



Reliability-Centered Maintenance + Root Cause Analysis

Doug Plucknette | Mark Galley

RCM Blitz™
Fast - Applicable - Effective

ThinkReliability®

Accelix™
Webinar Series



Doug Plucknette

President, Reliability Solutions, Inc.

- Creator of RCM Blitz™
- 20+ years in the Maintenance and Reliability field
- Instructor, Mentor, Practitioner of Reliability Tools and Measures
- Author, Reliability Centered Maintenance using RCM Blitz™ & Clean Green & Reliable
- Fellow, EPRA (Electric Power Reliability Association)



Mark Galley

President and Founder of ThinkReliability

- Has 20+ years of experience helping organizations (frontline personnel, technical leads and executives) develop a prevention culture
- Focuses on incident investigation (RCA) as a way to improve the reliability of work processes
- Holds a degree in Mechanical Engineering and began career at the Dow Chemical Company
- Became Certified Reliability Engineer through the American Society for Quality in 1993

Reliability-Centered Maintenance + Root Cause Analysis

Root Cause Analysis

← PAST

What DID happen?

A method of investigating an incident to identify specific actions for preventing it from occurring.

(Reactive)

Reliability Centered Maintenance

FUTURE →

What COULD happen?

An approach for developing a maintenance strategy to ensure equipment and process function in accordance to its inherent designed safety and reliability capabilities.

(Proactive)



Reliability-Centered Maintenance + Root Cause Analysis

Focus on the Principles

- Reliability-Centered Maintenance
- Root Cause Analysis
- Six Sigma
- Total Productive Maintenance
- Kaizen
- Failure Modes Effects Analysis
- Quality
- Lean Manufacturing
- Value Streaming
- Total Quality Maintenance
- Error Proofing
- 5S
- 8D

ALIGN

These methods **align** because of the underlying principles.

PRINCIPLES

The closer an organization gets to the **principles**, the more effective it becomes.

EFFECTIVE

Use what's **effective** for your people and your organization.

*It's not just that the method is applied. **It's HOW the method is applied.***

Reliability-Centered Maintenance + Root Cause Analysis

RCM and RCA are both based on:

Cause-and-Effect Principle



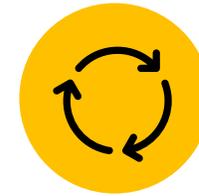
Every effect has causes. Failure modes are causes.

Systems Thinking



Every system breaks down into parts. The system itself (the piece of equipment or the unit operation) dictates how the levels are broken down for the FMEA.

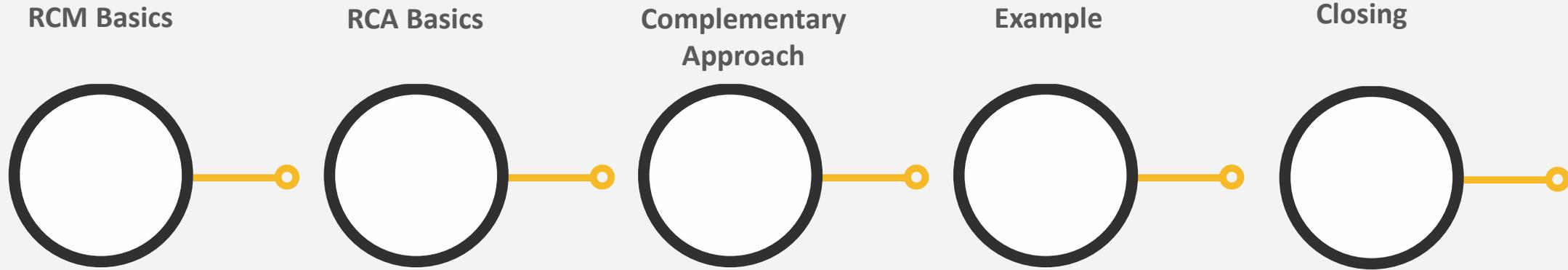
Work Process



Both focus on improving work processes with specific actions.



