Fireground

Officer Development

HIGH RISE

CONSIDERATIONS and OPERATIONS

High Rise
Characteristics

- Any building over 75’ in height
  - Beyond aerial capability
- Require a structured approach
- Require an expanded Command organization
- Preplanning is essential
- High Rise SOP

High Rise Considerations for Success

- Don’t Freak Out!!
  - Enclosed stairwells
  - Fire doors
  - Noncombustible structural materials
  - Sprinklers

Fire-Resistive Construction

- NFPA Class I
- Reinforced concrete
- Protected Structural steel
- HVAC System
- Combustible Cladding

High Rise
Characteristics

Pre-war Era

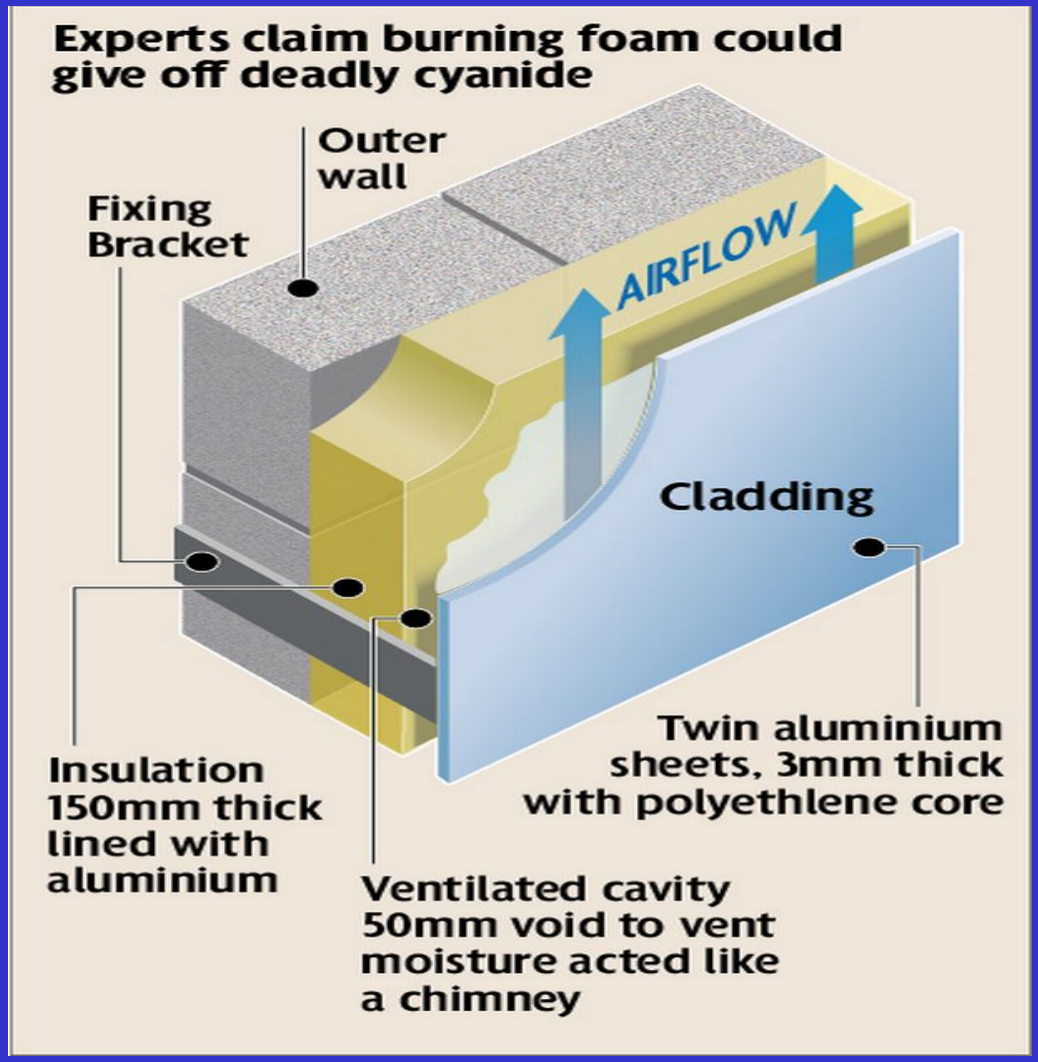
- Fire-resistive construction
- Heavily reinforced
  - 23 lbs. Per square foot
- No Central HVAC
- Operable Windows
- More compartmentation
- Fewer electronic items

