

Air Systems

3100

Attar

Filter > 1 - 10 of 34

Failure Code	Description
AIR BAGS	Air bag issues
AIR SUPPLY	Problems with air supply or air supply c
ALIGNMENT	Alignment Issues
BEARING	Bearing problems
BELT	Problems with conveyor belts
BLOCKED	Equipment blocked
BLOWER	Blower issues
BREAKER	Circuit breaker problems
BROKEN	Broken Parts
CHAIN	Problems with chains

New Row

causes for AIR BAGS Filter > 1 - 3 of 3

Failure Code	Description
LEAK	Leaks
WEAR	Worn parts
DAMAGED	Physically damaged

New Row

Remedies for LEAK Filter > 1 - 2 of 2

Identify and Apply Failure Coding

Help Control Defects In



JFC & Associates

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Senior Maximo/EAM Consultant
JFC & Associates



- Master Electrician's license for Delaware in 2002 and Maryland in 2006.
- Certified Reliability Leader certification in 2019
- Certified Educational Facilities Professional in 2020
- Certified Maintenance & Reliability Professional in 2021
- Previously held NABCEP certification for Solar Installation from 2009-2013
- 14 years functional Maximo experience



Learning Objectives

Identify

Identify standard high level failure modes

Create

Create an awareness of what failures are and how to work toward eliminating them

Develop

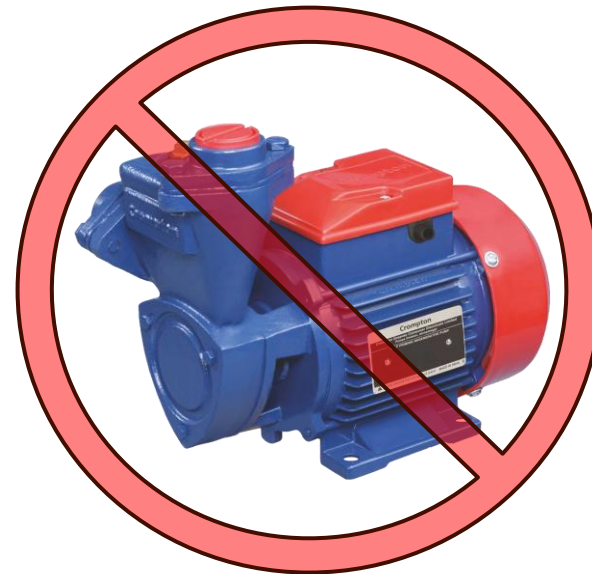
Develop situational asset management awareness of why something may fail

Align

Align your business processes to better facilitate elimination of defects found in your asset portfolio

FAILURE

Inability of an asset to preform it's designed function



FAILURE

EXAMPLES OF FAILURES



ELECTRICAL



VENTILATION



WATER



FUEL



LOCK



UNDERGROUND



HEAT



FIRE

IBM Maximo Application Suite | Manage | Take a tour

Failure Codes

Find navigation item <

Available Queries >

Common Actions

- New Failure Code
- Create KPI
- Create Report

More Actions

- Attachment Library/Folders >
- Run Reports

Failure Classes (1 - 20 of 23)

