

WHY SMARTER MAINTENANCE IS MUST

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Why do we conduct maintenance?

We conduct maintenance because it would cost us more if we did not conduct maintenance.

How to Achieve Smarter Maintenance?

The overall objective is to ensure equipment reliability at a level that meets business goals and reduces the cost of maintenance and other equipment reliability-related losses.

- **Equipment reliability performance monitoring:**

Value impact and frequency of reliability losses and maintenance

- **Equipment failure elimination:**

Systematic process for identifying the root causes of problems or events and an action plan for responding (prevent failures)

- **Risk mitigation strategy:**

Identification of critical equipment through an Asset Criticality Analysis (ACA) and application of value-added mitigation strategies (maintenance tasks) through a systematic Failure Mode, Effect and Criticality Analysis (FMECA)

- **Equipment reliability strategy review:** Mitigation strategies (maintenance tasks) are reviewed for effectiveness

PRIMETALS' PORTFOLIO TO ACHIEVE SMARTER MAINTENANCE

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Condition Monitoring

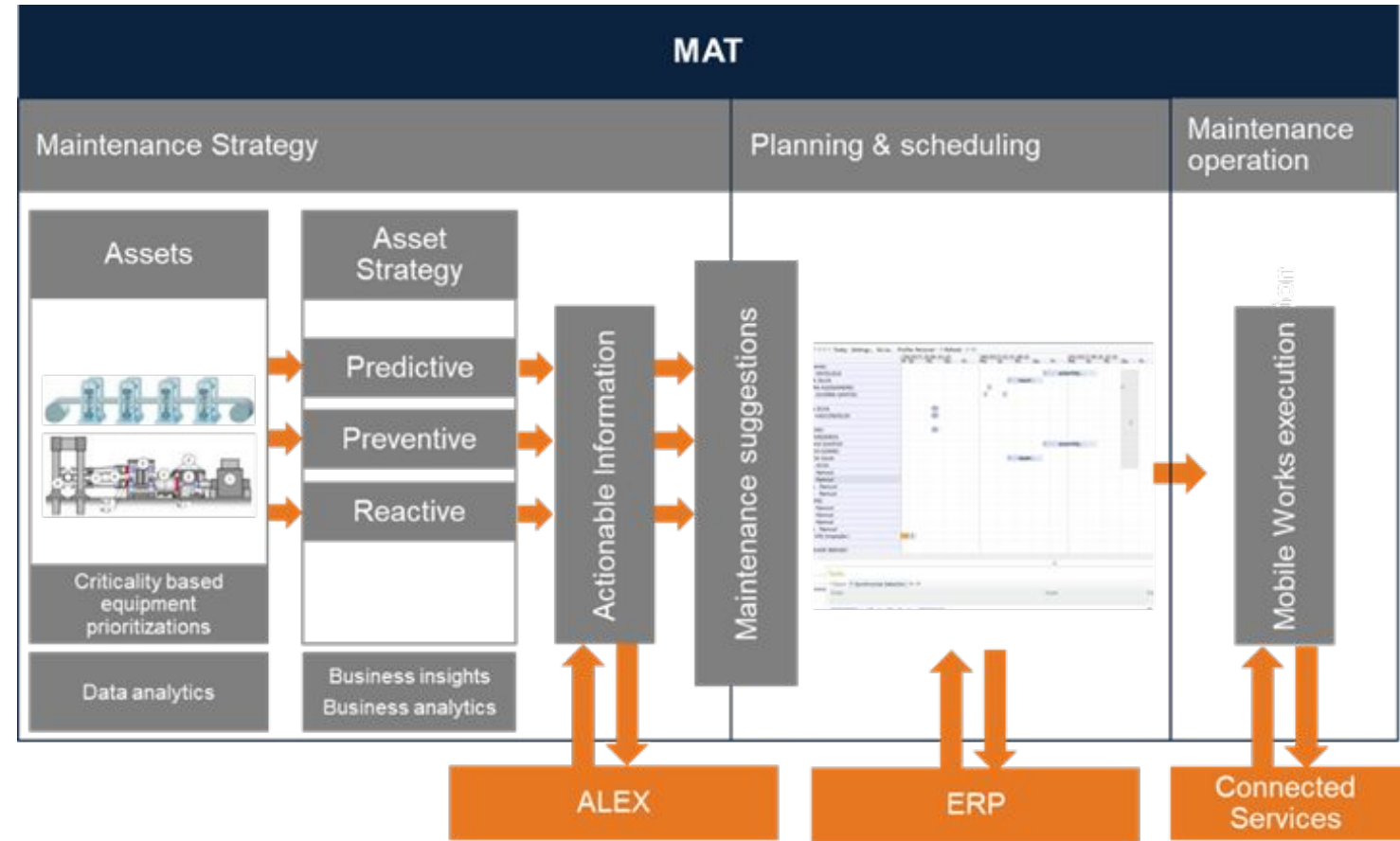
1. Vibration monitoring and Analysis: Detection of faults before they cause the asset to fail by applying full signature analysis going far beyond ISO10816-3
2. ALEX (Asset Lifetime Expert): Condition Monitoring System based on all available data sources (level 1, level 2, dedicated sensors, 3rd party systems, quality systems, etc)



