Work Management Yields Faster, Better, Cheaper IT Operations

By Thomas A. Westerkamp
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IT managers are constantly challenged to improve on-time delivery and reduce costs. The best way to accomplish these goals is to improve productivity of the staff. And yet, management does not give productivity a proportionate amount of attention. In fact, the widespread practice of hiring based on software applications or network skills perpetuates this problem. The programmer is promoted to project manager without work management training and management loses a good programmer and gains a poor manager. On the other hand, good work management practices contribute to better customer service, higher quality, on-time delivery, lower cost and ultimately, satisfied customers. Satisfied customers will not only keep coming back, but also spread the word to other potential customers.

This article reveals how the IT professional spearheads dramatic productivity improvement impact by implementing state-of-the-art work management to plan, schedule and control IT activities. Work management is the tool that leads to faster, better, cheaper--and gets there faster, better, cheaper.

Definition of IT Work Management

IT work management is the planning, scheduling and control of IT productivity to achieve continuous improvement. It combines introduction of a formal planning function with application of state-of-the-art, engineered work measurement and process design techniques, fully integrated with the information technology strategy.

High achievement Work Management principles

For high quality results that stand the test of time, management practices must be based on sound principles. High productivity work management is built bed on bedrock comprised of seven principles that lead to spectacular results that not only last but also grow in value far greater than their cost and far into the future. Management analysts are very familiar with some of these principles because they apply to measuring direct production operations, but they also serve the special needs of IT and other indirect service work. These principles are as follows:

1. Scientific principle. Best productivity results when each worker has a definite job to do in a definite way and a definite time. Frederick Taylor's principle, the cornerstone for his scientific management approach used in the 1800's and published in 1911, applies to all work; support activities are no exception. This principle is the basis for the work management technique described here. This technique does not lock out creativity, it embraces it; does not limit teamwork, it enhances it; does not threaten empowerment, it facilitates it.

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2. Measurement before control. The measurement of an activity comes before control. Lord Kelvin saw this in the 1800's as applied to his scientific investigation of the laws of physics. It is universal and applies equally well today.
3. Activity responsibility. The responsibility for each activity in the life of a job or project is necessary to ensure that it continues to move toward completion without delay.
4. Delegate, educate. If you delegate responsibility for an activity or function, you must educate the staff in means to carry out that responsibility.
5. Customer/service relationship. A customer/service relationship exists between the beneficiaries of the work--customers--and those who perform the work--IT team. The customer decides what is needed from an operational viewpoint, and the IT staff decides how the service is provided. Together the customer and IT agree on when--priority--based on resources available and urgency of each specific task compared to other current work.
6. Team size. The optimum team size for a job is the smallest that can perform the work using a good method in a safe, efficient way. The standard size is one. Other team sizes are applied as exceptions to this general rule.
7. Timeliness. Large IT jobs or projects are divided into smaller work orders. Smaller work orders are easier to plan accurately. They highlight problems or roadblocks early enough to enable making adjustments that result in on-time completion of the project.

The nature of IT service and support work

IT service and support, much like physical plant maintenance today, is very high tech and encompasses four types of work--emergency maintenance, routine maintenance, preventive/predictive maintenance, and projects. Emergencies occur when, for example, a user's password doesn't work or a workstation fails because a fan bearing seizes up causing overheating. A routine maintenance example is adding RAM capacity to a PC. A preventive/predictive maintenance example is periodically running diagnostic checks on PCs or the network to prevent trouble or detect overloads or security leaks before they shut the system down or compromise privacy. Projects involve, for example, a large database application program needs requirements, design, testing, training and installation for a client-server or mainframe network of many users.

Similarity of IT and physical plant maintenance work

An examination of the nature of IT and physical plant maintenance work reveals some unique, shared characteristics. Both are made up of emergencies, routine work, preventive maintenance and projects. Both are low volume work. That is, a maintenance or IT technician often does many different jobs in a single day, unlike the production counterpart who does high volume, repetitive work. The maintenance or IT person does longer cycle work while the production worker does shorter cycle work. Both

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maintenance and IT work involve creativity; production work does not. These significant differences led to major problems in early attempts to measure maintenance work.

