Using Root Cause Analysis to Enhance Risk Management

RIMS’16 GO BEYOND
RIMS ANNUAL CONFERENCE & EXHIBITION | SAN DIEGO | APRIL 10-13

Paul Daniele
Process Improvement Specialist

Mark Galley
Reliability Engineer

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Abstract

Risk management anticipates what could happen in the future in an effort to minimize negative consequences. Root cause analysis, however, has a different focus. It looks at an incident in the past to understand how and why it happened.

The ability to provide a thorough explanation of why a specific incident did happen is a prerequisite for mitigating risk going forward. Most organizations do a poor job investigating their problems. A complex problem can get condensed in an executive summary which provides the truth – but not the whole truth. When important details are omitted an incident gets distorted. Action plans are then developed from an analysis that did not adequately represent the issue. Many people, but not all, are then surprised when a previously unrecognized scenario materializes.

This presentation shows the simple, but important connection between root cause analysis and risk mitigation. It will also explain what’s commonly confused between the two approaches. There will be at least one case study of what a basic, mid-level and detailed cause-and-effect analysis looks like and how it can be used to manage risk within an organization.
How well does your company solve problems?

investigate and prevent
explain, document and present

Problem solving drives results.
Problem solving is culture.
Problem solving is a career skill.

Organization
Individual

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Analysis
To break into parts

1. Problem
2. Analysis
3. Solutions

6σ DMAIC
1. Define
2. Measure
3. Analyze
4. Improve
5. Control

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Common Root Cause Analysis Terminology

**Contributing Cause:** (Contributing Factor, Causal Factor)
- A cause which contributes to the effect.
- On its own a contributing cause cannot produce the incident.
- Controlling it reduces the likelihood, but doesn’t necessarily prevent the problem.

**Root Cause:** (Main Cause, True Cause)
- The main cause of the incident.
- Without the root cause the incident wouldn’t have occurred.
- Controlling the root cause eliminates the problem.
Keep the analysis simple and accurate.

TERMINOLOGY FOCUS - Unnecessary adjectives

True Cause
Main Cause
Primary Cause
Root Cause
Secondary Cause
Real Cause
Special Cause
Latent Cause
Action Cause
Immediate Cause
Basic Cause
Direct Cause
Indirect Cause
Environmental Cause
Intermediate Cause
Contributing Cause
People Cause
Condition Cause
Physical Cause
Predominant Cause
Essential Cause
Final Cause
Underlying Cause
Transitive Cause
Absolute Cause

Associated Cause
Overall Cause
Systemic Cause
Obvious Cause
General Cause
Programmatic Cause
Organizational
Cause
System Cause
Informal Cause
Trigger Cause
Proximate Cause
Preliminary Cause
Partial Cause
Human Cause
Procedure Cause
Material Cause
Prime Cause
Elemental Cause
Real Root Cause
True Root Cause
Contributing Factor
Causal Factor
End Cause

Causes

Evidence-based Cause-and-Effect

Cause

the producer of an effect supported with evidence

Possible Cause

Apparent Cause
Probable Cause
Likely Cause
Potential Cause
Theory
Hypothesis
Might have been
Could have been
I think
Possibly
Maybe

missing evidence

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**Root Cause Analysis and Risk Management**

**PROBLEM SOLVING MODELS**

Source of unnecessary disagreements, pointless debates

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### Being Right vs. Being Accurate

#### SCHOOL

<table>
<thead>
<tr>
<th>Problem</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is 2 x 7?</td>
<td>14</td>
</tr>
<tr>
<td>What is the capital of Texas?</td>
<td>Austin</td>
</tr>
<tr>
<td>What is the atomic weight of carbon?</td>
<td>12.01</td>
</tr>
<tr>
<td>Which month were you born?</td>
<td>July</td>
</tr>
<tr>
<td>What temp does water boil at sea level?</td>
<td>212°F, 100°C</td>
</tr>
</tbody>
</table>

**One Right-Answer**

Language: **“Right or Wrong”**

---

#### WORK

<table>
<thead>
<tr>
<th>Problem</th>
<th>Answer</th>
<th>PREVENTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanic Sank</td>
<td></td>
<td>Make sure it doesn’t happen again</td>
</tr>
</tbody>
</table>

Why did the Titanic sink?

- Ship hit iceberg
- Weak rivets
- Lookouts saw iceberg late
- Water filled hull

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Why?

- Ship hit iceberg
- Titanic sank
5-Whys

Why?

Why?

Why?

Why?

Why?

Titanic sank

Water filled hull

Openings in hull

Hull plates pulled apart at seams

Ship hit iceberg

Lookouts saw iceberg late
Why did the Titanic sink?

1. Safety Goal Impacted
   - 1500 people died
2. Titanic sank
3. Water filled hull
   - Ship hit iceberg
   - Lookouts saw iceberg late
4. Safety Goal Impacted
   - 1500 people died
   - Titanic sank
   - Water filled hull
   - Hull plates pulled apart at seams
   - Weak rivets
5. Safety Goal Impacted
   - 1500 people died
   - Hypothermia, drowning
   - People in cold water
   - Insufficient lifeboats
6. Safety Goal Impacted
   - 1500 people died
   - Titanic sank
   - Ship hit iceberg
   - Turn was ineffective
   - Speed

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Why did the Titanic sink?

- Titanic sank
  - Water filled hull
  - Hull plates pulled apart at seams
  - Weak rivets
    - Possible Solution: Use stronger rivets.
  - Ship hit iceberg
    - Possible Solution: Improve task to identify objects.
    - Lookouts saw iceberg late

- Insufficient lifeboats
  - Possible Solution: Add more lifeboats

- 1500 people died
  - Safety Goal Impacted
Reducing Risk

A combination of solutions produces a Cumulative Reduction in RISK.

Layers of Protection

Defense in Depth

Solutions – Changes that Reduce Risk

Possible Solution: Improve task to identify objects.
Possible Solution: Use stronger rivets.
Possible Solution: Add more lifeboats
Risk = Consequence \times Probability

Magnitude
Severity
Impact
Value
Gap

GOALS

Frequency
Likelihood
Chance
Rate
How explained do you want the problem?

More complete explanation...more opportunities to find effective solutions to reduce risk to an acceptable level.
## Root Cause Analysis and Risk Management

### How solved do you want the problem?

<table>
<thead>
<tr>
<th>Task</th>
<th>Frequency</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>20,000 Commercial Flights per day</td>
<td>2x per day</td>
<td>99.99%</td>
</tr>
<tr>
<td></td>
<td>1 every 5 days</td>
<td>99.999%</td>
</tr>
<tr>
<td></td>
<td>1 every 50 days</td>
<td>99.9999%</td>
</tr>
<tr>
<td></td>
<td>1 every 500 days</td>
<td>99.99999%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Task</th>
<th>Frequency</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task 2x per day</td>
<td>1 every 5,000 days</td>
<td>99.99%</td>
</tr>
<tr>
<td></td>
<td>~13 years</td>
<td>1 in 10,000</td>
</tr>
</tbody>
</table>

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Documenting and Presenting an Incident

- **Pencil & Paper**
  One or two people

- **Chart Paper with Post-It® notes**
  Use paper on a table or wall

- **Dry Erase Board**

- **Microsoft Excel®**
  Simple method for storing, sharing, emailing Cause Maps

Leave card or email for copy of Excel Cause Mapping Template
Take aways

(1) The important distinction between what DID happen and what COULD happen.

(2) How a thorough analysis of what DID happened is essential for effective risk management.

(3) A simple way in Excel® to create a visual dialogue for explaining and communicating risk.
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LinkedIn

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LinkedIn

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