Performance

Rotating Equipment Performance

Value for the Customer is only created when action is taken

Piotr Korzunowicz
2024-11-13

AGENDA

SKF CoMo & Maintenance

- What we do?
- Way? How?

Digitalization and Maintenance

Effect of collaboration

Preventive maintenance
CoMo concept

Technology to cover needs

Detect

Provide Information

Improve

Q&A

Improve Customer Competitiveness/Performance

Performance

Reliability

Predictability

TCO

Secure the full value of the Bearing through reliable rotation

Contract Managment

Rotating Equipment Performance

Lubrication & Lubrication automation

Field Service & specialist maintenance

Condition Monitoring & & digitization

Training

Bearing arrangement & Improvements

Circular Economy

Remanufacturing

Units

Clean Oil

SKF service agreement

98%
Reporting rate

> 8 800
Recommended Actions

30 years
Experience of vibration monitoring

>10 000
Continuously monitored assets

100+ years
Experience with rotating equipment

< 3 years
ROI

Ovako and SKF extend cooperation

The steel manufacturer Ovako in Hofors is investing in expanded preventive maintenance work and is signing a five-year service agreement with SKF, which involves extended online measurement and the use of the latest wireless technology for measuring operational data.

> "Our strategy is to reduce the proportion of corrective maintenance and work even more preventively, where we see that increased online measurement is an important part,"
>
> *Erik Wallberg*
> *Maintenance Manager*
> *for Rör och Ring*

LKAB signs agreement with SKF to develop maintenance work

"A key enabler for creating the conditions for trouble-free and safe processes is world-class data-driven maintenance.
The goal is to increase safety, availability, plant speed and quality, which will lead to a lower total cost for LKAB,“

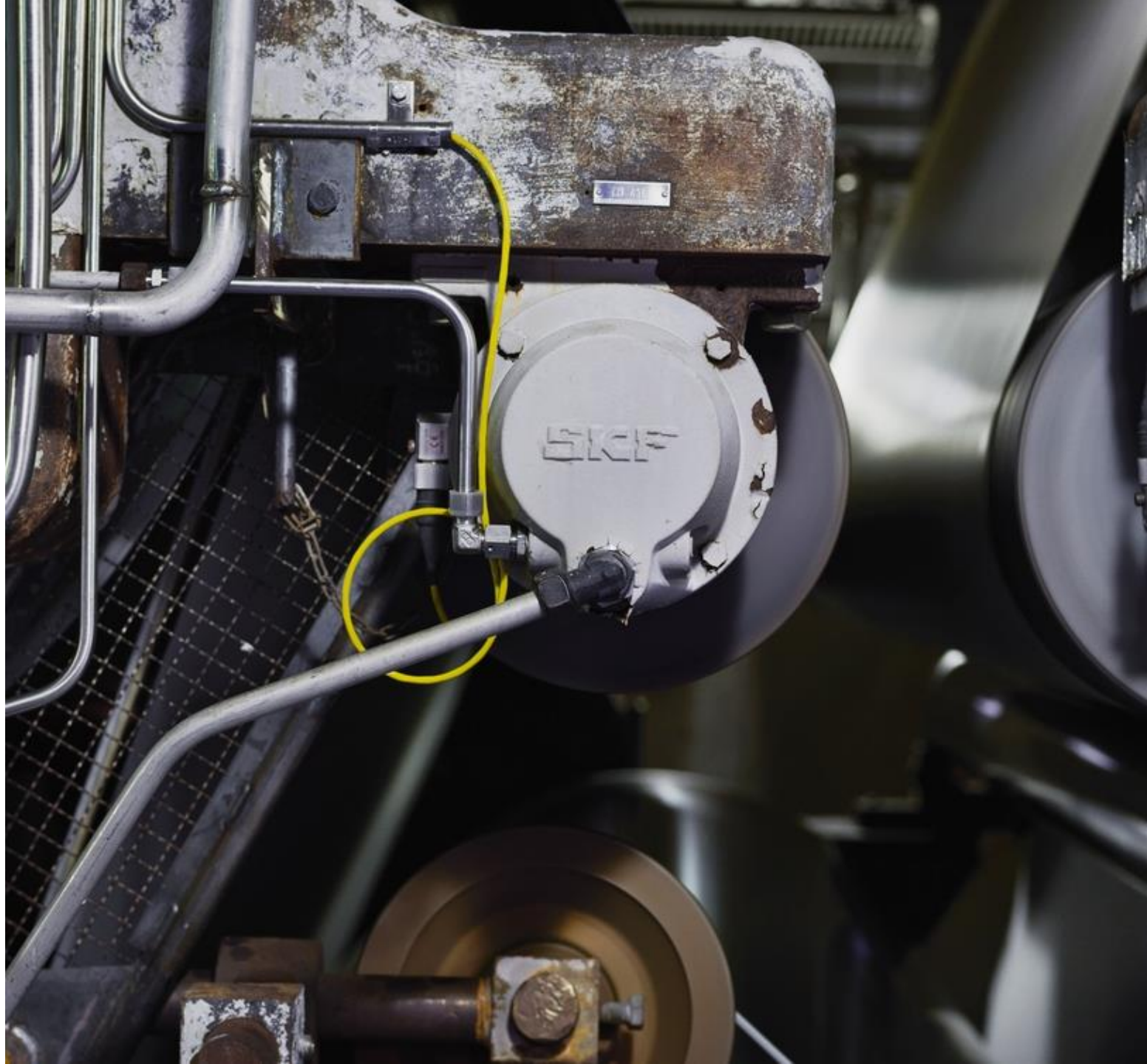
Maria Ryytty
Section Manager for Strategic Maintenance

SKF enters collaboration with Ahlström-Munksjö

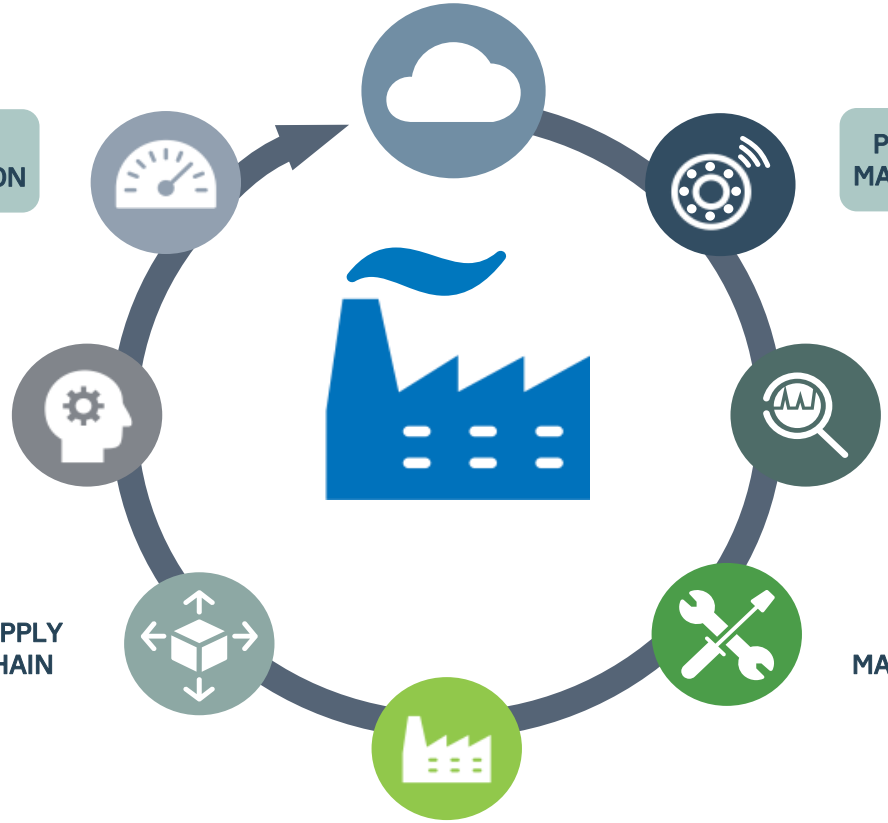
The engineering company SKF has entered a three-year collaboration with Ahlström-Munksjö in condition-based maintenance with the aim of increasing safety and improving the technical availability of the paper machine PM13.

> In our quest to increase plant availability and reliability, this collaboration with SKF in PM13 condition monitoring is an important step in our journey from corrective to predictive maintenance
> ***Robin Andrésen,*** *Maintenance Engineer*

> With the remote sensing service, we also have the opportunity to take advantage of SKF's broad expertise in the field and develop our own staff. We see this as a great advantage for the future"
> ***Peter Dahlbom,*** *Maintenance Manager*



This is how we do it



SKF DIGITAL PLATFORM

Secure and easily accessible data storage, IOT and Big Data Analytics

DATA COLLECTION

Including condition monitoring data , lubrication, maintenance, process, production, and spare parts

PREDICTIVE MAINTENANCE

Utilizing remote diagnostic resources and system based tools

ACTIONABLE INSIGHTS

Visualization through dashboards to support decision making and actions in real time that optimize asset performance and KPI measurement

FIELD MAINTENANCE

Full range of maintenance support services

REMANUFACTURING

Identifying when to perform a cost-efficient remanufacturing process while reducing carbon footprint and optimising the life cycle cost of the assets

SUPPLY CHAIN

Real time info on the spare parts for specific machinery, enabling a new and more efficient spare parts management and supply chain.

ENGINEERING KNOWLEDGE

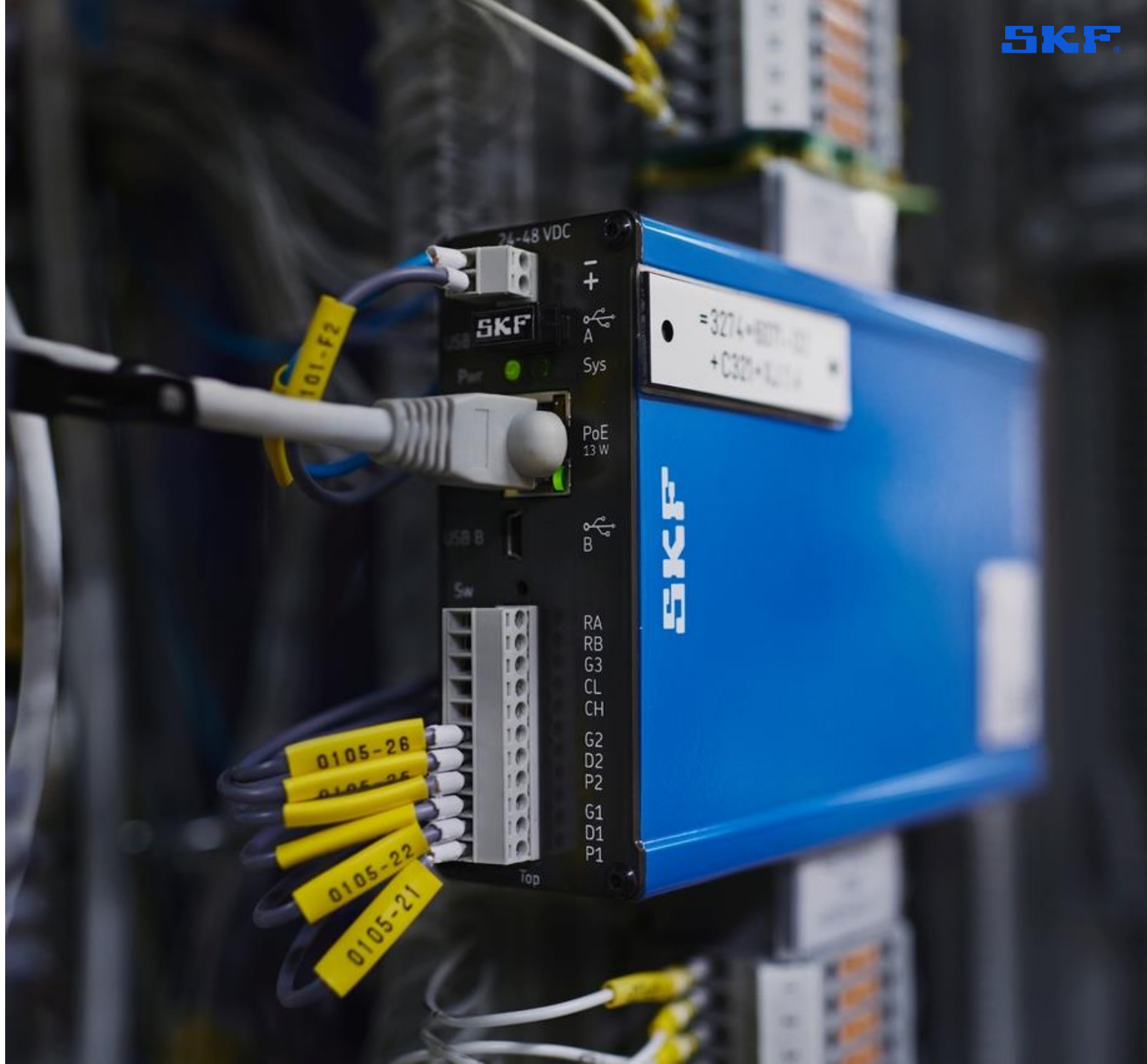
Benchmarking, understanding your needs and opportunities for improvement, application expertise, ensuring performance and KPI targets

Digitalization and Maintenance

Digitalization is a prerequisite for us and our customers to increase competitiveness

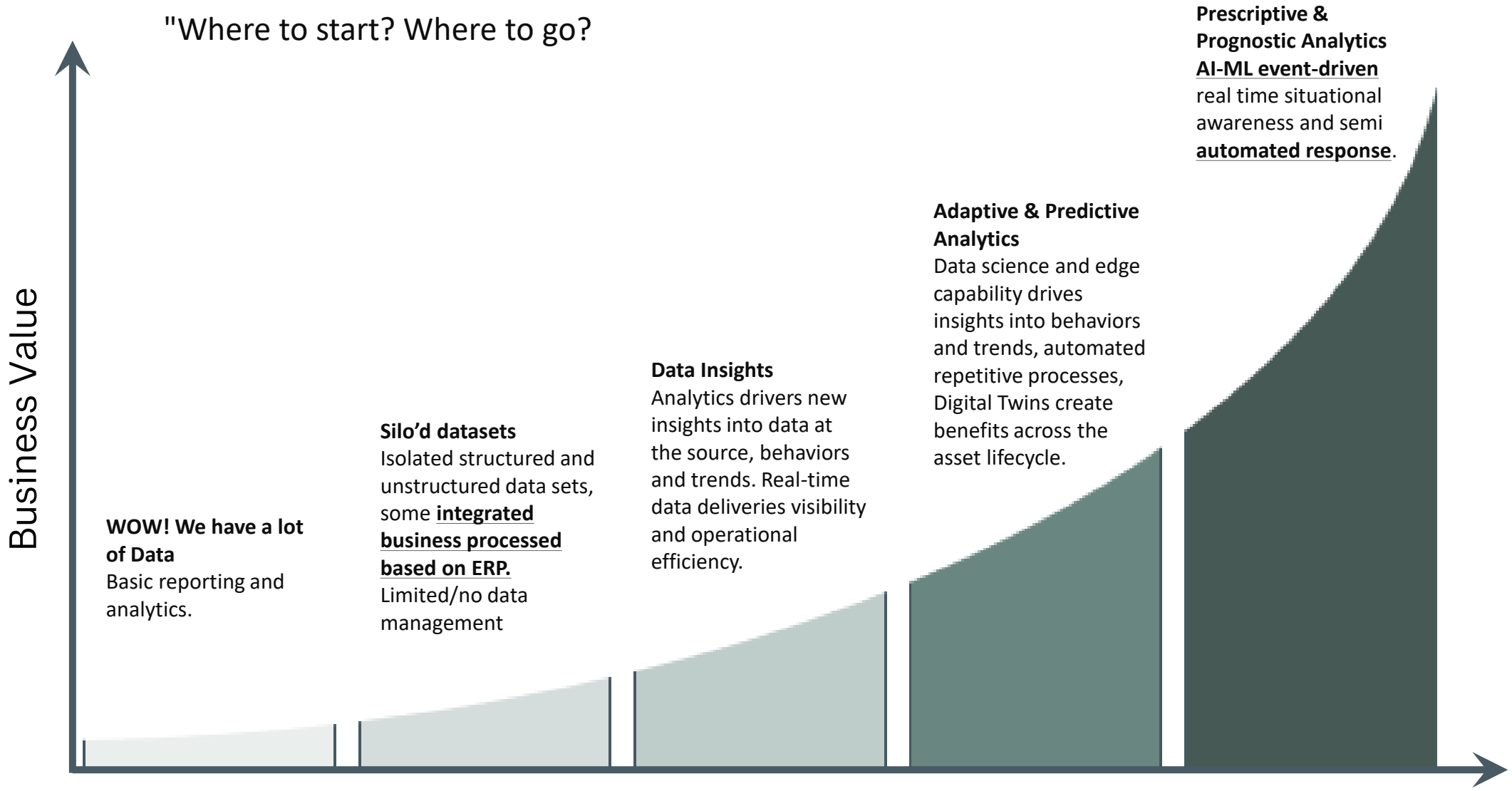
We believe in working based on the customer’s needs and goals. With common goals and incentives, we succeed.

Our customers turn to us when they want to secure their investments and expertise knowledge around rotating shafts



DIGITAL MATURITY

"Where to start? Where to go?

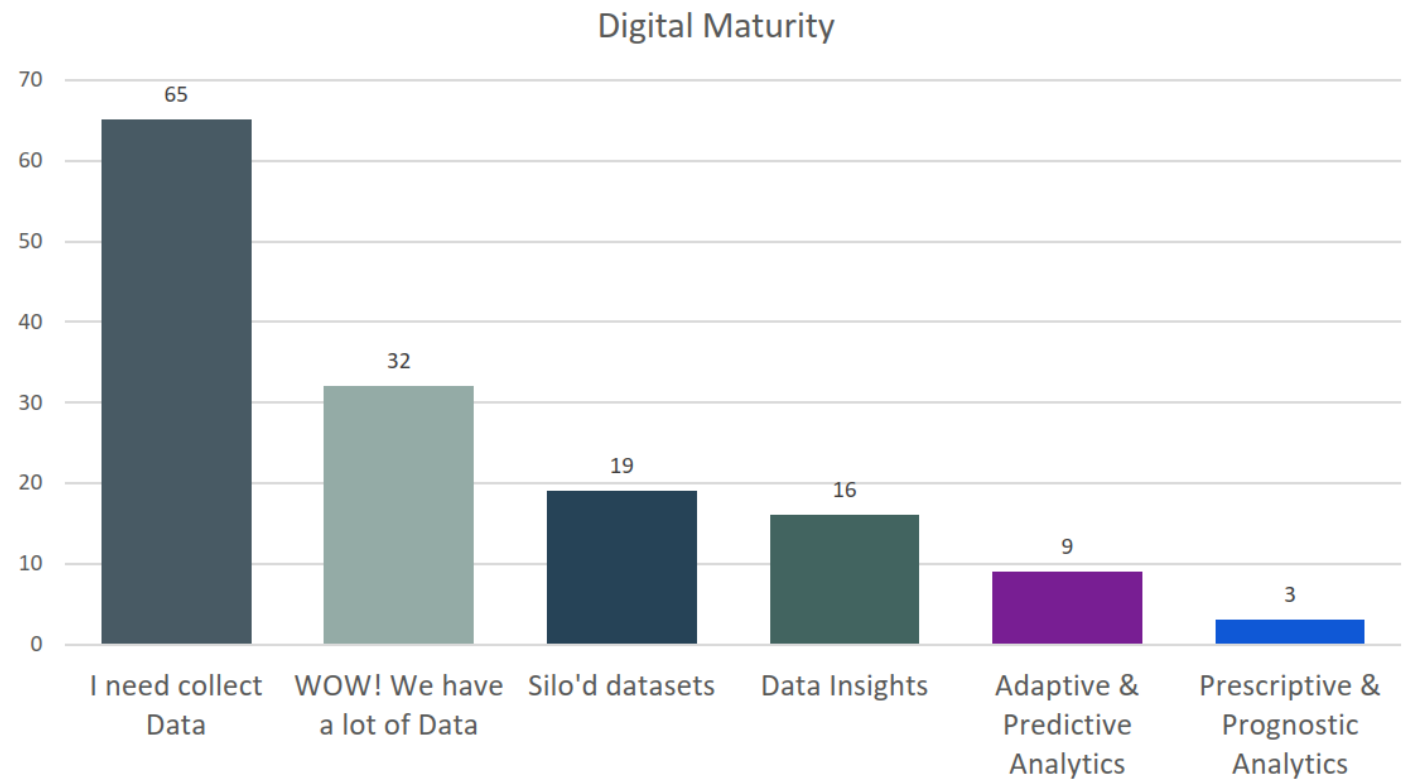


Source: AVEVA

DIGITAL MATURITY

121 responders

I need collect Data	65
WOW! We have a lot of Data	32
Silo'd datasets	19
Data Insights	16
Adaptive & Predictive Analytics	9
Prescriptive & Prognostic Analytics	3



