

Labor Standards Soup to Nuts

Performance can be measured through the use of standards for maintenance work. The increasing need to contain and control maintenance costs has been the driving force.

Reasonable returns should be expected from investments in job standards. A maintenance shop should balance its investment with the potential returns available. Certainly, non-repetitive jobs of short or moderate duration do not require standards unless the timing of the asset's return to service is critical. Repetitive jobs such as PM tasks and repetitive corrective actions are well suited to standards.



There are four ways of developing standards. These different ways can be used together to create a unique set of standards for your facility.

1. Estimate: Estimates are educated guesses.
2. Historical standard: The elapsed times it takes your personnel to do individual jobs.
3. Direct observation: Two approaches are methods engineering (ME) and reasonable expectancies (RE).
4. Published standards: Published standards are published by both public organizations and private companies for profit.

When seeking standards, look first to the manufacturer of the equipment or material. Other places to look include experienced trade people, your written history, contractors, and consultants.

Many facilities have computerized work order systems, inventory control, and PM task list generation. Most of the over 100 maintenance packages (CMMS, Computerized Maintenance Management Systems) support some level of usage of labor standards.

The minimum level of support is a field on the work order called estimate. Someone is expected to enter the repair description when the work order is opened. They are also expected to add their best estimate manually. With these systems, there is no attempt to manage the standards themselves or automate the assignment of standards to jobs.

Some CMMS support standards to a slightly greater extent. In addition to a field on the work order, there is the ability to store repetitive jobs under a code. The code for an annual PM on an air conditioner might be PMA-A/C-01. Anytime that job is called up, the estimate comes with it. These named jobs do not only have to be PM jobs. Any job can be pre-planned, entered, and assigned a code.

The third level of support to look for is the performance recording against the job descriptions or job codes. Some systems can track and calculate historical standards and keep these numbers on file for reporting, job analysis, and employee comparisons. Some will develop the mean time to repair all jobs in the meantime.

High-level systems help manage standards with assignments, modifications, histories, and performance tracking. Several systems keep two different types of standards for each job. The system updates the historical standard every time a repair is completed. The second doesn't change with the jobs. Outside standards allow the supervisor or manager to set performance goals using outside standards that don't change.

Why have standards?

Scheduling

The advantages of labor standards in scheduling are efficiency, morale, and customer service. "You can schedule your people, or you can let breakdowns; or irate, bored or lonely maintenance customers schedule them. One way or another, your people will be sent to jobs every morning." (From The Handbook of Maintenance Management)

The other job elements can be coordinated when the start time is known. Maximum efficiency requires bringing together, in precise timing, the six elements of a successful maintenance job: the mechanic, the tools, the materials, the information, the availability of the unit to be serviced, and the permission to proceed.

Efficiency can be improved by scheduling several jobs together at one end of the facility. Knowing how long jobs take, fill-in jobs can be added to a large job to fill out the day at that location. Efficiency can be gained by grouping jobs together that use the same materials.

Some jobs go wrong. Due to hidden problems, inadequate skills, defective materials, or inadequate tools, a job might take twice or longer than it should. If a large repair is falling behind schedule, interventions can be instigated. When the job runs, interventions can correct the problem and prevent a complete disaster.

People work at a pace partially based on the amount of work they are given. Schedules based on standard hours free workers from a hurry-up atmosphere one day and a kill-time atmosphere the next. Back-up jobs are given so employees can move to another job if a lack of parts or tools impedes them. Consistent flow improves both output and quality.

Long-term planning of repetitive work

Preventive maintenance (PM) task list work, routine jobs, and scheduled equipment replacement are repetitive jobs that must be completed continuously. If PM-type jobs start to exceed a percentage of your available hours, then the natural tendency is to let them slip in favor of urgent jobs.

Yearly planning using labor standards can reduce the need for overtime and contractors. It will also ensure enough time for your PMs to complete the month they are scheduled.