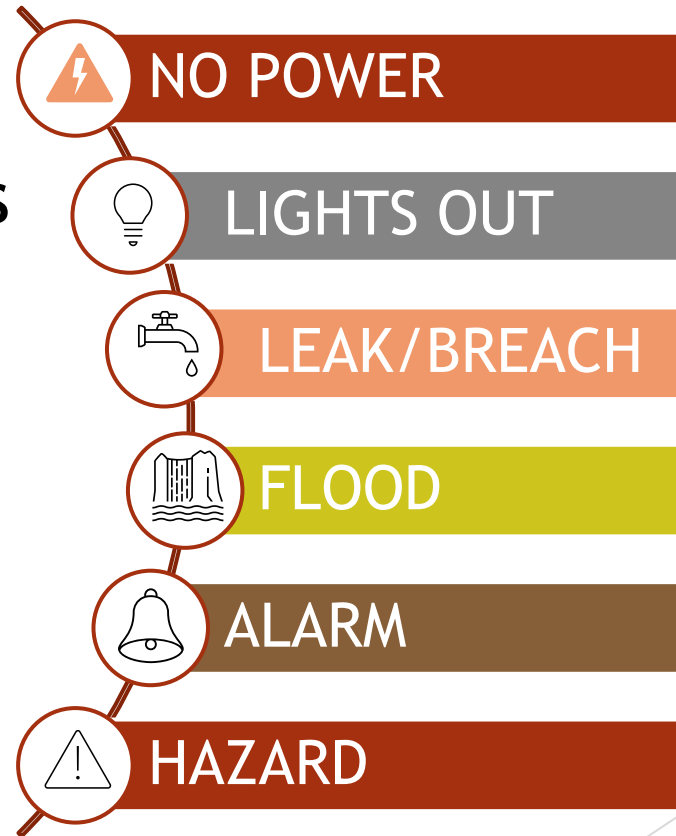
Failure Class	Description	Organization	
PUMPS	Pump Failures	EAGLENA	
PKG	Packaging Line Failures	EAGLENA	
BLDGS	Facility Maintenance & HVAC	EAGLENA	
BOILERS	Boiler Failures	EAGLENA	
BURNERS	Gas Fired Burner Failures	EAGLENA	
PIPES	Pipe Failures	EAGLENA	
CONVEYOR	CONVEYOR LINE FAILURES	EAGLENA	
PROD	PRODUCTION FAILURES	EAGLENA	
MOLD	MOLDING EQUIPMENT	EAGLENA	
TUMBLE	TUMBLE EQUIPMENT	EAGLENA	
MECHASSY	MECHANICAL ASSEMBLY	EAGLENA	
SPRAY	SPRAY EQUIPMENT	EAGLENA	
CLEAN	CLEAN EQUIPMENT	EAGLENA	
HARDWARE	Hardware Failures	EAGLENA	
VPN	Virtual Private Network (VPN) Difficulties	EAGLENA	
PRINTER	Printer Issues	EAGLENA	
NETWORK	Network Issues	EAGLENA	
BUILDING	Building	EAGLENA	



PROBLEM

WHAT MAKES THE FAILURE HAPPEN?

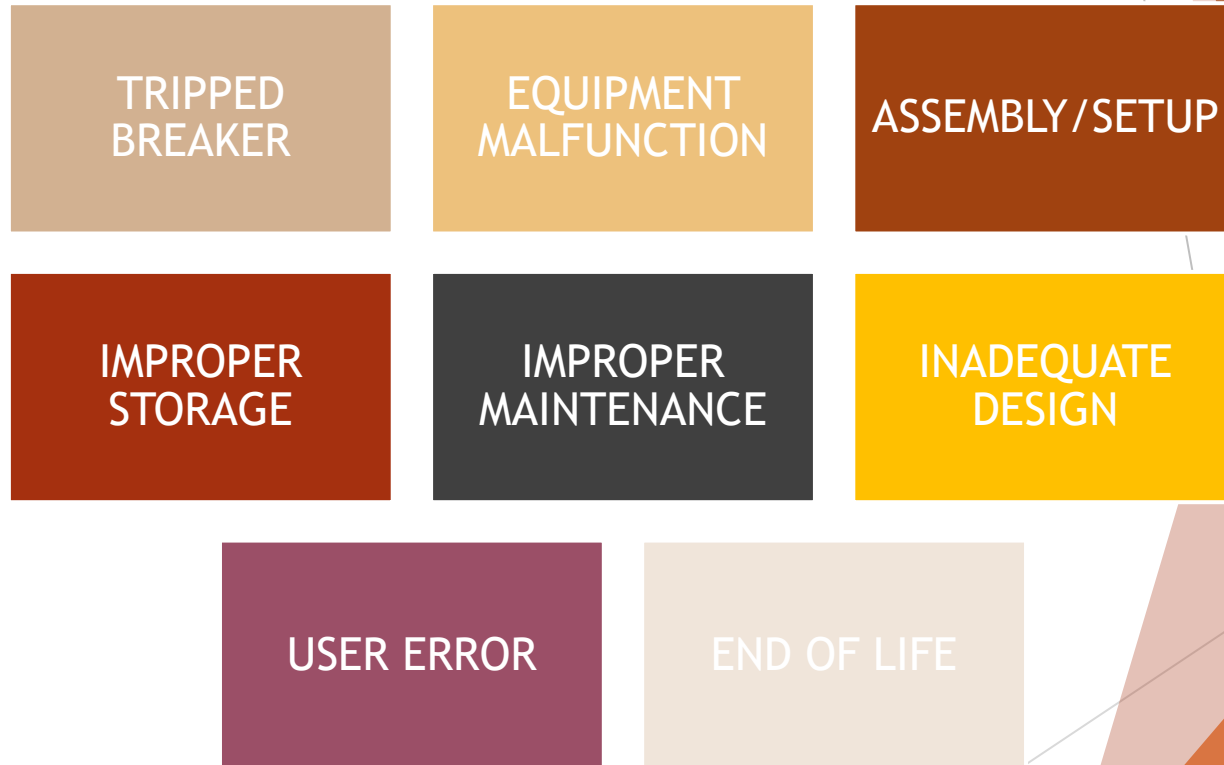
When identifying what makes the failure happen think of the simplest form of the cause. This should be something easily identifiable as the **PROBLEM**