Reliability-Centered Maintenance + Root Cause Analysis



POLL QUESTION No. 1



Are you currently using RCM to develop your maintenance strategy at your facility? **(Click only one answer)**

- Yes, on all equipment
- Yes, for critical assets only
- No; we would like to use RCM but have yet to start doing so
- No; we have no plans to use RCM



Reliability-Centered Maintenance + Root Cause Analysis

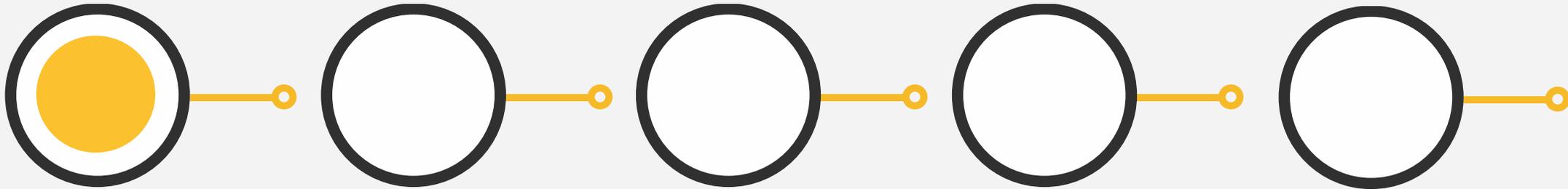
RCM Basics

RCA Basics

Complementary
Approach

Example

Closing



Reliability-Centered Maintenance + Root Cause Analysis

7 Basic Questions

- | | | |
|---|---|--|
| Goals
Systems
Components | 1 | What are the functions of the asset (operating context)? |
| | 2 | In what ways can it fail to fulfill its function? |
| FMEA
Causes and effects
(Failure Modes) | 3 | What causes each functional failure? |
| | 4 | What when each failure occurs? happens |
| Value | 5 | In what ways does each failure matter? |
| Maintenance
Decisions
(Strategy) | 6 | What should be done to predict / prevent each failure? |
| | 7 | What should be done if proactive tasks cannot be found? |

Reliability-Centered Maintenance + Root Cause Analysis

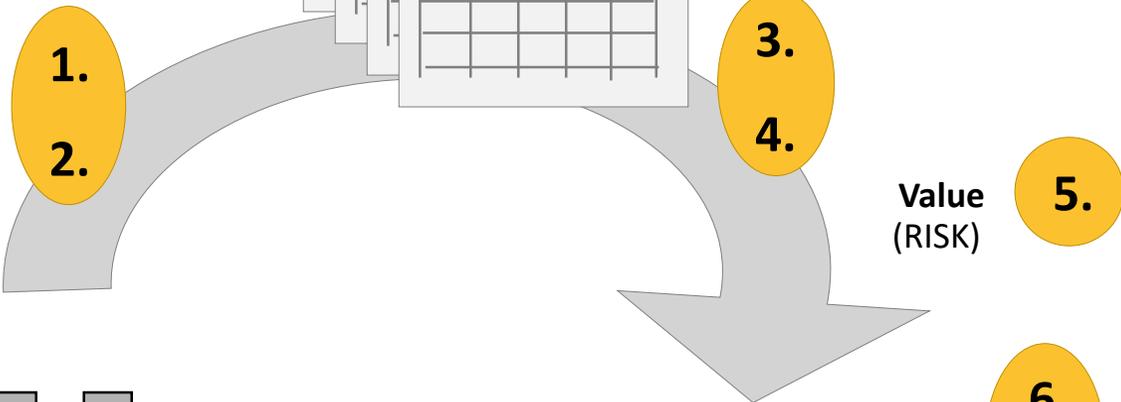
Plant (Facility)



Goals/Functions
System/Support
Components

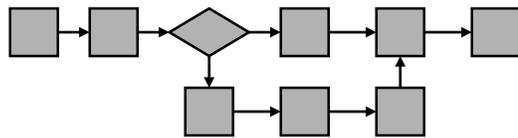
FMEA
Causes and Effects
(Failure Modes)

