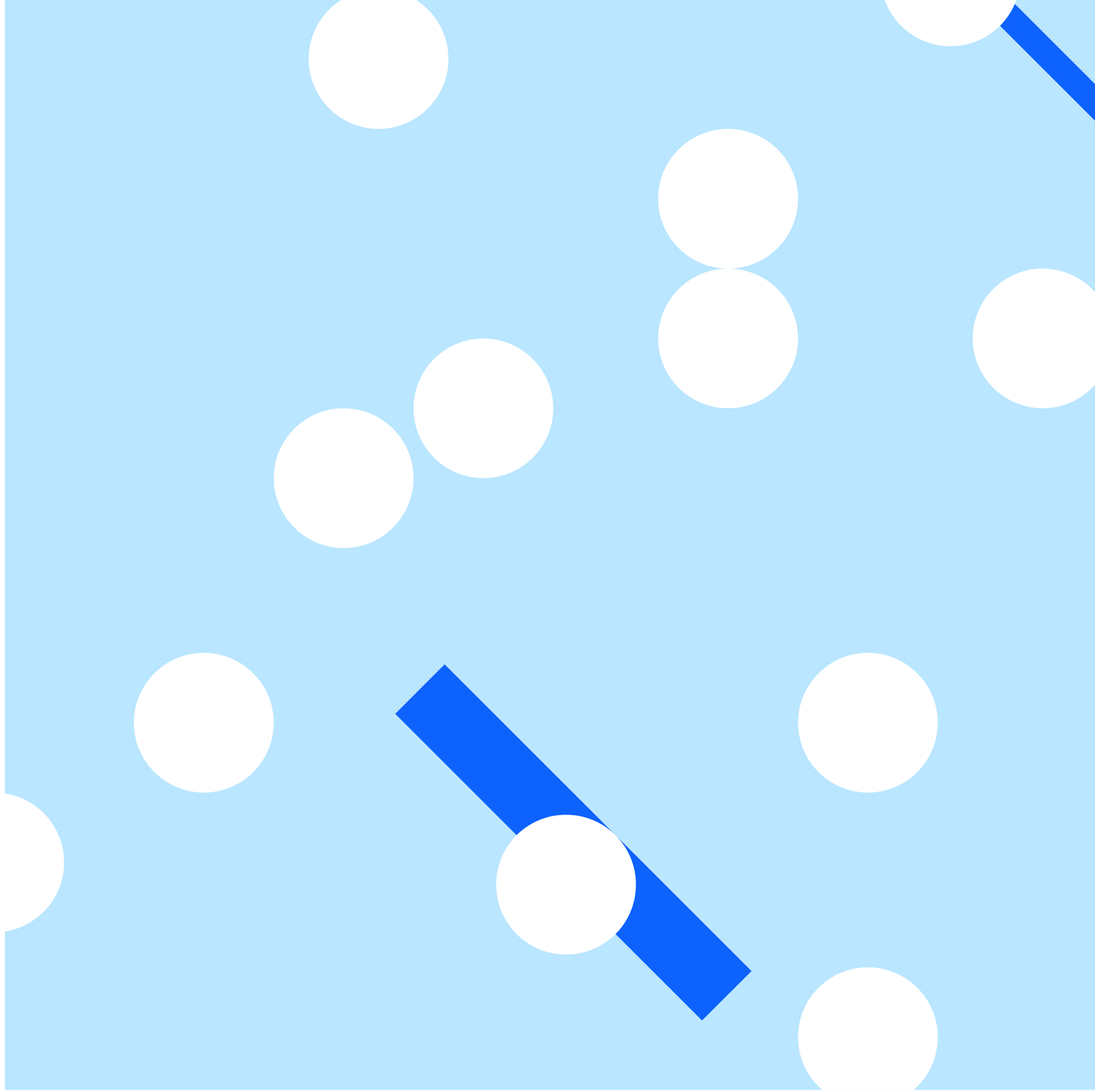
Reliability Strategies

What’s new in 9.2



Please note...

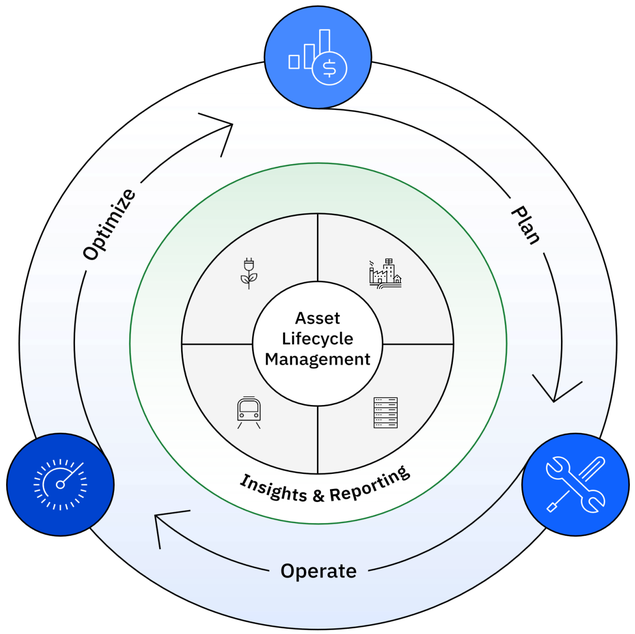
The information mentioned regarding potential future products is not a commitment, promise, or legal obligation to deliver any material, code or functionality. Information about potential future products may not be incorporated into any contract.

The development, release, and timing of any future features or functionality described for our products remains at our sole discretion.

IBM’s statements regarding its plans, directions, and intent are subject to change or withdrawal without notice at IBM’s sole discretion.

Information regarding potential future products is intended to outline our general product direction and it should not be relied on in making a purchasing decision.