CAUSE

WHAT MADE THE PROBLEM OCCUR?

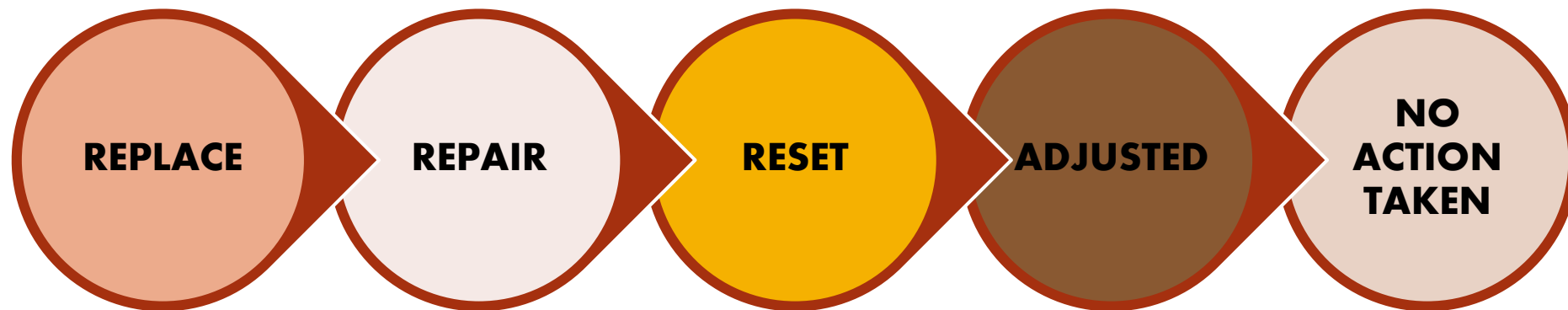
Now what elements made the problem happen. Again, concise descriptions get to the root cause.



REMEDY

WHAT WAS DONE TO CORRECT THE FAILURE?

FINALLY, THE FIX!!