RCM Blitz™



BEFORE

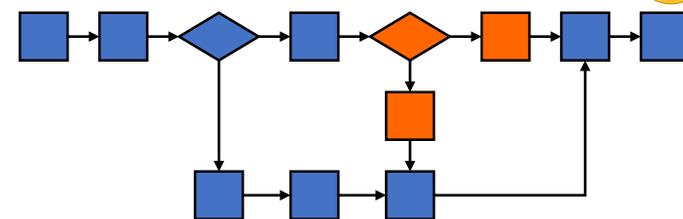
Maintenance Processes



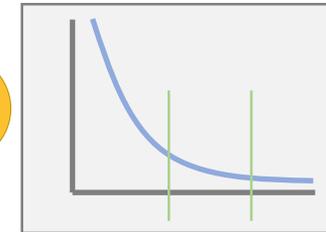
No Maintenance Process or
Inadequate Maintenance Processes

Maintenance Decisions (Strategy)

AFTER



Value
(RISK)





Reliability-Centered Maintenance + Root Cause Analysis

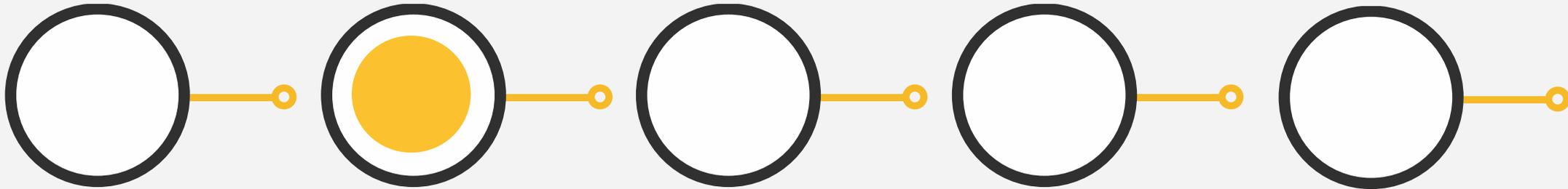
RCM Basics

RCA Basics

Complementary Approach

Example

Closing



POLL QUESTION No. 2



Does your organization look for:

(Click only one answer)

- The root cause
- Multiple root causes
- Different types of causes – latent, primary, contributing, physical, human, system
- None of the above

Reliability-Centered Maintenance + Root Cause Analysis

Cause Mapping® Method

Problem Solving • Root Cause Analysis



Deviation from the **GOALS**

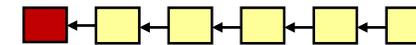
Consequence



Timeline

When?

Cause-and-Effect



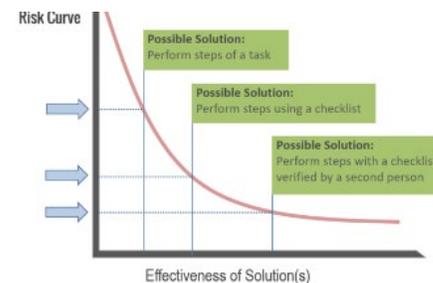
Problem Solving

Troubleshooting

Incident Investigation

Root Cause Analysis

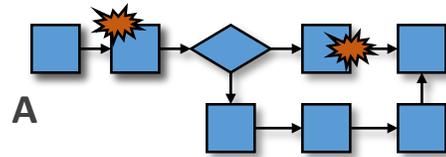
Why?