Source: SKF customers visiting Solution Factory - UH Mässa 2024

Performance

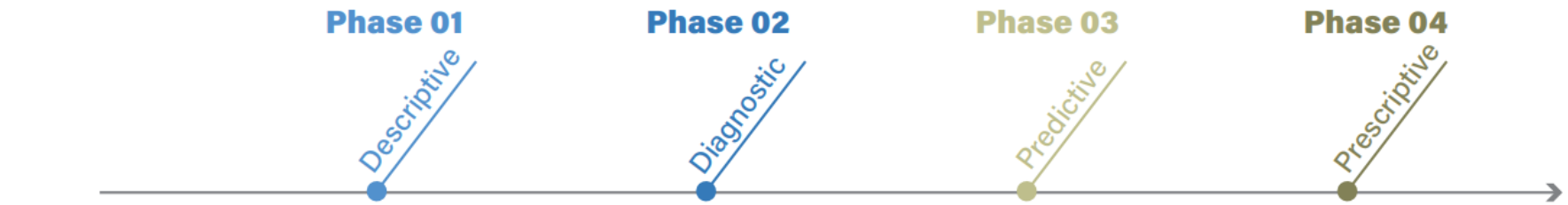
Rotating Equipment Performance

Critical Pressure Points in Today's Operation Activities

Top Pressure Points in Operation Activities

Source: Frost & Sullivan

Evolution of Maintenance and Condition Monitoring Applications

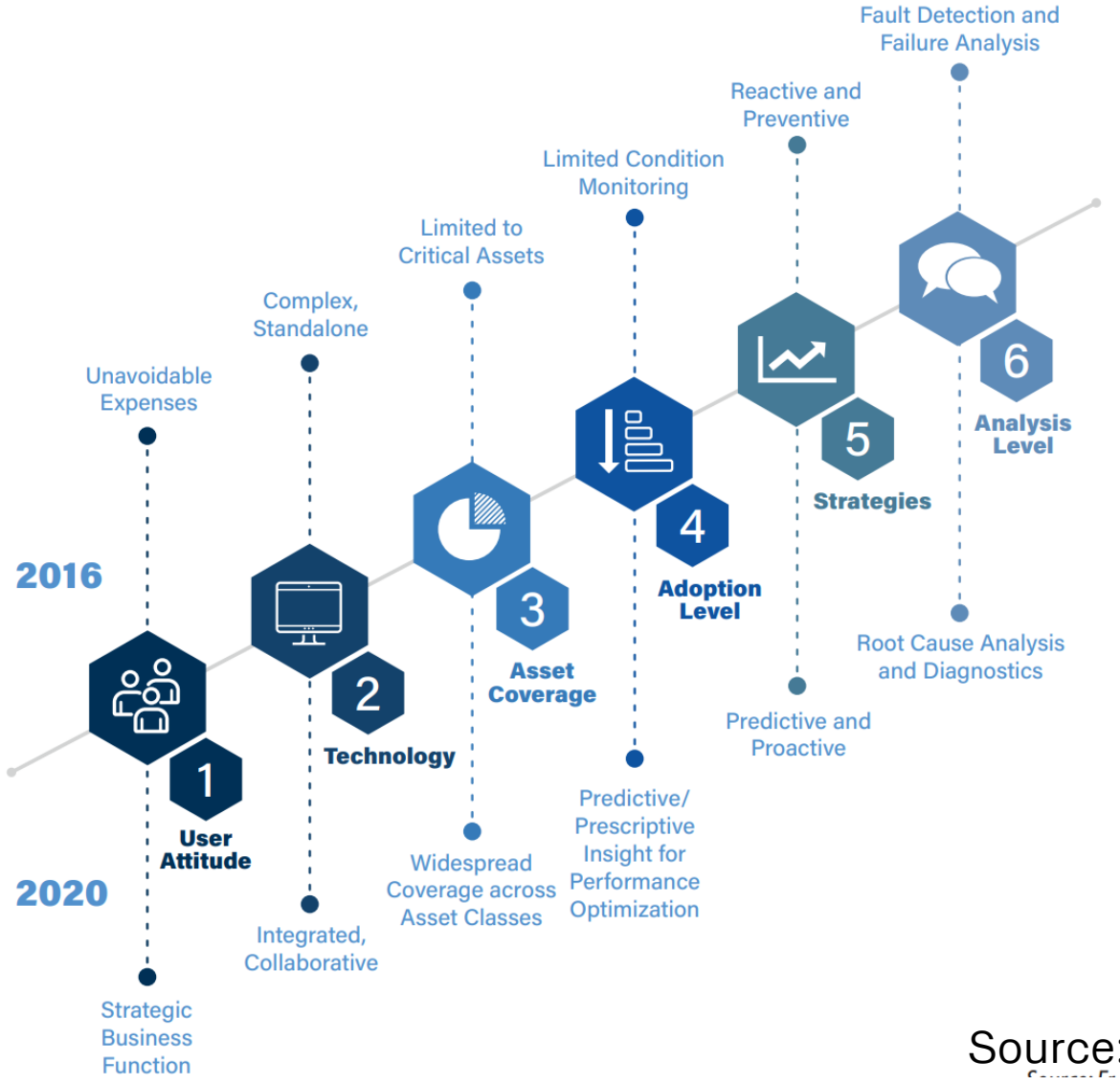


Asset Mangement Strategies	Reactive	Preventive	Condition Monitoring
	▪ Maintenance on failure ▪ High risk of unplanned downtime ▪ High-pressure environment in case of asset breakdown ▪ Production cost of asset maintenance	▪ Planned maintenance as per schedule ▪ **Savings of 12-18%** over reactive methods ▪ Production cost of asset failures ▪ Improves asset performance	▪ **Savings of 30-40%** over reactive methods ▪ **Cost savings of 8-12%** over preventive by avoiding unnecessary maintenance ▪ **Unpredicted failures reduced by more than 55%** over preventive maintenance ▪ **Equipment availability increased by 30%** over preventive maintenance ▪ **Mean time between failures** increased by 30% over preventive maintenance

Source: Frost & Sullivan

Asset Monitoring and Management: Changing Landscaping

The changes within the asset monitoring landscape that are forcing the shift to CM



Source: Frost & Sullivan

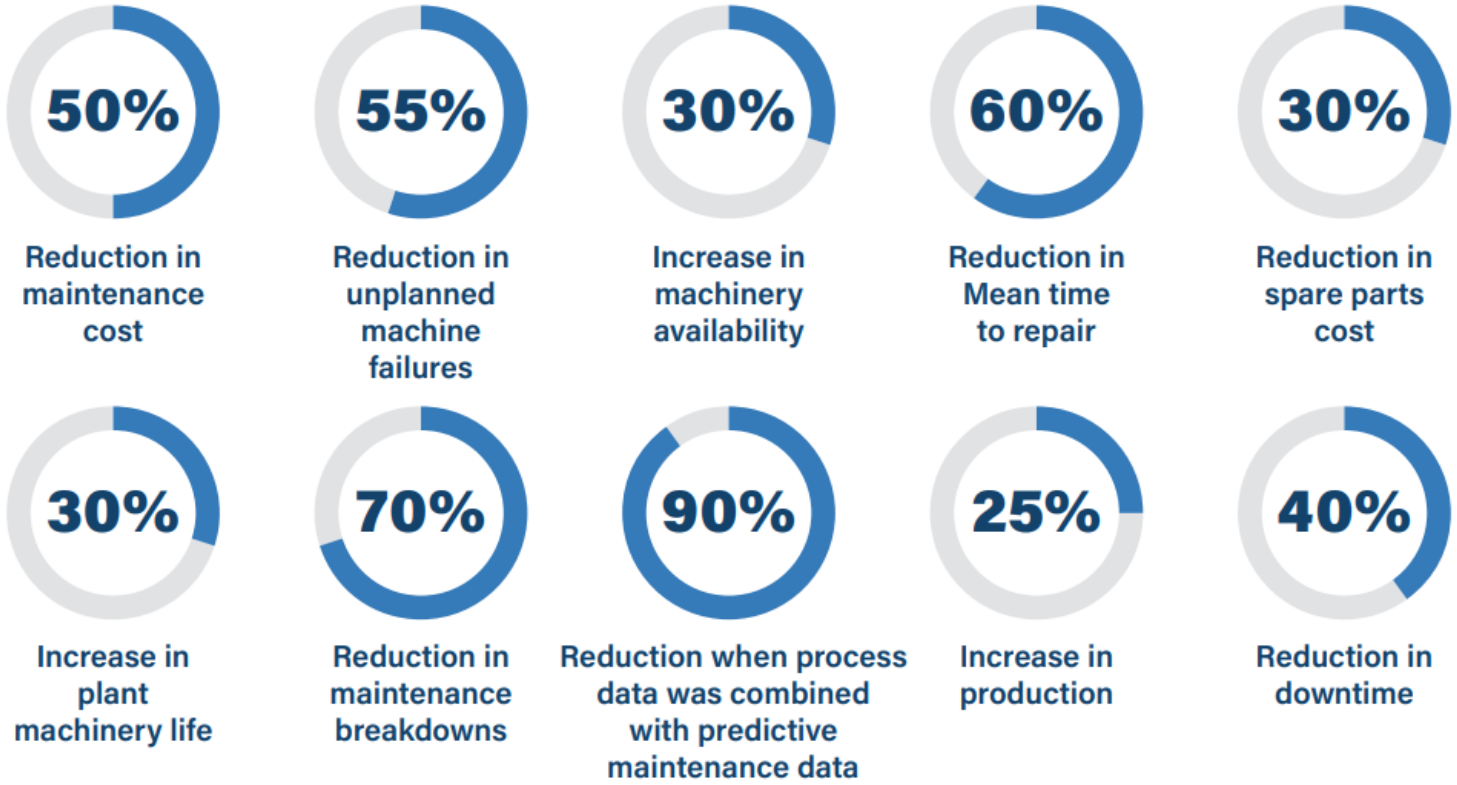
A Condition Monitoring Strategy Enables

Importance of Condition Monitoring and Business Benefits

The major benefits of CM are:

- Maximizing asset uptime
- Enhancing yield
- Lowering costs
- Minimizing unplanned downtime
- Extending asset life
- Improving safety
- Making more informed decisions

Condition monitoring could achieve a 50% reduction in maintenance costs



Source: Frost & Sullivan

Effect of collaboration

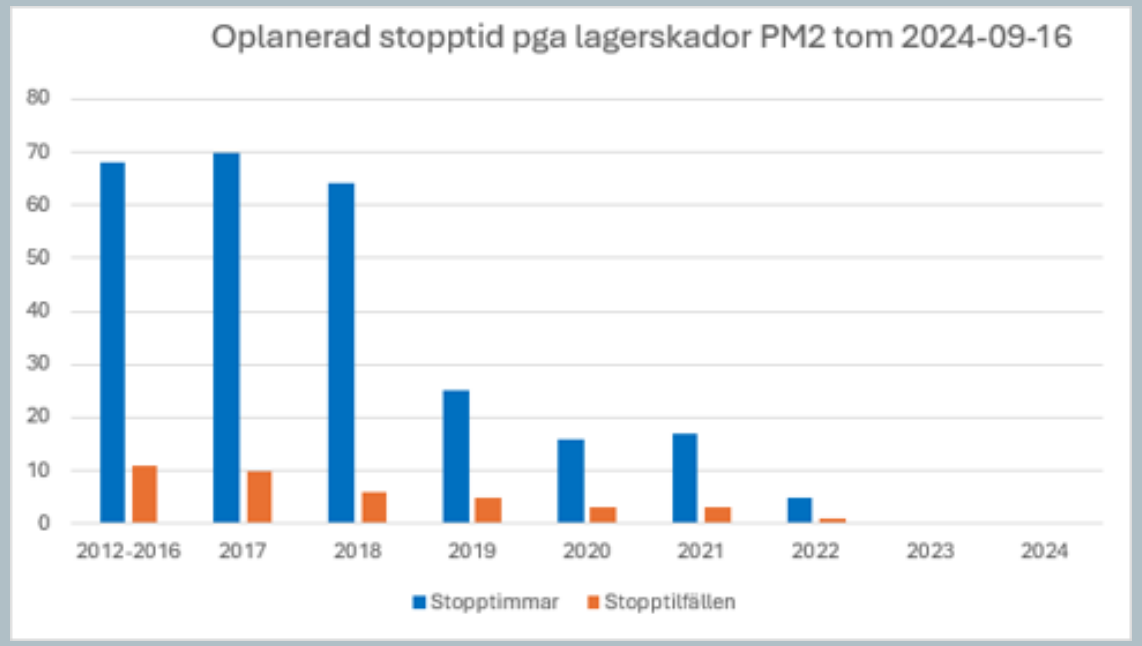
Effective replicable methodology around improvements

We work together with our customers to propose, implement and follow up improvements, for increased operational reliability around rotating machines and in this way affect availability and thus enable the collaboration's goals

Our service agreements:

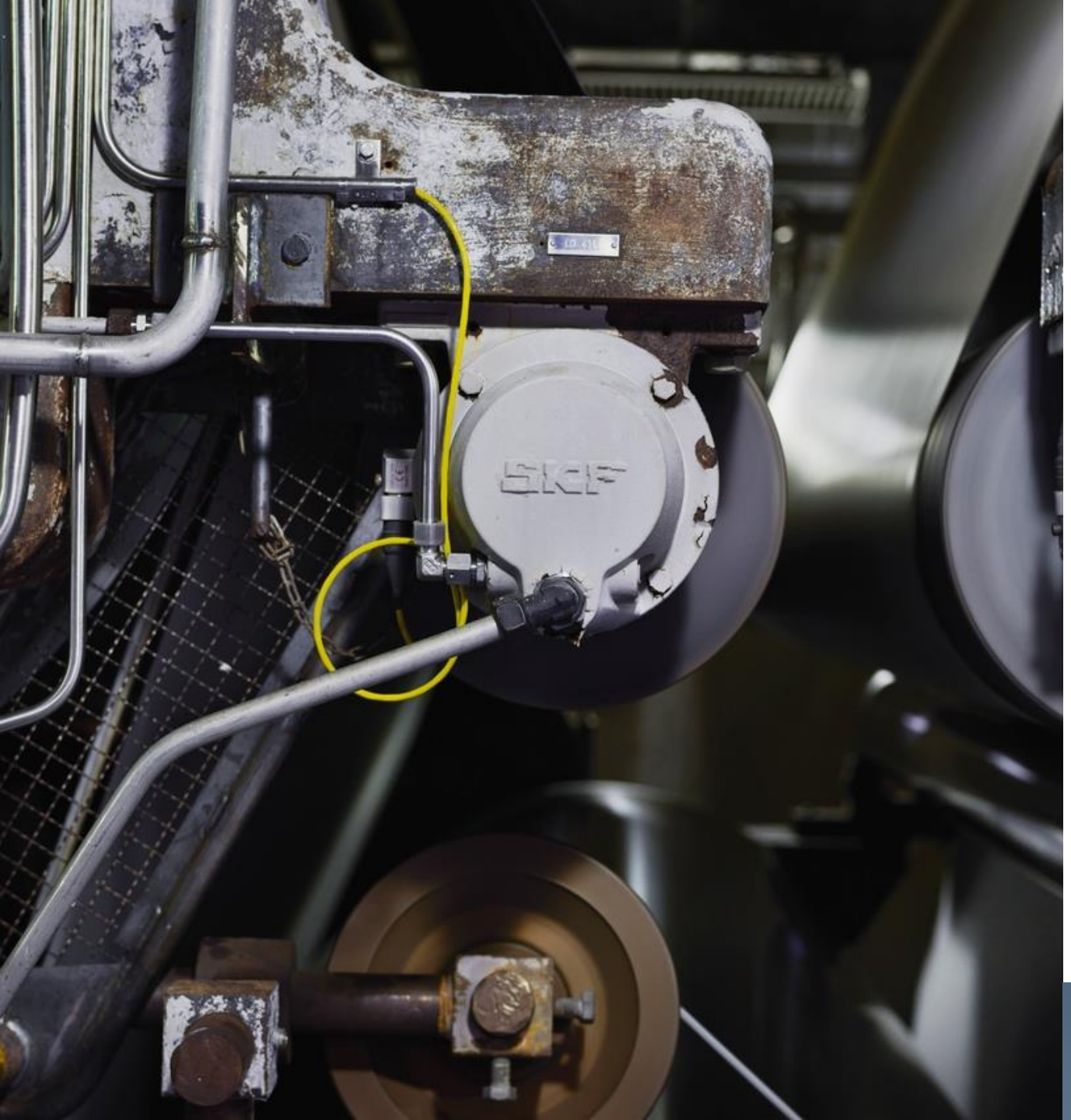
- Adapted to the customer's situation and goals
- Scalable
- Standardized methodology
- Cross-functional improvement groups
- Cutting-edge expertise and high-tech tools
- Continuous connectivity and decision support

Improvements in one of our collaboration contract



Unplanned stops related to bearing performance issue
- Blue = number of hours
- Orange = number of unplanned downtime

- Since the SKF collaboration started in 2019, unplanned downtime for bearing replacement has decreased to “0”.
- 2 production records in 2022
- 0 (zero) unplanned stops since Dec-22.
- 20% fewer planned stops
- Reduced need of components



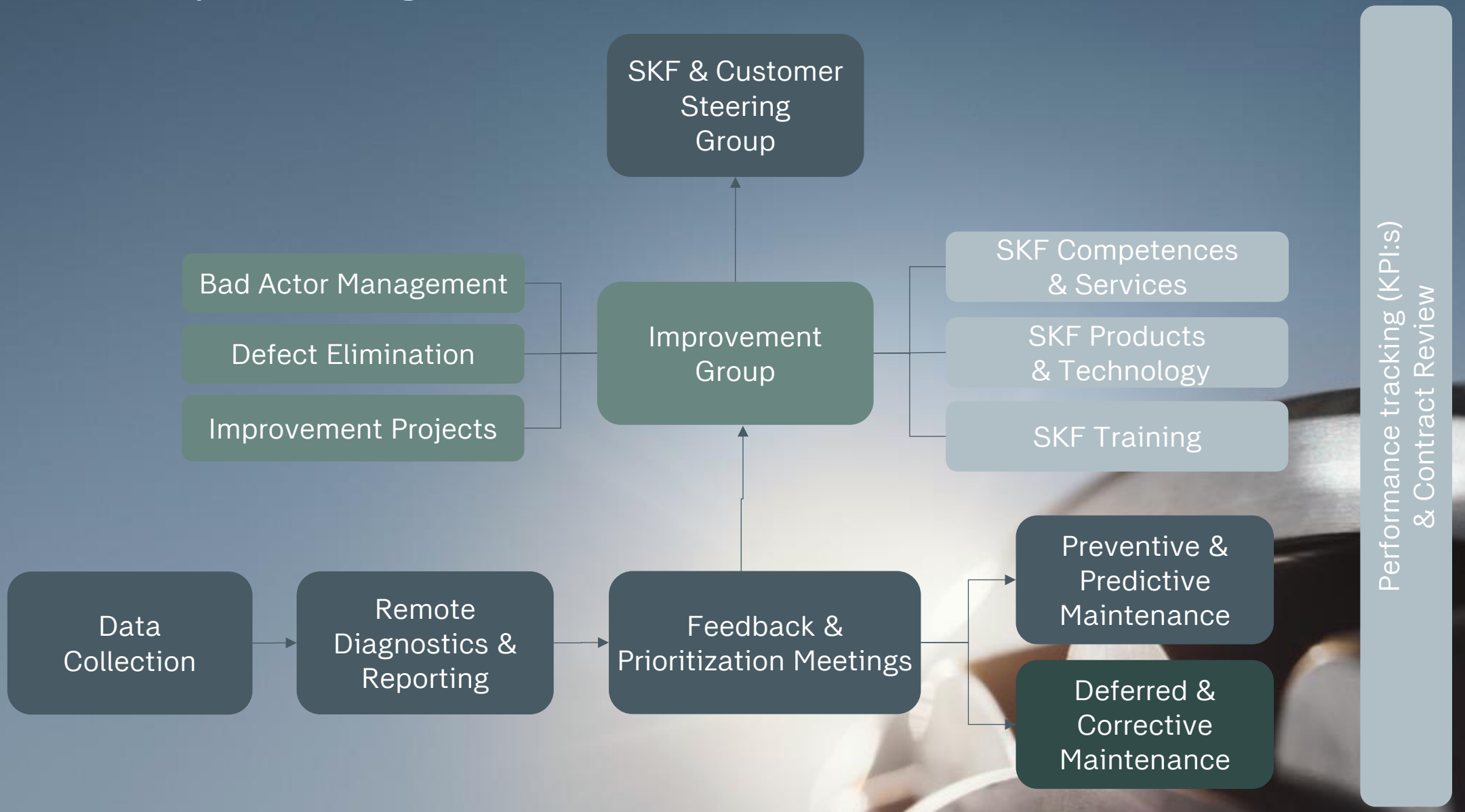
Our service agreements:

- Increased production due to reduced unplanned stops
- Improved product quality
- Reduced maintenance costs
- Increased number of hours available for proactive maintenance activities
- Skills / knowledge developing
- Improved quality of data to be used for continuous improvement
- Improved control over asset status and operations, resulting in improved production planning
- Improved personal security

Realized savings and customer value

Working methodology for vibration monitoring

Contract Setup and Organization



Preventive maintenance
CoMo concept

Questions before .....

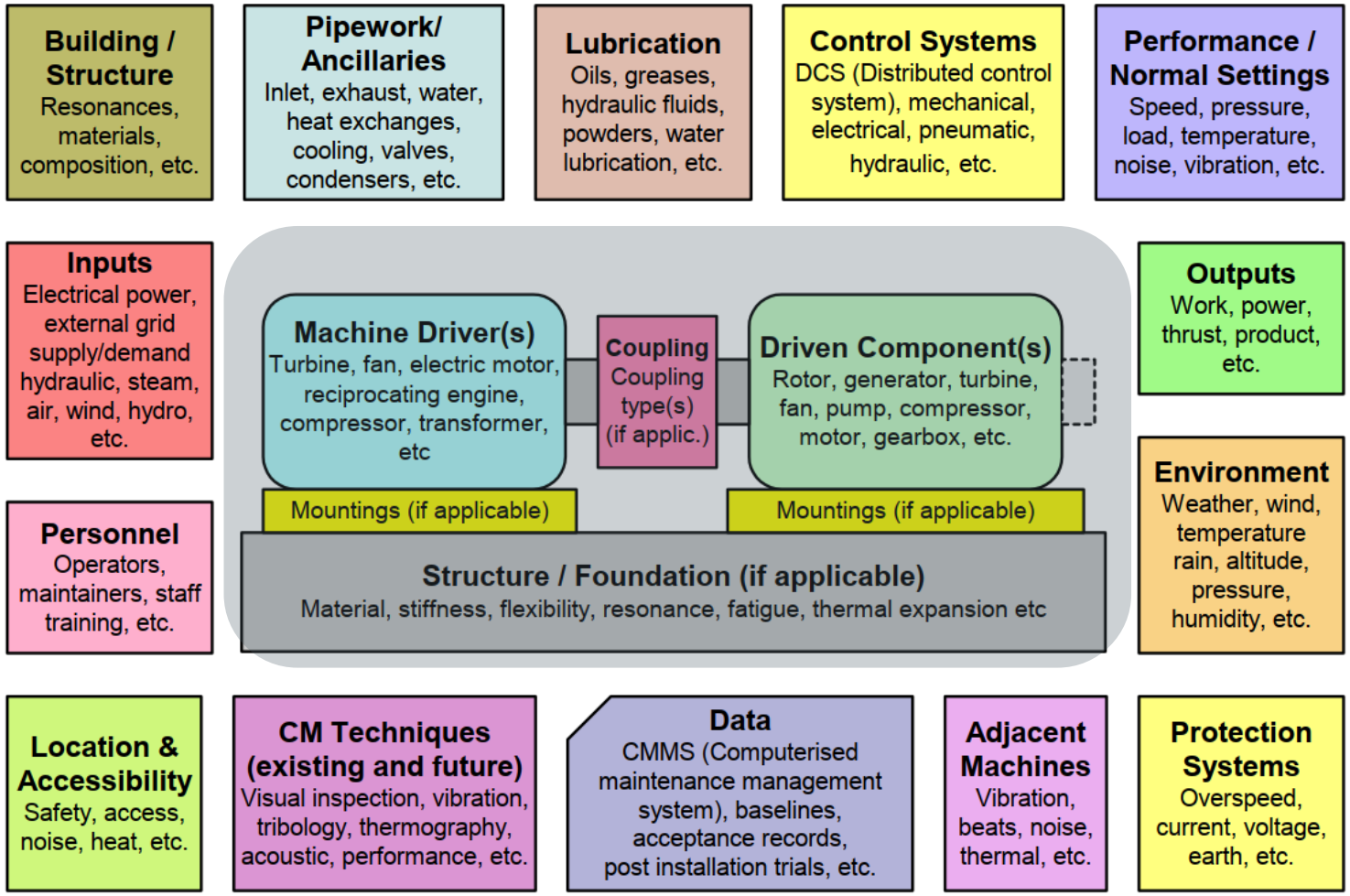
1. What do you need from Condition Monitoring ?
2. Goal in implementation of concept and technology.
3. Do you have budget to implement it ?
4. Value from CoMo implementation ?