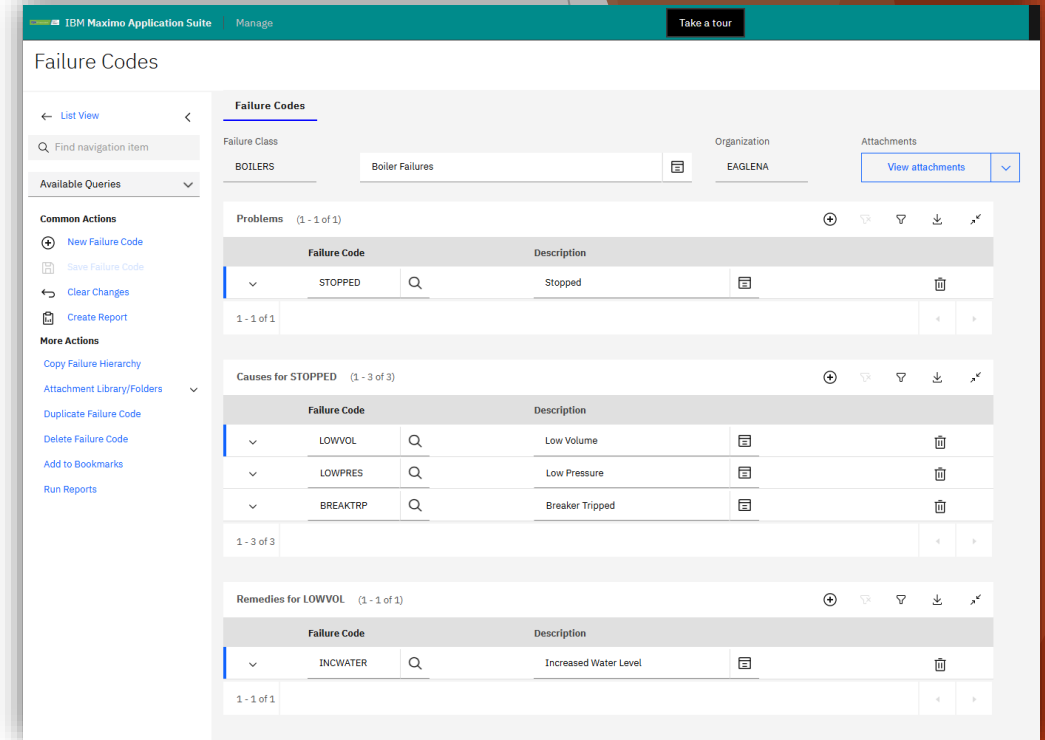
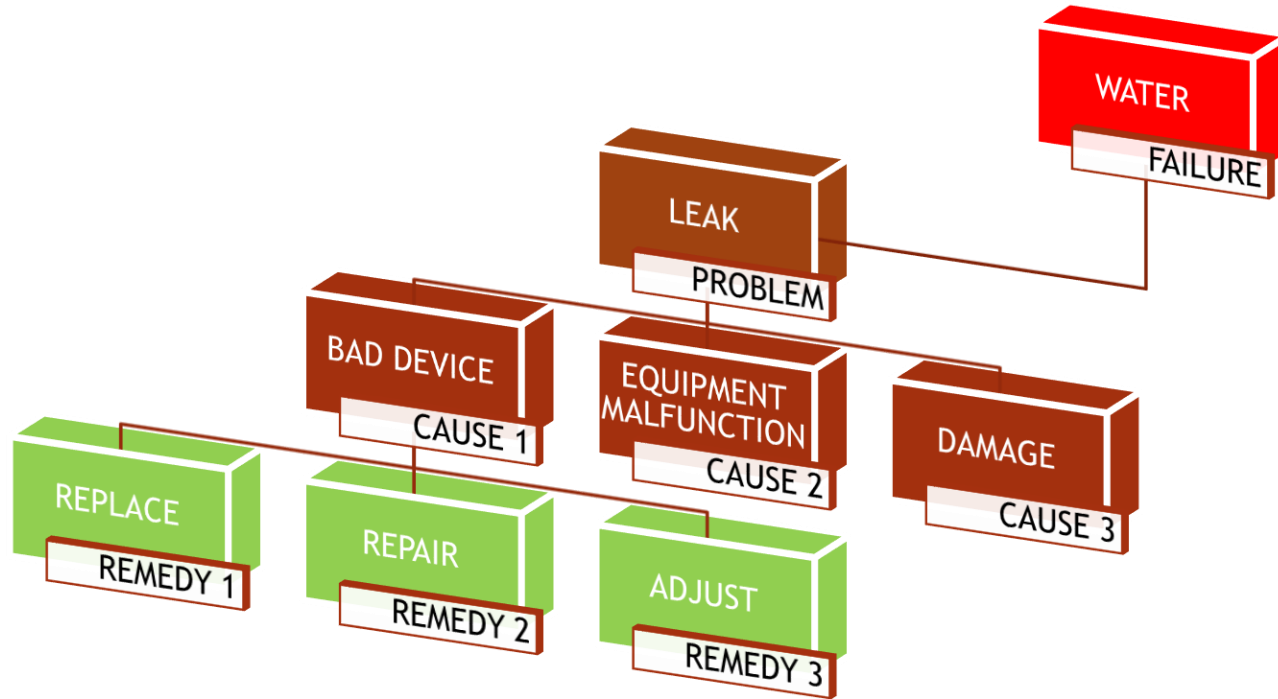


