Allianz

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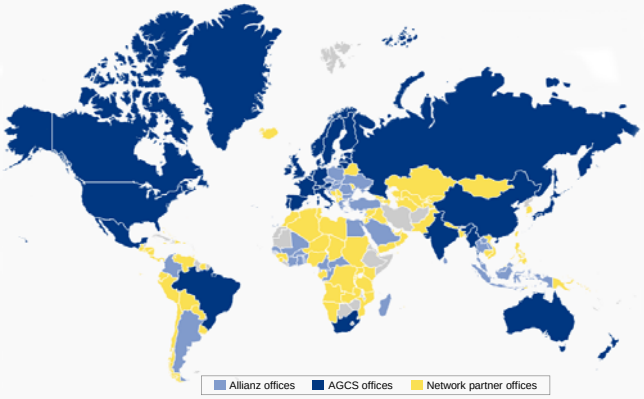
The Allianz Network

Combining one of the largest own-office networks with carefully selected partners, Allianz Global Corporate & Specialty provides a truly global reach.



Our expert team of risk engineers offer clients a wide range of technical qualifications and in-depth industrial know-how.

For details on our global network, please visit www.agcs.allianz.com/global-offices

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Capabilities …

The worldwide network of Allianz Risk Consulting (ARC) consists of more than **260** of some of the insurance sector's most seasoned risk engineers. Allianz risk consultants are experts who come from the industries of our clientele, and represent a wide range of technical and scientific disciplines. As a result, our strength is offering customized client solutions borne out of industry expertise.

Services are available in all industrial sectors and risks, including:

- Aviation
- Energy
- Engineering
- Liability
- Marine
- Property
- Special & Emerging Risks

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Allianz Centre for Technology

Drawing on eight decades of lessons learned to manage future challenges.

ARC offers a type of expertise and service package unique to the industry. The Allianz Center for Technology (Allianz Zentrum für Technik, or AZT) is an arm of ARC and a unique institute in the insurance sector.

Based on technical evidence, the AZT helps our clients assess and prevent losses through meticulous, impartial damage research, and guides them in their management of industrial safety operations.

When working with ARC and the AZT, you get 80 years of damage analysis and prevention engineering in your corner. There is simply no better way to prepare for the unexpected!

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Property

Worldwide risk engineering solutions that consider all the angles on a case-by-case basis.

Our expert team of more than 100 property risk engineers offer clients a wide range of technical qualifications and in-depth industrial know-how. The focus of our services is improving risks by working in partnership with clients.

Our services are as diverse as our clients

ARC Property offers comprehensive risk engineering specified to each client and project.

Key services include:

- Global location data management systems
- Global Risk evaluation & assessment tool – Great
- Reviews of loss-prevention management programs
- Business Interruption (BI) & supply chain analysis
- Site audits & surveys
- Plan Review, testing & commissioning of fire protection systems
- Review of maintenance concepts
- Training & knowledge transfer

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Engineering

In-depth and specialized consultancy in all areas of the global engineering markets.

More than 50 engineering risk consultants from across the global Allianz network are available to our clients that can provide expert insight into the following market segments:

Market Segments – CAR – EAR & machinery breakdown

- Oil & gas
- Power plants
- Renewable energies
- Heavy industries
- Electrical engineering
- Building & construction
- Heavy civils (large infrastructure projects)

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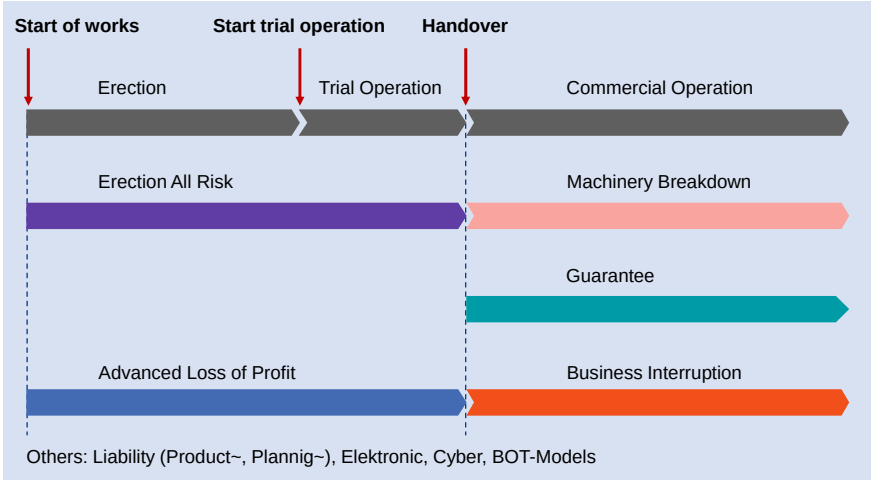
Erection, Assembly & Operation vs. Insurance options