Employee Evaluation

Analyzing an individual's work could prove who needs training, reassignment, or should be looking for another job. One performance measure compares the hours reported on the work orders against the standard hours for the same repairs. This measure is focused on the mechanic's ability to complete maintenance tasks. It does not measure the job quality (which would have to be looked at separately).

A second measure adds all the standard hours accumulated in a week or month and compares that number to payroll hours for the same period. This sum measures the maintenance delivery system because all lost time is included in the comparison. The department's ability to assign jobs, communicate critical information, get parts to the workers, and unlock rooms is measured using this metric.

Budgeting

Time standards can positively impact the budget process. Time standards allow the facility manager to answer the question, how much will it cost to maintain a new building, machine, or product line?

Morale builder

Feedback to maintenance workers is more related to the customer's mood than the speed or quality of their work. Standards help by providing the mechanic with the expectations of management. When the mechanic can keep up with the standards, they know they are doing a 'good job' by management's definition. This specific feedback improves morale.

Customer service

Accurate estimates improve your customer service and increase the value of the service you perform for your users. Good customer treatment requires the supervisor to answer the question, "When will the maintenance worker get here?" and the related question, "When will my repair be completed?" A schedule will lay out the standard times for each mechanic and can estimate when they will be available to work on the customer's job.

Systems of Standards

All types of work standards should be based on:

1. Similar types of equipment (like equipment in like service) should be grouped.
2. Concise description of repair or PM tasks performed
3. Description of what work was accomplished
4. Easy access to the room or area to work on the asset.
5. Number of people required (crew size).
6. Location of the unit repaired
7. The mechanic should record complications and extra work. Written-up work is usually added on a standard hour per-work-hour basis.
8. Standards are usually based on a skilled and professional tradesperson with the right tools in the right place at the right time.
9. Factors like age, gender, years of service of the mechanic, time of day, and parts cost are **not** considered in labor standards.

Estimate

By far, the most common type of time standards are estimates made by supervisors, craftspeople, and planners/estimators. Anyone involved in maintenance has been asked how long it will take until this bathroom is fixed or this building chore is complete. The answer is an estimate.

Slotting method of estimating: Slotting compares the job to be evaluated to a group of well-known and studied jobs. The supervisor determines where the job fits in (which slot). Is it bigger than slot two but smaller than slot 3? The time estimate would be between the two. Usually, it is easier to determine whether a job is bigger or smaller than another than how long it would take.

Your slot chart could be broken up by craft and have 7-10 entries. The trade's people could pick the standard jobs after a short discussion.

Historical Work Standards

All computer systems track the time it takes to do a job. Some systems can evaluate all of the repairs of a particular type in a specific type of equipment. These standards can be helpful since (unlike the engineered rates) they factor in variables such as the actual condition of your equipment, the skill level of your workforce, the layout of your shop, and your tools and equipment.

The disadvantage of historical standards is the accuracy of the data collection. For example, the work order might read 'Fix pump.' The mechanic might have to check valve positions, motor circuits, and source products before accepting that there is even a problem with the pump itself. All of these activities are lumped together as part of the historical standards.

Most organizations do not insist on accurate descriptions of work accomplished. Without detailed descriptions, historical standards will be averages of very different jobs. If all toilet jobs were lumped together, the range of jobs might be from minor float adjustment to removal and replacement with a rebuild to the floor!

Schedules based on historical standards include total lost and wasted time. When an employee is talking, eating, or not at their job, the time is still charged to the repair and will find its way into the historical standard. Published standards don't usually include lost time but don't consider the conditions and skills of your crew.

Directly observed standards

Direct observation has two different approaches. The micro approach is called methods engineering (ME). ME has two roots: time study and motion study. Time study breaks the task into units and precisely times each element. The father of modern time study was Frederick Taylor. Taylor worked in the late 19th century. It is hard to imagine today, but the concepts were so controversial that in 1912 the US Congress conducted a full-scale investigation of the field.

Motion studies can trace its history back to the same era with a husband-and-wife team, Frank and Lillian Gilbreth. The Gibreths studied motion in a laboratory and broke it into its basic elements. These elements, called therbligs (Gilbreth backward), are still the basis of motion study.

