following information

Smoke Detector/Automatic Recall: Yes ☐ No ☐

Phase I Operation:

Key inserts properly? Yes ☐ No ☐ Key withdraws in the ON position? Yes ☐ No ☐

Did all the cars respond to Phase I Recall? Yes ☐ No ☐

If not, what happened:

Phase II Operation:

Does the key insert and turn on the ON position properly? Yes ☐ No ☐

Does the key remove from the ON position properly? Yes ☐ No ☐

Does the key insert and turn to the HOLD position properly? Yes ☐ No ☐

Does the key remove from the HOLD position properly? Yes ☐ No ☐

If not, explain:

Does car respond to discharge floor, keeping doors closed on arrival? Yes ☐ No ☐

If not, explain:

Do car doors open and close under "CONSTANT" pressure? Yes ☐ No ☐

Briefly describe problems:

ELEVATOR EXTRICATION RESPONSE: Please provide the following information

Was power to car disconnected and left in the "off" position? Yes ☐ No ☐

Was "Lock Out/Tag Out" performed? Yes ☐ No ☐

Were there injuries? Yes ☐ No ☐ If Yes, were injuries to Non-FD ☐ or FD Personnel ☐

Was Elevator Company called? Yes ☐ No ☐ If Yes, provide company name:

Briefly describe situation:

Emergency Elevator Procedures

Hoistway Door Unlocking Key Tool

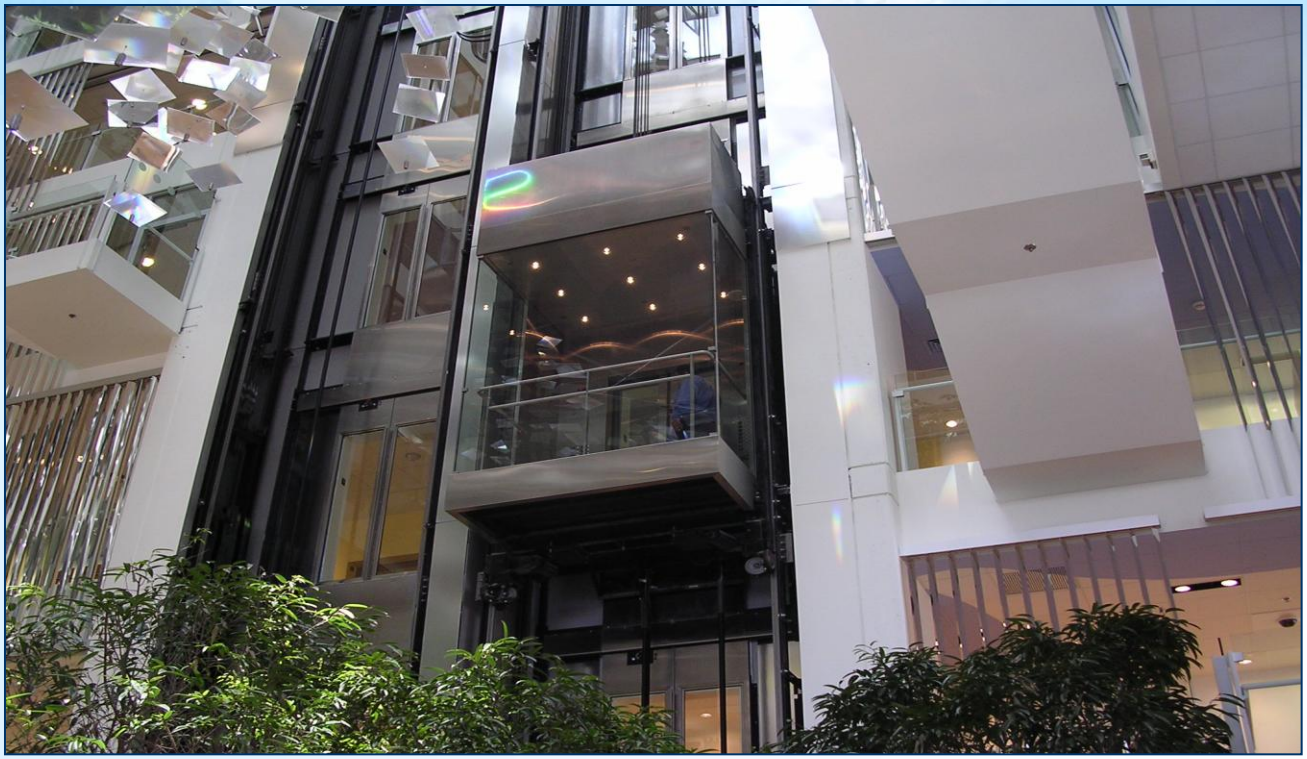
Department of Fire Services / Massachusetts Firefighting Academy

Department of Public Safety

Elevator Division

Goal

- To provide a safe environment for firefighters when working near elevator equipment



Why We Are Here!

Look and Read!

Now in the MA Code!

What Is It?

- The hoistway door unlocking key tool has been used across the country for many years
- In 2003, Massachusetts adopted the use of this tool
- There will be NO retroactive installations*
- Its use is limited to licensed elevator mechanics, state elevator inspectors and trained firefighters

Section 6(a) and 6(b)-Fire Service Related

- EXCEPTION: If all the door panels and interlocks are replaced on an existing elevator, hoistway door unlocking devices for use by Massachusetts licensed elevator mechanics and trained firefighters are required.
- **Section 17.07** (6) No keys or devices shall be permitted which will unlock any landing door when the car is not within the landing zone.
- **(a) On completion of the elevator installation and safety test, the elevator inspector shall notify the local fire department to have an authorized representative available to witness a demonstration by the elevator manufacturer or his agent on the purpose, operation and use of the hoistway door unlocking device. The unlocking device (tool) for that manufacturers' door shall be secured at a location in the building that is readily accessible to the fire department. Effective 7/25/08.**
- **(b) The opening of cars doors and landing doors and the closing of the same shall be the sole responsibility of the local fire department during firefighting or extrication operations.**

Basic Elevator Procedures

- Can I wait for the elevator mechanic when the situation allows it?
- 90% of stalled elevator incidents are door closure problems
- Usually elevator incidents are nuisance problems rather than emergencies
- After evaluating the situation, ask yourself the first question again

Basic Elevator Procedures

- BEFORE any attempt is made to remove a passenger from an elevator, power must be DISCONNECTED in the machine room
- To avoid electrical arc injuries, stand to one side and look away from the disconnect when operating the switch
- Wear your protective gear!

Basic Elevator Procedures

- LOCK OUT/TAG OUT must be performed
- Whenever possible, maintain firefighter presence in the machine room during the incident

Lock Out / Tag Out

ASME A17.1 / CSA B44 Safety Code for Elevators and Escalators (2007)

ASME A17.4 Guide for Emergency Personnel (2008 Draft) Safety Code

OSHA Standard 1910.147 (b)

ASME 17.4 Guide

ASME A17.4 Guide for Emergency Personnel (2008 Draft)

- Section 1.2.3 Lock out/ Tag out Procedures (page 3)
- Whenever persons are being assisted from a stalled elevator car, adherence to strict lock out / tag out procedure must be followed. The mainline disconnect switch must be turned to the off position and a lock and tag installed on the disconnect switch in order to prevent anyone from turning the switch to the on position. The mainline disconnect switch is located in the elevator machine room

Lock out / Tag out

- Lock out - using a padlock will ensure that the unit will not be turned back on prior to an elevator mechanic examining it
- Tag out - list your fire alarm 24-hour telephone number for the mechanic to call for retrieval of fire departments' Lock out / Tag out equipment
- This will also keep the elevator from being run in an unsafe condition by building occupants or owners

OSHA Standard Definitions

- **Lockout.** The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.
- **Lockout device.** A device that utilizes a positive means such as a **lock, either key or combination type**, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.
- **Tagout.** The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.
- **Tagout device.** A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed

Upon Arrival

- Carry necessary tools in with you (Short folding ladder, forcible entry tools etc)
- Does your department issue the Hoistway Door Unlocking Tool sets?
- Have you noticed any installations in your district?

Gaining Access

- Use your Knox Box key to gain access to the building
- Remove the tool if stored in Knox Box
- Check the remote elevator annunciator in the Fire Command Room for elevator location

What Will I find?

- Each key is dependent upon:
  - The type of hoistway door interlock installed (all doors in hoistway will use the same key tool)
- Manufacturers may utilize various key tools, depending upon the design and the Interlocks used by that company
- Many different companies may service a buildings elevators over the service life of the system, thus integration of parts occurs

Procedure to Follow

- **Always perform "power down"**
- **Always perform lock out / tag out**
- **NEVER** move an elevator
- **DOCUMENT all** responses, including notifying the DPS-elevator division of your response and actions
- Fire incident reporting system (NFIRS)

Procedure to Follow

- Call for elevator mechanic immediately
- If you can await mechanic, do so
- Secure proper key tool
- Always work with another firefighter at scene
- Confirm with machine room team that lock out/tag out has been performed
- Determine approximate location of car in hoistway

Procedure to Follow

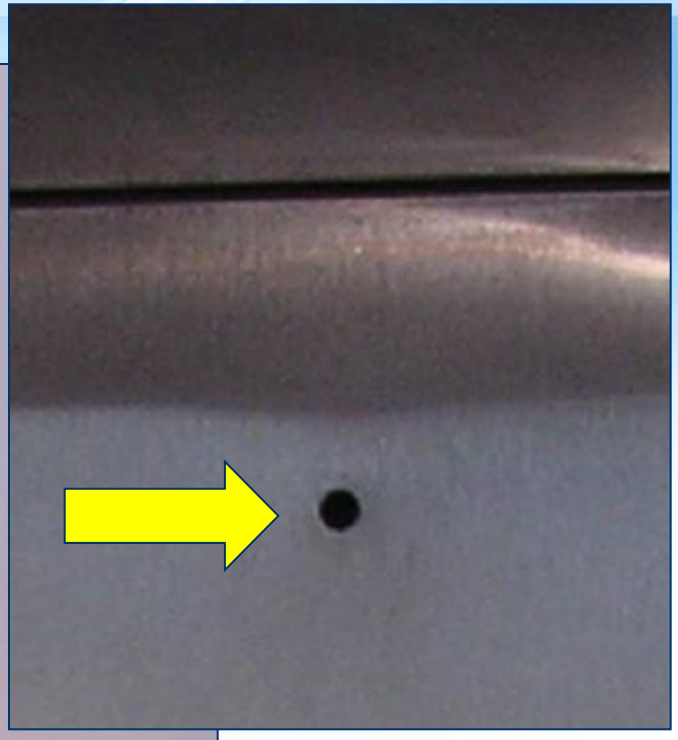
- Use tool to open hoistway door
- If at wrong level, shut door and test for locking
- If at proper level, gain access to car
- Follow fire department plan for passenger safety
- Follow fire department SOG for firefighter safety

What Do Keys Look Like?

