MANAGEMENT SYSTEM CERTIFICATION
DNV
ISO 9001 · ISO 14001
ISO 45001 · ISO 50001
ISO/IEC 27001

COSL
Drilling Europe AS

RCM in the details

Different expertise, different outcome




Safe
Efficient
Low-Carbon

Honest
Motivated
Cooperative

SAFETY FIRST

“We want 100% compliance to 100% of our Policies & Procedures 100% of the time.”

Frank Tollefsen, CEO and President

Safe
Efficient
Low-Carbon

COSL Drilling Europe AS

Quality, Health, Safety & Environment (QHSE) Policy

COSL Drilling Europe delivers safe, efficient, and low-carbon offshore drilling services in line with our core values: **Honest, Motivated, and Cooperative**.

Our Goal

Zero harm to people, the environment, and assets.

Our Approach

All personnel are expected to act proactively and apply the **RISK Card** principles:

- **Plan** activities so all involved understand the task and associated risks
- **Identify** relevant procedures and requirements
- **Manage** risks and define clear STOP criteria
- **Verify** roles and responsibilities and ensure everyone is confident before starting
- **Execute** work according to plan; stop and take a **Time-Out for Safety (TOFS)** if conditions change, assess risks, and regain control before continuing
- **Complete & Evaluate** the activity, identifying improvement opportunities
- **Record learning** to support continuous improvement and knowledge transfer

Our Commitment

- **Compliance & Safety**
  We comply with applicable laws and regulations in all countries where we operate, as well as international requirements and company standards. All work is planned and executed safely in line with procedures and the CDE Safety Standard. Stop Work Authority and TOFS are mandatory elements of risk control.
- **Leadership & Engagement**
  We demonstrate clear, proactive leadership through active involvement in planning and execution, engaging all relevant parties. All personnel share responsibility for preventing harm.
- **Environment & Sustainability**
  We minimise environmental impact by optimising the CDE Energy Management System, reducing emissions, preventing pollution, and contributing to low-carbon operations through innovation and efficiency.
- **Risk & Security**
  We remain vigilant in managing risks, including information and cyber security.
- **People & Competence**
  We ensure employees and contractors possess the required competence, training, and tools to work safely. We promote a just reporting culture where **speaking up and learning** is encouraged. We invest in developing employee competence and encourage active participation and consultation.
- **Collaboration & Continuous Improvement**
  We collaborate with clients, authorities, and contractors to reduce risk and enhance QHSE performance. We learn transparently from incidents, non-conformities, and operational experience to drive continuous improvement.

Frank Tollefsen
CEO / President, COSL Drilling Europe AS

Sandnes 01.01.2026.

Honest
Motivated
Cooperative

Agenda

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- Introduction
- What is RCM and why should you use it?
- Expertise 1 : Process Chemistry, Plant Design
- Expertise 2 : Maintenance Management
- User case and how different outcomes pending the engineer's background.
- The macro and micro case – Asset Management & Maintenance Engineering
- Summation

Introduction

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Rickard Dalman

Maintenance Performance Manager

Always set up people for success. All the necessary conditions and circumstances to achieve the stated goals needs to be in place.

Board member of CIAM – Cluster for industrial Asset management
Chairperson for NORSOK/EG Z RE Reliability engineering and technology
Chairperson for SN/K 629 Critical minerals, metals and sustainable extraction

Introduction

COSL Drilling Europe AS

- ***Always do better* is our guiding principle, leading us through the energy transition and towards our vision of becoming the preferred supplier of drilling services. We are known for having the most efficient drilling units and a strong safety performance and culture.**
- COSL Drilling Europe is a Norwegian company that was established in 2005, with its head office located in Stavanger, Norway. The company is a provider of offshore drilling services, and offers safe, efficient and low-carbon operations.
- The first drilling operations started in Norway in August 2011 and COSL Drilling Europe has since then been drilling and completing wells in Norway, UK, Faroe Islands and New Zealand.
- Today we operate four modern drilling units, all operating in Norway. The drilling units are of a similar design and have proven strong and consistent performance deliveries.

COSL

What is RCM and why should you use it?

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What is RCM?

Reliability-Centered Maintenance (RCM) is a structured method for improving maintenance by finding the most effective tasks for each asset.

It focuses on preserving system function, ensuring safety, and enhancing reliability by examining how and why equipment fails. Based on failure mode data, RCM helps to find actions, or no actions, to prevent or mitigate each specific risk.

