



## **FIRE RISK MANAGEMENT, INC**

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# **Memo Report**

**From:** W. Mark Cummings, P.E.  
**To:** Mr. Skep Reske, IDC Construction, LLC  
**CC:** Mr. Greg Sams, IDC Construction, LLC

**Subject: Review of Need for Smoke Dampers in Basement Level Corridors**

As requested, Fire Risk Management, Inc. (FRM) has performed a review of the information that was provided with regards to the potential need to install smoke dampers in one or more of the ventilation ducts installed at the Basement Level of the Westin Hotel at 157 High St. in Portland, ME.

### Background

The Corridors in question are those that are located within the Basement Level of the building and are used to provide access to the exits; as such are termed “egress access corridors.” It has been indicated by IDC that the City’s Code Enforcement Officer has raised questions about the installation of return (or exhaust) air ducts that facilitate the movement of return air from a number of rooms into the corridor(s); whereby the air is then picked up by the exhaust air ducts that remove air from the corridor (return air grills installed in corridor ceiling). The apparent concern by the City is the fact that smoke from a fire located within one of these spaces would be able to move directly to the corridor via the exhaust/return air duct. As such, it was apparently stated that the codes (IBC and/or the Life Safety Code) would require that a smoke damper be installed in these ducts.

### Discussion

Having reviewed the specifics of the planned ventilation system design, it is agreed that there is a problem with code compliance, albeit not one involving a requirement for smoke dampers. It is understood that IDC has been treating all exit access corridors throughout the building as being constructed using “smoke resistant” barriers; effectively calling them “smoke partitions.” However, this proposed approach is actually “above & beyond” the actual code requirements for this application/occupancy. The general requirements within the Life Safety Code that address “Exit Access Corridors” [NFPA 101 – 7.1.3.1] do include a requirement that for areas serving more than 30 occupants, they must be separated from the rest of the building by 1-hour fire rated barriers; unless otherwise allowed by the other chapters of that code. The various areas located within the Basement level of this building are classified as “Business” occupancies. As outlined in Chapter 38, Business Occupancies, of this code; when the building is fully protected by an automatic sprinkler system, there is no specific rating applied to the corridor walls (or ceiling); either for fire or smoke resistance [ref. paragraph 38.3.6.1(3)].

The above requirements are very similar to those listed in the IBC; section 1018.1 [ref. Table 1018.1]. However, it is also this section of the IBC that then poses a problem for the current ventilation system design for this area. The IBC prohibits the use of corridors as “return air plenums”, which is how they are being used in the current IDC design; for those instances where a corridor is directly connected to an adjacent space via a exhaust/return air duct. However, in this instance the codes do allow the space that is above the ceilings of corridors to act in the capacity of a return air plenum [ref. 1018.5.1]. If the ventilation system

design was modified to utilize the space above the ceiling to facilitate return air movement, this area then becomes code compliant.


### Summary and Recommendations

It is understood that there have been a number of issues that have arisen in the past regarding the requirements for the various corridors throughout the building; regarding just what sort of fire and/or smoke ratings are required for each. In this instance, it was a decision within the IDC Team, not a code requirement, to protect all corridors that provide access to exits with barriers/partitions that, as a minimum, can resist the passage of smoke. Many of the corridors that are currently designated as being “smoke partitions” within the building design plan would not be required by the codes. This includes the corridors of interest at the Basement level. As such, there would be no requirements for any penetrations in the corridor walls or ceilings to be provided with smoke dampers. However, it is also true that the current design of the ventilation system within these areas (corridors) is not code compliant.

As discussed in our recent onsite meeting, it is recommended that the ventilation system design be modified such that all transfer of return air occurs within the space above the ceilings of the corridors; e.g., ducts from the spaces where air is being exhausted should terminate in the space above the ceilings and not within the corridors. This modification to the ventilation system design will not only remove any questions regarding the potential need for smoke dampers, but will make this area fully code compliant.

As an “aside” to this review, please also note that during my review of this issue, I also noted areas where the ventilation design was erroneously indicating a need for fire dampers, such as from bathrooms, elevator machinery room, etc. You should ensure that you review the ventilation drawings in detail, in comparison to where fire rated barriers are actually required, such that you do not spend money installing fire dampers where they are not required.

If you have any questions regarding what has been outlined above, please don’t hesitate to contact me.

  
W. Mark Cummings, P.E.  
Principal Engineer