How to Optimize a CMMS/EAM in Order to Manage an Effective Maintenance Organization

By Ricky Smith CMRP

UpKeep

WORLD CLASS MAINTENANCE

“A CMMS is an Organization’s Navigational Tool which ensures Equipment Reliability is meeting the requirements of Production/Operations”

"A CMMS/EAM is an Investment"…

…which provides visibility of assets so management can make the right decisions at the right time at the lowest cost.

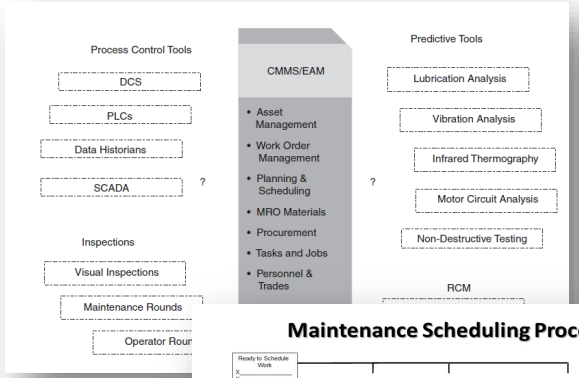
"All the best companies in the world have a fully functional CMMS"

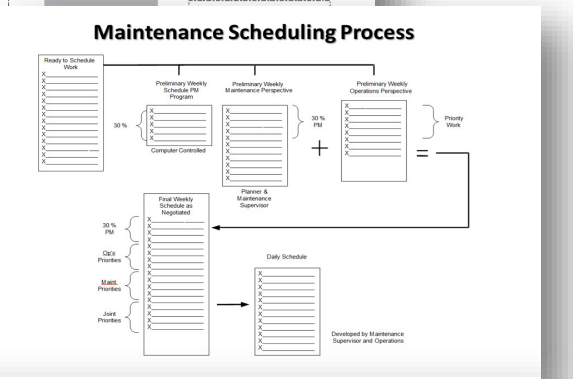
Why Companies do not use their CMMS to it's Full Capabilities?

1. No one has ever seen a fully integrated Maintenance Software
2. No one understands the value of the CMMS
3. CMMS is too difficult to use
4. Standing work orders are used in place of work orders charge to specific assets
5. Companies pick and choose what they want in a CMMS without a focus on Maintenance Best Practices

   "World Class Maintenance enables World Class Production"

4. CMMS is not aligned with Process Maps or have no Process Maps
5. Reactive Maintenance dominates (everyday is different)
6. Lack of Discipline
7. Roles and Responsibilities are not clearly defined





CMMS

"Roles and Responsibilities"

Task Position ➡ ⬇	CMMS Administrator	Maintenance Manager	Maintenance Planner	Maintenance Supervisor	Maintenance Technician	Storeroom Manager	Plant Manager
CMMS Data Management	R	R	R	C		C	A
Asset Register	R	C	C				A
Asset Hierarchy	R	R	R	R	I	I	A
Asset Criticality	A	R	I	R	I	R	R
Data Management	R	A	C			C	C
CMMS Reports	R	R	C	C		R	A
Maintenance Scorecards	R	A	R	I	I	I	I

Responsibility "the Doer" (could be more than one)
Accountable "the Buck stops here" (One person only)
Consulted "two-way communication" (in the Loop)
Informed "one-way communication" (kept in the picture)

What is a CMMS / EAM?

Computerized Maintenance Management System (CMMS), also known as computerized maintenance management information system, is a software package that maintains a computer database of information about an organization's maintenance operations.

Enterprise Asset Management (EAM) involves the management of the maintenance of physical assets of an organization throughout each asset's lifecycle.

EAM is used to plan, optimize, execute, and track the needed maintenance activities with the associated priorities, skills, materials, tools, and information.

What is the difference? Your thoughts?