SAMPLE FAILURE CODING

Dispatcher		Mechanic/Technician	
Failure Class	Problem Code	Cause Code	Remedy Code
ELECTRIC (EL)	No Power(NO_PO)	Tripped Breaker(TRIP_BR)	Replace(RPLC)
AIR (AIR)	Lights Out(LI_OUT)	Shorted/Broken Wire(SHORT)	Repair(RPR)
VENT (VENT)	LEAK/BREACH (LK_BR)	Equipment Malfunction(EQ_MAL)	Reset(RST)
WATER (WTR)	FLOOD (FLD)	Bad Device(BD_DEV)	Rework(RWK)
FUEL (FUEL)	ALARM (ALRM)	Bad Lamps(BD_LMP)	SUPPORT(SUP)
LOCK (LK)	TEMPERATURE (TEMP)	Bad Ballast(BD_BALL)	FOLLOWUP (FL_UP)
DEVICE (DEV)	NOISE/VIBRATION (NS_VIB)	User Error(US_ERR)	ADJUSTED (ADJ)
STRUCTURE (STR)	ODOR (OD)	No Problem Found (NPF)	EXERCISED/LUBRICATED (EX_LUB)
UNDERGROUND (UG)	FLOW/PRESSURE (FLW_PR)	Oil (OIL)	CLEANED (CLND)
HEAT (HEAT)	EQUIPMENT INOPERABLE (INOP)	Antifreeze (AF)	NO ACTION TAKEN (NO_ACT)
VALVES (VLV)	HAZARD (HAZ)	Damage (DAM)	WARRANTY/CONTRACT (W_C)
VESSELS (VES)	SUSPECTED MOLD (MLD)	ASSEMBLY/SETUP (AS_SET)	SECURED/CONTAINED (SEC_CON)
FIRE (FIRE)	MISSING (MISS)	INSTALLATION (INSTL)	
FURNISHINGS (FURN)		IMPROPER STORAGE (IM_STOR)	
DISTRIBUTION (DIST)		IMPROPER PACKAGING (IM_PACK)	
STEAM (STM)		IMPROPER TRANSPORT (IM_TRAN)	
LADDERS (LAD)		IMPROPER MAINTENANCE (IM_MNT)	
VEHICLE (VEH)		IMPROPER OPERATION (IM_OP)	
		IMPROPER START UP (IM_ST_UP)	
		IMPROPER BURN IN (IM_BRN)	
		IMPROPER COMMISSIONING (IM_COM)	
		INADEQUATE DESIGN (IN_DES)	
		SUBSTANDARD MANUFACTURING (SUB_MAN)	