What is Condition Monitoring?

Condition Monitoring depends on the measurement and comparison of parameters which are indicators of the condition of key equipment failure modes.

The general procedure for data collection is to take measurements and compare them to historical trends or other data (e.g FFT)

Scope of Condition Based Maintenance



Factors influencing condition based maintenance and diagnostics

Source: THE BRITISH INSTITUTE OF NON-DE STRUCTIVE TESTING

Condition Monitoring as part of Maintenance Strategy

Run-to-failure

Large inventories, machines that cost more to maintain than replace

Preventive

Oil changes, scheduled activities

Condition-based

Trending, determine the current condition of machinery as it runs, in order to schedule necessary repairs on a timely basis

Proactive

Eliminate or reduce the sources of failures through craftsmanship and the use of the highest quality components and parts , root cause correction, continuous improvement

More to define in Condition Monitoring

1. Condition Monitoring Programme
2. Equipment/ Asset Audit
3. Reliability & Criticality Audit
4. Range of Condition Monitoring Techniques
5. Condition Monitoring Techniques
    1. Human Senses
    2. Performance Monitoring
    3. Corrosion Monitoring
    4. Motor Current Monitoring
    5. Thermal Monitoring
    6. Tribology Monitoring
    7. Acoustic Emission
    8. **Vibration Monitoring**
6. Measurement Intervals

Condition Monitoring decisions

What machinery do I monitor?

What measurements do I perform on the selected machinery?

How often do I perform the selected measurements?

What type of PdM equipment do I monitor with?

What machinery do I monitor?
Assesment

		Aspects and Consequences to be Assessed					
		SHE / HSE	**Quality**	**Occupation Rate**	**Production Opportunity**	**Frequency of Failure**	**Related Costs**
Criticality Level	High Risk	**H1** Failure results in serious accidents with casualties and/or impacts on the man or the environment	**Q1** Failure results in unacceptable product and out of minimum specifications	**O1** The equipment is operated 24 Hrs and lacks of replacement equipment	**P1** A failure in the equipment results in the complete stoppage of the productive process	**F1** The equipment has recurrent failures with immediate corrective measures	**C1** The failure results in high repairing times and very high related costs
	Medium Risk	**H2** Failure involves risks and results in reportable events with improvement actions	**Q2** Failure results in a product with specifications deviation but in acceptance ranks	**O2** The equipment is operated by shifts and has a replacement equipment	**P2** A failure in the equipment results in a partial stoppage or production speed reduction	**F2** The equipment has occasional failures with programming of corrective measures	**C2** The failure results in high/moderate repairing times and high/moderate related costs
	Low Risk	**H3** Failure does not result in regretful consequences nor reportable events	**Q3** Failure does not result in negative effects on production	**O3** The equipment is occasionally used	**P3** It has no serious impacts on the continuity of the productive process	**F2** The equipment has very unusual failures	**C3** Repairing times and related costs are not relevant

What measurements do I perform on the selected machinery?

Vibration or nothing more ?

Goal of measurements

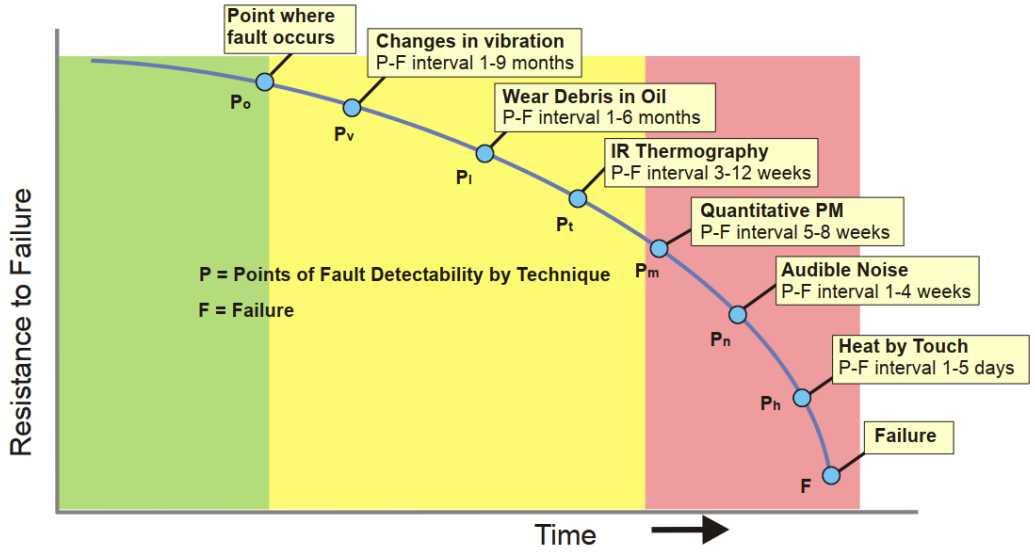
- Information about level or understanding problem

Is it applicable or not ?

- Access
- Time
- Cost/Value

Nothing more ?

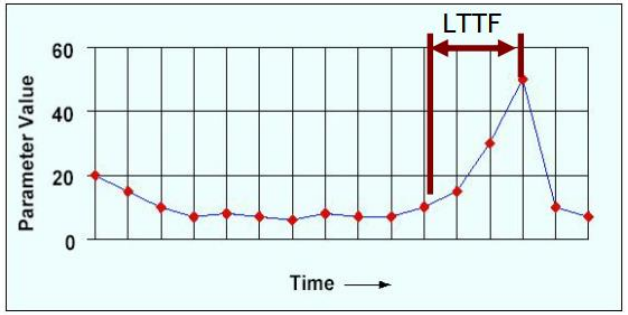
How often do I perform the selected measurements?



Key: Resistance to Failure

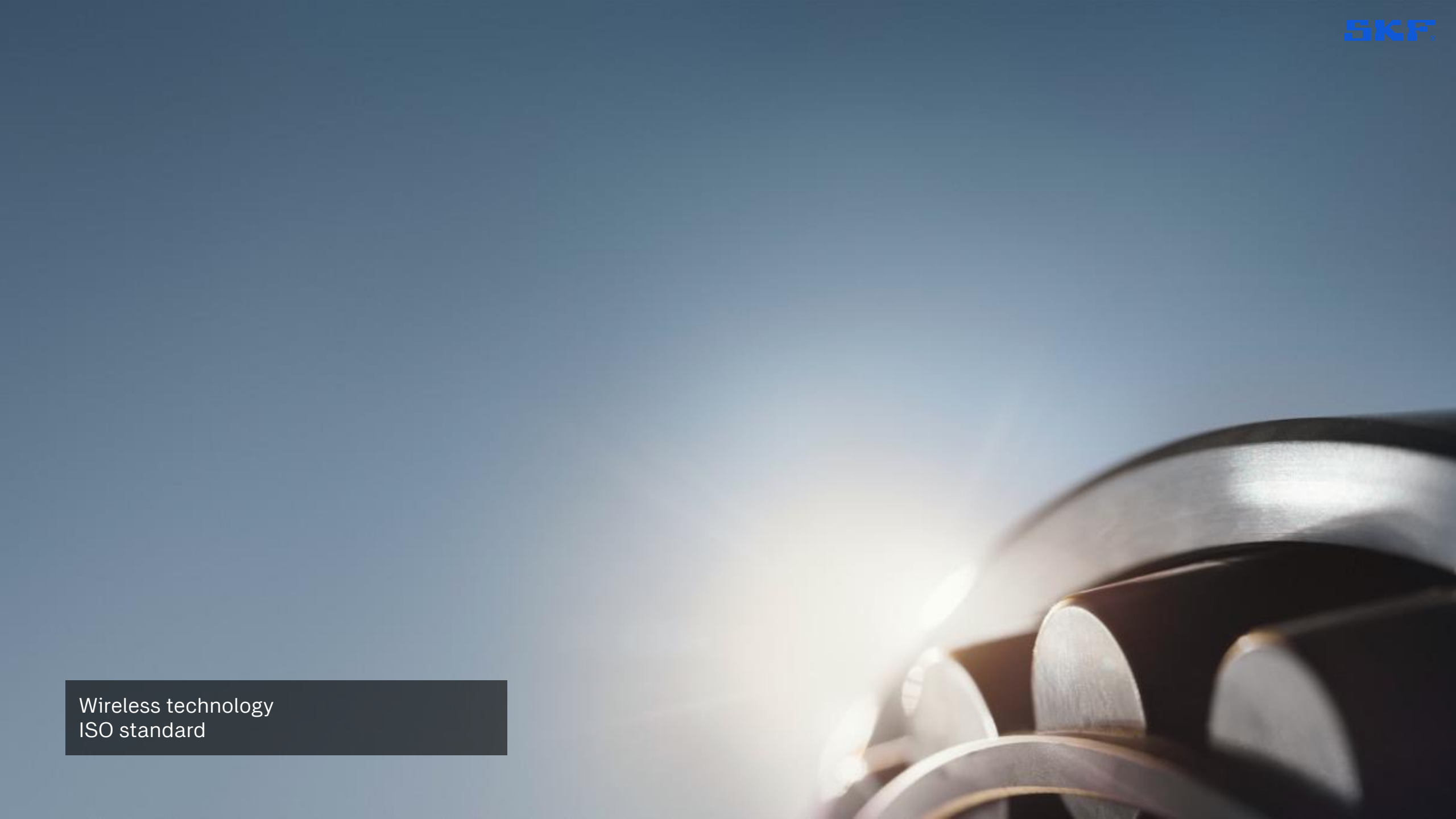
Acceptable | Reduced | Low / Poor

Lead time to failure (LTTF)



Lead Time To Failure	Monitoring Frequency					
	Quarterly	Month	2 Weeks	1 Week	Daily	On Line
> 1 year	✓	✓	✓	✓	✓	✓
> 6 month		✓	✓	✓	✓	✓
> 2 month			✓	✓	✓	✓
> 1 month				✓	✓	✓
> 1 week					✓	✓
> 1 day						✓

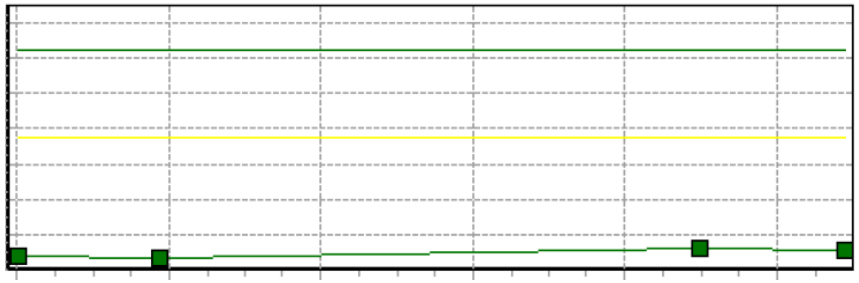
Source: THE BRITISH INSTITUTE OF NON-DE STRUCTIVE TESTING



Wireless technology
ISO standard

Why FFT or not only total trend value

OK



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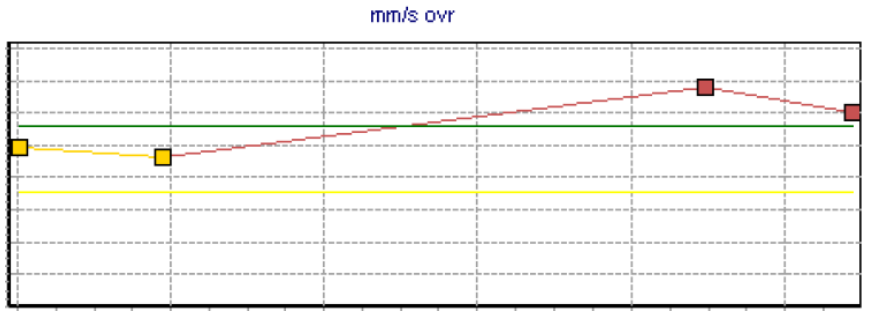
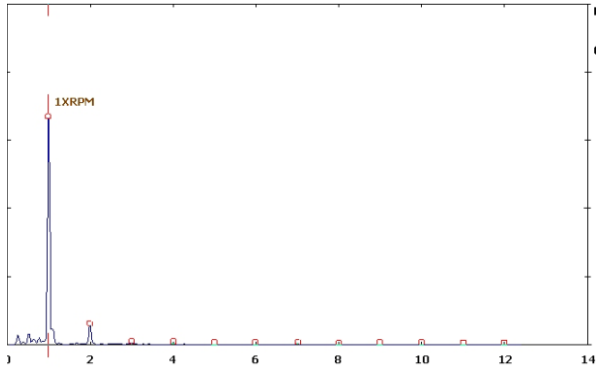
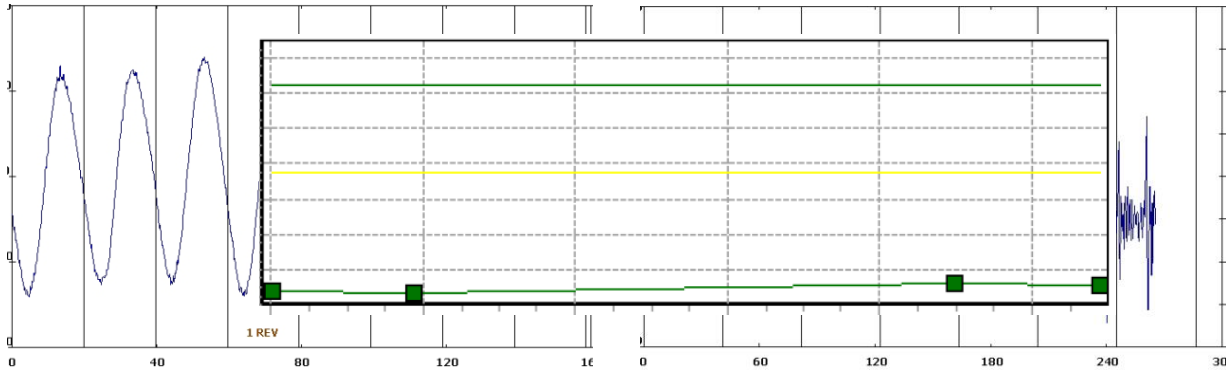


Why FFT or not only total trend value

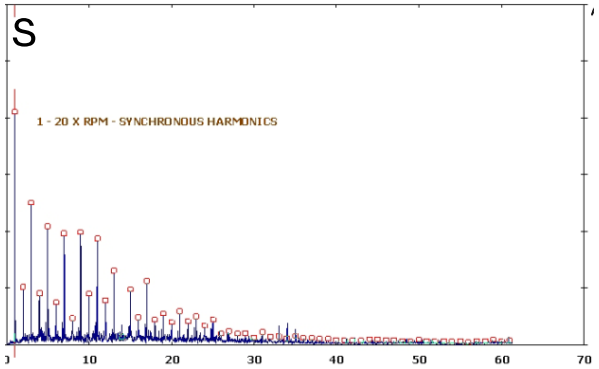
Sensor → RAW data transfer path → Converter/process of data → Grafical presentation → Analyze → Report

Unbalace

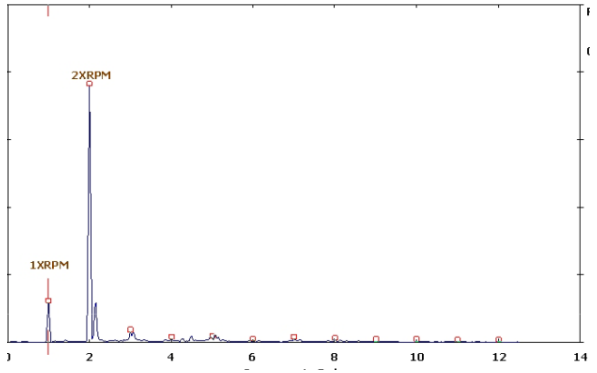




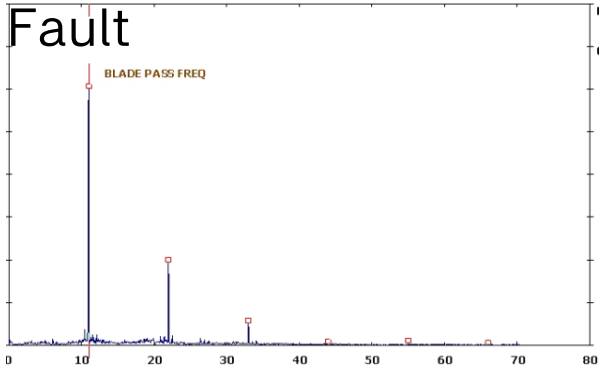
Loosenes s

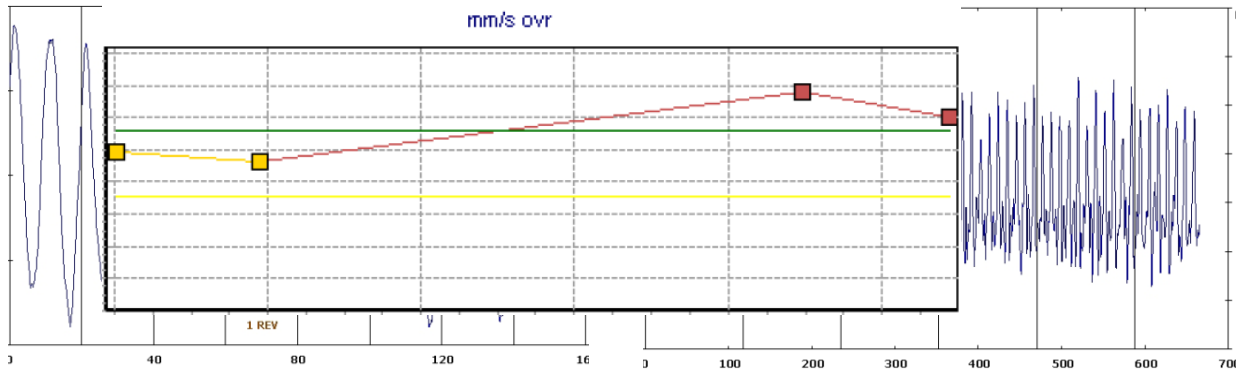


Misalignment



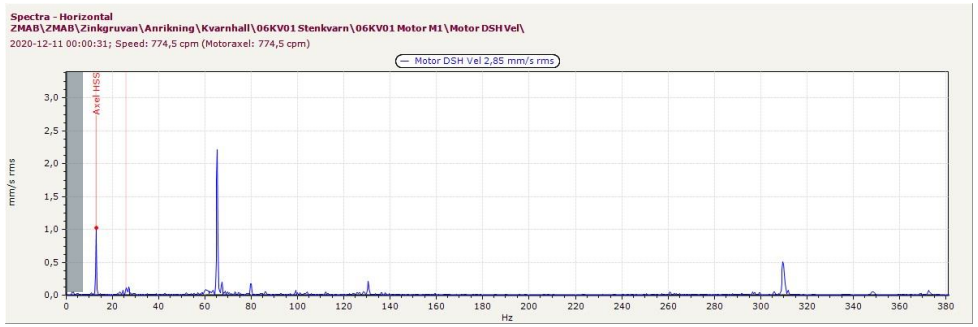
Excessive Clearance Fault



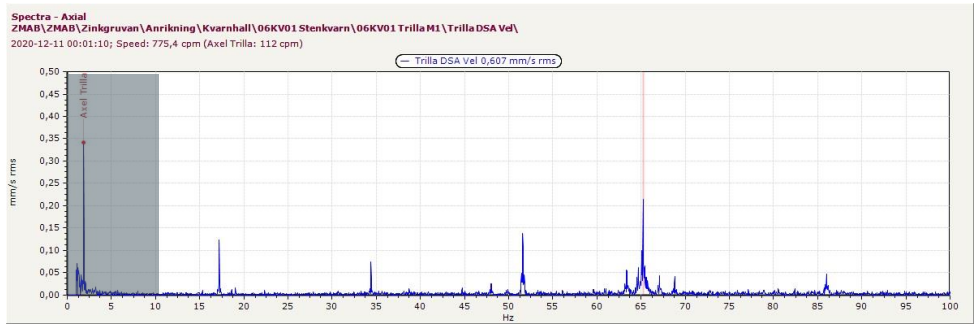


ISO standard. 10Hz – 1kH (600 rpm – 600 000 rpm)

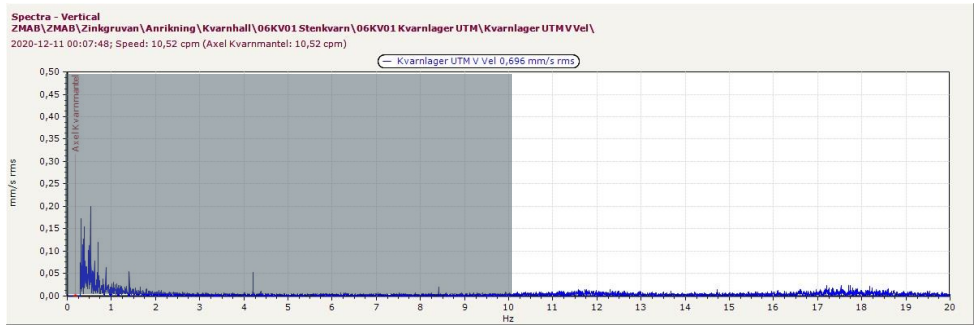
Sensor → RAW data transfer path → Converter/process of data → Grafical presentation → Analyze → Report



