

Reliability Information Management Best Practice #2:

Manage Actionable Information

Forrest Pardue



RIM Best Practices

RIM Program

Single Database

Actionable Info

Program Value

Basic Reliability Metrics

Asset Health

Condition Based Inspection Task

Integrated Dashboard

Basic Care

Asset Health Metrics

Work Management

Red Meetings

RCFA Corrective Actions

Work Management Metrics

Life Optimization

Repair Vendor Interface

Failure Analysis

Bad Actor List

Equipment Metrics



Analysis Data



Repair Action

BP #2: Manage information NOT data

Reliability information is **NOT** raw measurement data. Understand the difference between inspection and analysis data and asset actionable information.

Actionable Information

- **Actionable Information** is a term for information that can be acted upon or information that gives enough insight into the future that the actions that should be taken become clear for decision makers
- **Actionable Information** should be about the asset & the business, not the data

Appropriate Information: Asset vs Inspection



Plant maintenance doesn't want to know the motor DE Bearing is .2ips and increasing from last month, the temp is 160°F (DE) and 90°F (NDE), or ultrasonic level remained high after greasing.



Plant maintenance wants to know that the motor has a moderately severe bearing problem that should be replaced in the next 90 days.

Analysis Turns Data Info Actionable Information.



How do you get actionable information?

- The state of technology today still requires a human analyst who is familiar with data interpretation and experience with asset failure modes.
 - The best analysts have a good asset maintenance background
 - Effective data analysis requires the analyst to turn data into asset based actionable information
 - Combining actionable information from multiple condition monitoring technologies on the same asset strengthens confidence
 - The better the actionable information the better the reliability program
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BP #2: Manage information NOT data

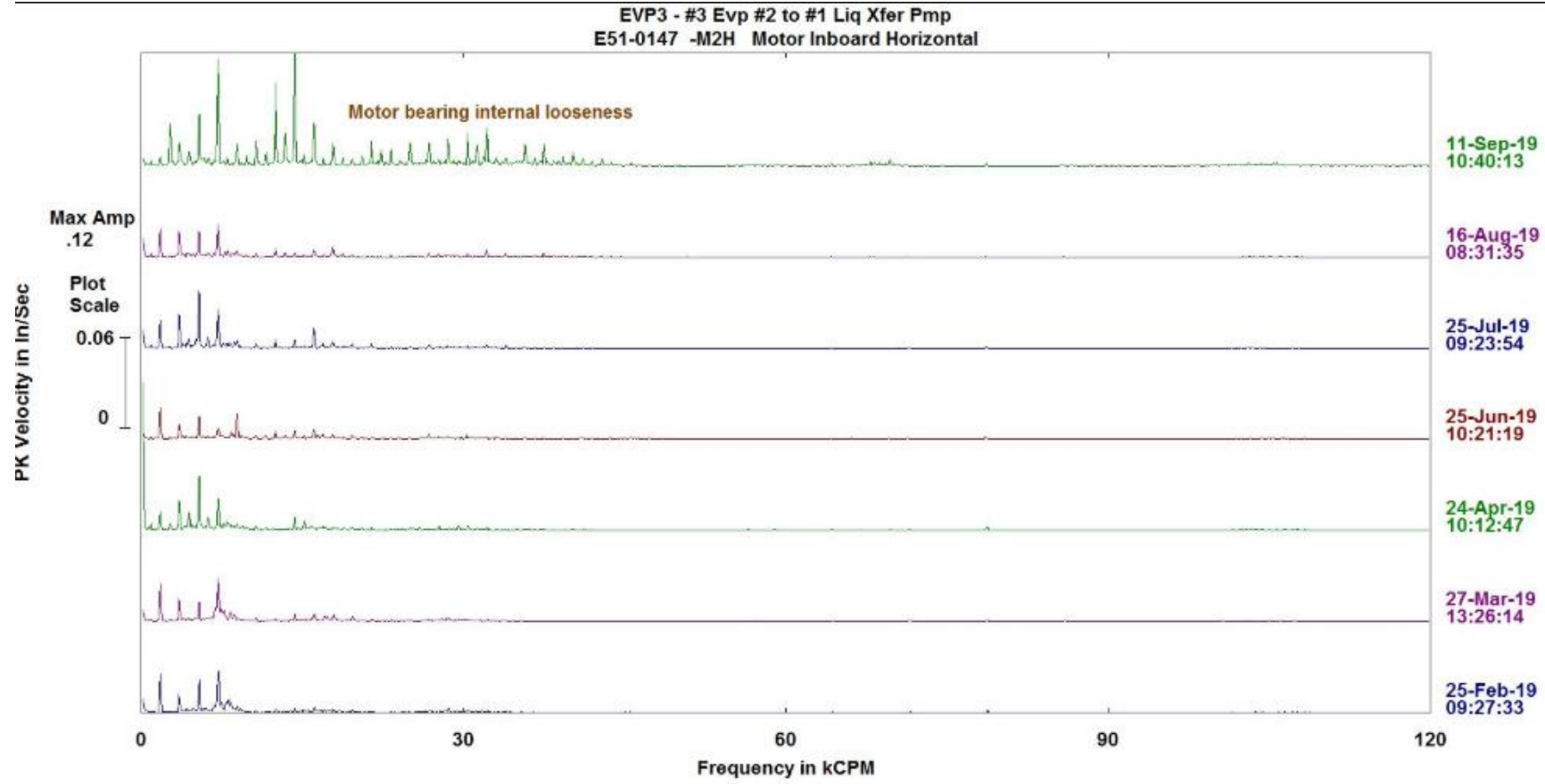
Reliability information is **NOT** raw measurement data. Understand the difference between inspection and analysis data and asset information.