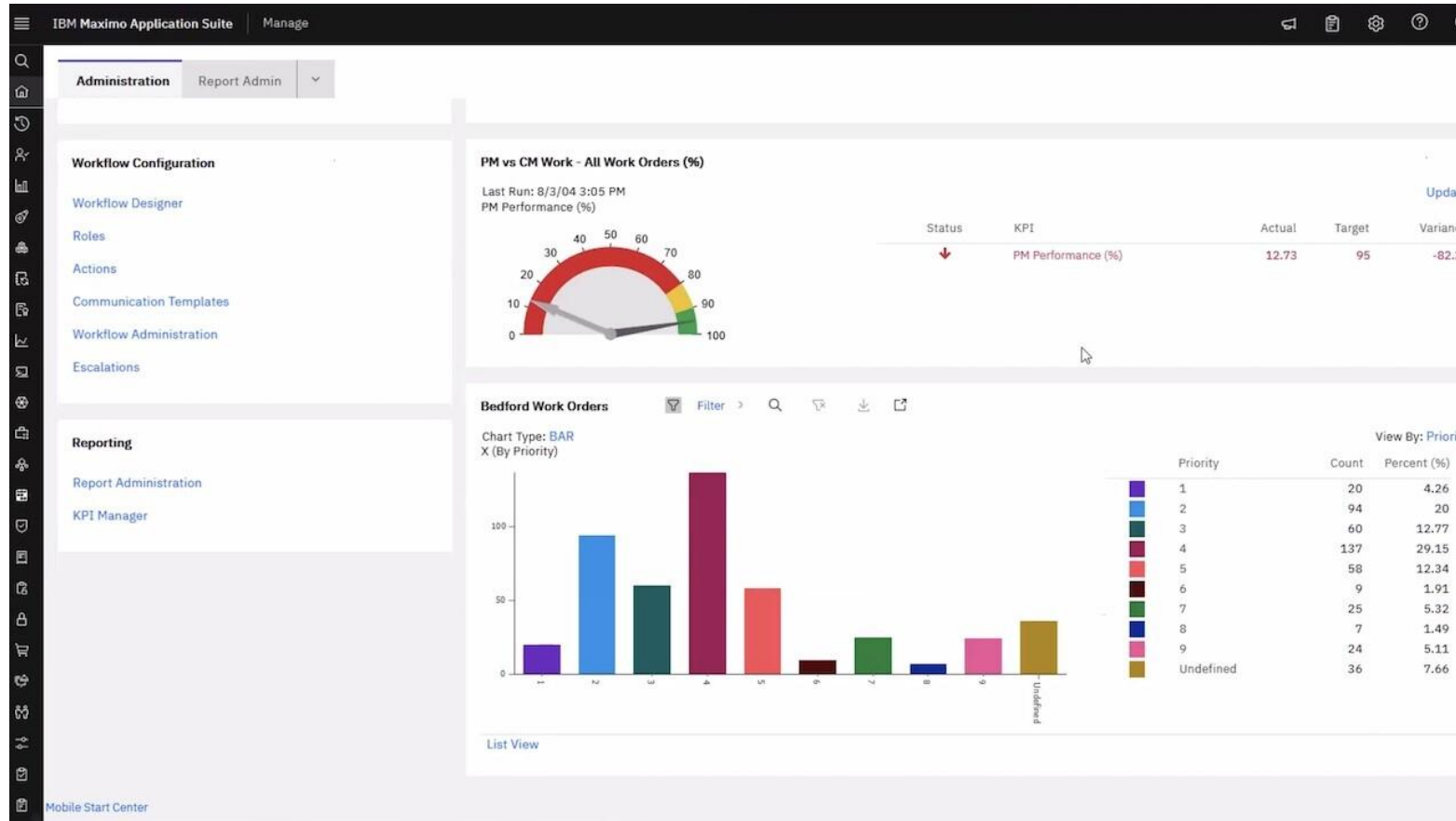


CREATE THE HIERARCHY



Once your failures are identified lay out into a hierarchy then apply to a work order, asset, location or inventory

OBJECTIVE OF FAILURE CODING



EFFECTIVENESS

UP

DOWN

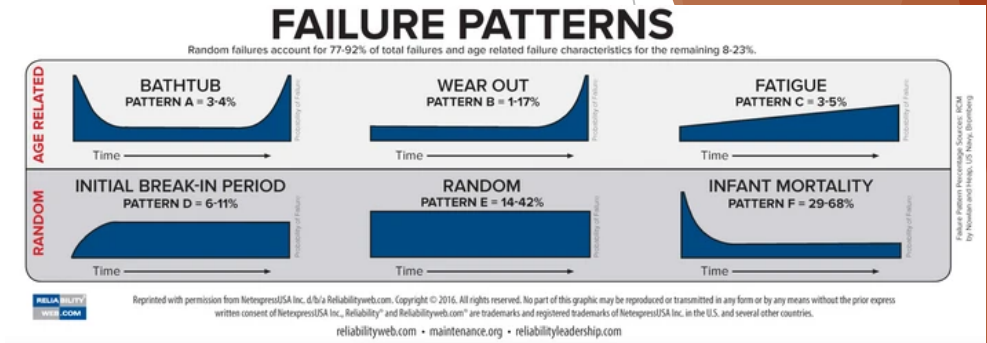
DOWNTIME

UNDERSTANDING FAILURE PATTERNS

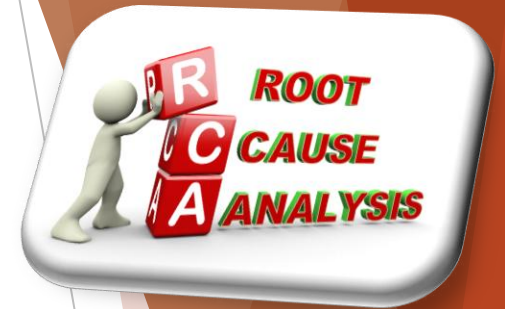
How A Failure Occurs

The screenshot displays the IBM Maximo Application Suite interface for Reliability Strategies. The top navigation bar shows 'Strategy library / Strategy'. Below this, there are filters for Asset, Asset type, and Asset configuration, all set to 'Air Handling Unit' and 'HVAC - Air Handling Equipment'. The main content area is divided into three tabs: Overview, Failure modes, and Mitigation activities. The Failure modes tab is active, showing a list of failure modes on the left and a table of mitigation activities on the right.