A unified suite of asset lifecycle management solutions built with watsonx



Plan

Asset investment planning

- Investment planning
- Total cost of maintenance
- Capital planning
- Project & portfolio management
- ESG & climate risk

Operate

Enterprise asset management

- Asset & work registry
- Asset inspections
- Field service management
- Supply chain & inventory optimization
- Health & safety

Optimize

Asset performance management

- Reliability-centered maintenance
- Condition-based maintenance
- Predictive maintenance
- Asset health intelligence
- Energy intelligence

Asset class solutions

- Real estate & facilities
- IT asset & service
- Data centers
- Renewables
- Linear

Environmental solutions

- Corporate sustainability reporting
- Environmental compliance
- Decarbonization intelligence

Industry focus

- Energy & Utilities
- Oil & Gas
- Manufacturing
- Transportation
- Civil infrastructure

AI

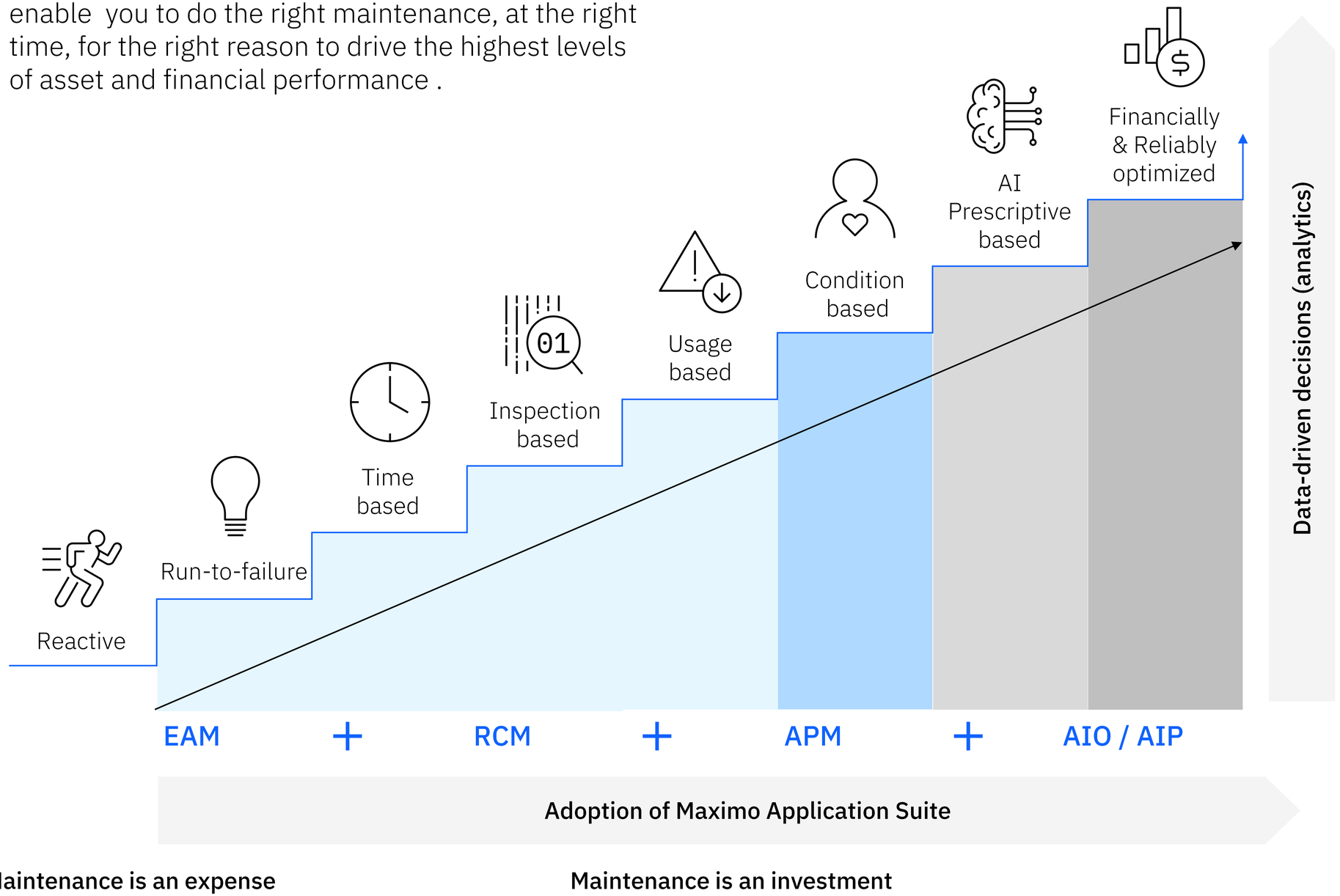
Built with watsonx

Asset Maintenance Practices and Adoption of MAS

Leveraging Reliability Strategies will quickly enable you to do the right maintenance, at the right time, for the right reason to drive the highest levels of asset and financial performance .

MAS delivers an integrated solution that enables coverage of all types of maintenance practices.

The asset maintenance practices and MAS adoption journey depends on factors including criticality of the asset, operating context, , asset replacement cost and its impact of failure on safety, environment and operations.



Reliability Strategies

Optimize maintenance, asset performance, and asset lifespan with reliability centered maintenance.

Top RCM Pain Points:

Time and Resource Intensive
Significant time to complete requiring your best SME's, diverting them from core duties

Expensive
Due to resource and time requirements the process is inherently expensive

Difficult to Scale
Lack of digitization and integration make scaling implementation difficult

Solved By:

The Reliability Strategies Library (RSL)
Significantly reduce the time required to perform RCM and Failure Modes Effects Analysis (FMEA) by leveraging existing content

GenAI-Powered Strategy Builder
Augment RSL or customer created content quickly with a GenAI assistant

Deep workflow integration
Rapidly scale FMEAs and leverage strategy content across the Maximo Application Suite (MAS)

Benefits Realized:

Maximized uptime
Improved equipment reliability leads to reduced unplanned downtime.

Reduced cost
Eliminate unnecessary maintenance tasks and leverage condition monitoring where cost effective.

Extended asset lifespan
Identifying and addressing root causes of failures can significantly extend the operational life of equipment.

Enhanced safety
Prevent safety risks associated with equipment malfunctions

What are Reliability Strategies?

What are Reliability Strategies?

Component Where is the failure happening?	Engine	Wheel	Windshield
Mechanism What is the failure?	Overheating	Vibration	Dirty
Influence Why is the failure happening?	Low oil level	Uneven tire wear	Low washer fluid
Action How to prevent the failure?	Oil change	Tire rotation	Fluid refill

What are Reliability Strategies?

Action
How to prevent the failure?

Oil change + Tire rotation + Fluid refill

=

Mitigation activity
When to perform the actions?

Full service inspection

What are Reliability Strategies?

Your vehicle at a glance 2

Your vehicle at a glance

Exterior overview

Front view

OSP2N011001

* The actual shape may differ from the illustration.

What are Reliability Strategies?

Your vehicle at a

Tire Pressure Monitoring System (TPMS)

The Tire Pressure Monitoring System (TPMS) detects the pressure of vehicle's tires and displays it on the LCD display.

1. Low tire pressure telltale / TPMS malfunction indicator
2. Low tire pressure position telltale (Shown on the LCD display)

Tire Pressure Indicator

- You can check the tire pressure in the assist mode on the cluster.
  - Refer to "Driving Assist mode" on page 4-53.
- Tire pressure is displayed 1~2 minutes later after driving.
- If tire pressure is not displayed when the vehicle is stopped, "Drive to display" message displays. After driving, check the tire pressure.
- You can change the tire pressure unit in the user settings mode on the cluster.
  - psi, kPa, bar (Refer to "User Settings mode" on page 4-54).