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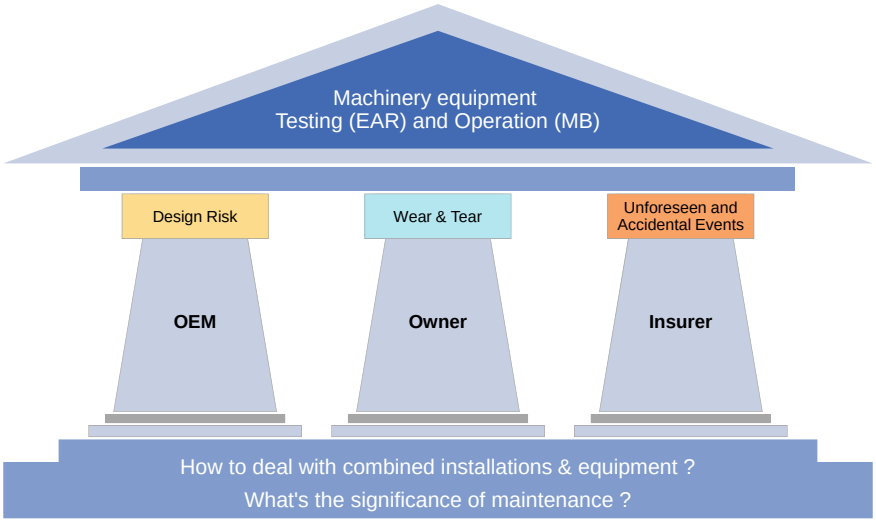
The Role of Insurance – Risk Sharing Model



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Machinery Breakdown-Insurance-Coverage

"(…) suffer any **unforeseen** and sudden physical loss or damage from causes such as defects in casting and material, **faulty design**, faults at workshop or in erection, **bad workmanship, lack of skill, carelessness**, shortage of water in boilers, physical explosion, tearing apart on account of centrifugal force, short circuit, storm, or from any other cause not specifically excluded hereinafter, in a manner necessitating repair or replacement (…)

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Machinery Breakdown-Insurance-Exclusions

Exclusions

- (…) Loss or damage arising out of the willful act or **gross negligence** of the **Insured or his representatives (…)"**

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Machinery Breakdown – EAR Insurance

Exclusions

- " (…) Loss or damage for which **a supplier, contractor or repairer** is responsible either by law or under contract (…)"

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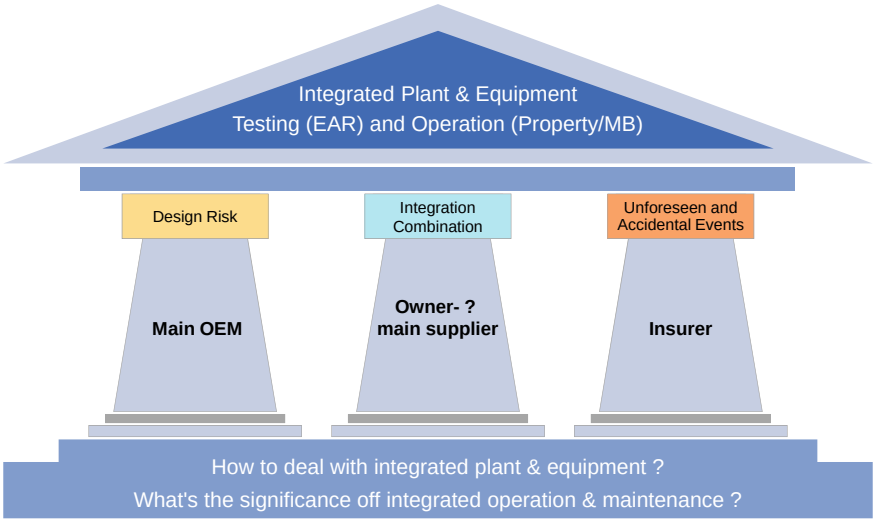
The Role of Insurance – Risk Sharing Model – Integrated plant