Benefits of RCM:

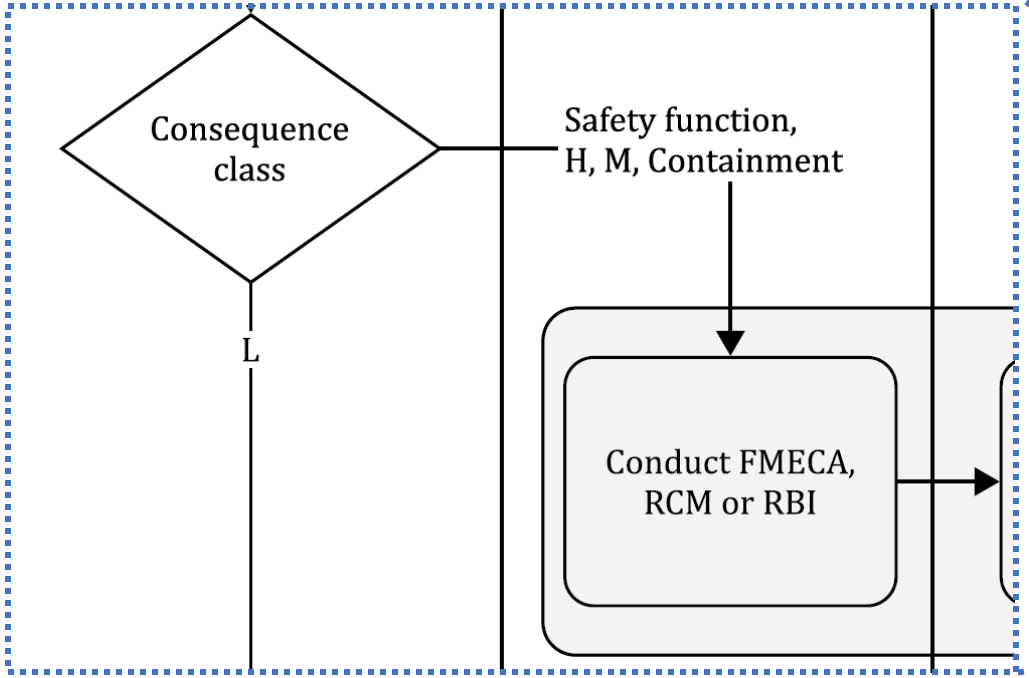
- Significant Cost Reduction
- Enhanced Asset Reliability and Uptime
- Improved Safety and Environmental Compliance
- Proactive, Data-Driven Decision Making

