

MAINTENANCE / RELIABILITY ASSESSMENT

Excerpts from “Rules of Thumb for Maintenance and Reliability Engineers”

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The biggest challenge organizations face is to know the status of their current maintenance and reliability process and developing a plan to close the gap between current and desired performance.

In the next few pages, you will be given specific questions to answer in order to define the gap between your maintenance and reliability process current performance and what is defined as “Best Practices”.

All answers should be a “yes” if not then this area may need to be explored in more depth. If you are unsure about the question or answer, then the question answer is a “no”.

Remember this assessment is only used to help an organization determine its gaps between current and desired performance.

It is recommended this assessment is performed with representatives from all state holders. This includes plant manager, maintenance and engineering manager, production management, operators, maintenance personnel, maintenance planners, storeroom management, etc.

Score totals:

0 - 500 = Total Reactive / Reliability principles are not understood or applied

- Need to educate all management and engineering in reliability and develop a reliability strategy for serious change. Need to develop a business case to define the opportunity immediately. (attend training in Maintenance and Reliability Best Practices)

501 – 700 = Emerging (long way to go)

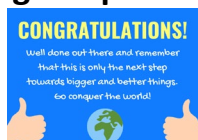
- Need to develop a business case and reliability strategy with timeline, targets, and objectives.

701 – 850 = Proactive (continue the journey, you are headed in the right direction)

- Need to ensure continuous improvement process is built into your asset reliability process. Identify gaps in the assessment and fill the gaps.

851 – 1000 = World Class

- Hire an outside reliability consulting firm to assess your current stated and make recommendations for any change required. Great job.



1) Key Maintenance and Reliability Process Principles

Calculation: Identify the number of statements which you identified as yes and multiply this number by 10 (possible 150 points)

Questions	Yes/No
a) Does management have roles and responsibilities defined for all of the maintenance staff?	
b) Does management know and manage with leading key performance indicators?	
c) Are the work flow processes defined for all elements of the maintenance and reliability process such as planning, scheduling, work execution, etc?	
d) Has the critical assets been defined based on consequence and risk the business ensuring weighted values are assigned to determine asset criticality in areas such:	N/A
i) Safety	
ii) Environmental	
iii) Capacity	
iv) Cost	
v) Other criteria	
e) Has the management team defined the gap between current performance of the plant and desired performance and determined the financial opportunity identified?	
f) Is your current PM / PdM program on critical assets based on RCM Methodology (RCM, RCM Turbo, FMEA, etc)?	
g) Does your organization define failure based on functional failure of the asset?	
h) Does your organization have dedicated planner/schedulers?	
i) Does the whole organization accept responsibility for reliability?	
j) Does your organization use MTBF (Mean Time Between Failure) to determine the reliability of your assets?	
Total "yes" answers times 10 =	

2) Reliability

Calculation: Identify the number of "yes" answers and multiply them by 30 for a total for this section. (Possible 300 points)

Questions	Yes/No
a) Do you use Reliability Software to determine rebuild intervals on equipment?	
b) Does maintenance and production management understand the PF Curve and how it functions to manage asset failure?	
c) Does maintenance and production management focus on a <u>formal</u> critical assets matrix when determining shutdowns and maintenance work? Ranking of at least 0-500	
d) Is a work order written for all functional failures (partial and total)?	
e) Is their a formal RCFA or RCA process which is defined and executed on major and multiple similar asset failures?	
f) Is their a maintenance or reliability engineer on staff in your organization?	

g) Does the maintenance or reliability focus strictly on reliability of the assets and not “project engineering” work?	
h) Does your company apply the Six Sigma DMAIC process in their reliability engineering efforts?	
i) Is an RCM Methodology (RCM, RCM II, RCM Turbo, FMEA, etc) used to determine the maintenance work strategy for your assets?	
j) Do you know what percentage of your assets your maintenance strategy is RTF (run to failure), PdM (predict maintenance), detective maintenance, PM (preventive maintenance restorations, replacements, lubrication, etc), etc.?	
Total “yes” answers times 30 =	

