



01



IDENTIFY EVENTS

Identify undesirable events in the facility using human and digital data.

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ROOT CAUSE ANALYSIS PROCESS STEPS

A systematic approach to uncover the true causes and drive lasting improvement.



01

IDENTIFY EVENTS

Identify undesirable events in the facility using human and digital data.



02

PRIORITIZE EVENTS

Identify the chronic events that account for 80% of the losses within the facility.



03

BUILD TEAM

Establish a cross functional team and appoint an unbiased RCA Facilitator.



04

COLLECT DATA

Gather data within the facility to validate the hypotheses put forth by the team.



05

ANALYZE

Leverage a logic tree approach that will guide the team in assessing root cause hypotheses and utilize data to validate each hypothesis.



06

COMMUNICATE ACTIONS

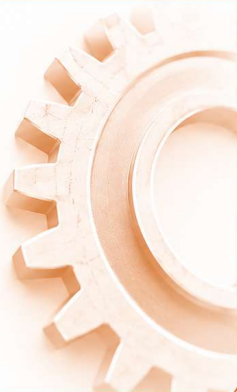
Convey RCA findings and corrective actions to stakeholders to ensure root causes are addressed.


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TYPES OF EVENTS

SPORADIC	CHRONIC
 • Urgent • Infrequent • Time Consuming • Costly • Often Used as RCA Triggers 	 • Routine • Frequent Occurrence • Quick Fix • Not Individually Costly • Rarely Used as an RCA Trigger 

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What is a Trigger?



A defined set of criteria that determines when a **Root Cause Analysis** must be performed



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PROS AND CONS OF RCA TRIGGERS

PROS	CONS
 Ensures consistency in problem-solving on significant issues	 Can generate excessive workload
 Supports data-driven decisions	 Risk of "checkbox RCA"
 Strengthens compliance and audit readiness	 May be seen by the workforce as punitive
 Aligns resources with significant issues	 Risk of focusing only on triggered events and ignoring chronic events

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EXAMPLE TRIGGERS FOR A PAPER MILL

-  SAFETY RECORDABLE INJURIES
-  ENVIRONMENTAL EXCURSIONS
-  8 HOURS UNSCHEDULED DOWNTIME on any major process area (C1, C2, C8, Power, Recovery, Fiberline)
-  UNSCHEDULED MECHANICAL OR ELECTRICAL REPAIR where costs exceed \$100,000 in maintenance expense
-  REJECTS GREATER THAN 250 TONS for a single event
-  BOILER TRIP FOR RECOVERY BOILERS (1 OR 2) or POWER BOILERS (1 OR 9)
-  MANAGER INVOKED



These triggers help identify significant events that require deeper root cause analysis.

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RCFA TRIGGERS BY AREA
Inspired by life





PULP MILL / U&R TRIGGERS	WOODYARD TRIGGERS	PAPER MILL TRIGGERS
RCFA shall be initiated when any of the following conditions are met:  1 Production Loss: An equipment failure resulting in 1/2 day of production loss (~25 lost cooks in batch digesters), whether caused by slowing back operations or fully shutting in a digester. Purpose: Ensures that production-limiting events affecting fiber output or overall mill throughput receive focused investigation to identify underlying process or equipment vulnerabilities.  2 Quality: An equipment failure resulting in 1/2 day off Quality for production. Purpose: Ensures that events affecting quality of production are analyzed such that the processes can be improved to design quality into production.  3 Repeat Failures: Any two (2) repeat equipment failures within a three-month period, regardless of immediate production impact. Purpose: Highlights chronic or recurring issues that may indicate deeper mechanical, procedural, or systemic causes requiring corrective action beyond repair.  4 Cost Impact: An equipment failure resulting in repair or replacement cost of \$200,000 or more. Purpose: Ensures that financially significant failures are analyzed to uncover preventable causes and improve cost-effectiveness of maintenance and asset management decisions.  5 Manager Evoked: A Manager may initiate a RCFA for any event that does not clearly meet a defined trigger within the applicable area but is judged to warrant deeper investigation based on professional experience, risk awareness, or business concern. Purpose: Empowers Managers to proactively drive learning and risk reduction by investigating emerging issues, near-misses, abnormal events, or recurring problems before they escalate into safety incidents, environmental events, or significant financial losses, recognizing that early intervention often prevents substantially higher future cost and risk exposure.	RCFA shall be initiated when any of the following conditions are met:  1 Unscheduled Maintenance Downtime: An equipment failure resulting in eight (8) hours or more of unscheduled maintenance downtime. Purpose: Ensures timely investigation of failures that disrupt woodyard throughput or delay chip delivery to the digester, impacting mill production and fiber balance.  2 Quality: An equipment failure resulting in 1/2 day off Quality for production. Purpose: Ensures that events affecting quality of production are analyzed such that the processes can be improved to design quality into production.  3 Repeat Failures: Any two (2) repeat equipment failures within a three-month period, regardless of downtime duration. Purpose: Identifies chronic or recurring issues that may indicate underlying mechanical, operational, or maintenance process weaknesses requiring long-term corrective action.  4 Cost Impact: An equipment failure resulting in repair or replacement cost of \$200,000 or more. Purpose: Ensures that high-cost failures receive structured analysis to determine preventable causes and reduce future financial exposure.  5 Manager Evoked: A Manager may initiate a RCFA for any event that does not clearly meet a defined trigger within the applicable area but is judged to warrant deeper investigation based on professional experience, risk awareness, or business concern. Purpose: Empowers Managers to proactively drive learning and risk reduction by investigating emerging issues, near-misses, abnormal events, or recurring problems before they escalate into safety incidents, environmental events, or significant financial losses, recognizing that early intervention often prevents substantially higher future cost and risk exposure.	RCFA shall be initiated when any of the following conditions are met:  1 Machine Downtime: an equipment failure resulting in eight (8) hours or more of unplanned machine downtime. Purpose: Ensures that production-interrupting events receive timely investigation to identify and eliminate root causes impacting continuous operation and product delivery.  2 Quality: An equipment failure resulting in eight (8) hours or more of off Quality for production. Purpose: Ensures that events affecting quality of production are analyzed such that the processes can be improved to design quality into production.  3 Repeat Failures: Any two (2) repeat equipment failures within a three-month period, regardless of production loss. Purpose: Detects chronic or recurring issues that may indicate systemic mechanical, procedural, or operational deficiencies requiring corrective action beyond repair.  4 Cost Impact: An equipment failure resulting in repair or replacement cost of \$200,000 or more. Purpose: Ensures that financially significant failures are analyzed to uncover preventable causes, improve asset life, and support more cost-effective maintenance practices.  5 Manager Evoked: A Manager may initiate a RCFA for any event that does not clearly meet a defined trigger within the applicable area but is judged to warrant deeper investigation based on professional experience, risk awareness, or business concern. Purpose: Empowers Managers to proactively drive learning and risk reduction by investigating emerging issues, near-misses, abnormal events, or recurring problems before they escalate into safety incidents, environmental events, or significant financial losses, recognizing that early intervention often prevents substantially higher future cost and risk exposure.

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SPORADIC EVENTS



16 Hours of downtime in a major process area



Unplanned failure of a critical gearbox that exceeds costs of \$125,000



Plantwide power outage



Serious employee injury



Environmental Event



AI Image

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CHRONIC EVENT EXAMPLES



Pump 101 fails multiple times a year



Numerous soot blower failures in recovery boiler



Heat exchanger tube leaks



Outage overruns



Parts repeatedly not available in the storeroom



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EXERCISE

As a group, let's develop a list of Sporadic and Chronic failures from your facility



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