

Fire Safety Curtains 101



Regulations & Standards

NFPA 80

Chapter 20 Fabric Fire Safety Curtains

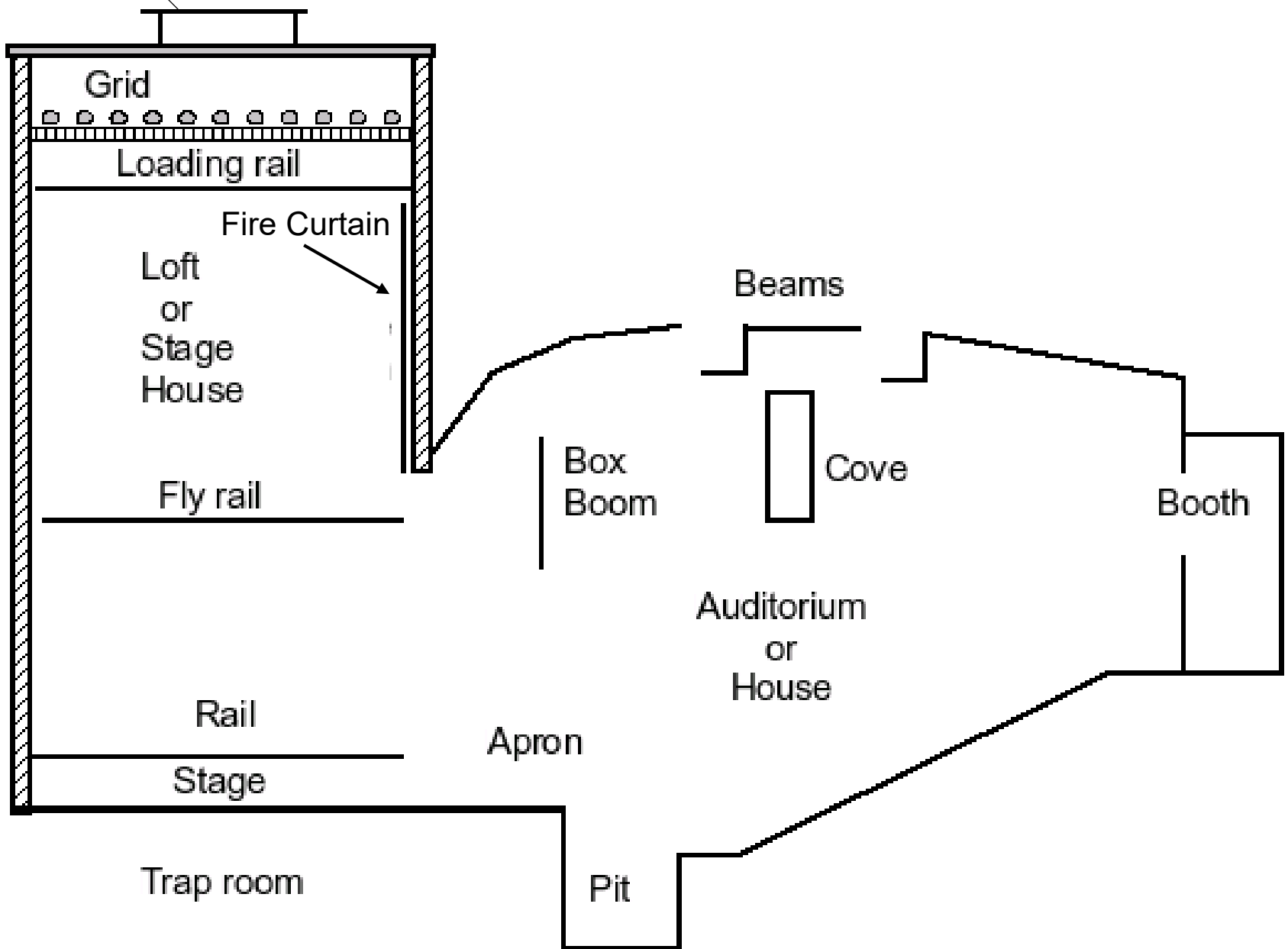
20.1 General.

20.1.1* This chapter shall cover the materials, fabrication, installation, operation, maintenance, and testing of fabric fire safety curtains and fire safety curtain assemblies used for the protection of proscenium openings.

20.1.2 Fire safety curtain assemblies shall be designed to protect the audience against the spread of fire and smoke between the auditorium and the stage.

