



The ACE Team Benchmarking Process:

A Proven Maintenance Work Measurement Technique for Reliable Planning Times
(*Available Soon in New Integrated Electronic Format)

Define Total Maintenance Requirements:

Top Leaders and Maintenance Leaders must know their “total maintenance requirements” in terms of craft labor hours needed for PM, corrective and reactive work, project work and deferred maintenance. This is essential information related to the demand for service and maintenance’s capability to provide the needed services. Therefore having reliable estimated labor hours impacts weekly schedules, overall backlog reporting, decisions on overtime, and use of contractors in addition to important management decisions on craft staffing levels. Also reliable planning times allow maintenance to support measurement of Overall Craft Effectiveness (OCE) and then document that maintenance resources are being fully utilized.

A True Team-Based Approach:

The ACE System methodology relies primarily on the combined experience and estimating ability of a group of skilled crafts people, planners and others with the technical knowledge of the repairs being made within the operation. Here we will outline a new and highly recommended methodology for establishing team-based maintenance performance standards which we call **reliable planning times**. The ACE Team Benchmarking Process (ACE System) was developed by TMEII founder back in the 1980s. It is a true team-based process that utilizes skilled crafts people, technicians, supervisors, planners and other knowledgeable people to do several things:

1. Review and improve current repair methods and reliability
2. Improve safety and quality of repairs
3. Define “benchmark jobs”
4. Establish “spreadsheets” by type of trade work
5. Allow planners to perform “work content comparison”
6. Establish work content time for selected “benchmark jobs” for planners and others to use in developing **reliable planning times**

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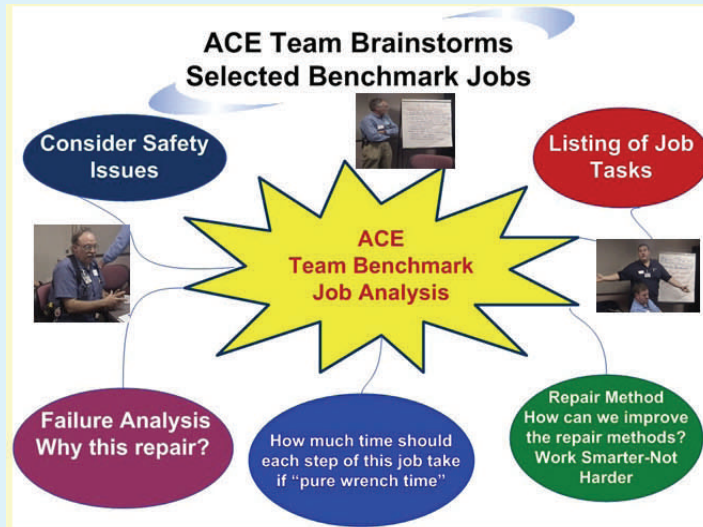
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Benchmark Jobs:



This is a proven process that uses "A Consensus of Experts" (ACE) who have performed the selected benchmark jobs. These jobs are reviewed for major tasks, safety, and quality of work issues as well as what are the best methods, tools required to help improve them. In turn, a relatively small number of representative "benchmark jobs" is developed for the major work areas/types within the operation. Benchmark jobs are basically job plans with detailed tasks listings. Within organizations having existing job plans already established, these can be reviewed by the ACE Team. Benchmark jobs are then arranged into time categories ("time slots") on spreadsheets for the various craft work areas such as mechanical, electrical, etc.

ACE System Time Ranges:

Time Ranges:

The ACE System is based upon the range of time concepts where, for example, benchmark jobs ranging from .9+ hours to 1.5 hours are assigned a Standard Time or slot time of 1.2 hours as illustrated. Time ranges increase for larger jobs. For example Work Group T ranges from 28+ to 32 hours with a slot time of 30 hours.