Breaking long jobs down into elements resulted in a large number of elements because the job duration was so long. Each element required further study followed by application of detailed stopwatch time study or a predetermined time system analysis to determine the time for each element from the method identified. Furthermore, if the same application technique applied to high volume production were used, the industrial engineer had to study each job in each skill. The combination of many elements, many different support tasks and many skills results in the need to develop, apply and maintain a library of over 10,000 standards on several levels. One of the most difficult activities the engineer faced was applying the standards to the daily workload. Which task standards would be required on a given day? Where is the standard for that task filed? How is it quickly retrieved? Is it realistic to measure this kind of work with the same precision as high volume work? In short, the attempts failed. Another approach was needed.

Engineered Performance Standards.

After repeated attempts to use conventional work measurement failed, engineers sought new methods for assigning standards to maintenance work. The resulting standards were called Engineered Performance Standards (EPS) because they could be applied not just in one location, industry or service, or one country, they could be applied in every enterprise where maintenance and project work was performed—manufacturing, service, government, utilities, commercial, finance, education and healthcare. Standards could be applied to conventional building and equipment maintenance and also to the huge and rapidly growing information technology assets of an enterprise. In fact, many maintenance operations today do the installation of complete computer rooms with under-floor and overhead cabling, complete testing laboratories, LAN workstations and all of the necessary peripherals. Why not apply this vast body of standards knowledge and experience to IT work management? In addition to IT project management, standards can be applied to trouble call management at the help desk or support services such as purchasing and inventory control.

The EPS system is based on two important, statistics-based techniques: range-of-time and work-content-comparison. These techniques are described below.

Range-of-time. The range-of-time technique recognizes the variable nature of service work. A simple task such as removing and replacing peripherals such as printers and scanners may take more or less time depending on how the workstation is configured. The range of time is that variation in time that will cover 95 out of 100 situations with an

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accuracy of +/-5%. For example, the database development standard time of 1.2 hours represents a range from over 0.9 hours up to and including 1.5 hours. The planner applies a standard time of 1.2 hours to any job that falls in that range. Instead of an infinite number of decimal-hour task times, only 21 task times cover all jobs up to 32 staff-hours in duration.

Work content comparison. Even though the work accomplished is different, the motion pattern for two tasks may be much the same, and therefore, the time to perform them is the same. For example, hand threading a nut on a bolt is like screwing in a light bulb. Or replacing a wall light switch receptacle is the same as replacing a wall plug receptacle. If the time to perform one of the similar tasks is known, that time can be accurately applied to the other task using the work content comparison technique.

In large samples of data, task times applied using the range-of-time and work-content-comparison techniques were found to compare favorably with task times carefully measured using direct work measurement techniques. The EPS data was found to be within +/-5% of the true standard with 95% confidence. This means that, if one hundred EPS job samples, each sample containing forty hours of work, were taken, in 95 out of the 100 samples, the total time would be within the accepted industrial engineering accuracy range of +/-5% with only a small fraction of the application time required--therefore faster, better, cheaper.

Organizing the method and time data--one-time development stage

During the development stage, the IT planner organizes standard data in a building block fashion similar to bricks making up a wall. Five levels of data make up the UMS library: basic motions, basic operations, specific skill operations, bench marks and spread sheets. Basic motions. The foundation of UMS data is predetermined time system basic motions. A predetermined time system analyzes and classifies methods into basic motions and establishes a relationship between the motions and the time required to perform them. Examples of very widely used predetermined motion time systems are Maynard Operation Sequence Technique (MOST), MOST PC and Methods-Time Measurement (MTM).

These predetermined time techniques measure work by dividing it into basic motions such as reach, grasp, move, position, release, walk, read, write, etc. They include a means to document the motions, sequence of motions, frequencies and time. The time for each motion is picked from tables of predetermined times already developed, tested and proven by long standing application.

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Basic operations. The basic motions are grouped together to form basic operations, common to all IT skills. For example, one of the basic operations is manual handling. All IT technicians move things about in the work area, so basic operations include a table of object handling operations. The variables included in the table are weight of the object, distance moved and whether the object is located on a workbench or on the floor. From this table, already developed, all handling values are selected. Consistency, speed of application and accuracy of times are enhanced with this approach.

Specific skill operations. Some operation times are unique to a certain skill. For instance, database management operations are made up of analysis, design, development, testing, etc. The times are a function of the application and platform. Special data, called database operations data, are organized for application to this work. Similar specific skill data is available for other skills such as administrative, mainframe systems and programming, network hardware and software, PC hardware and software, and web applications.