Double-Leaf Drop Key

- Turning handle
- Stop
- Cylinder
- Allen set screw
- Single or Double Drop leaf

Otis Tool Hole



Otis Tool (1)

- Looks like a screw driver
- Inserts into hole in door
- Then into the door interlock

Otis Tool (2)

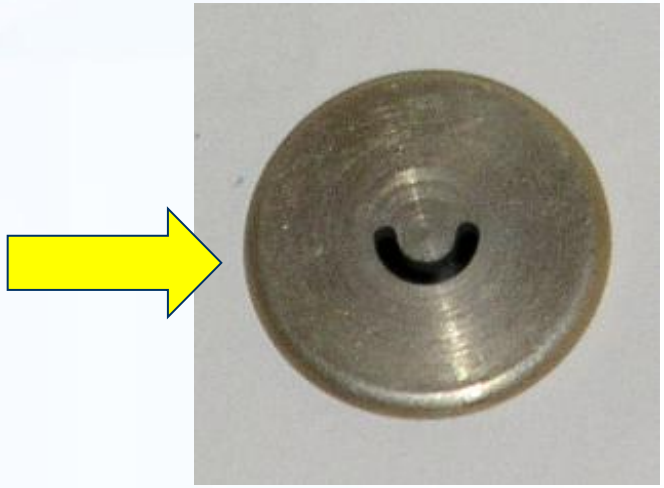
- Looks like a screw driver with drop section
- Inserts into hole in door
- Then into the pick up rollers


3


G.A.L. MFG. CO
NEW YORK CITY
TOP SAFETY RETAI
-TYPE "A" HANGE
TURN ANGLE TO VE
POSITION FOR RETA
GAL
ELEVATOR DEVICES


GAL
ELEVATOR DEVICES
TOP SAFETY RETA
-TYPE "A" HANG
TURN ANGLE TO V
POSITION FOR RE

Key Hole for Opening Door on All Floors

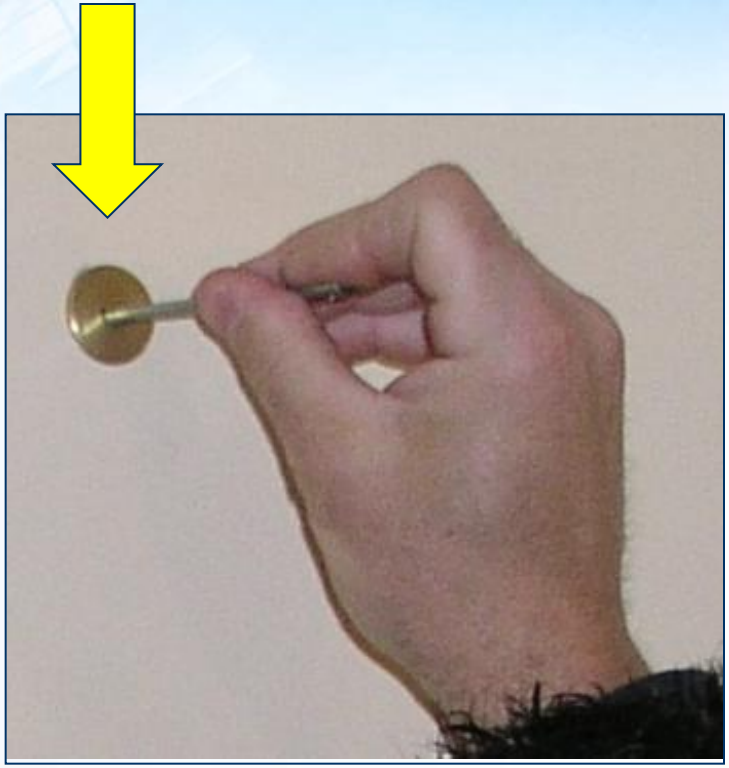


Insert Tool (Schindler)

- Look before you spread!

Move Tool

- Insert key half way, then pull down on key

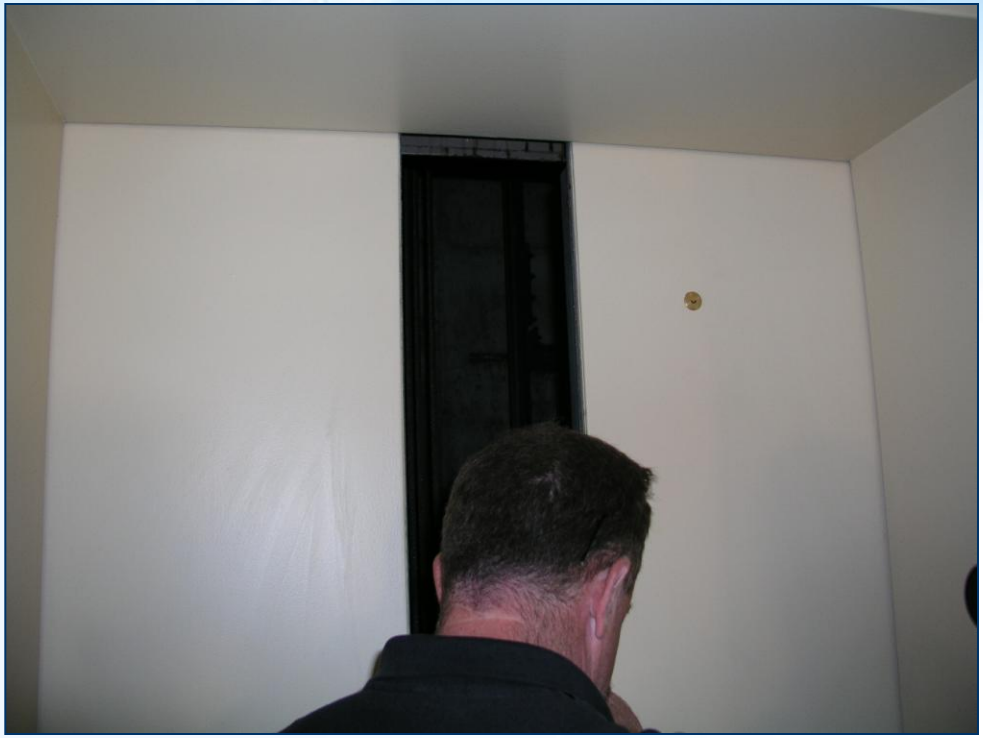


View From Inside the Hoistway

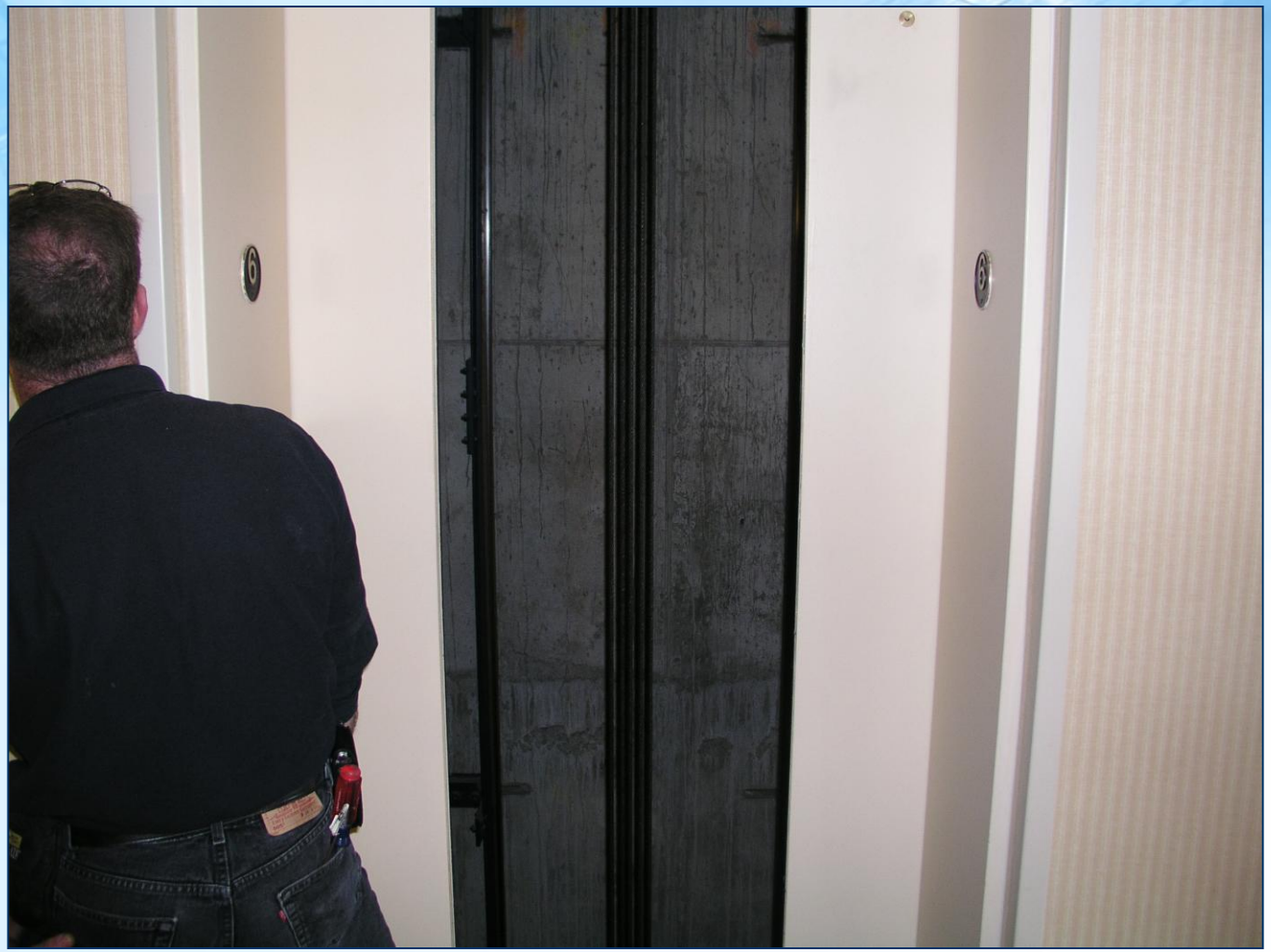
- Inserted key lifts bar up, releasing the lock keeper in the lock box located above the dust cover