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Maintenance Management Systems

MAT (Maintenance and Asset Technology) is a computerized maintenance management system (CMMS) and Enterprise asset management (EAM) software solution for managing assets, work orders, maintenance strategies, schedules and parts inventory

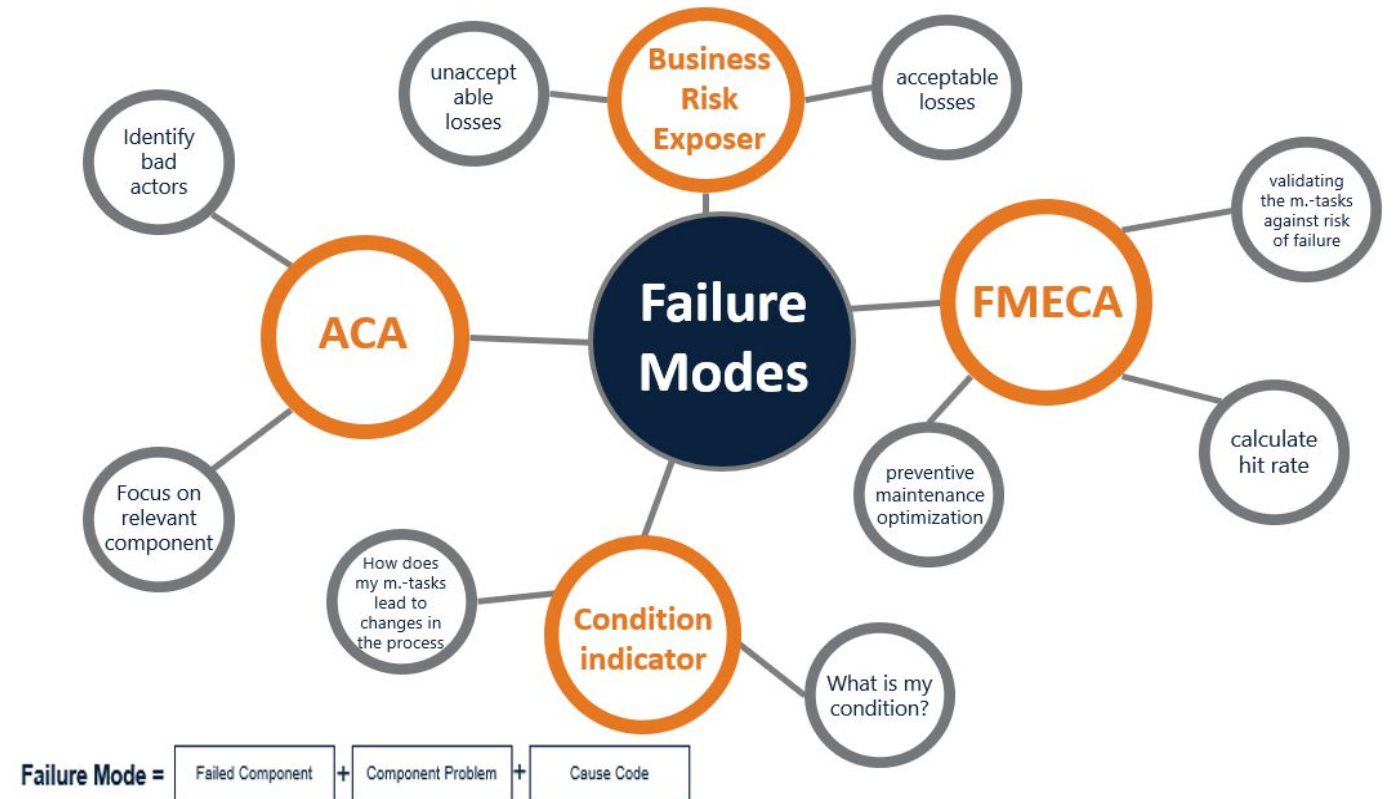


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Reliability Centered Maintenance

RCM- a structured process to identify problems which when solved increases the productivity of your equipment and assets while reducing maintenance costs.

Failure Mode Library (Knowhow Data Base)