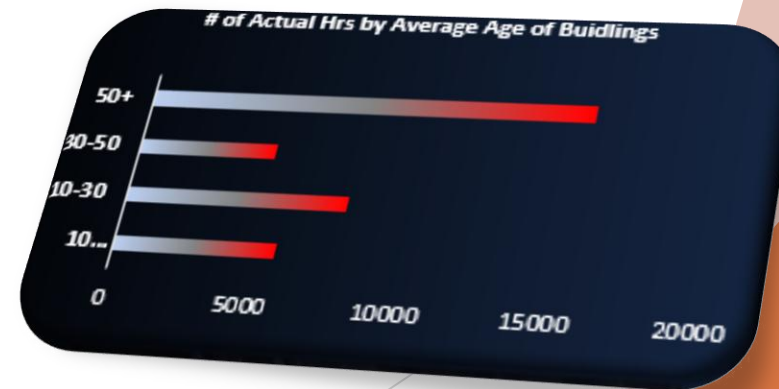
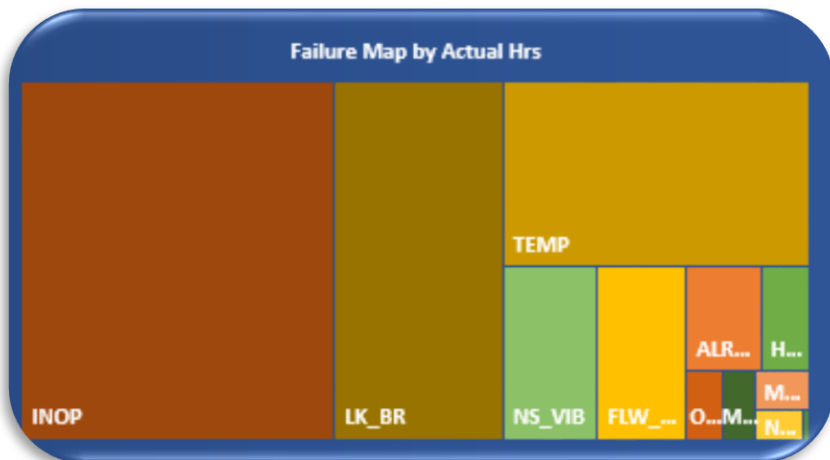
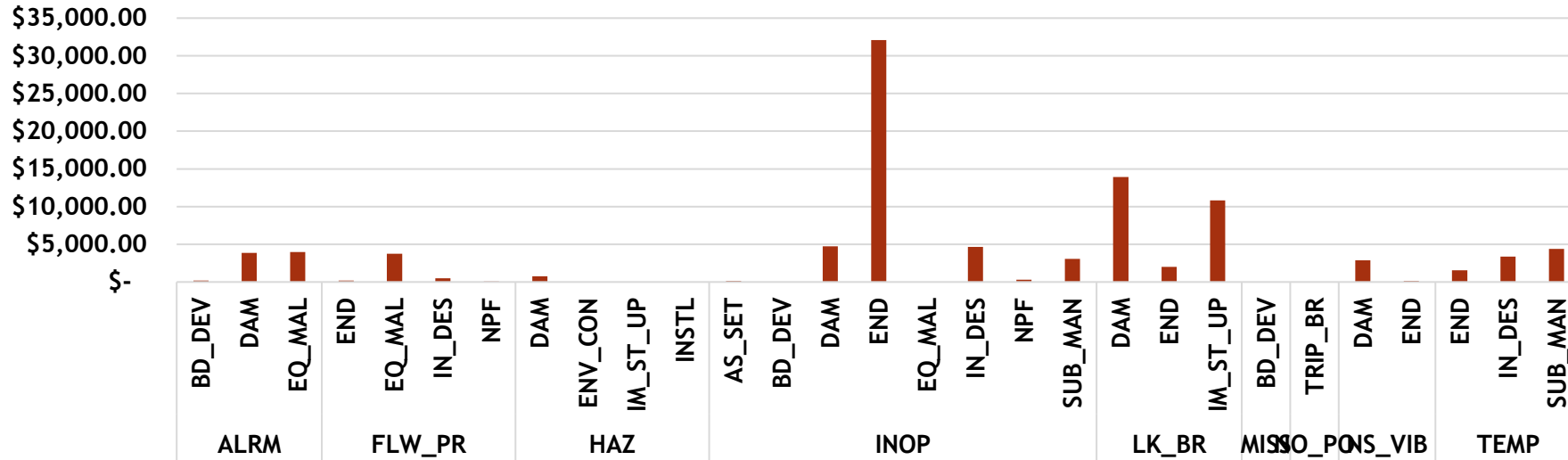
Operating context	Criticality	Duty cycle	Service condition
System Testing - Functional Tests	<input checked="" type="radio"/> Critical	<input checked="" type="radio"/> High	<input checked="" type="radio"/> Severe
Vibration Analysis	<input type="radio"/> Minor	<input type="radio"/> Low	<input type="radio"/> Mild
Fan Bearing Temperature Monitoring	<input type="radio"/> Minor	<input type="radio"/> Low	<input type="radio"/> Mild
Calibration	<input type="radio"/> Minor	<input type="radio"/> Low	<input type="radio"/> Mild
Performance Monitoring	<input type="radio"/> Minor	<input type="radio"/> Low	<input type="radio"/> Mild
Thermography	<input type="radio"/> Minor	<input type="radio"/> Low	<input type="radio"/> Mild
Filter Clean and Inspection	<input type="radio"/> Minor	<input type="radio"/> Low	<input type="radio"/> Mild
System Engineer Walkdown	<input type="radio"/> Minor	<input type="radio"/> Low	<input type="radio"/> Mild