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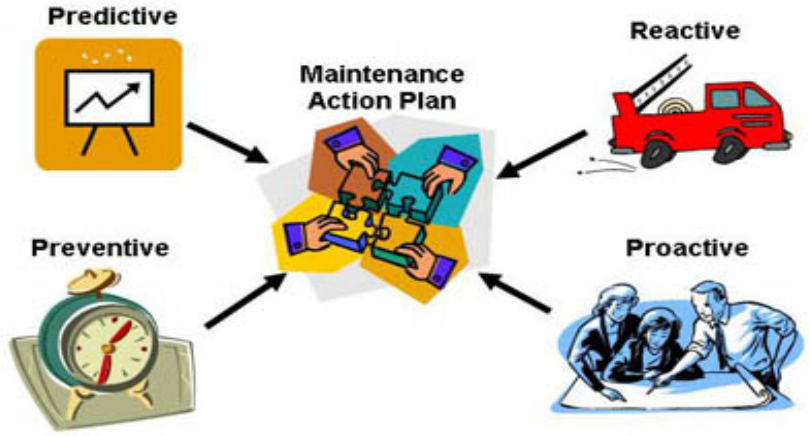
Types of Maintenance



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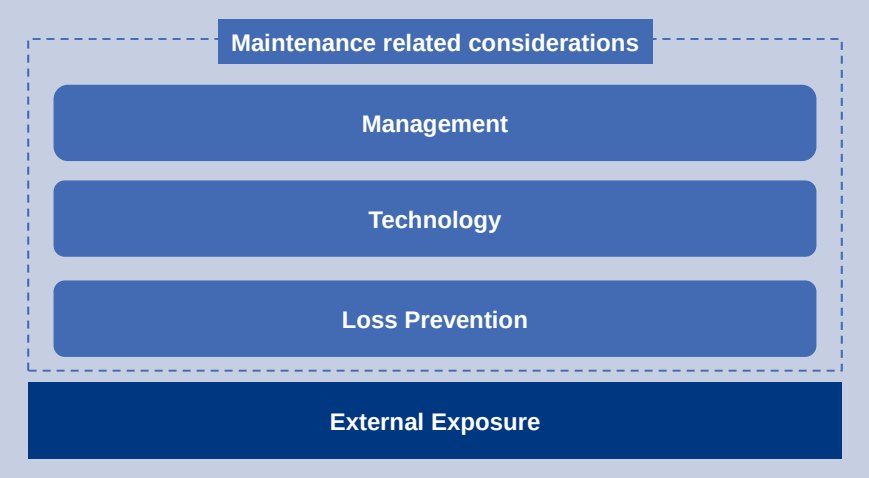
Insurance Perspective: “Good Ownership” & Maintenance



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Risk considerations – Plant & Equipment

Management: Maintenance Aspects

- ✓ **Maintenance Organisation**
  Procedures, site resources
- ✓ **Maintenance Budget**
- ✓ **Staff Qualification and Responsibilities**
- ✓ **Maintenance KPIs**
  Availabilities, efficiencies, Health and Saftey
- ✓ **Information Management**
  Lessons learned, non conformance, service bulletins, manuals
- ✓ **Management of service providers**

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Risk considerations – Plant & Equipment

Technology: Maintenance Aspects

- ✓ **Field and Loss Experience, Fleet Issues (OEM, Plant)**
- ✓ **Technology Level**
  Complexity, redundancies, techn.issues
- ✓ **Equipment and Plant layout and design**
- ✓ **Operation Parameters**
- ✓ **Maintenance Service Providers**

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Risk considerations – Plant & Equipment

Loss Prevention: Maintenance Aspects

- ✓ **Handling of maintenance and loss history**
- ✓ **Level of Condition Monitoring**
- ✓ **Spare Parts Availability- infrastructure – import?**
- ✓ **Standard of Documentation**
- ✓ **Standard of quality control**
- ✓ **Access/Logistics (internal/external)**