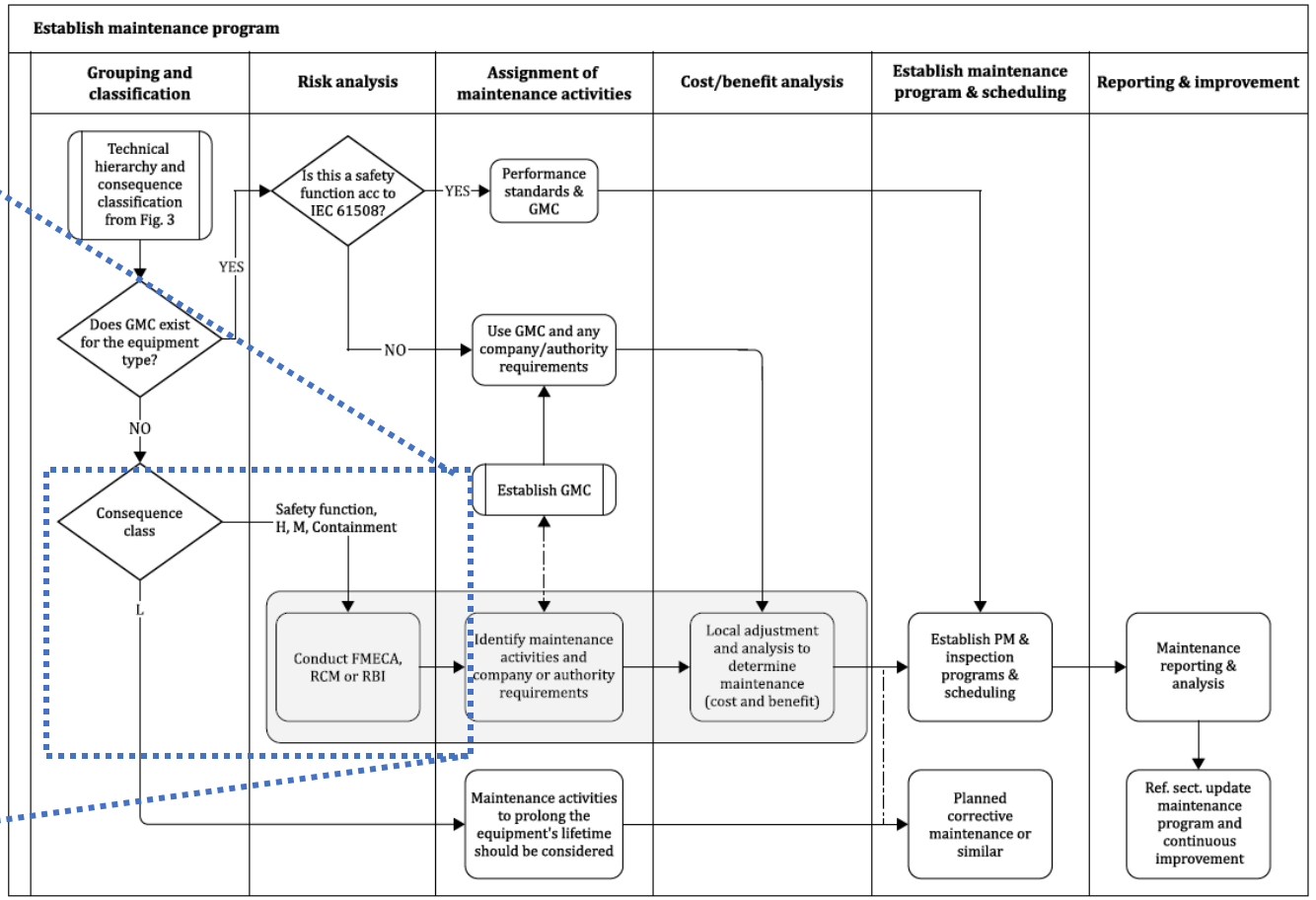
Challenges in RCM

- Cultural Resistance and Lack of Leadership Support
- High Resource and Time Intensity
- Poor Planning and Scope Definition
- Technical and Skill Gaps
- Failure to Implement the Results

What is RCM and why should you use it?

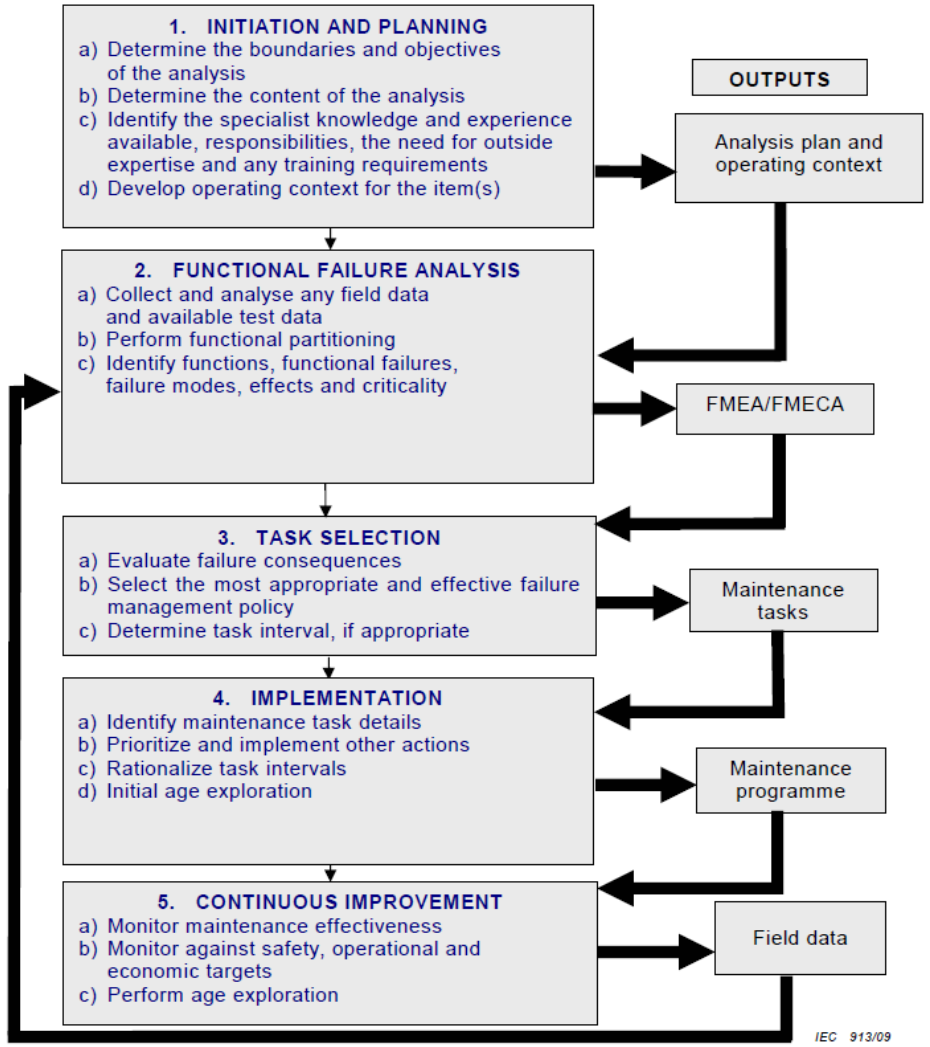
- Z-008:2024 Recommends an FMECA-RCM approach to maintenance significant items which has a medium or high value in consequence classification.





