
TARGETS
The Maintenance Excellence Institute
World Wide Services – Measured Shop Level Results

Introducing
TARGETS for RELIABILITY and MAINTENANCE EXCELLENCE

The Maintenance Excellence Institute

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Sample Path Forward Plan: Company ABC

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Just Do It!

This Plan of Action is a real proposal. It represents our standard process to take aim at your *Targets*. It is a synergistic combination of a comprehensive Scoreboard assessment with focused, JIT training via TrueWorkShops & validated profit-centered results from implementation. The Investment depends on size/scope of each operation.

Introduction

- **The Maintenance Excellence Institute was invited to propose maintenance improvement opportunities for Company ABC.**
- **Bottom Line: ABC like all most, has significant opportunities to achieve measurable potential direct and tangible benefits**
- **This plan of action outlines an approach for;**
  - **Moving toward reliability & a profit-centered maintenance strategy**
  - **An assessment, training and implementation of best practices**
  - **Measuring and validating Company ABC's results**
  - **Investing less than $50,000 for at least a 10 to 1 return on maintenance investment (ROMI)**
- **Like many of our past clients, Company ABC has the opportunity for a big ROI from a very small investment.**
- **Here we will also introduce our new *TARGETS* approach for:**

"Taking Aim at Recommendations to Gain Excellence from Training Success"

Know Your Current State of Maintenance

- **The following slide includes *"The Reliability Pyramid"* with the five stages of development for a typical operation.**
- **ABC is still in Stage 1: Daily Maintenance & wants to continuously improve & not gamble with maintenance.**
- **Achieving manufacturing and reliability excellence in Stage 5 is the goal to ensure total operations success.**
- **ABC realizes that a solid foundation in Stage 1 with basic best practices must remain solid.**
- **Moving up to Proactive Maintenance in Stage 2 & beyond with significant benefits can be achieved by ABC.**
- **A strong team effort between Company ABC and The Maintenance Excellence Institute staff will define the current "state of maintenance for lasting improvements.**

The Reliability Pyramid

Courtesy of Strategic Asset Management

STAGE 5
Operational Excellence

Assure alignment of financial operations, corporate leadership, sales and marketing, and customers

STAGE 4
Engineered Reliability

Systematically eliminate sources of potential system failure

STAGE 3
Organizational Excellence

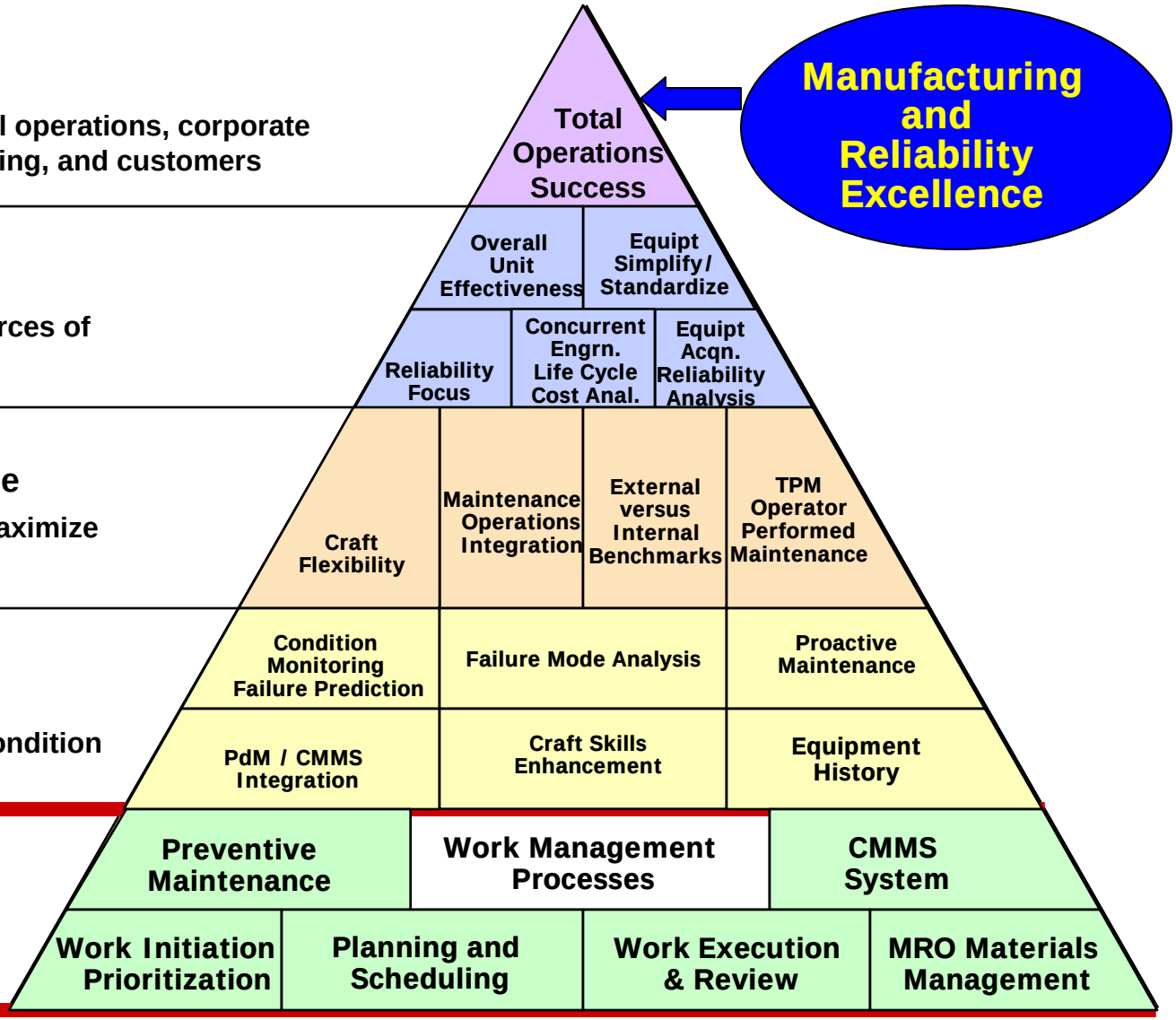
Create the environment to maximize the staff contribution