Reliability-Centered Maintenance + Root Cause Analysis

Process

Task, Job

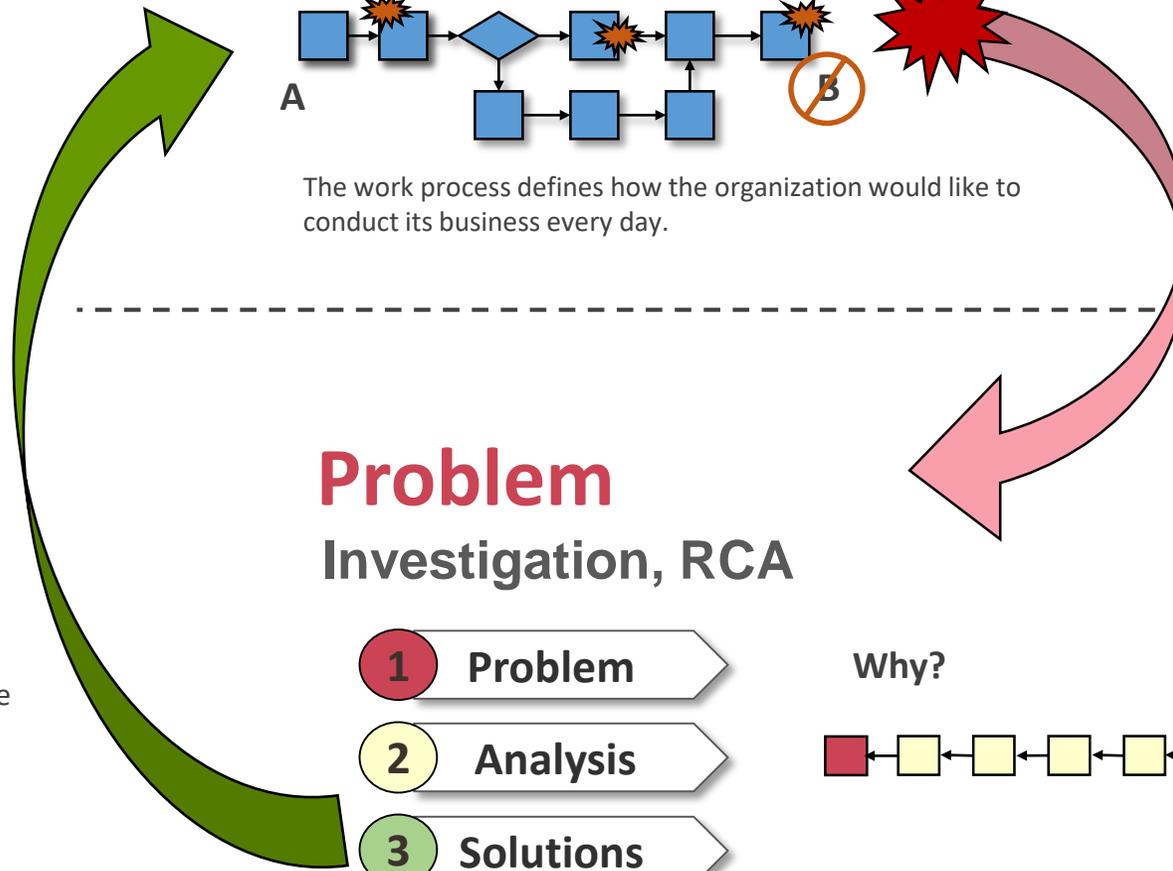


Failure, Error, Defect, Complaint,
Injury, Outage, Release

The work process defines how the organization would like to conduct its business every day.

Cause Mapping® Method

Problem Solving • Root Cause Analysis

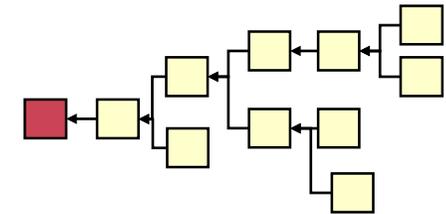


Problem

Investigation, RCA

- 1 Problem
- 2 Analysis
- 3 Solutions

Why?