Spreadsheets:

Spreadsheets have four (4) time ranges each based on the ACE System time ranges shown and include only a brief description of each benchmark job. By using spreadsheets to do what is termed "work content comparison" or "slotting", a planner is then able to establish planning times for a large number of jobs using a relative small sample of "benchmark jobs". Spreadsheets are set up for each major type of craft work performed such as mechanical electrical etc. Typically only 2 to 4 benchmark jobs per Work Group is required.

The ACE System Time Ranges

WORK GROUP	ACE SYSTEM TIME RANGES		
	FROM	STANDARD TIME (Slot time)	TO
A	0.0	.1	.15
B	.15	.2	.25
C	.25	.4	.5
D	.5	.7	.9
E	.9	1.2	1.5
F	1.5	2.0	2.5
G	2.5	3.0	3.5
H	3.5	4.0	4.5
I	4.5	5.0	5.5
J	5.5	6.0	6.5
K	6.5	7.3	8.0
L	8.0	9.0	10.0
M	10.0	11.0	12.0
N	12.0	13.0	14.0
O	14.0	15.0	16.0
P	16.0	17.0	18.0
Q	18.0	19.0	20.0
R	20.0	22.0	24.0
S	24.0	26.0	28.0
T	28.0	30.0	32.0

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ACE System Example Spreadsheet for Work Groups E, F, G and H:

Example Spreadsheet for Work Groups E, F, G and H			
CRAFT: _____		CODE: _____	
Task Area: Task areas would be mechanical, electrical, hydraulic, etc or by major areas such as a specific asset, fork lifts, conveyor systems or building systems types of repairs.			
Group E: 1.2 Hours (.9+) (1.5)	Group F: 2.0 Hours (1.5+) (2.5)	Group G: 3.0 Hours (2.5+) (3.5)	Group H: 4.0 Hours (3.5+) (4.5)
Job Description A	Job Description E	Job Description I	Job Description M
Job Description B	Job Description F	Job Description J	Job Description N
Job Description C	Job Description G	Job Description K	Job Description O
Job Description D	Job Description H	Job Description L	Job Description P
NOTES:			

Work Content Comparison or Slotting:

Using Benchmark Job Spreadsheets for Estimating Wrench Time

Benchmark Jobs
In Work Group E
1.2 Hrs
Range: 0.9 to 1.5 Hrs

Benchmark Jobs
In Work Group F
2.0 Hrs
Range: 1.5 to 2.5 Hrs

Benchmark Jobs
In Work Group G
3.0 Hrs
Range: 2.5 to 3.5 Hrs

Planner
Knows for
Sure
Job Greater
Than
1.2 Hrs

Job To Estimated:
Planner Slots
Job at 2.0 Hrs

Planner
Knows for
Sure
Job Less
Than
3.0 Hrs

Slotting Provides 95% Accuracy that
the Work Content Ranges from 1.5 Hrs to 2.5 Hrs

The example shown illustrates how a planner would do work content comparison. First the job to be estimated may not be on a spreadsheet so the planner then looks at work content of jobs on their existing spreadsheets. Here they will see Work Group jobs like those in Work Group E of 1.2 hours requires more time than their job being estimated has more work content. Also they see nothing in Work Group F of 2.0 hours that matches the job being estimated. However, when they review the jobs in Work Group G of 3.0 hours and they are for sure that their job being estimated has less work content than their job being estimated. In this case, they then slot their job into Work Group F at 2.0 hours of work content time.

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Work Content Comparison or Slotting (cont'd):

In this case, they then slot their job into Work Group F at 2.0 hours of work content time. Slotting provides 95% that the work content time of the estimated job ranges between 1.2 and 3.0 hours. This illustrates how an experienced planner reviews "work content" of jobs and uses work content comparison to define the time range for the wrench time. **Note:** Allowances for the "Make Ready and Put Away" activities must also be considered to define the total planning time for each job which includes travel, getting parts etc

Maintenance work, by its very nature, seldom follows an exact pattern for each occurrence of the same job. Therefore, exact methods and exact times for doing most maintenance jobs cannot be established as they can for production-type work. However, the need for having reliable performance measures for maintenance planning becomes increasingly important as the cost of maintenance labor rises and the complexity of production equipment increases.