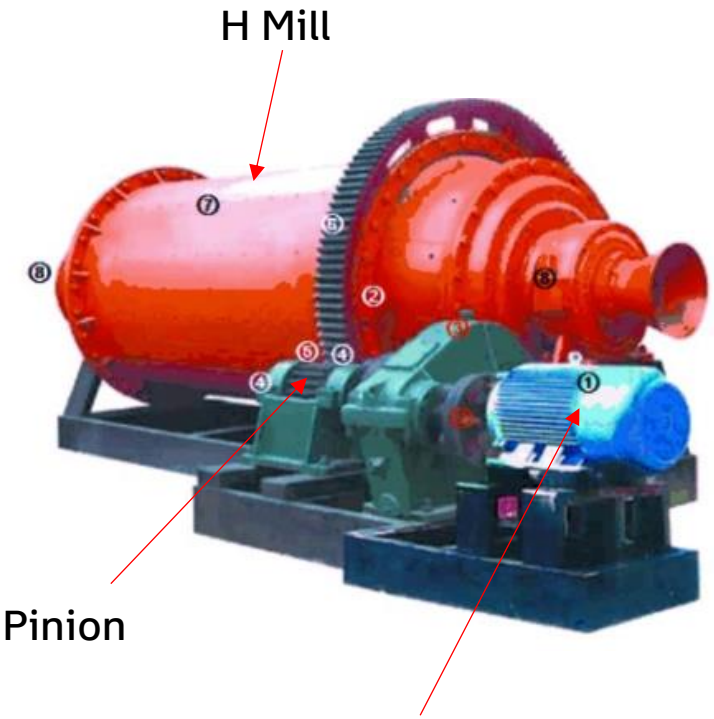
El. Motor 1500 rpm (25Hz)



Pinion 120 rpm (2Hz)



Horizontal mill 18 rpm (0,3 Hz)

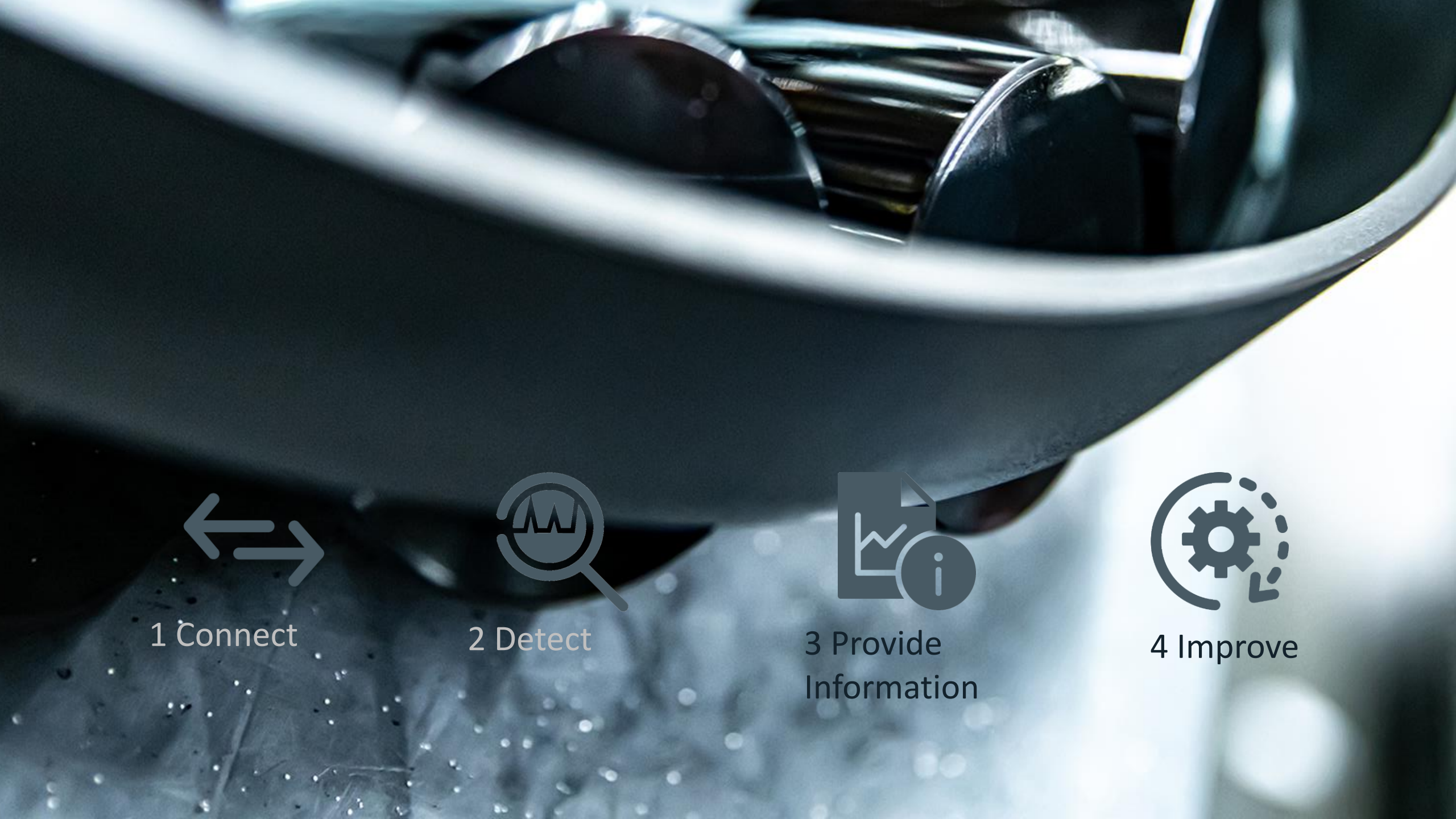


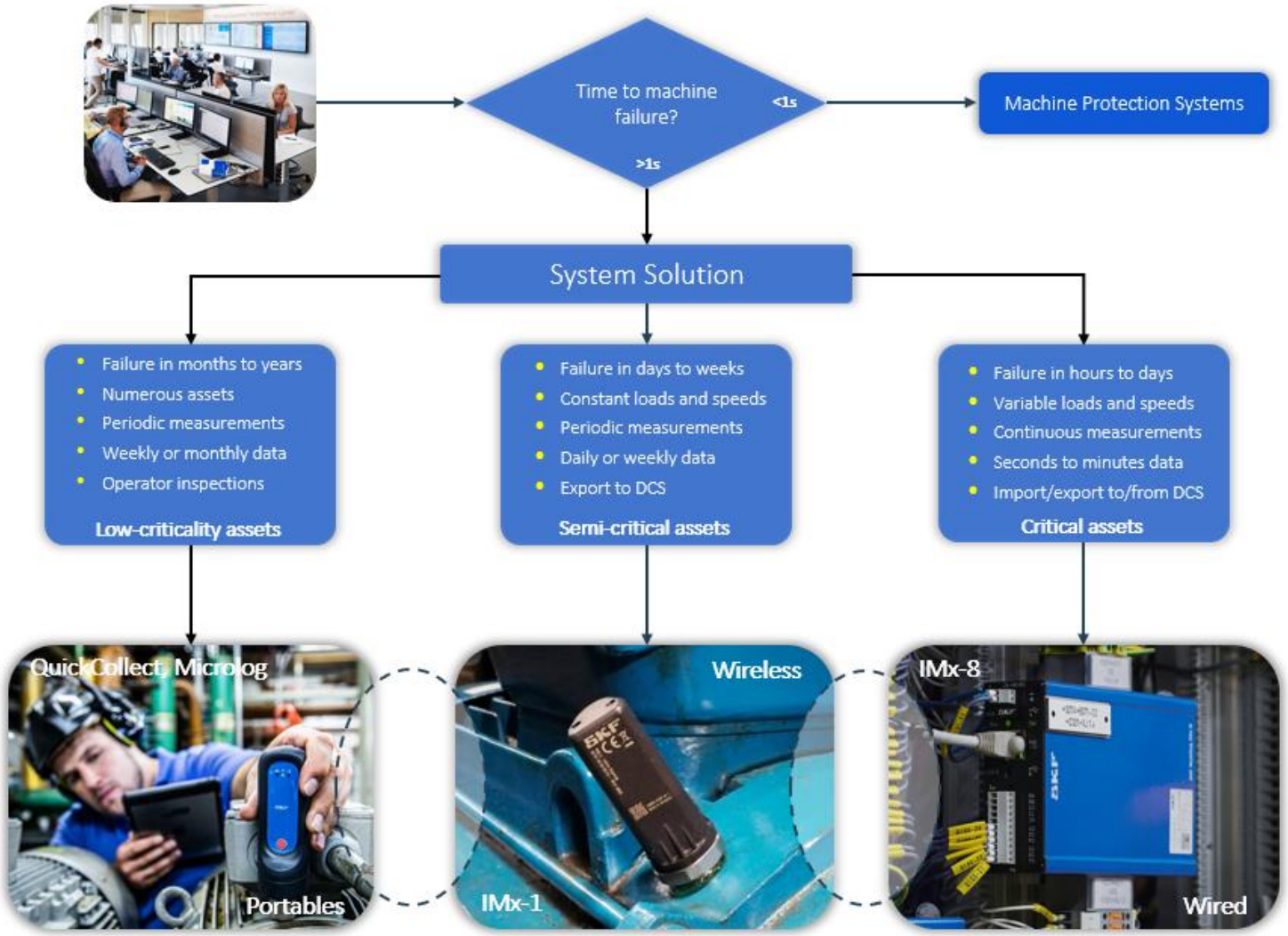
Different approaches to monitoring

Handheld - Offline

Wireless - Online

Wired- Online


1 Connect
2 Detect
3 Provide Information
4 Improve



Selecting the right tools for the job

Select the right condition monitoring solutions based on the asset criticality and failure mode detection horizon

Technology to cover needs

Periodic or Continues Condition Monitoring

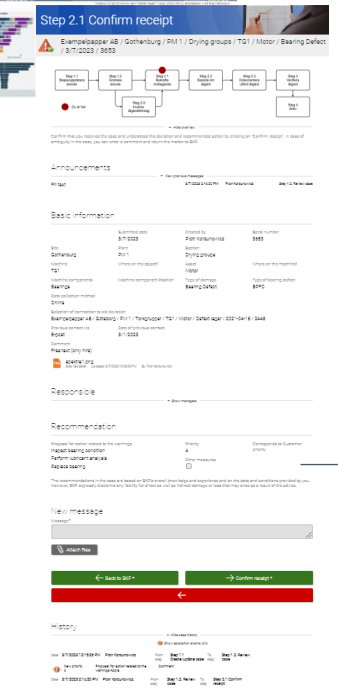
DATA ACQUISITION

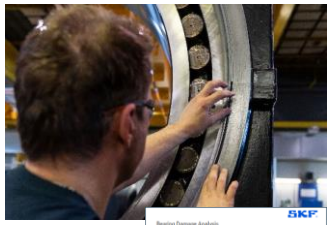
DATA ANALYSIS AND VISUALISATION

REPORTING THE ANALYSIS RESULTS

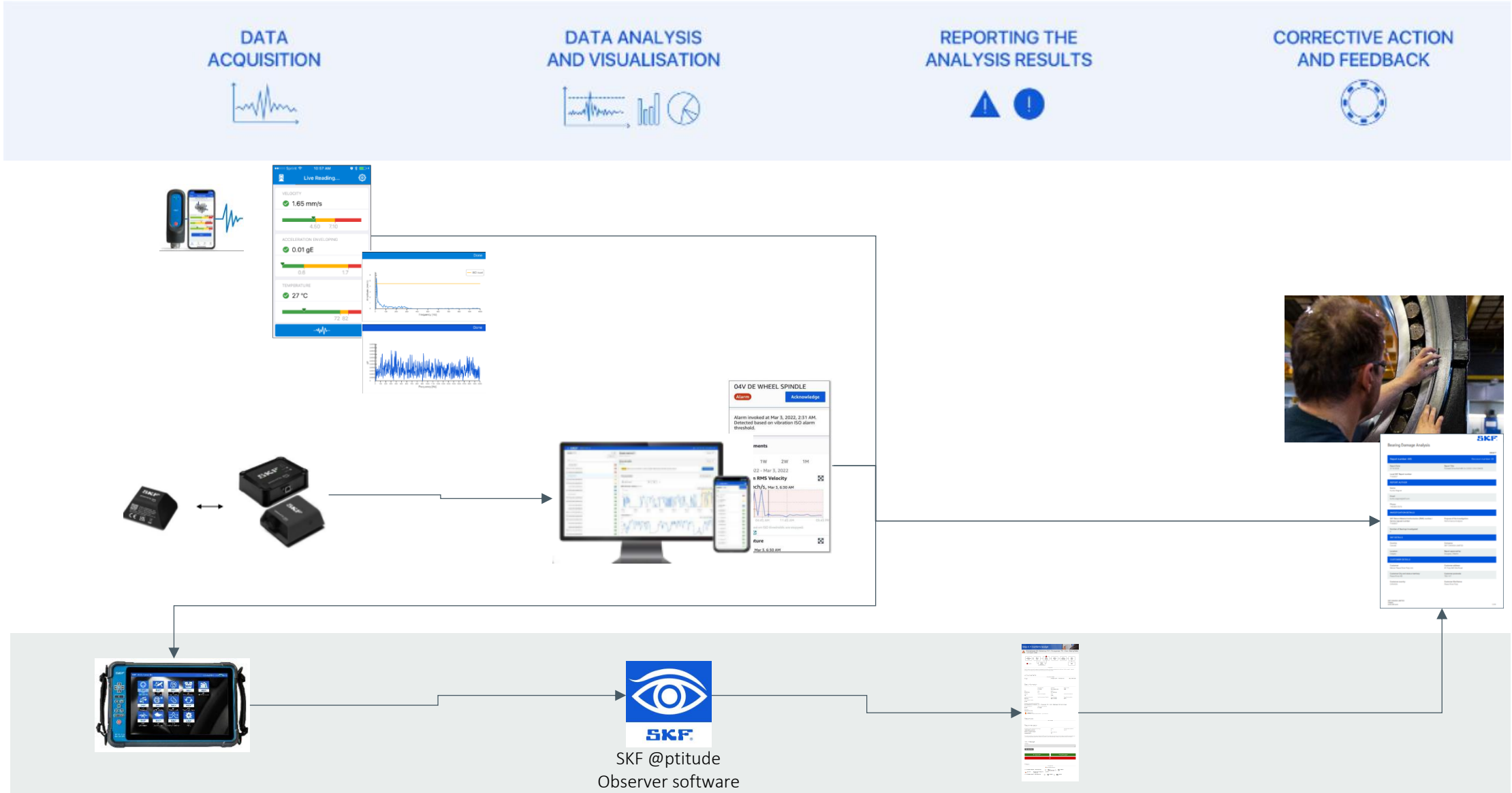
CORRECTIVE ACTION AND FEEDBACK

SKF @ptitude
Observer software





Simplified machine health monitoring



Portables: SKF Enlight ProCollect

Periodic data-collection
- Rugged Quickcollect hand-held wireless sensor.

Condition indicators
- Machine vibration, bearing condition, temperature
- Trends, time-waveform, spectrum

Operator inspection rounds
- Replace paper log-sheets and enhance with condition indicators

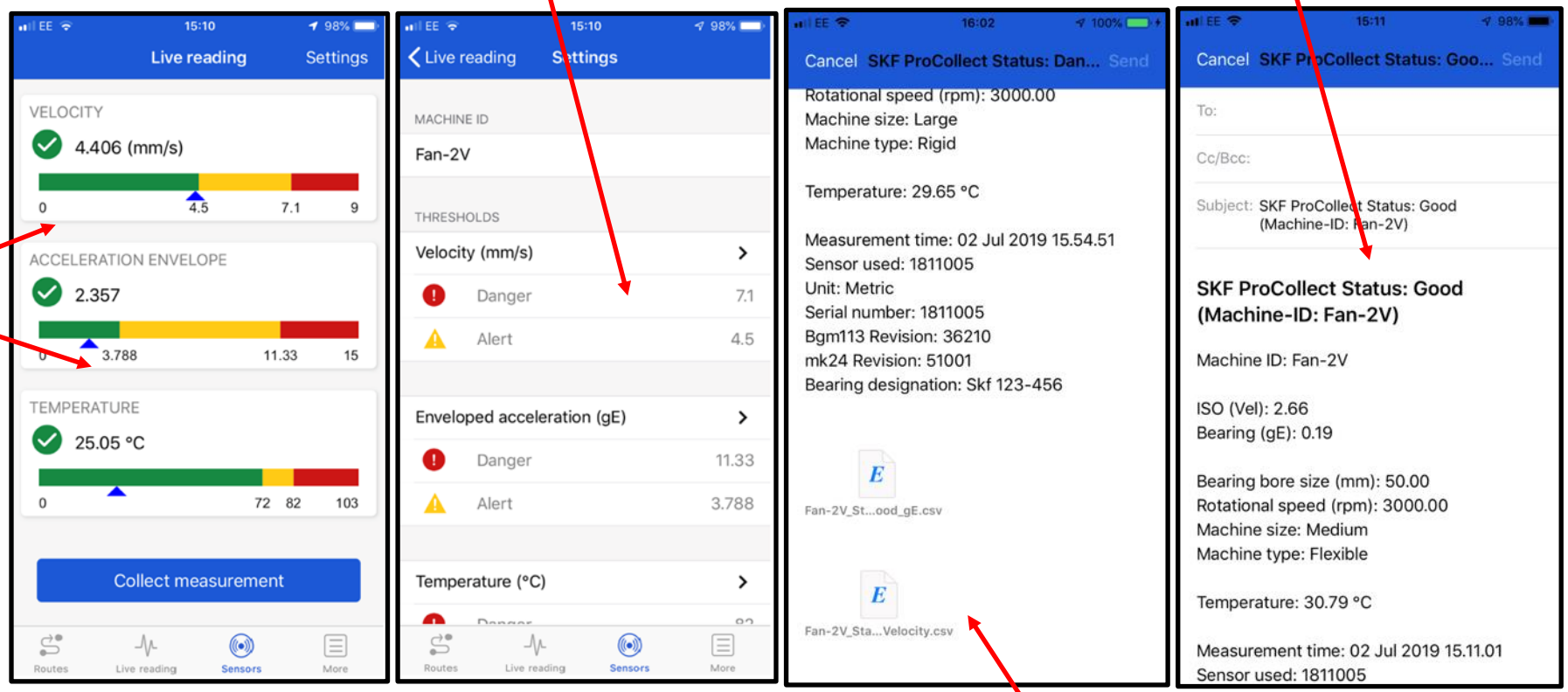
Mobile tablet/phone operation
- App connected to cloud-based software

Portables: SKF Enlight ProCollect

Detection

Inform

Data



Diagnosis

Portables: SKF Microlog Analyzer dBX

Periodic data-collection

- Rugged wired sensors and Microlog vibration analyser.

Condition indicators

- Machine vibration, bearing condition, speed, phase angle, temperature.

Analysis data

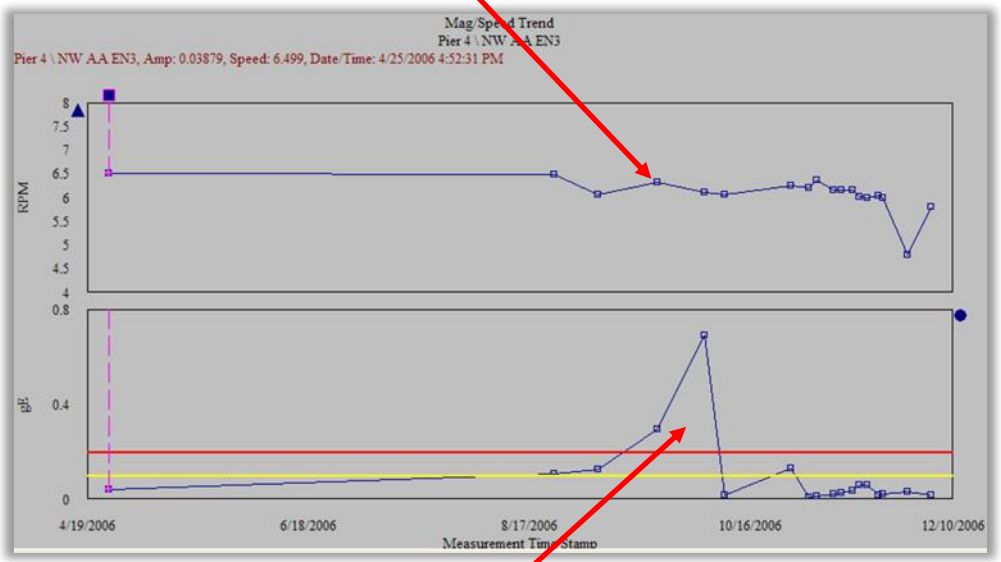
- Multi-channel, trend, time-waveform, spectrum, waterfall, cascade, bode, orbit.

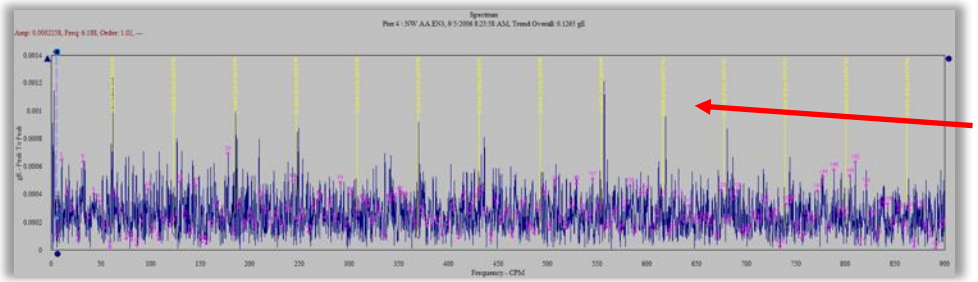
Condition monitoring specialist tool

- On-site analysis and trouble-shooting on all asset classes
- Software support on-premises or cloud.