High Rise
Characteristics

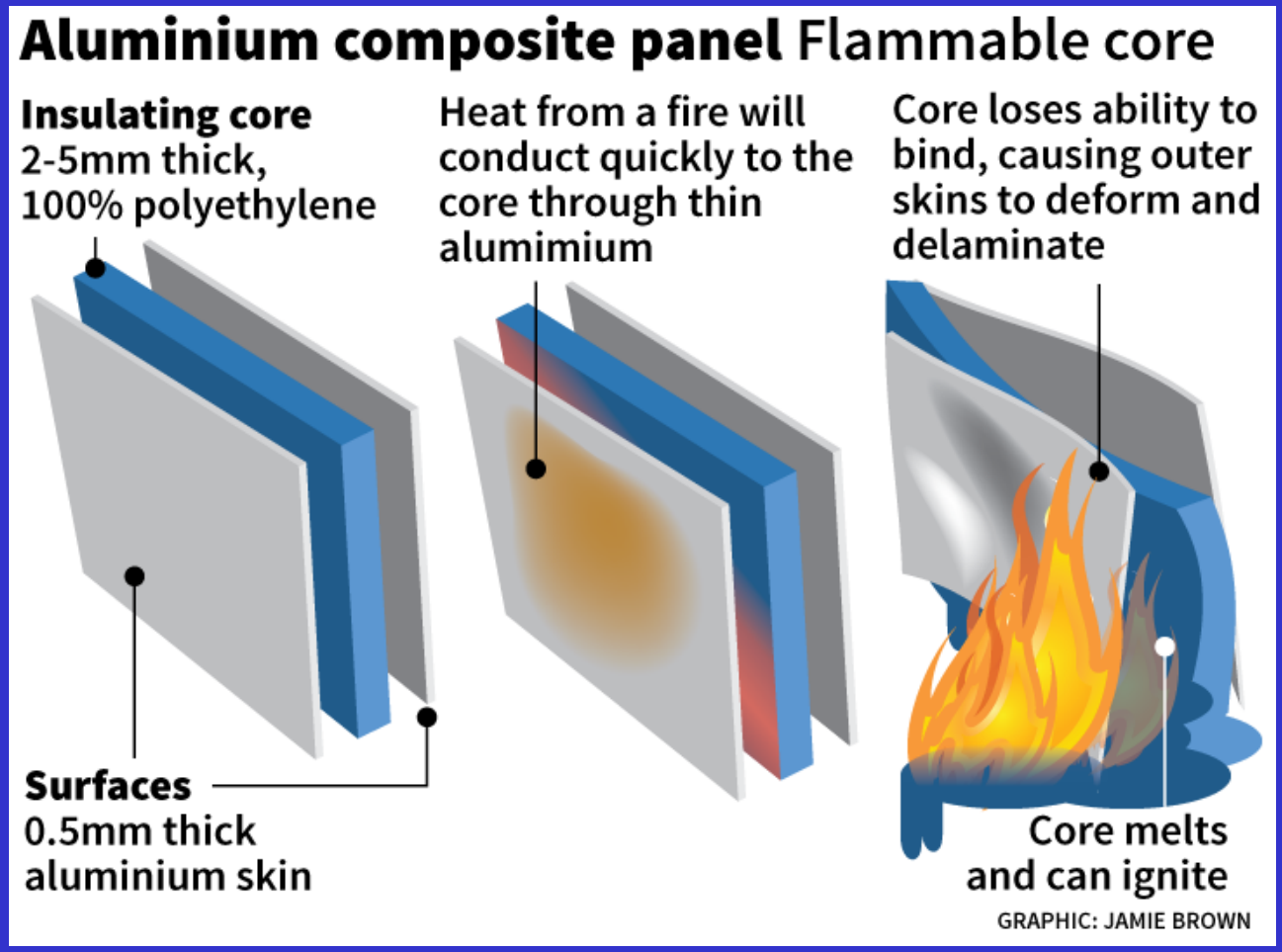
Post-war Era

- Fire-resistive construction
- Lightweight building materials
  - 8 lbs. Per square foot
- Larger floor spaces
- Center core construction
- Hung ceilings / Raised floors
- Difficult to Ventilate

