

The Impact of Air Movement on High-Rise Commercial Fires

COURSE EXAMINATION

- 1) Why is it important to understand where the air is going in a high-rise incident?
 - a. Allows the incident commander (IC) the probable location of a flow-path
 - b. Gives the IC a better idea of where the smoke and toxic gases also may be going**
 - c. So that the truck company knows which windows to ventilate
 - d. All of the above
- 2) If you understand how a building behaves and breathes, you will have a firmer grasp on where the problem areas are going to be and where the danger zones are within the confines of the building
 - a. True**
 - b. False
- 3) You can minimize or even avoid potential casualty counts just by knowing how the _____ will be acting during the fire
 - a. Smoke
 - b. Fire gases
 - c. IC
 - d. Building**
- 4) Air balancing is directly associated with the concept of:
 - e. Stack effect**
 - f. Neutral pressure plane (NPP)
 - g. Flow Path
 - h. None of the above
- 5) When cold weather, air is rushing _____ into the tower from the _____ of the building
 - a. Down, Top
 - b. Up, Bottom**
 - c. Down, Bottom
 - d. Up, Top
- 6) What building feature in newer high-rises seals the building like an envelope?
 - a. Energy Efficient Windows
 - b. Automatic fire doors
 - c. Curtain walls**
 - d. Draft stops
- 7) Combined wind pressure and thermal differential may shift what in the building?
 - a. NPP**
 - b. Flow Path
 - c. Fire gases
 - d. None of the above
- 8) In the negative-pressure range of the building, the air is “pulled” into the building; in the positive-pressure range, the air discharges or “leaks” to the outside
 - a. True**
 - b. False
- 9) What impact does heating ventilation and air conditioning systems (HVAC) have on the NPP?
 - a. Reduces air movement into the building
 - b. Brings more air into the building than is exhausted to the outside**
 - c. Raises the NPP in center core buildings
 - d. All of the above
- 10) The air balance and NPP in a building shift up or down from the theoretical NPP midpoint in the building when air is moving horizontally as a result of wind pressure and thorough leakage on nearly every floor
 - a. True**
 - b. False
- 11) In super tall high-rises during cold weather, the velocity of air channeling into the core from lower floors and lobby doors can be high enough to prevent which type of doors from opening or closing?
 - a. Fire doors
 - b. Office doors
 - c. Elevator doors**
 - d. Entrance doors
- 12) What could be the consequence of compromising one or both stairs on the fire floor with an upward draft on the NPP during cold weather?
 - a. Stabilization of the NPP
 - b. Turning both stairwell shafts into smoke towers, thereby endangering fleeing occupants**
 - c. Overpressure of the attack stairs
 - d. None of the above
- 13) With regards to the Stack Effect, a commercial high-rise building is analogous to a _____ as the core shaftways are flues and the lobby entrances are dampers
 - a. Chimney**
 - b. Smokestack
 - c. HVAC
 - d. None of the above
- 14) Even poor firestopping on core ‘poke-throughs’ such as cable risers can feed the vertical air flow going up or down within the core area
 - a. True**
 - b. False
- 15) What common fire gas should be tracked as part of the overall scope of the IC process at high-rise fires?
 - a. HCN
 - b. CO₂
 - c. CO**
 - d. O₂
- 16) On a hot summer day, the _____ cool interior air will be rushing _____ of the vertical shafts below the NPP and on the lower-level floors
 - a. ascending, out
 - b. descending, in
 - c. ascending, in
 - d. descending, out**
- 17) Which of the following is a way to control the Stack Effect?
 - a. Leave the building HVAC system on and allow it to maintain positive pressure to floors above and below the fire
 - b. Provide supervision for the lobby entrance doors
 - c. Keep ground-level doors closed
 - d. All of the above**
- 18) Which of the following is another way to control the Stack Effect?
 - a. Mechanically pressurize stairwells with fire department fans
 - b. Send elevator cars to the second floor and place in the ‘Hold’ position
 - c. Ensure stairwell doors on the floors in the negative-pressure zone are closing behind fleeing tenants and are not oscillating in the open position
 - d. All of the above**
- 19) During cold weather, the IC should expect rapid smoke spread to the upper floors from fires on the lower floors
 - a. True**
 - b. False
- 20) During hot weather, the IC should expect fires on the lower floors to contaminate several floors below the fire and possibly the lobby command post
 - a. True**
 - b. False