NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

First Time Attendee

2018 HUMAN PERFORMANCE CONFERENCE

Root Cause Analysis (RCA) vs. Shallow Cause Analysis (SCA):

What's the Difference?

Bob Latino, CEO
Reliability Center, Inc.
www.Reliability.com

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Objectives

1. Viewing RCA as a system and not simply a task
2. Pro's and con's of common tools to express logic
3. Constructing a logic tree to tell a story
4. Practical Case Studies: The nature of the failure is irrelevant.

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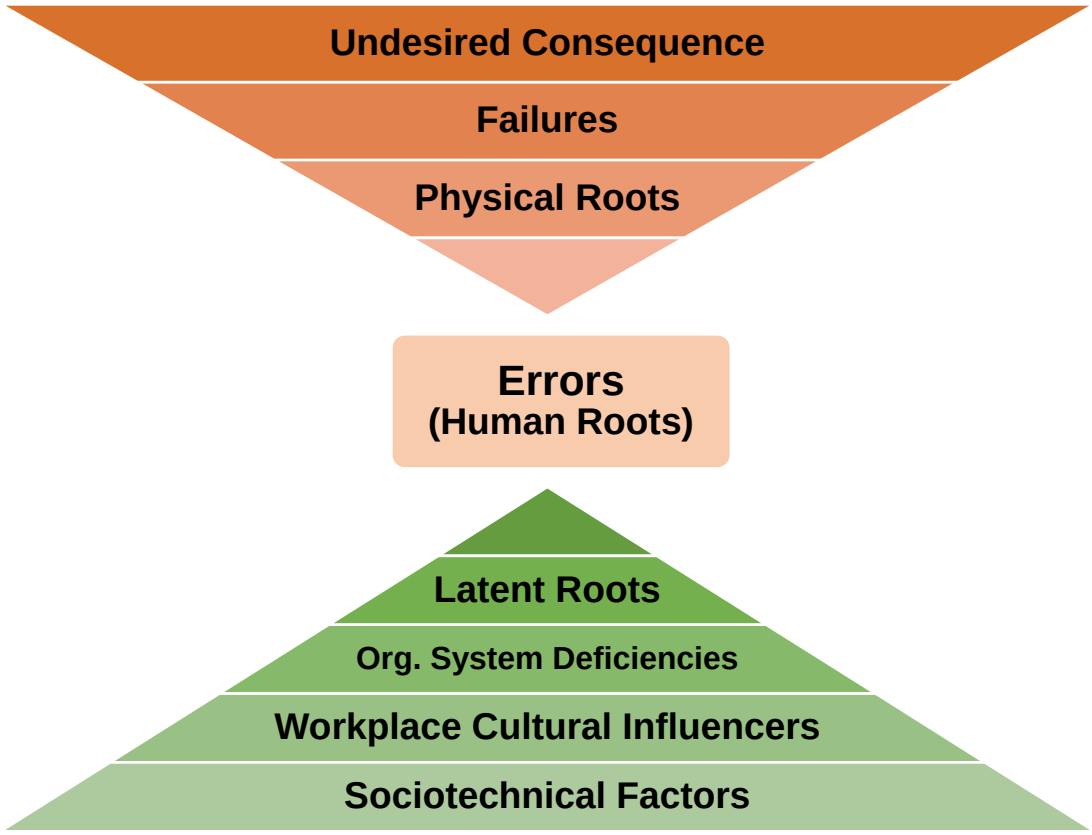
Viewing RCA as a system and not simply a task

1



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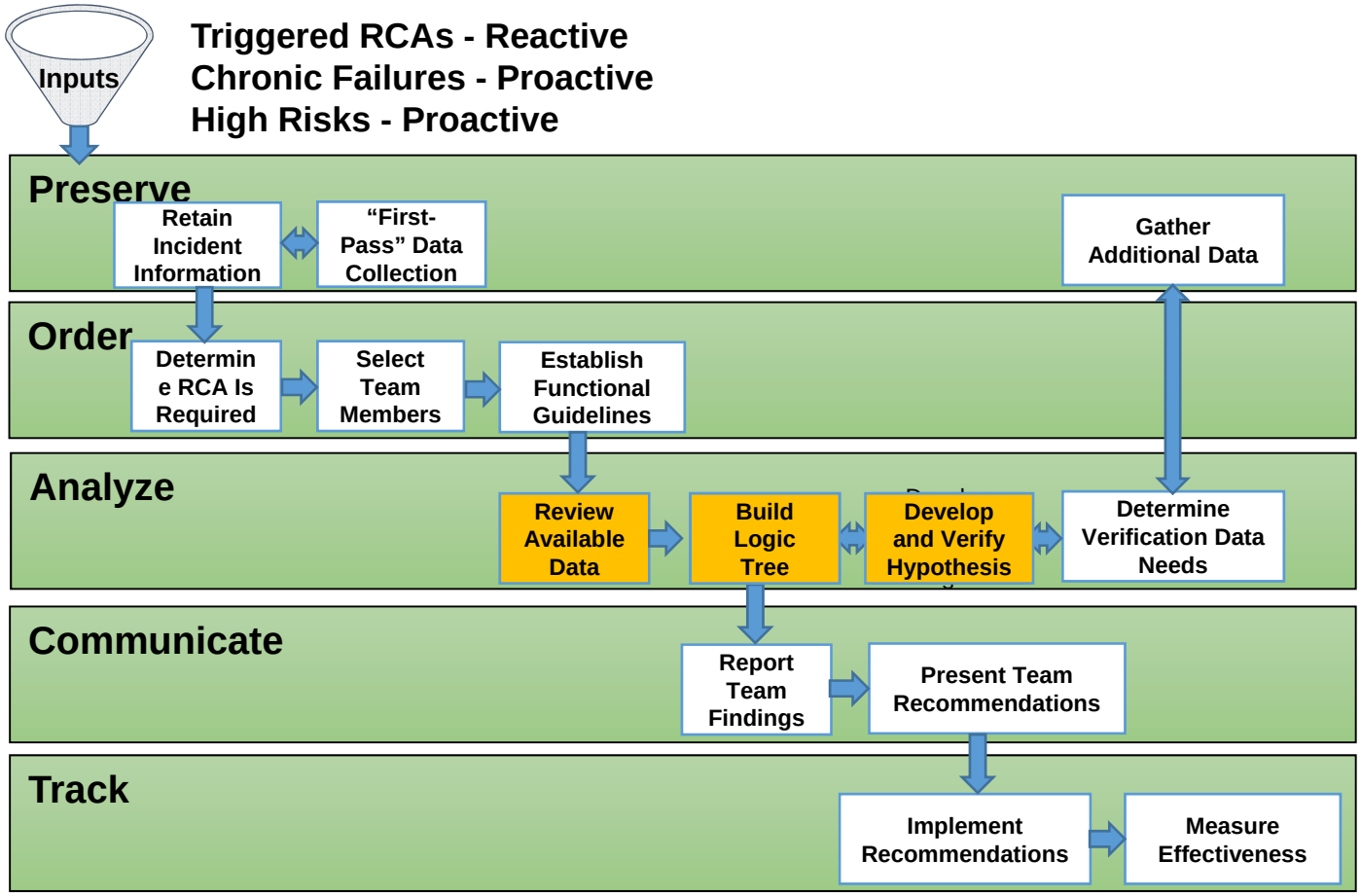
RCA System Process Flow Diagram



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2

Pro’s and con’s of common tools to express logic

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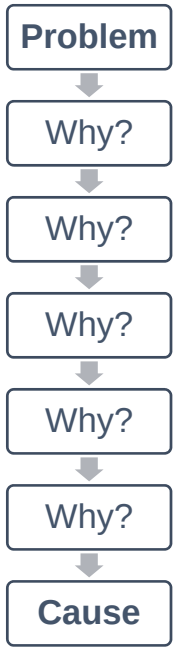
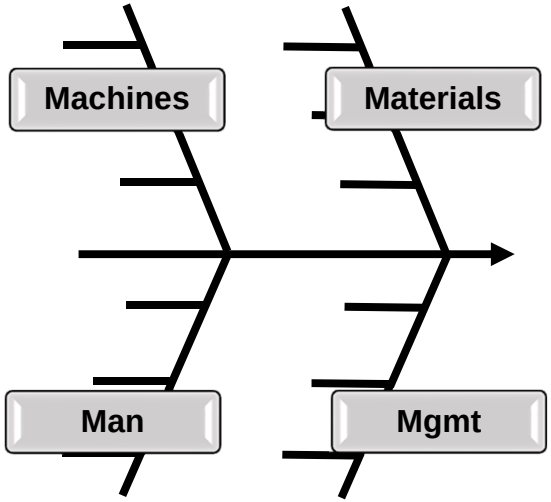
Common Analysis Tools

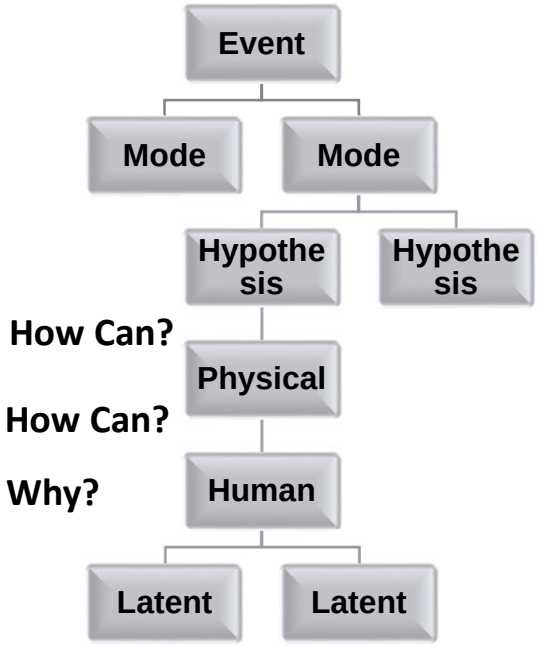
Comparison



5-WHY



FISHBONE



LOGIC TREE

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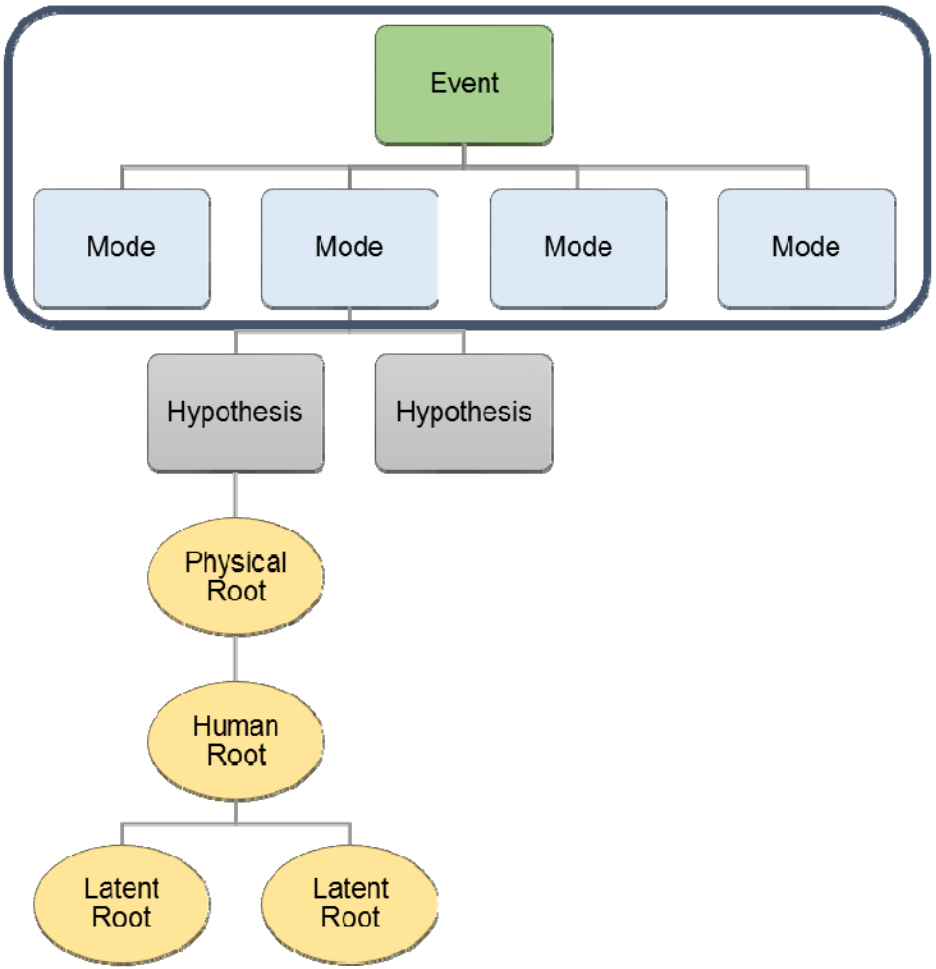
3A