Combustible Cladding



Combustible Cladding



High Rise
Characteristics

Post-war Era

- Systems dependent
  - Communications
  - Elevators
  - HVAC systems
  - Auxiliary Appliances
  - Fire Pumps
  - Building Maintenance Personnel

High Rise
Characteristics

Residential

- Large Life Hazard
- Compartmentalized
- Dead-end hallways
- Forcible entry Concerns
- Panic
- Fire Safety Education

High Rise
Characteristics

Commercial

- Open floor spaces
  - Cubicles
- HVAC systems
- Drop ceilings / Raised floors
- Transient occupancy
- Access / Security Concerns

Firefighting Concerns

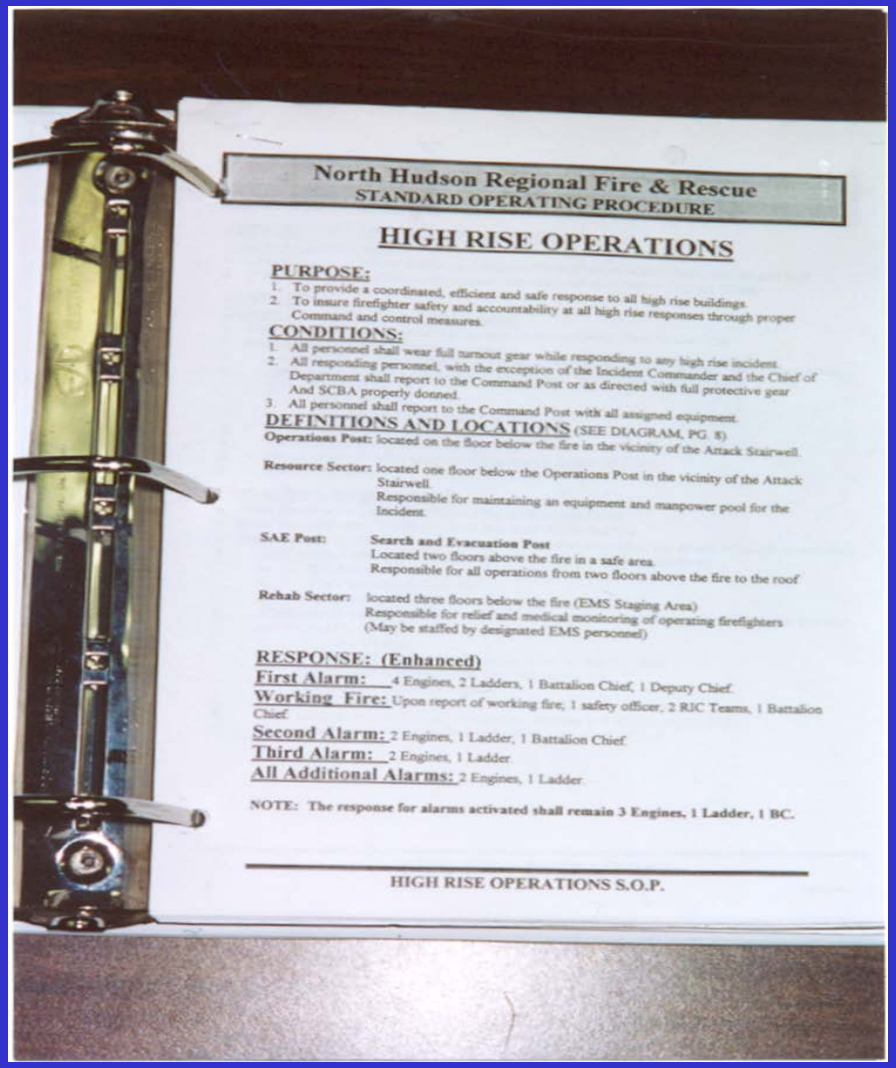
- **Buildings under Construction**
  - **Standpipe serviceability**
  - **Access**
    - **Hoists – Personnel / Materials**
  - **Fire companies should routinely visit the construction site**
    - **Building changes daily**
    - **Familiarization from ground floor up**
    - **Correct violations**

