




**Engine Company Operations**  
**Commercial / Taxpayer Fires**  
**Session 2**

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**Introduction**

- **Commercial Building Fires**
- **Taxpayers / Store Fires**
- **Types of Buildings**
- **Types of Construction**
- **Firefighting Tactics**
- **Sprinkler System Operations**

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Objectives: Student shall have knowledge of .....

- Commercial Building and Taxpayer Fires
- Types of Commercial Building Construction
- Firefighting Tactics in commercial buildings
- Operations with fire protection systems
- Safety Considerations in these buildings

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### Any town in Suffolk County

- Stores, factories, strip malls
- Sizes range from 20' x 40' to our large factory or shopping malls
- Attempt to lead you through a logical sequence dealing with these types of structures, as an Engine Company

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### Types of Commercial Buildings

- Churches
- Factories
- Mill
- Stores
- Mall
- Warehouse
- Schools
- Vacant
- Hours of Operation

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### Factors of Commercial Building Fires

- Fire Load
- Undivided Floor Area
- High Ceilings
- Common Cockloft
- Increased water flow
- Fire Protection Systems
- Manpower Requirements
- Back draft
- Access to fire area
- Ventilation
- Collapse Zone
- Long hose stretch

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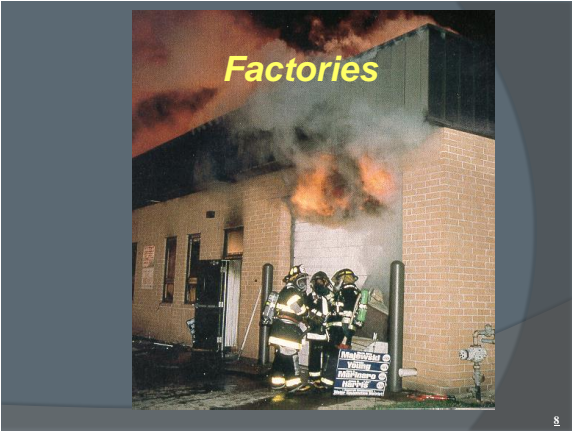
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### Vacant Building



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### Construction Features

Broad categories:

- 1900 - 1950
- 1950 - Present

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### Construction Features con't

Turn of the Century until 1950's:

- Built entirely of wood with brick walls (brick & joist construction)
- Roofs generally tongue & groove
- Large, undivided cockloft
- Hot, smoky fires

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### Construction Features con't

1960 – Present:

- Larger undivided floors
- Steel “I” beams
- Cinder block walls
- Truss construction

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### Truss Construction

- Can be found in supermarkets, commercial factories & other businesses requiring large unobstructed floor area
- Trusses get there strength by geometric shape of a triangle

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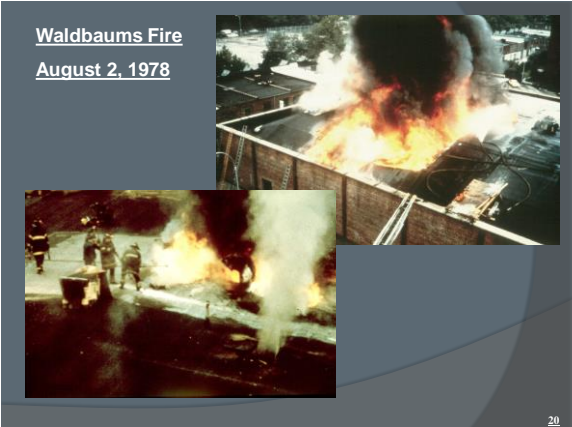
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### Steel "I" Beams