3) Reliability Engineering

Calculation: Identify the number of “yes” answers and multiply them by 15 for a total for this section. (Possible 150 points)

Questions	Yes/No
a) Does your plant have a reliability engineer?	
b) Does your reliability engineers use Reliability Software to determine the optimal intervals between PMs?	
c) Does the reliability engineer perform only reliability engineering work?	
d) Are all projects reviewed and approved to ensure reliability of the assets?	
e) Is there a validation by engineering, maintenance, and production to insure a project is completed and operating to design specifications before the project’s responsibility is turned over to production?	
f) Are projects cost allowed to continue to accumulate even after a project has over run its projected cost? (Are project cost paid for by engineering and not maintenance?)	
g) When a project is completed has an RCM methodology been applied to the equipment to ensure the correct maintenance strategy has been applied to the assets?	
h) When a project is completed has all equipment, parts, etc been entered into the CMMS/EAM?	
i) Does reliability engineering focus less than 20% of their time on “bad actors”?	
j) Are reliability engineers <u>not used</u> as project engineers?	
Total “yes” answers times 15 =	

4) Planning

Calculation: Identify the number of “yes” answers and multiply by 10 for a total for this section. (Possible 100 points)

Questions	Yes/No
a) Does most of the maintenance work scheduled have pre-planned job packages developed for them? (all specifications, procedures, parts, labor, etc. identified)	
b) Does the planner use the maintenance staff to assist in the development of pre-planned job packages?	
c) When is a planner/scheduler (or just a planner) performing their day-to-day job they are never called upon to rush parts in for a breakdown?	

d) Does your planner identify backlog based on categories? (ie. Ready to schedule, waiting on parts, waiting on engineering, waiting to be planned, etc) and measured by labor hours, weeks of backlog?	
e) Does the planner validate whether a work request is valid or not?	
f) Does the planner provide feedback to the requester when a work request or notification has been entered into the CMMS/EAM System?	
g) Does the planner visit the job sites of work to be planned on at least 30% of jobs?	
h) Can the planner check status of planned work parts on the CMMS/EAM within 5 minutes or less of any job?	
i) Does the planner validate work request in 3 days or less?	
j) Do you have at least one planner or planner/scheduler for every 7 to 25 maintenance personnel?	
Total "yes" answers times 10 =	

5) Scheduling

Calculation: Identify the number of "yes" answers and multiply by 10 for a total for this section. (Possible 100 points)

Questions		Yes/No
a)	Is someone responsible for scheduling either as a full time maintenance scheduler or fulltime planner/scheduler?	
b)	Do planner/schedulers or schedulers work closely with production to schedule maintenance work?	
c)	Is maintenance work scheduled one week out at least?	
d)	Is maintenance work scheduled by day?	
e)	Is maintenance work scheduled with maintenance person's name or names assigned?	
f)	On large outages do maintenance personnel provide input into the schedule?	
g)	Does the scheduler or planner/scheduler facilitate the maintenance weekly scheduling meeting?	
h)	The scheduler or planner/scheduler does not report to maintenance supervision. Reporting to maintenance manager is acceptable.	
i)	Next week's schedule is posted at least the Friday prior for all to view to include maintenance and production.	
j)	Is schedule compliance above 80%?	
Total "yes" answers times 10 =		

6) Key Performance Indicators

Calculation: Identify the number of "yes" answers and multiply them by 10 for a total for this section. (Possible 250 points)

Questions	Yes/No
a) Are the workflow processes mapped in your maintenance and reliability process with Leading and Lagging KPIs defined at specific points in these processes?	

