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Maintenance
Management
Newsletter

Managing Maintenance in Scientific and Medical Research Buildings

Using OIEs to Manage Facility User Damage

By David Tod Geaslin
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When working with a very large university and commercial research facilities to improve the quality and quantity of maintenance there are several obstacles to providing excellent maintenance services that must be considered in their specialized buildings.

1. **Dedicated Scientific Departmental Maintenance Staff** – These are people retained to handle the specific tasks of creating and maintaining the specialized equipment needed to conduct their research. Examples are glass blowers, electronics technicians trained to maintain high energy experiments, etc. These people can be a significant resource to a campus facilities maintenance department but cooperation with them can be a challenge because they are often isolated by the difference between budgets and who pays for what.

This is a significant barrier because the confusion creates delay in getting help and delay is just another form of deferred maintenance that allows an asset to be operated to failure (OTF). While computing the [True Risk/Reward Ratio for Deferred Maintenance](#) in scientific research buildings, it has been proven that OTF will produce a breakdown cost that is 80-times more than the cost of Early Intervention and will take 15-times longer to correct. Creating a clear understanding of budget responsibility of the facility maintenance department and the research department can reduce the time a maintenance event is deferred.

2. **Trust and Confidence** - Research directors trust their specialized maintenance technicians but do not trust the knuckle-dragging plumbers, electricians, and PM workers rummaging around in their labs while experiments are being conducted. This concern of the white lab coat experimenters concerning experiment disruptions is valid but their distrust toward blue collar maintenance workers with tools in their hands can only be changed by the maintenance department through a professional approach to resolving the research department's facilities maintenance needs.

The stress on an experimenter of having a maintenance worker show up unannounced and say, "I gotta turn off the power." is enormous. The implementation of my [Vertical Maintenance Program](#) (VM) is a very powerful tool to relieve this stress. This program organizes the full resources of a facilities maintenance department, specialty vendors, and the different departments within a research building to execute a two day surge effort within a building on a scheduled day planned months ahead. This gives the departments the opportunity to schedule downtime for a specific period and facilities maintenance to maximize the work completed during the surge effort.

3. **Operationally Induced Events (OIEs)** – [Operationally Induced Events](#) are repairs corrected on facilities maintenance work orders that were evaluated by failure analysis and found to have been caused by the building operators. These costs were assigned to the facilities maintenance department but to be blunt, the users of the building caused the damage. It would be nice to say that this is just the way it should be but these OIEs account for about 60% of the facilities maintenance budget dollars spent.

In each of these cases, the user in the building deferred maintenance (For whatever reason.) and

operated the asset to failure. Tracking every cost associated with a breakdown event and evaluating the total negative effect on a research facility will confirm that the [Inverse-Square Rule for Deferred Maintenance](#) does create an exponential increase in not just maintenance repair costs but also indirect costs and intangible costs associated with the breakdown event. I am teaching the facilities maintenance department how to track OIEs on their work orders and isolate those people who are damaging the facilities by attaching a dollar value to their behavior. They are beginning to track every case where acid was poured down the wrong drain, circuits were overloaded with lab equipment, safety devices were disabled, the behavior of people who are just careless, etc. It has been discovered that 8% of a building's users are responsible for 60% of the maintenance dollars. Helping the department directors to identify these careless staff members and put a dollar value on their behavior will change the quality and quantity of maintenance in their research facility.

4. **Facility Design Deficiencies** – Scientific building design deficiencies reveal themselves in the form of high maintenance costs but the real damage is discovered when the intangible costs are evaluated. Chronic maintenance issues cost money but the effect on continuity of research and unrecognized signal errors introduced into the results by mold in the HVAC system, contaminants in the clean water system, or a dirty electrical connection compromising data collection is where the real damage is done. There is a real need for a facilities maintenance department to create a corporate memory to remember all the lessons learned and make this knowledge available to the department directors and architects that are going to build the next building to remedy the chronic maintenance issues and disruptions to research.
5. **Access to Building Documentation** – Many times the operating instructions and maintenance manuals for the equipment in a research facility are not made available to the maintenance worker at the point of work. In this era of wireless access to knowledge, this should be corrected.

To improve the quality and quantity of maintenance in research facilities the research staff must understand their budget responsibilities and act responsibly. The research facility leadership must recognize the exponential and dramatic cost penalties put upon their departments by deferring maintenance for any reason, especially through denial of access to the assets when maintenance is required. And, the research departments must recognize the effect of operationally induced events (OIEs) by their own people and take action when presented with the evidence.

Facilities maintenance did not design the facility or choose the quality of the components installed. Facilities maintenance is not the operator of the building or the equipment. However, facilities maintenance must repair the problems associated with these preexisting conditions, improper operation, lack of access, and breakdown maintenance.

Bridging the gap between the rare air of the researcher and the dirty and often smelly maintenance worker cannot be achieved until the facilities maintenance department can convince the researchers that the facilities maintenance department cannot control any of these variables but must correct them. When researchers understand that facilities maintenance is part of the solution and not part of the problem, the challenges associated with maintaining a highly technical research facility is reduced dramatically.

The author:

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