NORSOK Z-008:2024

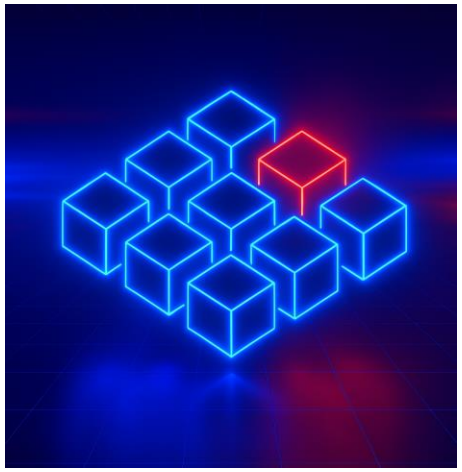
What is RCM and why should you use it?



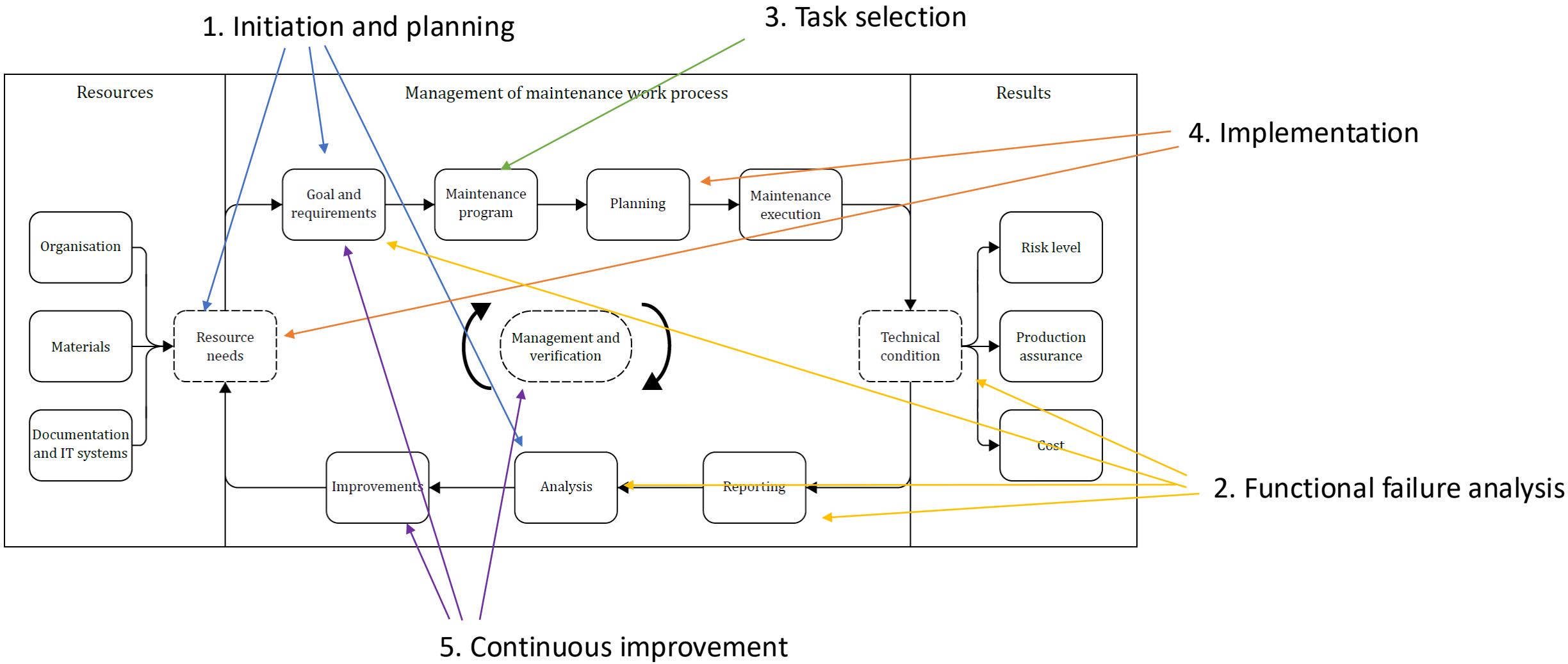
BS EN 60300-3-11:2009

The RCM Process consists of five main steps:

1. Initiation and planning;
2. Functional failure analysis;
3. Task selection;
4. Implementation;
5. Continuous improvement.