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### Collap



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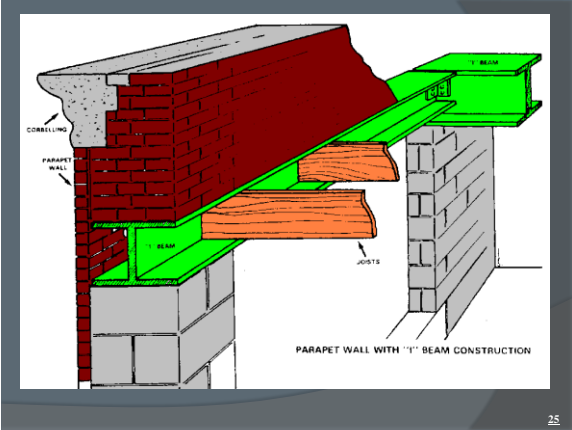
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### Methods of Attack

- Offensive
- Direct
- Indirect
- Defensive
- Combination
- No Attack



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### Firefighting Tactics

- Location of the FIRE
  - Cellar
  - 1st Floor
  - Cockloft
  - Upper Floor
- Line Placement
  - 1st Line
  - 2nd Line
  - 3rd Line

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### Access to Fire Area



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### Access to Fire Area



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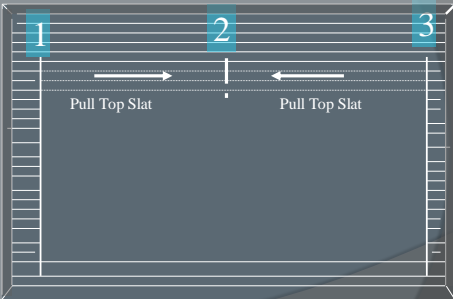
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### The "3-Cut" Method



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### Access to Fire Area



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### Access to Fire Area



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### Access to Fire Area



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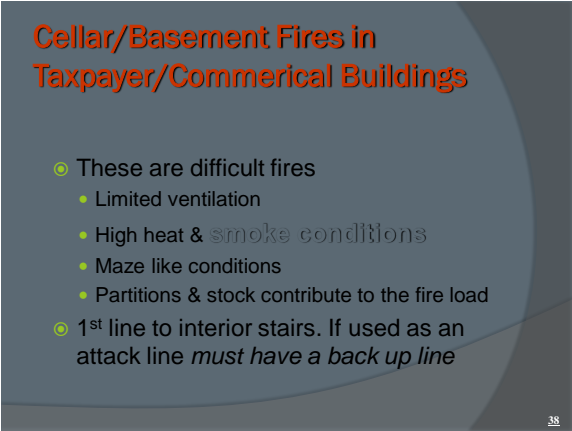
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### Cellar/Basement Fires con't

- Most stores stairs are located in the rear
- Insure you have enough line to reach seat of fire
- Extreme difficulty making the stairs (high heat)
- Use of distributors or cutting the floor
- NO Civilian life hazard*, do not commit firefighters

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### Cellar/Basement Fires con't

**Line Placement:**

- 1<sup>st</sup> line** - into occupancy, locate interior stairs
- 2<sup>nd</sup> line** - back-up first line
- 3<sup>rd</sup> line** – ensure **sprinklers** are supplied
  - Attack rear or exposures as directed by IC
- Additional hoselines maybe needed
  - Supply distributors or large caliber streams
  - Covering any additional stores as needed

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### Store Fires

- Generally originate in the rear
- Taxpayer/store daytime = major life hazard
- Non-business hours, delayed discovery
- Major problems:
  - Fire Load
  - Fire entering cockloft area
  - Fire spread to adjacent stores

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### Store Fires con't

- Major problems con't:
  - Roof supports weakened
  - Stock & Partitions impeding attack lines
- Attacking the store fire
  - During business hours – consider life hazards
  - Chiefs & Officers must be proactive in their size-up
  - Consider mutual aid on conformation 13-35
  - Multiple RIT's

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### Engine Co. Tactics for a Store Fire

**First Line:**

- Fire visible 1<sup>st</sup> line into store involved
- Medium to Heavy fire condition, initial attack line 2 1/2" line
- Minor fire no extension, then 1 3/4" acceptable
- Difficulty gaining entrance
- Manpower permits - 1<sup>st</sup> Engine may be able to stretch 2 handlines