STAGE 2
Proactive Maintenance

Gain control of equipment condition

STAGE 1
Daily Maintenance

Gain control of the work



Typical Improvement Opportunities

- **Effective Planning, Estimating & Scheduling is about;**
  - ✓ Improving and measuring craft labor productivity
  - ✓ Improving OEE and asset utilization
- **Equipment maintenance not using a work order system**
  - ✓ Work accomplished & failures needs to be documented.
  - ✓ Work order not defining root causes of downtime
- **Current PM program needs to be reviewed & upgraded**
  - ✓ Review of existing tasks, frequencies and time required
  - ✓ Determine maintenance strategies via an RCM approach
  - ✓ Review application of predictive maintenance technology
  - ✓ Establish a measurement process that ensures effective PM

Typical Improvement Opportunities

- **Modernize Storeroom Operations**
  - ✓ Significant inventory reduction possible; 10% to 20% minimum
  - ✓ Tool Room can also benefit greatly from the planning and scheduling process
  - ✓ Control &location of satellite stores needs immediate attention
  - ✓ Critical spares need attention or obsolete items purged
- **Asset numbering system needs to be upgraded**
  - ✓ Numbering of equipment often needs to be completed or improvement.
  - ✓ Often analysis of specific component failures not possible
  - ✓ Information not available for improving reliability
  - ✓ Correct asset numbering supports future bar coding
  - ✓ Often production or facilities equipment needs to be reviewed for numbering at major component level.

Typical Improvement Opportunities

- **Improved Measurement of Results: All most operations need help here. We help implement this to ensure that our projected benefits can validated. For example;**
  - ✓ **% Planned versus % True Emergency**
  - ✓ **% Craft Performance & Craft Utilization (Wrench time)**
  - ✓ **% Craft Service Quality**
  - ✓ **% PM Compliance and % Craft Hours for PM**
  - ✓ **Number of Work Orders from PM Inspections**
  - ✓ **% Inventory Reduction**
  - ✓ **% Inventory Accuracy**
  - ✓ **Number of Stock Outs**
  - ✓ **OEE (A current measurement)**
  - ✓ **% Schedule Compliance**
  - ✓ **Planned Cost versus Actual Cost (Large Jobs)**

The following slide illustrates how a reactive maintenance strategy can waste a very important and often scarce resource; craft skills and people resources.

Planning & Scheduling Will Increase Wrench Time and Craft Productivity

Typical Maintenance Worker's Day	Reactive No Planning	Proactive Planned
Receiving Job Instructions	5%	3%
Obtaining Tools and materials	12%	5%
Travel To and From Job (Both with and without tools & materials)	15%	10%
Coordination Delays	8%	3%
Idle at Job Site	5%	2%
Late Starts and Early Quits	5%	1%
Authorized Breaks and Relief	10%	10%
Excess Personal Time (Extra breaks, phone calls, smoke breaks, slow return from breaks/lunch)	5%	1%
Subtotal Non-Productive Time	65%	35%
Direct Wrench Time Available for Work	35%	65%

Industry surveys continuously show that wrench time is only 30% to 40% for a reactive, unplanned operation. Some are less than 30%!