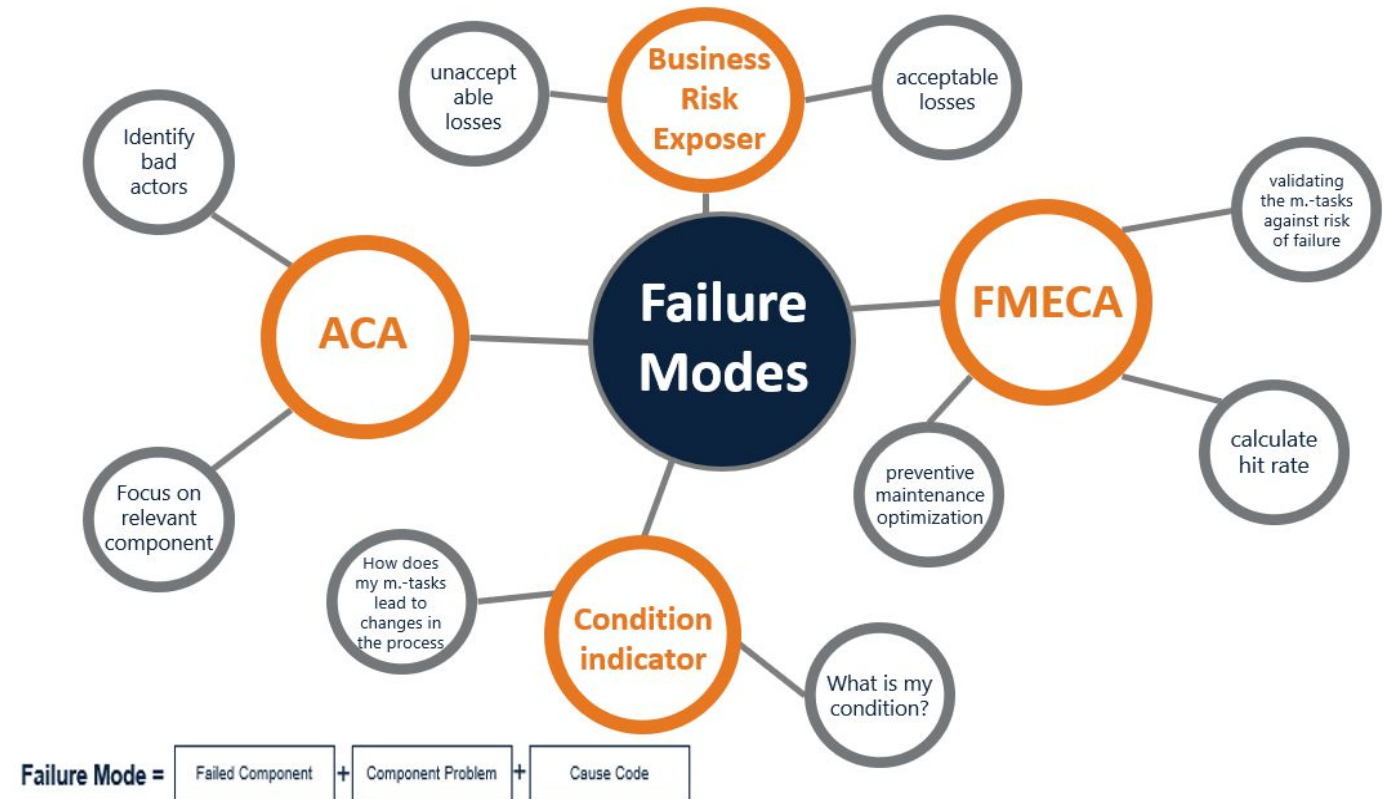


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