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### 1 3/4 VS 2 1/2

<ul style="list-style-type: none"> <li>1 3/4           <ul style="list-style-type: none"> <li>Known fire condition</li> <li>Manueverability/ Speed</li> <li>Compartmented Fire Area</li> <li>No FL Problems</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>2 1/2           <ul style="list-style-type: none"> <li>Unknown fire condition</li> <li>No need for speed</li> <li>Large Uncompartmented Fire Area</li> <li>No FL Problems</li> </ul> </li> </ul>
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**Second Line:**

- Attack line in operation, second line stretched immediately to back up the 1<sup>st</sup> line
- If delay in initial attack line, due to forcible entry of fire area for example, second line to **sprinkler system** if equipped ensures that the system has adequate supply of water
- Can be used into exposures as a precaution after first line in operation

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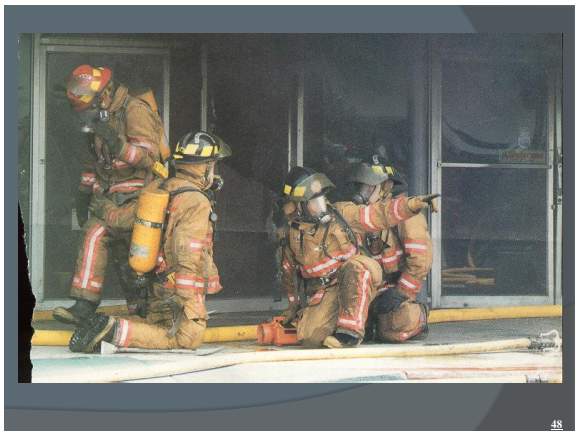
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Third Line:

- Used to cover opposite exposure
- Ensure **sprinkler system** is supplied
- Operated as order by Incident commander

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**Large Area Fires:  
Factories or Offices**

- Locate fire
- Get initial hose line in operation
- 2<sup>nd</sup> hose line ?
  - Back up 1<sup>st</sup> line
  - Advance to 2<sup>nd</sup> floor
  - **Supply sprinkler system**

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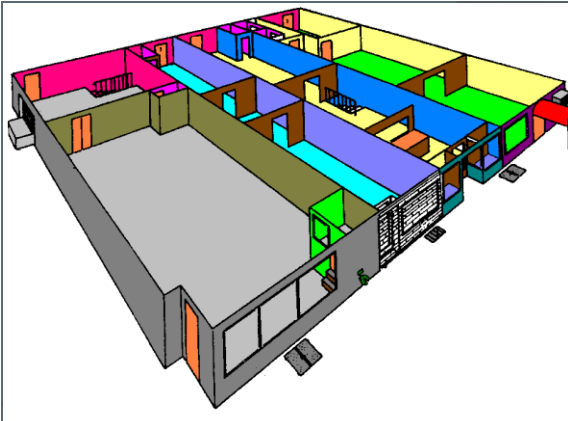
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### Cockloft Fires in Taxpayers

- Rapid extension via openings through ducts and voids

**Hoseline Placement:**

- 1<sup>st</sup> line - most seriously involved occupancy
- 2<sup>nd</sup> line – Back up first Line/ feed the sprinkler
- 3<sup>rd</sup> Line – Feed Sprinkler/ most serious exposure

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### Cockloft Fires in Taxpayers con't

- Advanced headway, supply large caliber streams; i.e., tower ladder deck pipe
- In a row of stores, fire is extending it may be advisable to skip a few stores to contain the fire
- Fire extending rapidly, consider apparatus deckpipe for a quick knock down

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### Considerations for Engine Co. Ops

- Building tightly sealed potential for smoke explosion or backdraft
- Establish water supply
- 2" or 2 1/2" hose
- Early water is the key
- Each Engine should secure a hydrant and test it
- Mutual aid early

