Welcome to
8D Problem Solving Process - An Overview
Clinic #2
ASQ Orange Empire Monthly Dinner Meeting
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8D Problem Solving Process - An Overview

Presenter: Frank G. Adler
Operational Excellence Consulting

“People and their managers are working so hard to be sure things are done right, that they hardly have time to decide if they are doing the right things.”

Stephen R. Covey
Learning Outcomes:

✓ understand the purpose and objectives of each phase of the 8D Problem Solving Process

✓ learn how to utilize key problem solving tools in each phase of the 8D Problem Solving Process

✓ use assessing questions effectively at the end of each phase of the 8D Problem Solving Process

✓ be able to apply some of the problem solving tools and key learning points on a simple case study

Case Study: We will have a case study throughout the presentation so that you can apply and practice some of the key learning points.
Problem Solving Process - The Terminology

- **Symptom** – A quantifiable event or effect, experienced by a Customer (internal & external), that may indicate the existence of one or more problems.

- **Problem** – A deviation from an expectation, standard, or status quo; a perceived gap between the existing state and a desired state. In the context of the 8D Problem Solving Process the cause(s) of the problem is not known.

- **Possible Cause** – Any cause, identified through Process Mapping and C & E Matrix, Why-Why Diagram or Fishbone Diagram, that describes how an effect may occur.

- **Most Likely Cause** – A theory, based on available or collected data, that best explains the problem description.

- **Root Cause** – A verified cause that convincingly supports and explains ALL facts available and thus accounts for the problem; verified passively and actively, by making the problem come and go. Root causes are the fundamental, underlying reasons for a problem, e.g. management policies, product design, system design, process capabilities, technology constraints, standard operating procedures and human errors.
Problem Solving Process - The Tool Box

If you only have a hammer, everything looks like a nail.

→ You need the right tools for the right tasks.
The 8D Problem Solving Process

1. Establish the Team
2. Describe the Problem
3. Develop Interim Containment Actions
4. Define and Verify Root Causes and Escape Points
5. Choose and Verify Permanent Corrective Actions
6. Implement and Validate Permanent Corrective Actions
7. Prevent Recurrence
8. Recognize Team and Individual Contributions
“Establish the Team” Key Activities

**Purpose:** Establish a small group of people with the process and/or product knowledge, allocated time, authority, and skills in the required technical disciplines to solve the problem and implement corrective actions. Review and scope the problem or improvement opportunity.

- Review priorities, scope and complexity
- Identify if a team is needed
- Identify team members and establish the team
- Nominate a team leader, project champion and facilitator
- Establish roles and responsibilities
- Establish basic team guidelines
- Consider team building exercises
“Phase 1” Checklist Questionnaire

The Problem Solving Team:

- Are the people affected by the problem represented?
- Does each person have a reason for being on the team?
- Do the team members agree on membership?
- Is the team large enough to include all necessary input, but small enough to act effectively?
- The Team Leader has been identified?
- The Champion of the team has been identified?
- Need for a Facilitator to coach the process has been considered?
- Have the roles and responsibilities been reviewed?
The 8D Problem Solving Process

1. Establish the Team
2. **Describe the Problem**
3. Develop Interim Containment Actions
4. Define and Verify Root Causes and Escape Points
5. Choose and Verify Permanent Corrective Actions
6. Implement and Validate Permanent Corrective Actions
7. Prevent Recurrence
8. Recognize Team and Individual Contributions
“Describe the Problem” Key Activities

**Purpose:** Describe the internal or external problem by identifying “what is wrong with what” and detailing the problem in quantifiable terms.

- Develop a **Problem Statement**
- Develop a **Problem Description** using the “IS – IS NOT Matrix”
- Develop a **flowchart of the process** and identify critical process steps with respect to the Problem Description and Escape Point(s)
- Determine whether the problem describes a “**something changed**” or a “**never been there**” situation
- Develop a **Cause & Effect Matrix, Why-Why Diagram** or **Fishbone Diagram** to identify “all” possible causes?
- Establish a high-level project plan, including milestones, project goals and objectives
There are two steps to develop a good Problem Statement. The first step is used to identify the **object** and the **defect** and develop the **initial Problem Statement**.

The object and the defect are defined by asking “What is wrong with what?”

- **“What is wrong?”** is the defect
  - The defect is an unwanted characteristic present in a product or process – broken, missing, wrong, too short, …
- **“… with what?”** is the object
  - The object is the name given to a specific product or process that exhibits the defect
**The 5 Why’s**

**Description:** The 5 Why’s Analysis helps to **identify the final problem statement or in some cases even the root cause.**

**Step 1:** Develop an initial problem statement of the specific problem to be solved. Write it in the upper left corner of a piece of paper, flip chart or white board.

**Step 2:** Ask “Why?” this problem does or could occur. Write the cause (object & defect) underneath the initial problem statement.