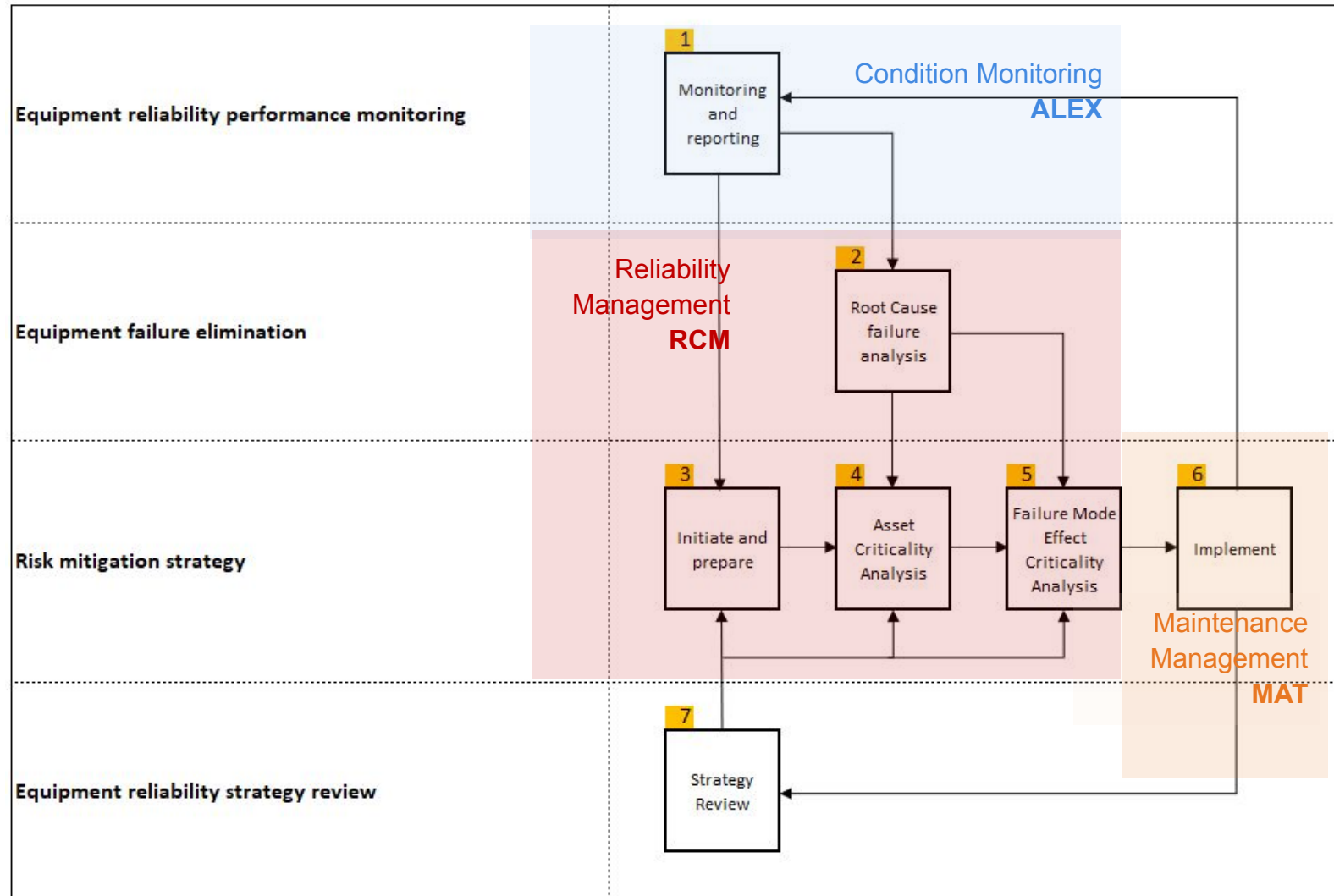