Constructing a logic tree to tell a story - Concept



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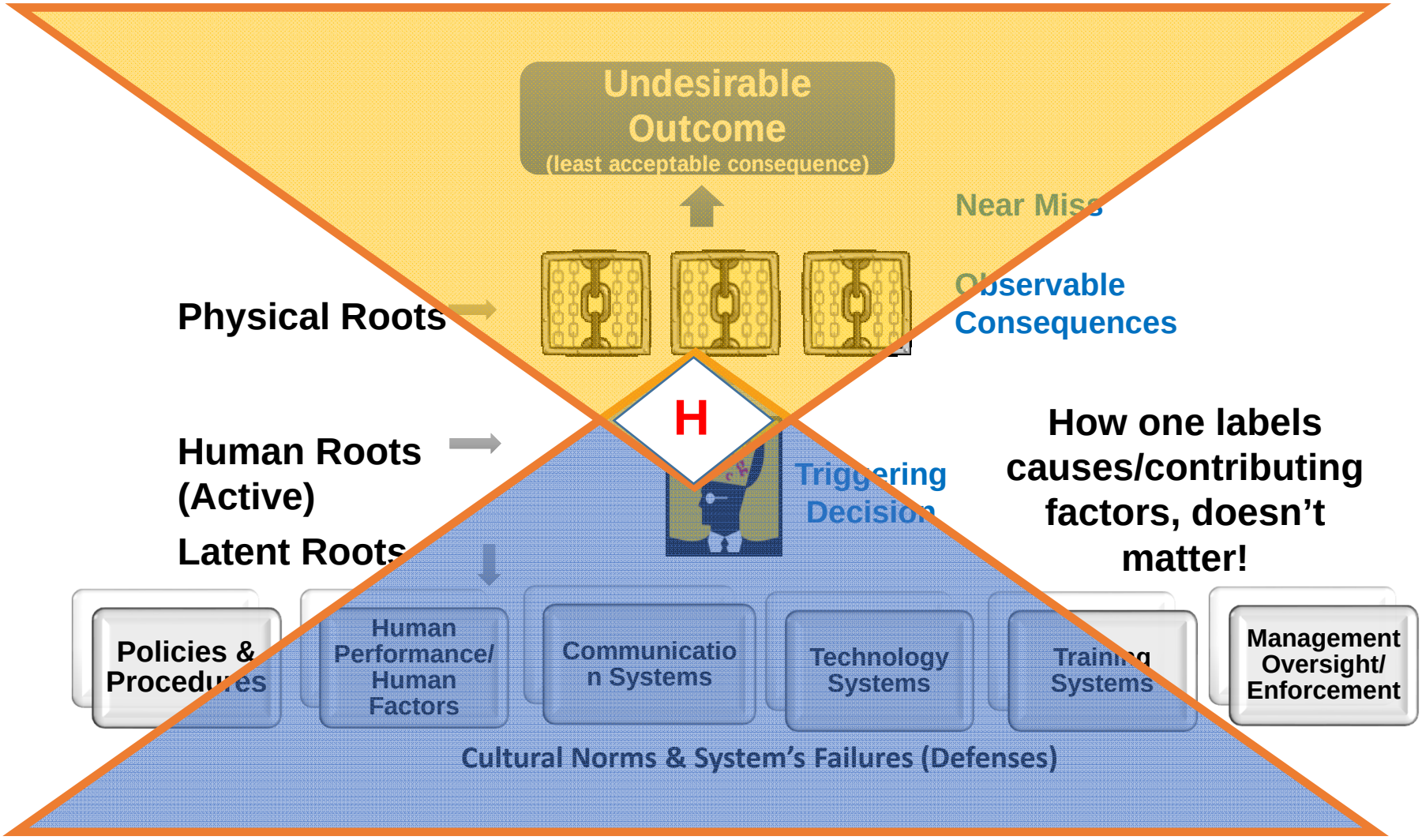
Germination of an Undesirable Outcome

The Basics



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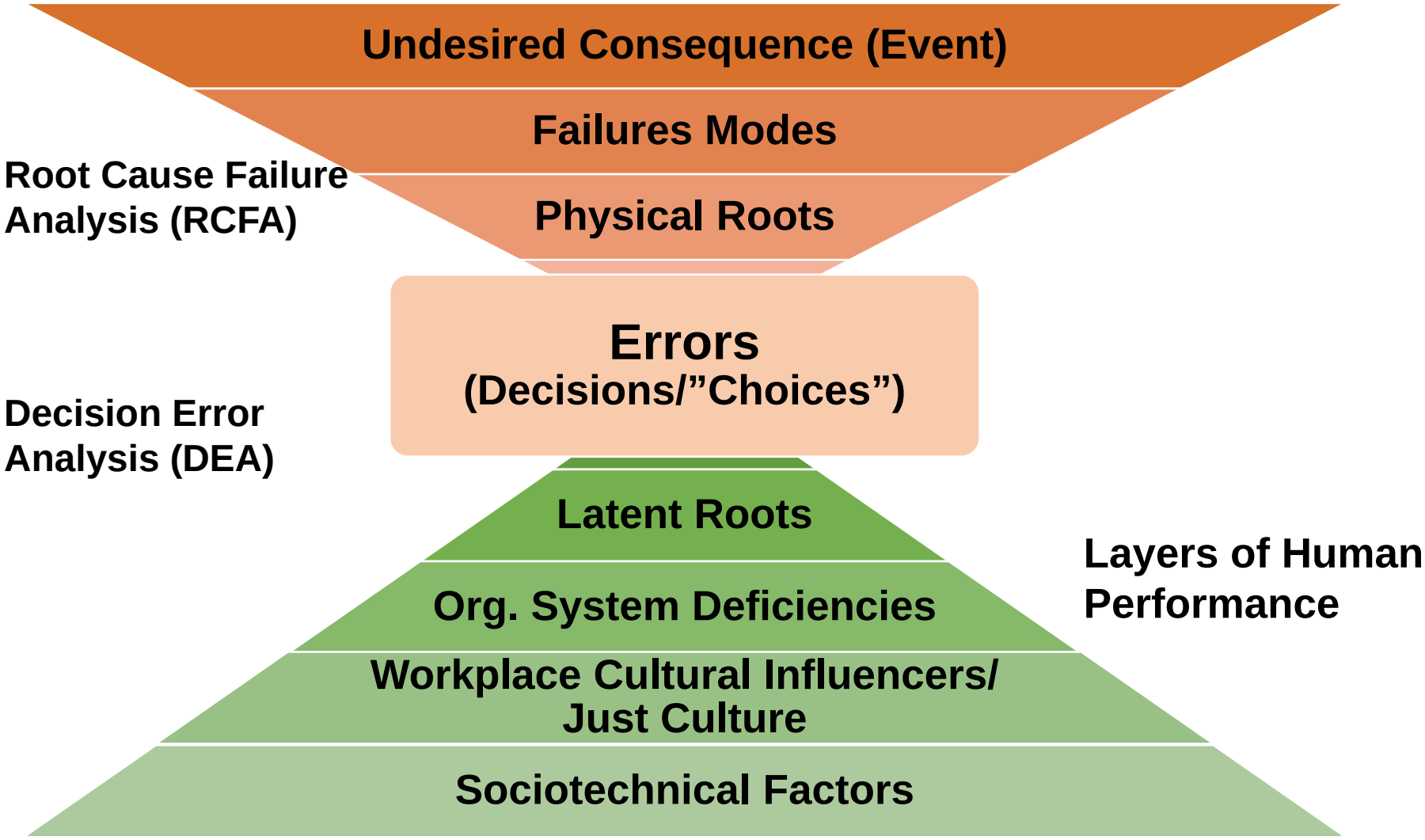
Anatomy of a Logic Tree

Going beyond the Blame Game



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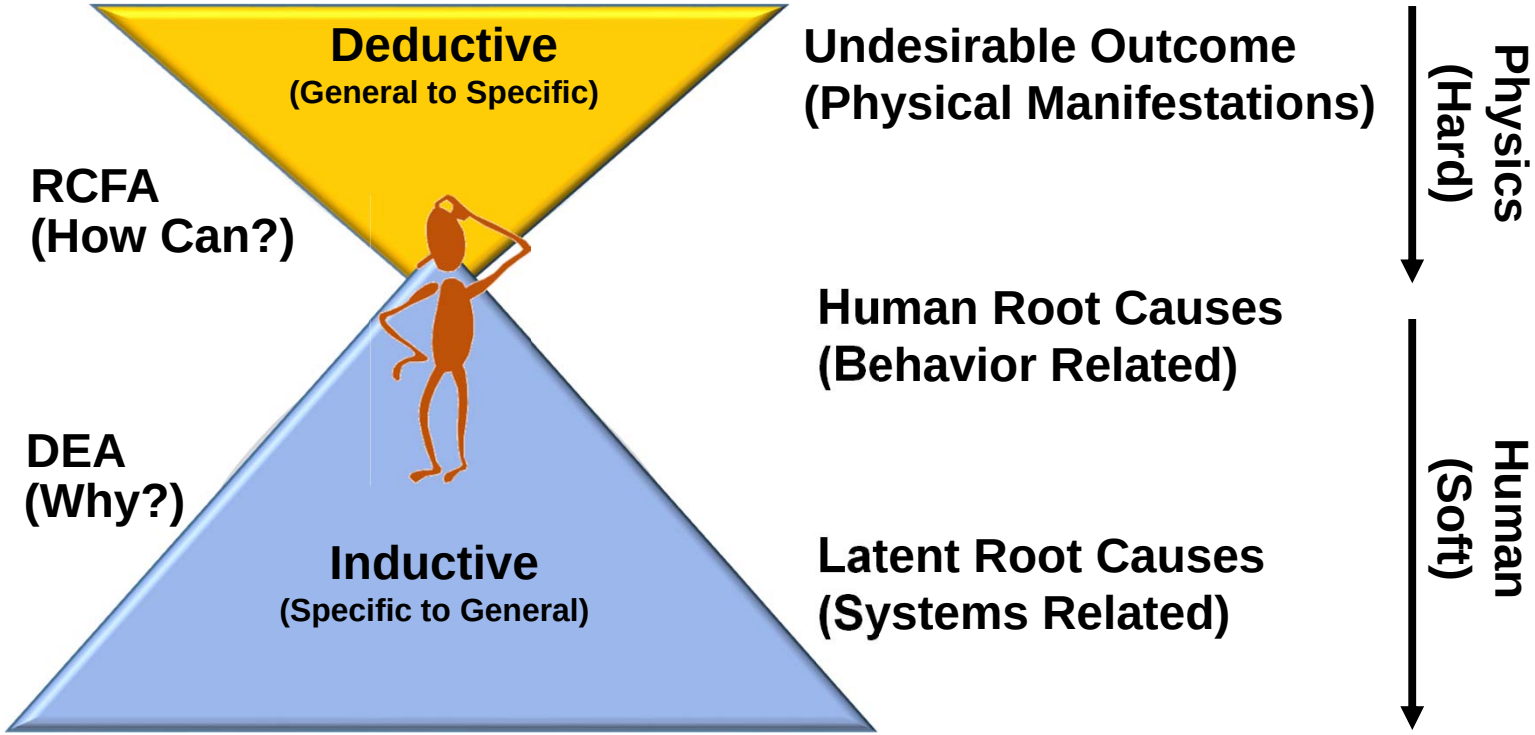
The Hourglass View