Smoke Doors

Penthouse



Grid

Loading rail

Fire Curtain

Loft
or
Stage
House

Fly rail

Rail

Stage

Trap room

Beams

Box
Boom

Cove

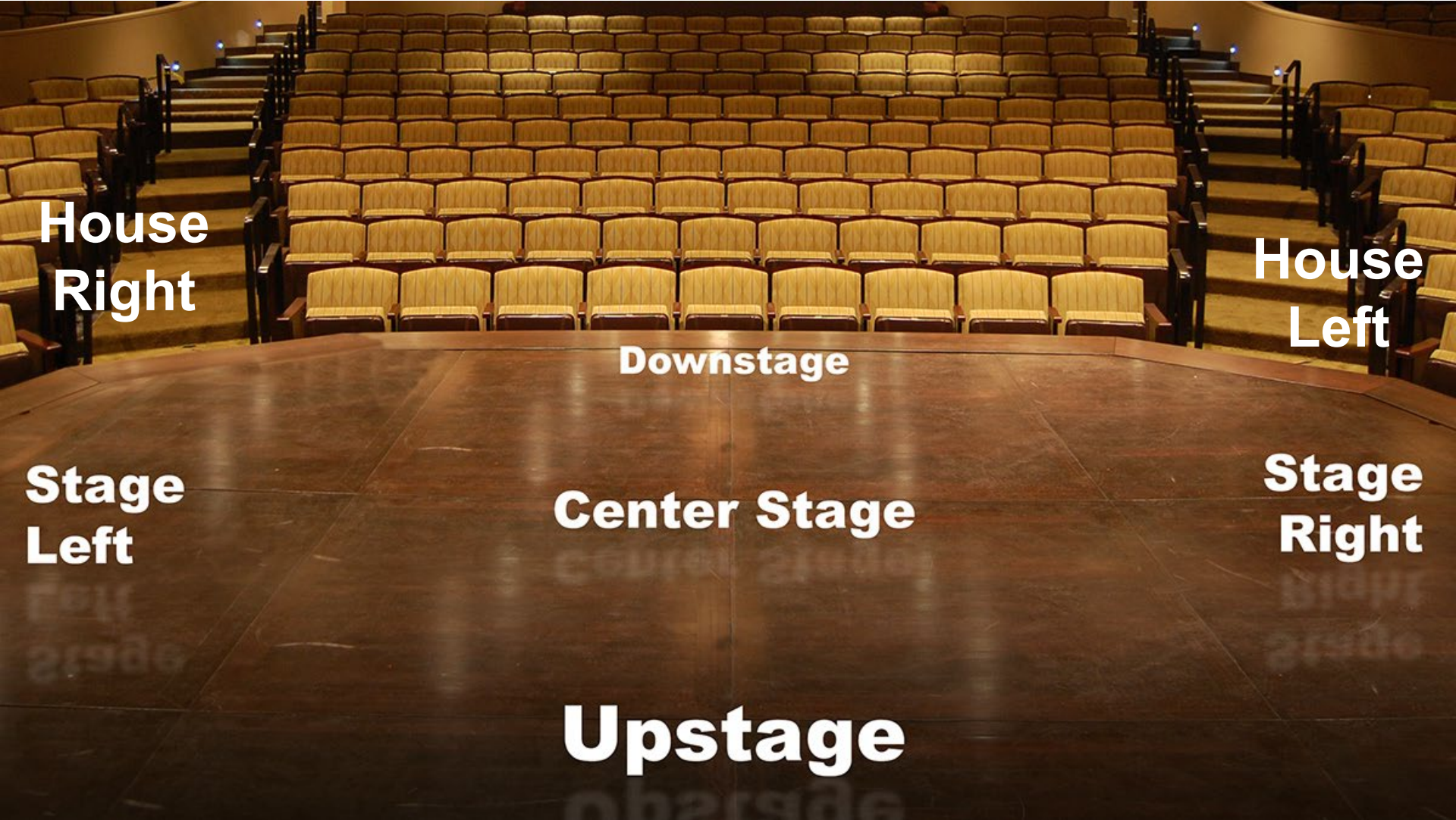
Booth

Auditorium
or
House

Apron

Pit





**House
Right**

**House
Left**

Downstage

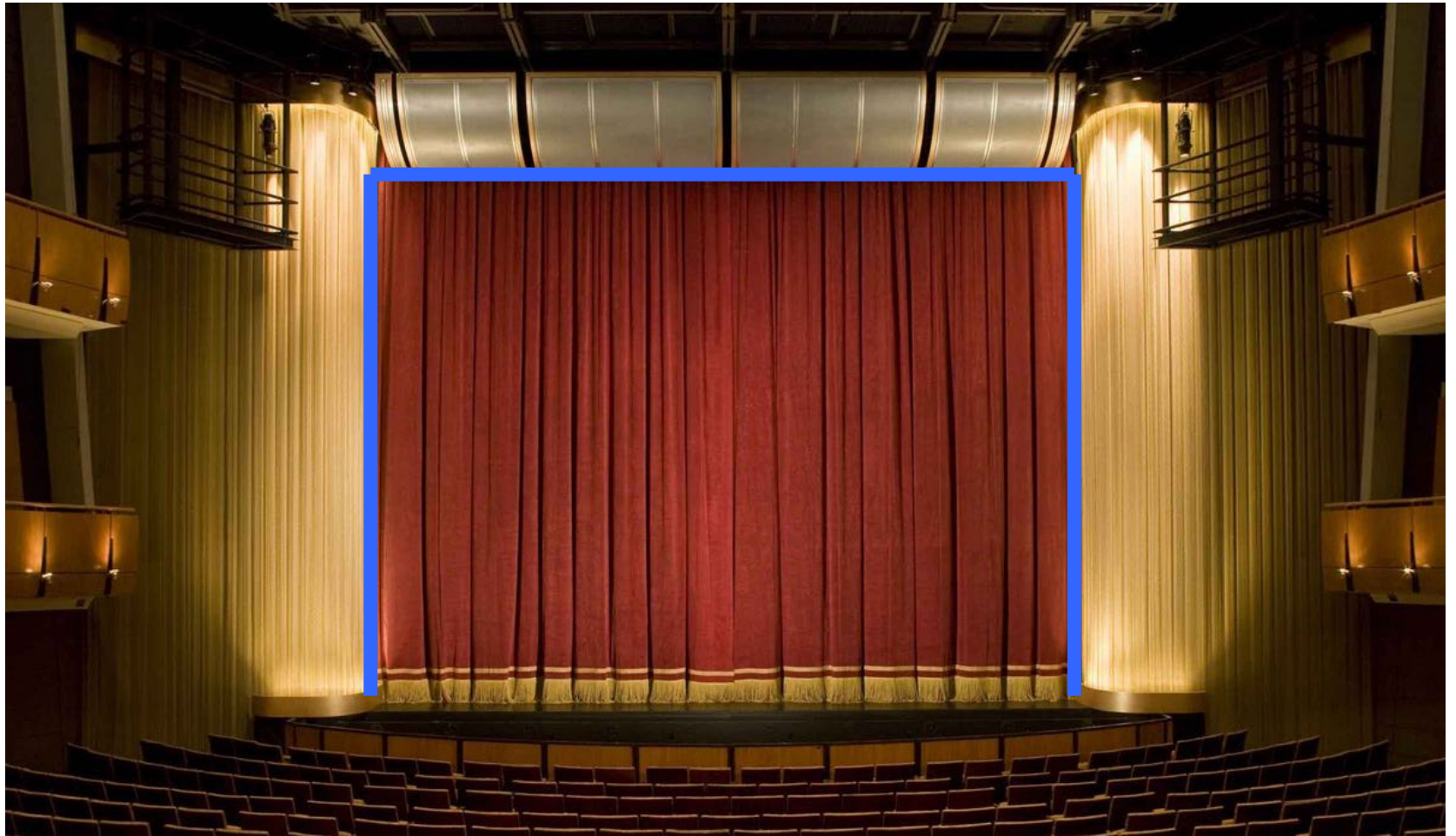
**Stage
Left**

Center Stage

**Stage
Right**

Upstage

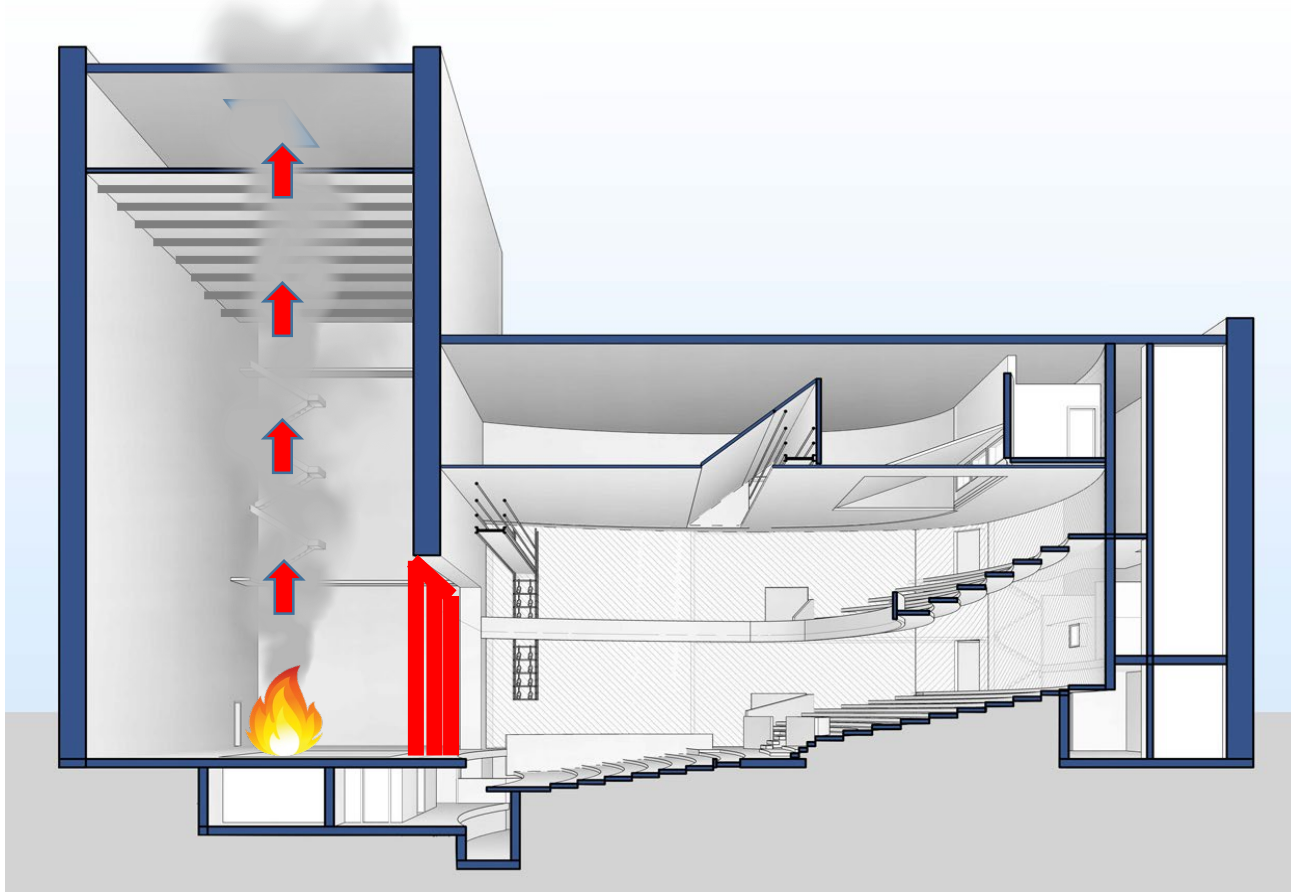
Proscenium Arch



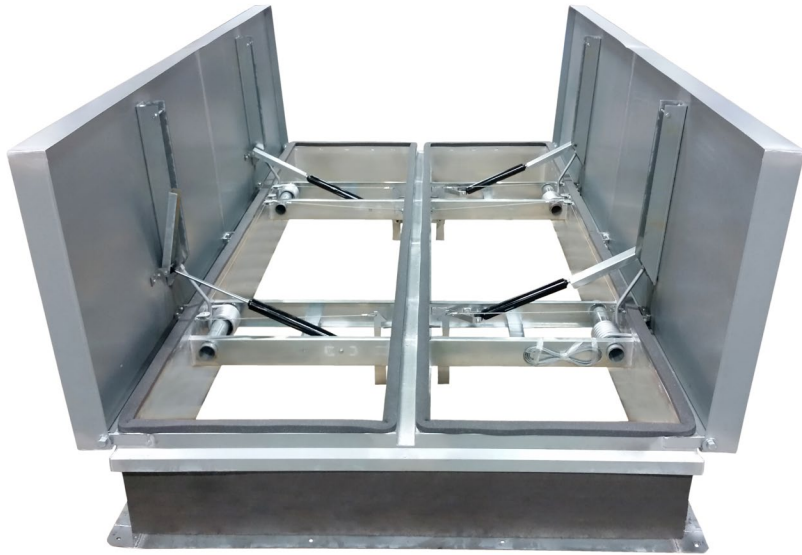
1. Fire curtains are not stage equipment.
2. Fire curtains are a component of the building fire & Life safety system.
3. Theater departments do not own this equipment. It is specific to the building.