Solutions

Same – Replace in Kind
repair, replace, respond, restore
and / or

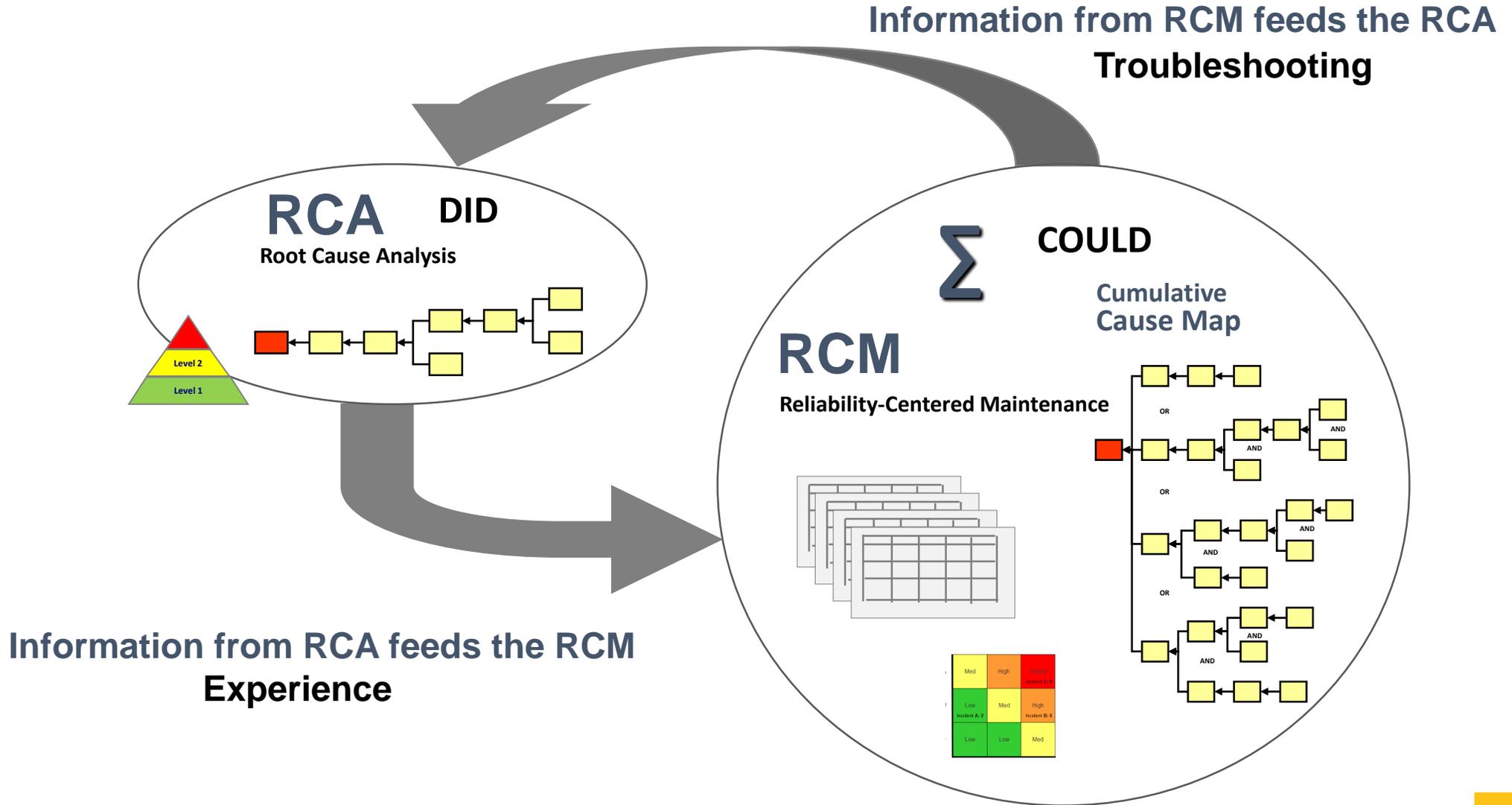
Different - Improvement
Change(s) to work process