Firefighting Concerns

- Pre-Cast
  - Connections Vulnerable
  - Unprotected Steel
- Cast-in-Place
  - Wood Formwork
  - Steel Screw Jacks

High Rise Considerations for Success

- Have an SOP and Share it
  - Mutual Aid SOP
  - Get People
  - Organize
  - Get as Plan
  - Go to Work



Case study

- Cullum Towers
- 15 stories Fire Resistive
- Fire reported in 14J
- Was actually in 14F
- 1 fatality
- Regional companies at another fatal fire in UC

Case study

- 1st line stretched short (wrong stairwell due to wrong location
- Elevator issues
- Gated wye issues
- Communication issues
- Wind-driven fire (apt., door left open / windows failed
- 19 FF's burned

Lessons learned

- Operations go nowhere without organization
- SOP's unfollowed not worth paper written on
- Extensive SOP revisions
  - Elevator guidelines reinforced
  - Standpipe control firefighter
  - Revised equipment protocol

Firefighting Concerns

- Personnel Requirements
  - 4-6x greater than usual
  - Command support
  - Tactical reserve
    - Operating
    - Staged
    - Rehab
  - Solid mutual aid pact
    - Automatic aid
    - Interagency SOP

Firefighting Concerns

- **Ventilation Difficulty**
  - **Beyond reach of OV ops**
  - **Wind-driven fire**
    - **Check wind direction & strength from floor below before venting**
  - **Flying glass hazard**
    - **Perimeter control – ground ladders protect supply line**

Firefighting Concerns

- Stratification of Smoke
  - Heat in smoke lost to surrounding areas
  - Will cease to rise
  - Difficult to vent
    - PPV
    - HVAC (Liaison with building engineers)

Firefighting Concerns

- **Stack Effect**
  - Caused by temperature differentials
  - Causes air (& smoke) to move in undesired directions
  - Use experimental openings before venting
  - Hi-hi or Low-lo is a No-No