**Step 3:** The cause identified in Step 2 now becomes a new problem statement. Repeat Step 2 and ask “Why?”, e.g. “Why would this situation occur?”, again.

**Step 4:** Continue Step 2 and Step 3 until you cannot for certain answer the question or reach an answer that is fundamental and actionable.
Once the initial problem statement (object & defect) is established, the second step is to use the “5 Why’s” and ask “Why would this situation occur?” or “Why is that happening to that object?”

The objective of this step is to refine the initial problem statement to

- determine the problem, rather than the symptom of the problem
- focus efforts on a single problem with a single root cause
- get as near as possible to the root cause using existing knowledge & information
- check if the root cause of the problem is really unknown

If you are certain that you have found the root cause, then you can immediately go to Phase 4 “Define and Verify Root Cause” and test your root cause theory.

However, if the cause is unknown and there is a need to find the root cause, then the last object and defect with an unknown cause is the final Problem Statement.
What is the Problem Statement (Object & Defect)?

WHY? → We did not have the “right” rework tool.

WHY? → The tool was not in inventory.

WHY? → The Supplier did not deliver the replacement.

WHY? → The Supplier did not receive our Purchase Order on-time.

WHY? → We did not submit the Purchase Order on time.

WHY? → We don’t know.

Initial Problem Statement

Final Problem Statement
The Task:

- Read the introduction to the “Felt Tip Marker” Case Study
- Develop the Problem Statement for the Case Study

OPEX PROBLEM SOLVING PROCESS WORKSHOP

FELT TIP MARKER CASE STUDY

John is one of our training consultants who takes a long time to make his point. His last expense report included a business expense for cleaning his shirt. Laundry is not a valid business expense unless the consultant is on the road for at least three days. When asked why he claimed the “business” expenses he explained that one of the red markers we gave him leaked ... all over his shirt.
Most problem solving projects will require a process flowchart as the problem is associated with a process that is failing. **The team needs to understand how that process works or at least is intended to work.**

A **Process Flowchart** is a graphical process description of the work flow or activities using standard symbols for each of the activities. Different types of activities are described with standard symbols. The problem areas in the process are often relatively easy to discover when assessing the flowchart.

- An ellipse shows the start and the end point of the process.
- A box describes an activity or process step.
- A diamond shows a decision making step.
- An arrow shows the direction from one activity to another.
“Change-Induced” vs. “Day-One-Deviation”

When the process performance once met the SHOULD and no longer does, then you have a “Change-Induced” problem.

When a condition required for achieving the SHOULD never existed, then you have a “Day-One-Deviation” problem.
The **Problem Description** defines the boundaries of the problem, in terms of *what it is and what it is not but could be*.

**Scientific description of any event** can be made by providing information on

- **What** the problem is and what it is not but could be?
  - *IS* - The long brackets are missing
  - *IS NOT* - The short brackets are not missing (but could be)

- **Where** the problem is and where it is not but could be?
  - *IS* - The order entry defects are in direct ship orders
  - *IS NOT* - The order entry defects are not in stock orders (but could be)

- **When** the problem occurs and when it does not but could?
  - *IS* - The clips started breaking in early 2010
  - *IS NOT* – The clips did not break before early 2010 (but could have)

- **How big** the problem is and how big it is not but could be?
  - *IS* - About 50% of the paychecks are incorrect
  - *IS NOT* – Not all paychecks are incorrect (but could be)
## The “IS – IS NOT” Matrix

### Problem Solving Process Worksheet

**Problem Statement:**

What is wrong with what?

| IS | IS NOT | DISTINCTIONS | CHANGES | TEST FOR MOST LIKELY CAUSES (+) (-) (?)
|----|--------|--------------|---------|----------------------------------|
| Describe what does occur | Describe what does not occur, but could occur | What could explain the IS-IS NOT? (People, Methods, Material, Machines, Environment) | What has changed in, on, around or about this distinction? When did it change? | <Define Possible Root Cause Theory>

<table>
<thead>
<tr>
<th>What?</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td>Object:</td>
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<tr>
<td>Defect:</td>
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<tr>
<td>Where is the object when the defect is observed? Where is the defect on the object? Are there any pattern or trends identifiable?</td>
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<tr>
<td>When was the defect observed first? Can or was the defect be observed before, during or after other events? When since has the defect occurred? Are there any pattern or trends identifiable?</td>
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<tr>
<td>How Big?</td>
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<tr>
<td>How many objects have the defect? What is the size of a single defect? How many defects are on each object? Are there any pattern or trends identifiable?</td>
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</tr>
</tbody>
</table>
The Task:

- Study the “Felt Tip Marker” Case Study (Part 1) thoroughly
- Develop the Problem Description for the Case Study

OPEX PROBLEM SOLVING PROCESS WORKSHOP

FELT TIP MARKER CASE STUDY

John is one of our training consultants who takes a long time to make his point.