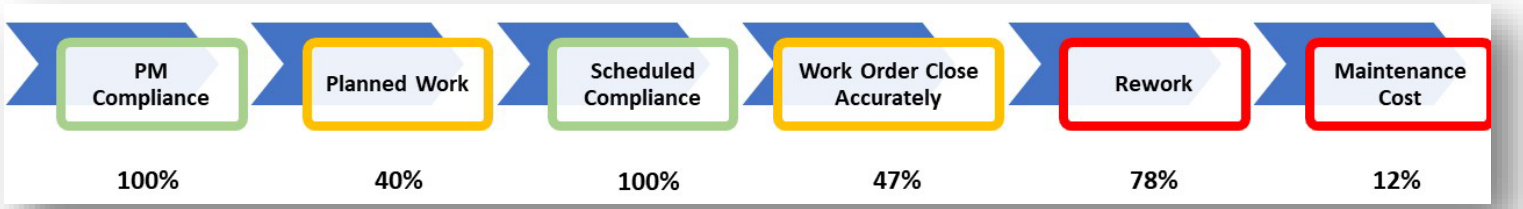
Questions

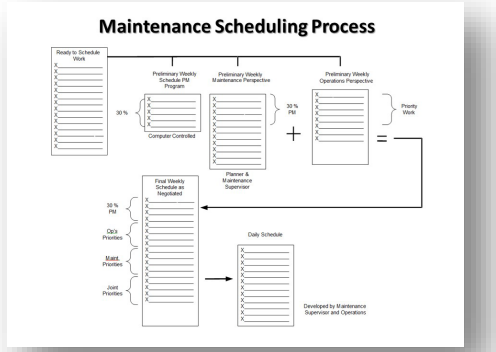
1. How effective is your current CMMS/EAM?

   1 – No CMMS/EAM …… 10 Fully Functional CMMS/EAM

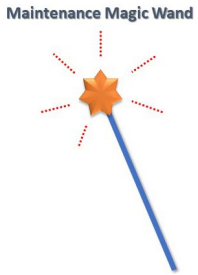
2. Currently, is all maintenance work captured in the CMMS/EAM?
3. Do you have Maintenance Process Maps?
4. How effective are current Maintenance Metrics?

   1 – Not effective …… 10 Leading and Lagging KPIs Dashboards are used





5. Is your CMMS User Friendly? Yes or No
6. If you had a magic wand what changes would you make to your current CMMS/EAM?



CMMS/EAM – A HIDDEN TREASURE

- **Investing in a CMMS is very similar to any other capital investment.**
- **One significant difference between the CMMS investment and other capital investments is that, over time, your return on investment for a CMMS will increase.**
- **This is because the CMMS system is doing something hardware doesn't. It is collecting information that can then be used to further improve the efficiency of your processes.**
- **Maintenance must be managed with a fully functional CMMS in order to repeat benefits expected**

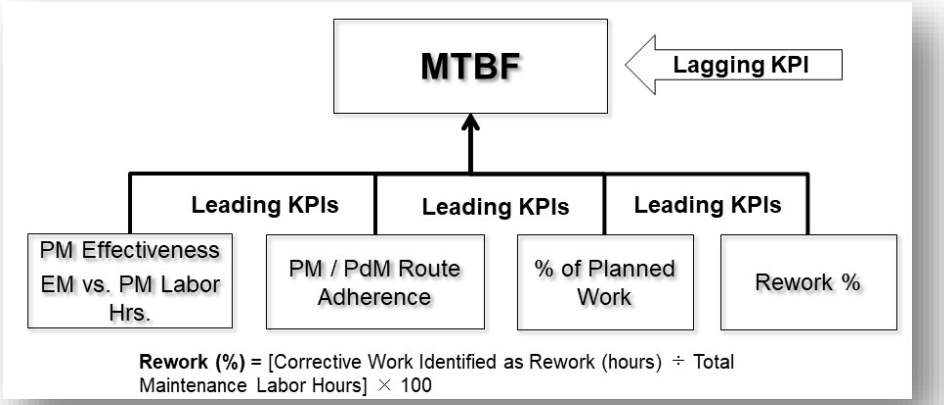
“Best Maintenance Practice” Questions

1. Is your current Maintenance Reactive or Proactive? (choose 1)
2. Does management have roles and responsibilities defined for all the maintenance staff?