Firefighting Concerns

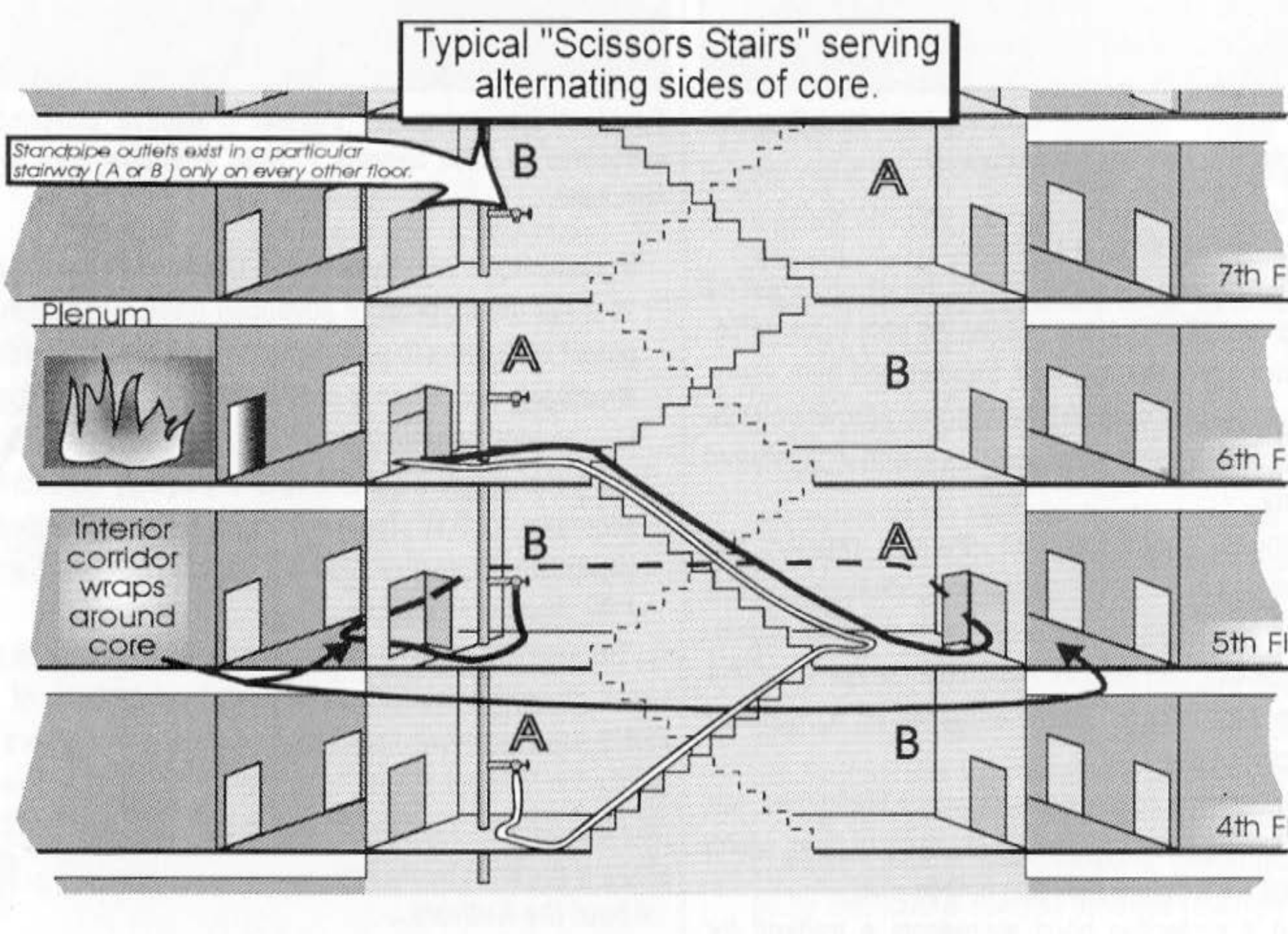
- Stack Effect
- Summer Stack Effect
  - Hi temps / upper floor fire
  - Heavier cooler (AC) air will sink
  - May pull smoke into shaft and to lower floors

Firefighting Concerns

- Stack Effect
- Winter Stack Effect
  - Lo temps / Low floor fire
  - Warmer, heated air will rise in shafts
  - May pull smoke into shaft where it will rise

Firefighting Concerns

- **Scissor Stairs**
  - **Orientation problem**
    - **Stairwells alternate floor location every floor**
  - **Standpipe Concerns**
    - **Will be in a particular stairwell on *every other floor***
  - **All floors *MUST* be properly labeled**
    - **Preplan is critical**


Typical "Scissors Stairs" serving alternating sides of core.
Standpipe outlets exist in a particular stairway (A or B) only on every other floor.
B
A
7th F
Plenum
A
B
6th F
Interior corridor wraps around core
B
A
5th Fl
A
B
4th F

Source: WNYF

Firefighting Concerns

- Spalling Concrete
  - Caused by expanding moisture trapped in concrete
  - Direct flame contact
  - Use reach of stream to cool overhead
    - Vent opposite advance to exhaust steam generated

Firefighting Concerns

- Control of Building Systems
  - Communications
    - Communications center
    - Standpipe telephones
    - Dead Spots
    - Alternative communication
      - Cell phones / Text
      - Apartment phone kidnap
      - Runners

Firefighting Concerns

- Control of Building Systems
  - Elevators
  - HVAC Systems
  - Auxiliary Appliances
  - Fire Pumps
  - Building Maintenance