Precautions!

- Standing to one side
- SLOWLY open door



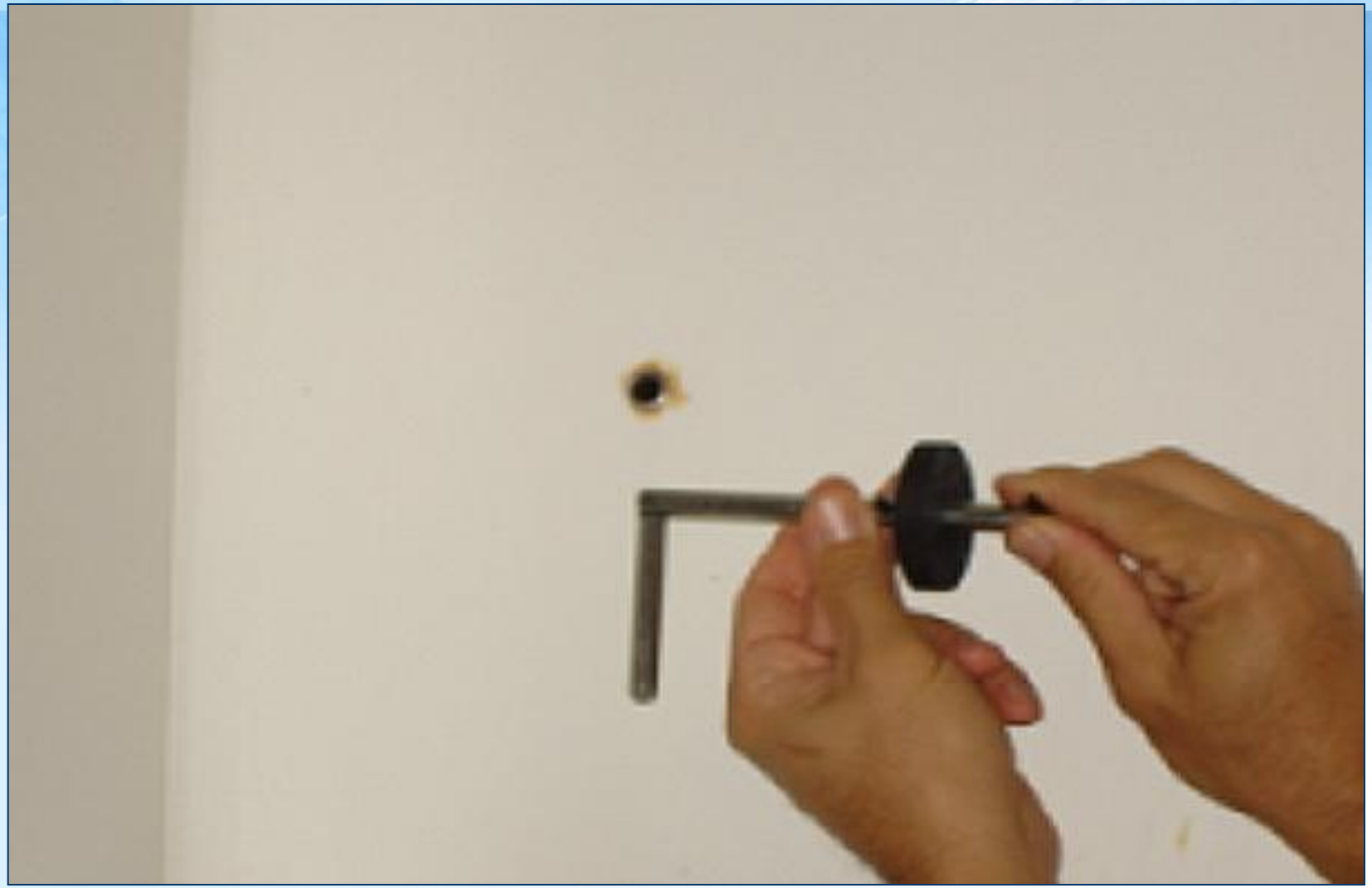
LOOK Into Hoistway As You Open Door!



BEWARE, car may be above or below

- Beware, car may be above or below!

Single-Leaf Drop Key



Single Drop Key

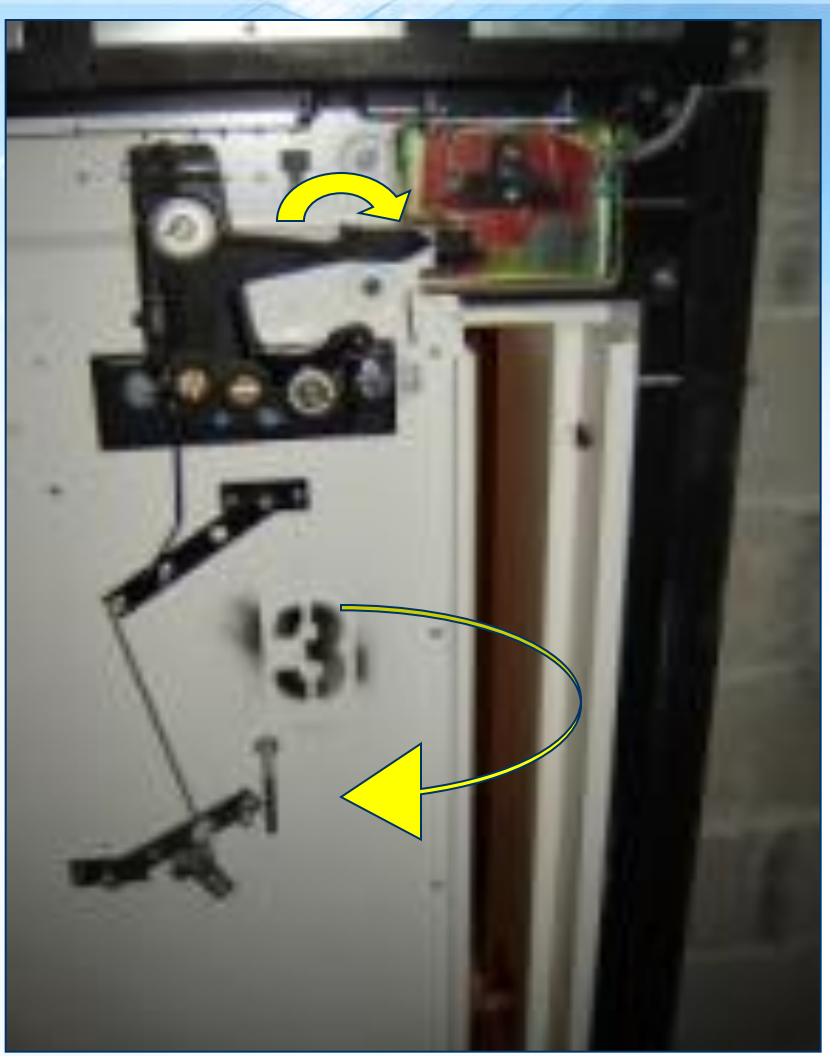
- Slide the tool all the way into the access hole
- “Stop” must be pre-set for proper space, allowing drop section to insert between release rollers

Proper Procedure-Again!