Transition from Deductive to Inductive Thinking



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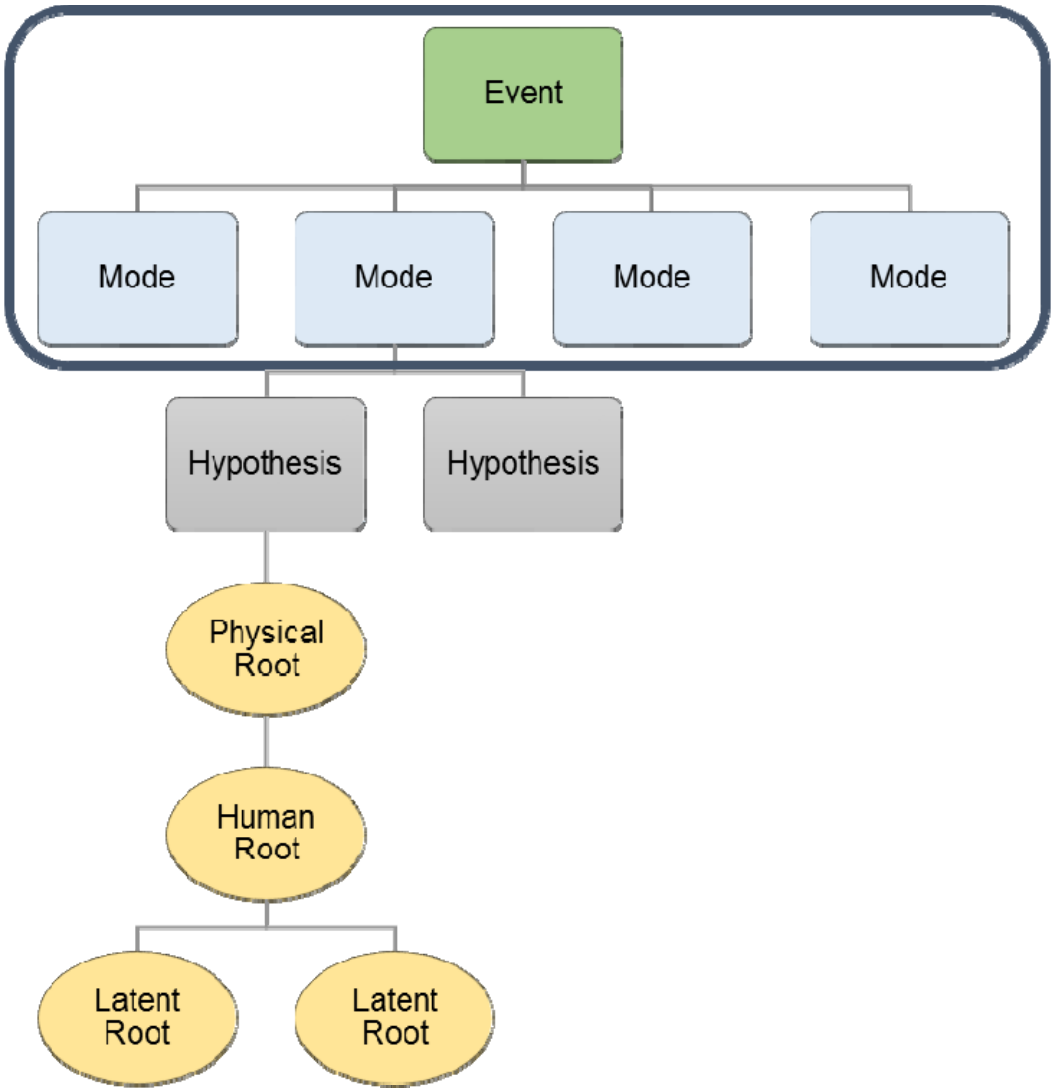
Constructing a logic tree to tell a story - Application



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Logic Trees are a Component of RCA

RCA Definition I Use…

Root Cause Analysis: The establishing of logically complete, evidence-based, tightly coupled chains of factors from the least acceptable consequences to the deepest significant underlying causes (www.rootcauselive.com)

(Bear with me, that's a mouthful…)

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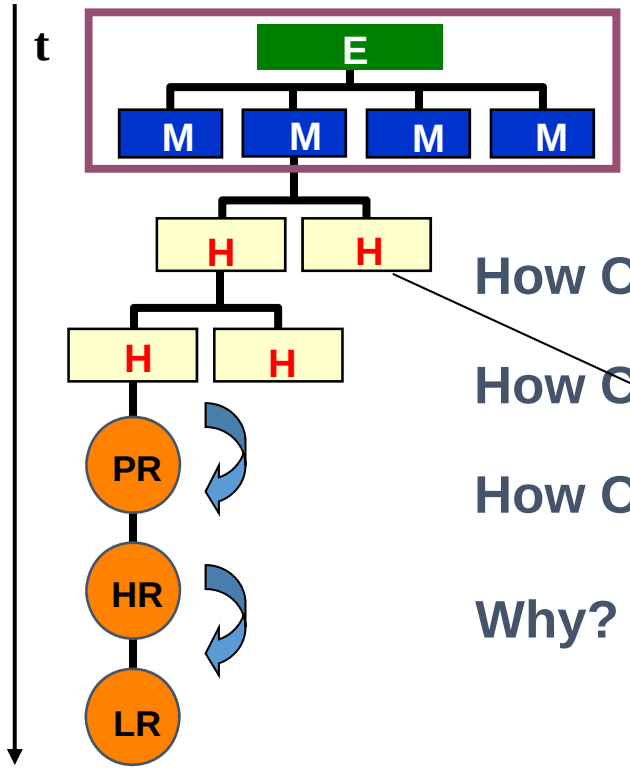
In More Simplistic Terms

Logic Tree Expression Used for 'Reconstruction'



Event Mode(s)

How Can?

How Can?

How Can?

Why?

HOW COULD? vs WHY?

Categorical vs Cause-and-Effect

logically complete

evidence-based

tightly coupled

Verification Log (5P's)

Verification Method –

Verification Outcome –

Responsibility –

Due Date -

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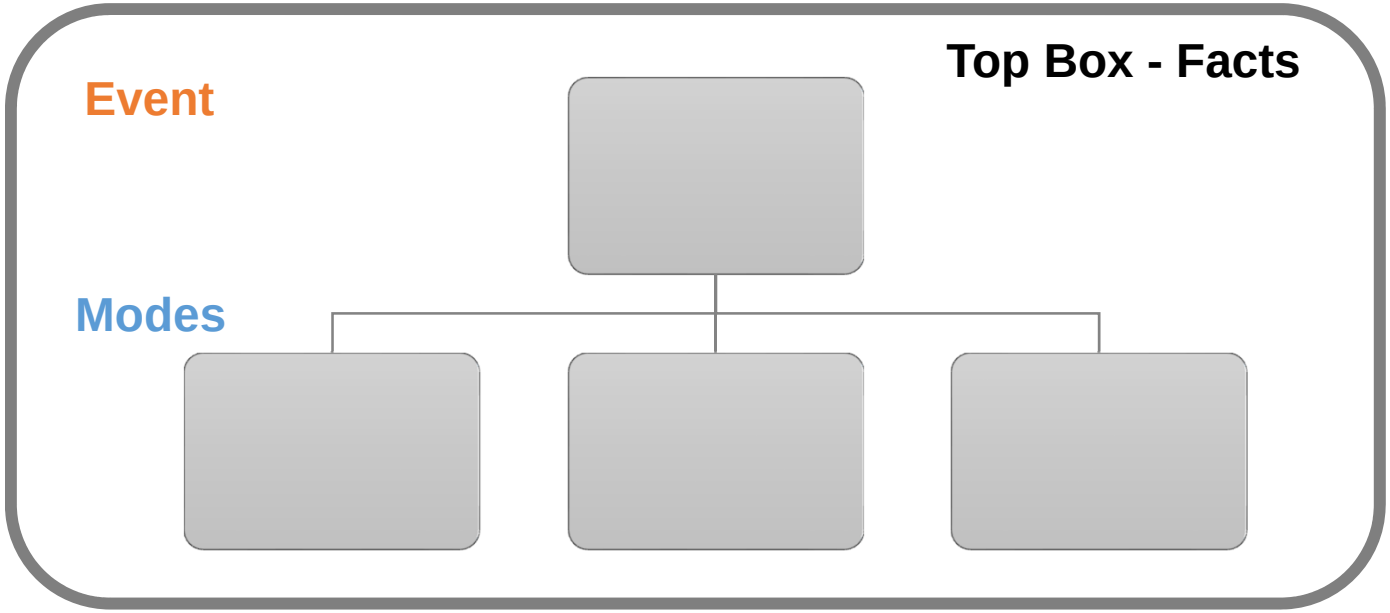
Role Playing

Give me a hand with the logic…

Do We Do RCA on Incidents?

What Would be the 'Event' if We Had a Critical Pump Failure?