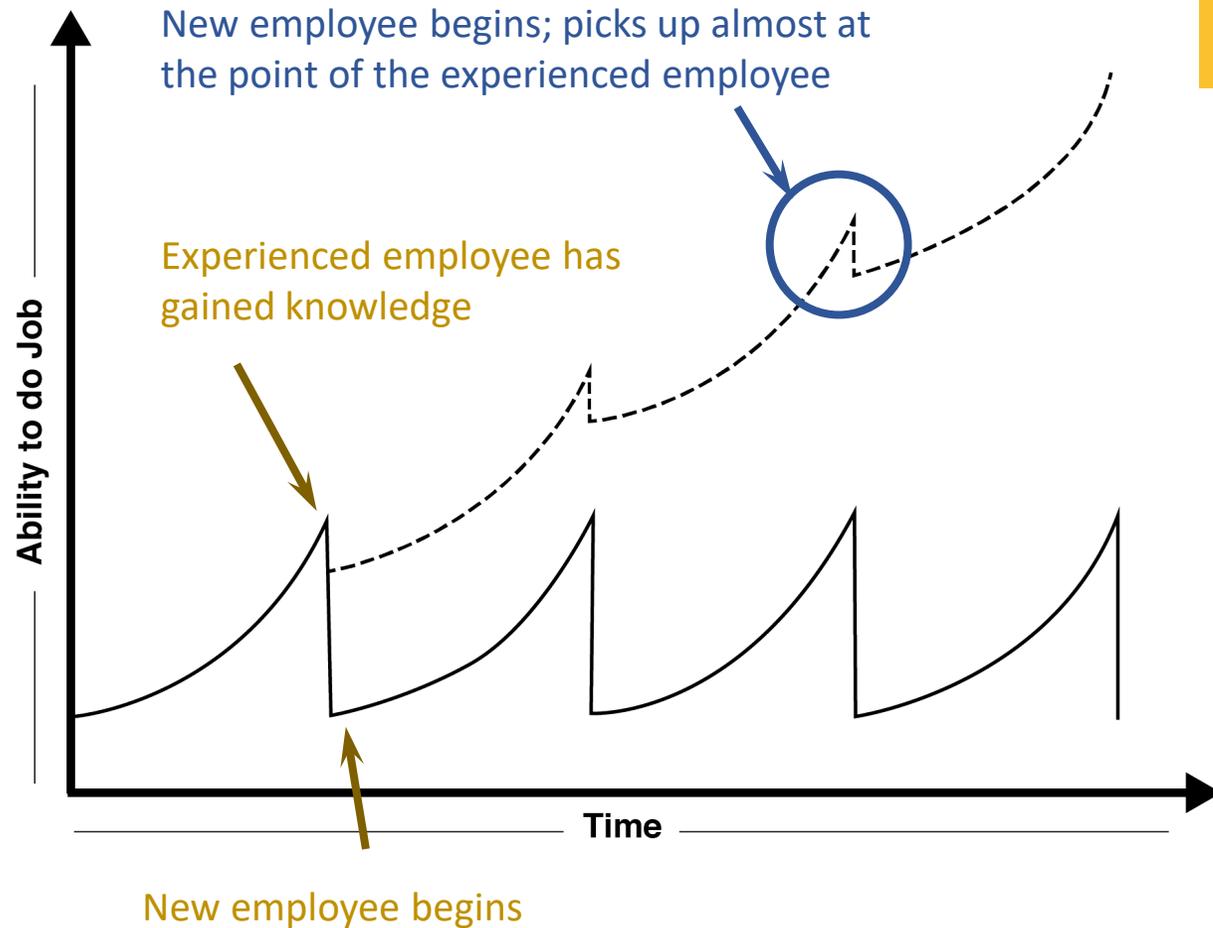
Reliability-Centered Maintenance + Root Cause Analysis



Reliability-Centered Maintenance + Root Cause Analysis



Reliability-Centered Maintenance + Root Cause Analysis



Learning Organization

“Rapid Learning Curve”

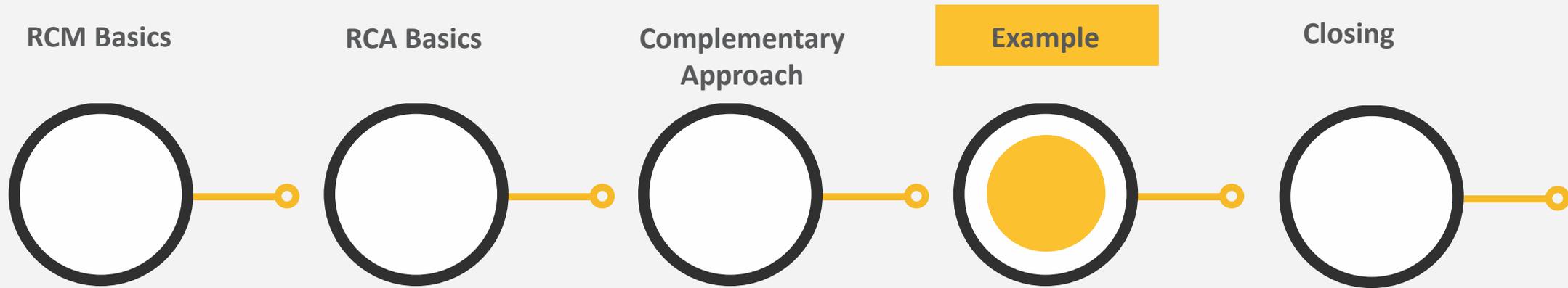
“Eyelash Learning Curve”

