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***“Navigating the Building Code Minefield”***

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It has been many years since a fire station; or any building for that matter, could be erected with only a passing thought being given to code compliance. But as the technologies change and the building industry learns more about building safety and the fire sciences, the Building Code Minefield becomes more and more difficult for an owner to navigate.

With the adoption of the International Building Code as the basis of the North and South Carolina Building Codes, the importance of having a basic working knowledge of some of the more common code issues that will effect the construction or renovations of your station is again emphasized. In this article, we will try to make you aware of many of these common issues to help you as you communicate with you design professional and help prevent an accidental wrong step that might be a land mine in your building project.

The first concept to understand from the code is the idea that a fire station consist of several different uses, referred to as occupancies. We will typically see either three or four occupancy classifications in most fire stations. The first is your apparatus bay which is a Storage (S2) occupancy, treated no differently than an enclosed parking garage. The second is the Sleep Rooms which will fall into a residential classification (R2), the third is the Office / Administrative portion of the fire station which will be classified as Business (B) and the last is any training, community or other assembly space that will hold 50 or more persons, this is known as an Assemble (A3) occupancy. Rooms holding less than 50 persons can normally be classified as part of the previous Business occupancy, an example being a typical conference room. I know each of you are thinking “This is exciting!, but an article about new carbon monoxide detectors would be more interesting”; stick with me on this. The reason I explain all of the occupancies, is that these are the basis for many of the code issues that will be discussed.

Each of the above occupancies are treated with differing requirements by the code, and also require planning to be sure that the overall facility does not exceed the maximum size as allowed for by the code. When it comes to the different occupancies, the design professional will have two choices which will effect the flexibility and cost of your building. If the overall size of the building or the individual occupancy components do not get to large, you have the option of building a facility that is a “non-separated mixed use” facility, or in simpler terms a facility that fits into the size and construction requirements of the most stringent occupancy. The other option is to separate the different uses with fire resistant (rated) walls ranging from 2 to 3 hours and providing rated doors and openings between these spaces. If looking only at the economy of materials and door systems, and the new facility can meet the size requirements to be “non-separated” their may be some cost savings with the “not-separated” route and it may also have the added

benefit of allowing more flexibility. But do not get your hopes all the way up, even if you can discard all of your rated walls above, the code will throw some specific wall rating requirements at you that you will not be able run from. We will discuss several of these in the following sections.

In the apparatus bay (S2) a 2 hour fire resistant separation will always be required between the vehicles and the remainder of the facility due to the inherent dangers of the equipment parked there. Not only will the apparatus bay always have the 2 hour rated wall separation, but because it is considered an enclosed parking garage, it will have several other requirements. If the apparatus bay is over 5000 sq.ft. (this is around 4 double stacked bays if you consider a 20' wide standard individual bay) the entire bay will have to be constructed with fire sprinklers. Another is that the bays will have to have automatic ventilation for both carbon monoxide build up and for exhaust fumes (NFPA). Your designer can assist you with the different options available for these ranging from *PlymoVent* type systems to using building mechanical systems. If any of your vehicle bays are going to be for repairs, continuous ventilation requirements will need to be addressed along with the above.

Corridors in the residential or sleep room portion of the project (R2) may have to be constructed with 1 hour fire resistant construction protecting it from the adjacent spaces. This is governed by how many people the corridor will serve, also know as the occupant load. The bed rooms themselves also need extra exits! The code states that “in addition to the *typical entry / exit door*, sleeping rooms...shall have one exterior emergency rescue opening...” What this means is that from any sleep room, we have to have two ways to get out. One can be the doorway into the corridor and the other an exterior window meeting specific code requirements. If the bed room is on an interior wall and does not have direct access to the outside, you will need a 1 hour rated corridor to lead you to two different exits. One common design today is dorm type rooms with either multiple beds in one room or beds separated by partial height walls for privacy. Each of these dorm spaces, as a whole, will require multiple exists the same as the single bed room design. Several other requirements to keep in mind will be the requirement for carbon monoxide detectors and alarm strobes in each sleeping area or room.

The corridors in the Office areas (B) have a similar requirement as the residential for a 1 hour fire resistant rating, the difference is that it can serve more people before the requirement kicks in. The kitchen in the station falls under the Business portion of the facility, also. Where previous versions of the building code in many cases allowed residential kitchen appliances in the fire stations without requiring full commercial kitchen hoods, the new code requires these to be installed over all cooking appliances used for commercial purposes. (*Commercial purposes* is currently is defined to include fire stations)

When you start looking at the Assembly spaces (A3) in your facility remember that this includes ANY space that you would congregate 50 or more persons. Examples of these spaces are training rooms, community rooms and even possibly even weight rooms. Again, the requirement of fire rated corridors will come into play in this area. Also exits will play a larger role in planning these areas. Rooms used for large groups will often have to have a minimum of two exits from each room, possibly more depending on the size of the room. Also, if any of the doors will provide exiting for 50 or more people, the

door will have to swing out of the room it is serving instead of swinging into the room as most interior doors do.

We will now move away from specific areas of the fire station and discuss some general requirements. All fire stations will require storage. There are two types of storage spaces other than the larger storage occupancy such as the apparatus bay, these are: incidental and accessory. Incidental storage spaces are the storage spaces in the building that you need in the facility but are NOT directly related to the main activities, an examples of these might be a storage room for lawn maintenance equipment. Incidental storage spaces over 100 square feet in size are required to be separated from other areas by 1 hour fire resistant construction. The other storage type, accessory, is a storage space that is specifically related to the adjacent activity, a common example would be the storage room for tables and chairs directly adjacent to a training room. This space will NOT have to be separated by fire resistant construction, as long as the combined size of all the accessory spaces does not exceed 10 percent of the entire facility floor space.

Another common adjacency that may require separation, depending on the view of the local building inspector, is the possibility of a satellite police substation. We see many communities considering this as way to meet additional needs, without building additional facilities, this arrangement; however, may require a tenant separation wall of 1 hour fire resistant construction.

Site constraints or program needs forcing you to go two stories with your new station? If you are considering a two story facility, go ahead and plan on the cost and space requirements of an elevator, along with the stairs! We have reviewed this with the state, and even though there is an ongoing discussion concerning this, currently the requirement for elevators is in force. The reasoning is that the upper level needs to be accessible, even if it is an area of the station with bunks rooms only for line firefighters. There is the real possibility that a temporary injury might affect a firefighter, where he may still pull duty and use the upstairs. Also, with many stations serving as shelters during emergencies or natural disasters, others besides the firefighters may need access to these spaces.

Another item to consider if you have multiple levels (in some jurisdictions this may consider any storage mezzanines) is that these may be required to have an “area of rescue assistance”, spaces large enough for a person in a wheelchair to seek refuge for a 1 hour period to await rescue. This space is needed when a person does not have direct access, without stairs or elevators to a safe passage out of the building. The area of rescue assistance also requires a two way communication system to notify firefighters of an individual requiring assistance or rescue.

These are just a small number of the major areas of the new code that will play an important role in your next building project, it is important to view the new code as a tool to help with your new facility and not a hindrance to meeting your needs or the design. This new code has many options on how to address different situations, as fire sprinkling the entire facility will change the dynamics of many of the requirements discussed above. You as the owner and end user will be able to communicate more affectively with your design professional, will have a better facility and better chance avoiding some of the major building code land mines that have the potential of derailing your next project if you are aware of the major requirements and how they affect you.