Interfacing for Fire Safety

by Dean K. Wilson, P.E.

Question: **The company I work for does not have special expertise in fire alarm system installation. Rather, we operate as a general electrical contractor supplying a wide range of electrical installation services. Yes, we do install fire alarm systems. But, we rely on the fire alarm design of the engineering firm hired by the architect.**

From time to time this has gotten us into trouble. More and more we find that so-called "design professionals" do not really have expertise in the subtleties of NFPA 72-2007, *National Fire Alarm Code*.

Our most recent project consists of the restoration of a historical auditorium. What kind of interfaces to other systems should we prepare to have the fire alarm system provide?

Answer: I certainly understand your dilemma. Seldom does an architectural firm hire a licensed fire protection engineer to design a comprehensive fire safety system. Such a system would include the fire alarm system and a whole range of other systems interfaced to that fire alarm system. In the space allotted to this column, let me try to address a few of those interfaces, and then highlight one in particular. Note that in the following text, the parenthetical references give some representative relevant sections from NFPA 72-2007, *National Fire Alarm Code.*

Naturally, in addition to providing fire alarm initiation from manual fire alarm boxes, heat detectors, and smoke detectors, the fire alarm system may have to receive fire alarm and supervisory signals from other fire protection systems installed in the restored auditorium. These

may include automatic sprinkler systems and special hazards extinguishing systems for such hazards as any kitchen range hood, deep fat fryer or from some type of flammable liquids storage area within the auditorium building.

Typically the fire alarm system would receive alarm signals from the actuation of the automatic sprinkler system or other extinguishing system (see 6.8.5.5 and 6.8.5.7). The fire alarm system would also receive supervisory off-normal signals and supervisory restoration-to-normal signals from automatic sprinkler system control valves tamper switches and low building temperature initiating devices (see 6.8.5.6 and 5.15).

If the protection for the auditorium includes a dry pipe sprinkler system, preaction sprinkler system, or deluge sprinkler system, the fire alarm system may also receive supervisory off-normal and restoration-to-normal signals from dry pipe valve high or low air pressure, loss of deluge or preaction supervisory pressure, or low building temperature in the dry pipe valve closet. If the project includes private water supplies, the fire alarm system may receive supervisory off-normal and restoration-to-normal signals from water tank level and temperature, or from fire pump running, fire pump controller trouble, or from low public water pressure—all depending on the particular circumstances of the installation. (See 5.15.3, 5.15.4, and 6.8.5.9.)

The fire alarm system may also interface with the auditorium's heating, ventilating, and air conditioning system (HVAC) to meet the shut-down requirements of NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems* (See 6.16.5).

The fire alarm system may actuate a smoke and heat vent installed in the ceiling of the backstage area. The fire alarm system may actuate the closing of a special fire retardant curtain to separate the backstage area from the audience area of the auditorium.

The fire alarm system may interface with any elevators in the building to provide for elevator recall and elevator shutdown as specified in ANSI/ASME A17.1, *Safety Code for Elevators and Escalators* (see 6.16.3 and 6.16.4).

The fire alarm system may provide an interface with the building security system to unlock locked doors during an emergency (see 6.16.7). More likely, the fire alarm system may provide an interface to release certain fire doors or smoke barrier doors (see 6.16.6). The fire alarm system may also provide an interface to audibly mark the locations of exits (see 6.16.8).

In addition to these somewhat generalized interfaces with the fire alarm system, in places of public assembly, such as your auditorium project, the *International Building Code*, 2006 edition, also requires that a minimum level of illumination be provided for aisle accessways in Group A occupancies. The Code specifies in 1006.2 that the level of illumination not be less than 1 candela (1 foot candle or 11 lux) when measured at the walking surface. An exception permits auditoriums, theaters, concert or opera halls, and similar assembly occupancies to reduce that level of illumination of aisle accessways during a performance to a minimum of 0.2 candela (0.2 foot-candles or 2.15 lux) providing that an interface with the fire alarm system protecting the space restore the lighting system to the required level of illumination upon actuation of an alarm signal.

So, the fire alarm system you install in your restored auditorium must interface with the lighting control system to meet this requirement of the *International Building Code*, or whatever similar requirement may exist in the building code that applies to your particular jurisdiction.

Fire alarm systems provide a host of valuable building safety services, in addition to detecting the presence of a hostile fire and warning occupants and emergency responders. By interfacing properly with other building systems, the fire alarm system helps make the building safer both before and during a fire emergency.

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