Productivity Improvement for a Large Plant's Central Maintenance Operation

Central Maintenance Without Planning	Central Maintenance With Planning
0 Planner 30 Total Crafts 35% Wrench Time 11 Equivalent Full Time	1 Planner 29 Total Crafts 65% Wrench Time 19 Equivalent Full Time Workers
Net Gain of 8 Equivalent Craft Positions	
Net Gain in Craft Capacity = 73%	
Gained Value = 8 crafts x $25/Hr Avg. x 40 Hrs/Wk x 52 Wks/Yr = **$416,000 Gained Value**	

Case Study

Wrench time improvement of 30% from an estimated baseline of 35% to 65% is very realistic with an effective planning and scheduling process in place.

Productivity Improvement for a Large Plant's Equipment Maintenance Staff

Equipment Maintenance Staff Without Planning	Equipment Maintenance Staff With Planning
0 Planner 173 Total Crafts 30% Wrench Time 52 Equivalent Full Time	2 Planners 171 Total Crafts 50% Wrench Time 86 Equivalent Full Time Workers
Net Gain of 34 Equivalent Craft Positions	
Net Gain in Craft Capacity = 65%	
Gained Value = 34 crafts x $25/Hr Avg. x 40 Hr/Wk x 52 Wks/Yr = **$1,768,000 Gained Value**	

Wrench time improvement of 20% from an estimated baseline of 30% to 50% is very realistic with an effective planning and scheduling process in place.

Potential Benefits Example

The Maintenance Excellence Institute's most recent project had the potential for the following direct benefits;

- ✓ **Central maintenance: Wrench Time Gain of 30% and 8 equivalent crafts (8 x $52,000/yr = $416,000 productivity gain)**
- ✓ **Production maintenance: Wrench Time gain of 20% and 34 equivalent crafts (34 x $52,000/yr = $1,768,000 productivity gain)**
- ✓ **OEE increase by 2% = Value of $350,000 in production gain**
  - **Based upon value of a 1% OEE gain as $175,000**
- ✓ **Inventory Reduction: 10% of $4,600,000 = $460,000**
  - **$460,000 one time reduction**
  - **Carrying Cost/Yr: $460,000 x 8% = $36,800/yr**
- ✓ **Total Potential Benefits: $3,030,800**

And the Maintenance Excellence Index will be implemented for Company ABC to validate its potential benefits

Improving & Measuring Craft Productivity

Most of the lost wrench time is not the fault of the crafts workforce. It can be attributed to the following reasons:

1. Running from emergency to emergency; a reactive, fire fighting operation
2. Waiting on parts, tooling and finding parts/special tools 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 or contractors to finish their part of a job
7. Travel to/from job site; walking with parts/tools or driving
8. Make-ready, put away, clean up, meetings, troubleshooting, etc.

30-40% Industry Wide Average for Wrench Time

Cause: Lack of Effective Planning, Estimating & Scheduling

Measuring Overall Craft Effectiveness (OCE)

Planning, Estimating & Scheduling Process & Can Measure and Improve the Three Elements of Overall Craft Effectiveness:

1. ***Craft Performance:*** **Planners will apply planned time to as many jobs as possible. Comparing planned hours to actual hours required provides the Craft Performance measurement data comes from the work order system.**

2. ***Craft Utilization (Wrench Time):*** **This measurement will require the reporting of non wrench time and is calculated by:** ***Total Wrench Time Hours ÷ Total Hours Paid = % Wrench Time***

3. ***Craft Service Quality:*** **This is the quality factor for Craft Productivity. It measures call backs for jobs not completed correctly the first time. It is relatively easy to obtain from monitoring of work by planners, supervisors and the customer.**

Case Study

Timing of Benefits for ABC

This timeline can be achieved at ABC depending on successful best practice implementation.