How does it work?

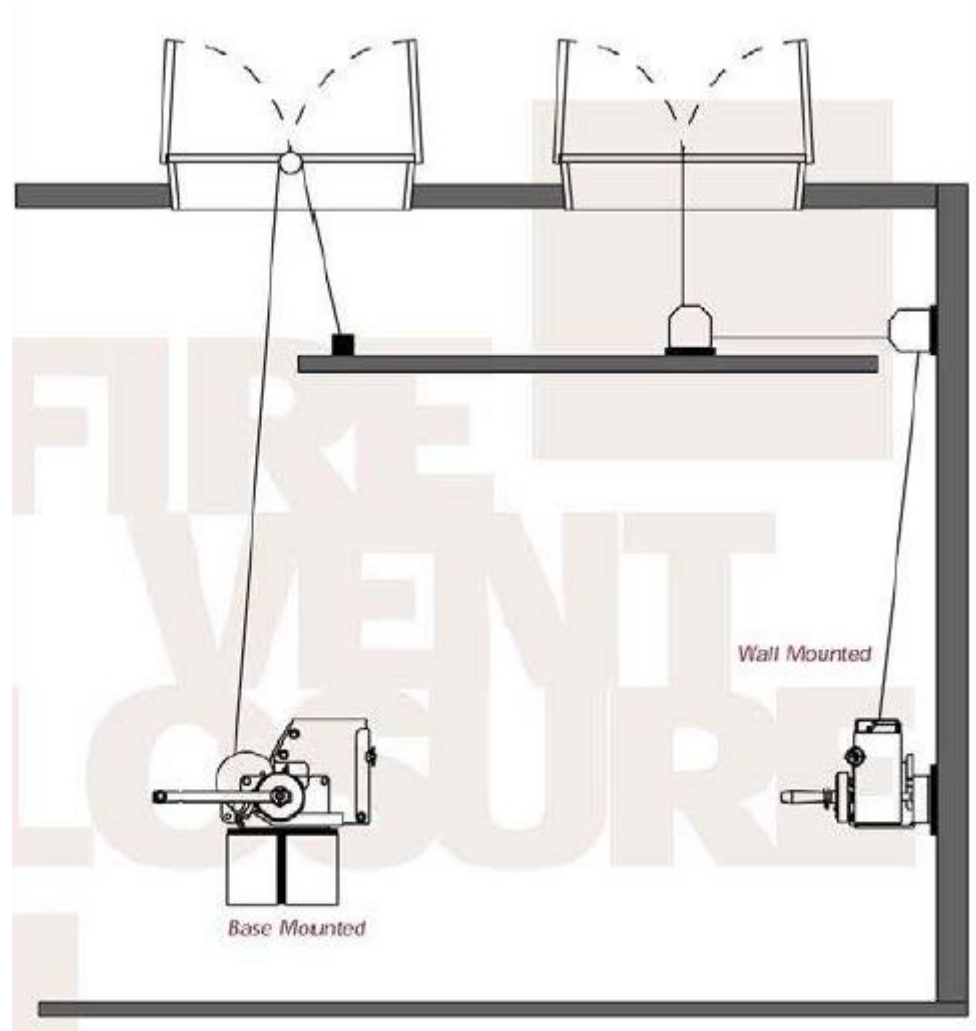
- Provides a barrier between the stage and the auditorium or audience.
- Works in conjunction with smoke doors to funnel smoke up and out instead of into the audience.



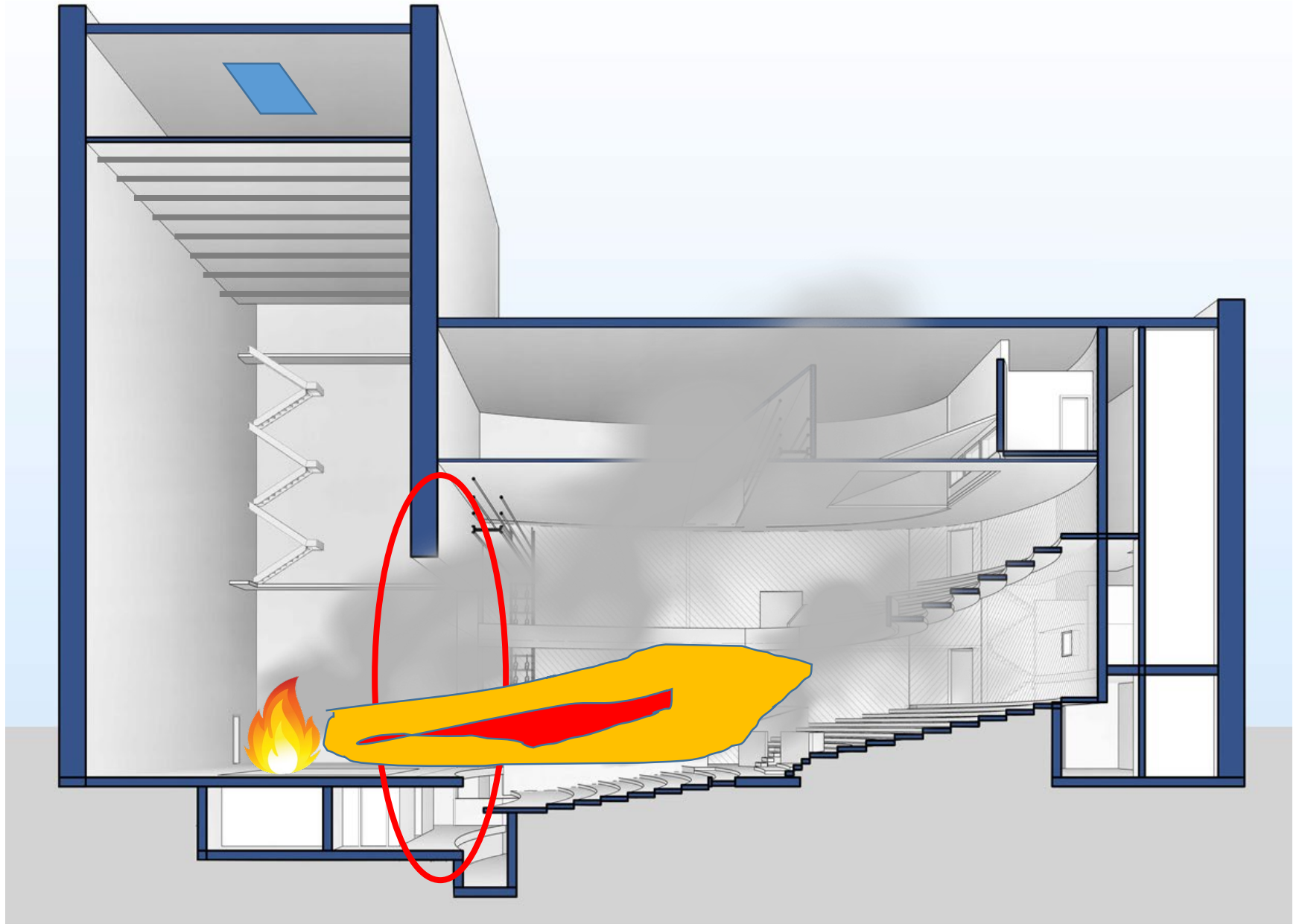
Design concept



Smoke
doors or
vents



NFPA 204



Iron

Steel curtain walls



Fire Prevention

Trip Curtain





Deluge Curtain Systems



<https://www.facebook.com/1246830591/videos/705088750601975/>

Fire Curtains

Fabric curtain



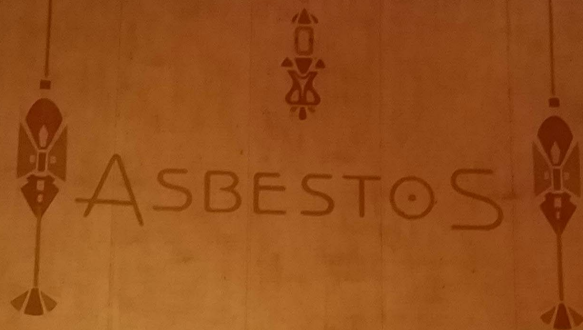
Asbestos curtains in use must be non-friable - coated completely and free from damage