Tasks Decisions / Functions	Maintenance Supervisor	Maintenance Planner / Scheduler	Maintenance Manager	Production Supervisor	Tradesman	Storeroom	Operator
Work ID PM/PdM/OpCare	R	I	A	A	R		R
Planning	C	R	A		C	C	
Scheduling	C	R	A	C		C	
Scheduling Meeting	I	R	A	C	I	I	
Work Execution	A		I		R		R
Work Order Close Out	A	R	I		R		R
FRACAS	A	R	R	R	R	R	R

Responsibility	“the Doer”
Accountable	“the Buck stops here
Consulted	“in the Loop”
Informed	“kept in the picture”

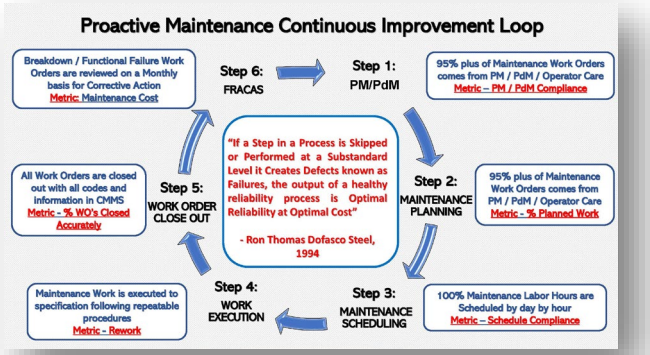
3. Does management know and manage with leading key performance indicators?

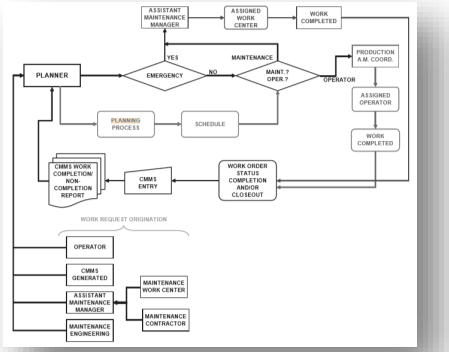


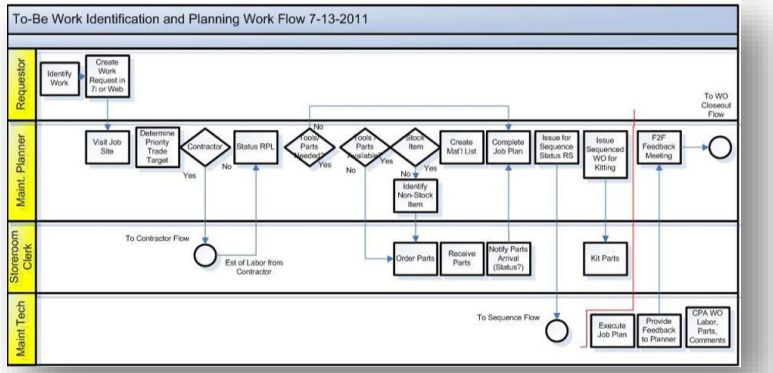
Rework (%) = [Corrective Work Identified as Rework (hours) ÷ Total Maintenance Labor Hours] × 100

Basic Best Maintenance Practices Questions, Cont.