The problem of ME is time. It might take a week or more to analyze a single repair thoroughly. It is a time-consuming process that results in accurate estimates when appropriately applied. The time study person is an industrial engineer who breaks down the job into simple motions and times each section.

The second method of direct observation is a macro approach. In this method, a person would observe the whole job and record the work time. They do not use stopwatches. The standard developed is called a reasonable expectancy (RE). The RE is usually based on several observations.

The concept of reasonable is essential. Observing several craftspeople doing the repair gives you a good idea of how long it should take. No speed-up is needed to improve productivity. REs will improve productivity by recapturing **time lost in non-productive and marginally productive activities**. Anyone can do REs. It does not take extensive training to directly observe a repair with enough accuracy to set a standard.

Published Standards

Organizations publish standards for their use (many contractors have developed standards for their use in preparing estimates) by equipment manufacturers or third-party for-profit publishers. The most widespread and oldest standard is the Engineered Performance Standards (mentioned later). In all cases, the skilled mechanics with proper tools should be able to meet or exceed the published work standard.

The reason published standards are essential in the mix is the clarity brought to the situation by an outside, impartial source of productivity data. The published standard was developed somewhere else by, presumably, expert mechanics observed by expert observers. This outside opinion is a good check on the skill and honesty of your crews.

Engineered Performance Standards

The engineered performance standards of the US Navy are the oldest set of labor standards in use. They were developed starting in the 1950s.

It took 10 years before the first version was ready for use. During the development phase, the Navy set up an industrial engineering group in NAVFAC to accomplish this task. Each 13-14 industrial engineer was assigned a craft to analyze. At the project's peak, 200 industrial engineers were working nationwide.

EPS is based on the actual pure work content of the job. Factors for travel, preparation, and delays were added based on the trade and the location of the job—the standards aimed at maintenance and repair functions, not installation or construction.

One of the advantages of EPS is its availability. The US Government has the standards available through the National Technical Information Service. Call the NTIS sales desk at (703) 487-4650 to order. All of the documents start with Engineered Performance Standards Public Works Maintenance.

R.S. Means Maintenance Standards

R.S. Means is the facility manager's largest publisher of information on estimates and standards. Their specialty is building construction.

One of these books, **Means Facilities Maintenance Standards**, by Rodger Liska, lists over 180 standards for everyday maintenance tasks. His 575-page book goes beyond time standards to include PM task lists, listings of tools and techniques, and information on managing a facility maintenance department.

The roots of this book stretch back to the late 1970s. Rodger Liska, now an Associate Dean of the School of Architecture Arts and Humanities of Clemson University in South Carolina, was asked by AT&T to look into its building maintenance practices. He created a course of study over several years that became the predecessor to the **Means Facilities Maintenance Standards** book.

He feels all standard systems must be adjusted for the particular facility. He advises maintenance managers to start with published standards and gradually create standards for their unique situations.

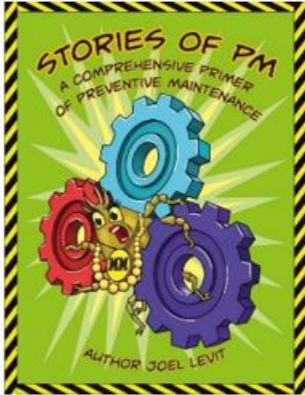
How to set up a standards system

1. It is imperative that your work order system is accurately reporting detailed job descriptions and actual time.
2. Enlist the mechanics' help in the program's overall design. The goal is to predict accurately when a job will be completed. The secondary goal is to smooth out the workflow for the workers, not to increase the amount of work.