NOTICE

- The tire pressure may change due to factors such as parking condition, driving style, and altitude above sea level.
- The tire pressure shown on the dashboard may differ from the tire pressure measured by tire pressure gauge.

Effective use of the TPMS

WARNING

Over-inflation or under-inflation can reduce tire life, adversely affect vehicle handling, and lead to sudden tire failure that may cause loss of vehicle control resulting in an accident

Each tire, including the spare (if provided), should be checked monthly when cold and inflated to the inflation pressure recommended by the vehicle manufacturer on the vehicle placard or tire inflation pressure label.

(If your vehicle has tires of a different size than the size indicated on the vehicle placard or tire inflation pressure label, you should determine the proper tire inflation pressure for those tires.)

As an added safety feature, your vehicle has been equipped with a tire pressure monitoring system (TPMS) that illuminates a low tire pressure telltale when one or more of your tires is significantly under-inflated. Accordingly, when the low tire pressure telltale illuminates, you should stop and check your tires as soon as possible, and inflate them to the proper pressure. Driving on a significantly under-inflated tire causes the tire to overheat and can lead to tire failure. Under-inflation also reduces fuel efficiency and tire tread life, and may affect the vehicle's handling and stopping ability.

Please note that the TPMS is not a substitute for proper tire maintenance, and it is the driver's responsibility to maintain correct tire pressure, even if under-inflation has not reached the level to trigger illumination of the TPMS low tire pressure telltale.

Your vehicle has also been equipped with a TPMS malfunction indicator to indicate when the system is not operating properly. The TPMS malfunction indicator is combined with the low tire pressure telltale. When the system detects a malfunction, the telltale will flash for approximately one minute and then remain continuously illuminated. This sequence will continue upon subsequent vehicle start-ups as long as the malfunction exists. When the malfunction indicator is illuminated, the system may not be able to detect or signal low tire pressure as intended. TPMS malfunctions may occur for a variety of reasons, including the installation of replacement or alternate tires or wheels on the vehicle that prevent the TPMS from functioning properly.

Always check the TPMS malfunction telltale after replacing one or more tires or wheels on your vehicle to ensure that the replacement or alternate tires and wheels allow the TPMS to continue to function properly.

NOTICE

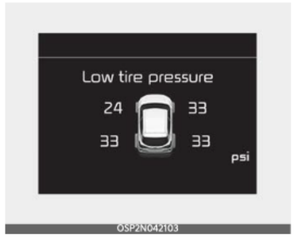
If any of the below happens, have the system checked by an authorized Kia dealer.

1. The low tire pressure telltale/TPMS malfunction indicator does not appear for 3 seconds when the ENGINE START/STOP button is turned to the ON position or engine is running.
2. The TPMS malfunction indicator remains illuminated after blinking for approximately 1 minute.
3. The Low tire pressure position telltale remains illuminated.

Low tire pressure telltale

Low tire pressure position telltale

When the TPMS warning indicators are illuminated, one or more of your tires is significantly under-inflated.



If the telltale illuminates, immediately reduce your speed, avoid hard cornering and anticipate increased stopping distances. You should stop and check your tires as soon as possible.

Inflate the tires to the proper pressure as indicated on the vehicle's placard or tire

What are Reliability Strategies?

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Scheduled maintenance service

Follow the Normal Maintenance Schedule if the vehicle is usually operated where none of the following conditions apply.

Follow the Maintenance Under Severe Usage Conditions if any of the following conditions apply.

- Repeated driving short distance of less than 5 miles (8 km) in normal temperature or less than 10 miles (16 km) in freezing temperature.
- Extensive engine idling or low speed driving for long distances.
- Driving on rough, dusty, muddy, unpaved, graveled or salt-spread roads.
- Driving in areas using salt or other corrosive materials or in very cold weather.
- Driving in heavy dust condition.
- Driving in heavy traffic area.
- Driving on uphill, downhill, or mountain road repeatedly.
- Using for towing or camping and driving with loading on the roof.
- Driving as a patrol car, taxi, other commercial use of vehicle towing.
- Frequently driving under high speed or rapid acceleration/deceleration.
- Frequently driving in stop-and-go condition.

If your vehicle is operated in any of the prior listed conditions, you should inspect, replace or refill more frequently, using the severe usage maintenance schedule instead of the normal usage maintenance schedule.

NOTICE

After 10 years or 100,000 miles (150,000 km), we recommend to use severe maintenance schedule.

Normal maintenance schedule - Non Turbo Models

The following maintenance services must be performed to ensure good emission control and performance. Keep receipts for all vehicle services to protect your warranty. Where both mileage and date are shown, the frequency of service is determined by whichever occurs first.

I: Inspect and if necessary, adjust, correct, clean or replace.
R: Replace or change

Number of months or driving distance, whichever comes first												
Months		12	24	36	48	60	72	84	96	108	120	132	144
Miles×1,000		8	16	24	32	40	48	56	64	72	80	88	96
Km×1,000		13	26	39	52	65	78	91	104	117	130	143	156
Rotate tires		Rotate every 8,000 miles (13,000 km)											
Engine oil and engine oil filter*1	(Gasoline) 2.0 MPI	R	R	R	R	R	R	R	R	R	R	R	R
Climate control air filter		I	R	I	R	I	R	I	R	I	R	I	R
Air cleaner filter		I	I	R	I	I	R	I	I	R	I	I	R
Brake fluid		Inspect every 8,000 miles (13,000 km) or 12 months, Replace every 48,000 miles (78,000 km) or 48 months											
Spark plugs		Replace every 96,000 miles (156,000 km)											
Coolant (Engine)		At first, replace at 120,000 miles (195,000 km) or 120 months After that, replace every 24,000 miles (39,000 km) or 24 months											
Vacuum hose		I	I	I	I	I	I	I	I	I	I	I	I
Air conditioner refrigerant													
Exhaust system													
Brake lines, hoses and connections													
Parking brake													
Brake discs and pads													
Suspension ball joints and mounting bolts													
Steering gear rack, linkage and boots													
Air conditioner compressor													
Drive shaft and boots													
Fuel tank and fuel cap		-	I	-	I	-	I	-	I	-	I	-	I
Fuel lines, hoses and connections													
Fuel tank air filter*2													
Cooling system		-	-	-	I	-	-	-	I	-	-	-	I
Transfer case oil (4WD)*3		Inspect every 40,000 miles (65,000 km) or 48 months											
Rear differential oil (4WD)*4													
Drive belts*5		-	-	-	-	-	I	I	I	I	I	I	I

