**Fire Detection Systems in the Intelligent Building**

Fire detection and the corresponding safety systems are crucial parts of an intelligent building. Billions of dollars are spent annually to install and maintain fire detection systems in buildings to assure safety from unwanted fires. New sensors will produce earlier and more reliable fire detection. Wireless systems will eliminate the need for cabling and offer opportunities for fire fighters to work out fire fighting strategies before arrival at the fire scene. Integrated building systems hold the potential for reducing false alarms, speeding building evacuation and assisting in fire fighting. These changes will create new ways to provide fire safety and new markets for fire detection, alarm and fighting systems.

New sensor technologies will be key components in the next generation of intelligent buildings. Current intelligent buildings often have embedded processors and dedicated information networks. The new generation is expected to add the capability to learn about the building’s circumstances and its occupants, needs and change the behavior of its control systems accordingly. The employment of a large number of sensors within the building will allow it to operate in a responsive manner, rather than using preprogrammed control models as are employed in the first two generations of intelligent building.

A major issue in any sensor system is differentiating between different causes of the event being detected. When separate sensors installed in the building for fire safety can be integrated, sensitivity to fires and false alarm immunity can be significantly enhanced. These sensors are located in different positions in the building. Once a fire occurs, the system can take multiple fire signatures and the spatial relationship and status of adjacent detectors into account in making decisions. Separate fire sensitivity information produced by these sensors would be transmitted to a control panel where fire signal processing and alarm and fault determinations are made.

New intelligent building technologies have strong potential to improve fire safety. Multifunction sensors and wireless sensors will not only reduce expenditure on sensors, but also reduce false alarms; speed response times and reduces fire-related losses. Real-time control via the Internet will extend the monitoring and control of building service systems and fire safety systems out of the building, which will increase the efficiency and reduce costs for building management operations, more efficiently discriminate between fire and non-fire threats, and increase the time available for property and life protection. The integration of fire detection and alarm systems with other building systems should also increase fire safety in the building.

However, the application of intelligent building technology may also create completely new risks. Sensor technologies will need to be robust enough to prevent false alarms, accurately discriminate between fire and non-fire threats, and ensure that vital information such as the location of occupants is not lost due to data overload during a fire. Internet based monitoring and control of building service systems will need to be completely secure to prevent false fire information being provided to building owners and fire brigades. Integrated building systems will need to be designed not only to give fire safety priority over other building activities but also that fire emergencies do not crash the building service system. A close examination of the concept of system integration will need to be conducted as intelligent building systems become more prevalent in order to determine whether a fully integrated building system has sufficient redundancy to provide adequate fire safety.