MIIA Risk Management Best Practice

Facilities Management

Building Management Systems

Purpose: Assessing System Issues, Maintenance and Emergency Response

Building Management Systems (BMS) are dynamic, integrated systems that respond to changes in the building environment, optimizing energy efficiency, maintaining occupant comfort and ensuring the safety and security of the building. These computer-based systems are complex, and it helps to think of the buildings they support, as living organisms with a brain, heart, circulatory system and musculoskeletal system, when considering maintenance and emergency response.

The Brain

The brain is the Building Management Systems. These systems are central to monitoring and controlling a vast array of building functions, including dampers, valves, fans, power supplies, boilers, fuel sources, hot water heaters, circulating pumps, security access, lighting, HVAC, and ancillary heating systems like unit ventilators (uninvents) – essentially anything building-related that can be managed by a computer. The BMS operates based on logic tied to setpoints that adjust according to temperatures and occupancy. The BMS is accessed and controlled through a graphical user interface on a computer or smart devices.

The Heart

The heart of the building is represented by the main furnaces and boilers, along with system components, responsible for generating the hot water or steam that circulates throughout the structure.

The Circulatory System

The circulatory system is represented by the main circulating pumps, all the plumbing and drain lines that supply devices like uninvents or any unit tied to the heart (boiler/hot water).

The Musculoskeletal System

The musculoskeletal system comprises all the thermostats, valves, actuators and units themselves, such as uninvents and other secondary components that aid in the final output of the heat.

In thinking of your BMS this way, it helps to differentiate between these four systems as there are different measures to take when there is a problem with the “brain” as opposed to the “heart”, “circulatory” or “musculoskeletal” system.

For instance, a failure in a primary boiler or furnace (the heart) necessitates a response aimed at protecting the entire building. This might involve deploying trailer-mounted emergency generators if the facility lacks a backup power source, bringing in trailer-mounted emergency boilers if the existing boiler tank is compromised beyond repair, or switching to secondary fuel sources if the primary gas or oil supply is disrupted. The immediate focus would be on minimizing heat loss by closing all dampers, maximizing recirculation of existing air, reducing or eliminating exhaust fan systems (depending on occupancy), and checking all external openings like doors, windows, bay doors, hatches, and skylights.

On the other hand, uninvents are secondary devices that control the environment within specific areas. To illustrate, one of our members has over 90 uninvents across two school buildings. Either facility could likely remain operational even with the loss of a significant number, or even all, of these units, provided the main boilers are still functioning and the circulation pumps are maintaining the flow of hot water. Furthermore, individual uninvents can be isolated in case of failure, limiting the impact.

In essence, the urgency and scale of the emergency response for a non-operational boiler or furnace are considerably greater than for a malfunctioning uninvent. When developing emergency response plans and procedures, it's also crucial to consider the building's purpose. Is it a facility that supports critical community needs, such as a school, fire department, DPW, or town/city administrative offices? Or is it a storage building, garage, or library? Understanding the criticality and usage of the building should be a primary consideration. At the top of the list, are buildings identified as emergency shelters which should have the most stringent and comprehensive preventative maintenance programs, support services and emergency plans.