Reliability Strategies

A look back at 9.1

Custom Strategies

- AI-powered FMEA Builder
- Mitigation Activities and Shared Actions
- Link Assets to Strategies
- Strategies in your Maximo instance
- RPN categories
- PCR Codes
- Functions and Functional Failures

Reliability Strategy Library

- Knowledge base of comprehensive maintenance strategies
- Based on RCM principles from domain and industry experts
- Derived from large, decades-long scale studies involving multiple corporations and SMEs
- Reduces time and effort to implement RCM processes complete with FMEAs, mitigations, and optimized maintenance practices

Reliability Strategy Library

In numbers

25

years of data collection

32,000+

years of professional industry experience

58,000+

failure mechanisms spanning all known operating contexts

5,000+

preventive maintenance tasks and intervals organized by operating context

800+

critical equipment types covered

UP TO

20%

reduction in maintenance costs

Compared to traditional PM strategies

UP TO

75%

Faster than traditional RCM

AI within Reliability Strategies

The next generation of AI-powered RCM

Creating custom strategies

Strategy Boundary
Use AI to quickly write a description of your asset and define the boundaries of your strategy.

Failure Modes
Leverage AI to build your component hierarchy, identify failure mechanisms and influences, speeding up the FMEA process.

Actions NEW IN 9.2
Identify necessary tasks for failure modes detection and build task descriptions based on relevant failures with AI suggestions.

Mitigation Activities NEW IN 9.2
Speed up development of Job Plan content based on relevant actions and failure modes with AI assistance.

Applying strategies

Suggested assets NEW IN 9.2+
Deploy your strategies faster by using AI to identify related assets.

Reliability Strategies

What's coming in 9.2

Job Plan & PM support

View, manage, and create Job Plans, PMs, and Master PMs directly from mitigation activities within Reliability Strategies.

Advanced Strategies

Build your strategies faster with more information from the *Reliability Strategy Library*, improved user interfaces such as component and mechanism management, multiple PCR codes, and more.

Locations support

Apply your strategies to your locations in Maximo and track their implementation.

Implementation Dashboard

Check your assets' coverage, identify common failures, easily track your strategy implementation, create PMs to mitigate gaps.

Meter support

Link failure modes, actions, and mitigation activities to your Maximo Meters to better document PM intervals and to quickly identify root causes.

Strategy Import & Export

Import your existing reliability content or edit strategies in your preferred tool with pre-formatted data templates.

Enhanced AI Strategy Builder

Generate actions and mitigation activities for your failure modes, ready to be turned into actionable PMs.

Risk Matrices

Classify your failure modes with against your defined standards with custom risk matrices.

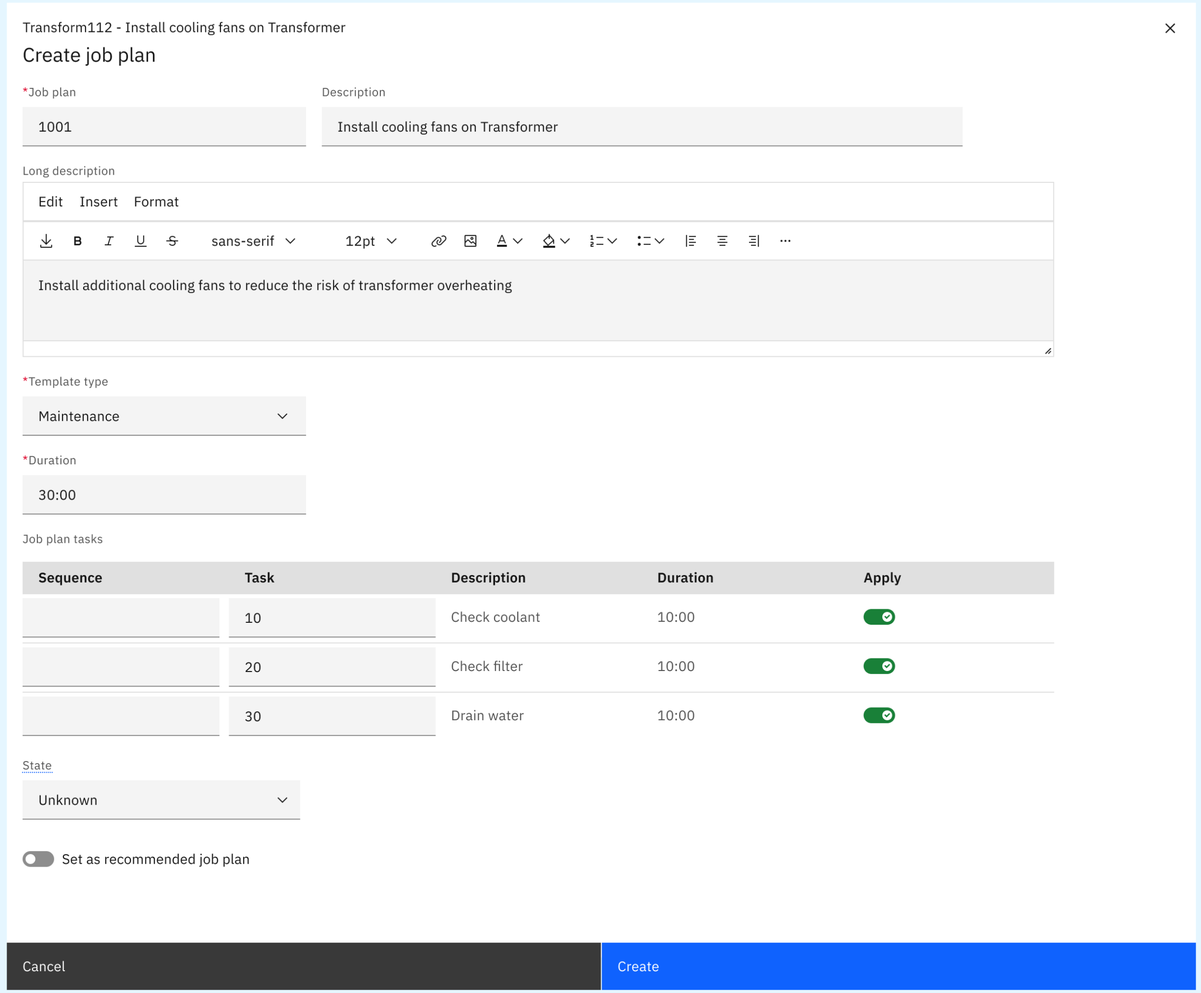
Strategy Validation

Identify common errors in your strategies, such as unlinked failure modes, missing action effectiveness, and more.