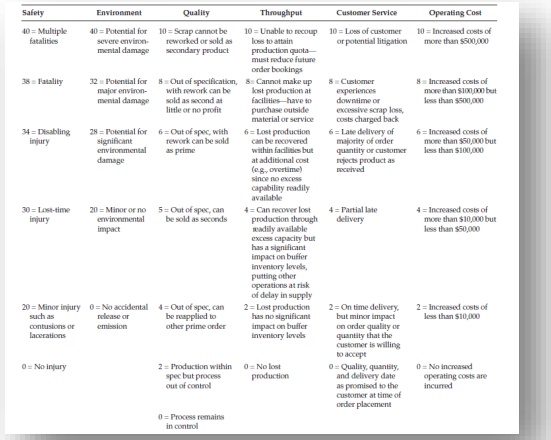
3. Are the workflow processes defined for all elements of the maintenance and reliability process, such as planning, scheduling, and work execution?







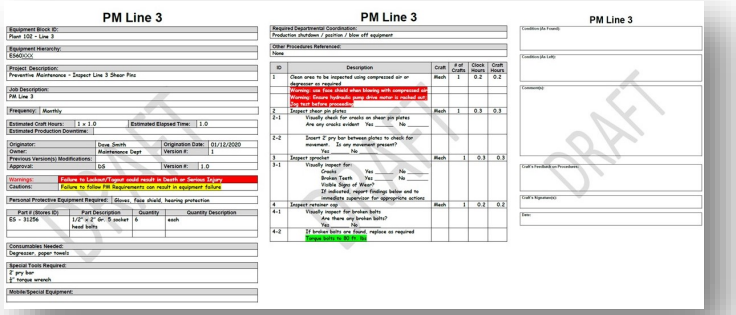
4. Have the critical assets been defined based on consequence and risk to the business, weighting values to determine asset criticality in areas such as: Safety, Environmental, Capacity, Cost, Other criteria



Safety	Environment	Quality	Throughput	Customer Service	Operating Cost
40 = Multiple fatalities	40 = Potential for severe environmental damage	10 = Scrap cannot be reworked or sold as secondary product	10 = Unable to recoup loss to attain production quota—must reduce future order bookings	10 = Loss of customer or potential litigation	10 = Increased costs of more than $500,000
38 = Fatality	32 = Potential for major environmental damage	8 = Out of specification, with rework can be sold as second at little or no profit	8 = Cannot make up lost production at facilities—have to purchase outside material or service	8 = Customer experiences downtime or excessive scrap loss, costs charged back	8 = Increased costs of more than $100,000 but less than $500,000
34 = Disabling injury	28 = Potential for significant environmental damage	6 = Out of spec, with rework can be sold as prime	6 = Lost production can be recovered within facilities but at additional cost (e.g., overtime) since no excess capability readily available	6 = Late delivery of majority of order quantity or customer rejects product as received	6 = Increased costs of more than $50,000 but less than $100,000
30 = Lost-time injury	20 = Minor or no environmental impact	5 = Out of spec, can be sold as seconds	4 = Can recover lost production through readily available excess capacity but has a significant impact on buffer inventory levels, putting other operations at risk of delay in supply	4 = Partial late delivery	4 = Increased costs of more than $10,000 but less than $50,000
20 = Minor injury such as contusions or lacerations	0 = No accidental release or emission	4 = Out of spec, can be reapplied to other prime order	2 = Lost production has no significant impact on buffer inventory levels	2 = On time delivery, but minor impact on order quality or quantity that the customer is willing to accept	2 = Increased costs of less than $10,000
0 = No injury		2 = Production within spec but process out of control	0 = No lost production	0 = Quality, quantity, and delivery date as promised to the customer at time of order placement	0 = No increased operating costs are incurred
		0 = Process remains in control			

Basic Best Maintenance Practices Questions, Cont.

