Maximizing Maintenance Operations for Profit Optimization:

The Journey to Maintenance Excellence

February 2002

Establishing a Strategy for Profit-Centered Maintenance

By

The Maintenance Excellence Institute

Division of Ralph W. Peters and PEOPLE Inc.

Part IV: Path Forward to a Profit-Centered Maintenance Operation

Ralph W. "Pete" Peters
The Maintenance Excellence Institute
Division of Ralph W. Peters and PEOPLE Inc.
6809 Foxfire Place, Suite 100
Raleigh, North Carolina 27615
919-846-6019
RalphPetePeters@aol.com
http://www.PRIDE-in-Maintenance.com

Introduction: Part IV provides a recommended strategy used successfully by The Maintenance Excellence Institute for manufacturing maintenance operations, as well as operations in both the public and private sectors including pure facilities maintenance operations, healthcare maintenance and even major contract maintenance providers where in house maintenance has been "contracted out" or privatized. This part defines three key elements that help turn improvement opportunities into visible profit-centered results. These elements all contribute directly to profit optimization and include how to:

1. Determine and quantify benefits and savings
2. Improve craft productivity, the most valuable resource
3. Define a path forward strategy to implement improvement opportunities

This section summarizes the many direct and indirect savings opportunities and illustrates how one of those opportunities; increased craft productivity can be included as gained value. It shows how just one of many best practice areas from *The Scoreboard for Maintenance Excellence*; effective shop level planning and scheduling provides more than a 5 to 1 return on the investment for just one planner position for a 20 person craft work force. When maintenance becomes truly profit-centered, ranging from attitudes to actions, the profit optimization process has another very real element to include in the final tally.

Determine and Quantify Benefits and Savings: Potential savings (both tangible and intangible) must be estimated and established at their most realistic levels. Maintenance must be given the best practice tools, the people resources, and capital investments to address the improvement opportunities and in turn are held accountable for results.

There are a number of key areas where direct savings, cost avoidances and gained value can be established, documented.

a. Gained value from increased craft labor utilization/effectiveness due to increases in wrench time
b. Gained value from increased craft labor performance/efficiency
c. Gained value of clerical time reductions for supervisors, planners, engineering and admin staff
d. Value of asset/equipment uptime
e. Value of facility availability or cost avoidance from be non-available
f. Value of MRO materials and parts inventory reduction
g. Value of overall MRO materials management improvement
h. Value of overall maintenance costs reductions with equal or greater service levels
i. Value of increased facility and equipment life and net life cycle cost reduction
j. Value of increased direct labor utilization (production operations)
k. Value of operations productivity increases (production operation)

Craft Productivity: Let's look at one example related to craft productivity. Surveys consistently show that wrench time (craft utilization) within a reactive, fire fighting maintenance environment is within the range of 30 to 40 percent. This means that for a ten hour day there is only four hours of actual hands-on, wrench time. Typically, low craft utilization is due to no fault of the craft work force. Most of the lost craft labor productivity can be attributed to the following reasons:

1. Running from emergency to emergency; a reactive, fire fighting operation
2. Waiting on parts and finding parts or part information
3. Waiting on other information, drawings, instructions, etc.
4. Waiting for the equipment to be shut down
5. Waiting on rental equipment to arrive
6. Waiting on other crafts to finish their part of the job
7. Travel to/from job site
8. Lack of effective planning and scheduling
9. Make-ready, put away, clean up, meetings, troubleshooting, etc.

The Most Valuable Resource: Maintenance operations that continue to operate in a reactive, run-to-failure, fire fighting mode and disregard implementation of today's best practices will continue to waste their most valuable asset and very costly technical resource - craft time. Best practices such as effective maintenance planning/scheduling, preventive/predictive maintenance, more effective storerooms and parts support all contribute to proactive, planned maintenance and more productive hands on, "wrench time".

An improvement in actual wrench time from 40% to 50% represents a 25% net gain in craft time available and a significant gained value. When we are able to combine gains in wrench time with increased craft performance when doing the job we increase our total gain in craft productivity. Measuring and improving overall craft productivity can be a key component to justify an effective CMMS and other investments for maintenance improvement.

Gained Value of 10% in Wrench Time: What if through better planning and scheduling, good parts availability and having equipment available to fix it on a scheduled basis, we are able to increase actual wrench time by 10 percent? What is the value to us if we get that 10 percent increase across the board for a 20- person crew operating now at 40% wrench time being paid an average hourly rate of $18 per hour.