Job Plan and Preventive Maintenance Support

Quickly deploy your strategy to your assets from Reliability Strategies.

Create job plans, PMs, Master PMs, and link your existing data to your strategies for tracking.



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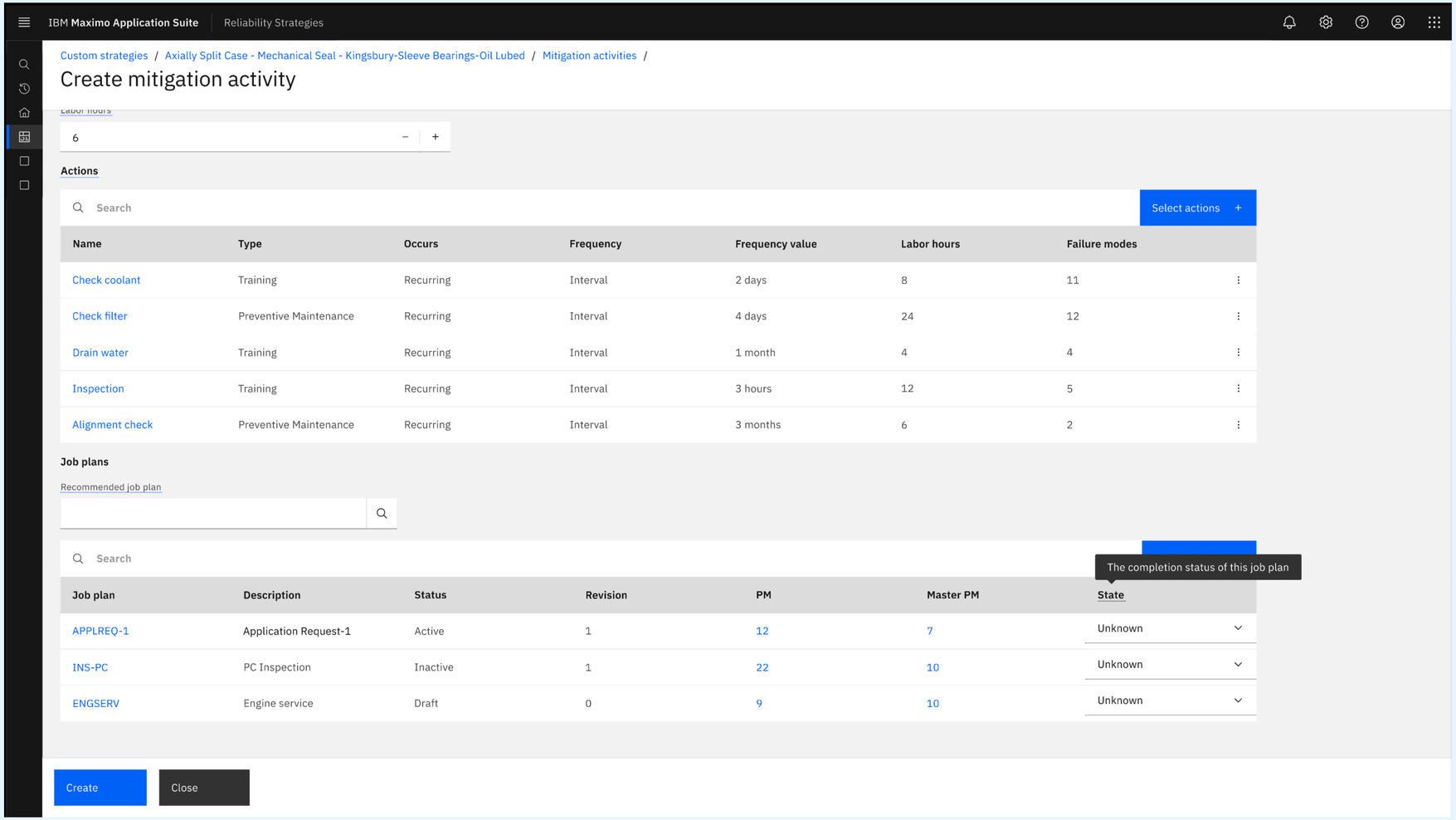