What is RCM and why should you use it?



Expertise 1 : Process Chemistry, Plant Design

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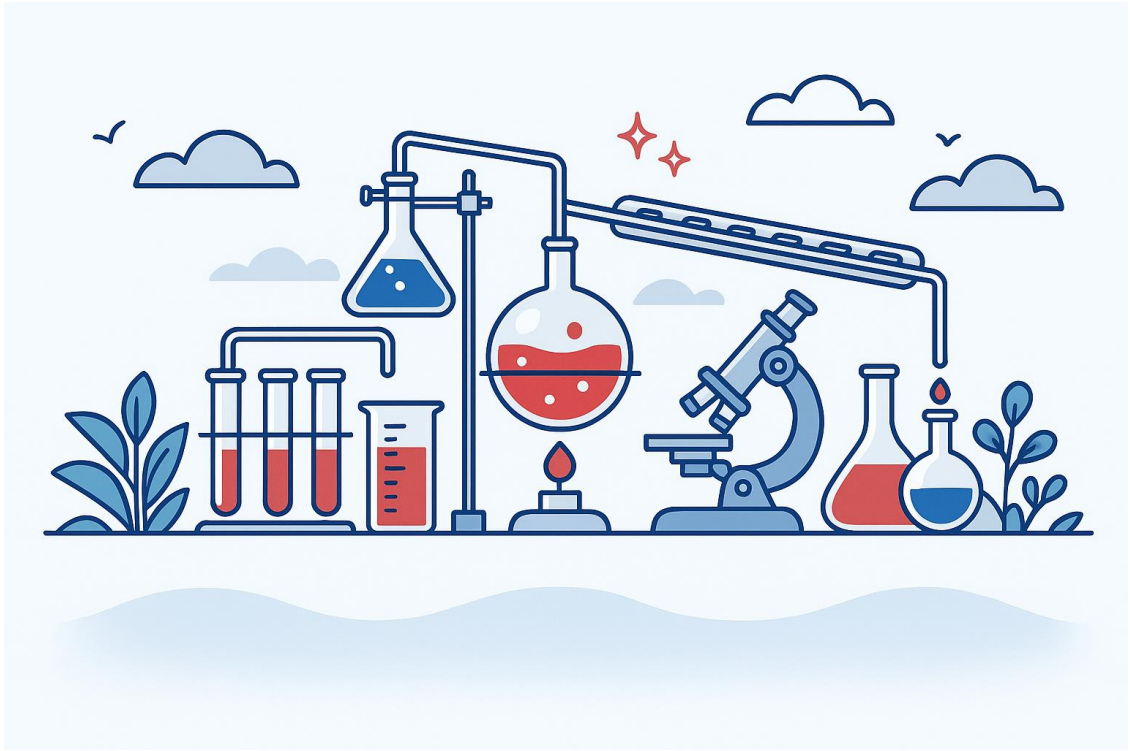

The Process Engineer's key Skills

- **Process Development and Optimization**
- **Engineering and Technical Design Support**
- **Troubleshooting and Analytical Skills**
- **Regulatory and Documentation Skills**

A chemical process engineer develops and refines scalable, safe, and sustainable chemical processes by designing and modeling equipment and chemical flows, troubleshooting process issues with analytical methods, and ensuring all work meets regulatory and documentation standards.

Expertise 2 : Maintenance Management

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The Maintenance Engineer's key Skills

- **Consequence Classification and Risk Assessment**
- **Maintenance Program Development and Optimization**
- **Technical Barrier Management**
- **Data-Driven Maintenance Management**

Maintenance and reliability engineering involves assessing equipment risk and consequences, improving preventive maintenance programs, safeguarding safety-critical barriers, and using data-driven insights from CMMS and KPIs to continuously improve maintenance performance and prevent failures.