Total Craft Hours Available and Annual Craft Labor Costs

	Hrs.	
20 Crafts x 40	wk.	x 52 wks./yr. = 41,600 Craft Hours Available

41,600 Craft Hours @ $18/hr. = $748,800 Craft Labor Cost/Year

Wrench Time and Actual Costs Per Hour at Various Levels of Craft Utilization

Level of Craft Utilization	Total Wrench Time (Hours)	Actual Hands On Cost Per Hour	Average Wrench Time Hours Per Craft Position
30%	12,480	$60.00	624
40%	16,640	$45.00	832
50%	20,800	$36.00	1040
60%	24,960	$30.00	1248
70%	29,120	$25.71	1456
***80%**	**49,920**	**$22.50**	**1664**
***85%**	**35,360**	**$21.18**	**1768**
90%	37,440	$20.00	1872
100%	41,600	$18.00	2080

Note: Maximum possible craft utilization is ≈ 80 to 85 percent considering paid holidays, vacation time, breaks, clean-up, employees meetings, craft training, etc. See Figure IV-1

For Example: With effective planning and scheduling we can achieve at a minimum a 10 point improvement in craft utilization. From a baseline of 40 percent up to a level of 50 percent we in effect get a 25 percent increase in craft capacity for actual work.

- **Total Hours Gained in Wrench Time: 4,160 hours gained**

20,800 hours @ 50% - 16,640 hours @40% = 4,160 hours gained

- **Total Gain in Equivalent Number of Crafts Positions: 5**

$$\frac{\text{4,160 Hours Gained}}{\text{832 Average Wrench Time Hours @ 40\%}} = \text{5 Equivalent Craft Positions}$$

- **Total Gained Value of 5 Equivalent Positions: $280,800**

$$\text{5 equivalents} \times 40 \frac{\text{hrs.}}{\text{wk.}} \times 52 \frac{\text{Wks}}{\text{yr.}} \times \frac{\$18.00}{\text{hr.}} = \$187{,}200 \text{ Gained Value}$$

Valuable Craft Time Can Slip Away: With only a 10% improvement up to 50% wrench time, the 20-person craft work force operating at 40 percent craft utilization baseline, the 4,160 hours of wrench time gained represents a 25 percent increase in craft labor capacity. The maintenance best practice for planning and scheduling requires dedicated a planner(s). An effective maintenance planner in turn can support and plan for 20 to 30 crafts positions. With only a 10 percent increase in craft utilization for a 20-person craft work force, can be much more than a 5 to 1 return to offset a maintenance planner position.

Figure IV-1 on the next page illustrates “How Your Valuable Craft Time Can Slip Away”.

Figure IV-1

How Your Valuable Craft Time Can Slip Away

Total Available Days: 52 Weeks/Yr x 5 Days/Week = 260 Available Days Maximum Without Overtime

260 Total Days – 10 Days Holiday Per Year = 250 Days Now Available

250 Days/Yr –15 Vacation/Sick Days Average Per Year = 235 Days Now Available

235 Days/Yr – 15 Days Break Time* Per Year = 220 Days/Year

Now Available

Note*: 15 min x 2 breaks/day
= ½ hour/day x 235 days
=117.5 hours ÷ 8 hours/day
=15 Total days Per Year

Bottom Line: 220 days ÷260 days = .846 = 85% +/- Craft Time Available for Work

Various Levels of Wrench Time

85%	=	Maximum Craft Utilization
70%	=	World-Class Wrench Time
60%	=	Very Good Wrench Time
50%	=	Good Wrench Time
40%	=	Above Average Wrench Time
30%	=	Average Wrench Time
20%	=	On Call: The Maytag Repairman
10%	=	On Call: The Maytag Repairman

The planner(s) position is normally recruited internally and not replaced. The additional craft capacity and productive craft time that is gained can be used to:

- ✓ Accomplish deferred repairs
- ✓ Accomplish PMs being neglected
- ✓ Reduce overtime
- ✓ Accomplish work done by contractors
- ✓ Reduce need to add or replace staff

Develop and Implement Strategic Action Plan: Successful implementation of maintenance best practices is the objective and represents the culmination of doing an effective overall evaluation and having a well-defined plan of action developed from recommendation that evolve from it. The results from the evaluation sets the stage for a prioritized plan of action. A project team is then defined and a more detailed project plan with tactical and operational tasks/plans to support strategic plan implementation. The major phases of a strategic plan of action may look something like the following:

Phase I: Establish Strategic Plan of Action

- Evaluate and Select CMMS
- CMMS Implementation
- Best Practice Development and Implementation Planning
  - Initiate Effective Planning and Scheduling
  - MRO Materials Management and Procurement Improvements
  - Storeroom Modernization
  - More Effective Preventive and Predictive Maintenance Technology