Nearly every computerized maintenance management system (CMMS) allows a user to enter "planned" or "standard" hours on a work order, and then report on actual versus planned hours (the Craft Performance element of OCE) when the job is complete. This holds true for both preventive and corrective maintenance work orders as well as a project type work for renovation, major overhauls and capitalized repairs. Most do not use this for one main reason; they do not have reliable planning times or standard hours available.

Determining the standard hours an average maintenance technician will require to complete a task under standard operating conditions provides everyone involved a sense of what is expected. The standards provide management with valuable input for backlog determination, manpower planning, scheduling, budgeting and costing. Labor standards also form the baseline for determining craft productivity and labor savings for improved methods.

The Goal is To Work Smarter, Not Harder:

Maintenance work must be planned, have a reasonable time for completion, use effective and safe methods, performed with the best personal tools and special equipment possible and have right craft skill using the right parts and materials for the job at hand. With an investment in maintenance planners there must be a method to establish reliable planning times for as many repair jobs as possible. The ACE System provides that method as well as team-based process to improve the quality of repair procedures. Various methods for establishing maintenance performance standards have been used, including reasonable estimates, SWAGs, historical data, and engineered standards such as Universal Maintenance Standards (UMS) using predetermined standard data. These techniques generally require that an outside party establish the standards, which are then imposed upon the maintenance force. This approach often brings about undue concern and conflict between management and the maintenance work force over the reliability of the standards.

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The ACE System: A Team-Based Approach:

Rather than progressing forward together in a spirit of continuous improvement, the maintenance work force in this type environment often works against management's program for maintenance improvement. The ACE System overcomes this problem with a team-based approach involving craft people who will actually do the work that will be planned later as the planning and estimating process matures. As shown later, The ACE System is truly a team-based process that looks first at improving maintenance repair methods, the reliability of those repairs to improve asset uptime and then secondly to establish a benchmark time the job.

The ACE Team overcomes many of the inherent difficulties associated with developing maintenance performance standards. The ACE (A Consensus of Experts) System is recommended and should be established as the standard process for modern maintenance management. Other methods such as the use of standard data can supplement the ACE System. The ACE System methodology relies primarily on the combined experience and estimating ability of a group of skilled crafts people, planners and other with technical knowledge of the repairs being made within the operation.