PdM analysts use data from multiple sources to define a problem and its severity.

Outside the PdM Teams the rest of the plant and company want Recommended action, severity, accountability for correction.



Problem Data:



Standardization of faults and severity:

	Level	Entries	Description
	1	3 (30.0%)	Repair within 7 days
	2	4 (40.0%)	Repair within 30 days
	3	2 (20.0%)	Repair within 90 days
	4	1 (10.0%)	Under Surveillance. No action required.

Fault List ×

Alphabetical Popularity

	Used (All Equipment)	Used (This Loc Equip Type)	Fault	Fault C ▼
<input type="button" value="Add"/>	1 case	Never	Drive end bearing failure	Mechanical
<input type="button" value="Add"/>	1 case	Never	Bearing failure DE	Mechanical
<input type="button" value="Add"/>	1 case	Never	Early stage bearing	Mechanical
<input type="button" value="Add"/>	Never	Never	Vibration/Bearings by NDT	Mechanical
<input type="button" value="Add"/>	Never	Never	Bad bearing housing	Mechanical
<input type="button" value="Add"/>	Never	Never	Bearing failure NDE	Mechanical
<input type="button" value="Add"/>	Never	Never	Bearing journal - Bad	Mechanical
<input type="button" value="Add"/>	Never	Never	Bearing housing - Bad	Mechanical
<input type="button" value="Add"/>	Never	Never	Non-drive end bearing	Mechanical
<input type="button" value="Add"/>	Never	Never	Instal New Bearings	RepairTrack Defaults
<input type="button" value="Add"/>	Never	Never	Bad bearing journal	Mechanical

Condition Entry

Browser tabs: Inbox (1) - dickcdawg@gmail.com, Tango™ Information Reliability In, Tango, Case Details

URL: tf7.com/TangoWebServices13/TangoDashboard/IntegratedConditionStatus/ConditionCaseDetails.aspx

User: TF7, Date: Sep 17, 2019, Time: 09:28:30

Location: MILL CREEK - MLCTP >>> SEC THICKENING >>> CENTRIFUGE #4, TC-204, SEC THICKENING >>> 005274
- CENTRIFUGE, ROTATING ASSEMBLY

Location Risk Ranking: 451 of 657

Equipment:

▼ Lifespan Chart

Show Closed Entries

Actions	Severity	Case Risk Ranking	Entered On	Technology	Faults	Entered By	Case ID
	Medium	17 of 33	Sep 05, 2019	Vibration - Route	• Bearing - degradation in advanced stage	Doug Little	2357

Details

Recommendations	REPLACE TAIL BEARING(PEDestal BEARING FOR SHAFT THAT IS BELTED TO SMALLER BACKDRIVE MOTOR)
Comments	VIBRATION RELATED TO BEARING DEFECTS ARE PRESENT ON THE BOWL TAIL BEARING
Work Order Request	<input type="button" value="Assign"/> <input type="button" value="CMMS"/>
Work Order Number	1398517
Status Comment	<ul style="list-style-type: none">• WSCHD (Maximo MIF, Sep 06, 2019)• INPLAN (Maximo MIF, Sep 06, 2019)
Area Of Responsibility	53 Set on: Sep 05, 2019 14:49:33

Linked Documents

Acute Condition Entry Email

Technology Condition Entry

Power House » #3 Evaps » E51-0147 #2 to #1 Liquor Transfer Pump » Motor-AC

[Log into Tango Webservice](#)

Condition Entry Details

Technology Vibration - Route

Analyst W

Severity High {defect exists address at the next practical opportunity}

Entry Date Sep 12, 2019

Work Request

Work Order

Suspected Faults

Fault	Fault Group
Bearing - degradation in advanced stage	Mechanical

Recommended Action

Replace motor during the next available opportunity.