Phase II: Develop and Establish Maintenance Planning Function

Phase III: Evaluate, Select and Implement CMMS

Phase IV: Develop and Implement Storeroom Modernization, MRO Improvements

Phase V: Implement Other Maintenance Best Practices

Phase VI: Measure Maintenance Performance and Validate Benefits with Maintenance Excellence Index (MEI in Part V)

Phase VII: Continuous Maintenance Improvement

The Real Work is Implementation: Successful implementation is the ultimate objective that provides maximum value to your maintenance operation. It is very important to remember the 90-10 Rule for projects. Ninety percent of the real project work comes during the implementation and normally the easiest part is planning which is only ten percent of the work. Never underestimate the resources needed for implementation. Begin implementation with clearly defined plans for each area of the strategic plan as well as tactical and operational level tasks and actions. Never begin implementation without methods in place to validate results especially if you use external consulting resources. External resources at times might "borrow your watch to tell you the time and then walk off with your watch before implementation".

Profit Optimization is About Total Operations Success and Profit: Part IV has provides a recommended strategy used successfully for manufacturing maintenance operations, as well as operations in both the public and private sectors and even for major contract maintenance providers. It has looked at three key elements that help turn improvement opportunities into visible profit-centered results and support to profit optimization and include how to:

1. Determine and quantify benefits and savings
2. Improve craft productivity, the most valuable resource
3. Define a path forward strategy to implement improvement opportunities

There are many direct and indirect savings opportunities and we illustrated how to capture one of those opportunities; increased craft productivity as gained value. Just one of many best practice areas from *The Scoreboard for Maintenance Excellence*; effective shop level planning and scheduling by a single planner can provides more than a 5 to 1 return on the investment for a 20 person craft work force. When maintenance becomes truly profit-centered, ranging from attitudes to actions, the profit optimization process has another very real element to include in the final tally for the total operation.

You Can Get Maximum Value from Your Maintenance Operation: You can maximize your total maintenance operation for profit optimization by successful implementation of strategic, tactical and operation level actions. To find out the best approach for your organization, for help with planning the pilot evaluation and to receive a complete copy of this five-part series contact.

Ralph “Pete” Peters
The Maintenance Excellence Institute
6809 Foxfire Place, Suite 100
Raleigh, NC 27615
E-Mail: RalphPetePeters@aol.com
Office: 919-846-6019
Fax: 919-846-9804
http://www.PRIDE-in-Maintenance.com

Bio of Ralph W. "Pete" Peters

President and founder for **Ralph W. Peters and PEOPLE Inc.** a consulting firm with three divisions for total operations improvement; The Maintenance Excellence Institute (maintenance), The Manufacturing Excellence Institute (manufacturing) and The Institute for Public Service Excellence (governmental). His practical engineering experience and technical leadership in the maintenance, manufacturing and governmental productivity consulting fields has helped hundred of operations achieve manufacturing operations success and maintenance excellence in plant, fleet and facility maintenance operations.

His scope of experience in governmental operations productivity has firmly established his personal capabilities and that of The Institute for Public Service Excellence to support value added government services. Pete is a senior member of the Institute of Industrial Engineers, the Association of Facility Engineers and the Society of Maintenance and Reliability Professionals He has been involved in manufacturing operations management, systems implementation, facilities management, maintenance and governmental productivity consulting for more than 30 years. He is retired from the US Army Corps of Engineers/NC Army National Guard (1995) with 28 years of service and serving in Viet Nam and during Desert Storm.

Pete is author of the upcoming books; *Profit-Centered Maintenance: The New Millennium Strategy for Maintenance Excellence* and *PRIDE in Maintenance*. He is editor/primary author for *The Guide to Computerized Maintenance Management Systems*, Scientific American Newsletters LLC, author of the maintenance chapters in *The Warehouse Management Handbook* and *The Future Capable Company* from Tompkins Press and John Wiley's new *Handbook of Industrial Engineering*, *3rd Edition*. A recognized leader in the areas of implementing manufacturing and maintenance best practices, profit-centered maintenance, performance measurement, productivity improvement for government operations and providing value-added total operations consulting, He is also the author of over 200 articles and publications and as a frequent speaker has delivered presentations on manufacturing and maintenance-related topics worldwide. He received his BSIE and MIE from North Carolina State and is a graduate of the US Army Command and General Staff Course and the Engineer Officers Advanced Course.

Clients from the manufacturing and maintenance sectors have included operations in the petrochemical, aerospace, manufacturing, mining, pharmaceutical, hand-tool manufacturing, utilities and automotive industries, in addition to construction fleet management, public transit operations and facilities management for healthcare, educational and governmental facility complexes.