Bench Marks. The IT planner selects table values from the basic operations and skill operations standard data to develop typical jobs—called bench marks—for each skill in the facility's IT department. The bench mark contains the method steps and the time for each step. It does several things: it provides a process for method engineering as the bench mark is created; then it acts as a method instruction once approved and applied to a work order. It is the first data level that documents a complete IT task.

Examples of network bench marks are "replace a router", "pull cable, connect and test", or "troubleshoot a control panel". A PC hardware bench mark is "replace a fan in a PC". A software example is "link tables in a many-to-many-relationship".

An example of an administrative bench mark is "prepare a purchase order from a requisition". Tasks are selected for bench marks because they represent the work most frequently performed by a group. If they are properly selected, a small number of bench marks, usually around 100, can be used to apply standards to all the work in a group. The planner uses the work content comparison technique to apply standards to work orders for which no bench mark exists, but which are similar in work content to the existing bench marks.

Using the EPS approach to work measurement, the planner can typically apply standards to all IT service and support work with 100 carefully selected bench marks for each specific skill included in the IT department. If there are five skills, about 500 of these bench marks are required, depending on the variability of the work. This technique substantially reduces the data library required compared to the direct standard method requiring thousands.

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Spread Sheets. Even with the advantages described above, there is still the challenge of managing 500 bench marks, quickly finding the appropriate one for an application, or finding the right bench mark for comparison with a work order for which no bench mark exists. The spread sheet fills these additional needs admirably.

The planner sorts the bench marks first by skill, then by task area within the skill, depending on the division of IT responsibility for that facility. Finally, the bench marks are sorted by range of time.

Examples of typical IT skill groups are PC hardware, main frame systems and programming, network hardware, and database software systems. Administrative groups such as purchasing can also be set up to handle commodity pricing, preparing RFPs and preparing RFQs.

The bench mark titles are listed on spread sheets in skill groups as sorted above. The spread sheets are the only references required for the actual day-to-day application of times to work orders. The other levels provide valuable backup that gives credibility to the times and can be used for staff training, periodic audits to ensure that the times are still valid and are being applied properly and for method improvements.

All work order times consist of four components: job preparation time, area travel time, job site time and allowances for personal, rest and minor unavoidable delays. The job preparation and area travel times are developed for each facility during bench mark development. The bench mark, job site, time comes from the spread sheets. The three components are added together, and the allowance is applied as a percentage of all three. Allowances are set by management policy. All four components are arranged on a single time calculation table. Once the time calculation table is developed, the whole application process takes only seconds for work orders that are several hours long.

Organizing for Work Management.

In most support organizations, without a formal planning function, both the staff technicians and supervision do the planning. There are several reasons why this does not work. First, several trips are made to the job site, first to talk to the customer and plan the job, then to go back to the shop or office and get tools, schematics, material order lists, and parts and possibly assistance from other skills. Second, the parts might not be in stores or information may have to be ordered so the support person has to find another job to do until the needed items arrive. If the supervisor checks the job, it takes time away from the main supervisory responsibilities—utilization and development of the staff. If a supervisor spends half the shift checking jobs and finding parts, manuals, etc., and has a

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staff of ten, the real ratio of supervisor to staff is 20:1, not 10:1. Little supervision or training gets done and project or service control declines.

The best organization for IT work management includes introduction of a small formal dedicated planning function. The planner role is to maintain a backlog of ready-to-work jobs for each staff person. Close communication with supervision is an important part of the process. The planner field checks jobs when needed, plans work content, verifies priority, identifies special tools, materials, requisitions non-stock or out-of-stock items, plans safety requirements, team size, skills, and time to do the work. The planner assists in developing service agreements for both project and service work. The planner also develops bench marks and maintains the data library. After the initial library is developed the management analyst serves as in-house auditor, performing an audit yearly to determine that the data and its application are accurate, or a consultant is called in for this purpose. The audit also verifies that time reporting is done properly—essential to accurate performance calculation as well as accurate and complete equipment cost.

Benefits of a planner function

Many operational assessments have been performed in all types of manufacturing, service and government enterprises. These assessments consistently show that a planner function and work measurement have substantial impact when applied properly and audited yearly. The proper ratio of planners to technicians is typically 20-30:1. The more proactive the operation, the more technicians a planner can support because preplanned work takes less planning time. Table 1 shows typical department sizes, appropriate number of planners, and the equivalent number of technicians the planner function will add to the workforce through higher productivity. Most departments, without planners, are about 50-60% productive. Productivity is raised to at least 80% with a planning function and accurate standards. This productivity improvement is very significant but only a part of the total savings. There are additional downtime reduction savings, life cycle cost reductions and on-time completion benefits. Whether the business operation is light manufacturing, heavy manufacturing, finance, healthcare, education or government operations, the principles and application are much the same. The continuous improvement opportunities revealed enable the enterprise to gain a competitive advantage, improve service to customers, and contribute to meeting other goals and objectives in the strategic plan.