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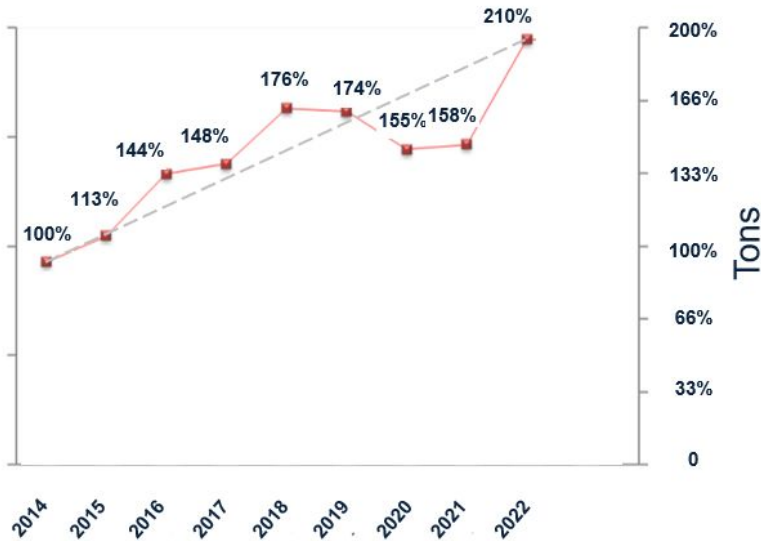
EXAMPLE - LONG TERM MAINTENANCE CONTRACT SUPPORTED BY SMART MAINTENANCE

Applied smarter Maintenance Process



Achievements

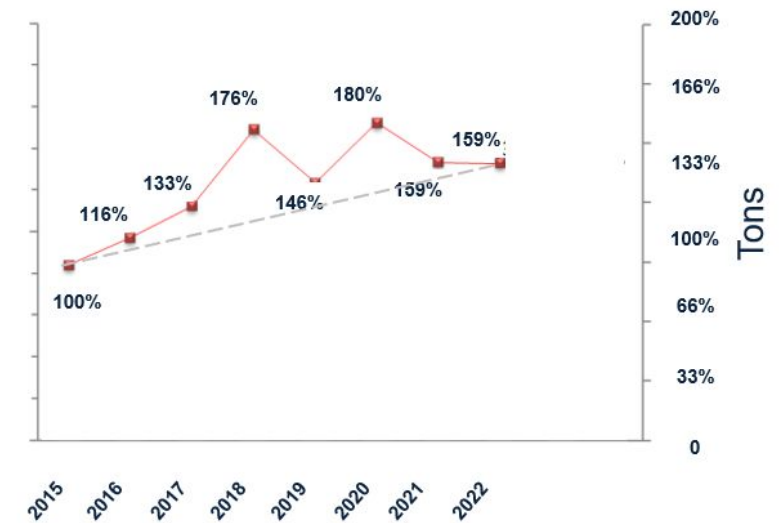
Caster – Mold Lifetime and Repair cycle improvements



Source: Primetals Reference Database

Long term maintenance contract extended the lifetime and increase the performance of components of the continuous casting machine (left) and horizontal (right).

Caster – Horizontal Lifetime and Repair cycle improvements



Source: Primetals Reference Database

Why do we conduct maintenance?

Because maintenance has value-added functions.

- Efficiency increase (operation, production and quality, overall equipment effectiveness)
- Secure maintenance knowhow
- Reduced costs (operational, capital expenditure, maintenance costs)