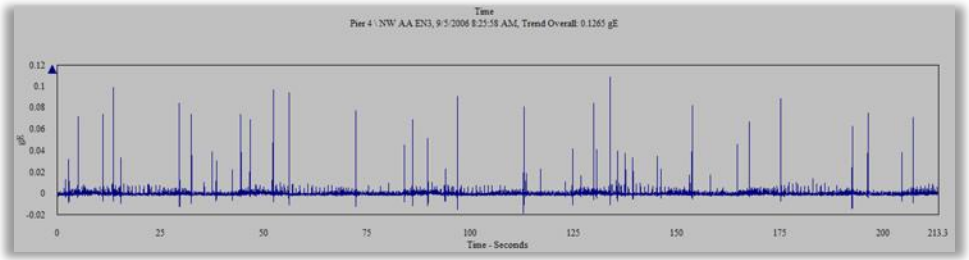
Portables: SKF Microlog Analyzer dBX

Periodic data





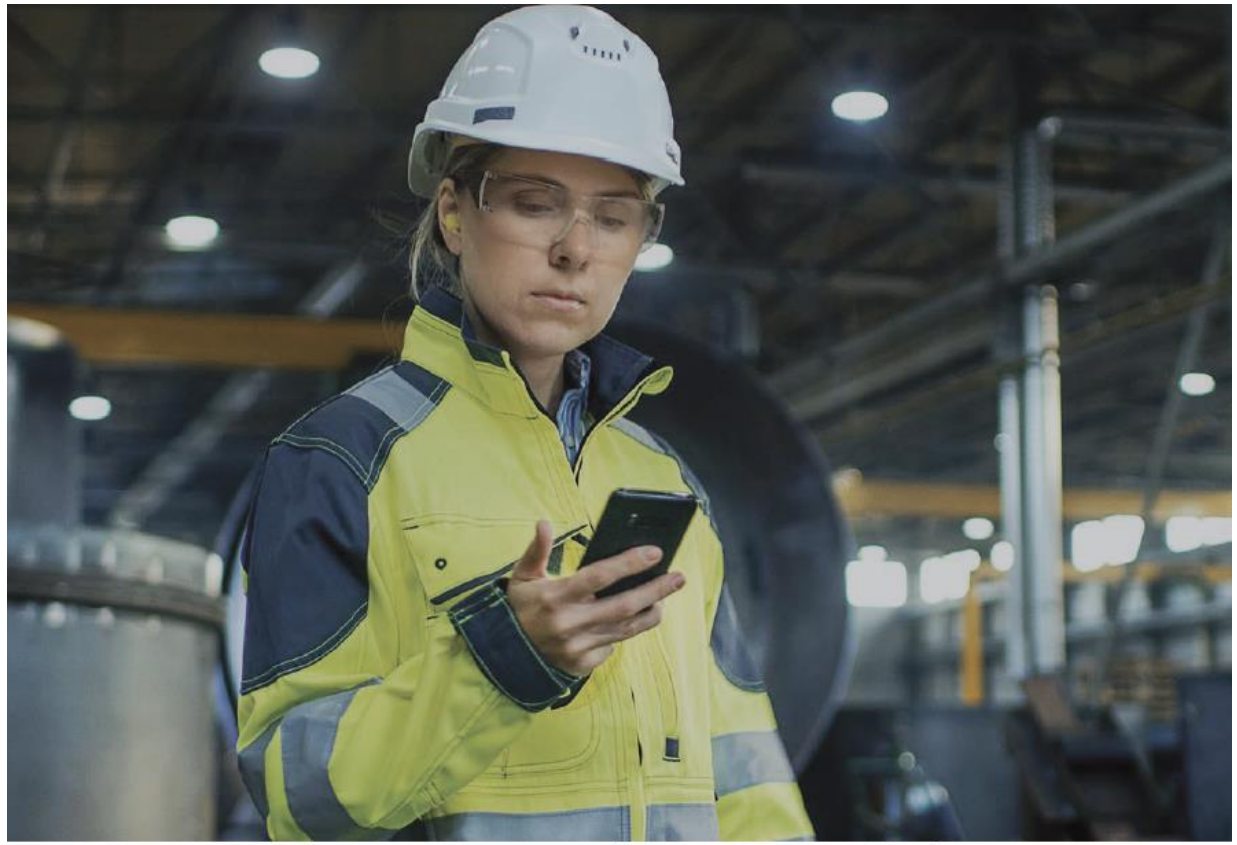
Diagnosis

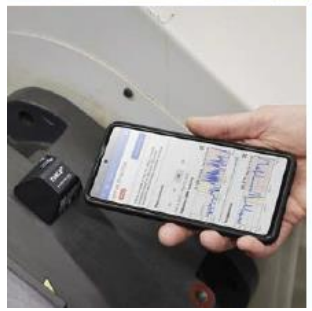


Anomaly detection

Feedback

Wireless: SKF Axios





Hourly data-collection
- Rugged adhesive mounted wireless sensor.

Condition indicators
- Machine vibration, temperature
- Trends

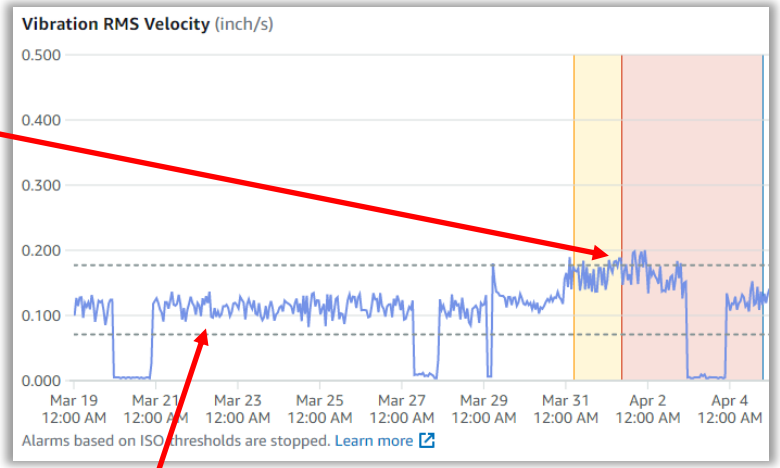
Anomaly detection
- Low criticality assets
- Historically unmonitored assets

Mobile tablet/phone operation
- Supervised machine learning and/or ISO velocity thresholds
- Cloud-based software

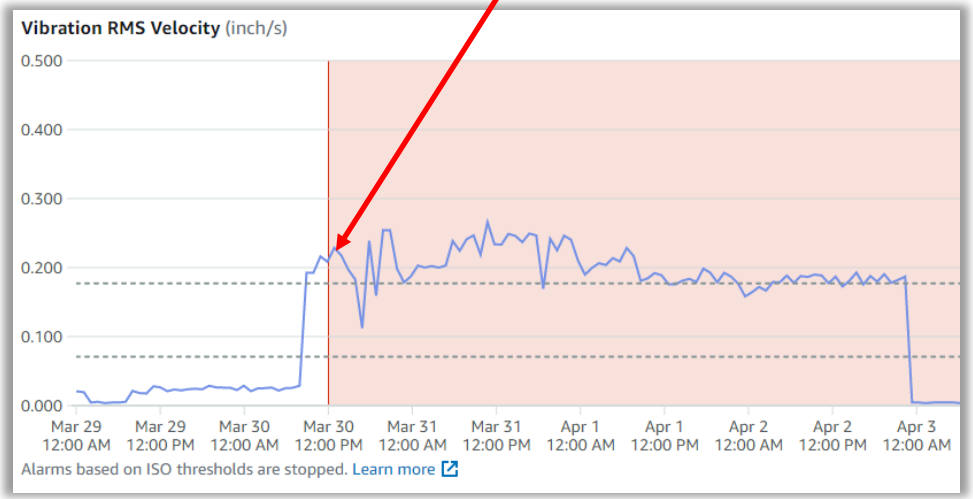
Wireless: SKF Axios

Anomaly detection

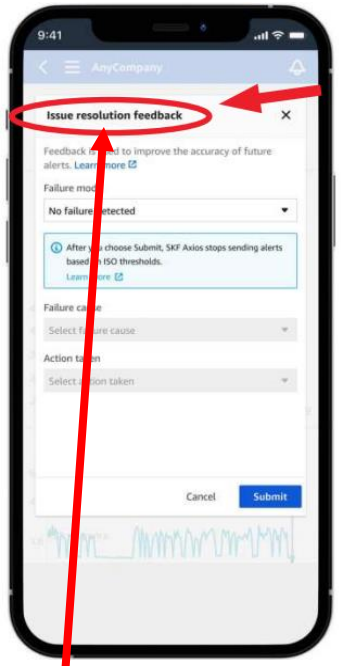
Oil pump



Hydraulic pump



Hourly data



Feedback

Wireless: SKF Enlight Collect IMx-1

Hourly & periodic data-collection

- Rugged stud-mounted wireless sensor.

Condition indicators

- Machine vibration, bearing condition, temperature
- Trend, time-waveform, spectrum, waterfall.

Automation of manual routes

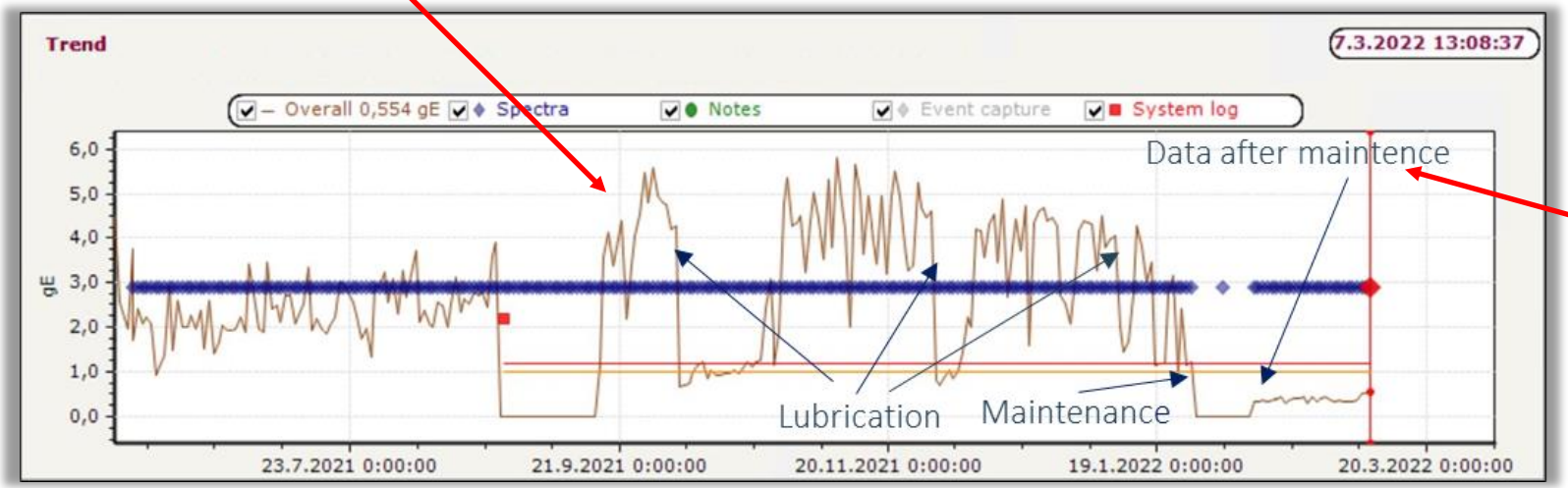
- Vibration analysis routes
- Inaccessible locations

Condition monitoring specialist tool

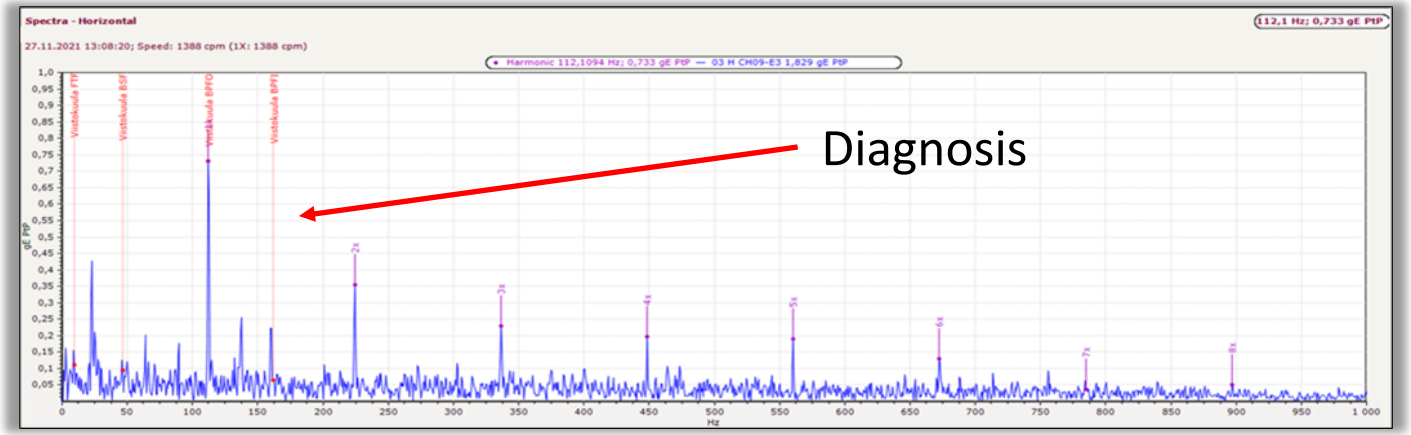
- Anomaly detection and diagnostics on semi-critical assets such as large fans
- Software support on-premises or cloud

Wireless: SKF Enlight Collect IMx-1

Detection



Feedback



Diagnosis

Wired: SKF Multilog IMx-8/16

Advanced parallel data acquisition

- Continuous measurements
- Adapt for variable speeds and loads

Condition indicators

- Machine vibration, bearing condition, speed, phase angle, temperature.

Analysis

- Multi-channel synchronous measurements
- Trend, time-waveform, spectrum, waterfall, cascade, bode, orbit

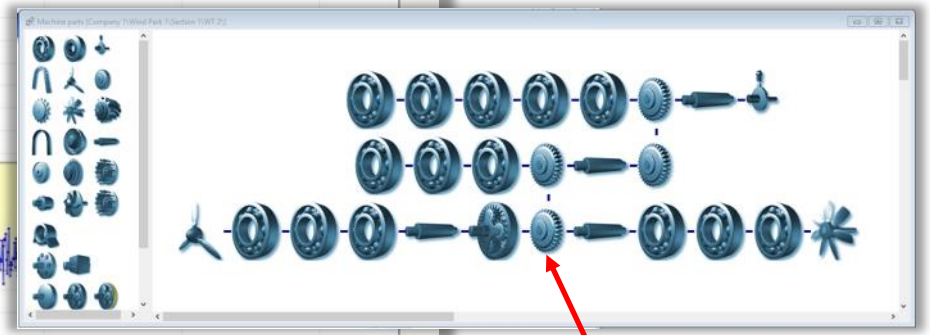
Challenging applications

- Wind turbines, rolling mills, marine thrusters, conveyor drives, paper machines
- Advanced fault detection and diagnostics
- On-premises or cloud
- Connection to DCS

Wired: SKF Multilog IMx-8/16

Auto-detection

Feedback



Details Company 1\Wind Park 1\Section 1\WT 2\HSS/IMS ENV3 (high class)\

Date/Time	Machine/Sub machine	Meas. point	Title	Value	%	Status	Reason	Acknowledge date	Signature
2014-10-10 04:01:39	WT 2	HSS/IMS ENV3 (high class)	Bearing IMS gs2	62,969	N/A	Protean alarm			
2014-03-26 17:01:05	WT 2	HSS/IMS ENV3 (high class)	Bearing IMS gs2	130,186	N/A	Protean alarm			
2013-12-13 13:25:34	WT 2	HSS/IMS ENV3 (high class)	Bearing IMS gs2	125,266	N/A	Protean alarm			
2013-09-22 13:41:04	WT 2	HSS/IMS ENV3 (high class)	Bearing IMS gs2	84,672	N/A	Protean alarm			
2013-01-29 03:00:09	WT 2	HSS/IMS ENV3 (high class)	Bearing IMS gs2	54,419	N/A	Protean alarm			

Auto-diagnosis

Inform

Data

Wired: SKF Multilog IMx-M

- API-670 machinery protection
  - High channel density racks
  - Reduced cabinet footprint
- Condition monitoring
  - Advanced multi-channel parallel data acquisition
  - Variable speeds and loads
- Condition indicators
  - Radial vibration, axial position, speed, phase angle, temperature
- Analysis
  - Multi-channel, synchronous measurements, trend, time-waveform, spectrum, waterfall, cascade, bode, orbit
- Complex projects
  - Greenfield contractors deploying across all classes of equipment from pump systems to turbo-machinery

Wired: SKF industrial sensors

- Garbage in = garbage out
- Vibration: acceleration, velocity, displacement
- Temperature: dual vibration + temperature, PT 1000 thermocouple
- Application optimised: complex specification selected with SKF experience from reliable suppliers
- Piezo-electric technology: industry-proven sensing solution over wide range of frequencies and environments. MEMS technology still in infancy.
- Eddy Current Probe technology for machine protection systems

Software solutions

On-premise	On cloud
Software application and database installed locally	Software application and database installed on internet-based host: e.g. Amazon Web Services
Capability - and need - to manage installation, upgrades, and database maintenance on-site	No customer capability - or desire - to manage installation, upgrades, and database maintenance.
Data secured and shared across the internal network. No internet connection permitted or possible	Data secured and shared across the internet. Enable benefits from economy of scale

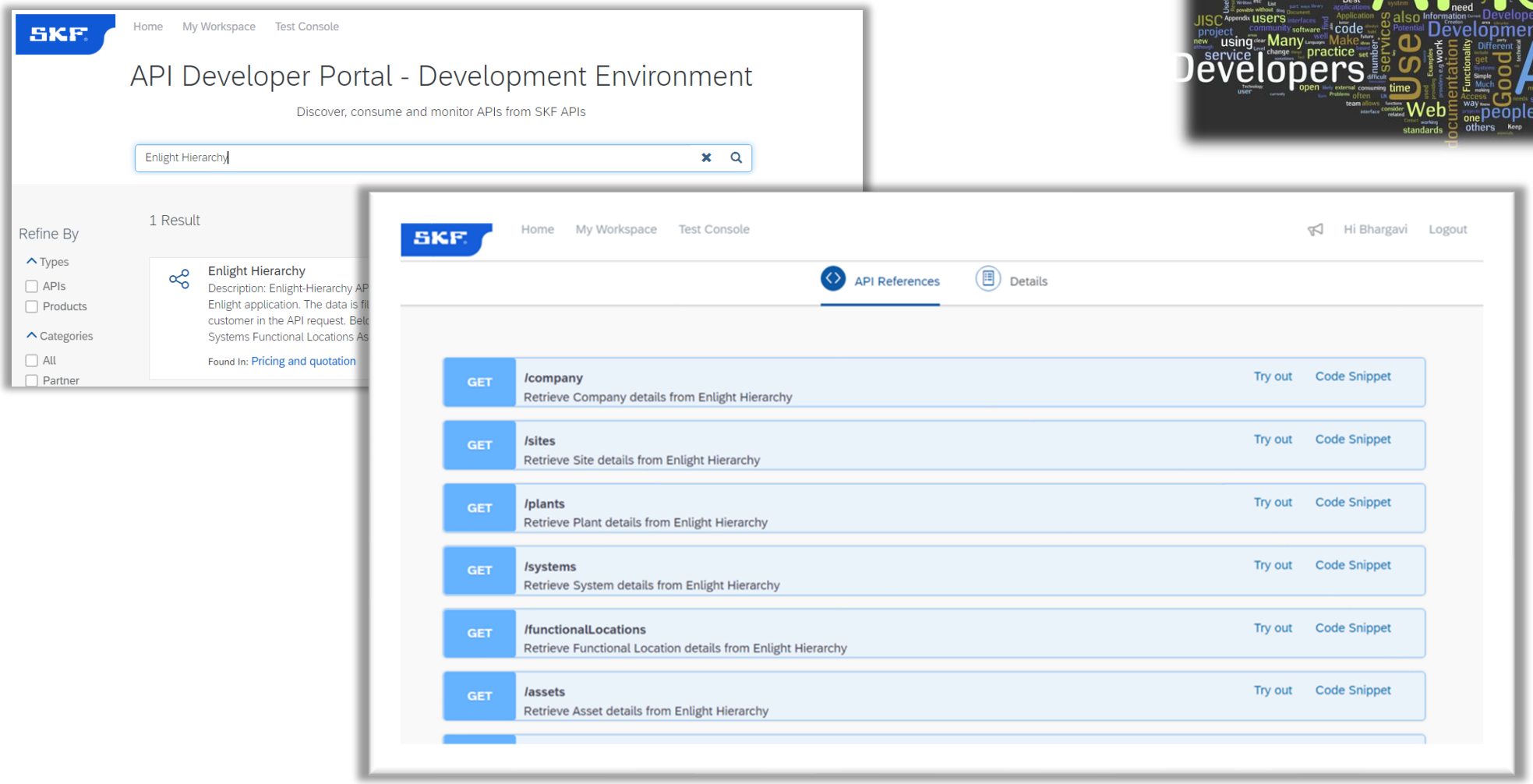
Software: SKF @ptitude Observer

- Expert diagnostics and analysis
  - Used with IMx-1, IMx-8/16, Microlog
- Detect issues
  - Auto-detection & machine learning
  - Manual alarm & event log.
- Diagnose issues
  - Automated rule-based AI methods
  - Manually with multiple complex vibration analysis plots and trends.
- Share data and results
  - Plant data historians (OPC-UA)
  - External corporate dashboards
  - Maintenance management systems

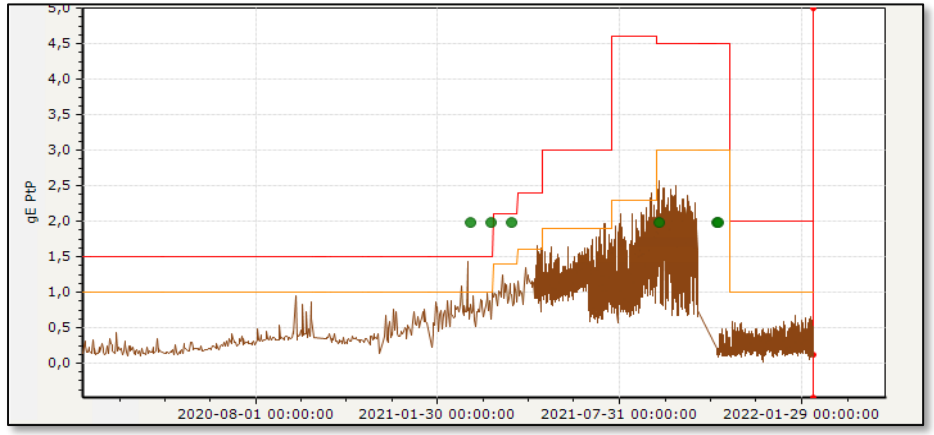
Software: SKF Enlight Centre

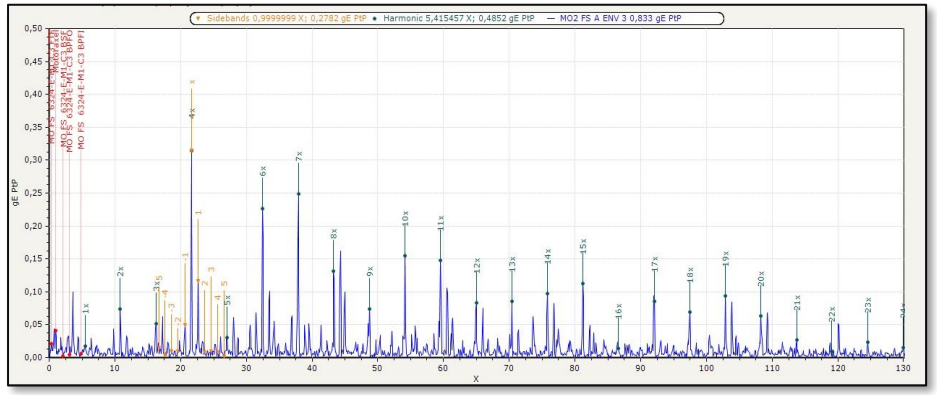
- Non-expert cloud-based visualisation
  - Used with QuickCollect and ProCollect
- Detect issues
  - Auto-detection
  - Manual alarm & event log
- Diagnose
  - Manually with vibration analysis plots and trends
- Share data and results
  - Cloud-to-cloud
  - Maintenance management
  - Corporate dashboards