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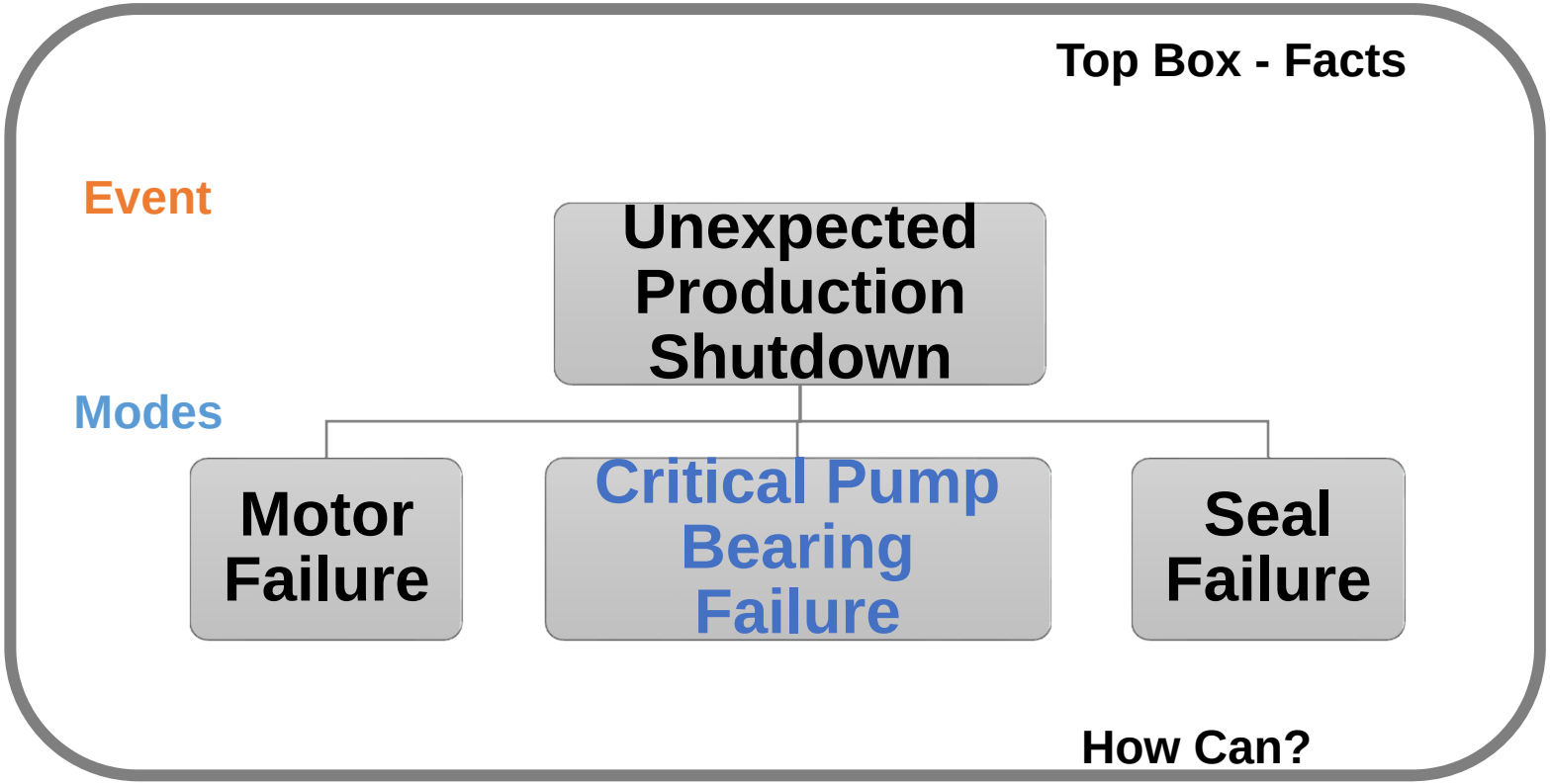
Role Playing

Give me a hand with the logic…



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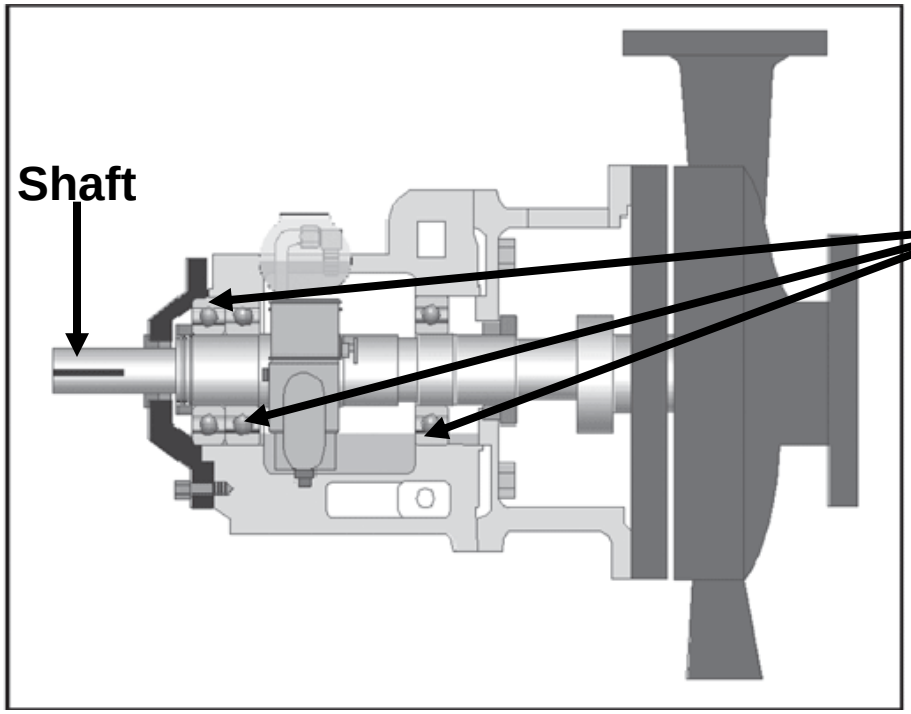
The Process Basics

From the Driver to the Driven



Motor (Driver)

Pump (Driven)

Roller Bearing

“How can a bearing fail?”

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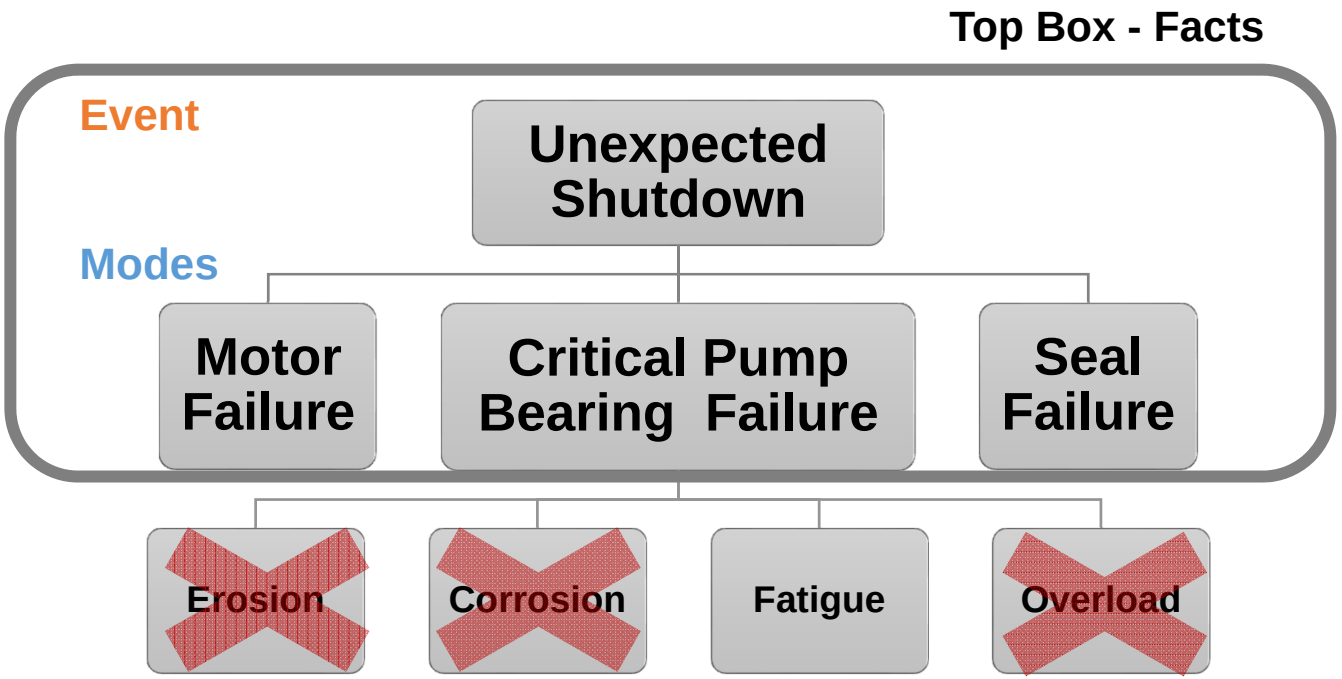
Role Playing

Give me a hand with the logic…



Then, Once Again…'How Can?'

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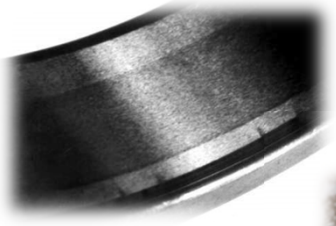
Quick Lesson in Component Failure

Metallurgy 101

Erosion



Uniform Loss of Metal

Corrosion

Pitting (Electrical Phenomena)

Fatigue

Cyclic Failure

Overload

Instantaneous Fracture

How Material Failure Occurs

Material Loss	Material is Overpowered
➢Erosion (Wear)	➢Fatigue
➢Corrosion	➢Overload

And many combinations of these four mechanisms!

Source: http://www.reliability.com/failure-scene-investigation.html

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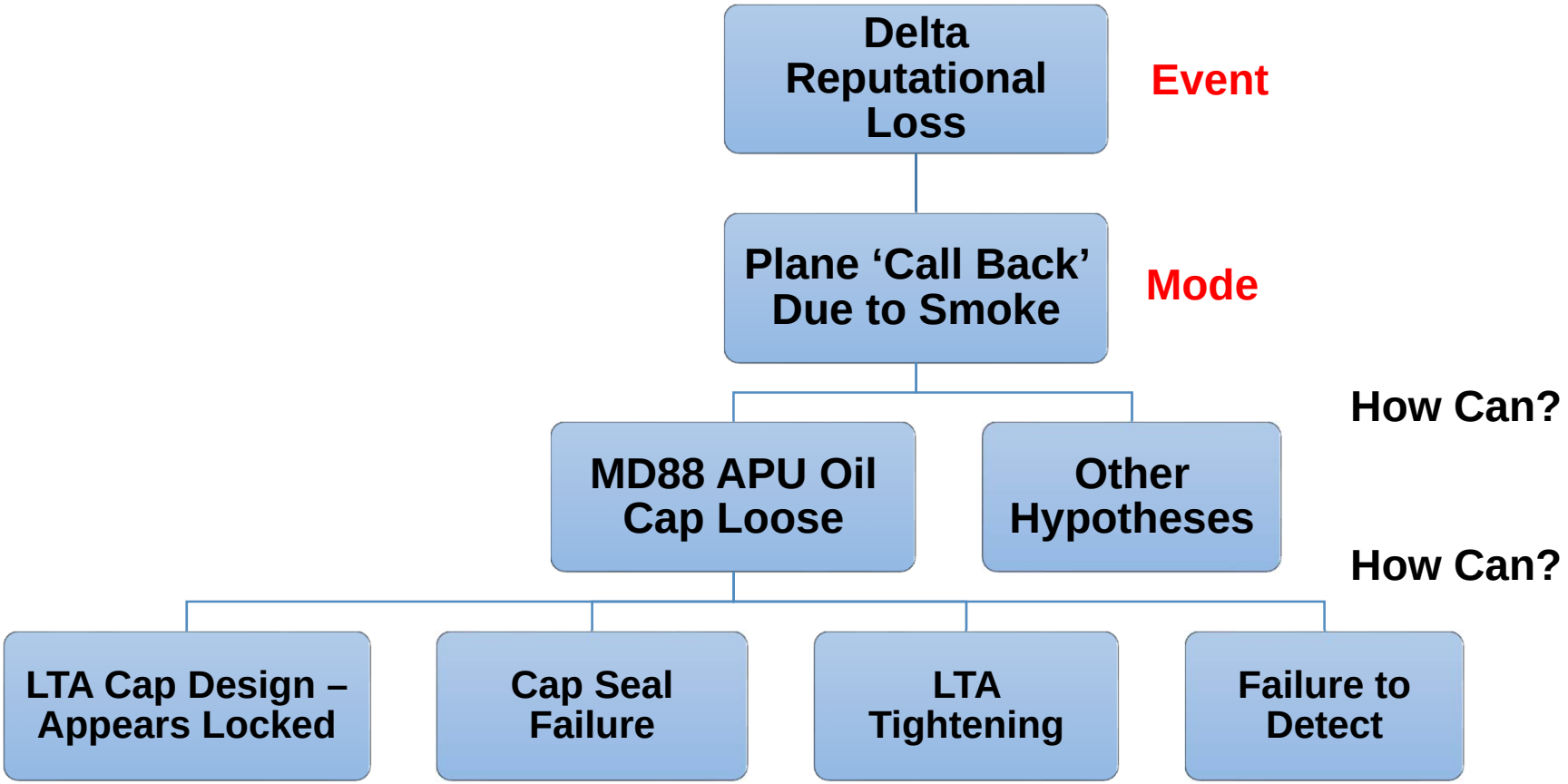
Delta MD88 Oil Cap Issue