- ✓ OEE Improvement: **6-9 months** after improving PM & planning & scheduling
- ✓ Improved craft productivity, wrench time and OCE: **1 year**
- ✓ Inventory reduction: **6 months**
- ✓ after a complete inventory review
- ✓ Improved documentation of equipment
- ✓ repairs & regulatory requirements: **3 months**

Concept of OCE: Developed by TMEI in 1994

PATH FORWARD PLAN OUTLINE

We will review each of these key steps within this plan of action

1. Preparation for Scoreboard for Maintenance Excellence (SFME) Assessment
2. Conduct SFME Assessment
3. Document SFME Assessment Results
4. Develop and Implement the ABC Maintenance Excellence Index (MEI)

PATH FORWARD PLAN OUTLINE

5. Present Written and Oral Report of Assessment Results & Path Forward Plan
6. Gain ABC Consensus on Path Forward
7. Establish the ABC Maintenance Excellence Implementation Plan of Action
8. Focus on ABC ***TARGETS***

Step 1

PATH FORWARD PLAN

1. Preparation for SFME Assessment and Key Deliverables for Implementation

a) Sometimes improving or setting up a planning and scheduling process

b) Sometimes establishing/improving asset numbering

c) Sometimes improving PM/PdM and reliability tools

d) Always implementing a Maintenance Excellence Index

e) Always helping the maintenance leader define and justify maintenance improvement needs

f) Always improved PRIDE-in-Maintenance

Duration: 2 Days Off Site (4 man days)

Step 2

PATH FORWARD PLAN

2. Conduct the Scoreboard for Maintenance Excellence (SFME) Assessment

a) **ABC Data Provided Before Start**

b) **Kick Off Meeting Scheduled Day 1**

c) **Interview Schedules Set By ABC**

d) **Out briefing end of Day 5 with preliminary results; key recommendations**

e) **Recommend & gain consensus on *TARGETS* training during 2nd week of onsite time**

Duration: 5 Days On Site (10+ man days) and 2 or more TMEI staff members

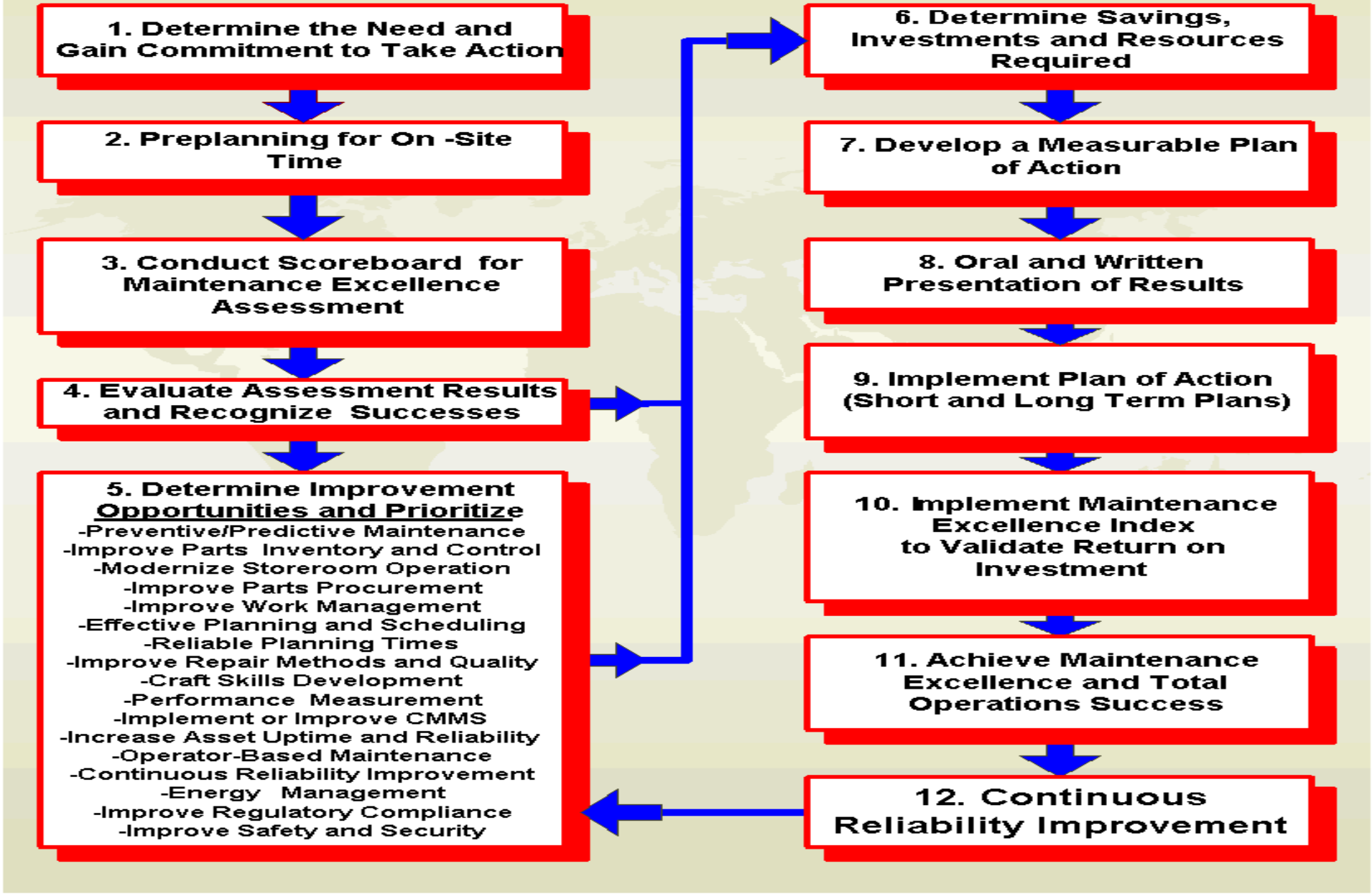
The Scoreboard for Maintenance Excellence