- Always have another firefighter work with you when opening the door
- Make sure that you remove your hand and the tool after you have cleared the keeper from the lockbox
- If you don’t, you will slam your hand into the door frame as it opens fully

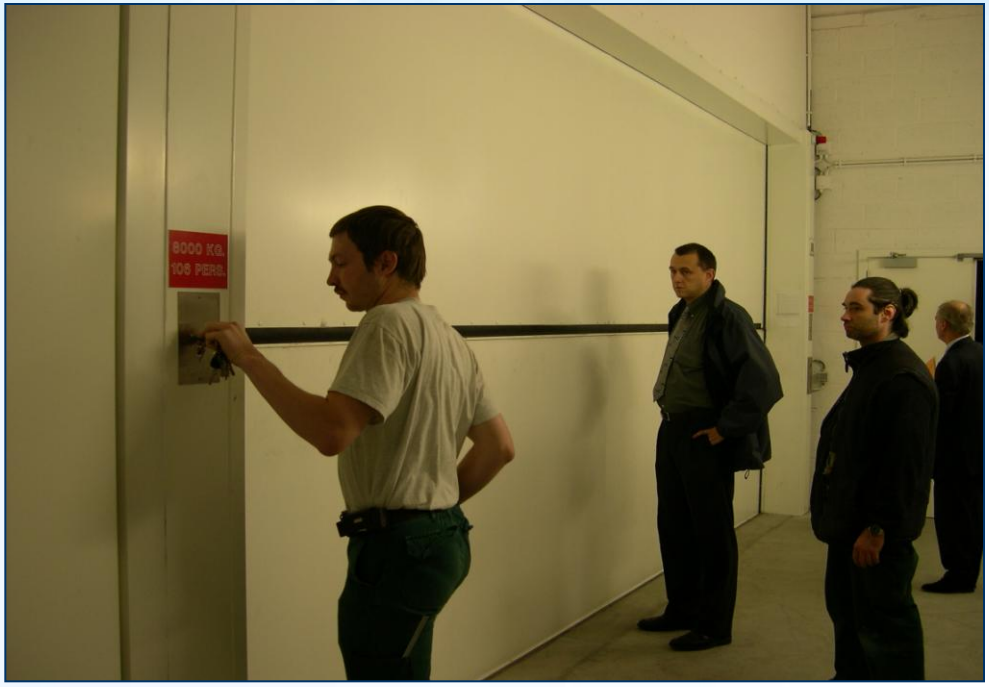
Single-Leaf Drop Key

- Note how the “keeper” (top arrow) has cleared the interlock, and the door is freed to being pulled open by the firefighter
- In the lower part of the picture (lower arrow) you can see the single drop key

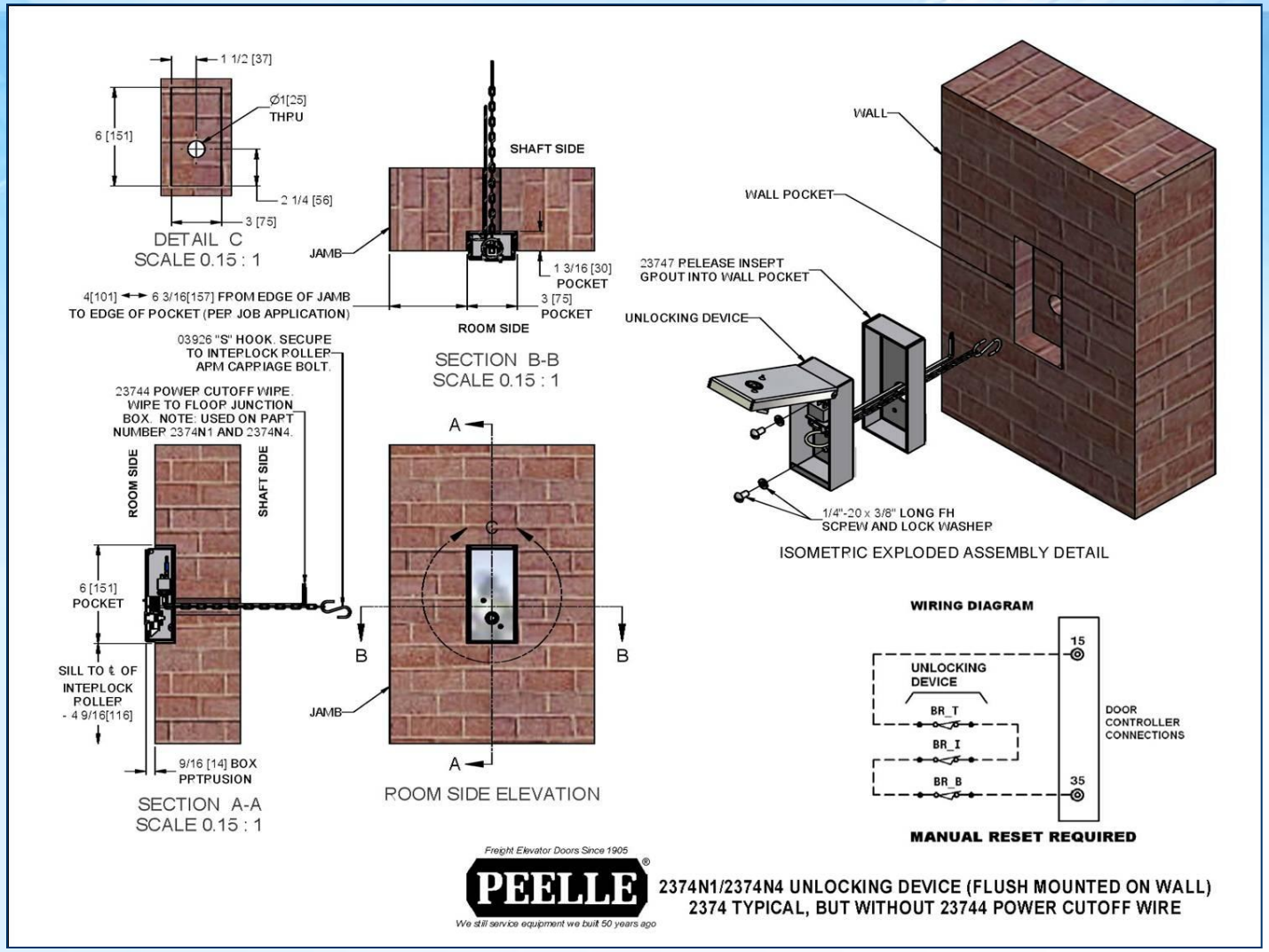


Bi-Parting Freight Doors

- Emergency Hoistway door unlocking tool access will be marked
- Follow the instructions as in the following slide



Bi-Parting Freight Doors



Technical Rope Rescue

- Full harness protection
- Properly tested and stored rope
- Used by members trained in their use

Technical Rope Rescue

- Ropes and harnesses are required for all
- There are no exceptions
- You MUST secure all involved with rope protection

Reminder!

- Before this program is used, firefighters must be trained in its use
- An assortment of keys may be purchased on the internet by going on-line
- Speak with the local elevator representative responsible for that building about securing a particular key for a building in your district
- Locate the key in the “Knox Box”, or other similar secure repositories (Gamewell, etc.)

MBER/DFS

- This content of this program has been approved by the Department of Fire Services (DFS) and the Massachusetts Board of Elevator Regulations (MBER)

Questions?

Thank You for Your Time and Attention

Emergency Elevator Procedures

ANYTOWN FIRE DEPARTMENT

STANDARD OPERATING GUIDELINE #15

FIREFIGHTER'S ELEVATOR KEY SWITCH (3502)

SOG # 15

FIREFIGHTER'S ELEVATOR KEY SWITCH (3502) PURPOSE

This Standard Operating Guideline is intended to direct the members of this department in the proper operation of an elevator that has been equipped with Firefighter's Emergency Operation (3502). It is not the purpose of this S.O.G. to describe the specific operational steps of each and every elevator; rather, to provide an understanding of the code along with its safe, effective application in conjunction with the ANYTOWN FIRE DEPARTMENT's high-rise procedure. Companies should familiarize themselves with the Firefighter's Emergency Operation (3502) capabilities of elevators in the various buildings in their districts.

DEFINITIONS

"3502" Key - The number assigned by the elevator industry to the key used to operate the firefighter's keyed switch.

Alternate Level - The level to which the elevator responds while on automatic recall when the fire alarm originates on the *designated level*. It is normally located two floors above the main floor.

Capture Station – The firefighter's keyed switch located on the wall at the designated level within sight of the elevators it controls. (See Fig. 1A-1) This is where the *"3502" key* is used to institute "RECALL" of the elevators, bringing them down to the *designated level*. The "RECALL" phase is also called PHASE 1.

Car Station – The firefighter's keyed switch located within the elevator car on or immediately adjacent to the operating panel of the car, for the purpose of placing the car on Firefighter's Emergency Operation (3502). (PHASE II)

Designated Level – Also sometimes referred to as the main floor. The level used as the entrance point by the fire department. The level to which the elevators respond when recalled on automatic recall, and where the firefighter's keyed switch capture station is located.

High-rise Building – Any building seventy feet (70') or greater in height measured from the lowest point at ground level.

Manual Elevator Standby Power Selection Switch - Located in the fire control room of high-rise buildings. The device used to transfer emergency power from one elevator to another.

Position Indicator - A device that indicates the position of the elevator car in the hoistway. It is called a "hall position indicator" when placed in the hall or a "car position indicator" when placed in the car.

NOTE: All italicized words found in this document are defined in the DEFINITIONS section above.

REGULATIONS

1A.1 Commonwealth of Massachusetts Regulations dictate that when on Firefighter's Emergency Operation (3502), an elevator shall be **operated by** and be under the **sole control** of a member of the local fire department who shall **remain inside** the elevator car and maintain control of the elevator car throughout the fire emergency. For more complete information on Firefighter's Emergency Operation (3502) regulations refer to 524 CMR and ASME/ANSI A17.1 –2000.

INTRODUCTION

1A.2 Firefighter's Emergency Operation (3502) is provided on all automatic passenger elevators. This service provides a two-fold purpose:

1. It allows for the capture of elevators, taking control of the elevators away from the occupants of the building. This provides a secure environment for the passengers riding in the elevators, by returning the elevators to a *designated level* of the building, thereby not allowing the elevators to respond to a call on the fire floor. (Phase I)

2. It allows for the controlled operation of specific elevator cars by firefighters, to be used in gaining access to upper floors during a high-rise incident. (Phase II)

1A.3 Most modern *high-rise buildings* have several elevator banks. The activation of any single firefighter's keyed switch *capture station* will recall only the elevators in that bank. In order to recall all of the elevators in a building it may be necessary to activate several *capture stations.* Most *high-rise buildings* have remote *capture stations* located in the Fire Command Center. All elevators in the building may be recalled from this location.