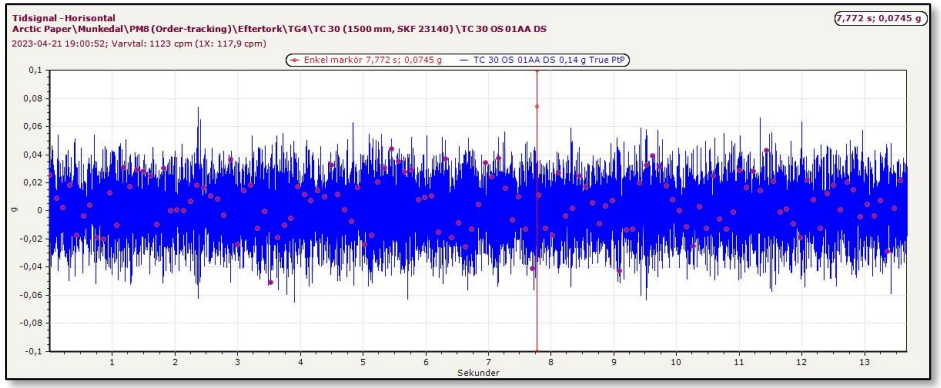
Connection to external dashboarding



2 Detect







Datamängd per dygn för en pappersmaskin

Trendvärde

- Fyra olika trenden per givare
- Trendvärde var 15:e minut
- 72 000 trendvärden per dygn

Spektrum

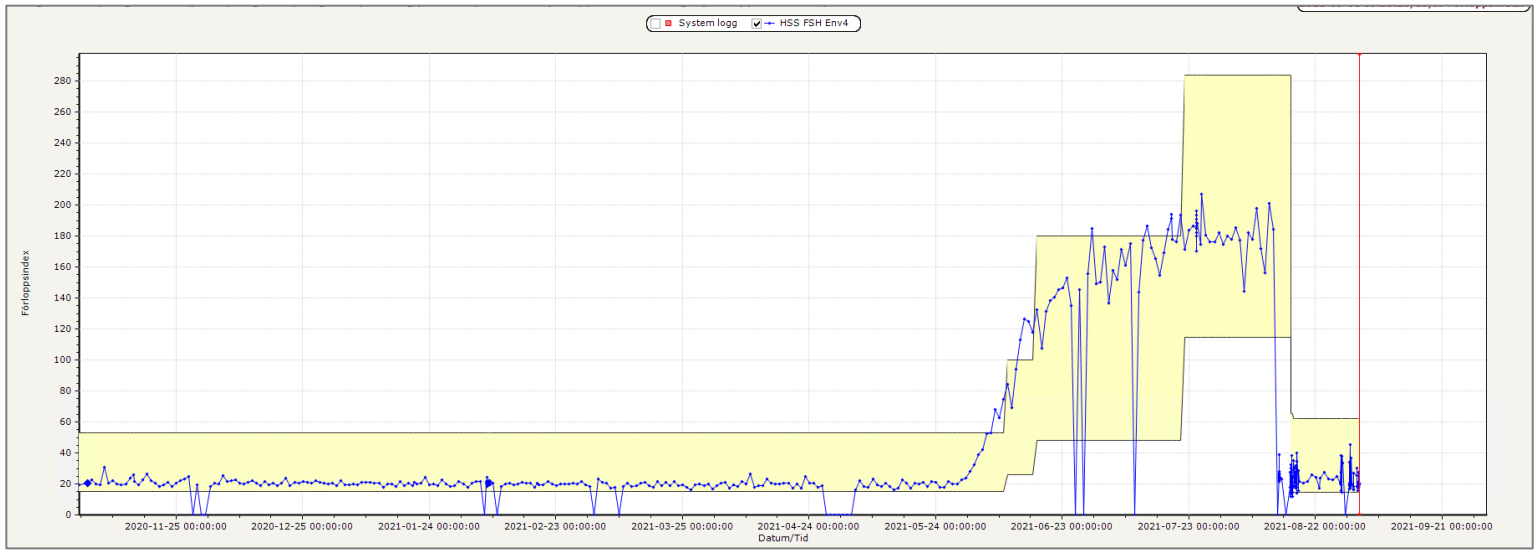
- Fyra olika spektrum per givare och dygn
- Totalt 3000 per dygn

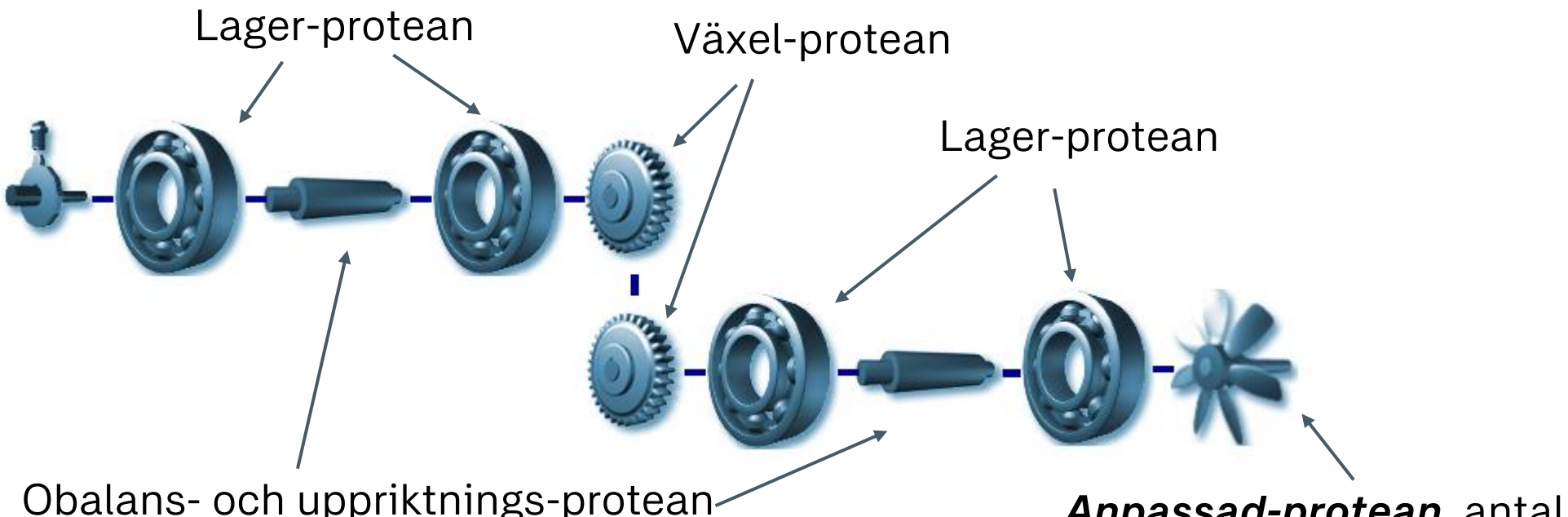
Tidssignal

- Fyra olika spektrum per givare och dygn
- Totalt 3000 per dygn

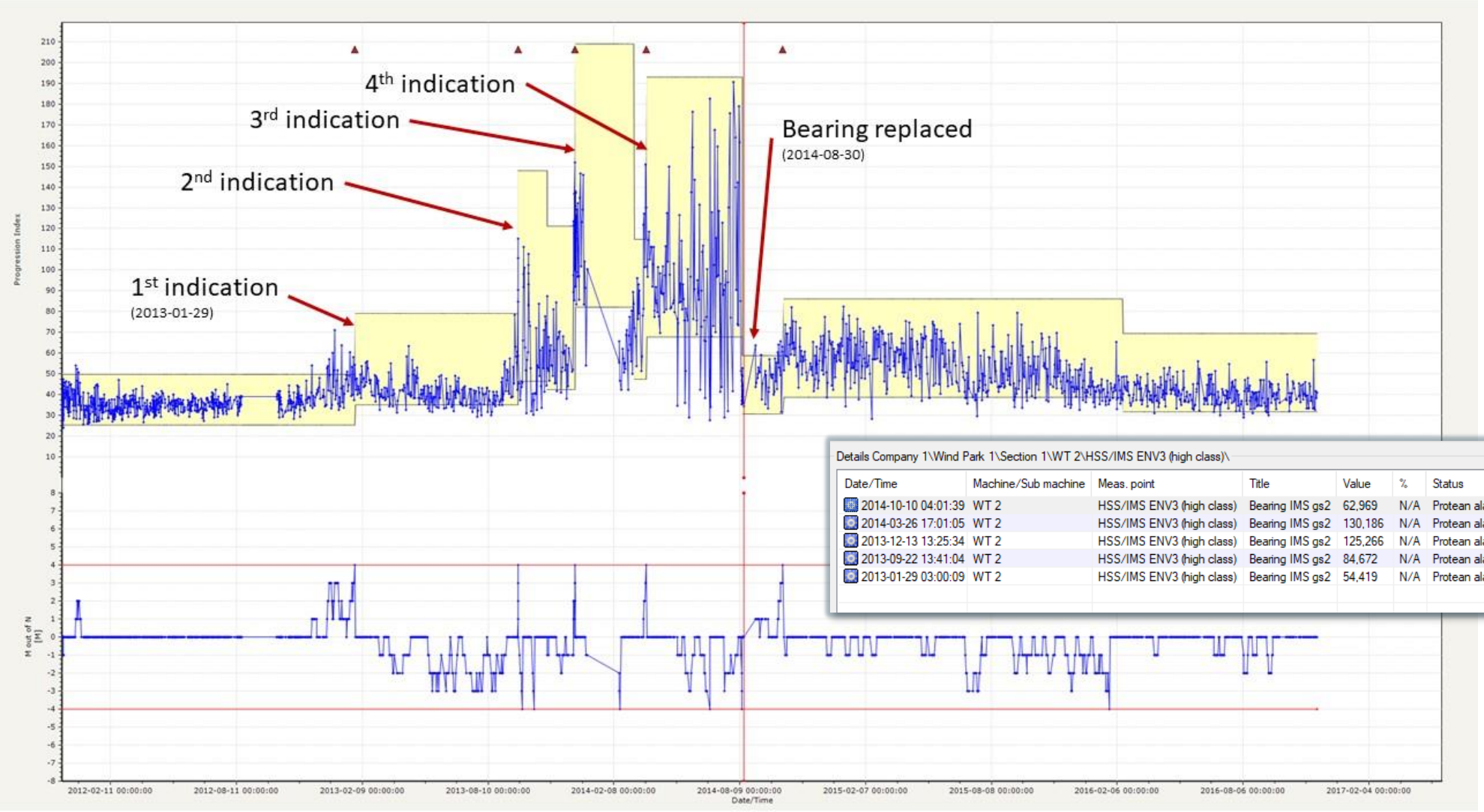
Protean

- ***Oxford languages:*** *”Able to change frequently or easily”*
- Automatisk, själv-justerande diagnos som följer specifika frekvenser





Example: Bearing defect in a wind turbine gearbox



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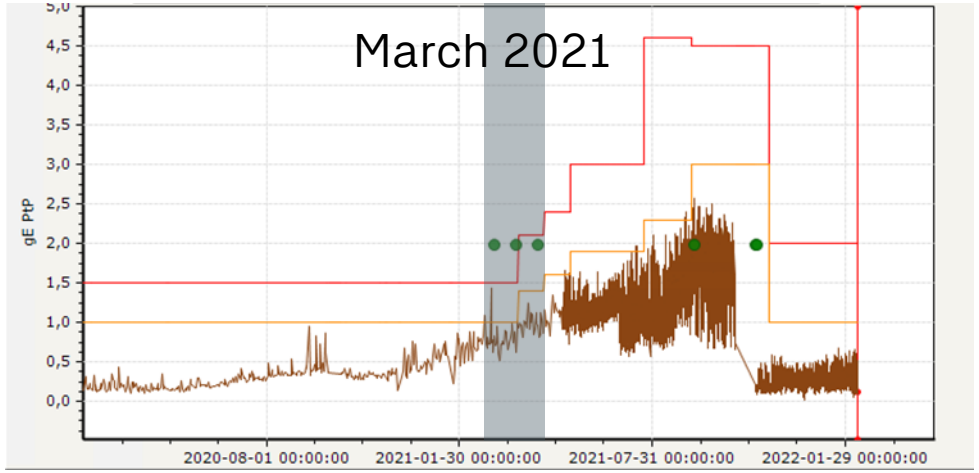
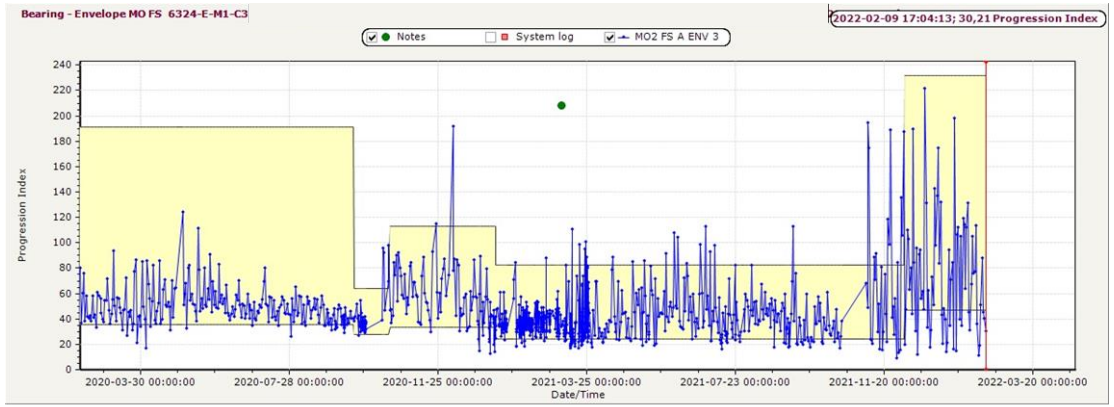
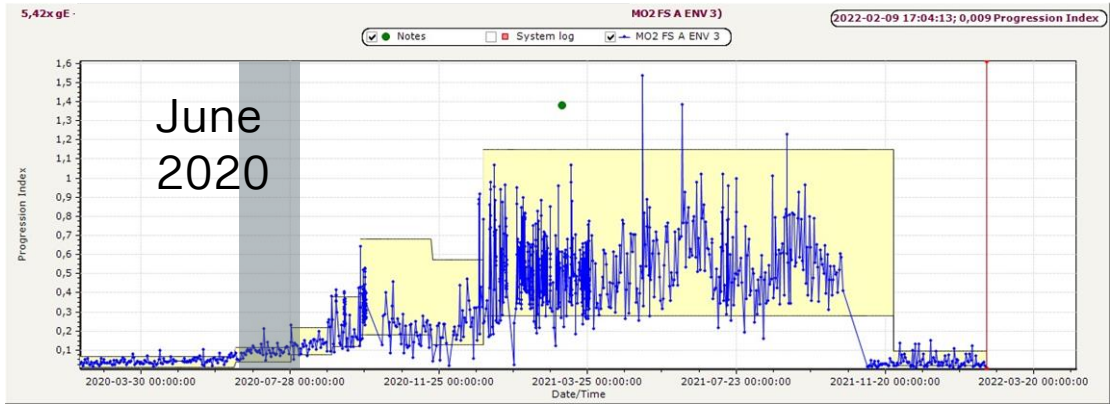
The importance of the right input

The importance of the right input





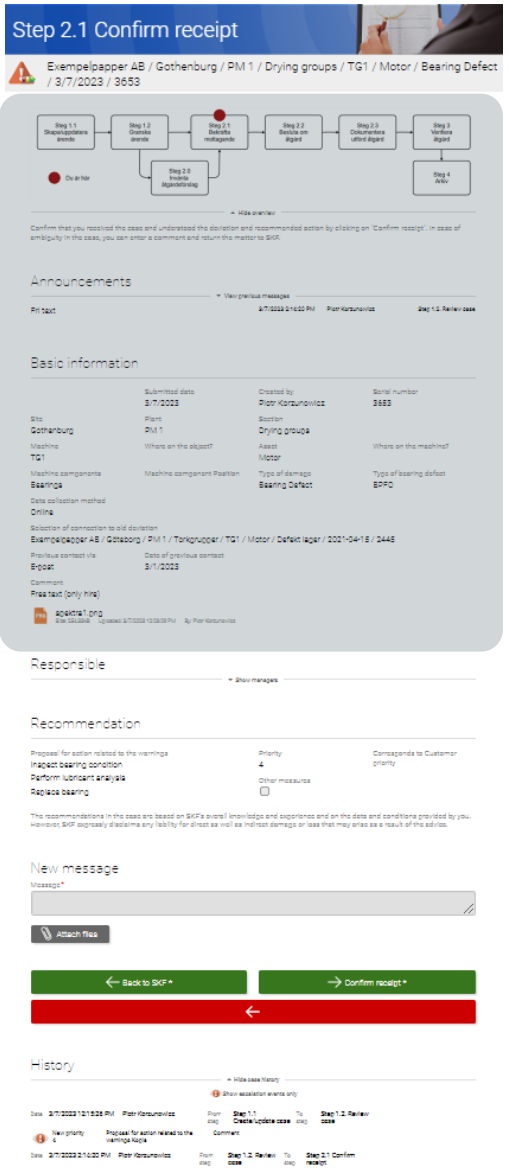


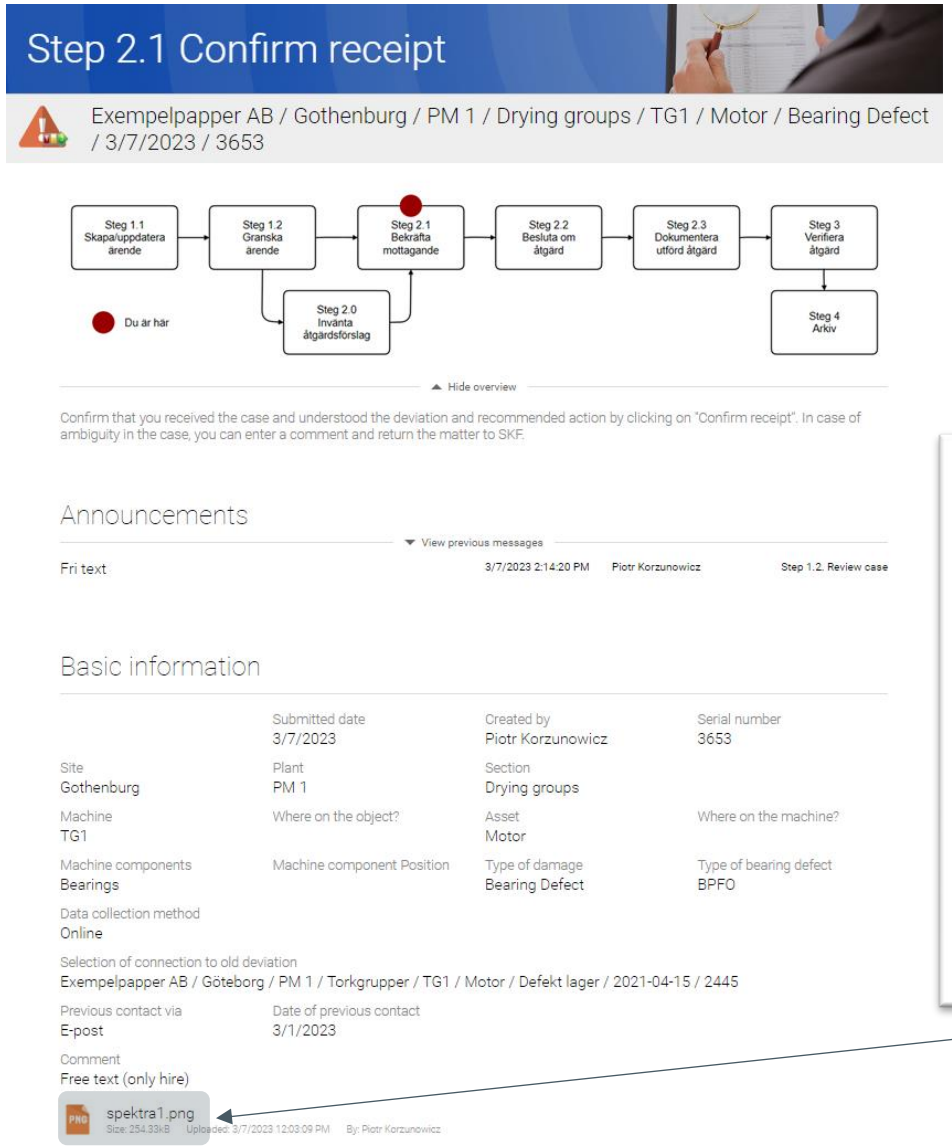
With the not right bearing designation, the bearing defect was detected in March 2021.

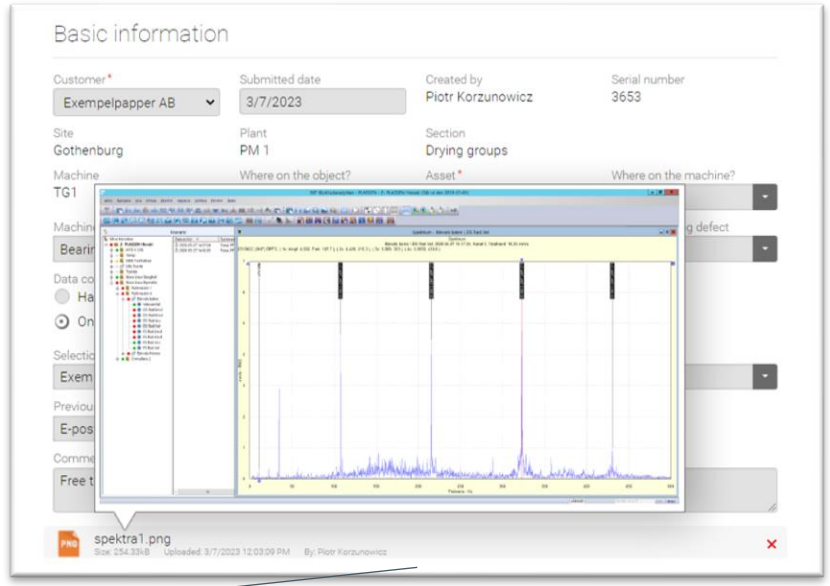
With the correct bearing designation, the development could have been detected in June 2020, i.e. approx. 10 months earlier.