Developed initially by TMEI Founder, Pete Peters in 1981. Used across multiple plants for a high quality hand tool manufacturer, The Cooper Group, a Division of Cooper Industries, Houston, Texas. Almost 30 years of evolution, use and refinement!

✓ Now today's most complete assessment tool

- **27 Best Practice categories**
- **300 evaluation items**
- **Provides baseline measurement; a benchmark of how ABC compares to other organizations**
- **Assessment results & recommendations provide the plan for reliability & maintenance excellence at ABC**
- **Used by TMEI for over 200 assessments**
- **Used by over 4,000 organizations as an internal benchmarking tool (global best practices)**

THE SCOREBOARD for MAINTENANCE EXCELLENCE ASSESSMENT:
Key Steps to Continuous Reliability Improvement



Step 3

PATH FORWARD PLAN

3. Document SFME Assessment Results

a) **Define All Improvement Opportunities**

b) **Confirm Potential Benefits**

c) **Define CMMS Improvements**

d) **Define Recommended Plan of Action**

e) **Preliminary Review With ABC Maintenance Leaders (Very Important)**

Duration: 5 Days Off Site (10 man days)

Step 4

PATH FORWARD PLAN

4. Develop Maintenance Excellence Index (MEI)

a) ABC Approves KPI's

b) ABC Approves KPI Performance Goals

c) Define KPI Weighted Values

d) Define Data Sources

e) Implement the ABC-Maintenance Excellence Index

Duration: Included as Part of Assessment

Steps 5 & 6

PATH FORWARD PLAN

5. Preliminary Review of Assessment with Maintenance Leaders

a) Confirm ***TARGET*** training needs

b) Develop ABC specific modules

c) Establish dates

6. Present Written/Oral Report of Assessment

a) **TMEI presents results to the ABC Team**

b) **Additional areas for improvement will be identified**

Duration: Included as part of Assessment

Step 7

PATH FORWARD PLAN

7. Gain ABC Consensus on Path Forward

a) **Internal Resources Required**
b) **External Resources Required**
c) **Timeline for project activities**
d) **Priority of Action**
e) **And a Focus on ABC *TARGETS***

Training for Maintenance Excellence

Changes in Attitudes: **Our third area of service is Training for Maintenance Excellence, a very essential element of our proven approach.**

- **Our TrueWorkShops focuses upon *TARGETS* to create organizational awareness and an internal understanding that maintenance must be managed and led as a profit center.**
- **Successful implementation of today's best practices requires changes in philosophies, attitudes and the application of technical knowledge.**

Training for Maintenance Excellence **course offerings provide a measurable return on investment to justify your training dollars.**