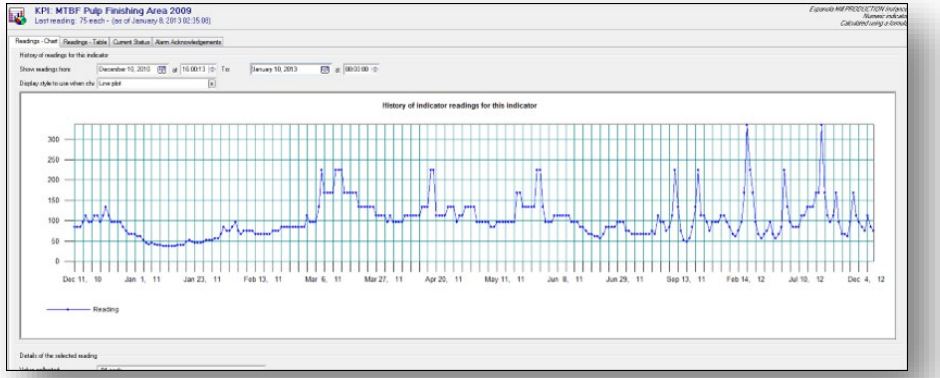
5. Has the management team defined the gap between the current and desired plant performance and determined the financial opportunity identified?
6. Does your organization have dedicated planner/schedulers?
7. Does your maintenance staff use repeatable procedures for all proactive maintenance work?


PM Line 3

PM Line 3

PM Line 3

8. Does the whole organization accept responsibility for reliability?
9. Is the current PM/PdM (predictive maintenance) program on critical assets based on RCM methodology (RCM, FMEA, etc.)?
10. Does your organization use mean time between failure (MTBF) to determine the reliability of your assets?



If you had a Magic Wand what would you want from a "World Class CMMS"

Example:

- User Friendly? (using the KISS Method)
- Alignment with Maintenance Dashboards/Scorecards?
- Required data field entry

  Examples:

  - Actual Maintenance Labor Hours posted for on Work Orders before Closure
  - Work Order Close Out Requirements
  - Algorithm to assist Maintenance Scheduling based on Asset Criticality and Defect Severity
  - Automated Failure Reporting based on Maintenance Rework, MTBF of Critical Assets, etc.
  - Maintenance Technicians, Reliability Engineers, Maintenance Supervisors use of PDAs or Cell Phones with Barcoding ability to review equipment history on specific assets real time

The Founding of the 1st Fully Integrated CMMS

John Day, PE

Engineering and Maintenance Manager, Alumax / Alcoa Mt Holly
(designer of World Class Maintenance)

John was my mentor and advisor for over 20 years

Mt Holly's Accomplishments and Recognitions:

1984 – Plant Engineering Magazine Published Article on the first Fully Integrated CMMS / EAM in the World
1987 – AT Kearney Nominated Mt Holly Maintenance as "Best of the Best" (World Class Maintenance)
1988 – Maintenance Technology wrote an article which was shared around the world of their Maintenance Program
1998 – Alcoa purchased Alumax Mt Holly and used their Maintenance methodology and CMMS/EAM to advance their presence on the World Stage

A Fully Functional CMMS/EAM is not an Option, it is a Requirement

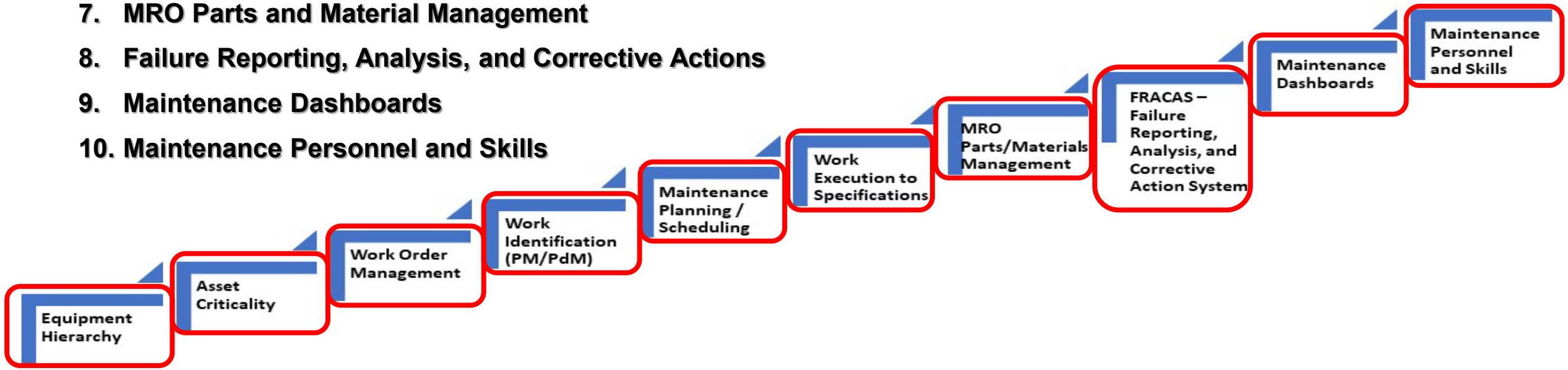
TABLE 1.1. Benchmarks at Alumax, Mt. Holly

