Needed: Owner's Manual For Educational Buildings

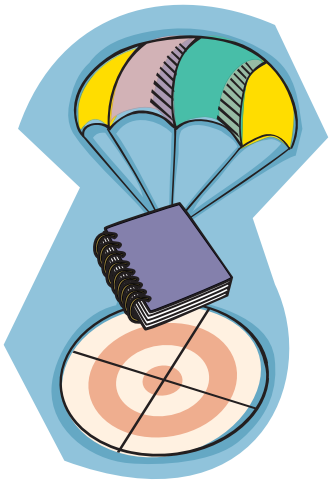
by Eric Dillinger

Imagine buying a new automobile without knowing how to start the motor, when to change the oil, or what the instruments on the dashboard indicate. Instead of handing you a copy of the owner's manual along with the key, the dealer turns over an armful of engineering schematics, diagrams, and blueprints and cheerfully waves goodbye as you drive off in confusion.

That's exactly what happens too often when a newly completed building is turned over to the institution and the facility manager. Architects, engineers, and contractors deliver numerous construction documents, but this information is almost useless to the operations and maintenance staff. The information is dense, voluminous, and close-to-incomprehensible for anyone except experienced design professionals.

Educational facilities managers may find some of this information useful, but they need something beyond conventional blueprints and schematics. There is a disconnect between the information provided by the engineers and architects and the information that facilities managers can use. Facilities managers need, in effect, an owner's manual for the building and its systems.

Work on a building doesn't stop upon completion. It is estimated that 60 to 75 percent of the total lifetime cost of a building occurs after construction. Maintenance and operations expenses are vital components of



the entire life-cycle costs of a structure, and it is a mistake to ignore their impact on the total.

Today's facilities managers are not being given the right tools to develop a coherent maintenance strategy geared toward a unique structure and its specific systems. The onus for this problem is on us, the design and construction industry. Building owners and operators should be provided with a rational maintenance strategy for their structure; if they don't get it, they should demand one be provided.

An educational building enclosure operates as a machine for conducting transactions between buyer and seller. It consists of architectural structural members; mechanical, electrical, and plumbing systems; and myriad of other systems and subsystems that work together as a functional whole. Keeping this machine at peak efficiency and effectiveness is the function of the facilities manager and, ultimately, the building owner. Unfortunately, architects, engineers, and contractors who are knowledgeable about these systems and how they work together too often fail to give the responsible parties the information needed to perform this function.

Rather than simply handing over construction documents, contractors, engineers, and architects should deliver a program that details how to run the building and keep it functional over the next 50 years. We can't assume that every facilities manager is an experienced veteran with the insight and education of an engineer, because that isn't the case.

The solution to the problem is not more data, but better information. Some say information is knowledge, but they aren't the same things at all. People turn information into knowledge based on experience, but without the right information the knowledge is lacking. Construction documents may contain the essential information about a structure, but they don't give building owners any insight into operations or maintenance. Operators of educational facilities need a distilled, step-by-step guide with clearly defined steps and procedures, written so they can be understood by non-technical personnel.

A coherent building operational plan should divide system maintenance into three segments: preventive/scheduled, predictive, and run-to-failure.

Preventive/scheduled maintenance is for essential systems that cannot be allowed to break down or fail. That is why you should change the oil in your car every 3,000 or 5,000 miles. There's no way an average motorist can know if the oil is dirty or breaking down in the engine, so the oil must be changed regularly to prevent fatal damage to the engine.

Predictive maintenance is for systems and equipment that can be monitored for signs of trouble. For example, you don't automatically

***Eric Dillinger is vice president, facilities management services, Carter & Burgess, Inc., Fort Worth, Texas. He can be reached at dillingeret@c-b.com. This is his first article for* Facilities Manager.**

change the tires on your car as soon as they have 30,000 miles on them. But you might check the tread and the inflation pressure more often as they age because these are better indications of how long the tires will remain serviceable than mileage alone.

The distinction between preventive/scheduled maintenance and predictive maintenance can be seen in air filters for HVAC systems. Manufacturers often recommend that filters be replaced every four months so the contractor tells the facility manager to replace the filters three times a year as a preventive measure. However, from a predictive viewpoint, the filter's useful life might be much longer. The remaining effective life can be determined better simply by removing them and looking at how dirty the filters might be rather than relying on a strict schedule. Some filters might last much longer than a few months, but the life span of an air filter will be shorter in an arid environment with frequent dust storms.

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Then there are items that qualify as **run-to-failure** and can be allowed to fail without consequence. For example, light bulbs in a janitor's closet should be replaced only when they fail, because their failure will not affect life, property, or any other system in the building.

Institutions of higher education often spend far too much money to over-maintain facilities because they don't have the correct information for a coherent maintenance strategy. Architects, engineers, and contractors should develop a seamless system to ensure a smooth transition from construction documents to maintenance programs and to turn construction documents and specifications into a true decision-making tool for building owners and operators.

A comprehensive maintenance strategy should be built into the structure from the design phase through the construction phase. As construction documents are generated, part of the plan must be to protect the long-term productive life of the facility.