Chapter 15

Fire Alarm/Security

*A*n automatic fire alarm system-FAS (typically made up of smoke detectors, manual pull stations, audible and visual warning devices, and a fire alarm control with remote notification capability) can provide early warning of a developing fire. In all situations, the installation of such a system is for the primary purpose of life safety. When a fire strikes, instant detection coupled with a prompt and suitable action is vital if the safety of people and property is to be maintained. It is recommended that system inspection and testing be scheduled monthly or as required by national and/or local fire codes. Adequate written records of all inspections should be kept.

Given these parameters, along with the fact that FAS have advanced over the past several years from hardwired to multiplexed to computer controlled, a question confronting building owners is: "do we want to have this system stand alone or do we want to combine the FAS with an EMS."

Points to keep in mind while addressing this issue include:

1. Has the microelectronics and local area network (LAN) data communications industries advanced far enough in reliability to allow the combination of two separate systems?

2. Will the response speed in reporting both the first fire alarm and successive alarms be compromised as the FAS and EMS both try to communicate at the same time with a central operators station?

3.   Will the same operator monitor both the EMS and FAS (FAS may require 24 hour per day monitoring)?

4.   Will the operator, who may have an excellent understanding of HVAC and the mechanical features of a building, also have equal expertise with the entire FAS?

5.   EMSs do not require the rigid attention and regular testing and maintenance that a FAS requires. Testing and maintenance of an FAS will have to be strictly adhered to.

6.   Will electronic malfunctions in the EMS affect the FAS?

7.   The communication protocol must be the same for both EMS and FAS. Individual manufacturers in each separate field do not share the same protocol; how can we expect manufacturers in separate fields to share this information?

A typical, modern day stand-alone FAS (depending on system design) may include the following:

- Intelligent, addressable smoke/heat detectors: intelligent means that analog information is reported in the form of a measured level of smoke, product of combustion, or the thermal measurement of each device. Addressable means that each device is continually reporting its type and status.

- Addressable manual alarm stations: used to manually initiate a fire alarm.

- Horns/strobes for audible/visual alarm notification.

- Control panel (microprocessor-based): this is the brain of a FAS. It provides power to the system and electronically supervises its circuits. The panel contains logic circuits that receive signals from alarm initiating devices and transmits them to alarm indicating appliances and equipment.

Depending on system design, a panel may:

- Provide audible signal sounds throughout the building.
- Provide automatic alarms to a fire department or to a central station, where a fire department can be notified.
- Shut down ventilation fans to prevent recirculation of smoke.
- Close doors to prevent the spread of smoke.
- Release fire extinguishing agents.
- Notify of water flow in a sprinkler pipe system.
- Return all elevators to first floor.
- Provide firefighters telephone system.
- Provide emergency audio evacuation communication.

Peripherals:

- Printer to provide hard-copy printout of all changes in status of the FAS. RS-232C interface.

- CRT monitor with keyboard that displays all changes in status of the FAS. RS-232C interface.

- Color graphics system displays floor plans, text message and flashing alarms of initiating devices.

The fire protection industry, like other industries, is finding big improvements in products with the use of more reliable electronic equipment. Microprocessor-based FASs can pinpoint fires faster because every addressable device is identified by location, priority, sensitivity and detector type. The system also can continue to operate without disconnecting an entire zone if a single detector fails.

Security systems, which are not necessarily involved with life safety, also rely on instant notification to a central operator station whenever an alarm device is activated.

Microprocessor-based systems bring many benefits to these systems as well:

- Reduced system hardware size (for a given number of zones).
- Reduced system cost.
- Easily reconfigured, modified, or upgraded system.
- Reduced wiring and installation costs.

Protection devices include:
- Magnetic contact switches
- Glass break detector
- Photoelectric beam detector
- Motion detector
- Microwave sensors that provide an alarm signal when motion is sensed within sensor range (30 Ft. 120 Ft. range).

In cases where security functions coexist within the system along with fire systems, the system response time requirements may be more stringent. Microprocessors have the power and speed, when properly programmed, to make the necessary split second decision for an automatic and reliable response to any type of conflagration or intrusion.