Zetex – fiberglass fibers that are long and larger than 3.5 microns in diameter

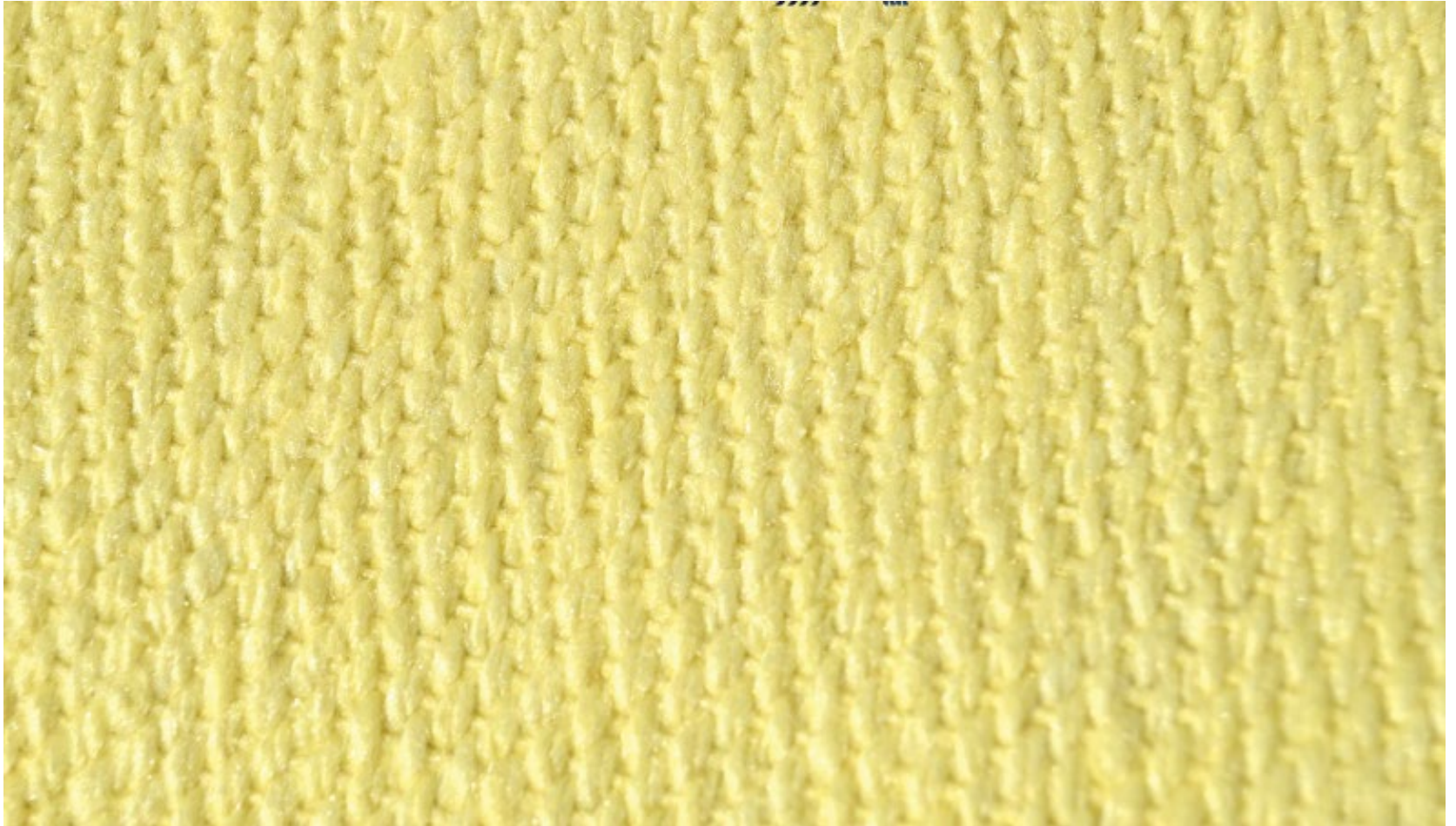


Materials





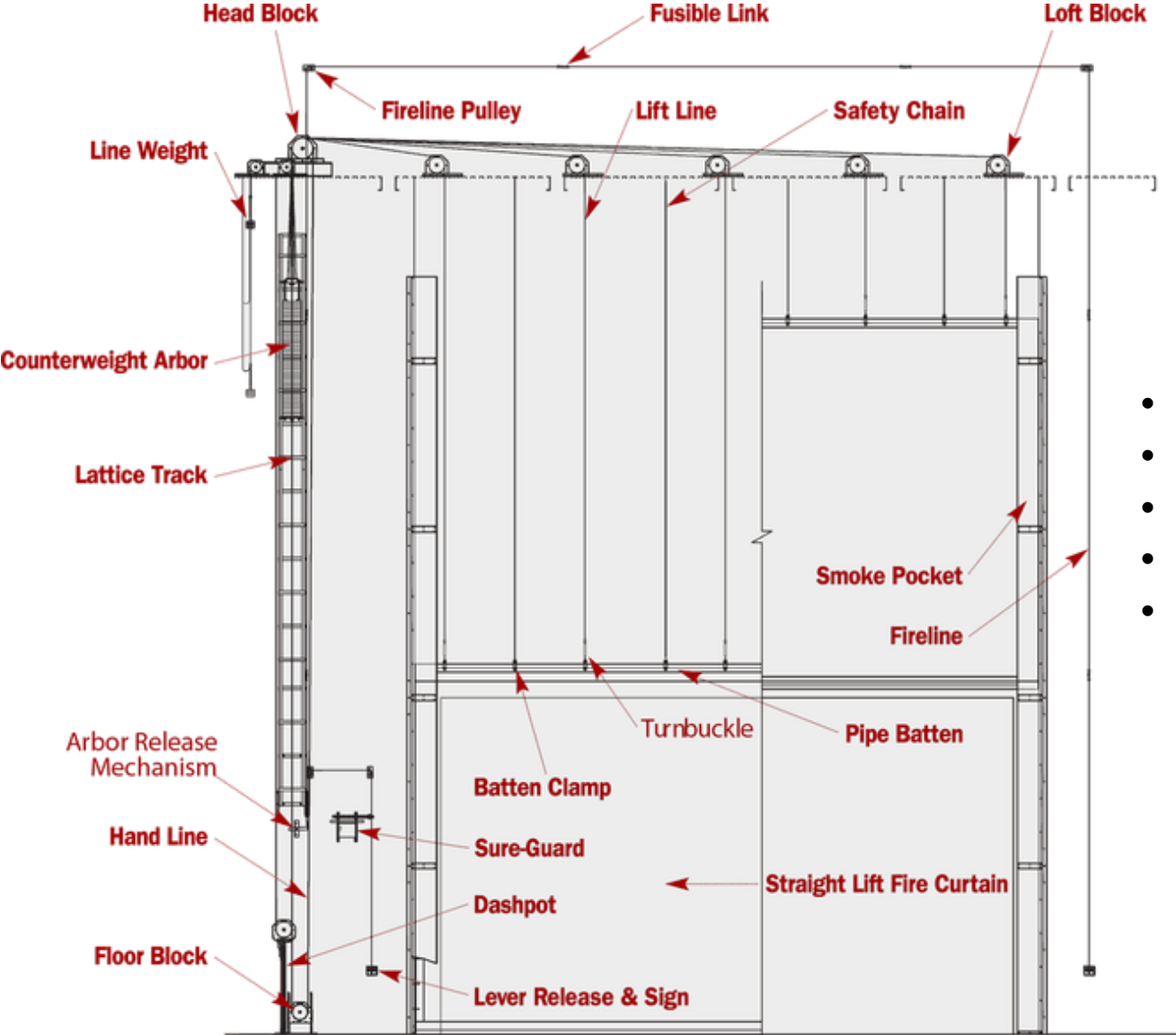
Materials



Materials



Typical Fire Curtain System

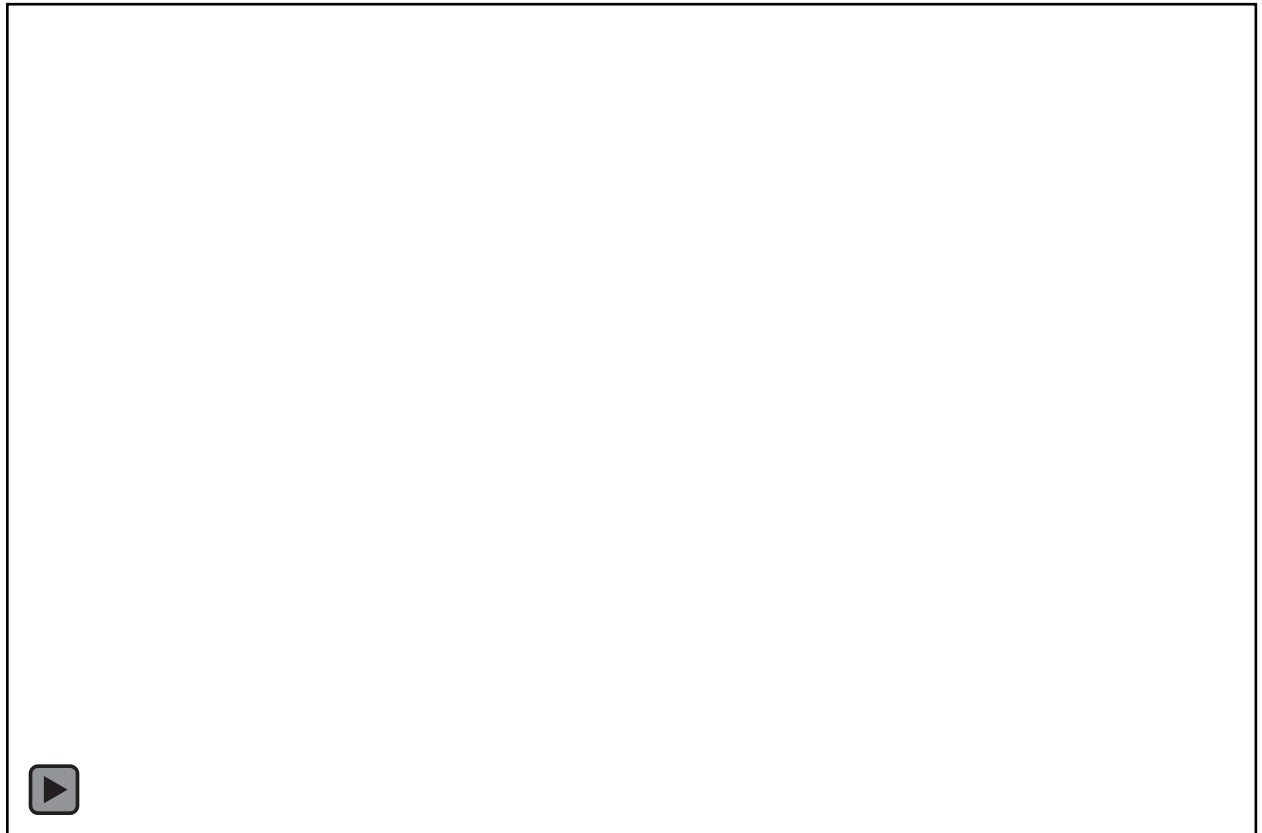


- Straight lift
- Soft
- Framed
- Wire guided
- Roller guided

Fabric – Straight Lift

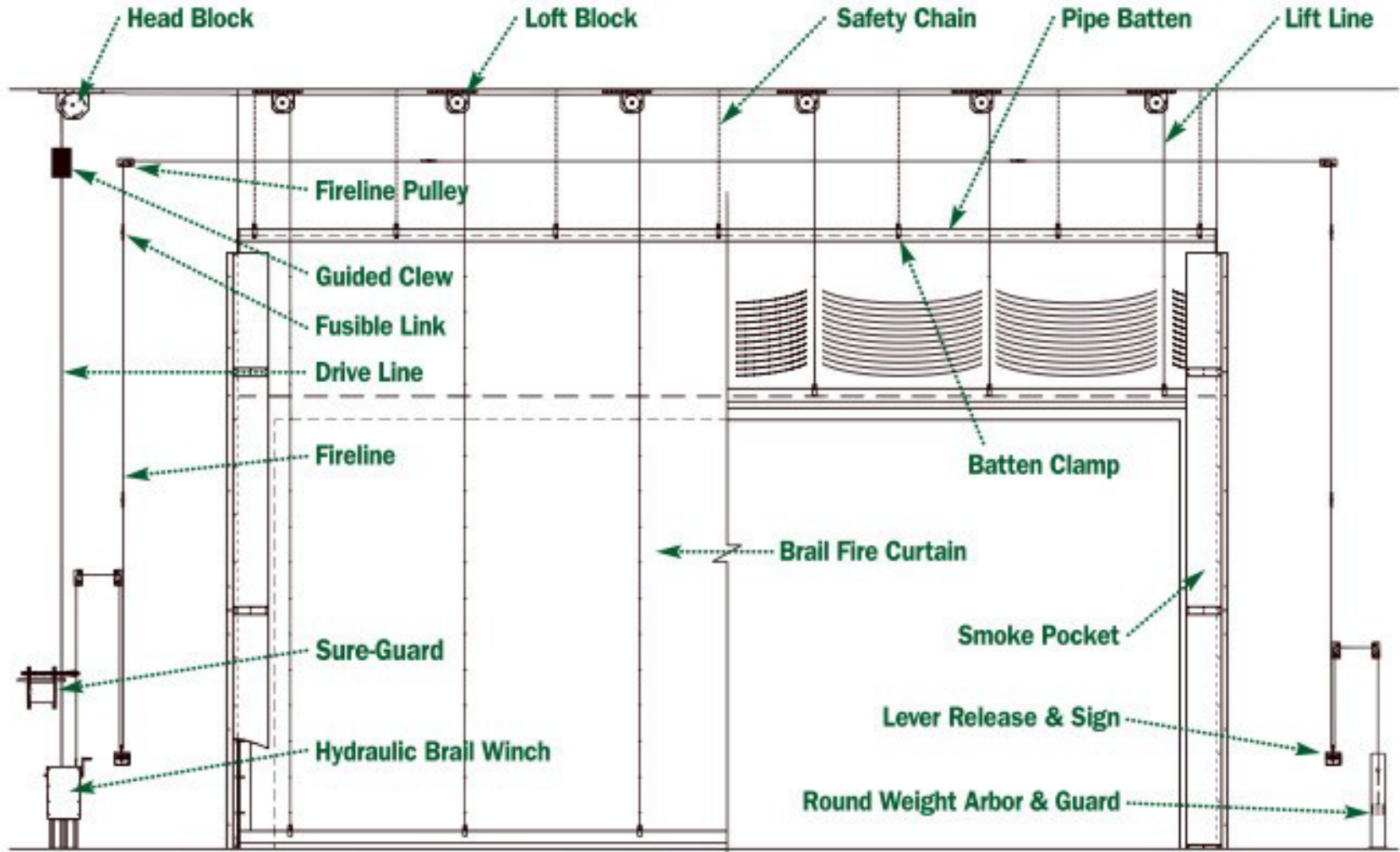
Fabric curtain

- Curtains can be manual or motorized
- Curtain must close in 45 seconds
- The last 8' must take 5 seconds