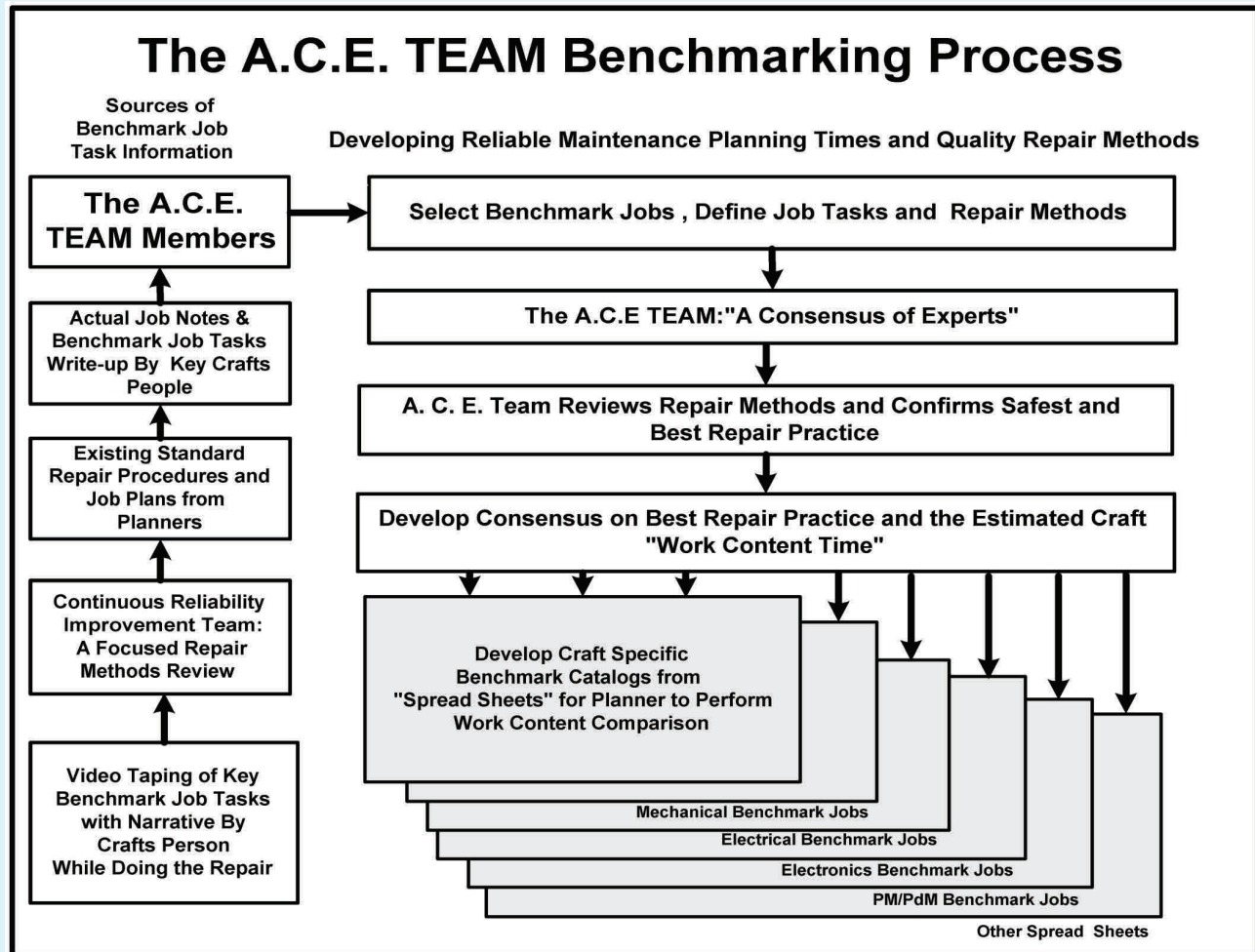
The objective of the ACE Team Benchmarking Process is to determine reliable planning times for a number of selected "benchmark" jobs and to gain a consensus and overall agreement on the established work content time. This system places a very high emphasis on improving current repair methods, continuous maintenance improvement, and the changing of planning times to reflect improvements in performance and methods as they occur. The ACE System is a very progressive method to developing maintenance performance standards a very hard area in itself to develop reliable and well-accepted planning times for maintenance.

The ACE Team approach combines the DELPHI technique for estimating along with a proven team process plus the inherent and inevitable ability of most people to establish a high level of performance measures for themselves. As used in this application, the objective for the ACE Team process is to obtain the most reliable, reasonable estimate of maintenance-related "work content" time from a group of experienced crafts people, supervisors and planners. This process provides an excellent means to evaluate repair method, safety practices and even to do risk analysis on jobs that leads to improved safety practices.

The ACE Team process map shown below can contribute significantly to continuous reliability improvement. Application of the ACE System promotes a commitment to quality repair procedures and provides the foundation for developing reliable planning times for a wide range of maintenance activities.

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Electronic Version of The ACE Team Benchmarking System:

TMEII is currently developing an electronic version that will have all spreadsheets and benchmark jobs within an integrated system for spreadsheets by craft work type and all benchmark jobs linked to their respective spreadsheet. This will allow the planner to have easy access to complete details of each benchmark job. Since benchmark jobs are basically job plans, this will give the planner a complete job plan file that can easily be referenced as templates for additional job plan development.

Like Even More Information? Please contact:

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