Rust Particles in VRU Inlet Filter – Vapor Recovery Unit

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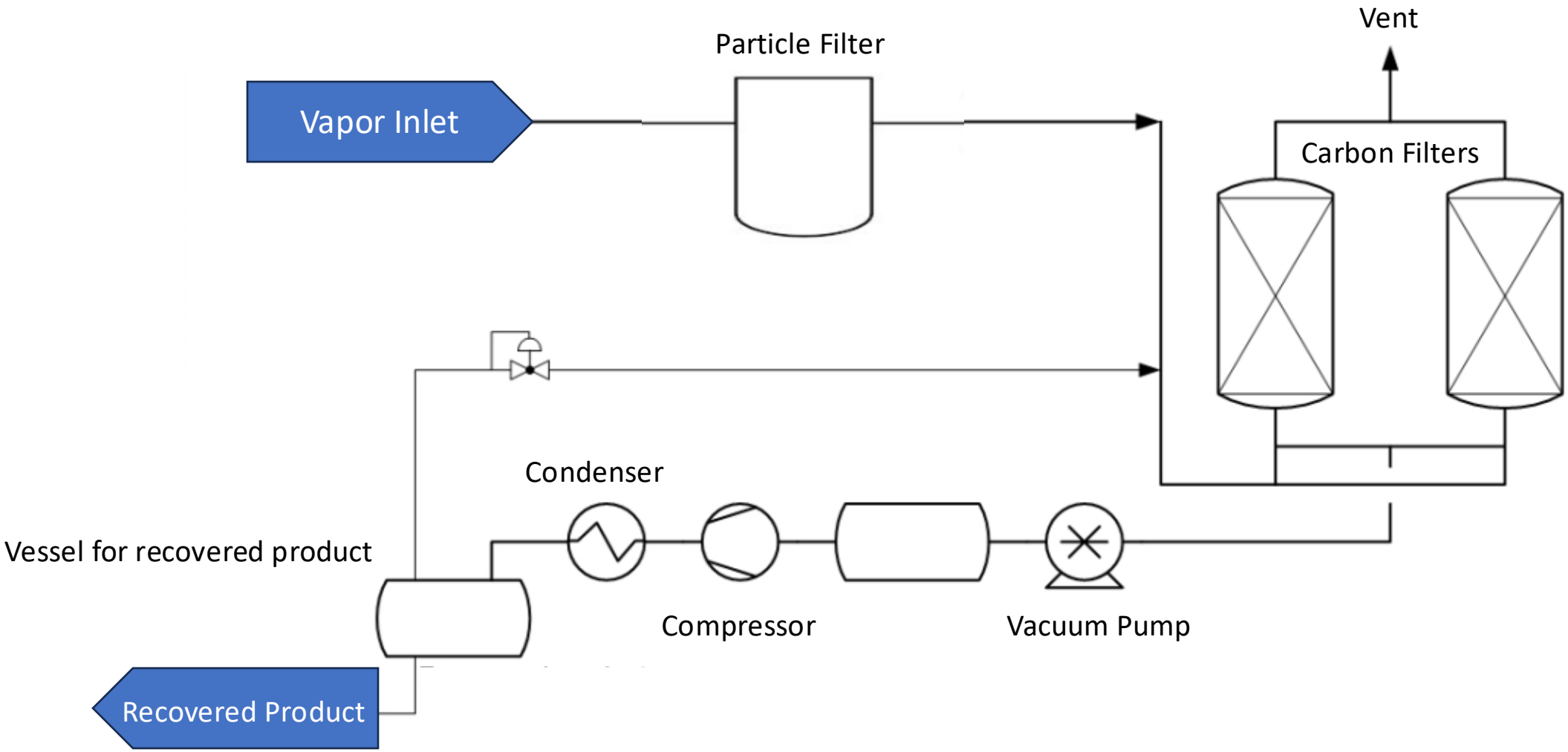

User case and how different outcomes pending the engineer's background.

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The case:

- Upgrade of loading flow of gasoline , 1000m3/h --> 1500m3/h
- Particle filter before VRU clogged up several times during one loading as compared to months previously.
- Problem disappeared when loading at lower flows.
- Ask the technicians to collect a sample for the filter during cleaning

User case and how different outcomes pending the engineer's background.

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There are three reasons why the movement began when increasing the loading speed to 1500 m^3/h:

- **Boundary layer breakthrough:** Right next to the pipe wall, the air is almost stationary (the boundary layer). Small particles are protected here. When the velocity increases, this layer becomes thinner, and the turbulent eddies reach the particles and “tear” them loose.
- **Saltation (hopping motion):** At 1000 m^3/h the particles may have been rolling along the bottom, but at 1500 m^3/h they receive enough lift to begin hopping. Once a particle hops and lands, it knocks loose other particles, creating a chain reaction.
- **Turbulent kinetic energy:** The lifting force in a gas is proportional to the square of the velocity (v^2). The increase from 1000 to 1500 m^3/h is a 50% increase in velocity, but it provides a full 125% more force to lift the particles.