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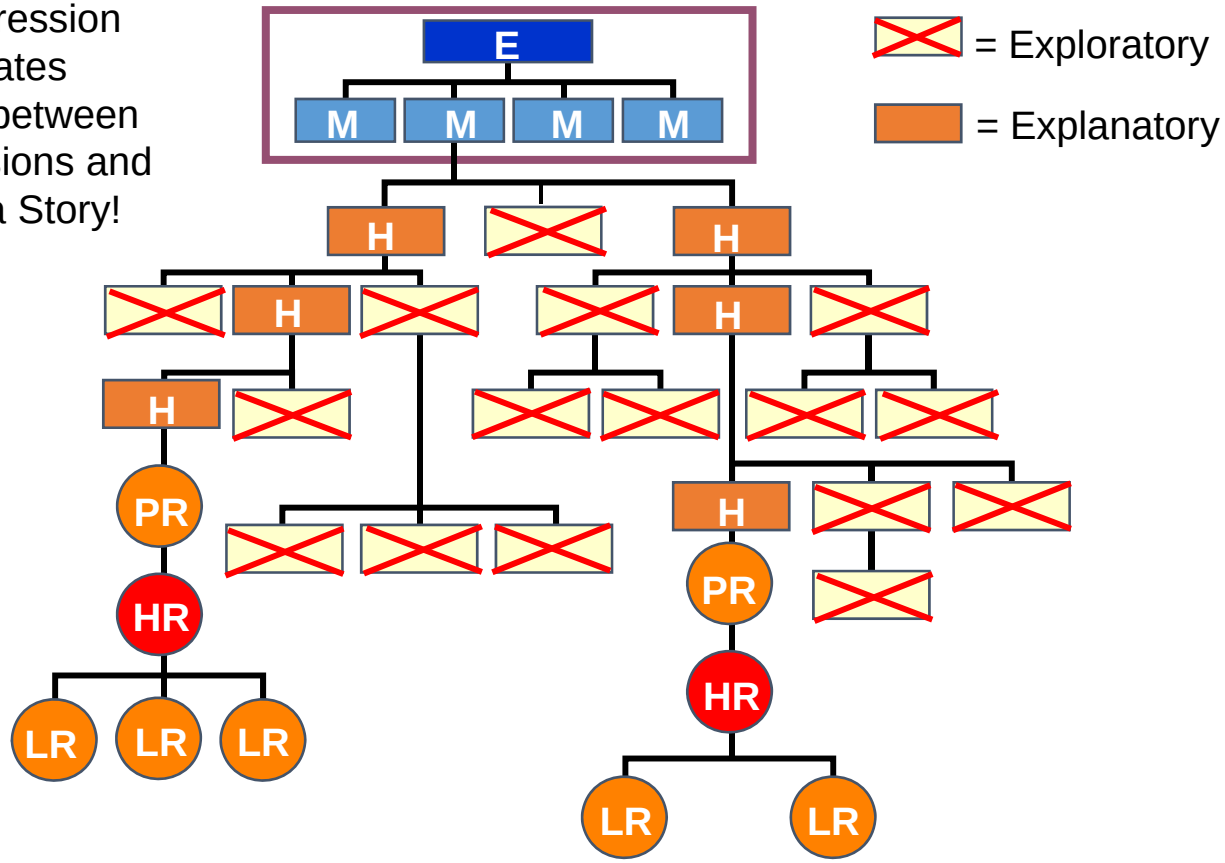
Exploratory vs. Explanatory Logic Trees

Storytelling Tool

Such an expression demonstrates relationships between systems, decisions and outcomes…a Story!



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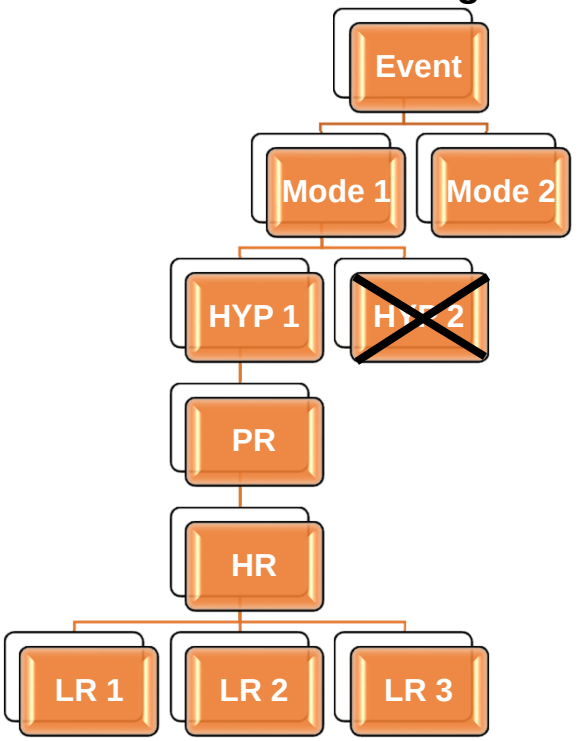
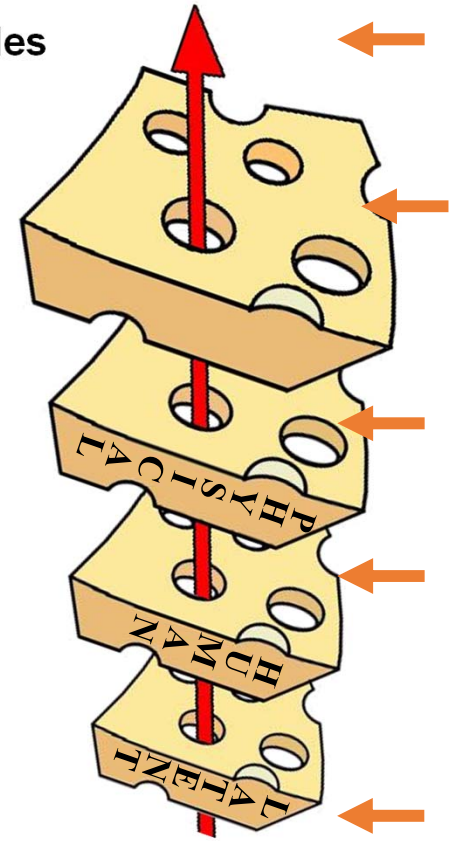
Correlating Swiss Cheese to a Logic Tree

Reasons, James. Human Error. 1990.

Swiss Cheese Goals

1. **Minimize # of Holes**
2. **Minimize Diameter of Remaining Holes**
3. **Don't Let Remaining Holes Line Up**





Event

Modes

Physical

Human

Latent

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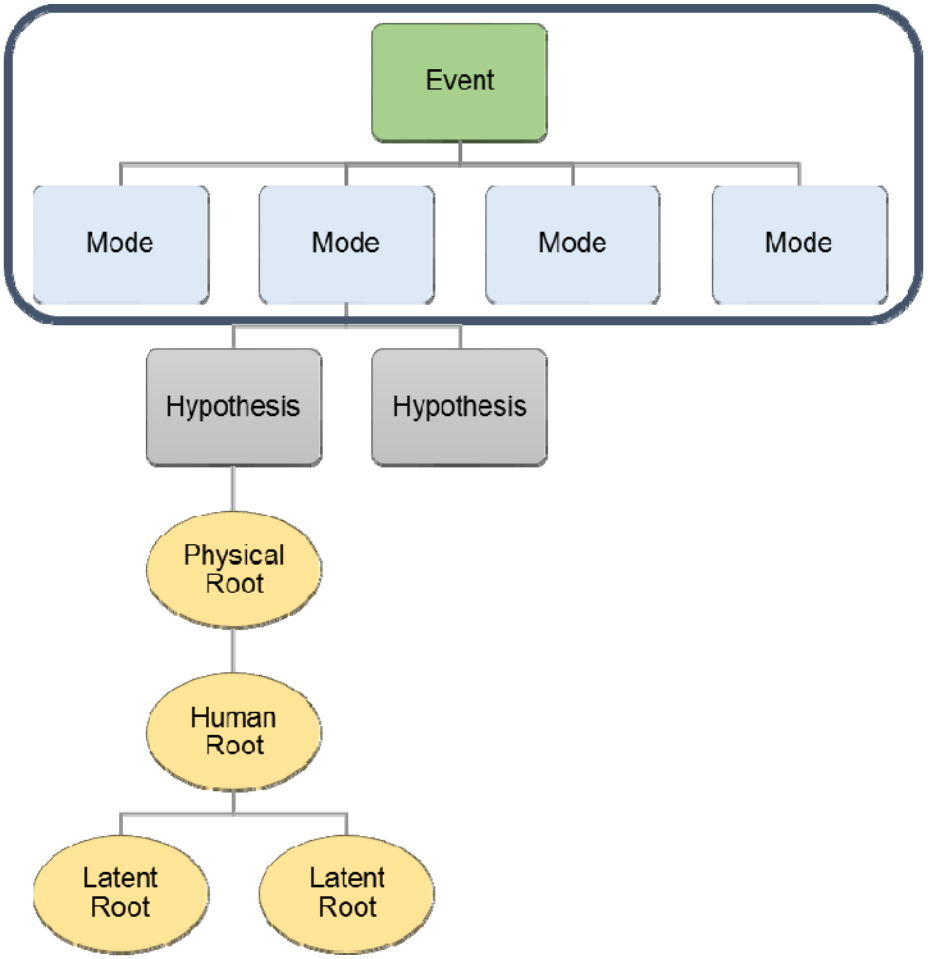
4

Prove that such practical tools can be applied anywhere, by anyone…even a 5th grader!



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Let’s Put These Concepts into Practical Reality!