	Mt . Holly	Typical
Planned/scheduled	91.5%	30–50%
Breakdowns	1.8%	15–50%
Overtime	0.9%	10–25%
Inventory level	½ normal	Normal
Call-ins	1/month	Routine
Off-shift work	5 people	Full crew
Backlog	5.5 weeks	Unknown
Budget performance	Varies, 1–3%	Highly variable
Capital replacement	Low	High
Stock outs	Minor	Routine

Alumax Mt Holly (1978) – site of first fully integrated Maintenance Software in the World

CMMS Functions

1. Equipment Hierarchy
2. Asset Criticality
3. Work Order Management
4. Work Identification (PM / PdM)
5. Maintenance Planning and Scheduling
6. Work Execution to Specifications
7. MRO Parts and Material Management
8. Failure Reporting, Analysis, and Corrective Actions
9. Maintenance Dashboards
10. Maintenance Personnel and Skills



Why Should you Optimize Your CMMS

1. Without a fully functional CMMS one cannot manage the reliability of their assets
2. Without a CMMS that is easy to use people will find a "Work Around"
3. To manage the assets as expected by the owners of the company
4. Without a fully functional CMMS you have reactive maintenance
5. To ensure you are measuring the right things
6. To manage the money (it is all about the money)

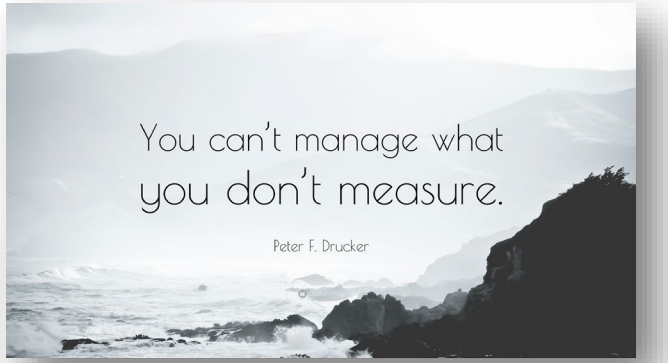


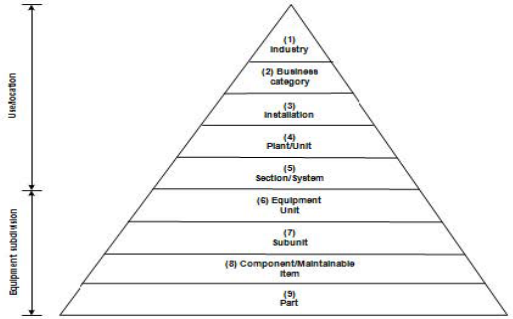
TABLE 7.2. Maintenance Costs in Typical and World-Class Companies