User case and how different outcomes pending the engineer's background.

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Maintenance Engineer's solutions:

Increased frequency in filter change: Transitioning from a fixed calendar schedule to a more frequent preventative maintenance program to ensure filters are replaced before they reach a critical clogging state that causes system stress or failure.

Introduction of redundancy: Duplicating filter units (e.g., parallel filter banks) so that one unit can be taken offline for cleaning or replacement while the other maintains continuous system operation.

Staged Filtration: Implementing a series of filters with decreasing pore sizes, using a coarse pre-filter to remove large debris and reduce the load on the expensive final-stage filters.

Install pressure sensors: Utilizing differential pressure (DP) sensors to monitor the rise in resistance across the filter, allowing for condition-based maintenance and automated alerts when a specific clogging threshold is reached.

User case and how different outcomes pending the engineer's background.

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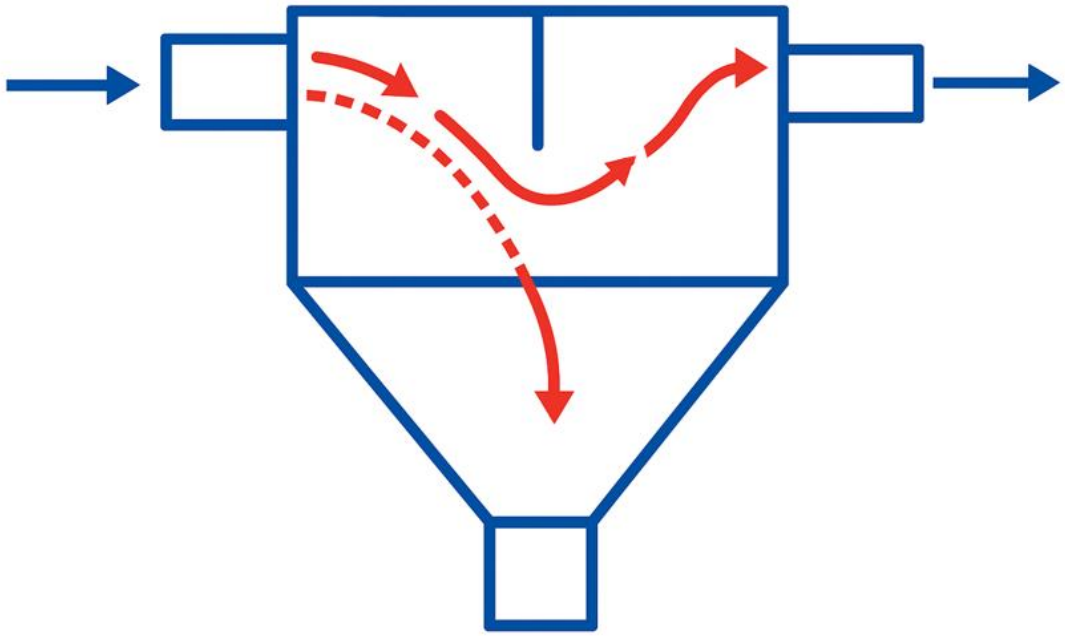
Process Engineer's solution:

Decreasing Fluid Velocity: When the flow drops below the "impact threshold" (the speed needed to keep particles moving), saltating particles lose energy and settle. By expanding the gas stream in a settling chamber to significantly reduce its velocity, allowing larger, denser particles to settle out of the air under the influence of gravity and collect in a hopper.



User case and how different outcomes pending the engineer's background.