<https://youtu.be/wh3klxRVarg>

Brail Curtain System



Example



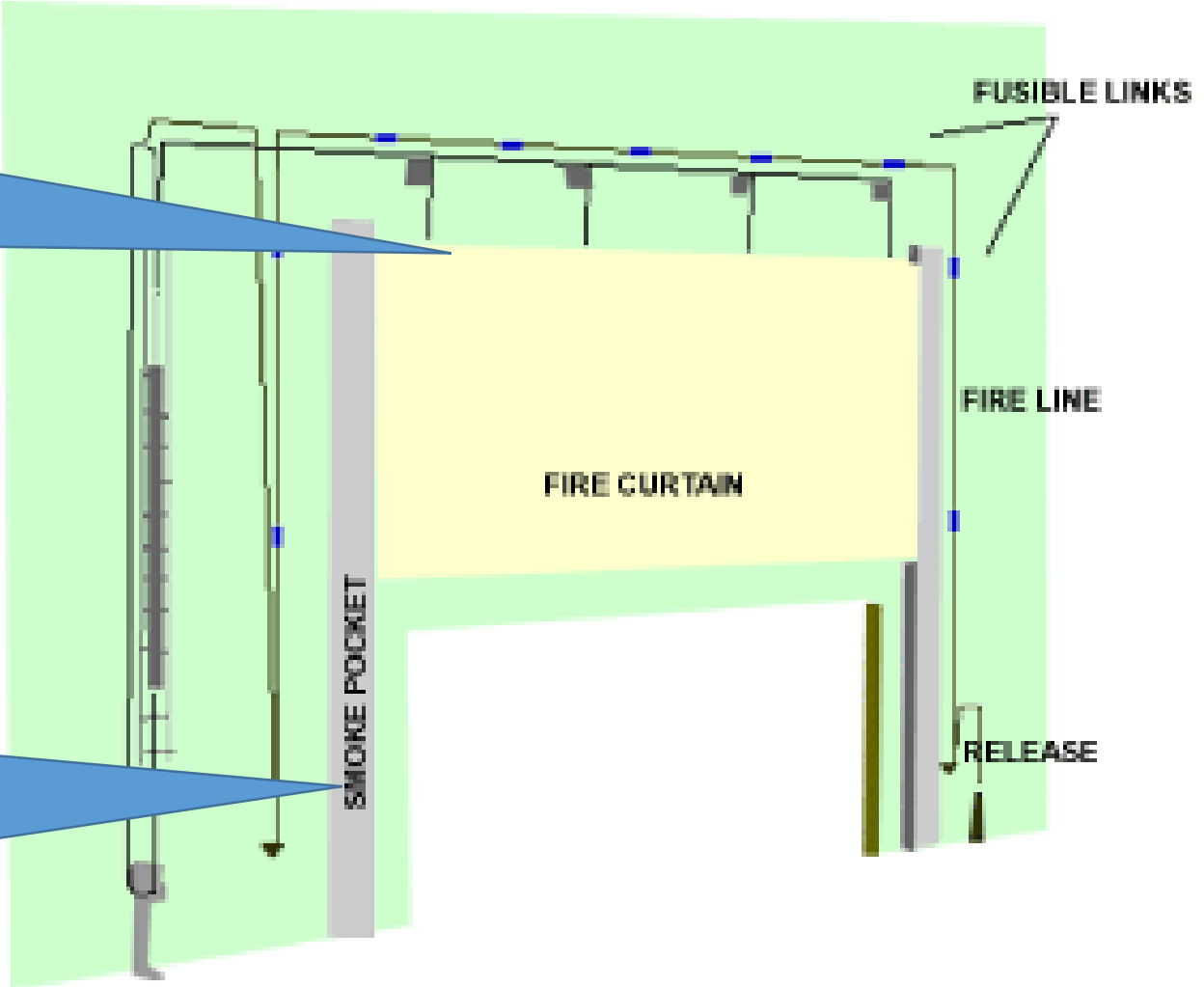
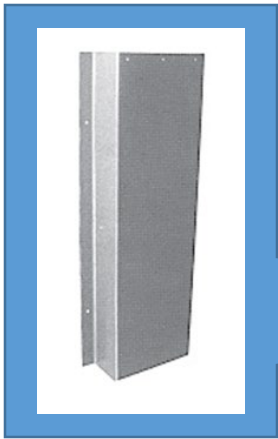
Fabric – Braille Lift

