

## When is “Run-to-Failure” Appropriate?

by Matt Adams, P.E.

For most of us in this industry, the holy grail of maintenance is the transition from reactive to planned maintenance. This short statement of purpose incorporates what thousands of our peers are preoccupied with every day. The achievement of this goal is now within reach of our maintenance departments. How they got there involves more specific scrutiny of maintenance assets. Clearly, the proactive maintenance of primary and critical systems is a part of any plan. However, what is the “floor” of the plan? That is to say, at what level of building system/component does it become practical to let it “run-to-failure?” A decision tree analysis of building systems provides a logical and practical cut-off point.

### Regulatory and Code Compliance

Initially, the vast inventory of systems and sub-components contained in our institutional facilities seems daunting. There are thousands of assets and they all have a cost to install, a life cycle, a cost to maintain, and then, ultimately, a cost to replace. In order to implement or make the transition to planned preventive maintenance, this universe of assets must be characterized in more detail. In a step-by-step application of business rules a maintenance planner can gradually stratify the pool of assets in qualitative groups. The business rules are generated from the planning process and are best kept simple and

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easily defined. For example, a short and simple business rule test is whether maintenance of an asset is required by code. If NFPA code requires testing of a system, run-to-failure is not an option. On our campuses, we start with a list of thousands of assets. With each test of a business rule in sequence, the list becomes smaller and more meaningful.

### Maintainability

The previous example of regulatory and code compliance is straightforward. Another business rule test is even simpler. Can the asset be maintained? Many building assets are not serviceable. Other items are not constructed to allow maintenance and these components are being utilized in construction in increasing numbers. These items are considered “throw-away” components. Finally, some components are not accessible to maintenance staff without great cost. These too may be disqualified for inclusion of the planned maintenance asset inventory.

### Return on Maintenance Investment

The financial consideration of asset maintenance has multidimensional value. Consistent with the goal of creating a proactive or planned maintenance program, the return on the investment (ROI) of maintenance is an important consideration. This ROI is realized in two primary forms—reduced operating cost and reduction in unplanned maintenance.

Utility costs are one of the largest costs to any operating and maintenance budget. The systems that drive these budgets have a sliding demand curve that relates to the performance of the same system. Over time, improper maintenance of these systems will drive utility costs up in a cumulative manner. These increases present an easy justification for proper maintenance. Conversely, transition from reactive to planned suggests that assets that do not pass the previous business rule tests, and do not impact utility charges may be disqualified from the primary maintainable asset pool.

Directly related to the goal of planning maintenance versus reacting to maintenance is reduction of unplanned maintenance (UPM). This is the primary contributor to maintenance programs that are out of control. In its final form, the UPM becomes so pervasive on a campus that virtually no planned maintenance takes place. Consistent with the goal of increased planned maintenance is

maintenance of assets that can potentially drive up UPM demand. In other words, the business rule is a test of the ability of an asset to positively respond to planned maintenance. If maintenance does not significantly improve the asset life and reliability of a system, it may be disqualified from the list. The best way to make this determination is to review the work order records from recent years. In the

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absence of such records, interviews with each of the trades provide anecdotal evidence. The basic challenge is to apply limited maintenance resources where they will provide ROI in the form of reduced UPM and thus, increased planned maintenance capacity. Items that do not meet this test are run-to-failure.

A sub-set of the UPM test is that of collateral damage. Cost avoidance is a very real ROI for maintenance. This business rule tests components for their impact on other systems. One of the best examples is weather tightness of the building envelope. It has been demonstrated that maintaining the systems that repel water from a building's interior provide real ROI by avoiding collateral damage. These systems include roofs, fenestration, etc. This business rule tests components for their impact on other systems. Systems whose failure does not directly affect the performance of other related systems would not pass this test.

Rationalization of the planned maintenance inventory focuses maintenance resources. With the realization that there is never enough money to do all maintenance, application of simple business rules to the asset inventory creates a prioritization process that is accountable and defensible. This rationalization ultimately validates the famous 80/20 rule. Some components will not make the cut and be allowed to run-to-failure. 🏠

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