Firefighting Concerns

- Unsafe Aluminum Balconies
  - Often set in concrete
  - Aluminum melts at 1200°
  - Beware of balcony above fire
    - Spalling concrete / weakened balcony = stay away
  - Gravity never takes a day off

Firefighting Concerns

- Enclosed Parking Garages
  - Apparatus access concern
  - Vent concern
  - Exposures – the building
  - Know attack options - preplan

Firefighting Concerns

- Utility Control / Service Areas
  - Electrical closets
  - Elevator shafts and motor rooms
  - Gas Control Rooms
  - Communications closets
  - HVAC Control areas
  - Beware of outward opening hallway doors:
    - Look for vents

High Rise
Operations

Interior Fire Control Factors:

- ***C*ommand**
- ***R*escue**
- ***A*ttack**
- ***V*entilation**
- ***E*xtension Prevention**

"CRAVE"

Command

- Requires Expanded Command organization
- Establish control points ASAP
- Establish communications
  - Demand progress reports
- Control building systems
- Provide adequate Personnel
  - Additional RIC Teams
  - Tactical Reserve

High Rise Considerations for Success

- Have enough people
  - 3X rule
- Have enough Chiefs
  - Early control point establishment
  - Keep the kittens in the box
  - Span of control violations

High Rise Considerations for Success

- Maintain air supply
  - MSU gets key position at front
  - Additional alarm equipment assignments
  - Carts to move extra SCBA to Resource Division

  **F.A.Rs technology

- Avoid 2- ½ story tactics

Accountability

- Strong adherence to SOP's
- Strong Command presence
- Operational discipline
- Best accountability system obtained via
  - Strong command and control
  - Disciplined Officers and FF's
  - Solid and ENFORCED SOP

Firefighting Concerns

- Firefighter Fatigue
  - May have to walk up dozens of floors
    - Heavy equipment
    - Consider stairwell shuttle
  - Extreme heat
  - Be proactive with tactical reserve
    - Have relief ready to go beforehand

Hi-Rise Control Points

- Command Post
  - Building lobby or pre-designated area
  - Liaison with bldg personnel
    - Blue prints
  - Begin system control
    - Check annunciator
    - Silence alarms
  - Decentralize Command
  - Formulate strategy to control situation

Hi-Rise Control Points

- **High Rise Command Kit**
  - **Command Tool assists in organizing operations**
  - **Laminated clipboards and dry-erase markers**
    - **Control Point Area Guidelines**

Hi-Rise Control Points

- Command Company
  - Report to CP
  - Used to support CP activities
  - Utilized as IC sees fit
  - May be split up or kept as team
    - Assist in setting up FG organization
    - Initiate accountability procedures
    - Checking on building systems
    - Staff Control Point positions

Hi-Rise Control Points

- **Lobby Control Post**
  - **Headed by Lobby Control Officer**
  - **Gatekeeper of the access to operational areas**
  - **Responsible for directing and funneling crews from CP via proper artery to upper floor Control Points**
  - **Use status board to account for companies entering and exiting**

Hi-Rise Control Points

- **Elevator Control**
  - Staffed as per dept. SOP
  - Personnel & equipment shuttle between Lobby & Resource Post
  - Place in Fire Service control mode
  - Avoid overload

NEVER OPERATE HIGHER THAN 2 FLOORS BELOW FIRE

WARNING!!

NEVER TAKE ELEVATOR TO REPORTED FIRE FLOOR

Get off two floors below lowest reported fire floor

If below 6th floor, DON'T BE LAZY--WALK UP

Hi-Rise Control Points

- Elevator Control Procedures
  - Place car under fire service control
    - Press “Call Cancel” Button
  - During ascent
    - Check Emergency Stop button
    - Stop every 5 floors
      - Check layout, find stairwells
      - Recon shaft
      - Have forcible entry tools

Hi-Rise Control Points

- Operations Post
  - 1-2 floors below fire floor
  - 1st arriving Officer is Ops Chief until staffed by Chief Officer
  - Close proximity to attack stairs
  - Designate stairwells
  - 2 RIC Teams