<https://youtu.be/9Sb00kiQUPc>





**Smoke Seal Assembly
016-SEAL4**



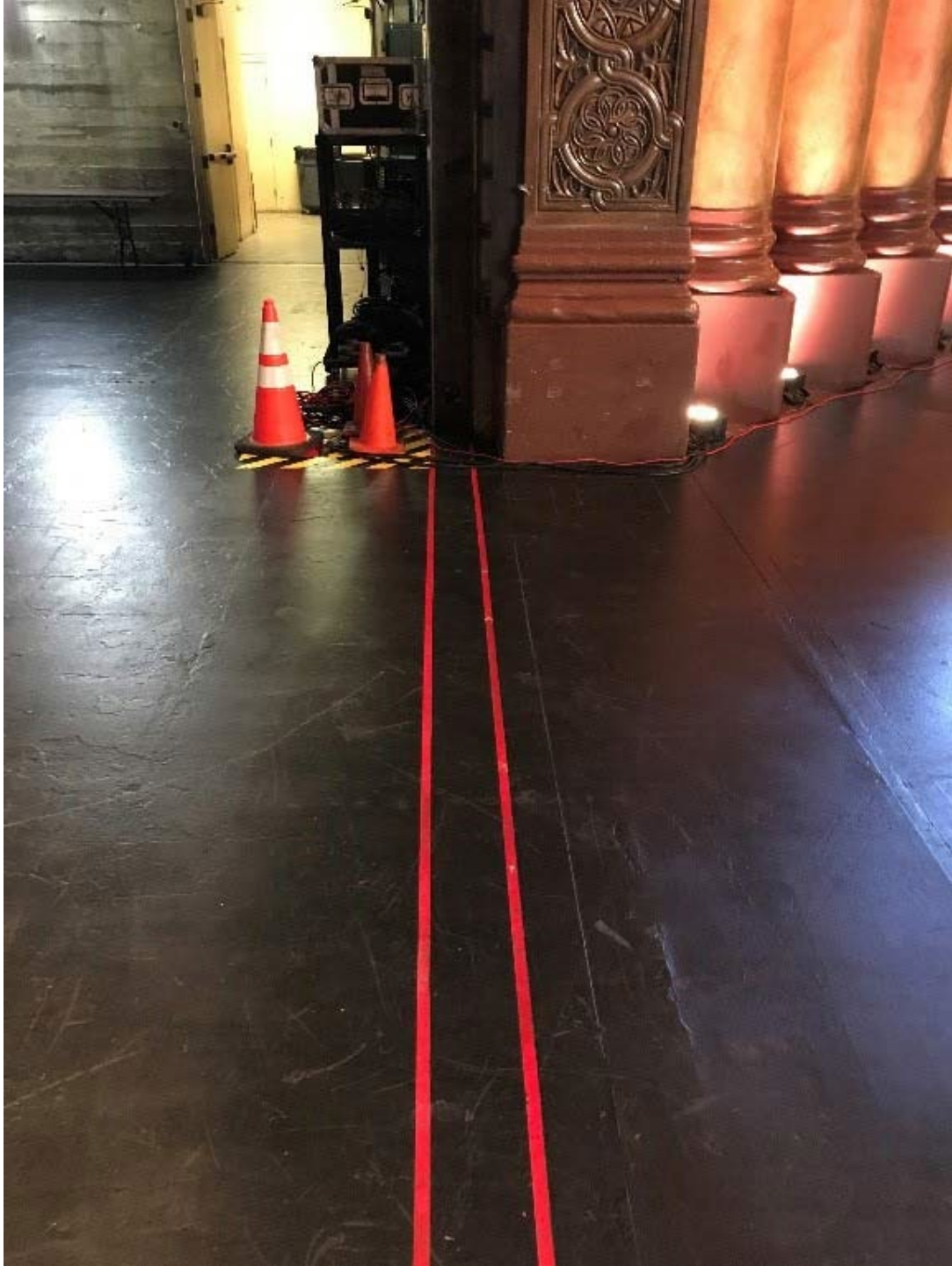
FUSIBLE LINKS

FIRE LINE

FIRE CURTAIN

SMOKE POCKET

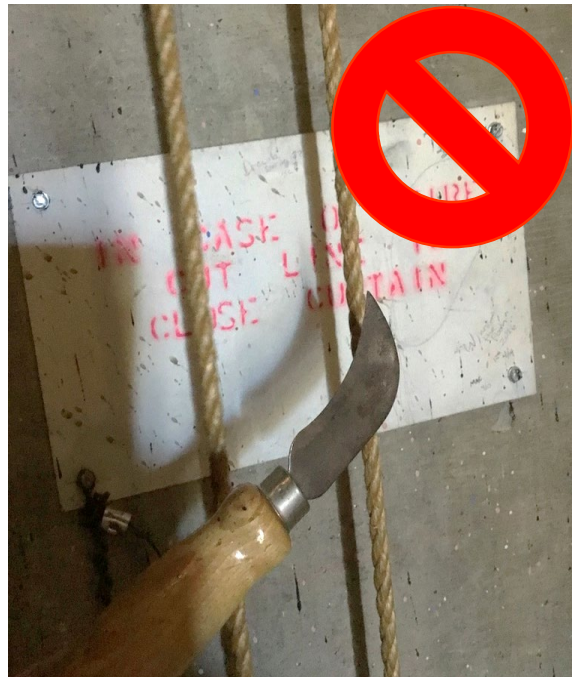
RELEASE



Emergency Release

Fabric curtain

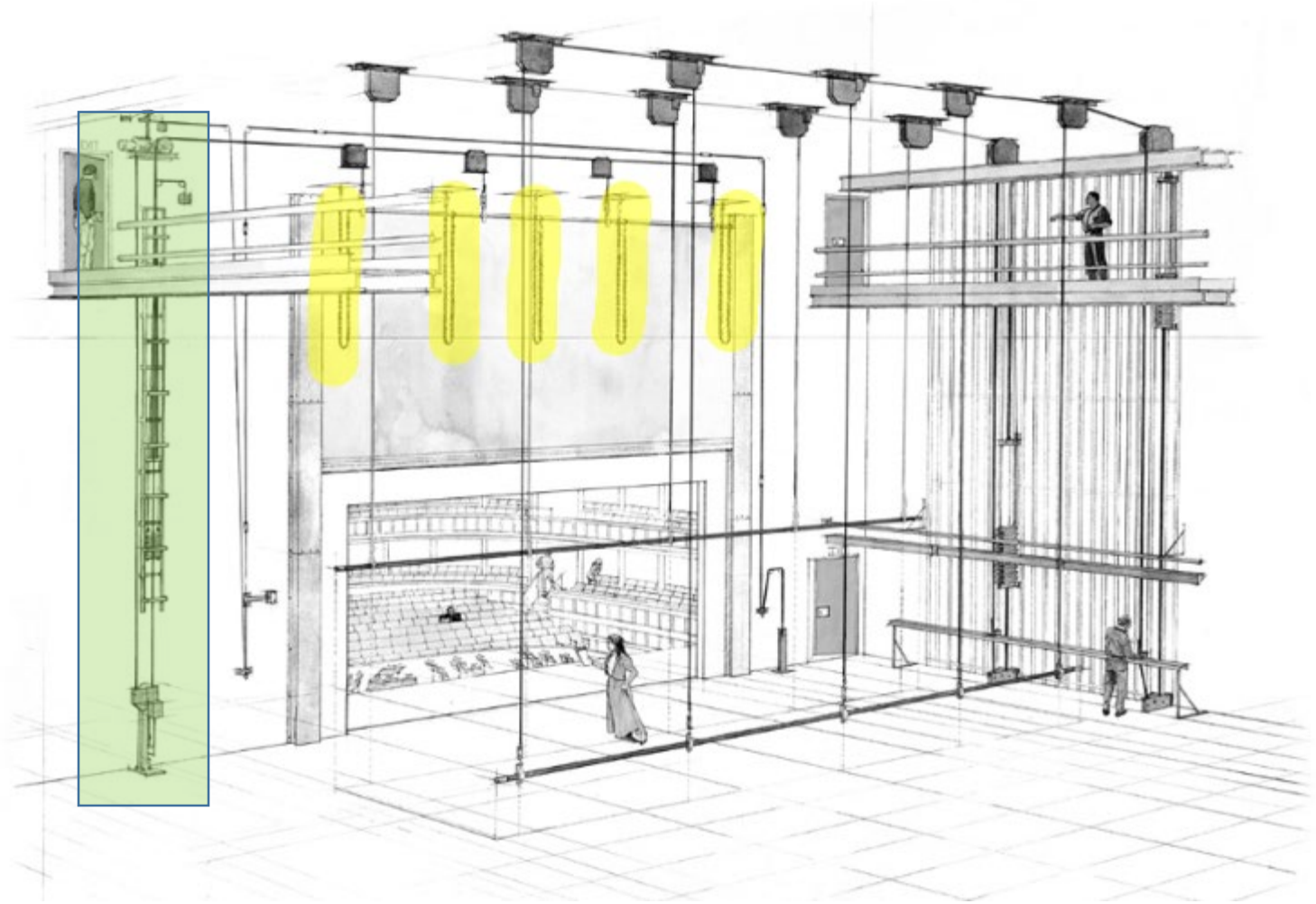
- Must have safety lever releases
- Must be tested every 30 performances or no more than 90 days (Every quarter!!!)
- All tests, repairs, and maintenance must be



Motor driven



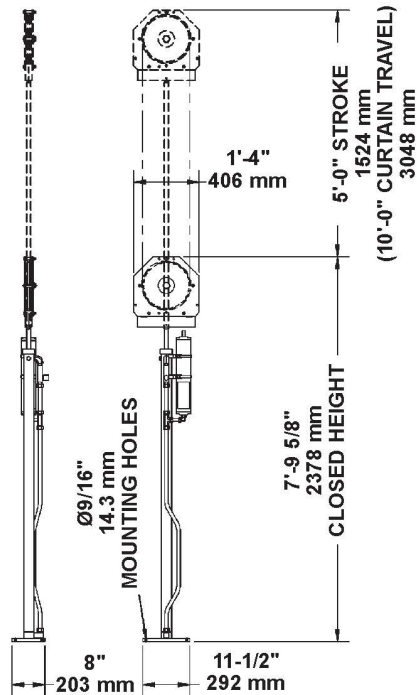
Arbors & Stay Chains



Hydraulic Dashpots

- Used on heavy straight lift fire curtains to slow the last few feet of descent.
May be needed to meet code requirements that the last 8' (2.4 m) of travel take 5 or more seconds.
- Provides 10' (3.0 m) of damping using a double purchased 5' (1.5 m) piston.
- 12" (305 mm) diameter sheave for 3/8" (9.5 mm) dashpot cable.
- The dashpot is rigged in a double purchase arrangement with a cable which is snatched by the fire curtain arbor when the curtain is nearing the floor. The dashpot cable pulls on the sheave at the top of the piston rod of the hydraulic cylinder.
