



Reliability Information Management

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BEST PRACTICES

RIM Program

- Single Database
- Actionable Info
- Program Value
- Basic Reliability Metrics

Asset Health

- Condition Based Inspections
- Integrated Dashboard
- Basic Care
- Asset Health Metrics

Work Management

- Reds Meetings
- RCFA Corrective Actions
- Work Management Metrics

Life Optimization

- Repair Vendor Interface
- Failure Analysis
- Bad Actor List
- Equipment Metrics

Current State of Reliability Management

Many separate pieces of reliability information in reports, databases, computer folders, spreadsheets

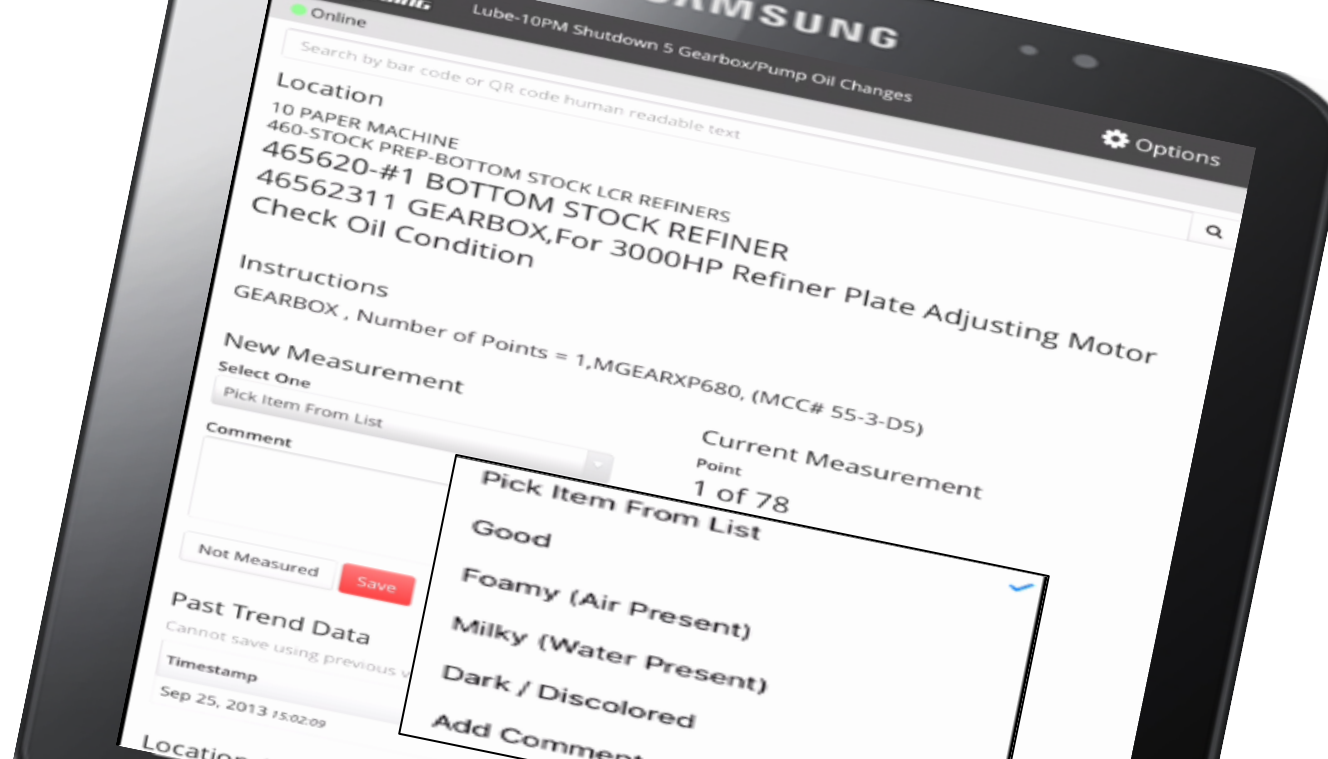
No Standardization

No Integration

Poor Communication

Poor Accountability

No Ability to Analyze Performance

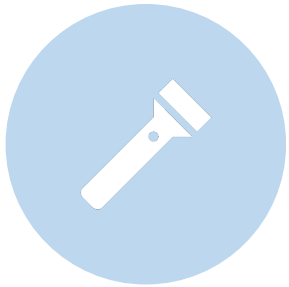


Best Practice #5

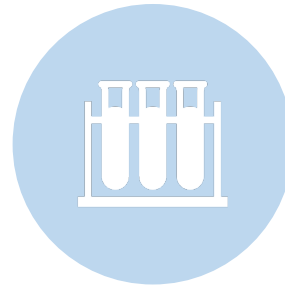
Integrate Walk-Around Inspections

- Operators, Lube Techs, Mechanics, & Electricians spend a lot of time up close & personal with your plant's assets
- Shouldn't you know what they know about developing reliability problems?