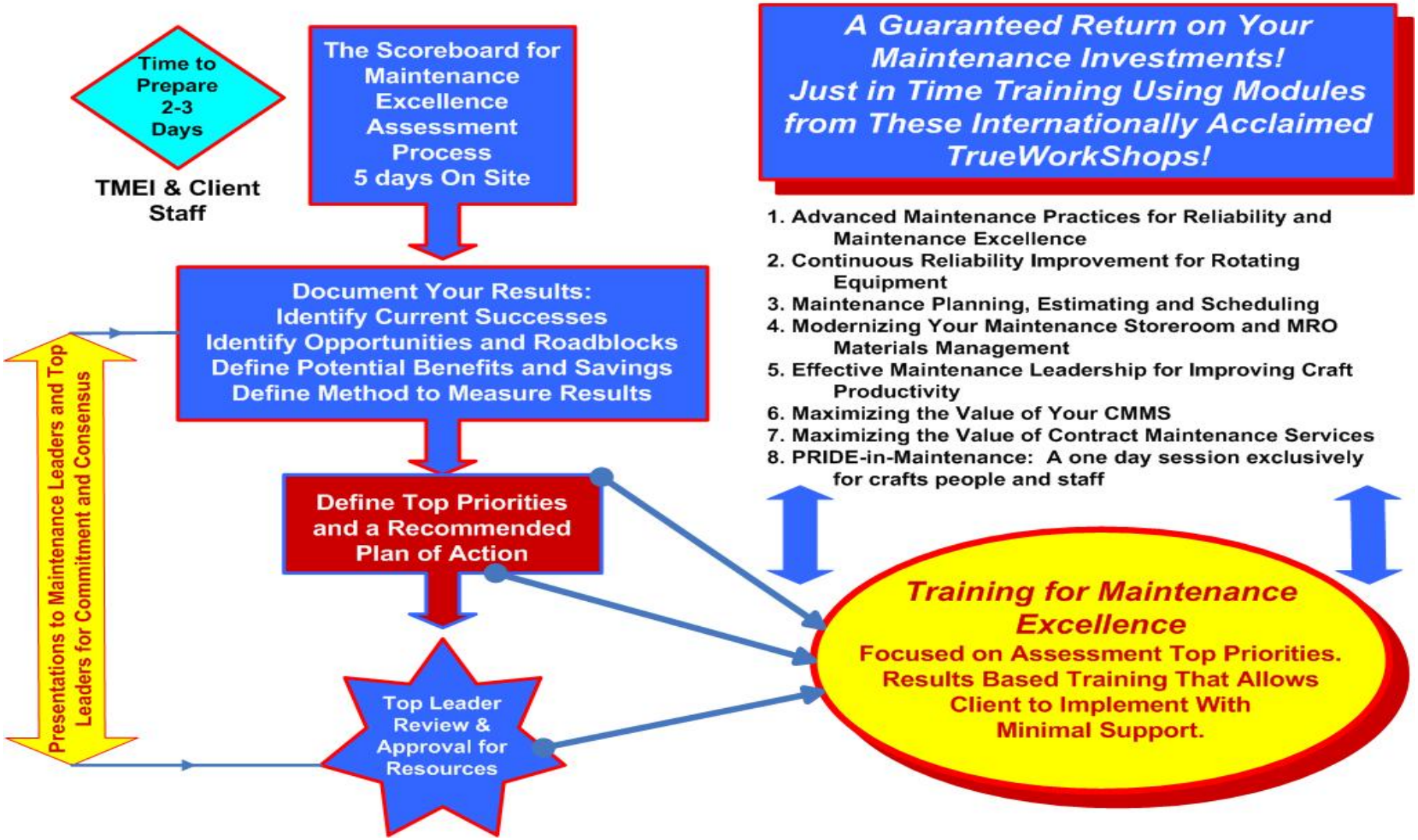
- **The beneficial part with TrueWorkShops is that "it's not over when it's over".**
- **Following completion of each session, whether after an in-house presentation or a public session, there is a personalized follow-up scheduled for each participant.**
- **Personal follow-up and one on one coaching is available to help you apply what you have learned. A TrueWorkShop summary is included as an additional document.**

Step 8

Focusing on ABC *TARGETS*

Taking Aim at Recommendations to Gain Excellence from Training Success

A Profit-Centered Approach to Reliability & Maintenance Training



Focusing on ABC *TARGETS*:

Taking Aim at Recommendations to Gain Excellence from Training Success

Training for Maintenance Excellence

Focused on Assessment Top Priorities. Results Based Training That Allows Client to Implement With Minimal Support.

Just In-Time Training Using Modules from These Internationally Acclaimed TrueWorkShops

1. Advanced Maintenance Practices for Reliability and Maintenance Excellence
2. Continuous Reliability Improvement for Rotating Equipment
3. Maintenance Planning, Estimating & Scheduling
4. Effective Maintenance Leadership for Craft Productivity Improvement
5. Modernizing Your Maintenance Storeroom and MRO Materials Management
6. Maximizing the Value of Your CMMS
7. Maximizing the Value of Contracted Maintenance
8. PRIDE-in-Maintenance: Exclusive, one day of fun for crafts people and support staff

Three Days On Site Training & 10 Days of Application Support Designed for ABC's Specific Needs

The Ultimate Goal

The Ultimate Goal: The ultimate goal of The Maintenance Excellence Institute (TMEI) is to implement and measure results of solutions we define by each assessment or TrueWorkShop event.

Our Commitment: We are committed to a long term partnership for achieving measurable results at ABC.