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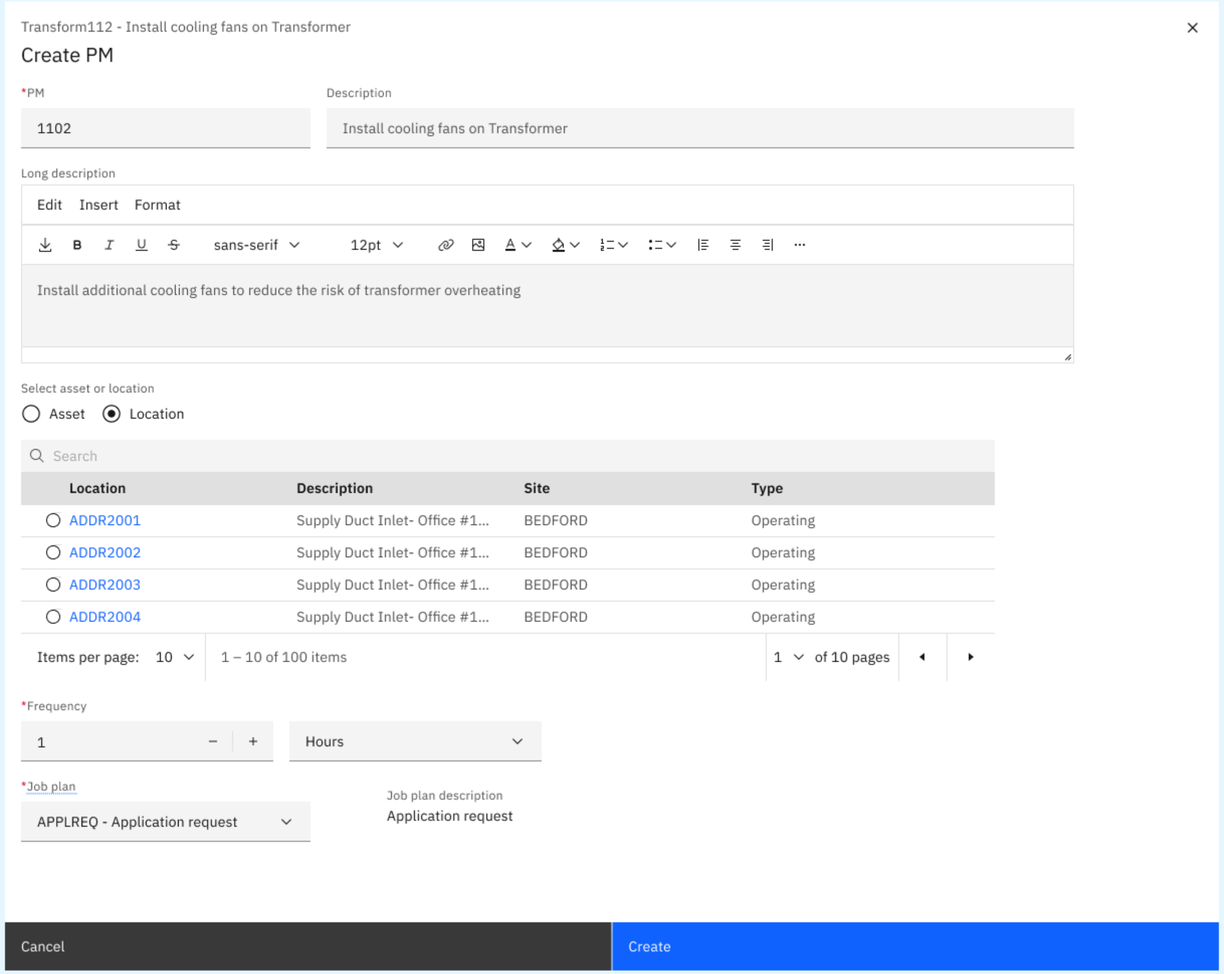
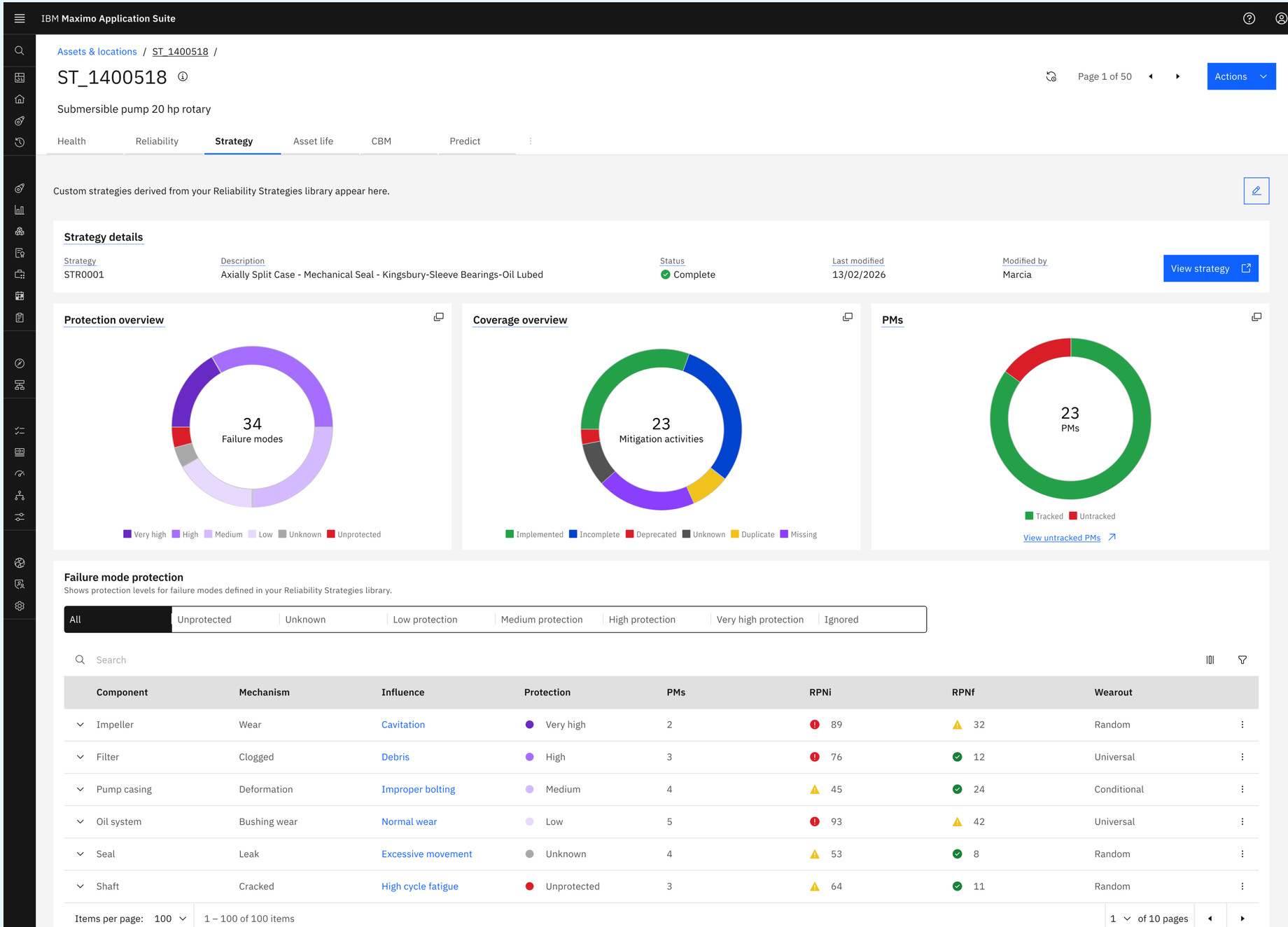


Implementation Dashboard

Check your assets' coverage, identify at-risk failure modes, and close gaps in your maintenance schedule.



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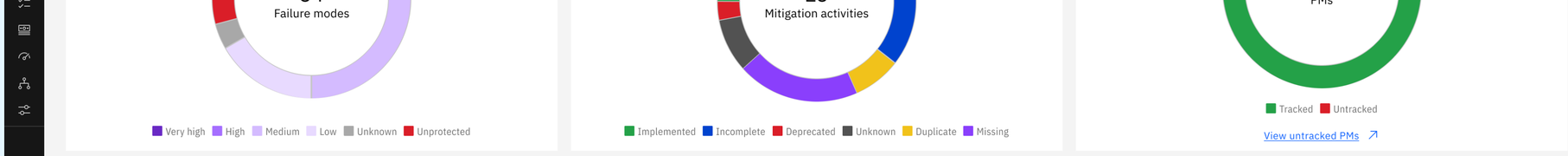


Failure mode protection

Shows protection levels for failure modes defined in your Reliability Strategies library.