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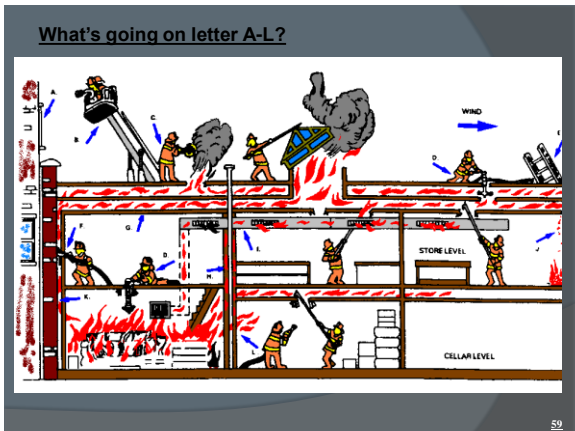
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### Sprinkler System Operation



- First line of defense in many commercial buildings
- Properly working systems have a 90% success record or better
- Found in many types of occupancies and required by code
- Engine chauffeurs must know location of Siamese & shut-offs

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### Sprinkler Systems

- Operating Pressure 150 psi
- Flow meters may determine # of open heads
- Heads flow 40 gpm @ 50psi
- 60 gpm @ 100psi
  - More than 150 gpm?
    - Broken Pipe?



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### Types of Sprinkler Systems

- Wet Pipe
- Dry Pipe
- Deluge System
- Combination Standpipe/Sprinkler



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### Augmenting Sprinkler Systems

- Supplied with minimum 2 1/2" lines
- Supplied with at least 2 lines
  - From an Engine with no hand lines
- Pump discharge pressure start at 150 psi
- A spare cap may be necessary if one of the Siamese connections is missing or broken



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### Operating in a Building with a Sprinkler System

- SCBA a must, heavy build up of CO
- Wooden Chock, Sprinkler Tong
- Sprinkler system control valve shut down by Officer in Charge. After fire is under control & hoselines in place
- FF assigned to shut down system should have a handi-talkie

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O. S. & Y. Valve –  
•Which piece is it?  
•Open or Closed?  
•Wet or Dry System?



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### Building Fire Pump



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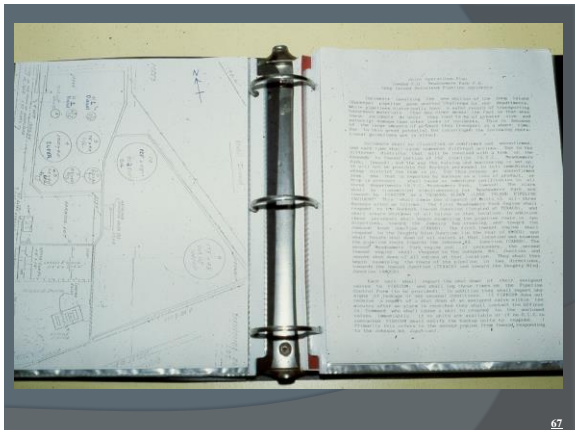
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### Fire Problem



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### Fire Problem - Building Features



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### Fire Problem



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- Any Questions?
- Break time!!

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### Multi Story Buidlings



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### Multiple Family Dwelling

- Construction Features
- Means of egress
- How many families?
- Basement Access
- Fire Spread
- Life Safety Issues
- Attached / unattached



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### Engine Ops

- Position Engine considering incoming aerial devices and efficient hose line stretch
- Establish positive water source.
- Stretching the line !!
- Estimating the stretch
  - How many lengths from Engine to bldg.?
  - 1 length per floor + 1 length on fire floor

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### Basement Fires

- 1st line – top of interior stairs
- 2nd line – back up first line, exterior entrance?, protect second egress (F.E.)
- 3rd line – back up first line?, back up second line?, upper floors

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### First Floor and Upper Floor Fires

- First floor fire
- 1st line through interior to apt. entrance
- 2nd line – backs up first line, if not needed moves to floors above for extension, after water on fire
- 3rd line – if needed determined by I.C.