A fluid flow adjusting valve is preset to provide the appropriate retarding force on the piston, braking the descent of the curtain.
The piston and cylinder automatically release the oil to return the unit to an "at rest condition" when the curtain is raised.
- 016-410L used for curtains up to 3500 lbs. (1588 kg).
- 016-411L used for curtains up to 1250 lbs. (567 kg).
- Custom units available.

Dimensions



#016-411L



Hydraulic Dashpot
016-410L

Fire Prevention

Fire Safety Curtains



NFPA 80 - Standard for Fire Doors and Other Opening Protectives

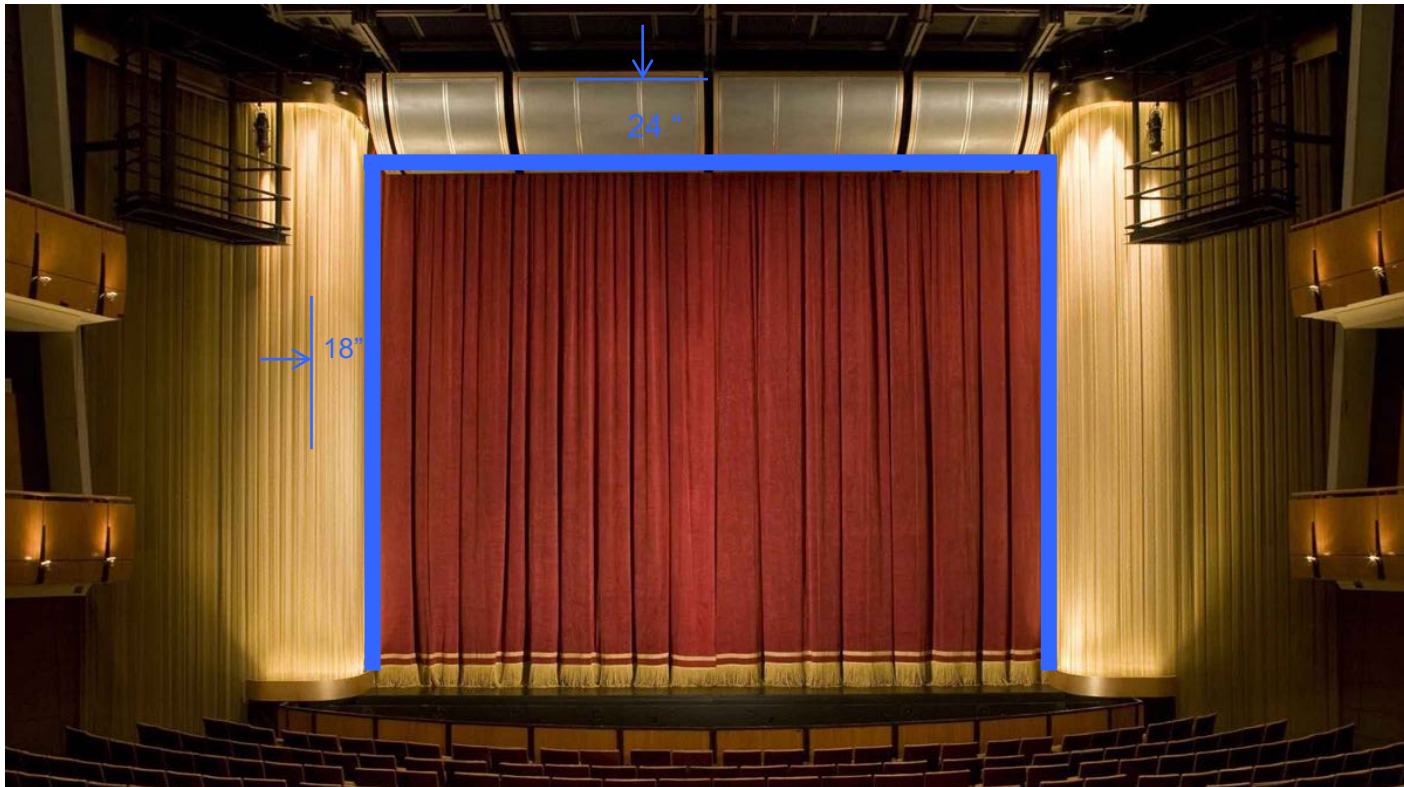


ANSI E1.22 - 2022
Entertainment Technology – Fire Safety Curtain Systems

<https://tsp.esta.org/>

NFPA Major Takeaways

20.3.2 The fire safety curtain shall extend a minimum of 18" (457mm) on each side of the proscenium opening and a minimum of 24 in. above the top of the proscenium.