Practical Case #1: Industrial Case Study

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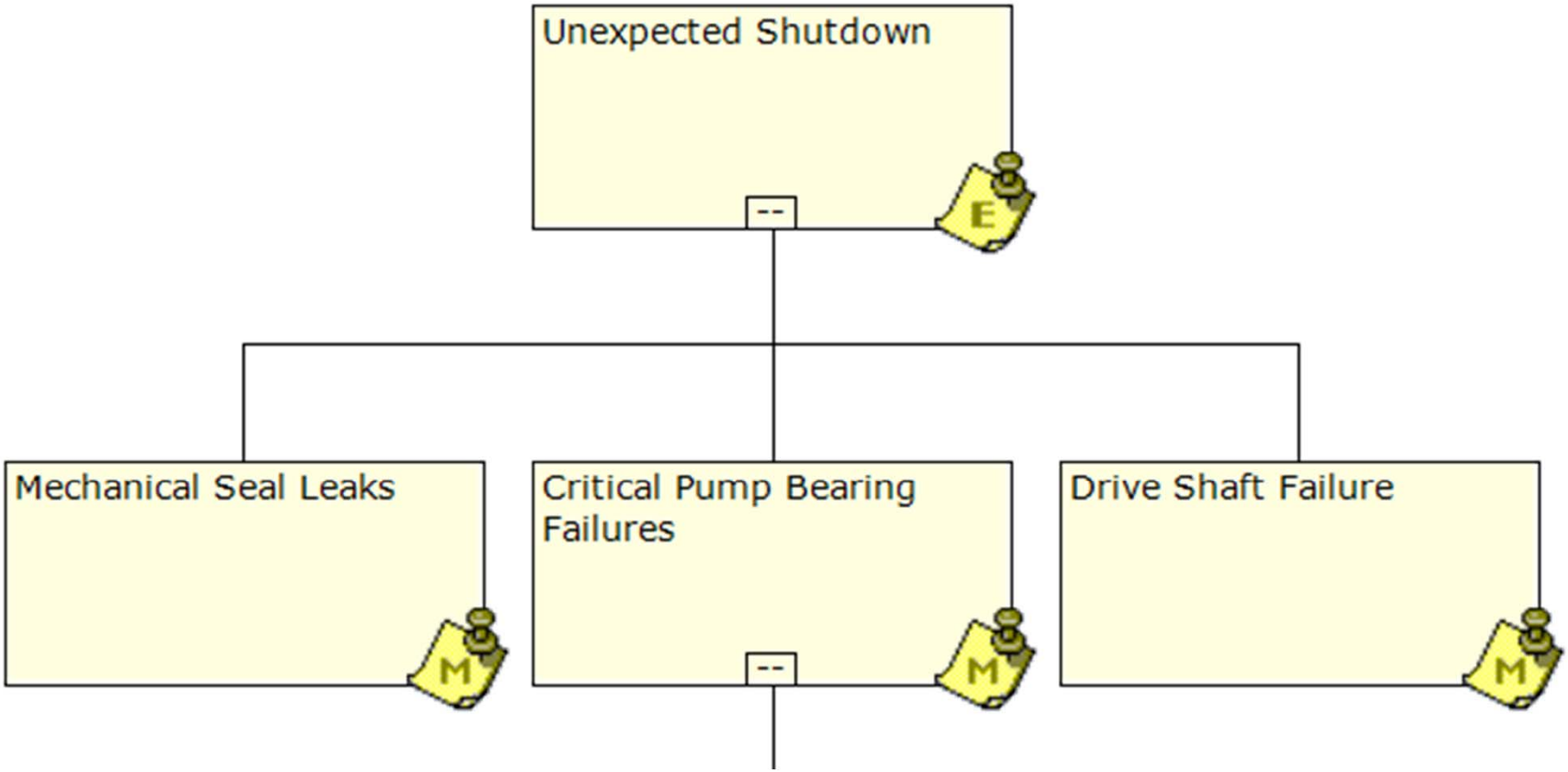

Source: Screenshots used with permission from www..reliability.com

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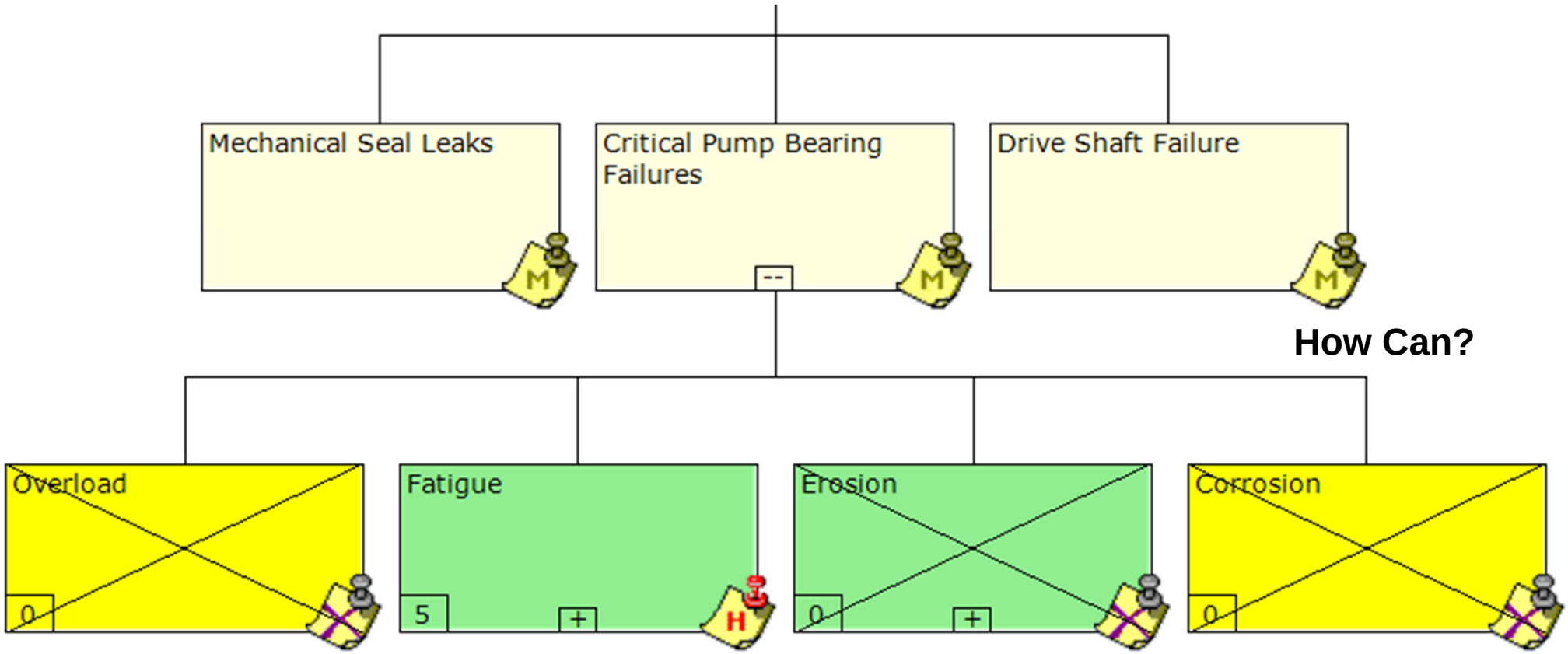

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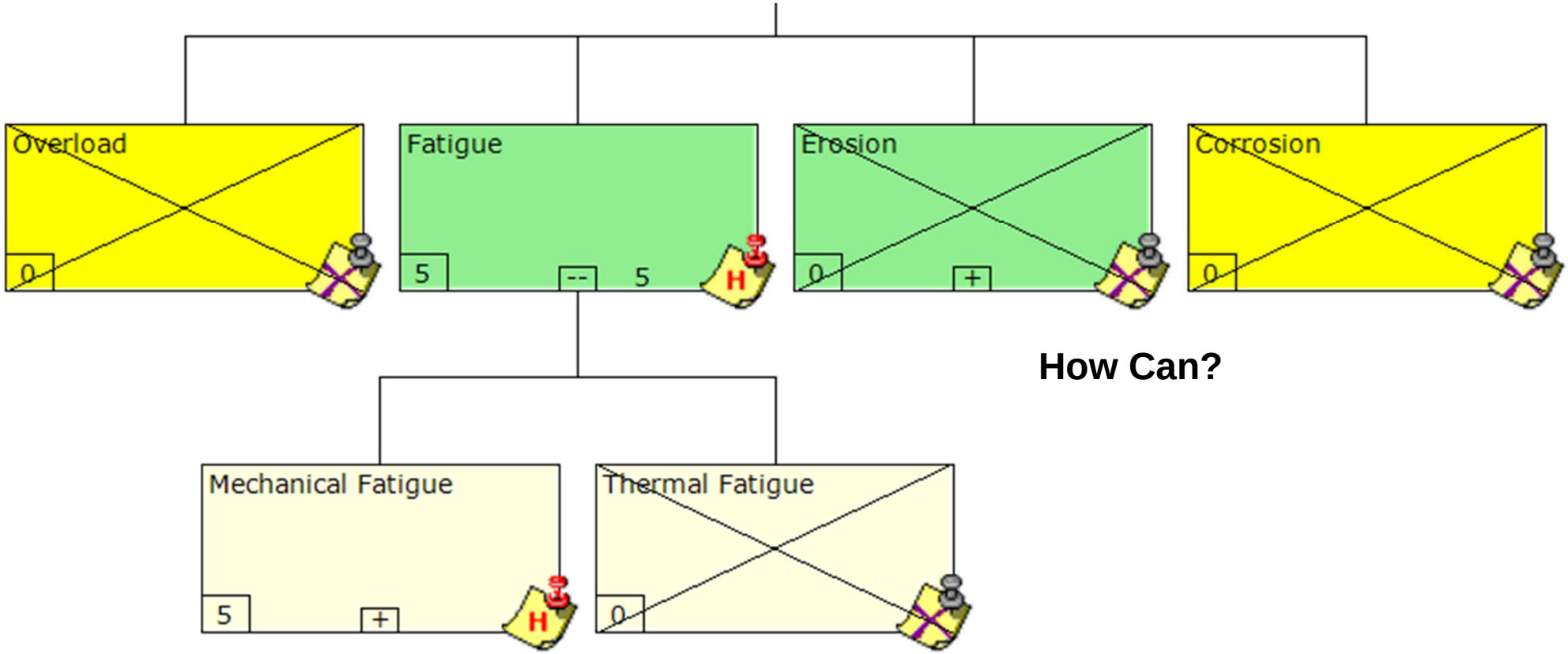

How Can?

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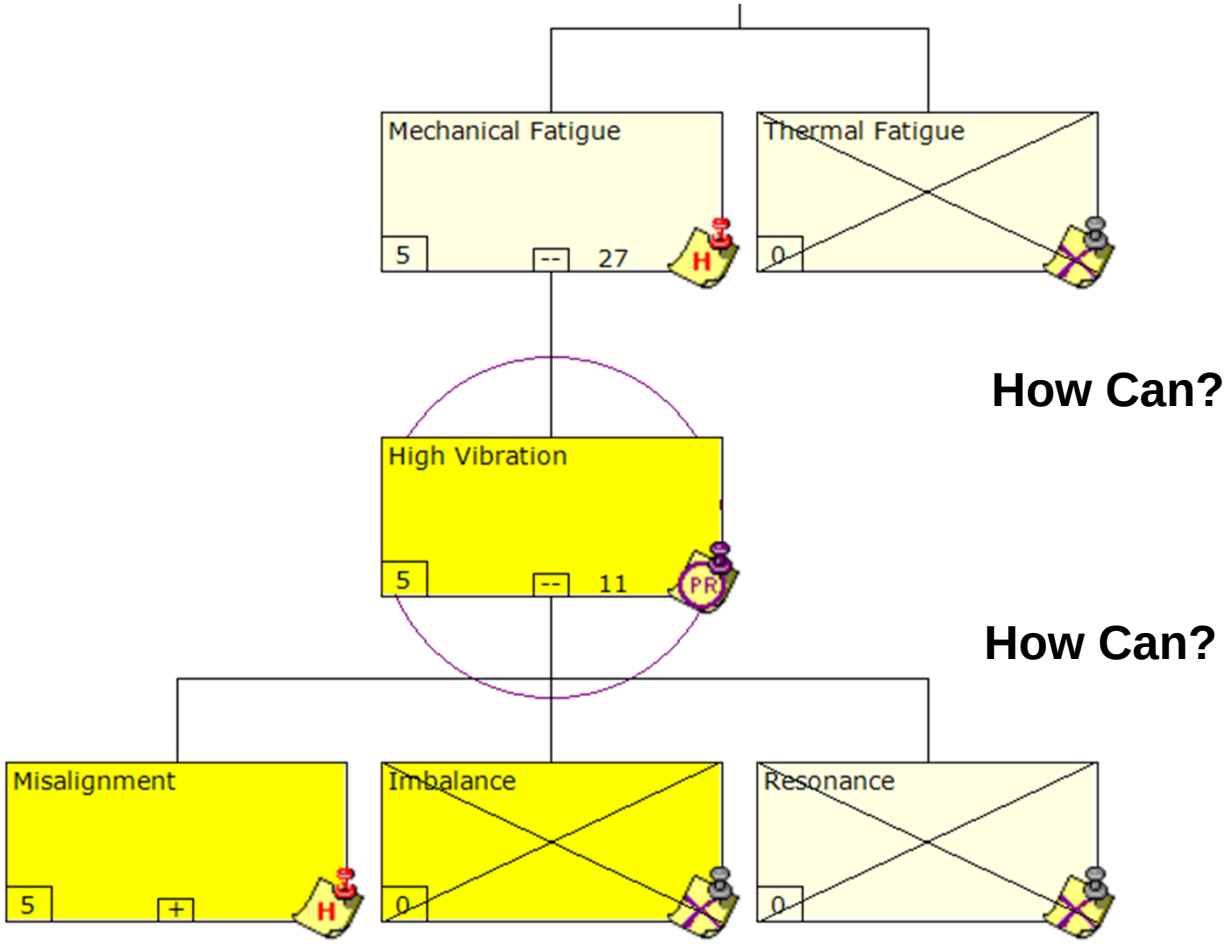