Brian Joiner

4th Generation Management

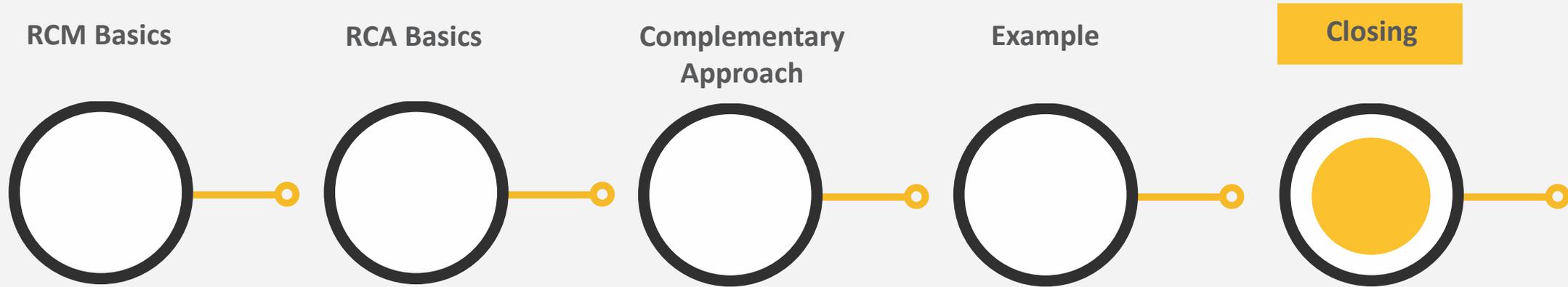


Reliability-Centered Maintenance + **Root Cause Analysis**





Reliability-Centered Maintenance + **Root Cause Analysis**



Reliability-Centered Maintenance + Root Cause Analysis

6 Benefits

- Clarifies overall reliability approach
- Better communication in problem solving
- Collects equipment history visually
- Improves troubleshooting detail
- Develops continuity in the organization
- RCM improves RCA, RCA improves RCM

Reliability-Centered Maintenance + Root Cause Analysis

Symptoms of Ignoring Maintenance Process

- Many repeat problems occur
- People do the same work differently
- Breakdowns in handoffs between groups
- Rework, inefficiencies, too many touches
- Complicated training



Visit bit.ly/RCM-RCA or scan the QR code above to receive a copy of the resources mentioned.

Thank you!

QUESTIONS?



Doug Plucknette

Cell: (585) 329-7040
plucknette.doug@gmail.com
Reliability Solutions
www.rcmblitz.com



Mark Galley

Cell: (281) 728-2116
Office: (281) 412-7766
mark.galley@thinkreliability.com
ThinkReliability





To learn more about **Accelix** and our **Webinar Series**



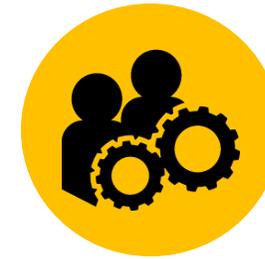
SURVEY

Please provide feedback on this webinar by responding to our survey.



WEBINAR SERIES

Visit this page to learn more about our Webinar Series:
<https://www.accelix.com/community/best-practice-webinars/>



DEMO

Visit [Accelix.com](https://www.accelix.com) for a free demo of our Connected Reliability Framework.



FLUKE®

THANK YOU!

www.fluke.com

1-800-850-4608

sales@accelix.com

Accelix™