



Inventorying Building Control Devices

Whether you are managing a building or simply in control of your home heating system it is always good to complete an inventory of all the control devices at your disposal. What is a control device? Well it is a tool or mechanism used to operate a piece of equipment or part of a system sending a command to manage an action-reaction and/or to regulate the behavior of other devices or systems. It can range from a single home heating controller using a thermostat controlling a domestic boiler's hot water heating temperature to a small heating, ventilating, and air-conditioning (HVAC) system or plumbing system. Other residential and commercial control devices can be found as part of an electrical power system, lighting control system, or fire alarm system to mention a few more building systems.

Inventorying control devices can be a tedious task so why inventory controls? Well there are several reasons beginning with the inconvenience of losing the operation of one's home heating system or domestic hot water. Many of the residential control devices will be beyond the layperson homeowner requiring a local service technician to troubleshoot the failure but there are a few control devices that can be inventoried and scheduled for routine replacement such as a battery operated space thermostat. When a residential facility's heating system doesn't start when the thermostat signals heat is needed, the first thing the resident may do is call a heating and air-conditioning contractor, but if this thermostat was on an inventory list the homeowner would have it scheduled to replace the battery in the thermostat annually. Quite often a heating system won't start because the interruption in the control system is the battery in the thermostat. Beyond that, a service technician will most likely be called in.

Another example of inventorying residential control devices is the smoke detectors and carbon monoxide detectors in a home. Instead of waiting for one of these devices to fail and begin to beep at 2 o'clock in the morning, the inventory checklist will have had the homeowner replace all these battery operated devices annually and at one time.

The control devices above are the more obvious ones in a home but a resident may have others to add to their inventory by simply walking around and taking note of other battery operated appliances or gadgets e.g., clocks. When it



comes to commercial building control devices, this inventory list can be significant and can influence the operation, safety, and utility costs of the building. Instead of an individual performing a proactive assessment of systems within a facility, it will take a team of individuals each bringing their familiarity to the task. The inventory checklist should be sorted by:

- Life safety and Building Safety
- Avoid Excessive Operating Cost (electricity, gas, oil, and water)
- Occupant Comfort

Starting with life safety there will be tasks that are required by code, such as monthly operation of a building's emergency generator and documentation to accompany this exercise. When it comes to building safety systems, such as a basement sump pump system, this should not be overlooked and should be tested just like a life safety system because water leaking into the basement could eventually flood it and the mechanical and electrical equipment in this lower level space.

Focus on Facilities: Inventorying Building Control Devices (cont.)

The team member skilled in performing this task(s) should have an inventory checklist of devices that have an “action” followed by a “reaction” response. Life safety systems to be on this inventory checklist are:

- Emergency Generator
- Fire Alarm System
- Exit and Emergency Lighting System
- Security System Including Camera System
- Smoke Control System
- Fire Suppression System
- Fire Extinguisher

Building safety systems can include:

- Access System
- Elevator
- Sump Pump system

With each of these systems there will be several “action-reaction” components e.g., an access device reacts to a break-in and the action taken will be an alarm. While the device will most likely not be battery operated it should be inventoried so that the team is aware of the components that can influence the system operating correctly. If not battery operated then they will probably be a diagnostic/electric program that will check and verify system compliance. On the inventory checklist should be an additional column stating the date(s) of the testing of action-reaction e.g., monthly, quarterly, annually, etc.

When it comes to “avoiding excessive operating cost” this will most likely also be a team effort and depending on the systems, there may be self-diagnostic automatic control programs to perform the control device analysis. The systems influencing building operating cost are:

- HVAC Building Automation Systems
- Utility Company Billing System

The team member(s) skilled in performing this task(s) should have an inventory checklist of devices created by reviewing the automatic control record drawing submittal, which will show on each system flow diagram control devices. These control devices should be reviewed to confirm the existing set point is based on the original design intent. Based on experience and/or with the help of an energy engineer it may be decided that certain control setpoints should be changed as an energy conservation measure e.g., change a hot water fixed temperature setpoint to an automatic reset controlled discharge hot water supply based on outdoor air temperature.

With energy conservation control point review and implementation completed, the next step in the inventorying

is to proceed to the control system’s ability to perform self-diagnostics. It should be noted that depending on the automatic control system, certain systems can do continuous diagnostics, as well as continuous commissioning of the system. On the inventory checklist there should be an additional column stating the date(s) of the testing of action-reaction e.g., monthly, continuously, etc.

Occupant comfort system devices may fall under energy conservation control point HVAC system measures because space temperatures will usually be influenced by control setpoints e.g., room thermostat setting. It can be an impossible challenge to try and satisfy all the building occupants when it comes to occupant comfort and the control devices associated with these building systems should be inventoried to maintain as accurate as possible on a daily basis. To do this, the individual(s) performing the inventory will not be documenting the actions-reactions associated with occupant comfort day-to-day, but still this is an important topic to include on the inventory checklist.

In closing this column, the lesson to be learned is that whether at home or in a building, we are surrounded by automatic control devices that protect us and make our environment better, but if not proactively inventoried and checked for efficient and correct “action-reaction” on a regular basis then some of these devices can become a nuisance e.g., beeping at 2 o’clock in the morning and most importantly give us a false sense of security.

For more information:
facilities@dioceseofcleveland.org