Hi-Rise Control Points

- Operations Post
  - Report conditions to Command Post
  - Liaison with Lobby Control Officer
    - Safest access route to Ops Post
  - Bring strategy developed at CP to life
  - Operate on fire floor / floor above
    - Use of an Attack Director

Hi-Rise Control Points

- **Resource Post**
  - **1 floor below Operations Post**
    - **Jump-off Point for add'l alarm co's.**
    - **Personnel / equipment staging**
    - **Coordinate Personnel requirements with Ops Post, Command Post, and Search and Evacuation Post**
    - **Keep staffed with at least 2 Engines and 1 Ladder**
    - **Establish Rehab Post**

Hi-Rise Control Points

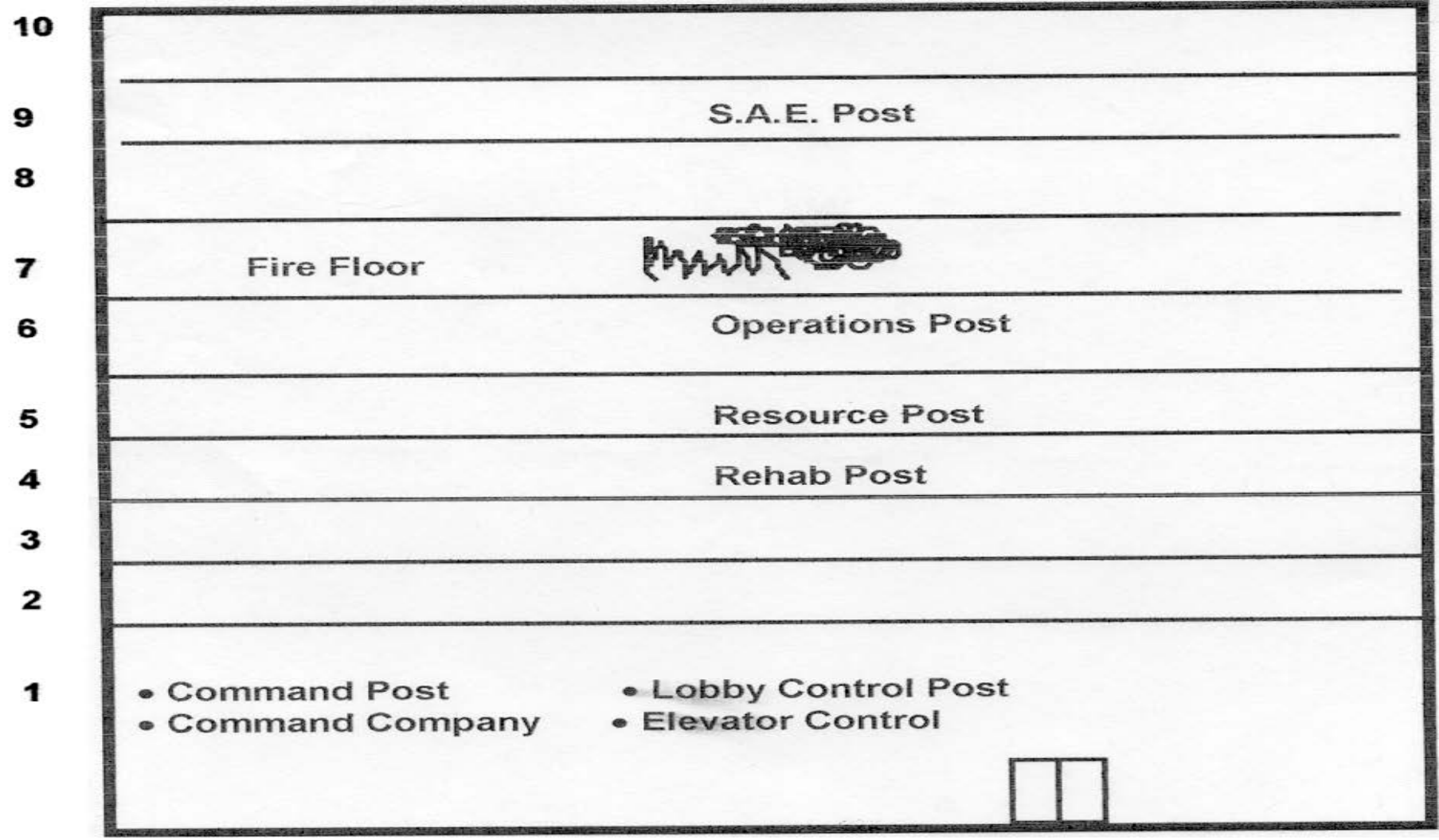
- Rehab Post
  - 3 floors below fire
  - EMS Division location
    - Medical monitoring of personnel
  - Resource Chief delegates supervision to EMS Chief or another Officer
    - Must use personnel tracking system