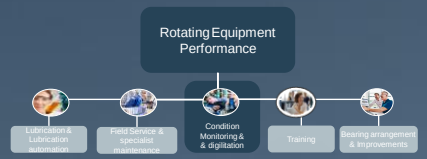
3 Communicate

Report process

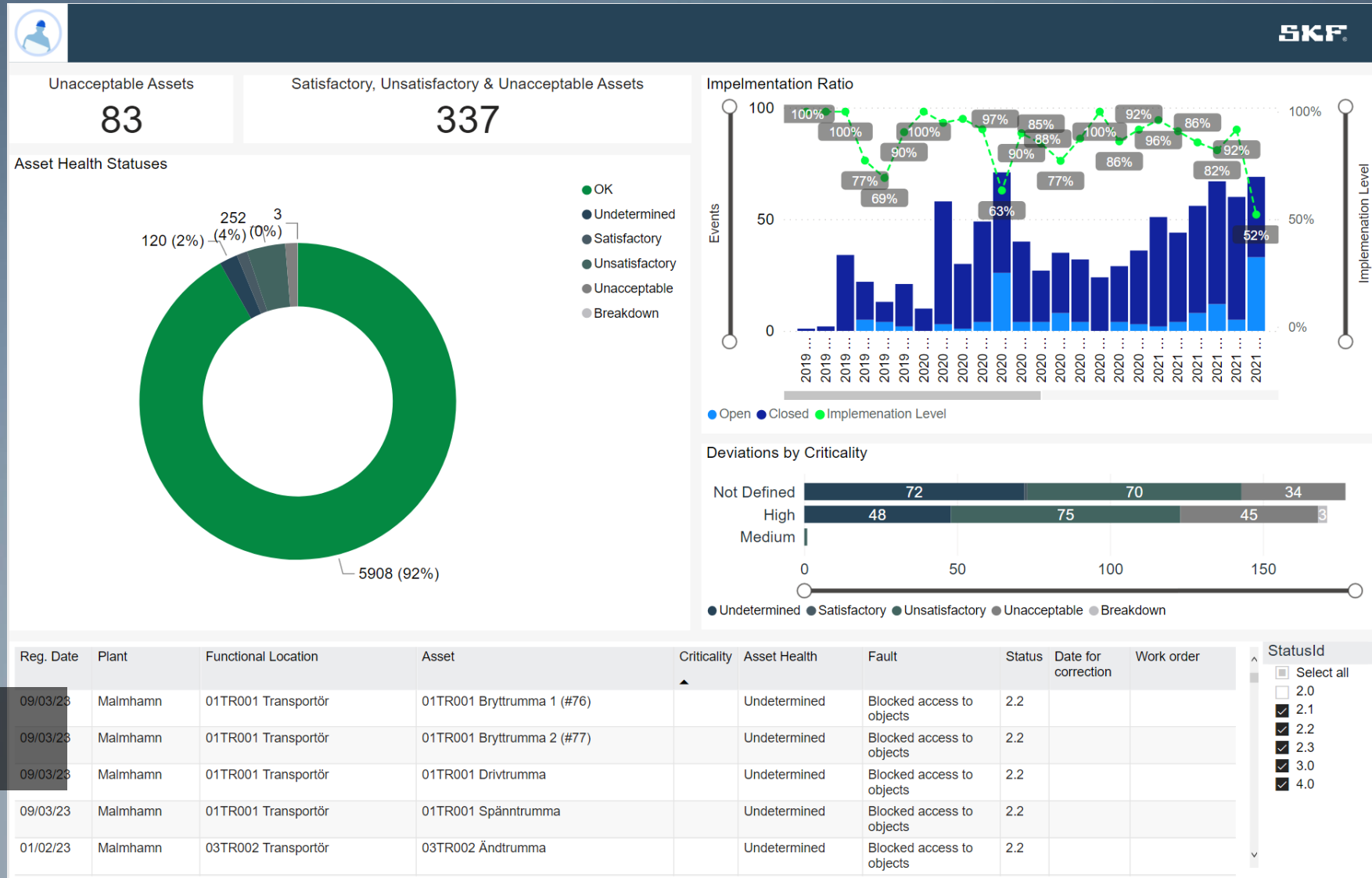






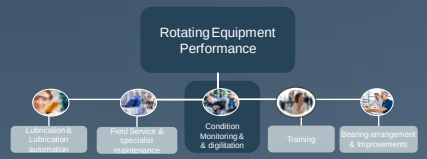


Condition Monitoring & digitization



Reg. Date	Plant	Functional Location	Asset	Criticality	Asset Health	Fault	Status	Date for correction	Work order
09/03/23	Malmhamn	01TR001 Transportör	01TR001 Bryttrumma 1 (#76)		Undetermined	Blocked access to objects	2.2		
09/03/23	Malmhamn	01TR001 Transportör	01TR001 Bryttrumma 2 (#77)		Undetermined	Blocked access to objects	2.2		
09/03/23	Malmhamn	01TR001 Transportör	01TR001 Drivtrumma		Undetermined	Blocked access to objects	2.2		
09/03/23	Malmhamn	01TR001 Transportör	01TR001 Spänntrumma		Undetermined	Blocked access to objects	2.2		
01/02/23	Malmhamn	03TR002 Transportör	03TR002 Ändtrumma		Undetermined	Blocked access to objects	2.2		

StatusId
Select all
2.0
2.1
2.2
2.3
3.0
4.0

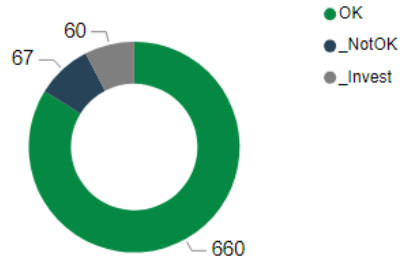


Effect and Priority

SKF

Actual Status		Closed YTD		All Events	
6	Unacceptable Assets	13	_Unacceptable_Assets_Old	129	_Unacceptable_Assets_All
60	Assets Under Invest	22	_Invest_Old	60	_Invest_Old
2	Undetermined Assets	15	_Undetermined_Old	67	_Undetermined_All
23	Satisfactory Unsatisfactory Unaccepta...	37	_Satisfactory_Unsatisfactory_Unaccep...	245	_Satisfactory_Unsatisfactory_Unaccep...
0	Breakdown	0	_Breakdown_Old	0	_Breakdown_All

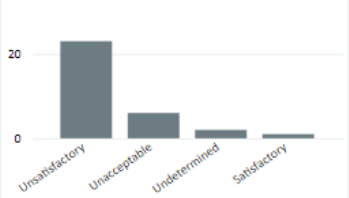
Asset Health Statuses



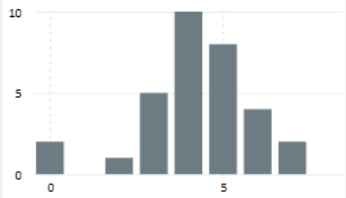
Open - 98 cases

Fault Correction Effect

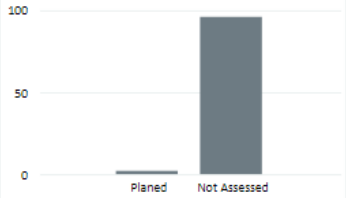
Events Severity Distribution



Events Priority Distribution



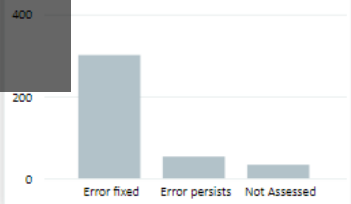
Correction time



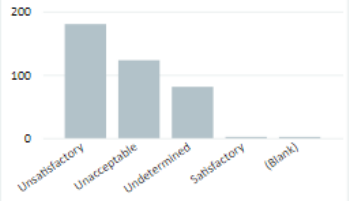
Asset Criticality

Closed - 387 cases

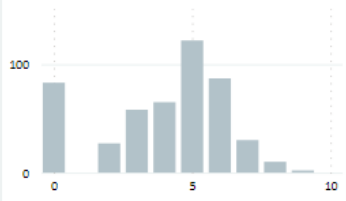
Fault Correction Effect



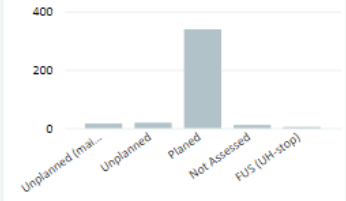
Events Severity Distribution



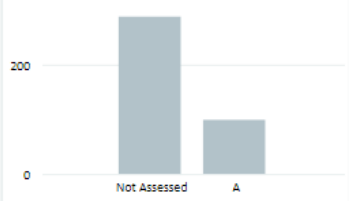
Events Priority Distribution



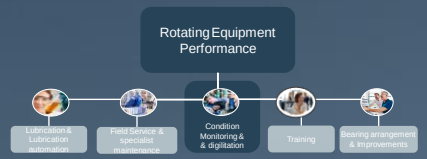
Correction time



Asset Criticality



Condition Monitoring & digitization

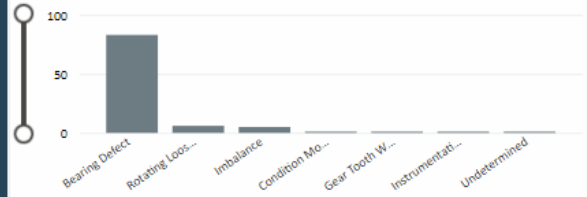


Fault Distribution and Action Management

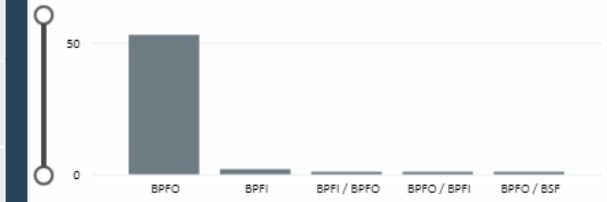
	Actual Status	Closed YTD	All Events
Unacceptable Assets	2	13	119
Under Investigation	60	22	60
Undetermined	2	15	65
Satisfactory Unsatisfactor...	19	37	228
Breakdown	0	0	0

Open - 89 cases

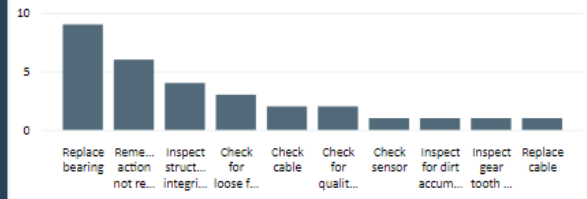
Fault Type



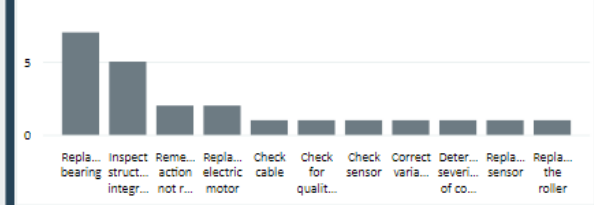
Specific Bearing Fault



Recommended actions

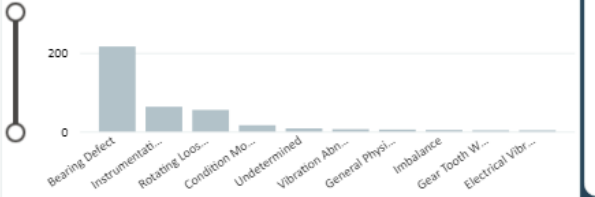


Planned actions

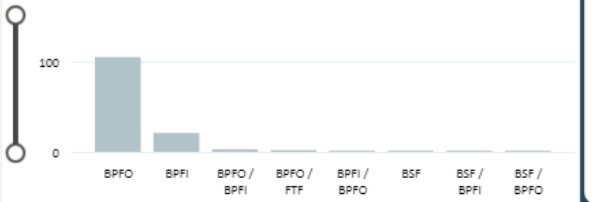


Closed - 365 cases

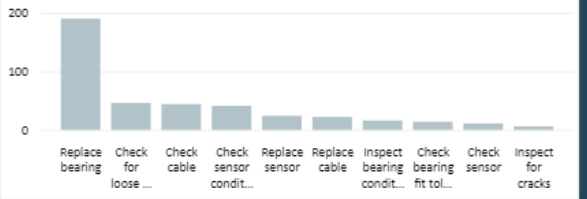
Fault Type



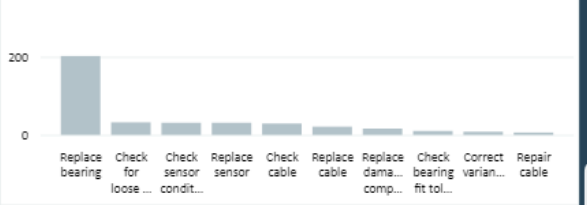
Specific Bearing Fault



Recommended actions

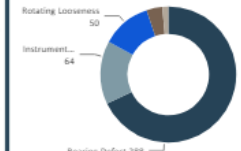


Planned actions

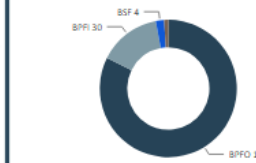


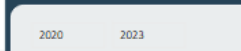
Total

Fault Type

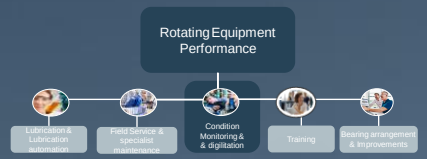


Specific Bearing Fault





Condition Monitoring & digitization



Condition Monitoring & digitization

- Rapporterade avvikelser

Uppdaterad senast 2023-08-31

Totalt antal ärenden	Antal öppna ärenden	Antal obs ärenden	Antal stängda ärenden	Antal öppna systemfel	Antal skapade AO	Antal AO per ärende
107	24	9	83	1	88	90 %

Filter

Anläggning, Maskin, Asset
- PM4
- PM5

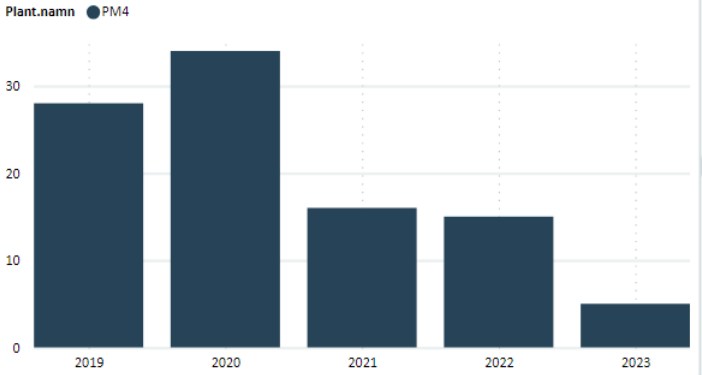
År, Månad, Dag
- (Blank)
- 2019
- 2020
- 2021
- 2022
- 2023

Fault type
- Bearing Defect
- Condition Monitoring System Pr...
- Crack

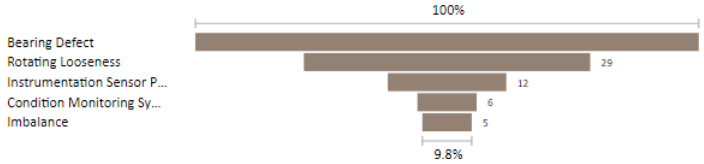
Priority: 0 – 9

status
- Step 2.0.Wait for action propos...
- Step 2.2.Decide on action
- Step 2.3.Document action perf...
- Step 4.Archive

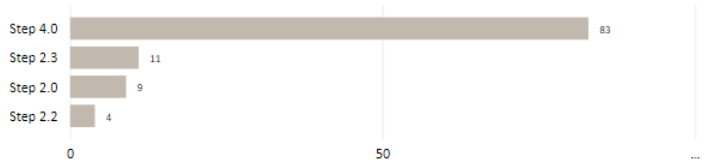
Antal ärenden över tid och anläggning



Fault Type

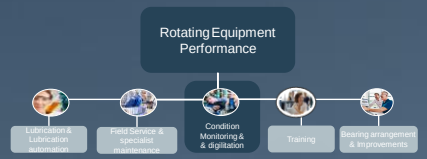


Antal avvikelser över status



Detaljer

Registered date	Plant	FLOC.namn	Asset.name	Located on object position	Priority	Fault type	Recommended actions.name	Work order	_StatusId
30/08/23	PM4	TG 3	Ledvals 744-630 112 (VT4270) (504mm 23224)		4	Rotating Looseness	Check for loose fasteners / cracks	6467329	2.30
20/04/23	PM4	TG 4	Ledvals 744-631 115 (VT4317) (504mm 23224)		5	Bearing Defect	Replace bearing	6435412	4.00
10/03/23	PM4	TG 5	Ledvals 744-2005 109 (VT4527) (610mm 23224)		4	Bearing Defect	Replace bearing	SB 714896	4.00
10/03/23	PM4	TG 7	Ledvals 744-2205 108 (VT4211) (504mm 23224)		2	Bearing Defect	Remedial action not required yet		2.00
23/02/23	PM4	TG 4	Ledvals 744-622 000 (VT4323) (504mm 23224)		0	Instrumentation Sensor Problem	Check cable	6419948	4.00
23/02/23	PM4	TG 4	Ledvals 744-622 000 (VT4323) (504mm 23224)		0	Instrumentation Sensor Problem	Check sensor condition	6419948	4.00
23/02/23	PM4	TG 4	Ledvals 744-622 000 (VT4323) (504mm 23224)		0	Instrumentation Sensor	Replace cable	6419948	4.00



Condition Monitoring & digitization

Rapporterade avvikelser

Uppdaterad senast 2023-08-31

Filter

År, Månad, Dag
- (Blank)
- 2019
- 2020
- 2021
- 2022
- 2023

Fault type
- Bearing Defect
- Bearing Defect BPFO
- Condition Monitoring System Pr...
- Crack
- Gear Backlash

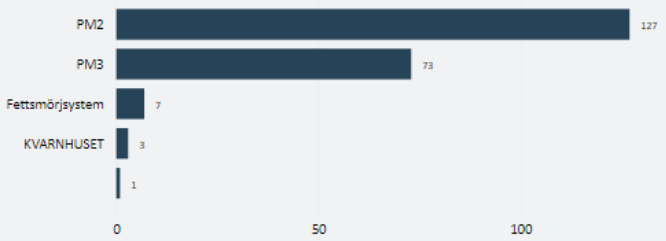
Priority: 0 – 9

status
- Arkiv
- Step 2.0.Wait for action propos...
- Step 2.1Confirm receipt
- Step 2.2.Decide on action
- Step 2.3.Document action perf...
- Step 3.Verify action
- Step 4.Archive

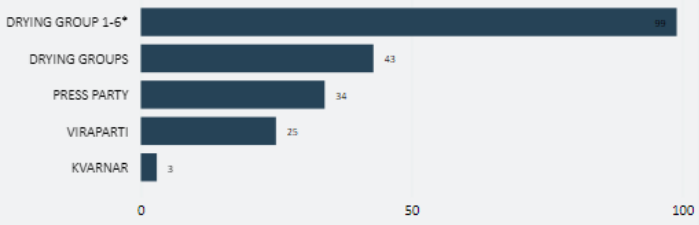
Anläggning: Fettsmörjsystem | KVARNHUSET | PM2 | PM3