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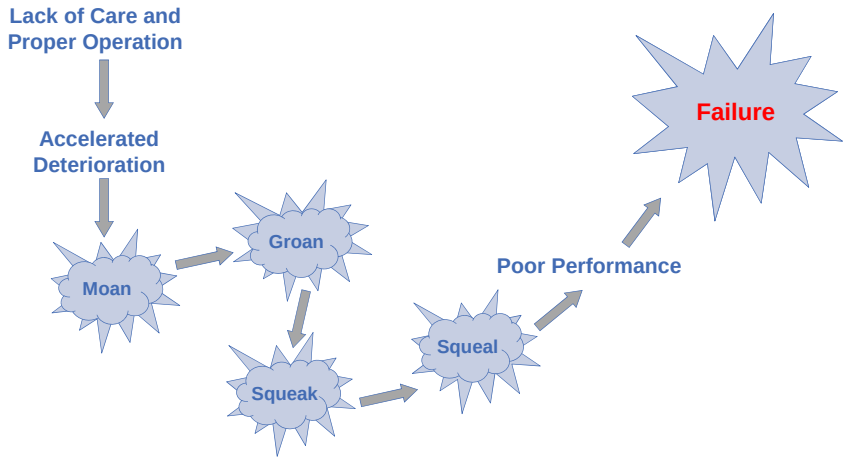
Factors for Rating Maintenance

The Root Cause of Failure and the Impact of Ownership



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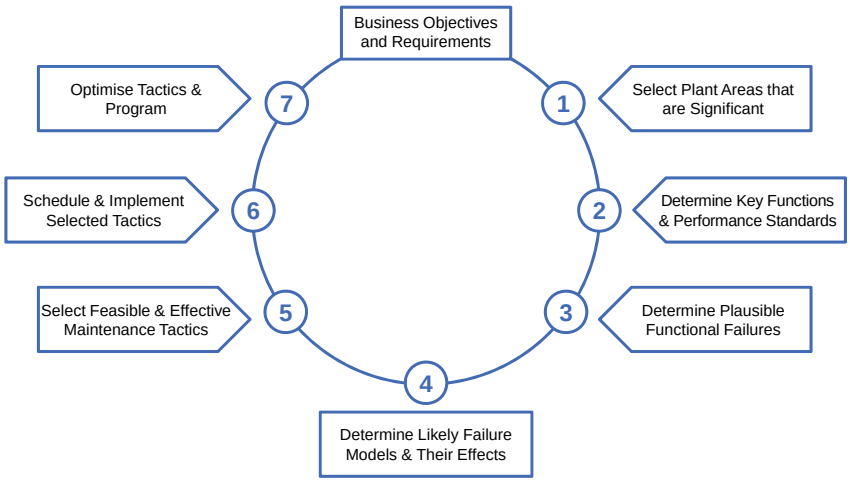
Reliability Centred Maintenance

The Seven Logical Review Steps



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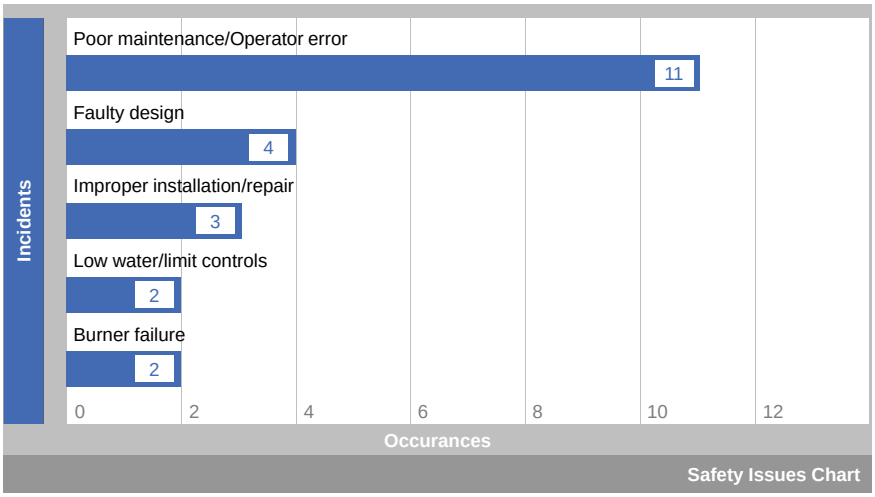
Example – Reactive Maintenance – Reported Boiler Incidents