b) Does the maintenance department measure the following? (all of these metrics must be used to receive a yes on this one)	N/A
i) Scheduled compliance	
ii) % of Planned Work	
iii) Rework	
iv) MTBF (Mean Time Between Failure)	
v) % of time (by vendor) vendors do not deliver on time	
vi) % of time vendors deliver the wrong part	
vii) Stockouts	
viii) % of assets ranked based on criticality	
ix) % of assets RCM Methodology has been applied and the maintenance strategy changed based on the data	
x) Bad Actors Report	
xi) #of potential failures identified	
xii) % of assets functional targets have been identified	
xiii) % of work proactive	
xiv) % of work reactive	
xv) Maintenance cost as a % of RAV (Return on Asset Value)	
xvi) Maintenance Material in Stores as a % of RAV (Return on Asset Value)	
xvii) Maintenance Cost per Unit Produced	
c) Are at least 50% of the KPIs listed above posted for all to see in the maintenance department?	
d) Are at least 25% of the KPIs listed above posted for all to see in the maintenance department?	
e) Are at least 10% of the KPIs listed above posted for all to see in the maintenance department?	
f) Are at least 10% of the KPIs listed above posted for all in production department to see?	
g) Are their targets and goals established for over 75% of the KPIs listed above?	
h) Are your KPIs listed as Leading or Lagging?	
i) For each KPI the maintenance department uses is there a standard for them (definition, objective, calculation, example calculation, roles and responsibility assigned to the KPI)?	
Total "yes" answers times 10 =	

7) Education / Training

Calculation: Identify the number of "yes" answers and multiply them by 10 for a total for this section. (Possible 100 points)

Questions	Yes/No
a) Has all management personnel been trained in the basics of reliability?	
b) If all of management personnel have been trained in the basics of reliability do they demonstrate this knowledge in their job?	
c) Has all plant personnel been trained in the basics of reliability?	
d) Has executive management been trained in the basics of reliability?	
e) Have all maintenance been trained in the basics of root cause failure analysis?	

f) Does the plant have a skills training program for all maintenance personnel and is it based on a skills assessment?	
g) Does your company have an apprenticeship or entry level training program for maintenance and production?	
h) Are skilled maintenance who are hired from the inside and outside administered a written and "hands on" test?	
i) Does the plant have a maintenance training budget which equals to or exceeds 6% of the maintenance labor budget?	
j) Does skilled maintenance workers use pre-planned job packages with procedures over 90% of the time?	
Total "yes" answers times 10 =	

FINAL RESULTS:

Assessment Area	Score
1. Key Maintenance and Reliability Process Principles	
2. Reliability	
3. Reliability Engineering	
4. Planning	
5. Scheduling	
6. Key Performance Indicators	
7. Education / Training	
Final Score:	

Score totals:

0 - 500 = Total Reactive / Reliability principles are not understood or applied

- Need to educate all management and engineering in reliability and develop a reliability strategy for serious change. Need to develop a business case to define the opportunity immediately.

Recommendation: Attend training in Maintenance and Reliability Best Practices

501 – 700 = Emerging (long way to go)

- Need to develop a business case and create a maintenance project plan with timeline, targets, and objectives.

Recommendation: Create a plan using the crawl, walk, run methodology



701 – 850 = Proactive (continue the journey, you are headed in the right direction)

- Need to ensure continuous improvement process is built into your asset reliability process. Identify gaps in the assessment and fill the gaps.

Recommendation: Create Maintenance/Reliability Dashboards and post for to see. Start out each week discussing the Dashboard.

Maintenance Scorecard	Best practice	10/12/2020	YTD
Maintenance Schedule Performance	>70%	62%	67%
Maintenance Break In Work	<15%	38%	33%
PM/PDM Work Scheduled	> 30%	18%	35%
PM/PDM Compliance	>80%	36%	67%
Notification Entered from PM/PdM find	1 for every 6 inspections	2	3
Equipment Not Available	Weekly	0	1.45
P1 Notifications	Weekly	12	11.43
Core Shift Mechanic	Weekly	4	3.95
Polymer Shift Mechanic	Weekly	9	6.22
No Information P1's (Still open)	Weekly	0	1.55
		Shift & Core worked on 1 P1 together	

851 – 1000 = World Class

- Hire an outside reliability consulting firm to **VALIDATE** your current stated and make recommendations for any change required. Great job.

Recommendation: Share your journey and experience with other organizations through speaking at Conferences and write papers on your experience along with your recommendations