NFPA 80 Major Takeaways

20.7.1.1 The fire safety curtain assembly shall be closed at all times except when there is an event, rehearsal, or similar activity.

This means it has to be closed at **all** times the stage is not actively in use.



NFPA 80 Major takeaways

20.7.1.3 Emergency operation should be verified by the owner every 90 days.

20.7.1.4 A signed and dated testing report shall be kept on file with the owner for review by the AHJ as an ongoing acceptance procedure.

NFPA 80 Major Takeaways

- **20.9.1** The rigging system shall be inspected annually.
- **20.9.1.1** The annual rigging inspection shall be performed by a qualified person.
- **20.9.1.3** Retraining of the owner and staff shall be mandatory during each annual inspection.

| | Level 1 | Level 2 |
|--|----------|--|
| Fire Safety Curtain (manually operated) | Annually | Immediately after equipment or components have been newly installed, altered, or repaired. |
| | | No less than every 5 years or as determined by a qualified person. |
| | | When the last date of inspection is unknown. |



ANSI E1.47 – 2020
Entertainment Technology—Recommended Guidelines for Entertainment
Rigging System Inspections

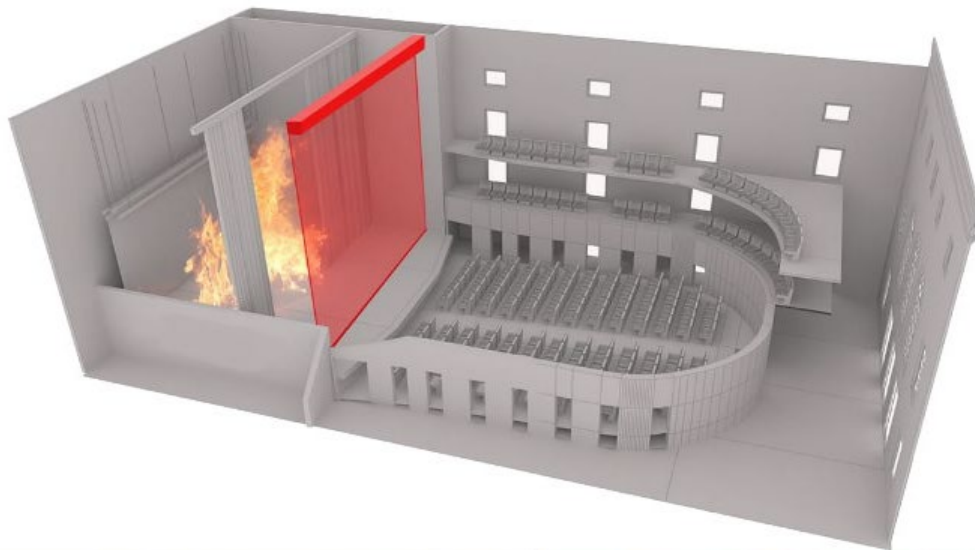


NFPA 80 Major Takeaways

- **20.9.2** Unless temporary measures have been approved by the AHJ, repairs required for emergency operation of the fire safety curtain assembly shall be completed before the facility can be occupied for an event with an audience.
- **20.9.3** Repairs not affecting emergency closing of the fire safety curtain shall be completed within 30 days.

ANSI E1.22 - 2022 : Entertainment Technology—Fire Safety Curtain Systems

- **1.2.3** A fire safety curtain system shall protect occupants of the audience area from fire onstage and shall, in combination with other building life safety systems, provide occupants of the audience area sufficient time for safe and orderly egress.
- **1.2.4** A fire safety curtain shall reduce the transmission of radiant heat, block debris, and continue to control of smoke and gas movement for a period of 20 minutes.

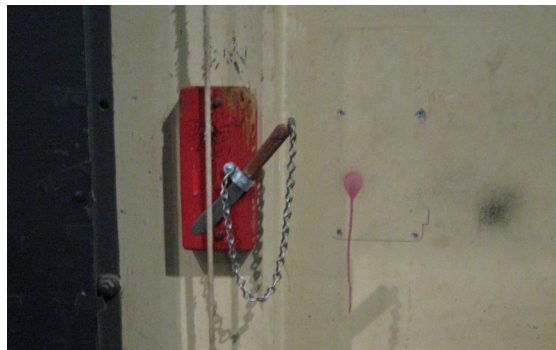


ANSI E1.22 - 2022 : Entertainment Technology—Fire Safety Curtain Systems

- **10.1** Non-emergency opening and closing shall be powered.
- **10.2** Straight lift unframed fire safety curtains less than 850 square feet shall be permitted to be unpowered.
- **10.5** Rigging shall be designed by a Qualified Person, certified by a third party, and installed or supervised by a person who has had his/her knowledge and work experience certified by a third-party acceptable to the AHJ.

ANSI E1.22 - 2022 : Entertainment Technology—Fire Safety Curtain Systems

- **12.5.1** A manual release station shall be installed at both sides of the proscenium opening. Stations shall be unobstructed, visible and operable from stage floor level.
- **12.5.2** The manual release station shall meet ADA requirements.
- **12.5.3** The emergency manual release device shall be painted red per ANSI Z535.1-2006, Safety Color Code.
- **12.5.4** Operations requiring cutting or severing a line are not permitted.



ANSI E1.22 - 2022 : Entertainment Technology—Fire Safety Curtain Systems

- **12.8** Manual emergency operation shall be accomplished by a single person.
- **12.13** All fire safety curtains shall be in the closed position except during events with an audience, rehearsals, technical production activity, or activities on stage that necessitate the curtain be open.



ANSI E1.22 - 2022 : Entertainment Technology— Fire Safety Curtain Systems

13.3 Periodic User Testing

The emergency closing of the fire safety curtain system shall be tested at least once every 30 performances but not less than once every three months.

13.4 Annual Inspection

13.4.1 A Qualified Person shall inspect the fire safety curtain system at least once a year.

13.4.2 Inspection shall include complete visual inspection of the curtain, rigging, and both the automatic and manual initiating and release devices

13.4.3 Emergency manual closing shall be tested including testing each manual emergency release device at least once.

13.4.6 The authority having jurisdiction shall be notified of the time and place of the annual inspection.

Questions?



**Don't worry guys
I got this!**

Some vendors that do rigging inspections

- [A to Z Theatrical](#), Kansas City, MO
- [Anchor Point Rigging](#), Portland, OR
- [Artistic Concepts Group](#), Chantilly, VA
- [Bigger Hammer](#), Long Beach, CA
- [Chicago Fly House](#), Chicago, IL
- [Delbert L. Hall](#), Tennessee
- [DeLong Rigging Solutions](#), Southern Indiana
- [Entertainment Rigging Services](#), Boston, MA
- [EPS](#), Las Vegas, NV
- [IA Stage](#), Sanford, FL
- [I Weiss](#), Fairview, NJ
- [Pointwright Rigging](#), Maryland???
- [Rosebrand](#), Secaucus, NJ and Sun Valley, CA
- [Sapsis Rigging](#), Primos, PA
- [Stagecraft Industries](#), Portland, OR
- [Syracuse Scenery](#), Liverpool, NY
- [Texas Scenic](#), San Antonio, TX and Bronx, NY
- [Tiffin Scenic](#), Tiffin, OH
- [Vertigo](#), Cortland, IL
- [Wenger \(JR Clancy\)](#), Owatonna, MN

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Helpful Links:

[University of California Performing Arts Safety website](#)

Entertainment ANSI Standards – Free download

- [ESTA Technical Standards Program website](#)

ETCP Certification Information - <https://etcp.esta.org/>

USITT Rigging Class - <https://www.usitt.org/education-training/jay-o-glerum-entry-level-rigging-class-indianapolis>

USITT Online Training - <https://www.usitt.org/innova-on-demand-learning>

Event Safety Alliance - <https://www.eventsafetyalliance.org/>