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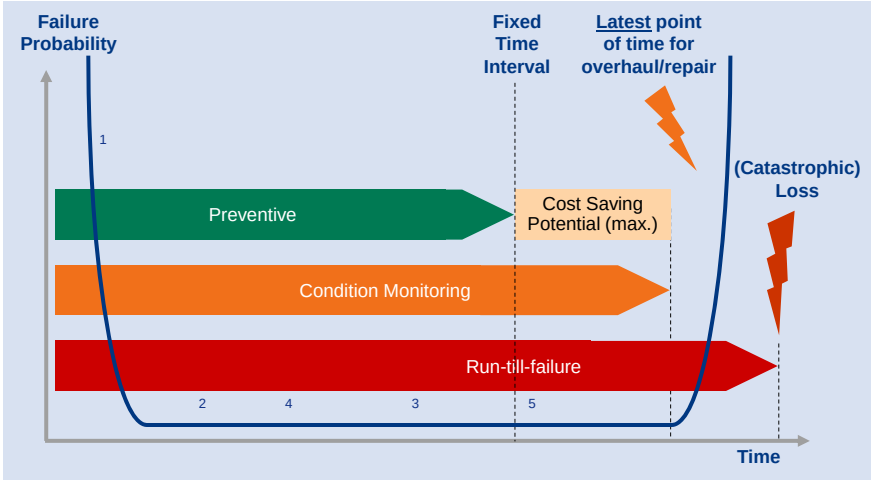
Maintenance Concepts and Risk



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Example1 – Edible Oil Refining – Main Overhaul

Incident : Fire during overhaul

Situation:

1. Fire by self igniting of light oil-fractions in column
2. Systems not fully cooled down
3. Heat exchanger in column not disconnected
4. Consequences: Distilling column heavily damaged, to be fully disassembled; 3 months stand still

Cause? : Process manual & Shut-down procedure- adequate, (not) clear, (not) followed? Description (in)

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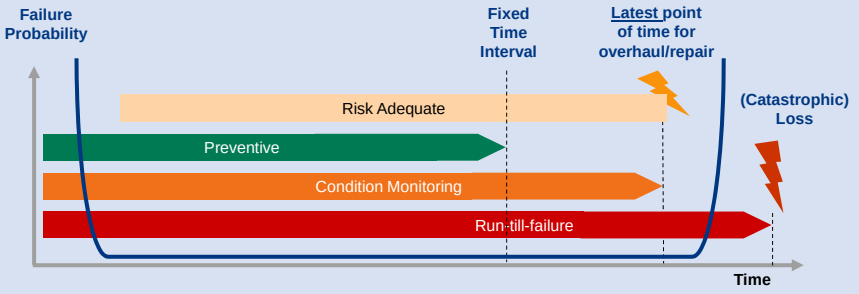
Lessons Learned – Maintenance and Risk

- Proper procedures & Maintenance have a significant impact on the risk
- **Risk adequate Maintenance** is an important precondition for safe & efficient operation and related insurance
- The maintenance and refurbishment concept is preferably subject to an open dialog between operator and the OEM manufacturers, service providers and last but not least insurance

Risk adequate Maintenance = condition, knowledge and prediction based



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Example 2 – Creep Damage

Pipe diameter 300 mm
20 bar, 530 °C

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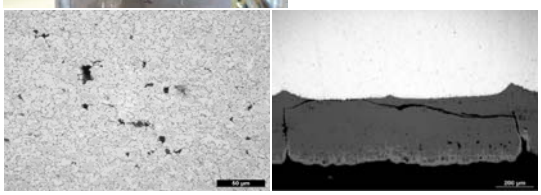
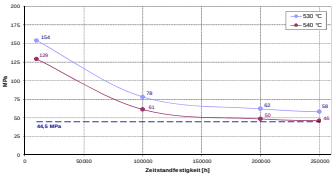
Creep Damage

Identifying and monitoring the critical components is crucial

- Extension of pipe diameter
- Microstructure with creep damage characteristics
- Oxide layer thickness corresponsds to operation time
- Calculated end of life time

➔ Pipe was subjected to steam for complete operation time of plant!





