



# Maintenance requirements for new assets

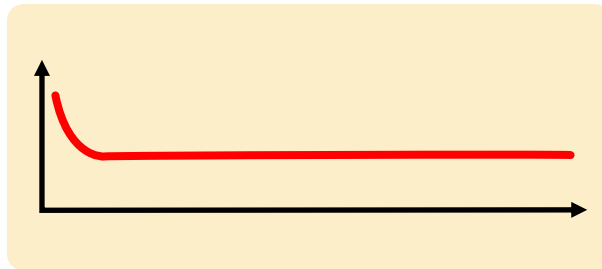
## Omaintec 2023

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# Case Study Presentation

- Most failures in maintenance originates from the design and construction
- "We will take the cheapest bid – regardless of the cost"
- Confirmation of the failure curve "Many failures in the start"



# Power plant intro

- Replacement of an old power plant
- Waste to energy plant
- 67 MW Power
- 247 MW Domestic heating
- Environmental requirements to - in particular waste water and fume gas
- On line 2017
- Business relation to the supplier managed by a standard contract
- The contractor almost collapsed during the commissioning

# After commissioning

- Problems with the waste water lines – (2 x 50%) – due to non compliance to the environmental requirements
- Stop of the production units
- Transport of the waste water by tankers to a temporary store – and return to the power plant



- One representative from the contractor on site 3 years after the hand over
- The power plant management asked for an overview of the reliability on the waste water lines

# Assessment of the reliability on the waste water lines

- Data from operation event log was present
- Data from the CMMS was existing – not necessary complete.
- Performed a FMECA process on all the units in the WW plants
- 3 months analysis effort
- Produce a list of tasks to increase the reliability

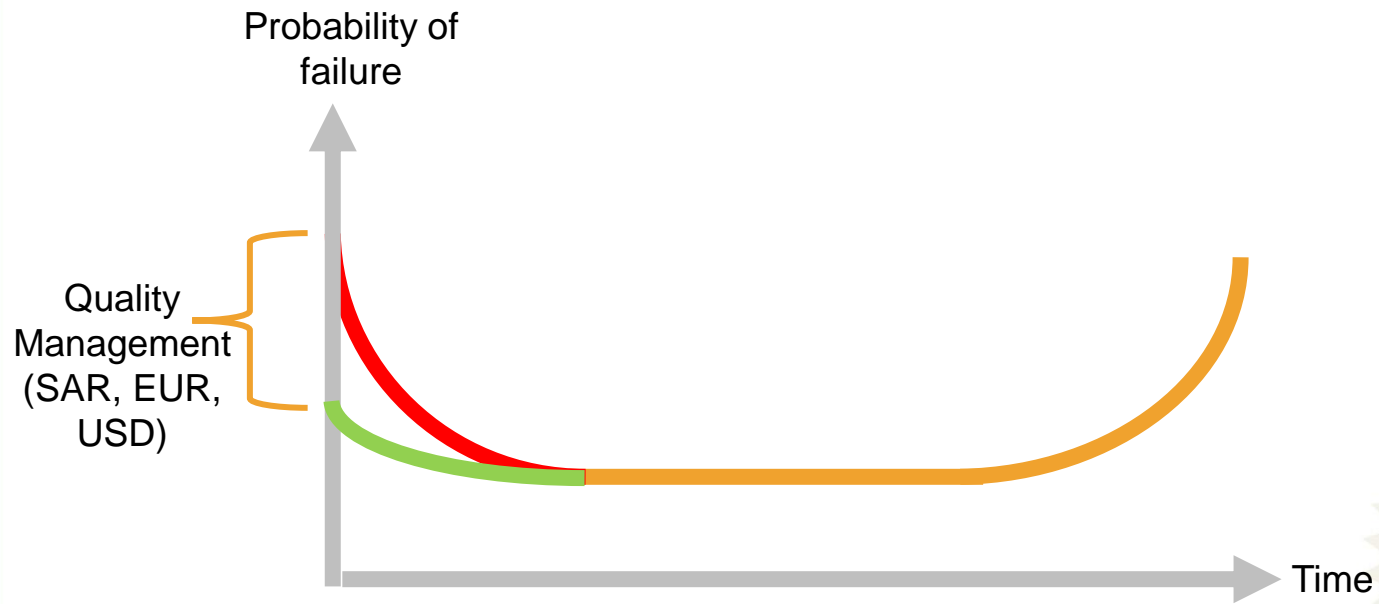
# Findings – Highlights

- Design review by the maintenance professionals from the w.w. units
- Isolator valves was missing – stop on one line requires both lines to be out off service
- MTBF on one pump was 14 days and one day to repair – positioned under a tank with poor accessibility
- Control valves of a poor unreliable design
- pH control sensors with a high failure rate
- Electrical motors – and other assets - subjected to spray from waste water and chemicals
- Dead legs in piping causing congestions
- Design material not suitable for the operation conditions. (mild steel and galvanised steel in a corrosive environment)
- Risk of safety and health consequences for the staff
- Poor accessibility to equipment (valves)
- High priority findings mounted to 1 mio. Euro – must be compared to the down time cost on the w.w. units.

# Findings – Easy winners

- Very few new or adjusted Preventive Maintenance plans
- Flushing system for pH electrodes
  - (Record of pH dip per time unit)
- Maximal timeout for the opening time for valves (Unrealistic open time)
- Continuously flow in the waste water cleaning process

# How could this be avoided?





# How could this be avoided?

A strict and robust quality management process starting at the project proposal phase:

- Design review by the maintenance professionals (Isolator valves, material of construction, access to equipment for maintenance professionals such as platforms and permanent ladders)
- Ask for MTBF for the most used equipment's – for reliability modelling
- Test of the equipment during operating conditions
- Sound engineering practices (SS bolts as opposed to galvanized bolts)
- "Flush back" valves to be installed
- Avoid dead legs in the drain piping
- List of preferred components, materials and practices (experience based)
- Use existing guideline for access to the equipment
- Describe the op. test - and then make the requirements.
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Thanks to the client



# Questions and Comments?



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