NorthStar Performance Improvement | Conger & Elsea Training & Consulting Solutions

PAPUC 2024 Virtual Pipeline Safety Seminar

Benefits of Root Cause Analysis

Introduction

- NorthStar Performance Improvement, previously known as Conger & Elsea, has been a training and consulting services provider to the utility industry since 1982.
- NorthStar's primary operations are providing training and consulting services in the areas of incident investigation and causal analysis, human performance, and safety culture.
- NorthStar's Principal Consultant since 2015 – Gene Cobey, President & CEO

Why Perform Root Cause Analysis?

- To preventing recurrence of the same or similar problem (e.g., accident or incident) with the same or more significant consequences
- To meet quality requirements
- To meet regulatory requirements
- To limit the organization's liability

What Is Root Cause Analysis?

Root Cause Analysis is a formal, systematic process used to identify the underlying causes of problems to facilitate the development of effective solutions that will prevent the recurrence of the same or similar problem.

Process

- Scope the problem
- Conduct an Extent of Condition evaluation
- Gather the facts (i.e., make relevant observations, conduct investigative interviews, review relevant records)
- Organize and analyze the fact set using appropriate analytical techniques to determine the cause(s)
- Conduct an Extent of Cause evaluation for each root cause
- Develop a corrective action plan to address the identified cause(s)

Types of Causes

- ***Direct Cause*** – The final action or condition that brings about the failure, incident, accident, or problem.
- ***Contributing Cause*** – Those actions, conditions, or events that have increased the likelihood or severity of the problem but did not have to be present for the problem to occur.
- ***Root Cause*** – The basic reason(s) (e.g., hardware, process, or human performance) for a problem, which if corrected, will preclude repetition of that problem.

Root Cause Analysis – Key Attributes

- Thoroughness
- Fairness
- Efficiency
- People, Plant, and Procedures
- Safety Precedence Sequence
- Overt Management Support

Root Cause Analysis – Analytical Techniques

- Event & Causal Factor Analysis
- Fault Tree Analysis
- Change Analysis
- Hazard-Barrier-Target Analysis
- Human Performance Analysis
- Why Staircase
- Management Oversight and Risk Tree (MORT)

Benefits of Root Cause Analysis

Improved Performance

- Safety
- Environmental
- Operational / Quality
- Financial

Organizations that effectively employ Root Cause Analysis will identify and resolve latent vulnerabilities in management systems and controls to prevent future problems.

Case Study – Pipeline Rupture

Scenario – A high pressure distribution steel gas main line suffered an underground material failure at a girth weld.

Operator initially identified welder workmanship as the cause of the failure.

Case Study – Pipeline Rupture (Cont.)

Independent Root Cause Analysis Results:

Direct Cause – Excess bending stresses induced during construction activities.

Root Cause – Operator did not establish and implement controls for conduct of construction activities including, in part:

- Procurement contractual controls did not establish training and qualification requirements for performance of the contracted activities.
- Procurement contractual controls did not establish vendor requirements governing expected response to instances where the contracted activity was not covered by the Operator's governance.
- Adequate procedural governance for the contracted construction activity did not exist.
- Inspection plan and acceptance criteria for the contracted construction activity did not exist.

Case Study – Pipeline Rupture (Cont.)

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Contributing Causes

- Contractor weld inspection activities and Operator oversight of welding activities was less than adequate to ensure that contract welder workmanship issues were identified.
- Operator had not established and implemented an accountability model which resulted in some staff and managers not understanding the importance to adherence to standards and not taking ownership or feeling a sense of responsibility for work conducted by vendors.
- Operator did not have a formal problem identification and resolution process that ensured the organization identified issues at a low threshold, prioritized and evaluated according to their risk and safety significance, and effective action taken to address issues in a timely manner.
- Operator had not established and implemented standards and expectations for development or periodic review of procedures.

Case Study – Pipeline Rupture (Cont.)

Contributing Causes (Cont.)

- Operator had not effectively established standards and expectations and/or required adherence to standards and expectations for procedure use and adherence.
- Operator had not established a flow rate alarm to alert the operators to unexpected changes in flow on the high-pressure distribution main which delayed identification of the leak and response to the failure.

Benefits of conducting a Root Cause Analysis for this event – Latent vulnerabilities in the Operator's management systems and controls were identified, and subsequently corrected which significantly reduced the likelihood of similar future events.

Question & Answer

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