Zero Based Maintenance Budgeting

By Joel Levitt

There is tremendous pressure on maintenance managers to improve their budget performance.

Traditional budget methods do not seem to be effective in the maintenance arena because maintenance expenditures are made up of 1000's of seemingly unrelated events. Maintenance does not seem to be volume related (higher output equals higher maintenance).

The breakdowns and other maintenance activities are hard to predict and do not necessarily reflect what happened last year. To successfully budget (and therefore predict) maintenance expenditures we must divide the whole maintenance demand into its basic parts

A zero based budget breaks the overall demand for maintenance services into its constituents, that is, assets or areas. Look at each asset (or group of like assets) to determine the maintenance exposure. In addition to the unit or asset list, a zero based budget has allocations for certain areas that are hard to define as individual assets such as the electrical distribution system or the paved parking area and sidewalks.

Prior computerization of maintenance simplifies the construction of a zero based budget. The computer can easily generate an asset and areas list. Many systems allow you to create classes of equipment where like equipment is aggregated into one line.

If the system has been in use for more than a year you can attach the hours and material dollars for each asset and area. Some systems have a reason for repair (see chapter on work orders). The reason for repair would roughly correspond to the categories below. Most systems allow export of the files to a spread sheet for further manipulation.

All maintenance activity can be traced back to one of the eight demands that follow. Shops that are craft dominated have a more complicated problem. After the budget is completed they must go back to the individual demands and break-out the labor by craft.

The eight reasons for maintenance resources are:

1. PM- preventive maintenance hours/materials. Based on your facility and equipment size, use, construction and the standard times of the PM activities you can predict how much time and materials PM's will take. In a TPM shop some of the PM hours will come from operators. The simplest formula is to multiply the number of services by the time for each service. Also look at the materials used for each service. Include some time for the short repairs that the mechanic will get done during the PM. Since you have some flexibility in scheduling you can consider PM's as a level demand throughout the year.

Specifically PM work includes all the inspection, adjustment, bolt tightening, oiling, cleaning, and readings that are initiated by task lists. The task lists are initiated on a periodic (quarterly, annual) basis.

2. CM-corrective maintenance hours/materials. Also called scheduled repairs or planned maintenance. As your PM inspectors inspect each part of the facility and all equipment they write-up repairs (deficiencies). These write-ups become your backlog of corrective maintenance (CM) for your maintenance schedule. The repairs are considered scheduled repairs as long as they don't interrupt jobs in process.

You can look at previous years to get an idea of the hours for this activity. Since you have control of the schedule this demand can be considered level throughout the year. These scheduled repair hours are inserted by equipment, by group of like equipment or by area.

There is a tremendous advantage to this type of work because you can plan the work and accumulate several jobs for a location or schedule them together or assemble several jobs with the same materials or craft (fix all the small roof problems at several locations) at the same time. I estimate that every hour spent planning these scheduled jobs you will save 5 hours on the site.

3. UM- all types of user maintenance (hours/materials) is all requests from users/customers from the routine broken pulley on a conveyor to a $1,000,000 catastrophic breakdown. This includes UM-R (Routine work), UM-P (Small projects), UM-B (breakdowns).

UM is the most common source of work in a breakdown driven organization. Without inspection and inspectors the users find problems first. Users also are the first to find vandalism, breakdown and damage. Responsive user complaint handling is essential if you are to be viewed as effective. In fact, most users will judge you entirely on how you respond to their complaints (other benchmarks usually don't have as much impact on their quality of life).

UM includes both breakdowns and routine service requests. UM includes servicing minor user requests for hanging pictures, moving furniture and other personal service.

At the beginning of the year budget the same amount of hours for UM as the previous year by asset or category. At the end of the year you can back off emergency component of UM as the PM system starts to take effect. For purposes of budgeting UM creates a level demand. In fact emergencies will tend to bunch. Many factories use outside contractors to level the demand for UM. In larger facilities this work will look more and more level. See seasonal demands (SM) for a special case of UM demand.

4. SM- Seasonal Maintenance hours/materials. This includes all special seasonal demands. Your entire grounds maintenance effort is certainly driven by season. Review of roofing systems before summer and winter or checking air conditioning before summer are seasonal demands.

Some businesses are seasonal. Cleaning the Candy Cane line before it starts up in July would be a seasonal demand. You can also use this category to pick-up some percentage of the seasonally driven emergencies or seasonally driven PM. Budget hours at the beginning of each season by asset or group based on history.

5. RM- Replacement/Rehabilitation/Remodel Maintenance hours/materials. In some organizations this category is capital improvement and is handled outside the normal maintenance budget.

RM also includes all maintenance improvements and efficiency improvements. At some point, units which have not been maintained for a period of time or have reached the end of their useful life will have to be rebuilt or replaced. The rebuilding effort should be added to your maintenance budget as a capital replacement line item separate from any current maintenance activity. If your people are doing the modernization to bring units up to PM standards then the hours will have to be budgeted.

Since you have control of the rebuild schedule you may be able to use rebuilds as a crew balancing tool. A special case of RM is Management decision. This work is generated by a manager when they decide to change something in, on or around a machine, other asset or the building. The reasons for the decision might range from energy efficiency, improve usage, legal problems or even a whim (I hate yellow presses, paint them!).