Metric	Typical	World Class
Maintenance cost/replacement asset value Maintenance cost must include labor (including overtime), materials, contract maintenance, and capital replacements, and maintenance (replacing worn-out assets because they were never properly maintained)	3.5–9%	2.0–3.0%
Maintenance materials cost/replacement asset value Maintenance materials cost must include material in storeroom stock plus material in other locations (maintenance shop, plant floor, etc.)	1.0–3.5%	0.25–0.75%

“Questions” Concerning a CMMS Optimization

Source of most questions: World Class Maintenance “Alcoa Mt Holly” – John Day

1. On a scale of 1 – 10 how effective is your current CMMS? (1 – not effective …… 10 highly effective)
2. Are all assets in your CMMS/EAM?
3. Are all maintenance parts/components/material assigned to a specific asset or assets?
4. Is the equipment hierarchy setup set up to provide the information required manage the assets in the most efficient manner?



5. Does the planner provide feedback to the requester when a work request or notification has been entered into the CMMS/EAM system?
6. Can the planner check status of planned work parts on the CMMS/EAM within five minutes of any job?
7. When a project is completed have all equipment, parts, and the Maintenance Strategy updated in the CMMS/EAM?
8. Does someone (Reliability / Maintenance Engineer) perform a thorough evaluation of the maintenance and reliability history for the most critical assets once a year?
9. Does Maintenance and Engineering Leadership know which assets are not meeting the functional requirements set forth by plant leadership?
10. Do you track the MTBF or your most critical assets?

CMMS Optimization Steps

Step One: Ensure You Have Strong and Early Buy-In from Management and Users

Step Two: Connect to Other Systems Wherever Possible

Step Three: Set Clear Expectations and Invest in CMMS and Maintenance Best Practices Training

Step Four: Use Custom Dashboards to Bring the Most Important Information to the Forefront.

Plant Maintenance/Reliability Dashboard

Step Five: Perform Regular System Checks.

Step Six: Ensure all assets are in the CMMS and are aligned for effective management of all assets

Step Seven: Ensure your KPI Dashboards are accurate and data dissemination is simple to manage

Questions to ask when "Buying a New CMMS"

1. Could you provide 3 References I could speak with concerning:
   - Ease of use
   - Capabilities
   - Process Maps
   - Dashboards
   - Comprehensive Training Plan for my staff
   - Phone number to call and text

2. Could you adjust the Maintenance software to my current Process Maps?
3. Can you ensure "required fields" when writing a work order (no blanket work orders – all work orders charged to an asset)?
4. Could all my assets have assigned parts attached and min/max/reorder point/safety stock?
5. Could you create a module for Failure Reporting?
6. Could you ensure we have RACI Charts for all our processes in the CMMS?
7. Could we use technician cell phones to optimize their activities?

My Recommendations

Whether buying new or optimizing your current CMMS think about these items:

1. Ensure your staff and team understands what "Maintenance Best Practices Looks Like"
2. Know what a fully functional CMMS looks like and ask does it meet your needs
3. Identify a granular Criticality ranking for "all" assets
4. Ensure all parts in the storeroom are linked to an asset or assets
5. Ensure all Maintenance Work is covered by a Work Order
6. Ensure Maintenance Planning and Scheduling is fully functional
7. If you do not have a Maintenance or Reliability Engineer take your best maintenance tech with the best attitude and assign them to focus 100% of their time on reducing equipment failures and NEVER pull them off this assignment unless the plant is on fire
8. Make Failure Reporting critical to success by measuring and reporting:
    - MTBF for each Critical Asset (all assets are not equal)
    - Part consumption by part type
    - Measure Rework and identify their causes
9. Ensure Roles and Responsibilities are defined for all Maintenance Processes
10. Post a Maintenance Dashboard to measure current state of Maintenance

Questions?

Best Maintenance Repair Practices Workshop

"3-Day Workshop"

December 8-10, 2020

For more information send your request to: rsmith@worldclassmaintenance.org

"Virtual Via Internet"

"Live" --- Southern Wesleyan University, Central, SC

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