- ✓ **To help continuously expand current ABC successes**
- ✓ **To help implement our recommendations**
- ✓ **To document ABC results & the value of our services**
- ✓ **To become a valuable technical resource**
- ✓ **To have ABC use maintenance for profit optimization.**

The Maintenance Excellence Institute's Commitment and the ABC Investment

The Maintenance Excellence Institute's (TMEI) Makes a Long-Term Commitment to ABC's Journey Toward Reliability and Maintenance Excellence:

- ✓ **Fixed Fee: 40 to 50 Days Total + Travel expenses**
  - ➢ Scoreboard Assessment and ABC Recommendations
    - ✓ Confirm ABC Benefits
    - ✓ ***TARGETS*** Training on ABC Recommendations
    - ✓ Develop Overall Plan of Action
    - ✓ Implement ABC Maintenance Excellence Index
  - ➢ Focused on site training for ***TARGETS*** solutions for ABC
  - ➢ Unlimited e-mail and teleconferencing support from TMEI
  - ➢ 10 to 20 days of support to ***Target*** ABC **implementation**
- ✓ **Training for Maintenance Excellence: 10 ABC attendees to any of TMEI's public TrueWorkShops (A $10,000 Value)**
- ✓ **A two year commitment from TMEI for additional support to implement the overall action plan Step 7 if required**

Next Steps

Like NIKE Says!

JUST DO IT!

Company ABC Commits to Implement & Measure Results

- TMEI Does Not Conduct Assessments to Deliver Reports with Fancy Presentations
- We Only Pursue a Small Number of "*Selected Clients*"
- We Have Quality Staff That Performs Quality Work

- ✓ TMEI Executes a Company ABC Contract as required
- ✓ ABC and TMEI Establish a Start Date
- ✓ ABC Provides TMEI a Small Work Space When on Site
- ✓ Initial Payment: 40% of Fixed Fees Due on Start Date
- ✓ Other Payments Per Approved Progress Schedule
- ✓ Confirm a Project Start Date as Soon as Possible
- ✓ Ensure ABC Receives Benefits as Soon as Practical

The Return on ABC's Maintenance Investment

Financial Results

- 5% to 20% increase in capacity/throughput
- 20% to 30% increase in craft productivity/wrench time
- 10% to 20% reduction in actual maintenance costs
- 10% to 20% decrease in parts inventory & asset accountability

Customer Satisfaction Results

- 10% to 30% increase in asset availability/reliability
- 10% to 20% reduction in stock outs
- 20% to 30% greater inventory accuracy and control
- 20% to 30% increase in planned work and schedule compliance

Fully implemented projects of this type provide a conservative range of direct savings/benefits and gained value from 10% to 20% in annual maintenance and MRO materials costs. ABC can achieve significant measurable improvements in many key performance measures. Also this project will also provide important intangible benefits for employee relations, attitudes and internal and external customer satisfaction.

Consulting for Worldwide Organizations

EVTAC MINING

CATERPILLAR®

SIDERAR

ArvinMeritor

AECL

BUCYRUS

Heinz

bp

Marathon Oil Corporation

BIG LOTS!

BOEING

WERNER

Past Support for Maintenance Excellence

- Atomic Energy Canada Limited (2 sites)
- Air Combat Command (3 Air Bases)
- Boeing Commercial Airplane Group (55 sites across USA)
- BP Texas City Refinery
- Braun Medical-PA
- Bucyrus International-WI
- BP Texas City Refinery-TX
- Carolinas Medical Center-NC
- Cascade Engineering-MI (4 sites)
- Caterpillar (IL)
- Big Lots Distribution Centers-OH, CA, AL, PA (4 sites)
- Consolidated Thermoplastics (3 sites)
- Cooper Tools/Cooper Industries (9 plants across USA)
- Dominion Terminal Associates-VA
- DIMON International-NC & VA-4 sites
- Ford Motor (Canada)
- General Foods-NY
- GlaxoSmithKline-NC
- Great River Energy-ND
- Heinz USA-OH
- Lucent Technologies-NE (2 sites)
- Marathon Ashland Petroleum-LA, IL,MI and TX (4 sites)
- The Marmaxx Group-NE
- National Defense-PA