3. Standards usage can be started on a pilot basis. Start with an area, equipment, or activity that is easy to isolate and consumes much time. This pilot could include frequent PMs, routine jobs (such as filter change routes), or common repairs.
4. the most accessible place to start is with published standards. You can obtain copies of all of the R.S. Means or EPS books for a few hundred dollars.
5. Start assigning standards to all PM task lists and all repetitive work. Also, assign standards from the books as work comes in against your pilot area.
6. When completed work orders return, note performance against the standard. The actual times (as reported on work orders) are the historical standards. Initially, you will start with three columns: the published time, the historical standard, and the observed time for each described repair or PM.
7. Observe some of the more common jobs after getting historical standards back from the field.
8. Compare the published standards, REs, and historical standards on jobs where all are available. Seek any patterns between the standards.
9. Determine the relationship between the different standards and determine the factors for your facility, crews, and tooling assignment. Scheduling and job assignments should be based on the most realistic standards, with or without extra factors.
10. Continuous improvement based on improving upon the standard is the goal. Re-engineering the maintenance task or machine, re-tooling, and re-deployment of parts or people might be necessary to achieve the goal. The best mechanics can train others in their techniques for common jobs.

**Crazy, Fun Books teaching maintenance fundamentals
From the series: "Elements of Great Maintenance Management"**

You can tell from the covers these books are different than everything else you've seen.



Preventive Maintenance



Defect Elimination



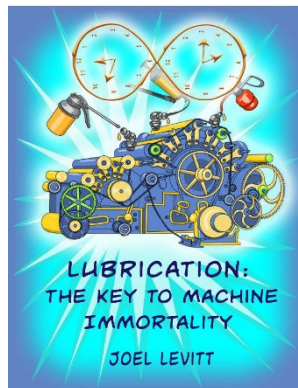
Reliability and fundamentals



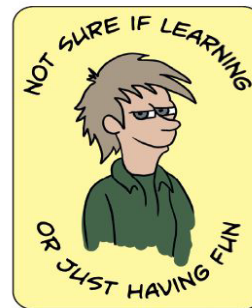
Maintenance quality



Maintenance Planning



Lubrication



We know:

- Old-school books and manuals don't cut it.
- Boring texts don't cut it.
- Humans learn best with stories.
- New students want **entertainment!** (I made this word up from Entertainment + Training)

Introducing a new training series. A tool to teach maintenance fundamentals called "Elements of Great Maintenance Management."

Quest for Defect Elimination (ISBN 979-8627700458) is a full-color graphic novel that provides the basics of defect elimination and shows the quest to achieve fewer defects. To view on Amazon: <http://www.amazon.com/dp/B086XG33D9/ref=nosim?tag=Maintenance08-20>

Battle for Reliability, Fundamentals Win the Day (ISBN: 9798598795286) teaches the critical need to focus on maintenance fundamentals to avoid breakdowns. To view on Amazon: <https://www.amazon.com/dp/B0B917XPKK/ref=nosim?tag=maintenance08-20>

Stories of PM, A Comprehensive Primer of Preventive Maintenance (ISBN: 979-8496071154) PM is the primary way to ensure the reliability of machines, buildings, or other physical assets. **To view on Amazon:** <https://www.amazon.com/dp/B09K1TTGD5/ref=nosim?tag=maintenance08-20>

Quality is Not an Accident, The Challenge of Managing Maintenance Quality (ISBN: 9798842723751) Quality of work depends on everything going right. <https://www.amazon.com/dp/B0B7QGX4TL/ref=nosim?tag=maintenance08-20>

LUBRICATION: The Key to Machine Immortality (ISBN: 9798387529566) Getting our people to take lubrication seriously is the simplest and most effective way to ensure the smooth running of your equipment. **To view on Amazon:** <https://www.amazon.com/dp/B0BZ27N6CW/ref=nosim?tag=maintenance08-20/>

Maintenance Planning Cuts Waste and Frustration ISBN: 979-8333645401 Maintenance Planning and subsequent scheduling are potent tools to cut waste and maintenance worker frustration. The challenge is that workers, operations, and even maintenance leadership don't always understand planning and, as a result, don't actively support it.

To view on Amazon: <https://www.amazon.com/dp/B0D9VQB4P5/ref=nosim?tag=maintenance08-20>



Joel Levitt, President JDL@Maintrainer.com
Springfield Resources 267-254-0061
WWW.MaintenanceTraining.com



These titles are also available for short webinars and on-site presentations.