Fault type: All

Antal Ärenden >1

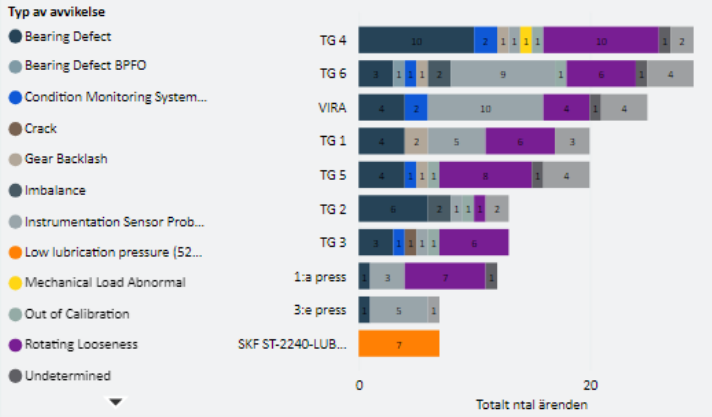


Count of id by Section

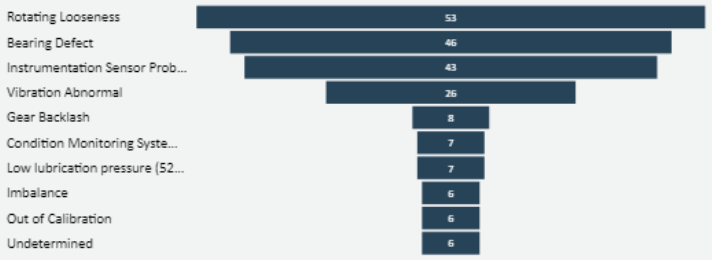


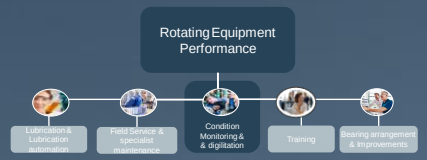
Count of id by Fault correction effect

Totalt antal ärenden by Maskin and Typ av avvikelse



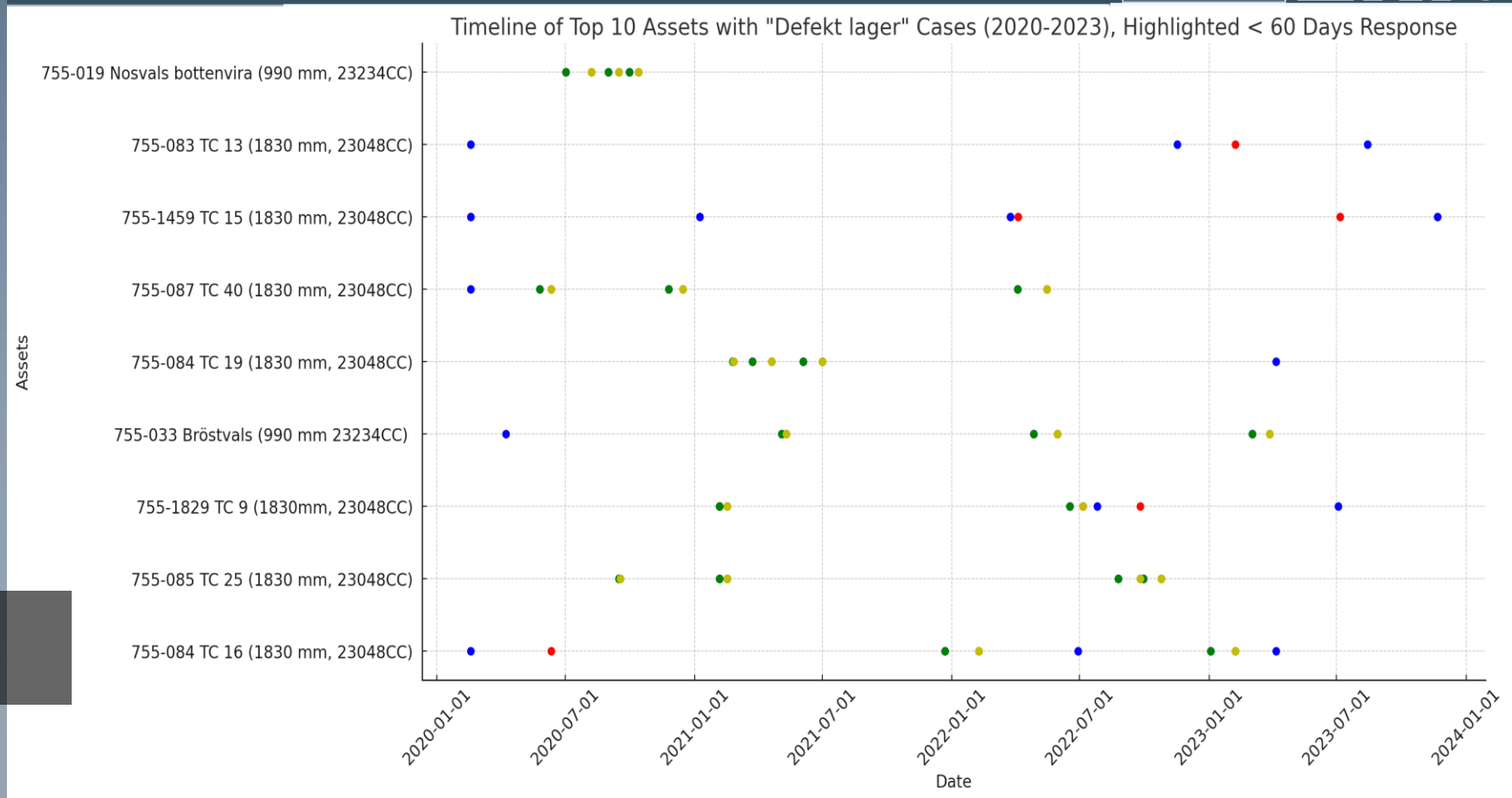
Top 5 Rapporterade feltyper



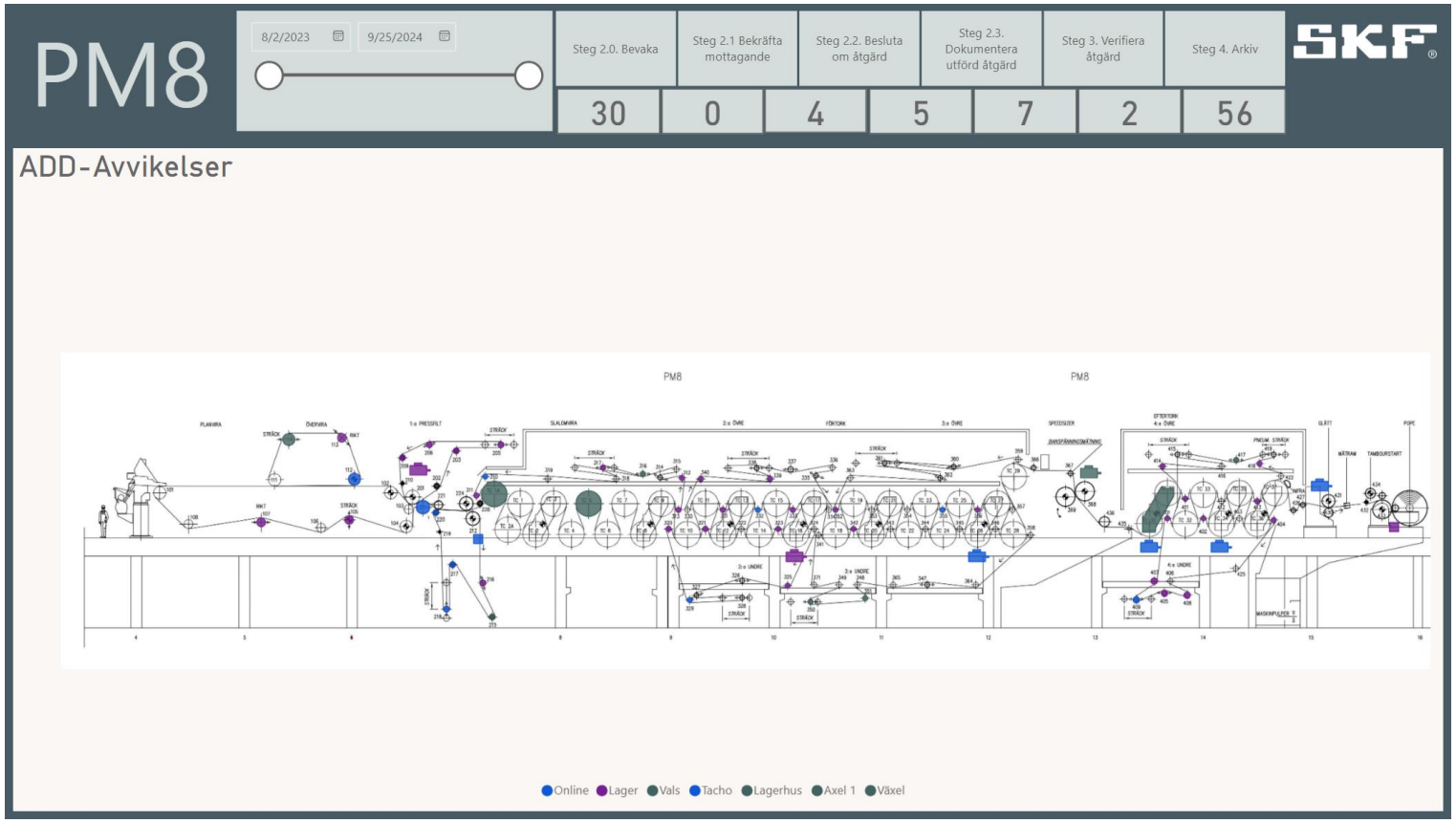


Rapporterade avvikelser

Uppdaterad senast 2023-08-31



Condition Monitoring & digitization

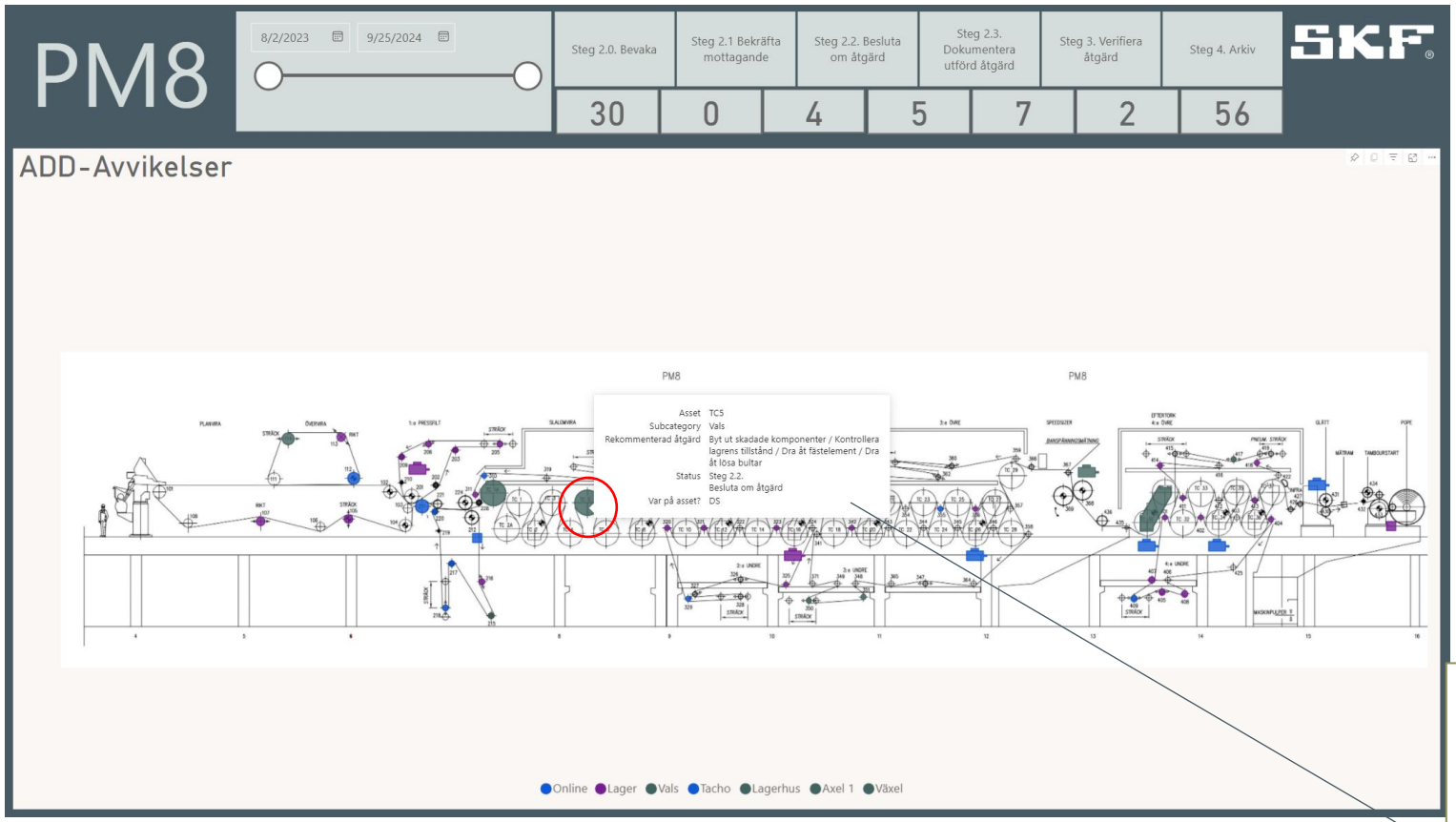


ADD Power BI dashboard – graphic overview of all Events

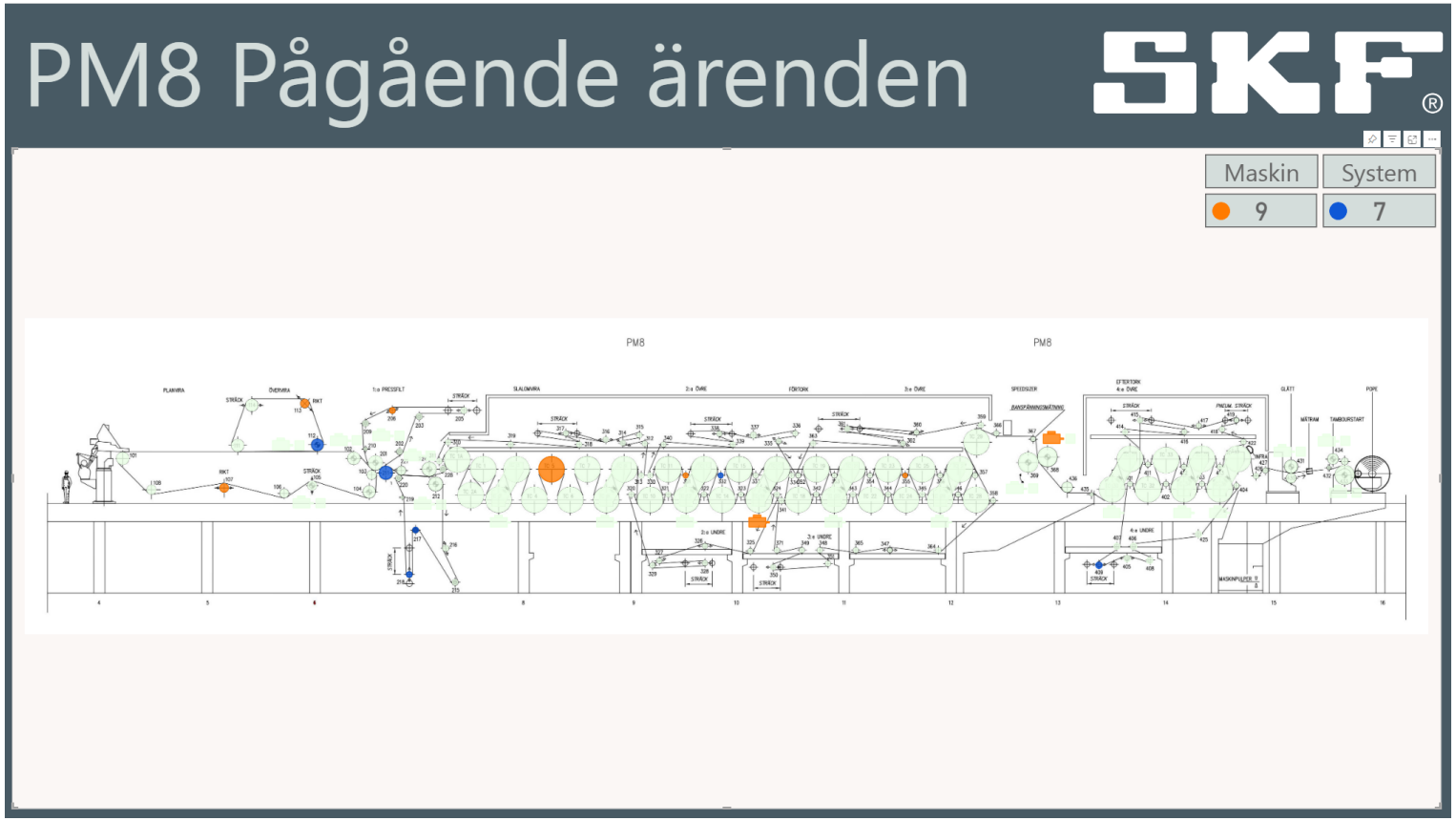
- Reported Case Overview on machine

ADD Power BI dashboard – graphic overview of all Events

- Information about the reported event is displayed when you click on the colored asset



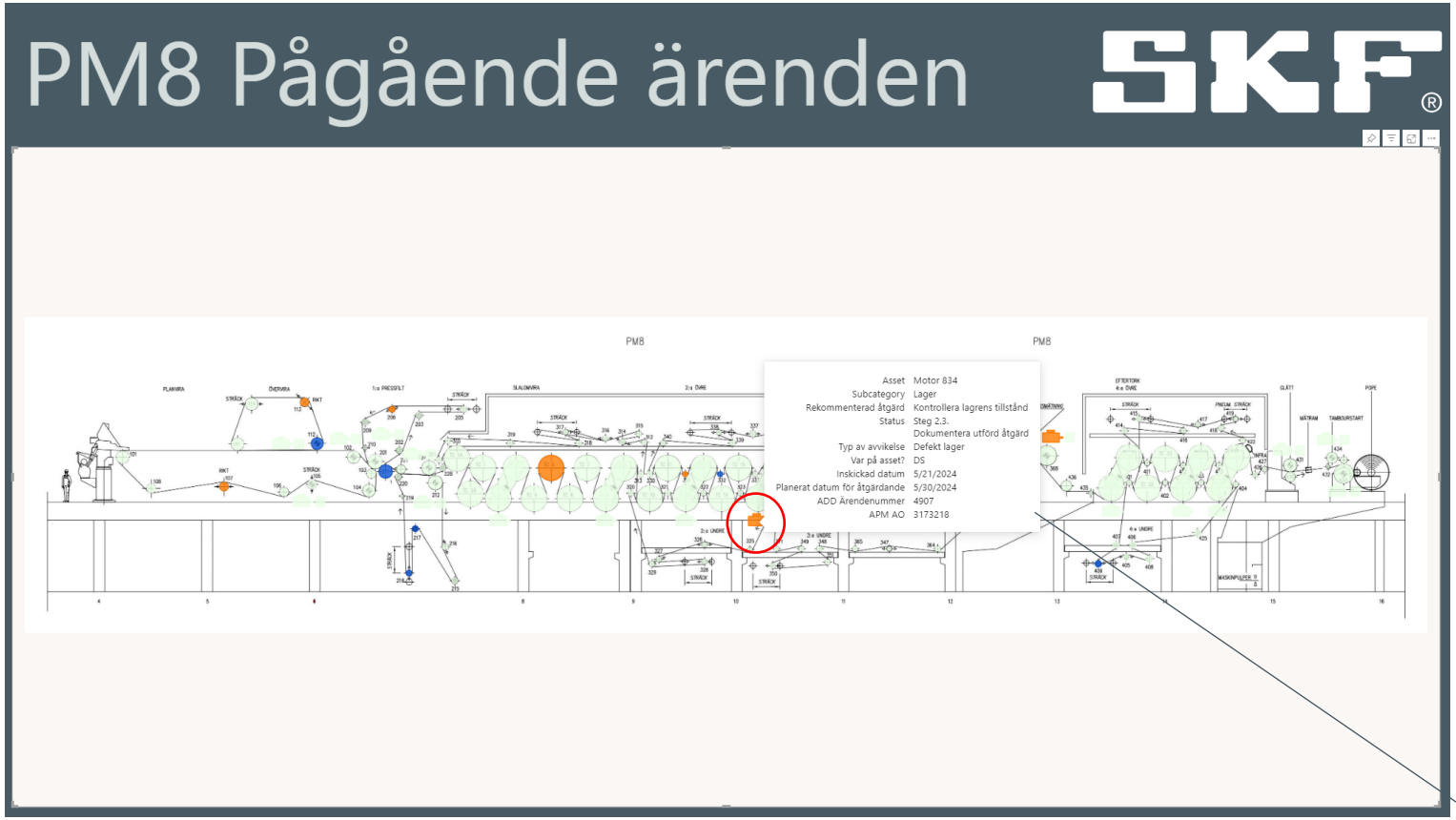
Asset	TC5
Subcategory	Vals
Rekommenterad åtgärd	Byt ut skadade komponenter / Kontrollera lagrens tillstånd / Dra åt fästelement / Dra åt lösa bultar
Status	Steg 2.2. Besluta om åtgärd
Var på asset?	DS



ADD Power BI dashboard – graphic overview of active Events

- Active Case Overview on machine

PM8 Pågående ärenden



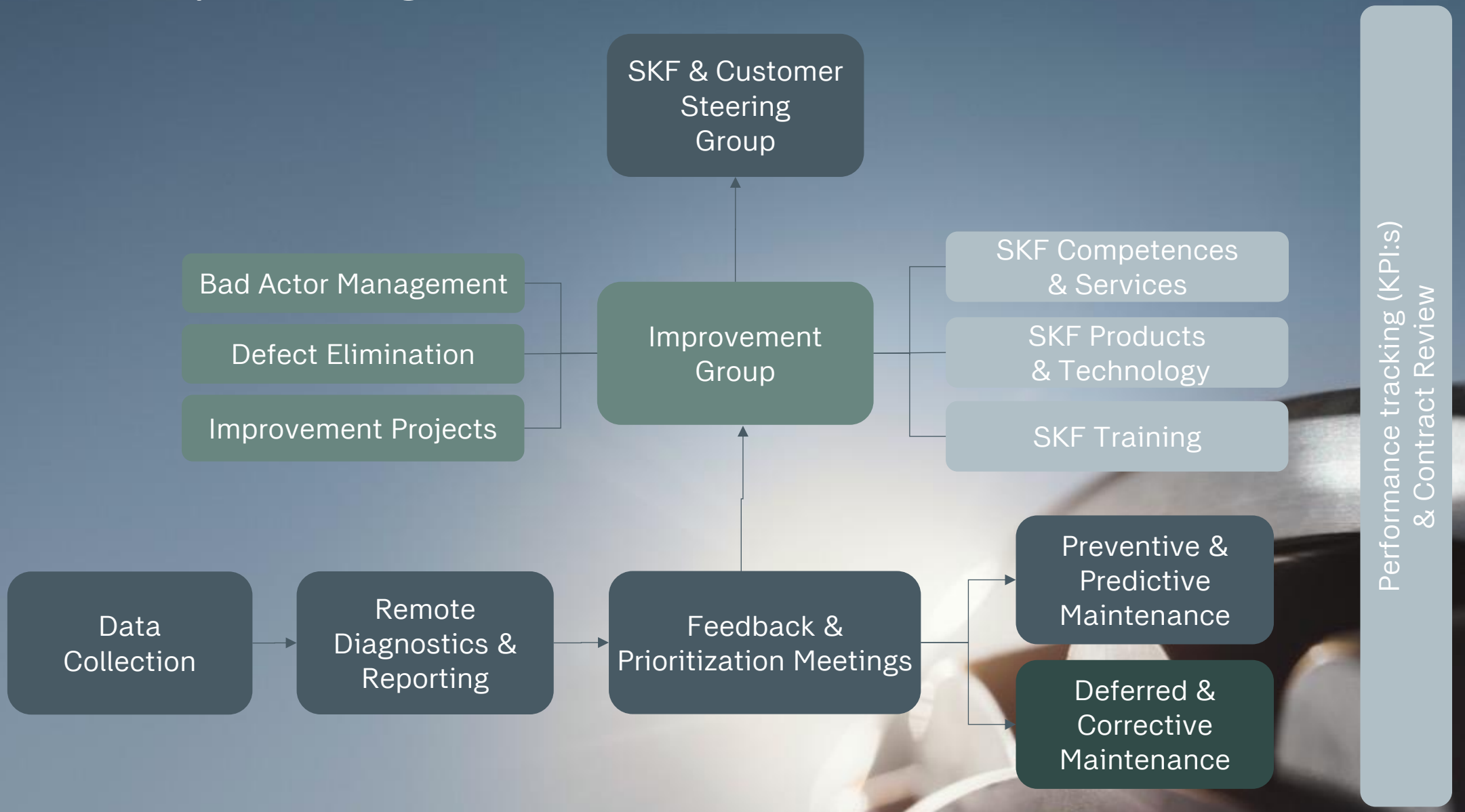
ADD Power BI dashboard – graphic overview of active Events

- Information about the reported event is displayed when you click on the colored asset

Asset	Motor 834
Subcategory	Lager
Rekommenterad åtgärd	Kontrollera lagrens tillstånd
Status	Steg 2.3. Dokumentera utförd åtgärd
Typ av avvikelse	Defekt lager
Var på asset?	DS
Inskickad datum	5/21/2024
Planerat datum för åtgärdande	5/30/2024
ADD Ärendenummer	4907
APM AO	3173218

4 Improve

Contract Setup and Organization



Questions?

Rotating Equipment Performance Center