What Walk-Around Inspections?



Operators doing Basic Care inspections



Lube Techs running lube routes



Mechanics & Electricians performing craft inspections



Even Safety & Environmental inspectors

Documenting Inspections

- **ISO 55000** Asset Management Standard requires documented inspection plans and auditable documentation of compliance to those plans

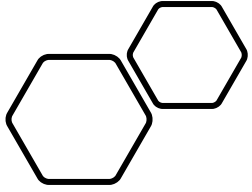
Traditional Walk-Around Inspection Process

Many plants rely on their work order system to schedule inspections

- Good for scheduling, not so good for content

Actual inspection details are usually kept in a separate system such as spreadsheet-based forms

- Information is now trapped on the paper form (desk stack, file cabinet, etc.)
- Not easily communicated to those in a position to make maintenance execution decisions.



Best Practice: Digitize the Inspection Process



CREATE INSPECTION DEFINITIONS
& SCHEDULES IN THE
MASTER RELIABILITY DATABASE



USE MODERN SMART DEVICES FOR
FIELD COLLECTION &
COMMUNICATION
WITH THE MASTER DATABASE



MAINTAIN A RECORD OF
WHAT WAS OR WAS NOT MEASURED
AND WHAT WAS FOUND

Inspection Definition

- Documents schedule & actions for each inspection point
- For Functional Component Locations in Master Reliability Database
- Assigns accountability to a person

Task Name: Lube-7PM-Wednesday

Next Due To Start Date: May 27, 2020

Interval: 7 days

Assigned User: Robert

User expected to collect data

Task Group Name: 07 Paper Machine Anytime Lube Routes

[Save](#) [Edit Locations](#)

Task Locations

Order	Trend or Observation Name	Alias	Asset Comp	Asset	Function	Unit	Instructions
30	Record Grease Added - Bearing 1		43542002 ROLL, WRR, Rider Roll	435420-RIDER ROLL, WRR	435-WINDER SECTION-ROLLS	7 PAPER MACHINE	RIDER ROLL BEARING #1, Number of Points = 1, SHCPM460
40	Record Grease Added - Bearing 2		43542002 ROLL, WRR, Rider Roll	435420-RIDER ROLL, WRR	435-WINDER SECTION-ROLLS	7 PAPER MACHINE	RIDER ROLL BEARING #2, Number of Points = 1, SHCPM460
100	Inspect Lube Lines / Fittings		43542002 ROLL, WRR, Rider Roll	435420-RIDER ROLL, WRR	435-WINDER SECTION-ROLLS	7 PAPER MACHINE	RIDER ROLL BEARINGS, Number of Points = 7 , SHCPM460
110	General Comments		43542002 ROLL, WRR,	435420-RIDER	435-WINDER	7 PAPER	RIDER ROLL BEARINGS, Number of Points

Inspection Measurements

- Route information collected with Smart Tablets (IOS, Android, Windows)
- These have replaced obsolete MS-CE™ PDA devices
- They have more capability for taking photos or downloading documents

Unit: 170 Compressor Room

Function: AIR

Asset: 1CENTAC

Component: Compressor

Route Point Name

Discharge Air Temp

New Measurement

Value in deg F (Acceptable: 85 -> 115)

Comment

Not Measured

Save

Past Trend Data

Cannot save using previous value because previous value is in alarm or out of bounds.

Trend points
allow numeric
input



Observation
points allow
selection from
a pick list

10 PAPER MACHINE

460-STOCK PREP-BOTTOM STOCK LCR REFINERS

465620-#1 BOTTOM STOCK REFINER

46562311 GEARBOX, For 3000HP Refiner Plate Adjusting Motor

Check Oil Condition

Instructions

GEARBOX , Number of Points = 1, MGEARXP680, (MCC# 55-3-D5)

New Measurement

Select One

Pick Item From List

Comment

Not Measured

Save

Past Trend Data

Current Measurement

Pick Item From List

Good

Foamy (Air Present)

Milky (Water Present)

Dark / Discolored

Add Comment

Inspection Problem Reporting

- Automate alarm notification when inspector enters out of bounds data
- Comments, photos, & linked documents explain problem details
- Capture potential problem information from inspectors

The screenshot displays a web interface for recording measurements. On the left, the 'New Measurement' section includes a text input field for 'Value in % (Acceptable: 70 -> 105)' containing the number '65', and a 'Comment' field with the text 'Input shaft seal leak'. Below these are buttons for 'Not Measured' and 'Save'. On the right, the 'Current Measurement' section shows 'Point 1 of 40'. A dark modal window titled 'Condition Entry Request' is overlaid on the form, featuring a close button (X) in the top right corner and a 'Comment' field containing the text 'Input shaft seal leak, needs attention at next months outage'. A red 'Save' button is located at the bottom right of the modal.