1A.4 Under no circumstances shall an elevator be used if water is detected in the hoistway. The Incident Commander (IC) shall be advised of this condition.

AUTOMATIC RECALL

1A.5 In Anytown, only the activation of specific, strategically located smoke detectors (Elevator Lobby) will automatically recall elevators to the *designated level.* However, the activation of a fire alarm on the *designated level* will automatically send all elevators to an *alternate level*. While the *designated level* is usually the main floor of the building, the location of the *alternate level,* although decided on a case-by-case basis by the enforcing authority, is usually two floors above the *designated level*.

PHASE I - RECALL

Fig. 1A-1. Firefighter's keyed switch for Phase I operation found on wall at the *designated level* within sight of the elevator bank it controls.

1A.8 When the key is placed in the "BY-PASS" position (RESET position per 2006 code), the automatic recall feature is rendered inoperative. "BY-PASS" is also used to reset the elevators from Firefighter's Emergency Operation (3502) operation.2 The key cannot be removed in this position.

PHASE II

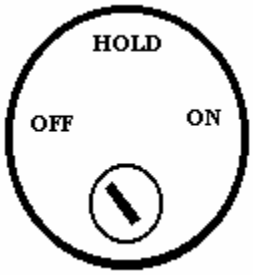


Fig 1A-2. Firefighter's keyed switch for Phase II operation found on panel in elevator car.

1A.6 When the three-position firefighter's keyed switch (*capture station*) is placed in the "ON" position, all elevator cars controlled by that switch shall return to the *designated level* (main floor). (See Fig. 1A-1.) The key is removable in the "ON" and "OFF" positions only. When elevators arrive at the *designated level*, their doors shall open and remain open. This completes Phase I. NOTE: If the elevators have been automatically called to the *alternate level*, activation of the *capture station* will call elevators to the *designated level*.

1A.7 With very few exceptions, automatic passenger elevators are equipped with Firefighter's Emergency Operation (3502). Some older elevators are equipped with Phase I **ONLY.**
NOTE: In order to comply with the code, Phase II may be added as these systems are upgraded.

1A.9 The three-position firefighter's keyed switch (*car station*) is installed in or immediately adjacent to the operating panel of the car. Normally found in the "OFF" position, turning the switch to the "ON" position by means of the *"3502" key* places that car only in Phase II. The key is removable in all three positions. Use of the "HOLD" position will be described later. When placed on Phase II, the car will respond only to commands entered at the car's operating panel. (See Fig. 1A-2.)

1A.10 Elevators are provided with a means to hold the elevator door in the open position when on Phase II. Most elevators are equipped with an automatic system that does not require the operation of a switch. When constant pressure is applied to the "DOOR OPEN" button and the door opens fully, the door will remain open. Another means of holding the door open is by placing the key switch in the "HOLD" position. NOTE: In order to operate the elevator on Firefighter's Emergency Operation (3502), the Phase II key switch must be placed back in the "ON" position.

AUXILIARY GENERATORS FOR EMERGENCY POWER

1A.11 An auxiliary generator shall be provided of sufficient capacity and proper rating to supply elevator circuits in conjunction with the firefighter's key switch installation in all elevators in high-rise buildings installed after **06/07/72**. The auxiliary generator shall have sufficient power to operate **at least one elevator** at a time on Firefighter's Emergency Operation (3502).

1A.12 Most *manual elevator standby power selection switches* are located on the *designated level* in the Fire Command Center or adjacent to or part of the elevator status panel.

1A.13 The IC shall see that elevators are recalled by means of the Firefighter's Emergency Operation (3502). All elevators must be accounted for immediately upon arrival of the first due companies.

1A.14 The Evacuation Sector Chief shall determine that all elevators have been recalled. In the event of a power failure, the Evacuation Sector Chief shall utilize the emergency power generator, if provided, to effect recall of elevators, through operation of the *manual elevator standby power selection switch*. It is important to note that in such cases (especially when an emergency generator is capable of moving only one elevator at a time) Phase II operation of all elevators must be curtailed until all elevators have been recalled and/or accounted for. All elevator cars unaccounted for shall be presumed occupied. The IC shall be kept informed of the status of all elevator cars.

ELEVATOR OPERATOR

1A.15 The member assigned the position of elevator operator shall be equipped with SCBA and a portable radio and must remain with the elevator at all times. A member of the first due Company shall be assigned this duty. If additional elevators are put into Firefighter's Emergency Operation (3502), the IC shall assign a different operator for each elevator car. Under no circumstances shall the elevator operator leave the elevator unattended while on Firefighter's Emergency Operation (3502). **Elevators shall not be locked or shut down on upper floors**. This defeats the efficient operation of the system and potentially denies other incoming units access to upper floors. Prior to leaving the main floor for upper floors, all members shall open the valves on the cylinders to their SCBA and have the face/piece at the ready.

1A.16 The best means of moving an elevator on Phase II is to apply constant pressure to both the "DOOR CLOSE" button and the "FLOOR" button of the desired floor. Once the elevator car picks up speed, the buttons may be released.

1A.17 In every case, between calls, the member assigned as elevator operator shall stage the car at the *designated level* to await further orders from the IC or his/her designee.

1A.18 Elevator operators shall not take it upon themselves to respond to a request for an elevator on upper floors. All requests shall be made through the IC or his/her designee.

1A.19 If an elevator starts to operate erratically or if water enters the hoistway during operation, the car shall be landed at the next available landing. All members shall exit the elevator and notify the IC. The Phase II firefighter's key switch shall be placed in the "HOLD" position and the key shall be removed from the key switch placing the car out of service. Under no circumstances shall that car be put back in service for the duration of the incident. All members, including the operator shall proceed to the nearest stairwell to gain access to the floor desired. The operator shall remain with the crew.

1A.20 The maximum number of members allowed to ride in an elevator car is **six**. This should be strictly enforced. Overloading an elevator can cause the elevator safety to activate, potentially trapping firefighters. In every case where the car safety has activated, the elevator car will be lost for the duration of the incident.

1A.21 Elevators shall be taken to a floor at least **two floors** below the lowest floor in alarm. Elevators shall not be programmed to respond directly to the reported fire floor without authorization from the IC, after he/she has consulted via radio with the companies already on that floor and has been assured of that lobby's safety.

1A.22 The elevator operator shall test the conditions on the discharge floor by temporarily pushing the "DOOR OPEN" button while at the same time observing through the door opening for signs of smoke and/or fire. If smoke conditions exist, the elevator shall be brought down another two floors. This operation shall be repeated until a smoke free floor is found. Only then shall members leave the elevator.

1A.23 The floor on which members are discharged shall be called the "DISCHARGE FLOOR". This location will be relayed to the IC by the Company Commander. The location of the DISCHARGE FLOOR shall be broadcast by Fire Alarm for the information of all members working at the incident.

FIREFIGHTER'S CALL CANCEL

1A.24 In newer installations cars are provided with a button marked "CALL CANCEL", located in the same car operating panel as the Phase II operation. When pressed, all registered calls are canceled and a traveling car will stop at or before the next available landing. The car will remain stopped in the hoistway until another floor button is depressed on the car-operating panel.

NOTE: The "CALL CANCEL" button is only operational when the elevator car is on Firefighter's Emergency Operation (3502) Phase II.

SAFETY CONSIDERATIONS

1A.25 Except in the case of occupant evacuation, only members of the department who are equipped with their protective ensemble and self-contained breathing apparatus shall be allowed to ride in elevators while operating on Firefighter's Emergency Operation (3502). The Incident Commander must approve all exceptions to this section.

1A.26 In the event self-extrication from a stalled elevator becomes necessary, a halligan bar shall always be included as part of the high-rise equipment.

1A.27 Elevators are not to be utilized when the alarm is determined to be on **floor number 6 or below**. Under such circumstances, members shall use the stairwell after determining that all elevator cars have been accounted for and are free of passengers.

1A.28 Elevators operating on Firefighter's Emergency Operation (3502) shall never be taken below the *designated level.*

EMERGENCY SELF-EXTRICATION FROM STALLED ELEVATORS

1A.29 In the unlikely event an elevator stalls while a team of firefighters is riding to or from an upper floor the following procedures shall be attempted.

- Check to see if the "CALL CANCEL" button has been pressed accidentally.
- Turn the Phase II key to the "OFF" position to attempt recapture of the car.
- Notify the IC that the elevator car has stalled and provide the IC with:
    1. The number of members in the elevator.
    2. The location of the elevator if known.
    3. If smoke is entering the elevator.
    4. If an emergency exists and self-extrication will be attempted.
- Before self-extrication is attempted, the Phase II key switch shall be placed in the "OFF" position and the key shall be removed from the tumbler.
- Mainline power must be disconnected and **lock out/tag** out performed to ensure firefighter safety. Fire companies must be assigned this task if fire conditions permit, before members exit that car into the elevator hoistway.
- If conditions allow, wait for assistance from the RIC Company.

1A.30 The IC shall assign the RIC Company the duty of locating and assisting the members from the stalled elevator under the command of the Evacuation Sector Chief. An additional RIC Company shall be ordered to the scene.

TERMINATION OF FIREFIGHTER'S EMERGENCY OPERATION (3502)

1A.31 Elevators shall be returned to automatic service only on the orders of the Incident Commander. No other member is authorized to remove the elevators from Firefighter's Emergency Operation (3502). All problems encountered with the Firefighter's Emergency Operation (3502) system shall be either emailed to the State Elevator Supervisor at elevator.supervisor@state.ma.us or mailed using state form DPS/DFS-3502 (03/2013).