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Fire Resistive Multi Story Buildings

- Office buildings
- Hospitals
- Assisted Living
- Hotels

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Fire Resistive Multi Story Buildings

- Construction features
- Means of egress
- Number of people
- Fire spread
- Life safety issues
- Built in protection

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Strategies

- Frontal attack
- Flanking attack
- Defensive attack
- Outside attack

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### Tactics

- Location, Location, Location!!
- Access to Fire Floor – stairs/elevators
- When don't we use elevators ?
- Using elevators, take forcible entry tools
- Attack and evacuation stairs
- Access stairs within an occupancy

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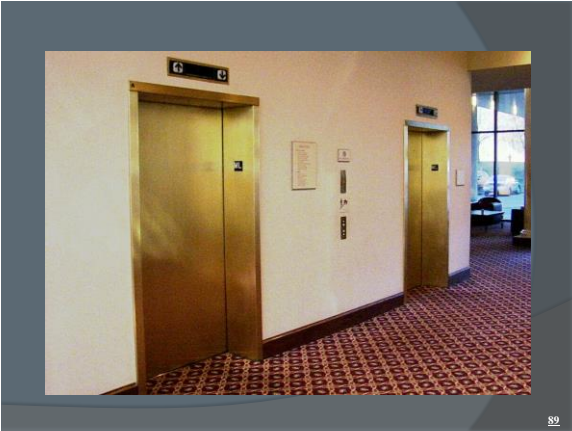
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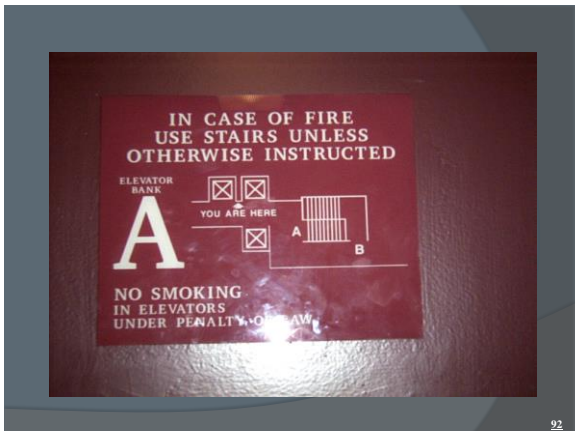
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### Tactics

- Teaming up crews
- More than one crew needed to advance one line
- Second crew assists with advance and provides relief – conserve air

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### Standpipe Systems

- Types
- Wet
- Dry
- Combination



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### Supplying Standpipes

- Siamese connections
- Floor outlets
- Color coded
- Size of supply line
- 2 siameses
- 2 water sources
- Pumper per line



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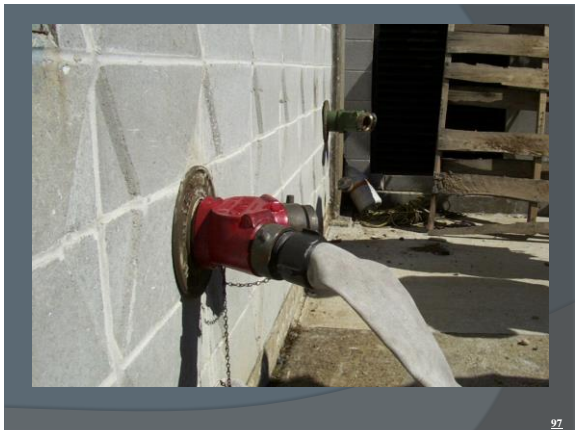
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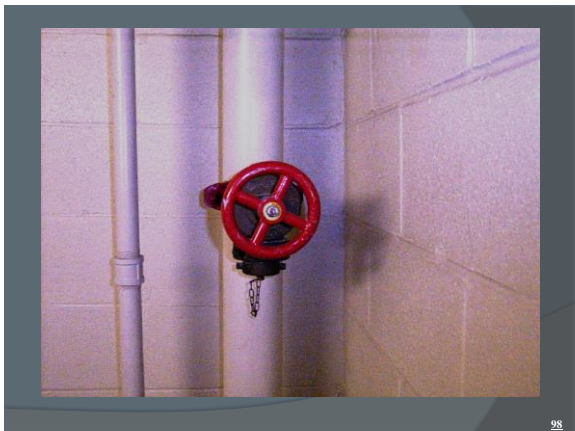
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### Supplying Standpipes

