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The Cold Lobby

KEEPING THE COLD OUT AND KEEPING WARM INSIDE

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Winter is here and there are many buildings that struggle to keep the cold air out. One building type that enjoys a gush of cold air whenever the exterior doors open is a building with a tall atrium. When the tall atrium is also used as a main entrance, the occupants of the atrium may be cold when the outside temperature drops.

Imagine for instance a new university library with a five story main entrance atrium. The main entrance has a large vestibule with automatic sliding doors that are operated using motion sensors. The vestibule doors are spaced about 10 feet apart with cabinet unit heaters for heating. Now also imagine that the entrance has very heavy traffic. Additionally imagine that the floor area of the atrium is used for an information area and reading area for library patrons.

How will the above building function in cold weather? The answer is poorly when there is heavy traffic in and out of the building. Both sets of sliding entrance doors will be open simultaneously under heavy traffic conditions. This will allow the cold outside air to breeze through the entrance vestibule and into the atrium, chilling the occupants. Usually an atrium like this has portable electric space heaters pressed into service on the coldest days to give those that have not stayed out of the space some comfort.

What can be done to correct or avoid this problem?

The entrance vestibule length can be extended and multiple air curtains or other means of heat can be added. The intent of lengthening the vestibule will be to minimize the amount of time both sets of vestibule doors are open simultaneously. The other intent of lengthening the vestibule is to allow the cold outside air to be brought up to room temperature before it is introduced into the atrium area. The building HVAC system can also be designed to provide positive air pressure to keep the cold air out but there are limits on this approach. These steps can help the situation but do not always cure the problem.

Another alternative is to install an automatic revolving door with entrance vestibules on either side of the revolving door. One entrance vestibule has automatic doors and the other entrance vestibule has manual doors. The automatic revolving door will be very good at controlling the amount of cold outside air that enters the building.

The revolving door is the entrance that needs to be used by the majority to keep the inside warm. The entrance vestibule with the manual doors will also be good at minimizing the amount of outside air that enters the building as most people will not want to use the manual doors. The vestibule with the

automatic doors has some subtle features to discourage use by those that can use the other entrances. The doors are controlled by separate push buttons. No motion sensors. To use the automatic doors to enter the building one has to push the button for the outer door to open. Only one leaf of the door opens. One then needs to walk into the vestibule and then walk off the traffic pattern to push the second button for the inner door. The idea of the push buttons is to make it inconvenient for people to use the vestibule with automatic doors and attempt to limit the time when both sets of doors are open simultaneously.

To summarize, the following are related factors for keeping the cold air out and keeping occupants of lobbies comfortable in the winter:

Cold air: Cold air is heavier than warm air. The cold air easily displaces warmer air in buildings. Everybody has experienced the cold rushing past your ankles when you open the front door of your house.

Building height: This is a tricky one to explain. The fact to remember is that as the building gets taller, the cold air will rush in quicker. Tall buildings with interior atriums are the worst because there is very little resistance to the outside air.

Vestibules: These are a very good idea, especially if there is seating in the lobby. If there is no vestibule, the cold air has a straight shot into the occupied space.

Air Curtains: Air curtains are sometimes advertised as having the ability of keeping cold air out. In some conditions this may be the case. It is better to think of an air curtain as an outside air pre-heater. Air curtains with steam heating coils pack the biggest punch at pre-heating the cold outside air.

Building Use: If the building will have periods of high entrance/exit traffic, such as a Church or Medical Facility, the heating system and entrance configurations will need careful study. In climates with extended periods of cold weather, seating areas near the entrances may not be practical.