We Strive to Support the Successes and the Challenges of All Past Clients

Past Support for Maintenance Excellence

- Purolator-NC
- Rocketdyne Propulsion-CA (Div of
- Boeing)
- Rockwell International-WI
- Rohm & Haas-TX
- SIDERAR (8 Steel Mills-Argentina)
- University of NC-CH Facilities Services Div (6 work units)
- University of NC-CH Building Services *Pride in Maintenance Sessions*
- EMCOR- VIOX Facilities Services-OH (Contract Maintenance Provider)
- The Werner Company-PA, IL and AL (3 sites)
- Wyeth-Ayerst -VA (3 sites in U.S.)
- Wyeth Medica (Ireland)
- Weyerhaeuser-WA
- NC Department of Transportation (15 Division level shops; 100 county shops
- National Gypsum-NY, GA and AL (3 sites)
- NYCOMED (Puerto Rico)
- Polaroid Corporation-MA
- Pratt & Whitney (Canada)

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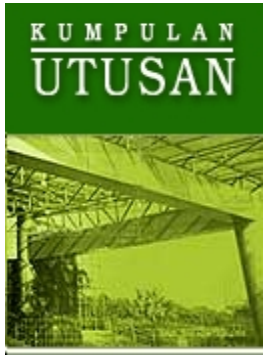
Training for Worldwide Organizations



Training for Worldwide Organizations

B.E.S Energy Resources Co.,Ltd.

Bayer

UBE GROUP in Thailand
Petrochemical Producer

Thai Caprolactam PCL

Chevron

Chevron Offshore (Thailand) Ltd.

Coca-Cola

ThaiNamthip

Particle Measuring Technique Co., Ltd.

INDORAMA
innovation everywhere

PETRONAS

Carigalli Myanmar (Hong Kong) Ltd.

MEDCOENERGI

TITAN CHEMICALS

Power Generation Services Co.

PTTEP

PTT EXPLORATION AND PRODUCTION PUBLIC COMPANY LIMITED

PT. PLN (Persero)

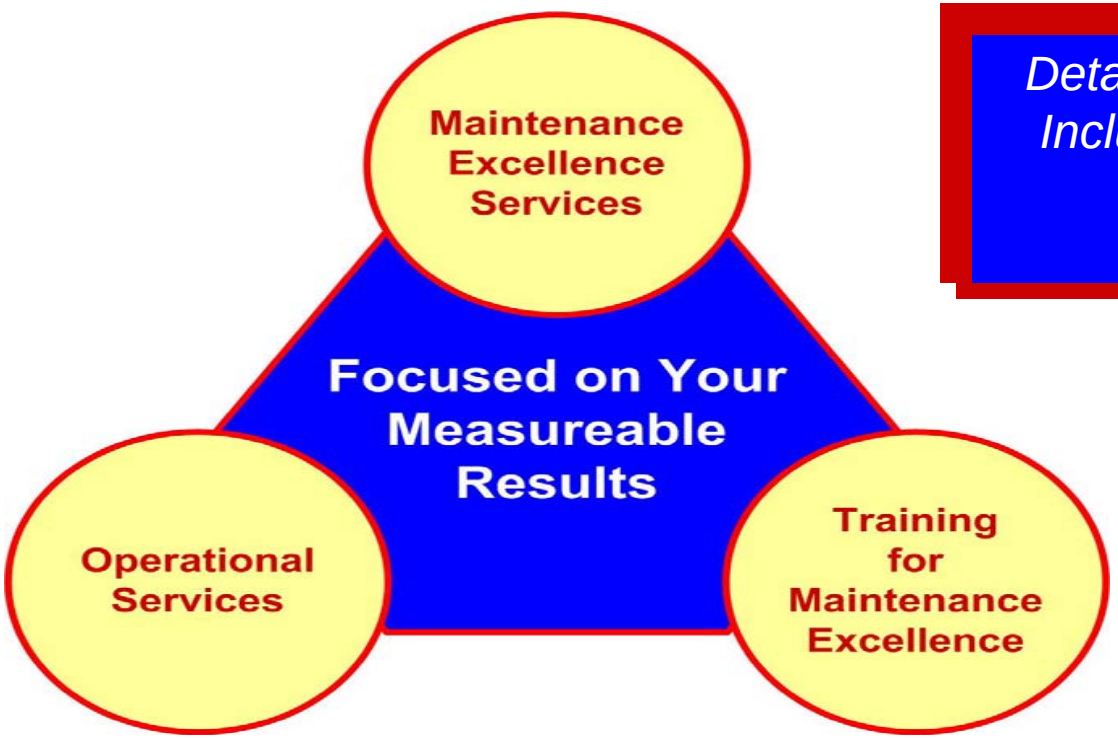
VINYTHA

ptt CHEM

TransGasIndo

The Maintenance Excellence Institute

Maintenance Excellence Begins With PRIDE in Maintenance



Details of Our Proven Approach is Included in the New McGraw-Hill Book By TMEI Founder Ralph W. "Pete" Peters

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