Inspection Problem Evaluation

- Problems found during inspection are sent to at top of the list for evaluation
- When decision is made to escalate a found problem to the Integrated Condition Status Dashboard, field comments & linked documents are included in the condition entry

User: matt
 Downloaded: Apr 11, 2020 18:31:15
 Uploaded: Apr 11, 2020 18:56:43

Order		State	Value	Trend	Location	Condition	Linked Documents	Collected By
430	 	Out of Bounds	Problem Found	Inspect Lube Lines / Fittings - DS	7 PAPER MACHINE 431-WIRE SECTION-ROLLS 431122-WIRE RETURN ROLLS 43112204 ROLL, WR04, Wire Return	Add Entry <i>Comment:</i> stainless steel greaseline broke loose from plastic line to bearing.	brokenline_1.jpg	matt @ Apr 11, 2020 18:38:59 EST
10	 	OK	2	Record Grease Added - DS	7 PAPER MACHINE 432-PRESS SECTION-ROLLS 432123-BOTTOM FELT ROLLS 43212301 ROLL, P103 Bottom Felt			matt @ Apr 11, 2020 18:32:14 EST
20	 	OK	Good	Inspect Lube Lines / Fittings - DS	7 PAPER MACHINE 432-PRESS SECTION-ROLLS 432123-BOTTOM FELT ROLLS 43212301 ROLL, P103 Bottom Felt			matt @ Apr 11, 2020 18:32:16 EST
	 	OK	None	General	7 PAPER MACHINE			matt

Inspection Linkage to Integrated Status Report

- Condition entries reporting problems are immediately be integrated with other condition problems on a browser-based dashboard
- Interactive single click access allows user to open report details
- New condition entries trigger email notifications, whether it's the first time the problem is reported or continuation of an existing case

Integrated Condition Status Report

User: John Reliable, Date: May 26, 2020, Time: 13:03:48

			Severity	Criticality	Unit	Function	Asset	Component	Technology	Most Recent Severity	Days Awaiting Checkoff
1			1	0	104 Hotline	Cranes	7120019	NBRIDGE	• Visual Inspection	1	94
2			1	0	162 Carbon Plant	BAKE	WASTE	FANS2	• Electrical - Online	1	5
3			1	0	101 Cooling Tower	Tower	CLDWELL	MOTOR1	• Infrared • Vibration - Route	1	53
4			2	0	162 Carbon Plant	BAKE	WASTE	FANN1	• Electrical - Online	2	0
5			2	0	170 Compressor	AIR	2CENTAC	Air leaks	• Visual Inspection	2	51
6			2	0	170	AIR	2CENTAC	Compressor	• Oil Analysis - Screening	2	75

Inspection Route Adherence

- The Master Reliability Database retrieves performance metrics for all inspections
- Reliability Managers can see where inspection scheduling or execution may need to be improved

Roundslogging Adherence

Date Range Jan, 01 2019 through Dec, 31 2019

		Route Completion Adherence			Route Point Adherence				
		69.10%			68.85%				
<input type="checkbox"/>	LUBRICATION	99.17%			77.55%				
<input type="checkbox"/>	LUBRICATION ROUTE 1	100.00%			78.43%				
<input type="checkbox"/>	LUBRICATION ROUTE 2	100.00%			71.01%				
<input type="checkbox"/>	LUBRICATION ROUTE 3	90.91%			81.88%				
<input type="checkbox"/>	MIX LUBRICATION ROUTE 1	100.00%			77.82%				
		Scheduled Start Date	Scheduled End Date	# of Route Completions	# of Points On Route	# Points Measured OK	# Points Measured Not OK	# of Points marked as Not Measured	# of Points with No Data Entered
		Totals		12	10501	8132	39	1	2329
		Jan 01, 2019	Mar 31, 2019	1	678	678	0	0	0
		Apr 01, 2019	Jun 30, 2019	1	893	679	5	0	209
		Jul 01, 2019	Sep 29, 2019	1	893	680	4	0	209
		Oct 30, 2019	Dec 31, 2019	1	893	680	4	0	209