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Determining the Adequacy of Maintenance

1	What is the potential of equipment failure to endanger or threaten personnel safety?
2	**Manufacturers' service manual should provide detailed recommended practices and procedures**
3	**Complexity of the equipment integration**
4	Operating environment vs. **Operating load conditions and equipment rating**
5	Unusually expensive equipment repairs- availability of " critical" parts
6	Equipment condition vs. **Production and operating schedules**
7	Failure and repair of damaged equipment causing extensive downtime and lost availability i.e. production $$ – recommended critical spare parts
8	Ability to take equipment out of service
9	Failure history
10	**Inspection history**

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Conclusion

Risk adequate maintenance is a major factor for efficient and safe long-term operation with acceptable risks.

- Reliable Operation & Maintenance starts with the appropriate design. Responsibility of assembled machinery – operational & maintenance manuals – is with the „ final" supplier – classified as the OEM.
- Knowledge transfer about the plant set up, interaction and required operation instructions from OEM to the Owner is most important
- The overall Maintenance concept is to be balanced with the expected operational load – the integrator/assembler and knowledgeable owner have to work together.
- Maintenance is a balance between the suggestions of the OEM (described in the OMG) and the objectives of the user/owner

The maintenance documentation guideline (OMG) is expected to streamline this process

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Contact

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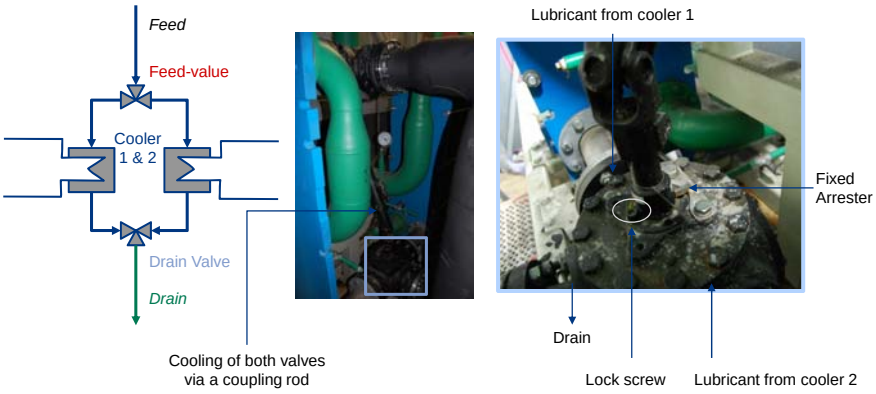
Example: Damage in a gas turbine due to missing labelling- inadequate instructions at the lubricant cooler (1)

Application of two lubricant coolers due to a river-water cooling

- Manual switch over for decreasing cooling capacity



Example: Damage in a gas turbine due to missing labelling- inadequate instructions at the lubricant cooler (2)

Intact fixed arrester at sister machine

Deformed fixed arrester at damaged gas turbine

Due to missing labelling, the operating staff didn't knew the direction to turn the coupling bar. Thus, the (too small) fixed arrester was deformed.

- Interruption of the lubricant supply
- Bearing damage leads to sinking of the shaft
- Rubbing event within comp. & turb.

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Global Expert Groups- Property

Providing specific expertise to clients in industry sectors

Automotive (Vehicle Manufacturers)

Chemicals

Pharmaceuticals / Cosmetics

Technology (Semiconductor)

Telecommunications / Data Services

Food & Beverage

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Liability

Trusted risk consulting across all industries for one of the most rapidly growing areas of insurance.

To cover the wide range of sectors within Liability, we offer risk consulting services in the following areas:

Consulting Services

- Information & Communication Technologies
- Infrastructure
- Construction & professional indemnity
- Facility management
- Pharmaceuticals & clinical trials
- Products liability & recall
- Environmental liability
- Product tampering
- Employer's liability

Comprehensive Risk Dialogues

Research & development, supply chain, manufacturing, quality, licensing/partnership, distribution, promotion, post-market surveillance


Thank you