- Standpipe and Sprinkler systems
- Supply which 1st ?
- Problems with siamese
- Proper pressures
- 100psi + 5 psi/floor
- Know type of nozzle
- 2 1/2" hose



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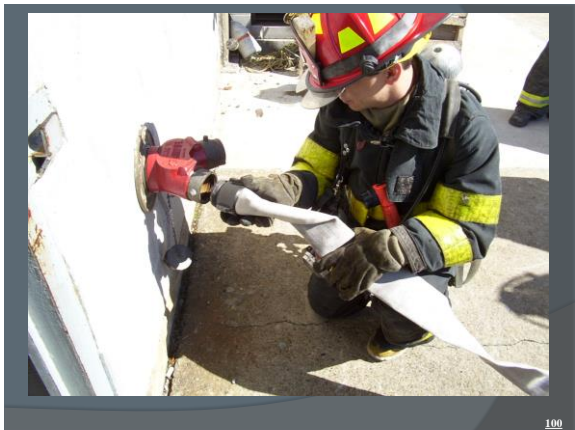
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**Standpipes**

- Hose outlets
  - Size
  - "House lines"
  - Fire Dept. hose



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# Standpipe Ops

- Required equipment
- Standpipe kit
  - Nozzle
  - Hand control wheel
  - Pressure gauge
  - Pipe wrench
  - Spanner wrench
  - Door chocks
  - Special adapters
  - 3 or 4 lengths of 2 1/2" hose



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### Standpipe Ops

- 1st hose line from floor below fire
  - NEVER use outlet on fire floor !!!!
  - NEVER use the house line, use the hose you carried up
- Make all connections on floor below in hallway outside the stairs in fresh air

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### Standpipe Ops

- Flush system
- Remove any pressure reducing device
- Attach pressure gauge
- Connect hose
- Start water
  - Nozzle Firefighter should do a long bleed, this allows control firefighter to properly set pressure in the hand line

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### Standpipe Ops

- Communication !!
- Check pressure at gauge with water flowing
- Rule of thumb
  - 3 lengths, 70 psi
  - 4 lengths, 80 psi



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### Standpipe Ops

- Engines should pair up
  - Second Engine Officer should stay at the standpipe outlet, assist with any problems, ensure first line gets into operation
- Additional Lines
  - May be from 2 or more floors below, consider number of lengths needed
  - Stairway configurations can create problems

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### Common Problems

- No water at outlet ? Control / section valves
- Low pressure ?
  - Valve not open completely
- Is Pressure reducer removed ?
- Break in pipe below outlet ?
- KINKS !!!

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### Additional Considerations

- Additional air cylinders
- EMS staging near fire floor
- Staging additional resources near fire floor
- Building fire pumps – engineer / maintenance personnel

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### Sprinkler Ops

- Fire department connection **green**
- Supply as soon as possible
- 2 ½" hose minimum
- Supply system with 150 psi to start
- Know what areas Siamese supplies

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### Sprinkler Ops

- Heavy smoke conditions, high CO
- Shut down ??
- Firefighter at valve with radio

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**Conclusion**

- Many variables and complexities
- Compounded by fire location and fire load
- Many fires within easy reach of hose streams but others may require much manpower to advance and be successful
- DRILL, DRILL, DRILL !!!
- Questions ??

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