EMERGENCY REMOVAL OF PASSENGERS FROM STALLED ELEVATORS

INTRODUCTION

1.1 The emergency removal of passengers from stalled elevators can be a time consuming, labor-intensive event. When working around any machinery, all actions must be well thought out and deliberate. Precautions must be taken to ensure the safety of both the victims and the rescuers. The need for effective administration of emergency medical services must be considered at every elevator incident. Lock-out/tag-out measures must be in place. Safety ropes and harnesses may need to be employed to make certain that no one falls down an elevator hoistway. Personnel accountability procedures must be followed to prevent accidents. Rehabilitation of members during protracted incidents must also be taken into consideration. This Standard Operating Guide (SOG) is divided into two main subject areas.

I. Removal of passengers from stalled elevators.
II. Elevator accidents involving personal injury.

The Incident Commander (IC) at all elevator incidents must always consider safety first.

1.2 PURPOSE

- To provide practical and safe guidelines, to be applied when department members respond to stalled elevator incidents.
- To establish an operational course of action and effective level of response when dealing with elevator accidents involving personal injury.
- To provide a standard procedure for reporting to the proper authority and recording all relevant information relating to all elevator incidents.

DEFINITIONS

1.3 Elevator Status Panel – Located in the fire control room of high-rise buildings and usually on the main floor in other buildings. Provides operating status and location of elevator cars within the hoistway. Includes the intercom for communicating with all elevators.

1.4 Position Indicator – A device that indicates the position of the elevator car in the hoistway. It is called a hall position indicator when placed in the hall or a car position indicator when placed in a car.

1.5 Landing Zone – An elevator car is considered as being within the landing zone when the car floor is not more than eighteen inches (18") above or below the landing.

1.6 Manual Elevator Standby Power Selection Switch - Located in the fire control room of high-rise buildings. The device used to transfer emergency power from one elevator to another.

1.7 ECC – Emergency Communications Center for the ANYTOWN/CITY.

NOTE: All italicized words found in this document are defined in the DEFINITIONS section above.

1.7 REGULATIONS AND STANDARDS

- 524 CMR-PART 35
- ASME/ANSI A17.1- 2000-Installation of New Elevators and Escalators

I. Removal of passengers from stalled elevators.

1.8 Response –1 Rescue Co. and 1 Ladder Co. or Engine Co. Notify Deputy Chief

1.9 Locate elevator – Ascertain, if possible, from the person who reported the incident, the location of the stalled elevator. Try to confirm this information by observing the hall *position indicator* of the stalled elevator.

1.10 Notify Service Mechanic – If a responsible person is present (building engineer, superintendent, owner, etc.) find out if the building is under contract with an elevator service contractor. Determine if the responsible person has keys to the elevator machine room, as access to this room will most likely be necessary. Keys will avoid the need for forcible entry. Determine the name of the service contractor and relay this information to the ECC Office. The ECC Office shall contact the elevator service contractor and try to get an estimate of their response time and relay this information to the IC. If no responsible person is present, the name and phone number of the elevator service contractor should be posted on a tag or sign in the elevator machine room. Unless there is a medical emergency, an excessively long estimated response time or other extreme condition, whenever possible, leave passengers in the car until the elevator service mechanic arrives. Under normal conditions, twenty to thirty minutes is a reasonable amount of time to wait for the elevator service mechanic.

NOTE: The name of the elevator manufacturer, which is usually prominently displayed within the car, is not necessarily the name of the elevator service contractor.

1.11 Communication – Communicate as soon as possible to the occupant(s) of the stalled elevator car the following:

- Steps are being taken to remove them from the car
- They are safe
- They should refrain from smoking

Also determine the following:

- The number of persons in the elevator
- Whether occupants are injured or ill
- The location of stalled car if known
- Whether the stop button, if provided, has been mistakenly set
- Are the lights on?
- How long has the elevator been stalled?

WARNING: Lack of lighting in an elevator car **DOES NOT** indicate that the power has been shut down at the main power disconnect switch.

NOTE: Consider using the intercom system between the *elevator status panel*, which is usually located on the main floor, and the elevator car.

1.12 While rescue operations are in progress, the occupants of the elevator should be kept informed of the progress being made and continually reassured of their safety.

1.13 Power Failure – If the cause of the stalled elevator(s) is due to a power failure in the area, many high-rise buildings are required to have an emergency power generator capable of providing power to all elevators.

1.14 NOTE: In order to transfer emergency power to the elevators, it will be necessary to activate the recall procedure by means of the firefighter's keyed switch capture station. Place the system in Phase I. Locate and operate the *manual elevator standby power selection switch,* to bring the elevator cars to the main floor, in most cases, only one at a time.

1.15 Evacuation Procedures – The IC shall send at least two members to the elevator machine room. The members shall be equipped with a hand light, halligan bar, hydraulic forcible entry tool, flathead axe, portable radio and a lock-out/tag-out kit. If keys to the elevator machine room are not available, forcible entry will be necessary. The members shall locate the elevator machine room and standby for specific orders from the IC. **Forcible entry shall be performed only on the orders of the IC.**

1.16 The IC shall proceed with all other members to the floor on which the elevator car is stalled. When communicating with the occupant(s) of the elevator, only one member at a time should do the talking. Several people talking at the same time can lead to confusion and misunderstanding.

1.17 The occupant(s) shall be given specific instructions to apply force against the car door in the direction of closing. This action attempts to close the car door safety circuit which may be out of alignment. At the same time a member of the rescue team should apply closing force to the landing door. This action may be all that is necessary to re-energize the car. The occupant(s) should then be directed to press a floor button. **WARNING: This is the only directive that shall be given to the occupant(s) prior to shutting down and locking out and tagging out the power in the machine room.**

1.18 Unless there is a medical emergency, an excessively long estimated response time or other extreme condition, it is always best to wait for the elevator service mechanic. It is recognized that the preferred safe practice in evacuating passengers is to move the elevator car to a landing level. **The movement of elevator cars by other than normal operation by members of this department is expressly forbidden.** Movement of the elevator car by any other means shall be attempted by experienced licensed elevator mechanics only. If there is an unreasonably long estimated response time for the elevator service contractor or if a medical emergency exists, the following procedure shall be attempted **in this order.**

1.19 The IC shall order the members standing by at the machine room to gain entry and shut down and lock-out/tag-out the power to the stalled elevator. If they are unable to determine which switch controls the elevator they shall notify the IC. If this should occur, all elevators in the bank, controlled by that machine room, must be cleared of all passengers. Activating Phase I fire emergency service will effectively accomplish this task. Once all passengers have been evacuated from all other elevators, the IC shall order the members in the machine room to shut down power to all elevators. If the members are unable to lock-out/tag-out any main power disconnect switch they shall immediately notify the IC. In all situations, both members with a portable radio shall remain at the door to the machine room to provide security. Their further services will be lost for the duration of the incident. The IC shall consider the need for additional resources. **No one is authorized to reestablish power to any elevator without the express consent of the IC.**

1.20 **The following point cannot be overemphasized.** The procedure of shutting down power at the main power disconnect switch is the **single most important step.** No further operations are to be attempted until the IC has received confirmation from the members in the elevator machine room that power has been shut down.

1.21 Door Opening Procedures:

1.22.1 Procedure when car is at or near the landing: (See Fig. 1-1.)

a) Once the power has been shut down and confirmed by the IC, the occupant of the car shall be given specific instructions to place his/her hands on the car door and attempt to roll open the car door. The rescue team should **not** attempt, at this time, to assist, by putting pressure on the landing door, as this will work against the actions of the occupant.

b) If the elevator has stalled within the *landing zone*, the passenger's actions may open the car door which will also unlock and open the landing door. On newer installations a restrictor bar has been installed to prevent the car door from being opened manually, unless the car is at or near its normal landing level.

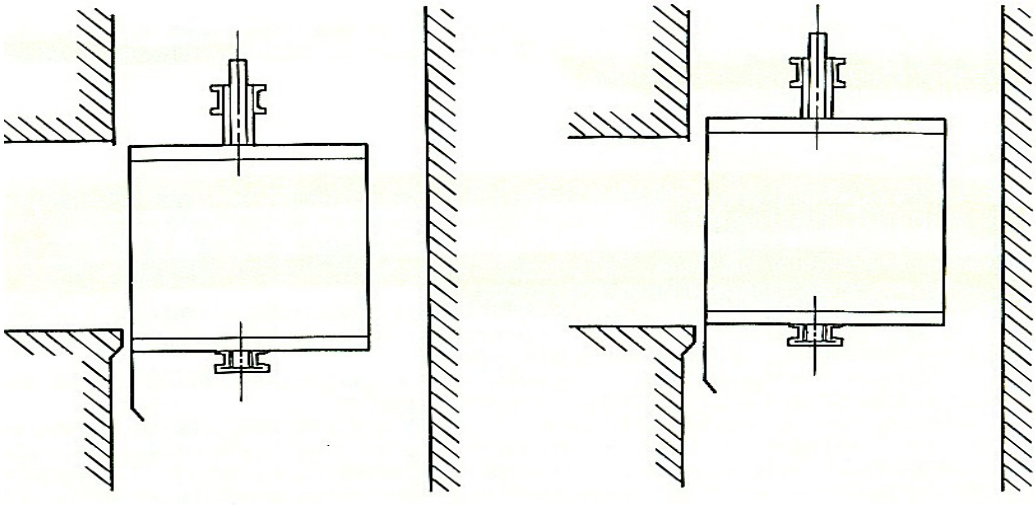


FIG. 1-1. CAR AT OR NEAR LANDING

1.21. 2 Procedure when floor of car is within 3 feet of landing: (See Fig. 1-2.)

a) Once the power has been shut down and confirmed by the IC, force open the hoistway door at the floor nearest to the stalled elevator car. (See Forcible Entry Techniques below.)

b) **WARNING: Always consider the hazard of an open hoistway.** Precautions should be taken to guard any hoistway opening below the car floor when the elevator car is above the landing.

c) Use ladders as necessary to provide a safe exit passageway for the occupants.

