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New Requirements for College Dorms

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Question: **We have recently submitted a proposal to provide a fire alarm system for a new dormitory that a nearby University currently has in the planning stage. Sadly, the local Authority Having Jurisdiction rejected our proposal stating we did not comply with the latest edition of the *International Building Code.* We had proposed a fire alarm system with audible and visible notification appliances throughout the hallways and public areas of the facility with initiation by manual pull stations, corridor smoke detectors, and automatic sprinkler system waterflow. We also provided single-station smoke alarms for each sleeping room. Where did we go wrong?**

As happens from time to time, various codes and standards introduce new requirements based on real-world experience. One such new requirement has arisen in the *International Building Code. IBC-2012* now includes this requirement:

> **907.2.9.3 Group R-2 college and university buildings.** An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group R-2 college and university buildings in the following locations:
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> 1. Common spaces outside of dwelling units and sleeping units.
> 2. Laundry rooms, mechanical equipment rooms, and storage rooms.
> 3. All interior corridors serving sleeping units or dwelling units.

> Required smoke alarms in dwelling units and sleeping units in Group R-2 college and university buildings shall be interconnected with the fire alarm system in accordance with NFPA 72.
>
> *Exception: An automatic smoke detection system is not required in buildings that do not have interior corridors serving sleeping units or dwelling units and where each sleeping unit or dwelling unit either has a means of egress door opening directly to an exterior exit access that leads directly to an exit or a means of egress door opening directly to an exit.*

As you can see from this requirement, simply providing single-station smoke alarms within each sleeping unit—as you had specified in your proposal—no longer meets the requirement. The smoke alarms must now interconnect with the building fire alarm system. The question remains as to whether or not the new requirement expects this interconnection to initiate an alarm signal and, thus, initiate evacuation of the building—or relocation within a building to an area of refuge where the Emergency Plan for the building calls for such relocation.

One side of the argument states that when a smoke alarm actuates within a sleeping unit, because of the significant potential for loss of life, that smoke alarm should initiate the evacuation or relocation procedure by transmitting an alarm signal to the fire alarm system control unit. The other side of the argument states that because of the potential for a large number of unnecessary (false) alarms within the sleeping units of a college or university dormitory sleeping room, the smoke alarms should initiate a supervisory signal at the fire alarm system control unit that would prompt someone to investigate the cause.

I can find no official clarifying interpretation from the International Code Council on this matter. Therefore, you should ask the local Authority Having Jurisdiction (AHJ) to state which type of signal the AHJ wants the smoke alarms to transmit to the fire alarm system.

To further clarify, *IBC-2012* requires the following with regard to smoke alarms:

907.2.11 Single- and multiple-station smoke alarms. Listed single- and multiple-station smoke alarms complying with UL 217 shall be installed in accordance with Sections 907.2.11.1 through 907.2.11.4 and NFPA 72.

907.2.11.2 Groups R-2, R-3, R-4 and I-1. Single or multiple-station smoke alarms shall be installed and maintained in Groups R-2, R-3, R-4 and I-1 regardless of occupant load at all of the following locations:

1. On the ceiling or wall outside of each separate sleeping area in the immediate vicinity of bed rooms.

2. In each room used for sleeping purposes.

   Exception: Single- or multiple-station smoke alarms in Group I-1 shall not be required where smoke detectors are provided in the sleeping rooms as part of an automatic smoke detection system.

3. In each story within a dwelling unit, including basements but not including crawl spaces and uninhabitable attics. In dwellings or dwelling units with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

907.2.11.3 Interconnection. Where more than one smoke alarm is required to be installed within an individual dwelling unit or sleeping unit in Group R or I-1 occupancies, the smoke alarms shall be interconnected in such a manner that the activation of one alarm will activate all of the alarms in the individual unit. Physical interconnection of smoke alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm. The alarm shall be clearly audible in all bedrooms over background noise levels with all intervening doors closed.

907.2.11.4 Power source. In new construction, required smoke alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source and shall be equipped with a battery backup. Smoke alarms with integral strobes that are not equipped with battery back-up shall be connected to an emergency electrical system. Smoke alarms shall emit a signal when the batteries are low. Wiring shall be permanent and without a disconnecting switch other than as required for overcurrent protection.

Exception: Smoke alarms are not required to be equipped with battery backup where they are connected to an emergency electrical system.

You will find the referenced requirements for the use of smoke alarms in residential occupancies in NFPA 72-2010, *National Fire Alarm and Signaling Code*, Chapter 29. Also be

aware that as this article goes to press, NFPA will have released an updated version of this *Code,* specifically, NFPA 72-2013.

Don't forget to make provision for visible notification whenever it may become needed at some future occasion in each sleeping room, in order to comply with this requirement in *IBC-2012:*

> **907.5.2.3.4 Group R-2.** In Group R-2 occupancies required by Section 907 to have a fire alarm system, all dwelling units and sleeping units shall be provided with the capability to support visible alarm notification appliances in accordance with Chapter 10 of ICC A117.1. Such capability shall be permitted to include the potential for future interconnection of the building fire alarm system with the unit smoke alarms, replacement of audible appliances with combination audible/visible appliances, or future extension of the existing wiring from the unit smoke alarm locations to required locations for visible appliances.

Notice that this requirement offers three possible ways to provide "the capability to support visible alarm notification appliances..." namely:

1. The potential for future interconnection of the building fire alarm system with the unit smoke alarms
2. Replacement of audible appliances with combination audible/visible appliances
3. Future extension of the existing wiring from the unit smoke alarm locations to required locations for visible appliances

Many contractors solve this problem by making provision in the design of the sizing of fire alarm system main or ancillary power supplies to account for the ultimate installation of visible notification appliances in each sleeping room and by installing the actual wiring to each room. However, *IBC-2012* does not require that specific action as long as the contractor can relatively

easily add the necessary ancillary power supplies and also relatively easily extend necessary wiring in the future.

For ultimate simplicity, just the same, many contractors will forgo the installation of smoke alarms in the sleeping units choosing to install system smoke detectors with sounder bases and programming the fire alarm system control unit to sound an alarm within the specific sleeping unit when that unit's smoke detector actuates. They will further study the character of the construction of the building and make provision for adding the necessary wiring for visible alarm notification appliances based on the type of construction. In some cases, they will install easy access to wiring trunks so they can easily add drops to serve the visible notification appliances when needed. In other cases, they will actually install wiring to each sleeping unit and terminate that wiring in a location appropriate for a visible notification appliance.

I applaud the University that they have determined to carefully plan this new dormitory before construction begins. Even though this rejection of your initial proposal has presented a momentary annoyance, the fact that you have sought some help means your revised proposal will likely put you on top of this matter.

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