All | Unprotected | Unknown | Low protection | Medium protection | High protection | Very high protection | Ignored

Search

Component	Mechanism	Influence	Protection	PMs	RPNi	RPNf	Wearout
Impeller	Wear	Cavitation	Very high	2	89	32	Random
Filter	Clogged	Debris	High	3	76	12	Universal

Preventive maintenance

PM	Description	Coverage	Mitigation activity	Description	Job plan	Effectiveness
PM1001	Inspect asset performance	Implemented	MA1001	Annual inspection	JP1001	High
PM1002	Install cooling fans	Incomplete	MA1002	Operator rounds	JP1002	Medium

Recommended mitigation activities

Mitigation activity	Description	Effectiveness	Recommended job plan	Description
MA1001	Fitler replacement	High	JP1003	Inspect asset performance
MA1002	Drain system	Medium	JP1004	Install cooling fans

Pump casing	Deformation	Improper bolting	Medium	4	45	24	Conditional
Oil system	Bushing wear	Normal wear	Low	5	93	42	Universal
Seal	Leak	Excessive movement	Unknown	4	53	8	Random
Shaft	Cracked	High cycle fatigue	Unprotected	3	64	11	Random

Items per page: 100 | 1 – 100 of 100 items | 1 of 10 pages

Mitigation activity coverage

Shows the coverage status of the mitigation activities listed.

All | Implemented | Incomplete | Deprecated | Unknown | Duplicate | Missing | Ignored

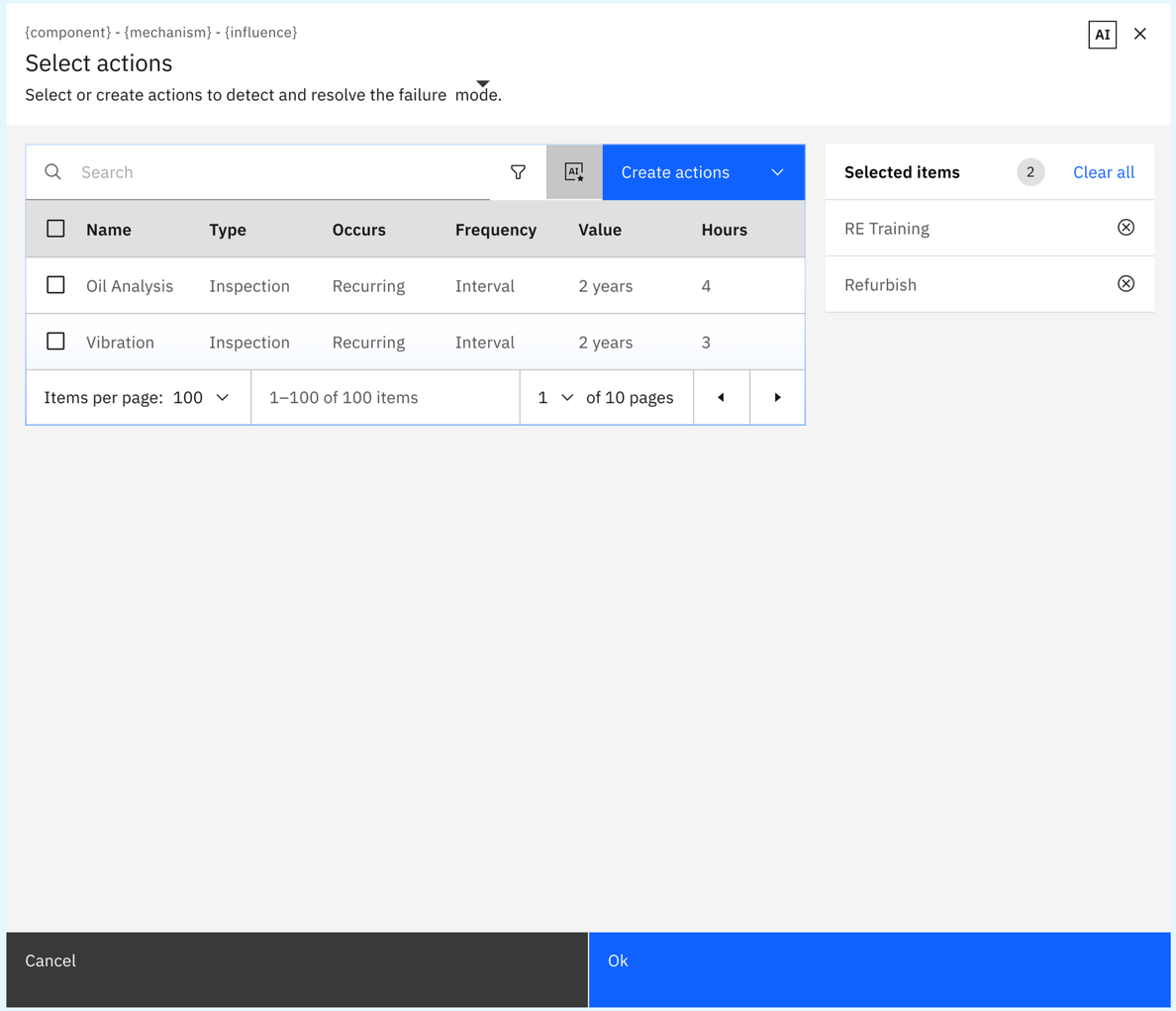
Search

Mitigation activity	Description	Coverage	Actions	PM	Job plan
MA1001	Annual inspection	Implemented	2	PM1001	JP1001
MA1002	Operator rounds	Incomplete	3	PM1002	JP1002

Enhanced AI Strategy Builder

Create or customize strategy faster than ever using our purpose-built AI models.

Create or find relevant actions and automatically build your mitigation activities descriptions.