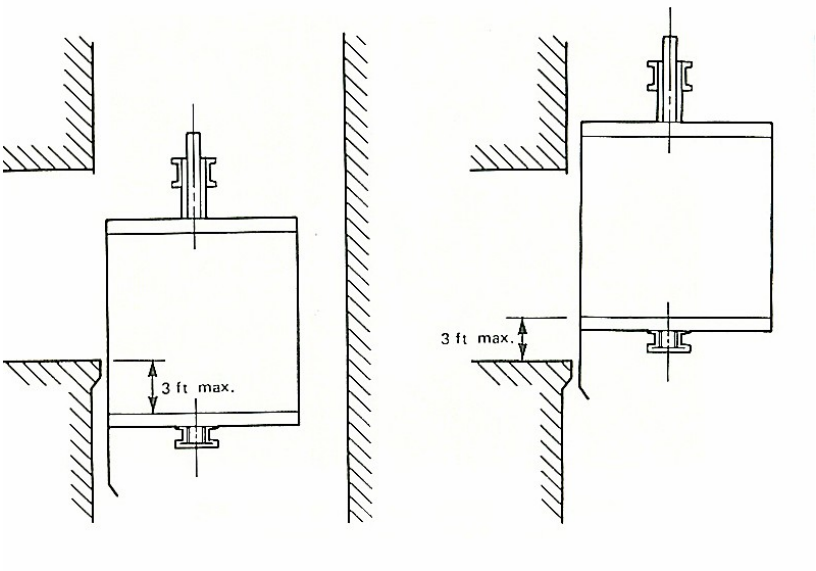


FIG. 1-2 CAR WITHIN 3 FT. OF LANDING

1.21.3 Procedure when car is more than 3 feet from the landing: (See Fig. 1-3.)

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a) Once the power has been shut down and confirmed by the IC, force open the hoistway door at the nearest landing **above** the stalled elevator car. (See Forcible Entry Techniques below.)

b) **WARNING: When there are other elevators operating in a common hoistway, the IC must consider clearing all adjacent elevators of passengers and shut down and lock-out/tag-out power to these cars also. SAFETY FIRST.**

c) Lower a ladder and securely position on the elevator car top. This ladder should be of sufficient length to extend at least 3 feet above the landing floor.

d) One member of the rescue team, wearing a safety harness and properly tied off to a secured lifeline, shall descend to the top of the stalled elevator car. He/she shall place the car top emergency red toggle switch in the open position.

e) Removal of the top emergency exit hatch may require the use of tools.

f) Use extreme caution not to drop tools or hatch cover into elevator car.
g) A second ladder shall be lowered through the top emergency exit and positioned between the elevator car floor and the car top. This ladder should be of sufficient length to extend at least 3 feet above the car top.
h) A second rescue team member, also wearing a safety harness and properly tied off to a secured lifeline, shall then descend to the car top. This member shall carry an additional safety harness for use in rescuing the passengers.
i) One team member shall enter the stalled elevator through the top emergency exit. The other team member remains on the top of the stalled car. A third member shall be positioned at the landing used to gain access to the hoistway.
j) The passengers may then be assisted, one at a time, from within the elevator car to the car top, then to the landing above with the use of a safety harness and secured lifeline.

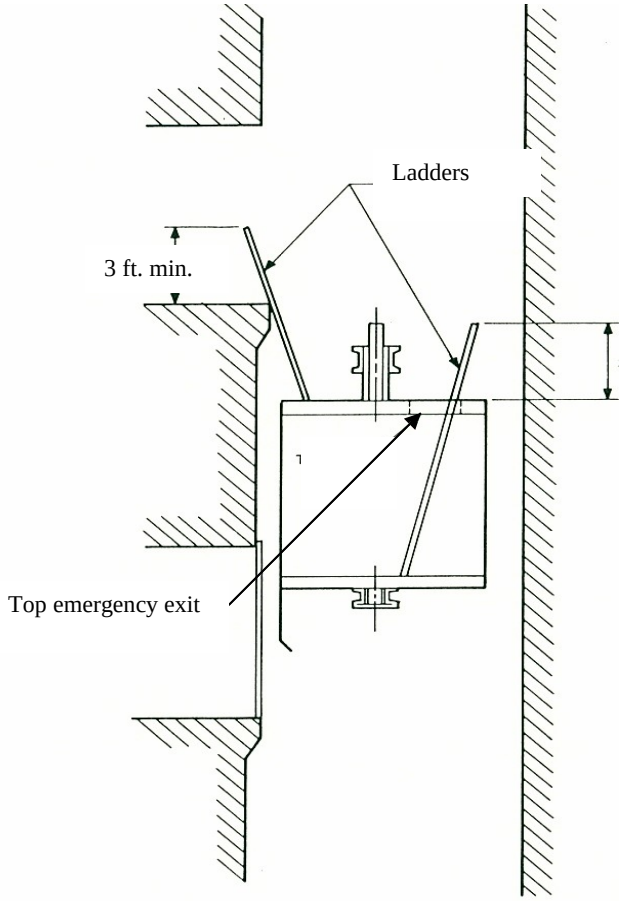


FIG. 1-3. USE OF TOP EMERGENCY EXIT

1.22 In each of the three procedures listed above, a member of the rescue team shall enter the elevator car prior to permitting the occupants to exit. Members both inside and outside the elevator car shall provide a helping hand to all exiting occupants. Occupants shall be physically guided to a safe area before the helping hand is released.

1.23 **WARNING: The past practice of aligning cars and transferring passengers through the side escape panels from one car to another is no longer permitted. Side escape doors are being permanently fixed in place as it has been determined that their use creates an excessive hazard.**

1.24 If elevator is stalled in a blind shaft, the rescue team should locate the nearest emergency access door above the stalled elevator car top and determine if its location, relative to the stalled car, is close enough to attempt a rescue with ladders.

1.25 NOTE: Manpower needs may require calling another company to the scene. If conditions warrant, IC shall consider upgrading to a confined space incident.

1.26 Forcible Entry Techniques:

- Prior to forcing a door instruct occupant(s) to step to the rear of the car away from the door.
- In descending order of preference the following forcible entry tools shall be used:
    - Hydraulic forcible entry tool (Rabbit tool, etc.).
    - Halligan bar with flat head axe
    - Mini lifting bag.
- Force shall be applied as close to the top of the door as possible.
- Applying force at the bottom of the door will only make the situation worse.
- Doors shall never be intentionally knocked off their rollers.
- Insert the tool between the door and the doorjamb on side sliding doors.
- Insert the tool between doors on center opening type.
- Don't confuse a two-speed side sliding door with a center opening door. The surfaces of the center opening doors are flush with each other. When forcing a two-speed side sliding door apply force at the doorjamb. (See Figures 1-4 and 1-5)

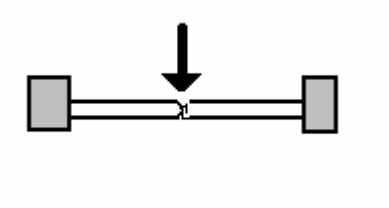


Fig. 1-4. TOP VIEW OF A CENTER-OPENING DOOR. ARROW INDICATES WHERE TOOL SHOULD BE APPLIED.

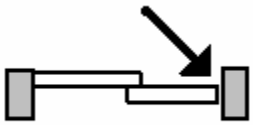


Fig. 1-5. TOP VIEW OF A TWO-SPEED SIDE SLIDE DOOR. ARROW INDICATES WHERE TOOL SHOULD BE APPLIED.

1.27 After passengers have been safely removed from the elevator car secure the landing door. It cannot be stressed too strongly that the danger of an unattended open hoistway is one of the most common causes of elevator fatalities. After the scene is secured or turned over to a competent person, power may be restored to all other elevators only. Remove lock-out/tag-out equipment from the main power disconnect switch of the stalled elevator but **do not** restore power.

II. Elevator accidents involving personal injury.

1.28 Response –1 Engine Co., 1 Ladder Co., 1 Rescue Co., 1 Deputy Chief , request an ALS and BLS response from Professional Ambulance . ECC shall utilize the directive on elevator accidents to request the response of a licensed elevator mechanic.

1.29 The means used to remove a victim entangled or crushed by elevator machinery may prevent a fatality or minimize the extent of the injuries. Before taking any action consider all of the following:

- Tactics will be based upon whether it is a rescue or a recovery.
- Consider the need for advanced life support intervention.
- Body Substance Isolation (**BSI)** precautions may need to be employed.
- Shut down and lock-out/tag-out power to the elevator and all adjacent elevators.
- Advise ECC to notify The State Elevator inspector ASAP.
- Is an elevator mechanic on the way?
- Set up hot, warm and cold zones.
- Is lighting adequate?
- Is there adequate manpower responding?
- Is this a crime scene? If so, notify Police.
- If accident occurred in machine room, consider the hazards of exposed electrical wiring and moving equipment.
- If accident occurred in hoistway consider fall hazards and the dangers of moving equipment.

1.30 The basic tactic will be to stabilize the elevator car and then move it enough to free the victim.

- Will it be necessary to breach a wall?
- Are the wire ropes slack?
- Secure elevator car using slings and come-alongs. Attach slings with come-along between the top of the car and the guide rail supports.
- How much movement will be required to free victim?
- Will removal of roller guides provide enough movement?
- If cutting torch is required to cut through guide rails, set up a charged line of hose.
- When using tools always consider the forces at work. Use the right tool for the right job.
- After victim has been removed and transported, stop all work and develop a plan for removing equipment. **WARNING: The same hazards exist during this phase. Consider Safety First.**

1.31 The IC shall turn the scene over to the proper authority only after all fire department personnel and their equipment have withdrawn from the scene.

