



Case Study

My First RCA

I had been working within the Manufacturing Technology team on site and was studying the Pareto of top ten production losses due to equipment failures.

Within the top ten was a critical centrifugal pump that had contributed to 88 hours lost production over the previous 16 months.

Operating Context:

The pump was required to operate 24/7, however, it was not continually pumping to production but was required to run through a kickback line. The nature of the product being pumped meant steam jacketed pipework was required to keep the product in solution.

A design change had been implemented the previous year which included a new 3 way valve

which allowed switch over from production flow to kickback using automated control.

A new design double cartridge seal was also installed on the pump complete with steam flush.

Summary:

This was the first of many RCA's that I facilitated during my time with ICI. It became evident to me very quickly what the power of RCA can bring to an organisation. My passion for problem solving and defect elimination grew to such an extent that I became an accredited RCA facilitator.

Since my first RCA back in 1997 I have facilitated investigations globally as well as training hundreds of people in the principles of Root Cause Analysis.

Here at Pro-Reliability Solutions Ltd (PRS) we cover 5 Whys, and Causal Factor Analysis.

If you would like further information, require support with your own Root Cause Analysis process, or would like to have a chat about starting your own RCA journey within your business then please do get in touch. We would be happy to help.

The Root Cause Analysis Report

Report Ref No

Equipment Number 3J24	Equipment Name Soda Carbonate Pump	Date April 1997
Date of Failure(s) Dec 95 – Apr 97	Downtime Production Loss 88 Hours	Owner G Tyne

Problem Statement

3J24 Pump is continually failing and has experienced 22 mechanical seal failures in 16 months. This pump is critical to production and runs 24/7, when this pump fails total production is lost.

Impact Statement

Cost of failure:

Labour = 88 hours @ £13/hr = £1144

Parts = £8052

Revenue Loss:

88 hours @ £4360 per hour = £383,680

Safety:

Potential risk of injury during unplanned maintenance activity

Reliability:

MTBF = 530 Hours MTTR = 4 Hours

The Analysis - 5W FB CF (highlight analysis type)

The RCA team were brought together and a Causal Factors Analysis (CFA) chart was developed to determine the root causes of pump failure.

Post-Its were used on a wall and we started with the 'Pump Failure' as our key cause. Through the development subsequent solutions were identified to prevent any further pump failures and increase the MTBF.

The Mechanical seal manufacturer was invited to the RCA and they provided evidence from previous seal failures

Solutions

Cause	Solution	Name	Due Date
Back Pressure on Mech Seal due to incorrect sizing of kickback line	Resize and replace kickback line and associated valves.		
Overheating of Mech Seal due to direct steam flush	Replace direct steam flush for thermosyphon and cooling fin arrangement		
Vibration of Mech Seal due to loose bed plate and damaged concrete plinth	Repair the concrete pump plinth and secure bed plate.		
Vibration of Mech Seal due to no alignment policy	Perform laser alignment policy on pump/motor		

Success Tracking – 6M – 12M – 24M (highlight failure free period)

All four solutions were implemented and visual monitoring of the pump and thermosyphon was carried out on a weekly basis initially for the first 3 months, followed by monthly checks.

The solutions were costed and a payback period of 3 months were achieved.

The pump ran for 11 months and 25 days before the first defect was identified.

The inner seal of the double seal had failed and product was seen within the thermosyphon sight glass. This was an early warning of failure and allowed us to stop the pump and replace the seal during the next planned outage.

The pump continued to operate with a new MTBF = 8030 hours.



Contact Pro-Reliability Solutions to see how they can support your Reliability Journey.

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