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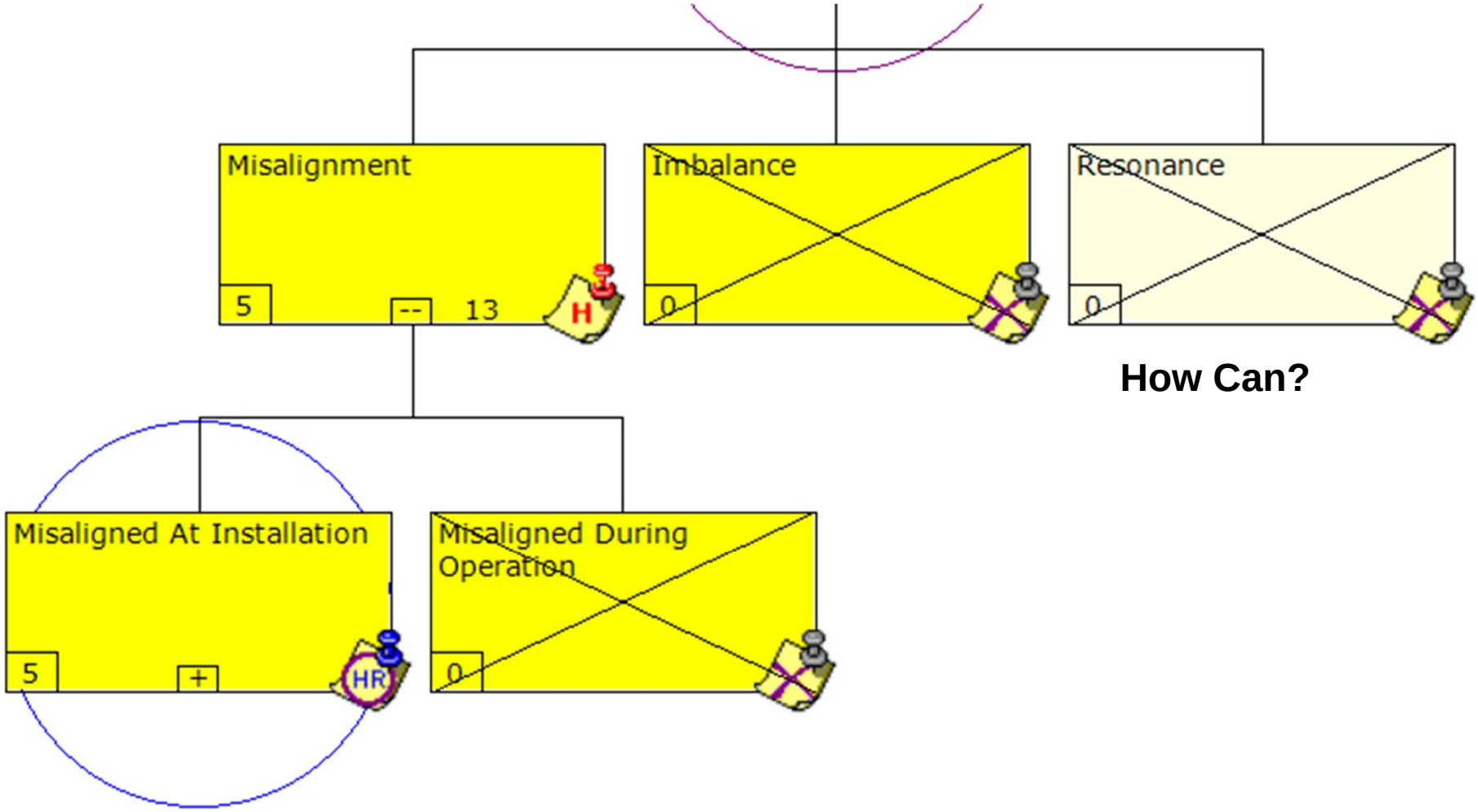

How Can?

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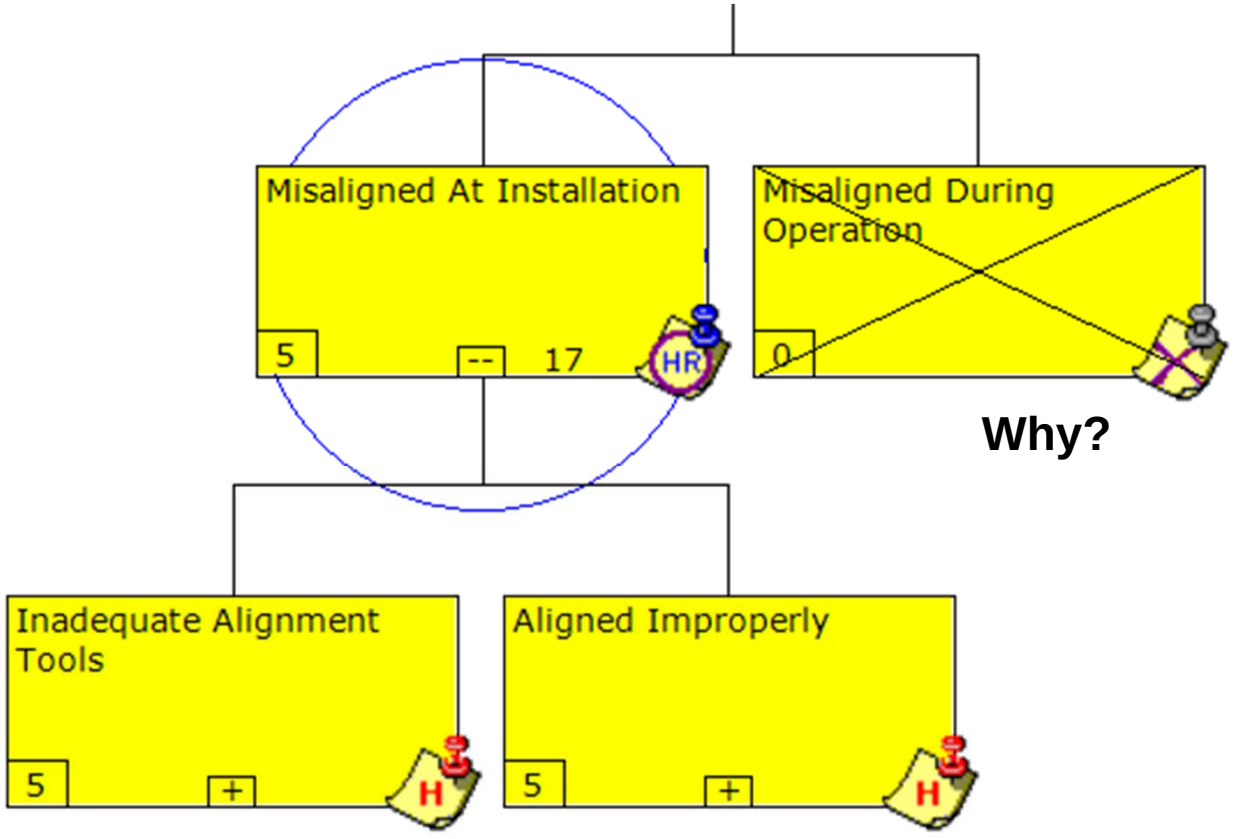

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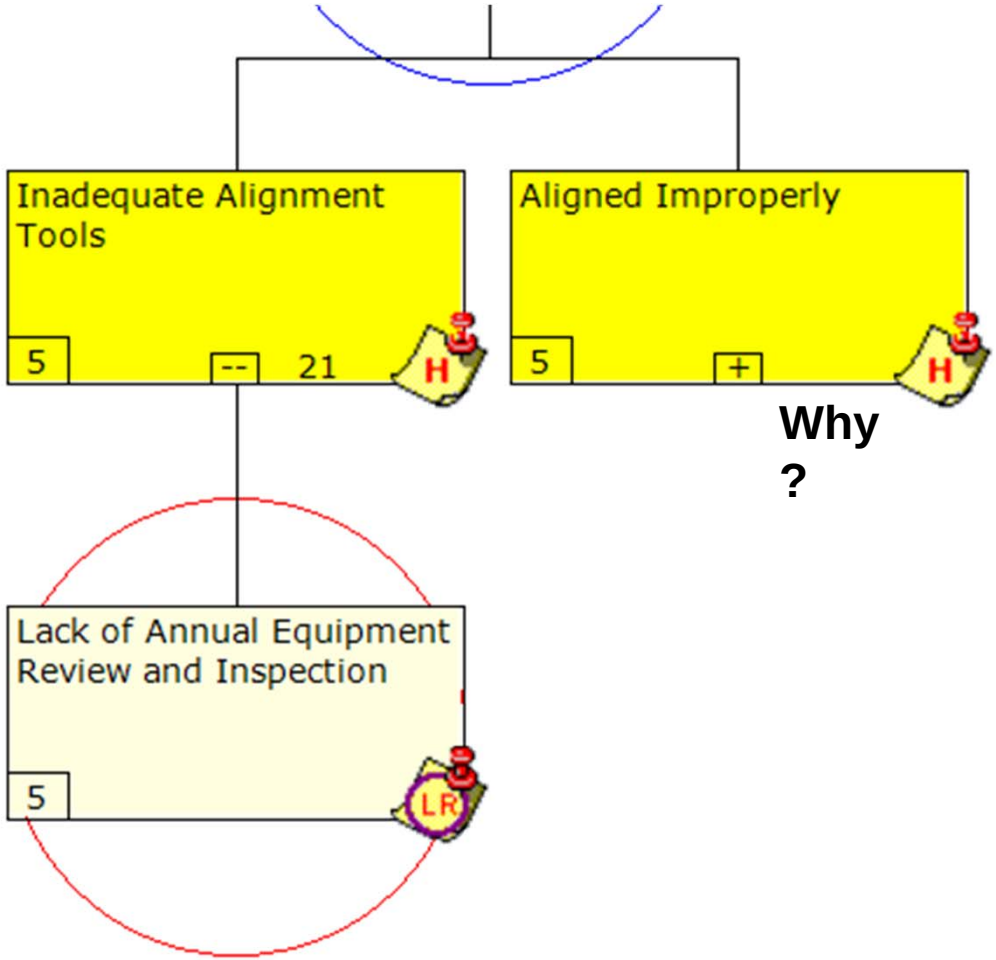