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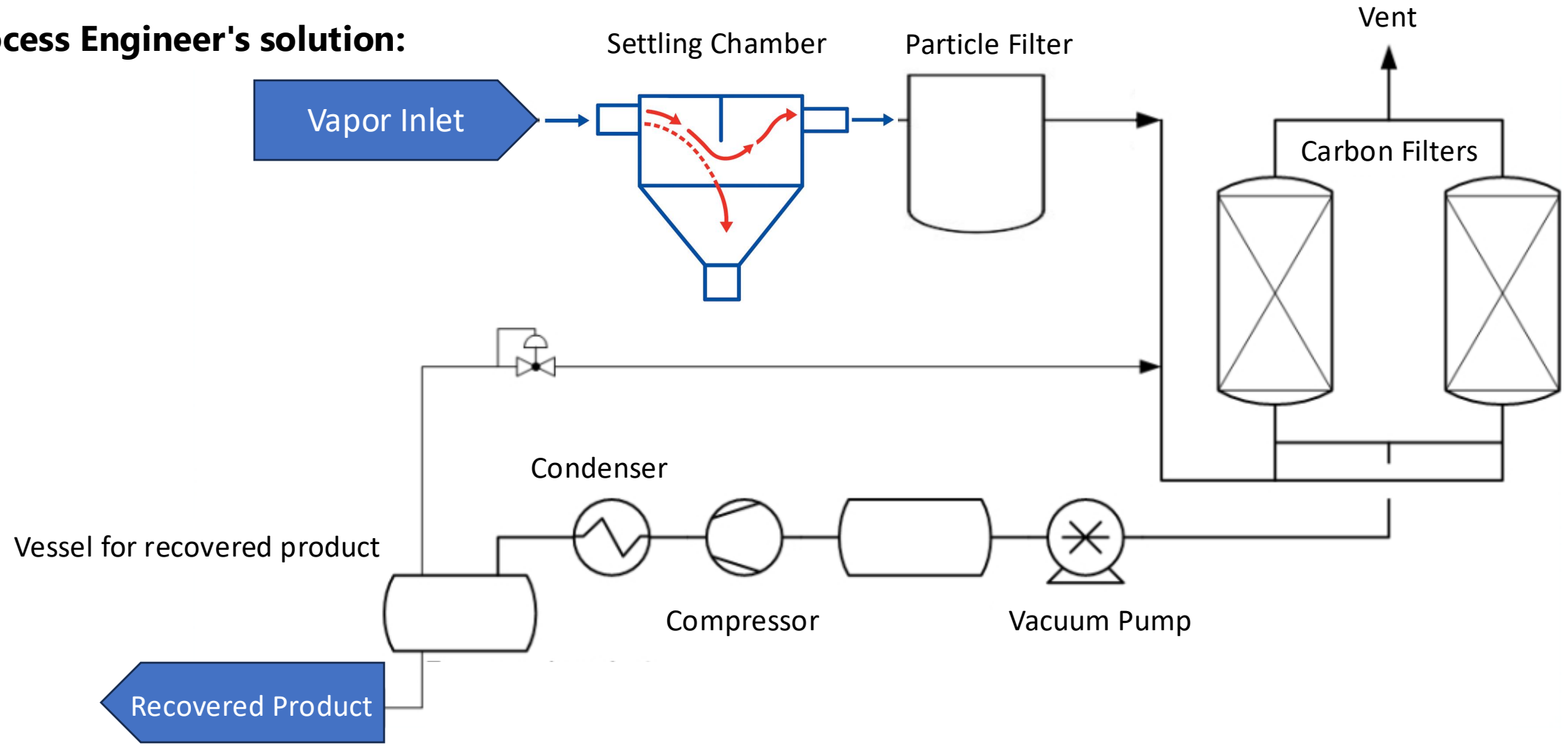
Process Engineer's solution:

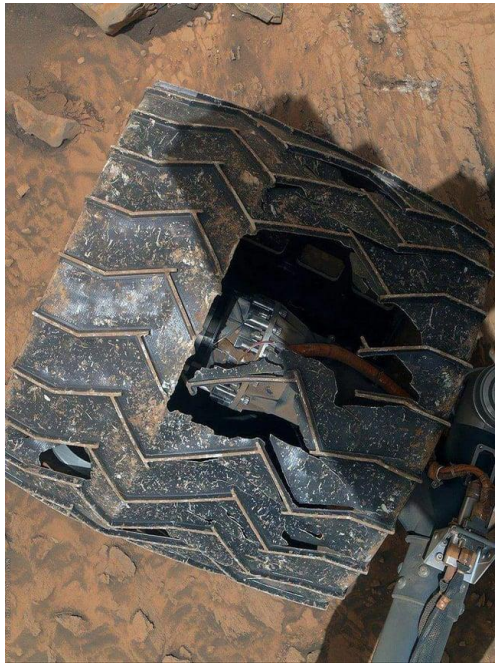


The macro and micro case – Asset Management & Maintenance Engineering

- Single manual instances are costly and time consuming, always reactive with few exceptions
- Use CMMS data to automatically find and visualize the best candidates for RCM improvements, more proactive approach
- The Devil's in the details and precision matters. Failure mode and work order data must be of high quality and standardized

Summation

- RCM – A well-established method to systematically improve maintenance programs and reliability.
- The teams background and tools have a massive impact on end results
- For this to be effective you must work at macro scales



NASA

Curiosity

Perseverance

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QUESTIONS


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