Getting Started

The high priority startup tasks for a work management program fall into organization and process improvement categories as described below.

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Organization. Organization involves selecting planners using the 20-30:1 ratio above. Planner selection is one of the most important management decisions and has great impact on the success of the program. The planners must have good skills and previous experience in the work being planned. In short, the selected planners are the ones you can least afford to lose from the technical staff group. If they meet this test, you have made a good selection. The benefit is this. Working as a technician, they applied their unique skills and experience to only the jobs they worked on. As planners, they will transfer their capabilities to everyone in the workforce on every routine task, service trouble call or project work order they plan. This planner function is the ultimate expert system and brings credibility to the IT operation. It is a continuous on-the-job training program. Moreover, it can be used as a career path to supervision, a basis for performance management, a means to measure the current work backlog, and a consistent basis for staffing adjustments.

Process improvement. Processes involve standard data development and work order planning. Most of the data development has been completed already by industrial engineers and can be obtained from consultants at far lower cost and less time than developing it. All the levels of data have been developed or validated before, so the manager can save many years of development time simply by purchasing the data software and validating it for the facility in which it will be used. A cautionary word. As with any technique, mastery of the system through training and practice is a prerequisite to using the data to measure work. A worthwhile option to consider is to hire a consultant to do the planner training, supervisor training, guided application and to make available a set of basic operations, specific skill operations and bench marks. The newly trained planners validate these data under the consultant's guidance. They can do this one-time development project in two to three months and, in the process, become familiar with the data before they start applying it to the workload.

Depending on the age of the help desk work order process, equipment record process, stores process, and performance management process used, this may be an ideal time to update them. A good clue to need for better stores control, for example, is if a walk-around shows that boxes are stacked everywhere including the IT staff's cubicles. If you haven’t done this updating in the last three to five years, you can take advantage of the new technology available to get a high-productivity, web-linked computerized work management and stores system, bar coding and other improvements.

At a minimum, the work order system used should be examined to see how the standard times would be applied. The "should take"times and a work plan should appear on each work order so the technician knows the goal. This is great motivational and training tool. The work order should also be checked to see how the time reporting is done. You may

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need to add or update performance and delay reporting or other work reporting to ensure that your performance and equipment history records are accurate.

The stores process should be checked to see if you could get a quick read on the inventory value at any time. Also the issue process should not take more than a few minutes. If cost is high, service takes too long, material location control is a problem, or there are too many stock-outs or other delays, unrealized opportunity lurks there waiting to be revealed.

One might ask, "What has the material availability to do with work management?" The answer is that, if the standard says the job should take one hour, and it takes two hours, not unusual in service or project work because of material delays, then you will increase productivity and reduce cost when the delay cause is fixed.

For an enterprise that earns 5% on revenue, a $50,000 cost reduction is equivalent to a $1,000,000 revenue increase. Work management is where the return on the investment is. You may not be sure were your next million in revenue will come from, but a one-week operational assessment can show you where and how much the potential cost reduction is. It will provide information to determine the savings potential and justify your Work Management Program, based on a formal planning function and solid work measurement using Engineered Performance Standards. In the fast-paced IT worlds you will differentiate your service by delivering faster, better, cheaper.

For further reading

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Table 1. Relationship of number of employees to planners and additional, predictable amounts of work with the same staff.

Number of Staff	Number of Planners	Number of Equivalent Staff Added
150	5	30 to 45
100	4	20 to 30
75	3	15 to 22
50	2	10 to 15
30	1	6 to 9
20	1	4 to 6
10	1/2	2 to 3

Bio Sketch

Tom Westerkamp is a consultant, author, and speaker. He is founder and CEO of Productivity Network, Inc, a productivity improvement consulting firm. He has assisted clients in over fifty productivity improvement training, development and installation consulting programs; speaks at client seminars and public conferences; authored two books and over 80 articles and software programs. He is Contributing Editor for Maintenance Solutions magazine and a contributor to Maynard's Industrial Engineering Handbook, McGraw-Hill. His phone is 800-828-6826, or tawest@pninc.com

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