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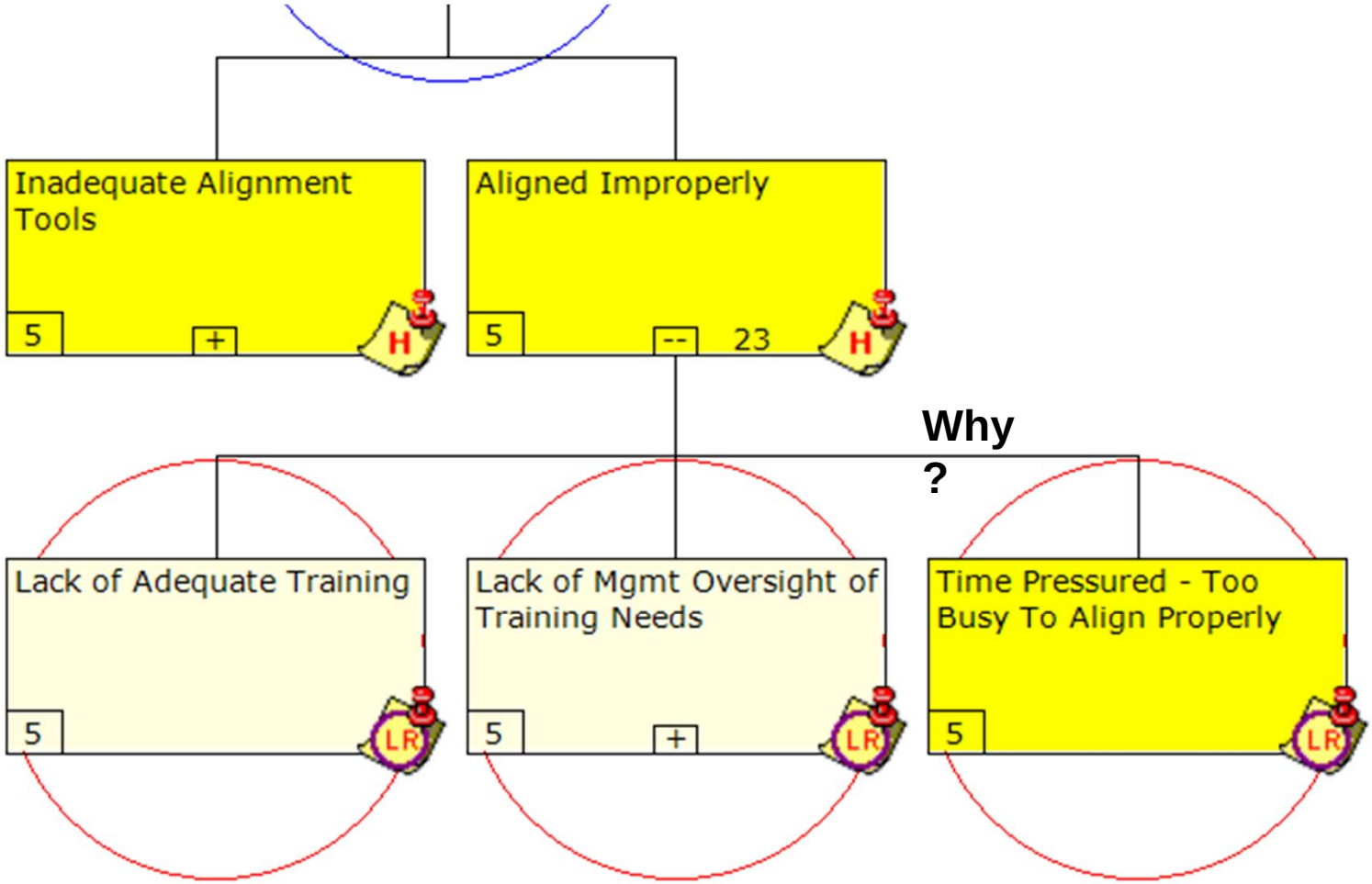

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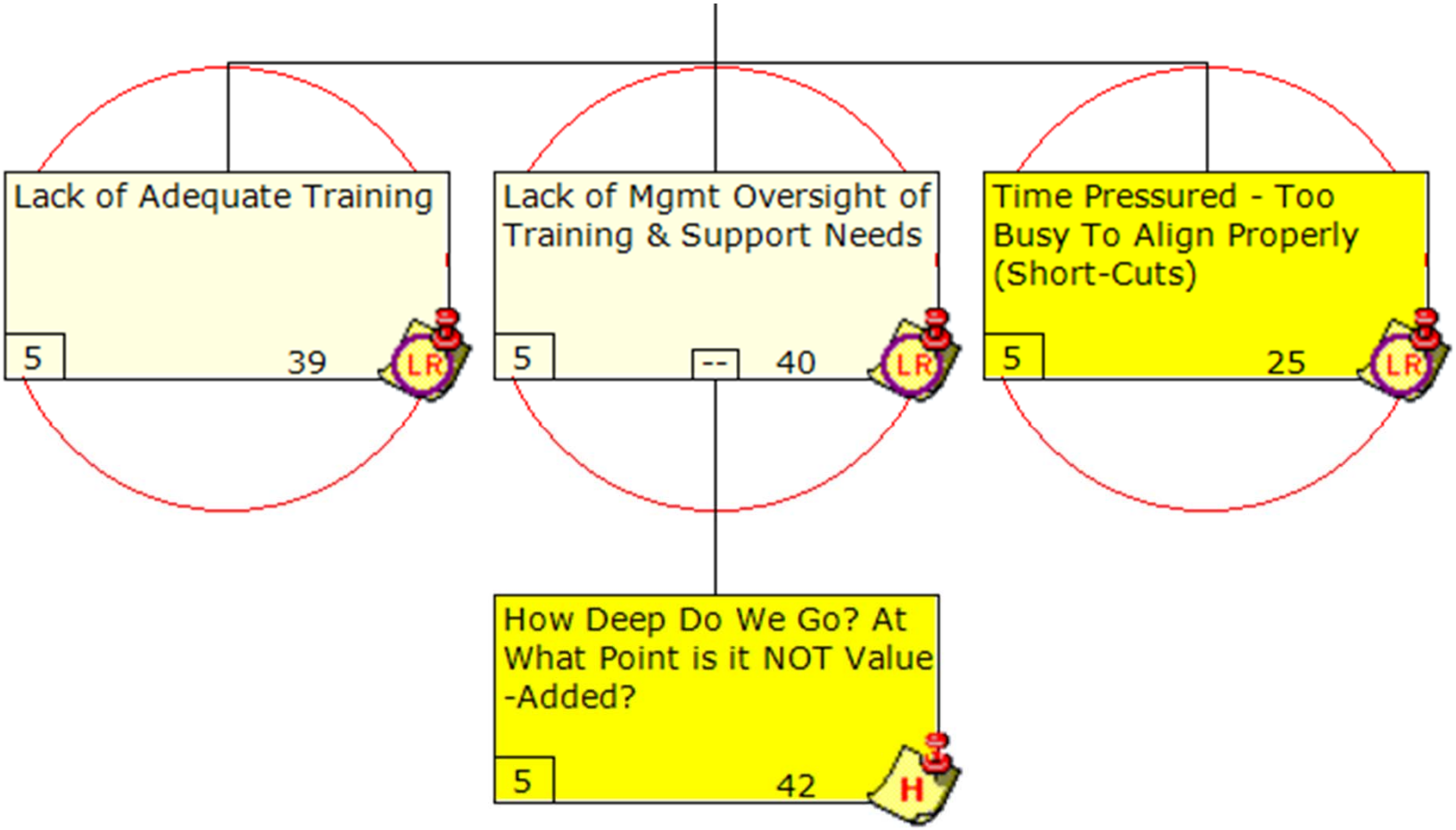

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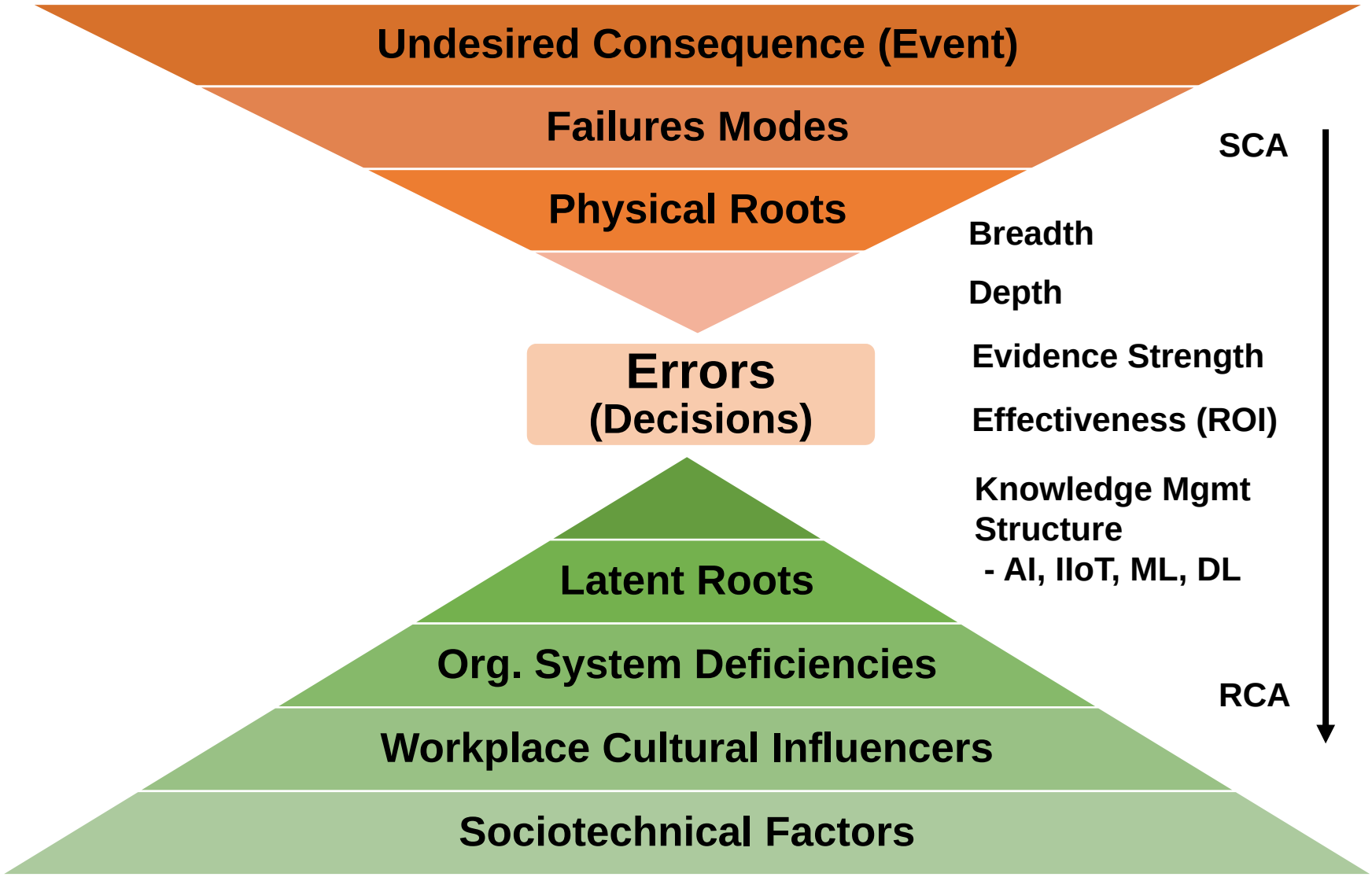
So What is the Difference Between RCA and SCA?...It Depends!



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Thanks for Your Time!

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