Hi-Rise Control Points

- Search and Evacuation Post
  - Est. in safe area above fire
    - Communications friendly
    - Near elevators (Sky Lobby / Blind shaft)
    - Standpipe telephones
    - Extra SCBA
  - At least 4 companies at all times
    - Split into 2 company teams

Hi-Rise Control Points

- Search and Evacuation Post
  - Responsible for ops (recon) 2 floors above fire to roof
  - Stay cognizant of ops on fire floor and floor above (monitor radio)
  - Determine evacuation vs. P.I.P.
  - Coordinate upper floor and roof vent ops with Operations Post



- **Suggested operational areas – 7th floor fire**

Search Considerations

- Recon all areas of operation
- Determine evacuation stairs
- Primary / secondary search on fire floor & Floor above
  - Check layout of lower floor
- Decide evacuation vs. P.I.P.
- Coordinate w/ attack operations
- Lifeline / T.I.C.

Search Considerations

- R.A.T.S
  - Rapid Ascent Teams
  - Quickly access and clear the stairwells in the attack stairwell above the fire.

Life Safety Concerns

- **Control of Occupants**
- **Evacuation….if possible**
  - **Fire Area / Fire Floor / Floor Above**
  - **Establish evac stairs**
  - **Consider Horizontal evacuation**

High Rise Considerations for Success

- Extent of Protection in place
  - Fire Area PIP (as per conditions)
  - Horizontal Evac
  - CO meter considerations
- Stairwell designation
  - Attack and vent usually the same due to fire door issues
  - Evac furthest away from fire
  - Cannot be a secret – notify all ASAP

High Rise Considerations for Success

- Be wary of what's Behind Door #1
- Scout out the fire
  - Wind-created hazards (fireballs)
  - Simulate attack conditions on the floor below
  - Check floor below for orientation

Attack Considerations

- Primary / secondary water supply
- Assign Standpipe Control-floor fire
  - Interior pump operator
- Supply auxiliary appliances
- Utilize attack stair
  - Floor below hook-up
- Back up each attack line
  - Fire floor and floor above
- Coordinate with support ops

Attack Considerations

- Wind-driven fire tactics
  - (Blast Furnace hallway)
    - Breach adjacent wall
    - Master stream (if in reach)
    - Portable deluge set
    - Use 2 lines (fog and solid)
      - Reverse flow of gases
      - PPV
    - Fire Curtain
    - Controlled Burn

High Rise Considerations for Success

- Practice risk management
  - Can't make apartment situation
  - Controlled burn
- Don't get hemmed into one game plan with your attack
  - Resource types should anticipate escalating conditions
  - Go BIG

Ventilation Considerations

- Check fire reaction when venting
  - Test effect on floor below
  - Bulkhead door opening
- Consider stack effect
- Coordinate with attack operations

COMMUNICATE

Extension Prevention

- Shut down HVAC
- Recon all areas for vertical and horizontal fire travel
  - Utility closets
  - Incinerators / Compactors
  - Elevator shaft
  - Kitchens / Bathrooms
- Be prepared to fight fires in areas remote from main fire

Conclusion

- Preplan / SOP
- Personnel
- Expanded Command Structure
- Operational Coordination
- Accountability
- Safety

Expect / Be prepared for problems