In the case of an elevator accident:

- The IC shall determine if fire department lock-out/tag-out equipment should remain in place.
- If lock-out/tag-out equipment is removed, members of this department are not authorized to restore the power to the affected elevator.

1.32 Documentation

Every elevator incident responded to by this department requires proper documentation by means of a QED report. The IC shall submit a Form to the Office of the Chief of Department and Chief of Operations with a complete description of the services provided. The IC shall also report all malfunctions of elevators to the State Elevator Inspector through the ECC Office and on State Form SFM52E.
(**see attachment #1)**

1.33 Summary

1. No attempt shall be made to free passengers of a stalled elevator until the power has been shut down at the main power disconnect switch in the elevator machine room.
2. Unless there is a medical emergency or other extreme condition, it is always best to wait for the elevator service mechanic.
3. The name of the elevator service contractor can usually be found on a sign or tag in the elevator machine room. The service contractor is not always the same company as the elevator manufacturer.
4. Always consider safety first when working around elevator machinery.
5. Both members assigned to shut down power shall remain at the elevator machine room door to provide security after they have installed lock-out/tag-out equipment.
6. Secure all hoistway openings or turn scene over to a responsible person (building engineer, elevator mechanic, state inspector etc.) prior to returning to quarters.

Anytown Fire Department
Standard Operating Guide 15B
LOCK-OUT/TAG-OUT GUIDELINES
(LOTO)

INTRODUCTION:

The Anytown Fire Department responds to thousands of rescue, hazardous condition and service type calls annually. Many times in the course of operating at these incidents it becomes necessary to shut down electrical equipment, close valves and perform other procedures to safe guard the area immediate to the site. To prevent the unauthorized reactivation of such devices the proper use of lock-out/tag-out equipment is essential. Private industry has been mandated to comply with OSHA standards on lock-out/tag-out guidelines for many years. This Standard Operating Guideline (SOG) provides guidelines which shall be applied when it is determined by the Incident Commander (IC) that lock-out/tag-out Guidelines are to be utilized.

PURPOSE:

To control the hazardous energy of machines, equipment, and utilities during an emergency incident in which the unexpected start up and/or activation could cause harm to members of the department**.** This SOG applies to any source of electric, mechanical, hydraulic, pneumatic, chemical, thermal or other energy, which if not controlled could create a hazard.

REFERENCE STANDARD:

OSHA Rule 29 CFR 1910.147 “Control of Hazardous Energy Sources”.
Massachusetts 524 CMR section 17.39(4) (e) 7/9/10 (LOTO).

EQUIPMENT:

One lock-out/tag-out kit shall be issued to each Ladder Company, Rescue Company, Engine Company, Squad Companies and The Training Officer Operational Unit.

The minimum contents of each kit shall include:

- Two padlocks with keys.
- Two multi-lock hasps.
- Six tags.
- Six plastic wire ties.
- One grease pencil.

Company Commanders shall direct requests for the replacement of lock-out/tag-out equipment to the Training Division. All requests for padlocks, keys and multi-lock hasps shall be made in writing and shall include the reason for the request for replacement. The condition of the lock-out/tag-out kit shall be listed along with all other special equipment on the company's monthly report.

GUIDELINES:

Lock-out along with tag-out is the required guideline for isolating machines or equipment from energy sources. Locks shall be affixed in a manner that will hold the energy-isolating device in a "safe" or "off" position. This is known as Zero Mechanical State. Multi-lock hasps shall be used when the situation may require the application of more than one lock. It is mandated by 524 CMR 17.39 (4)(e).

When in doubt as to the number of locks that may be used, apply the multi-lock hasp.

Examples: Multiple crews working at same incident.
Unit clears scene, new unit applies lock.
Other companies or agencies responding and applying locks.
Safety Officer applies a lock.

NOTE: All locks and multi-lock hasps are marked with the company number (L-1 for Ladder Co. 1, R-1 for Rescue Co. 1, etc.)

WARNING: Although all locks used by this department are operable with an individual key, only the Company Commander of the company that affixed the lock shall authorize its removal. All exceptions to this section shall be with the specific consent of the Incident Commander.

Tags do not provide the physical restraint provided by a lock. Use of tags alone may evoke a false sense of security. Tags must be secured to the energy-isolating device so that they cannot be accidentally detached.

WARNING: **If a lock cannot be attached to the device, a tag shall be applied and a member with a portable radio shall be posted to provide security.**

When more than one company is operating at an incident where lock-out/tag-out guidelines are in use, the Incident Commander shall assign the principal responsibility of energy control to the Commander of one company. If on scene, this responsibility shall be given to the Safety Officer.

INCIDENT TERMINATION:

At the termination of an incident the member assigned the principal responsibility of energy control shall be the last member to remove his/her lock. Prior to ordering the

removal of the last lock the IC shall conduct a personnel accountability of all members operating at the incident.

The Incident Commander shall consider the ongoing status of the energy-isolating device prior to terminating the incident. The IC shall decide if the equipment may be re-energized or if it shall be tagged out. When the energy-isolating device remains tagged out, the tag shall include information as to why it has been affixed and who is authorized to remove the tag. For example, the tag affixed to the main power disconnect of a malfunctioning elevator would state**, "To be removed by a licensed elevator mechanic ONLY"**.

Changes to Massachusetts 524 CMR 17.39, section (4) effective 7/9/10
Responsibility of the Fire Department 524 CMR 17.39

(e) (New Section) The fire department shall utilize a Lock-out /Tag-out ("LOTO") procedure on the electrical main line of the elevator equipment during fire department operations including extrications. A written procedure relative to removal of the lock shall be printed on the affixed LOTO tag to facilitate speedy removal for an incoming Massachusetts licensed elevator mechanic.

Rationale *The new section (e) is to mandate the use of a proper LOTO procedure for use by fire departments involved in elevator extrications. The fire department Operational Guidelines procedure listed is an informal suggestion that a fire department may adopt to comply with section 17.39(4) (e).*

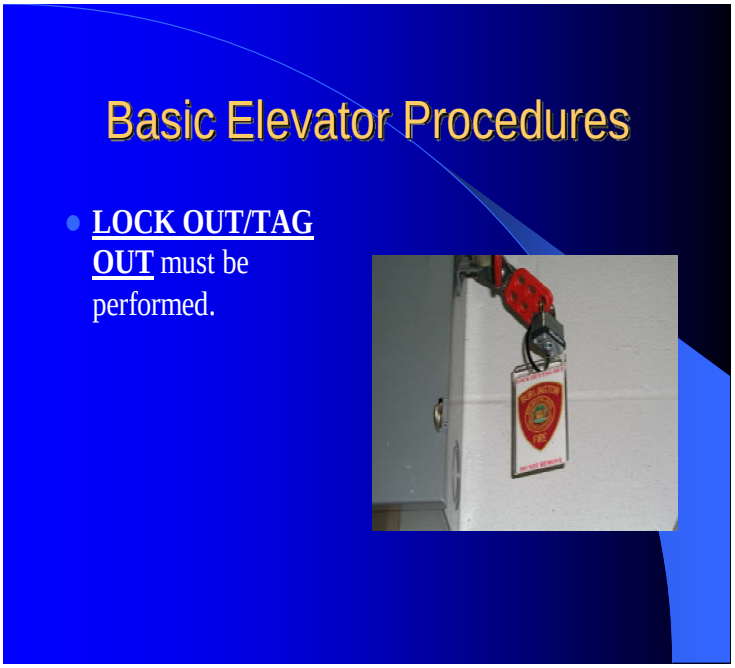
The Incident Commander shall report in writing every time lock-out/tag-out guidelines are employed. The report shall include the state in which the energy-isolating device was placed at the time the department terminated the incident.

.


LOCK OUT/TAG OUT
BURLINGTON
FIRE
DO NOT REMOVE

Suggested Operational Guidelines

Consistent with this new section the Massachusetts Board of Elevator Regulations has developed an example of procedures that a fire department may adopt to comply with section 17.39(4) (e).



Fire Department Procedure
Lock-Out-Tag-Out (LOTO)

(a) Upon arrival the local fire department shall notify the listed elevator service company to respond to their location. That telephone number will be found in the elevator machine / control room on the elevator code required 24-hour emergency response service card placed there by the contractor. This notification should be done through the Fire Alarm Dispatch or Emergency Communications Center of the fire department, and will provide a rapid response of qualified elevator personnel. If elevator personnel are on scene with the fire department, they shall work together to establish a safe removal of the occupants, after performing Lock-Out-Tag-Out (LOTO). At that point, the scene may be terminated by the fire service. After confirming the safety of the scene, they may remove their LOTO equipment. The Massachusetts Licensed Elevator Mechanic will now assume the responsibility for the elevator system.

(b) If upon arrival, the situation requires immediate removal of the occupant(s), the fire department will notify the listed elevator service company and perform LOTO on the elevator main line power disconnect. If a wait period is indicated as being a good alternative, then initiate one that will fit the situation at hand. If not, then perform a safe

removal of the passengers and await the elevator mechanics arrival. The fire department shall not remove its LOTO equipment if they have to leave the scene, but rather leave it in place. The LOTO telephone number for the fire department will allow for a rapid response back to the scene to retrieve their equipment at the request of the Massachusetts Licensed Elevator Mechanic.

(c) It will be the responsibility of the fire department to assure a timely response of the fire company to remove its equipment. The solution to the elevator problem is to allow a mechanic to gain access to the equipment and run tests on it, and with LOTO in place, that cannot be done. By providing this timely response, the public and the fire service will both benefit with renewed access to the upper floors of the building.