Maintenance demands for the whole operation (not tracked by individual but by location). After the base demand is cataloged by equipment or area of the plant look into some of the budget busters below. A well designed budget can be ruined by excessive social demands generated by visiting dignitaries or a large construction project's effect on the rest of your operation.

6. SD- Social Demands (sometimes known as hidden demands because they don't always show up on work orders). This is also called PS for Personal Service. Your primary mission is

maintenance of the equipment and facility. You may be called upon for other duties in your organization. These duties may include supplying clean-up people, running tours, preparation for visiting dignitaries, set up of special events (like running sound cable), providing chauffeur services, picking-up or delivery of papers or packages, organizing picnics or work on non-organization equipment and facilities (charity work). Estimate your hours for these activities.

7. ED- Expansion demands. Any expansion in the size of your facility, size of your work force, additions to the scope of your control will add hours to your overall requirements. New buildings, assembly lines, major changes to the plant require start-up time. New facilities disrupt current activities as well as taking direct time. Adding satellite facilities will result in additional lost time until systems are well in place. Estimate additional time if an expansion is contemplated.

8. CD- Catastrophic Demands. It seems that every location has characteristic catastrophes. Add time for one or two catastrophes. You can review your records for the actual amount of time spent in a typical catastrophe. This can include floods, hurricanes, trucks taking out the side of the buildings, fires, etc.

How to Set-up a maintenance budget

1. Start the process by compiling a list of all machinery, equipment that you maintain. As much as possible arrange the list by department or cost center. This will facilitate report printing at a later stage. If you have a CMMS, (Computerized Maintenance Management System), print an asset or equipment list. This list might have as few as hundreds, thousands or more entries depending of the size of your plant.

2. Add to this list areas of the plant and site that require maintenance resources that don't lend themselves to the unit concept. Typical areas include roofs, pavement, electrical distribution system, piping, doors/windows, etc.

3. Look at the list and see if there are any units that can logically be grouped together. A wire harness assembly plant might have 50 braiding machines of similar usage and vintage. These could logically be aggregated into one line. Putting similar units or areas together simplifies the process and also makes predictions more accurate.

4. Collect any maintenance data available by unit or area for the last several years if available. Your CMMS would facilitate this step. If the data is coming from the CMMS then see if it has an export capability. Some systems will send data to spread sheet files without re-entry. Inquire if your accounting or cost accounting group can shed any light on the costs to maintain certain areas, departments, assets or production lines.

5. We recommend this whole mass of information be designed in a computer spread sheet

Excel. Create a template to duplicate the form at the end of this section. The equipment, areas and groups of units/areas are listed in the template. An alternate recommendation would be to enter the data into a database manager. There are advantages to both approaches. Most budgets are usually run from spread sheets.

6. After the individual units and the general assets are listed add the global lines (that apply to the whole site) social, expansion, catastrophes. Look into your history or estimate the impact of these areas. The three areas can be added as hours and materials or as percentages depending on the need. If these areas have traditionally been non-work order items now would be a good time to set-up the codes to put them on work orders. Once accounted for these costs can be studied year to year.

7. Once assets have been inserted into the template, this document becomes the basis for your zero based budget. Back-up the filled in template. You have many hours in at this point so make your back-ups now and keep them up to date! The other point is that this computerized list might have other uses so a copy might be useful for another reason.

8. Review each unit, area or group and estimate your PM, CM, UM, RM, SM costs and hours. A useable history of costs from accounting or from the CMMS greatly simplifies this process.

9. Add in your estimates for SD- Social, ED-Expansion and CD-Catastrophe related demands against the department. These can be as percentages of the above areas or as actual hours and material costs.

10. Your material costs are the sum of all material columns, your hours are the sum of all hour columns. You would then apply the costs of your labor, fringe benefits and maintenance overheads to determine your budget.

When management wants reductions to your budget you have a new level of discussion. All changes need to be justified in terms of higher or lower levels of service on individual assets or areas. Now when cuts are needed you can talk about which assets will be allowed to deteriorate or which departments will not be served as well.

Almost every business has deferred maintenance. You may see a problem slowly developing and put off the work. You could be short of funds, be planning a major rehabilitation, planning to sell the unit or property or lack the requisite skills. Some organizations run their whole operation with excessive amounts of deferred maintenance Distribute your zero based budget to the users, staff, and top management for comments.

If your current actual hours available are only a small percentage of your budgeted demand then something will have to be done. Either deterioration is taking place or your customers are unsatisfied or both. One solution is to use contractors to make up the short fall.

Some organizations are using this strategy to maintain maximum flexibility.

Using the budget to schedule the need for outsourcing

Some organizations use outsourcing strategies where they crew for 75% to 80% of demand and use outside vendors during peak periods. The most effective way to predict the need for contract labor is to recast the budget on a monthly basis. Using the hours per month you can see which months will exceed your crew available hours.

The process is similar to a staffing exercise. If your core crew has 1400 hours available a month the contractor would have to supply and labor above 1400 hours. The budget will show which months it would be likely that contracting will be needed. Moving project work can be used to minimize contractor needs in a given month.

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