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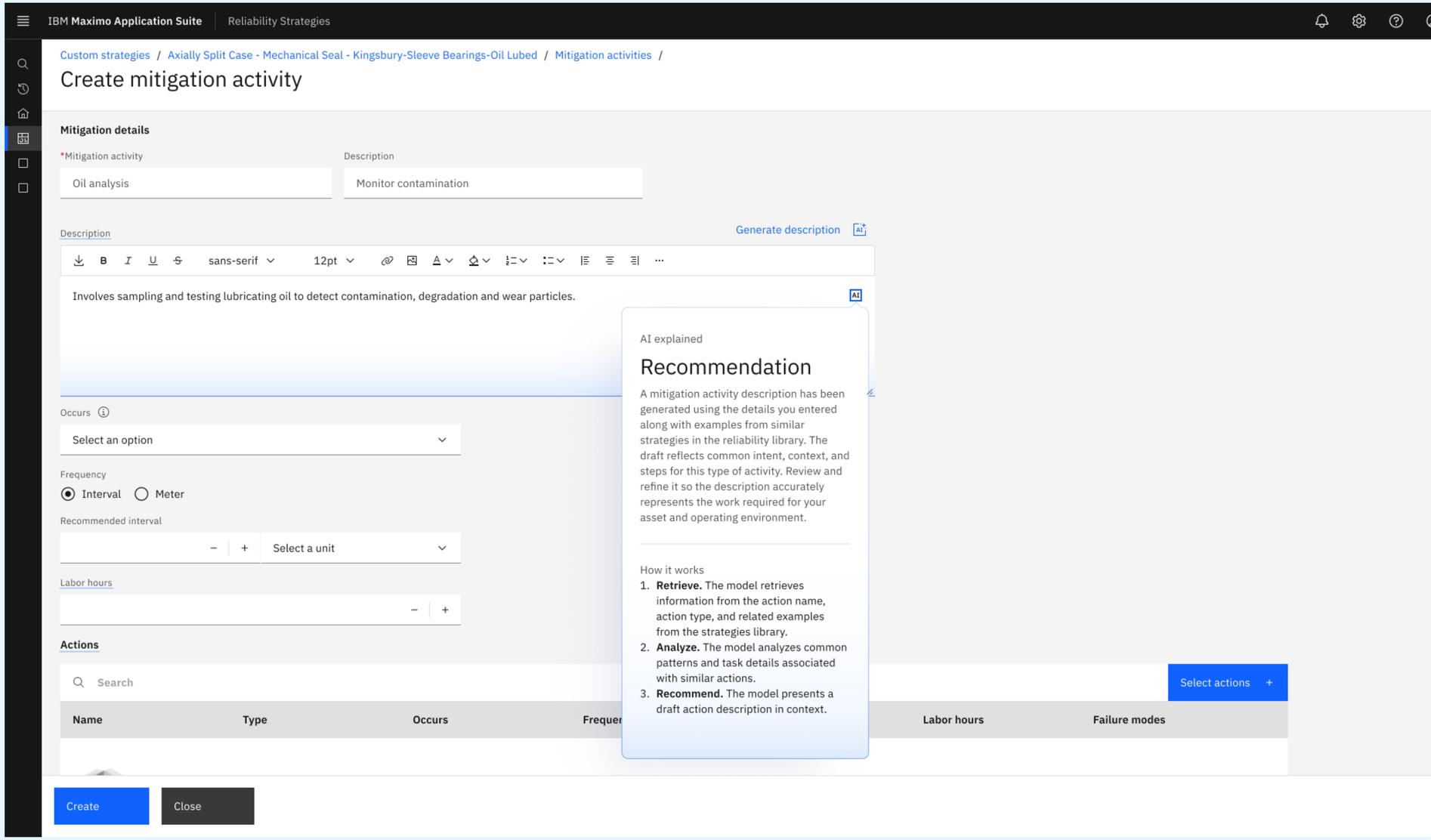
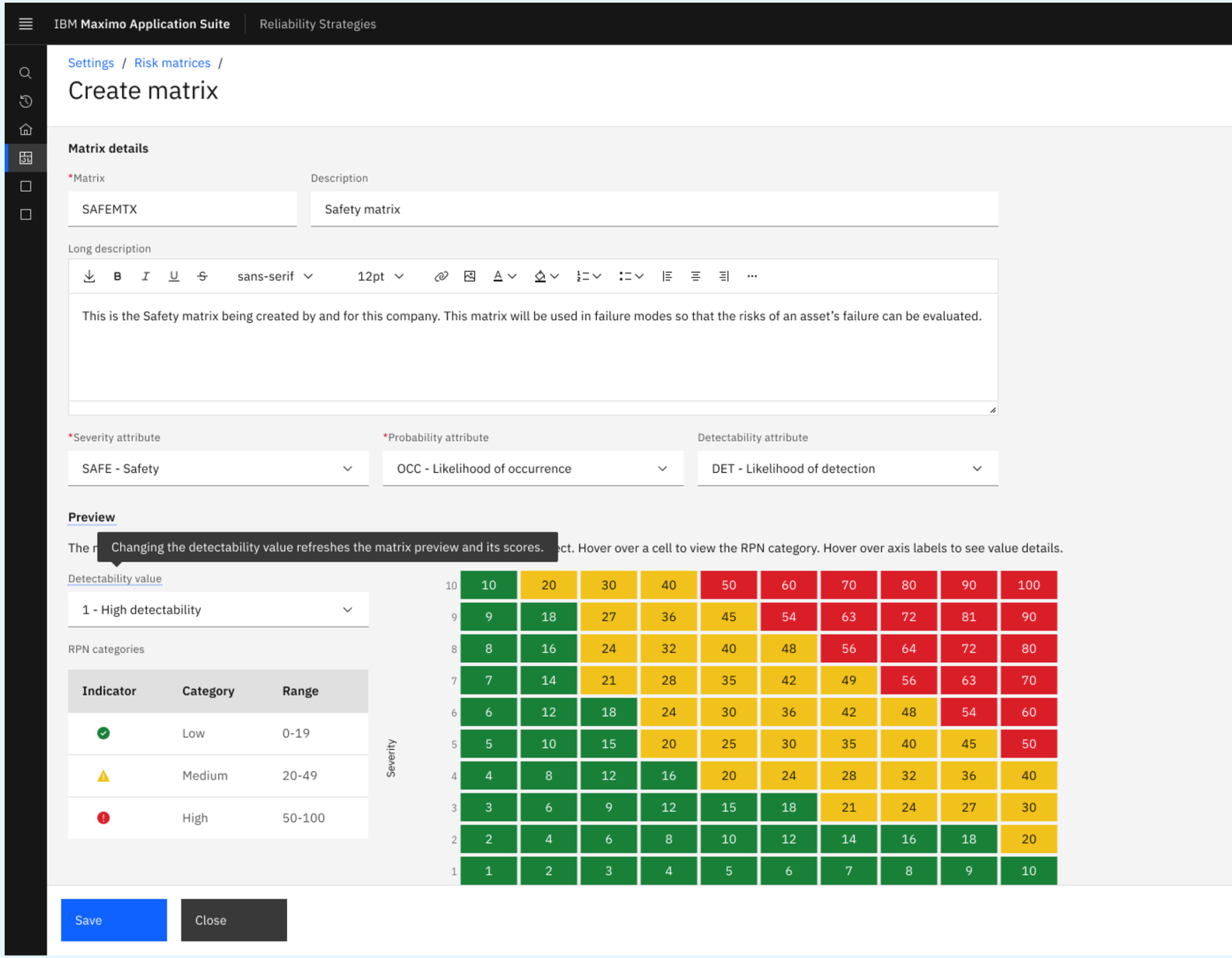


Matrices

Import or define your own custom matrices to decorate your RPN across Reliability Strategies.

Apply your matrices per-strategy and use them within failure modes.



Thank you!

For additional questions/comments:

reliabilitystrategies@ibm.com