FAILURE ANALYSIS



Cost of Causes per Problem



RCA

ROOT CAUSE ANALYSIS



Define the problem



Collect the data



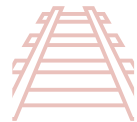
Identify causal factors



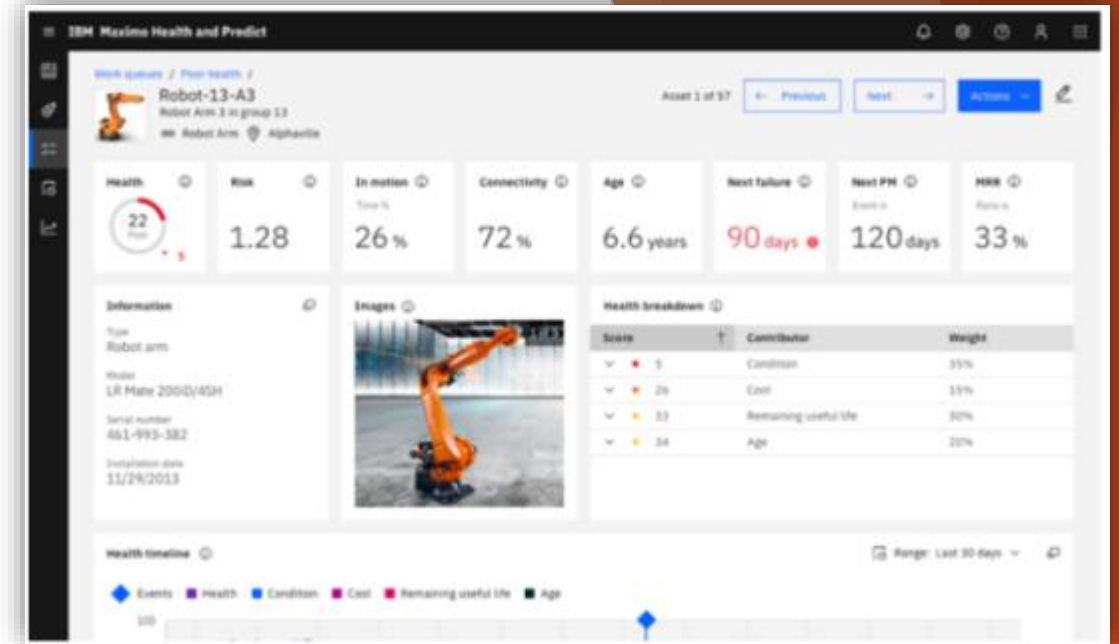
Develop recommendations



Implement recommendations



Track recommendations to ensure effectiveness



TOOLS

5 WHYS ANALYSIS
CAUSE MAPPING
PARETO ANALYSIS
FAULT TREE
MAS Health



Learning Objectives

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Develop	Develop situational asset management awareness of why something may fail
Align	Align your business processes to better facilitate elimination of defects found in your asset portfolio

REFERENCES

Reliabilityweb.com, et al. "Uptime Elements Body of Knowledge". Reliabilityweb.com (2017-2019)

<https://www.facilities.udel.edu>

<https://www.jfc-associates.com>



THANK YOU!



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