Comments

Excessive motor bearing internal looseness

Integrated Condition Report

3			1	0	101 Cooling Tower	Tower	CLDWELL	MOTOR1	<ul style="list-style-type: none"> Infrared Vibration - Route 	1	1300	1 of 2	• 02-14056	<ul style="list-style-type: none"> James Tech Mike Manager 	<ul style="list-style-type: none"> Still waiting on special sheilded bearings - expected in by early June
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Actions	Severity	Case Risk Ranking	Entered On	Technology	Faults	Entered By	Case ID
		1 of 10	Mar 10, 2016	Vibration - Route	• Drive end bearing failure	James Tech	1

Details

[Recommendations](#)
[Comments](#)
[Work Order Request](#)
[Work Order Number](#)
[Status Comment](#)

Repair or Replace Motor

Drive end bearing showing advanced degradation, motor should be repaired at earliest opportunity - and monthly cleaning should be done.

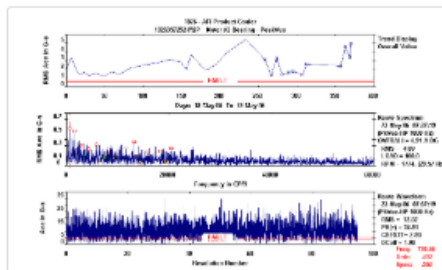


• Still waiting on special sheilded bearings - expected in by early June

(John Reliable, May 25, 2011)

Linked Documents

Condition Entry Linked Documents



File Description

Vibe data_bearing

Type

Condition Data Snapshot

Condition Cases Vs. Condition Entries

- ***Condition Entry*** documents a problem every time it is inspected
- ***Condition Case*** contains all problem entries from start to completion

Integration of technologies and faults

- Data integration may occasionally be important in solving complex problems.
- Condition case integration is essential to resolving all problems present on the asset.
- Asset has both vibration and lubrication cases open. Don't fix just one.

It's All About Appropriate Maintenance Execution

TANGO MSD-Cincinnati // TF7 Plant Tag All Equipment Find ...

Home Asset Tree Print Equipment Repairs Orders ICSR Root Cause Assignments Quick Metrics Admin Logou

005185 - CENTRIFUGE, ROTATING ASSEMBLY

- Sludge Dewatering-MLCTP (Centrifuge 2 GBX)
- Sep 13, 2019 (Open), Medium {Vibration - Route}
- Mar 07, 2018: HIGH BOWL IMBALANCE
- Sep 27, 2013 (Closed), High {Vibration - Route}**
- Sep 03, 2013 (Closed), High {Vibration - Route}
- Jul 23, 2013: INCREASED 1X IMPACTING
- May 02, 2013: EARLY BEARING WEAR DEVELOPING
- Mar 26, 2013: EARLY BEARING WEAR DEVELOPING
- Dec 19, 2012: EARLY BEARING WEAR DEVELOPING
- Jul 09, 2012 (Closed), Medium {Vibration - Route}
- Mar 12, 2012 (Closed), Medium {Vibration - Route}

005187 - PUMP, GEAR COMBO

005217 - PANEL, CONTROL

022804 - MOTOR, AC (BACK DRIVE)

022836 - DRIVE, VARIABLE FREQ

050020 - HYDRAULIC UNIT, LUBE SYSTEM

021805 - GEARBOX[?]

024742-MOTOR, AC (FRONT DRIVE)

SLUDGE DEWATERING CENTRIFUGE #3

SLUDGE DEWATERING CENTRIFUGE #4

SLUDGE DEWATERING CENTRIFUGE #5

SLUDGE DEWATERING CENTRIFUGE #6

Recommended Action
Replace the rotating assembly and repair/replace any loose or worn components.

Comments
There has been a huge increase in harmonics of bowl turning speed with highest amplitudes in the axial direction on the sheave side pillow block bearing. There was some increase noted in last month's data. It has increased tremendously this month. The noise could be audibly heard and was picked up on a wave file and compared to the other six fuges at this location. Plant Maintenance has inspected what they can. Based on PDM findings, they have opted to replace the rotating assembly. 12/16/2013 Baseline test performed

Analyst Comments & Recommendations
No Analyst Comments

Lab Comments & Recommendations
No Lab Comments

Linked Documents

Document Desc	Type
POST REPAIR MULTIPLE SPECTRUM PLOT	Condition Data Snapshot
POST REPAIR MULTIPLE WAVEFORM PLOT	Condition Data Snapshot

Checkoff Status

Checkoff Date	Dec 17, 2013
Checkoff User	Doug Little
Checkoff Comment	Rebuilt rotating assembly installed.

Close Status

Close Date	Dec 17, 2013
Close User	Doug Little