His last expense report included a business expense for cleaning his shirt. Laundry is not a valid business expense unless the consultant is on the road for at least three days. When asked why he claimed the “business” expenses he explained that one of the red markers we gave him leaked … all over his shirt.
## Case Study - Problem Description

### PROBLEM SOLVING PROCESS WORKSHEET

**Problem Statement**

(What is wrong with what?): Red Felt Tip Marker Leaks

<table>
<thead>
<tr>
<th>IS</th>
<th>IS NOT</th>
<th>DISTINCTIONS</th>
<th>CHANGES</th>
<th>TEST FOR MOST LIKELY CAUSES (+) (-) (?)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe what does occur</td>
<td>Describe what does not occur, but could occur</td>
<td>What could explain the IS-IS NOT? (People, Methods, Material, Machines, Environment)</td>
<td>What has changed in, on, around or about this distinction? did it change?</td>
<td>&lt;Define Possible Root Cause Theory&gt;</td>
</tr>
</tbody>
</table>

**What?**

Object: Red felt tip marker

Defect: Leaks

**Where?**

Where is the object when the defect is observed? Where is the defect on the object? Are there any pattern or trends identifiable?

- Tip
- Barrel (side or base)
- Both our place and next door
- Just us or just next door
- All other places/customers
- No other places/customers

**When?**

When was the defect observed first? Can or was the defect be observed before, during or after other events? When since has the defect occurred? Are there any pattern or trends identifiable?

- First seen two weeks ago
- Before two weeks ago
- Daily
- Just some days
- Continuing
- Stopped
- Last ten days shipments
- Just some daily shipments
- Upon arrival
- Develops later (on shelf) in supply room

**How Big?**

How many objects have the defect? What is the size of a single defect? How many defects are on each object? Are there any pattern or trends identifiable?

- All red felt tip markers (100%)
- Just some red felt tip markers (less than 100%)
- All shipments
- Just some shipments
- All ten per day
- Less than 10 per days
- Slow drip
- Steady or pressurized stream
Identifying Possible Causes

To learn more about a specific problem and identify “all” possible causes, the following tools are often very helpful and widely used.

- **Process Flowchart** and **Cause & Effect Matrix** or
- **Why – Why Diagram** or
- **Fishbone Diagram**

These tools work really great in a team environment to ensure that everyone has a voice and every voice is being heard.

Select the Cause & Effect Matrix, the Why-Why Diagram or the Fishbone Diagram based on the problem you try to solve and/or your personal or team’s preference.
Cause-and-Effect or Ishikawa Diagram is another way of looking at the possible causes of a problem. It organizes large numbers of possible causes into pre-defined categories, e.g. 4Ms & 1 E or 4 Ps, or team-defined categories.

4M’s = MEN
METHODS
MATERIALS
MACHINES
+ ENVIRONMENT

4P’s = PEOPLE
PRODUCT
PRICE
PROMOTION
Problem Statement:

- The initial question “What’s wrong with what?” has been answered?
- The “5 Why’s” were used to asking questions “Do we know for certain why this is occurring?”
- A final problem statement (or specific root cause) has been defined (object and defect) and documented?

Problem Description:

- A thorough “IS – IS NOT” Analysis has been performed (what, where, when, how big) and documented?
- The problem description has been confirmed as to what the Customer and/or affected party(s) are experiencing?
- Physical evidence of the problem has been obtained?
“Phase 2” Checklist Questionnaire

Problem Description (cont.):

- Determination has been made as to whether this problem describes a “Change-Induced” or a “Day-One-Deviation” situation?
- The current process flow has been identified and documented (if applicable)?
- Process detail has been reviewed to determine where this problem first appears?
- Problem pattern(s) has been considered / evaluated?
- Similar components and/or parts have been reviewed for the same problem?
- All required data has been collected and analyzed?
- A Cause & Effect Matrix, Why-Why Diagram or Fishbone Diagram has been developed to identify possible causes?
The 8D Problem Solving Process

1. Establish the Team
2. Describe the Problem
3. **Develop Interim Containment Actions**
4. Define and Verify Root Causes and Escape Points
5. Choose and Verify Permanent Corrective Actions
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7. Prevent Recurrence
8. Recognize Team and Individual Contributions
“Develop Interim Containment Actions” Key Activities

**Purpose:** Define, verify and implement Interim Containment Action to isolate the effects of the problem from any internal and/or external Customer until Permanent Corrective (Preventive) Action are implemented.

- Define potential Interim Containment Action
- Verify effectiveness of potential Interim Containment Action
- Select and implement Interim Containment Action
- Validate effectiveness of implemented Interim Containment Action with the Customer
“Phase 3” Checklist Questionnaire

Planning:

- Appropriate departments have been involved in the planning of the Interim Containment Action
- Plans, including action steps, have been developed considering who needs to do what by when?
- The Customer’s viewpoint has been considered for the Interim Containment Action
- The Customer’s approval has been obtained?
- A validation method for the Interim Containment Action has been determined?

Post Implementation:

- The validation data indicates that the Customer is being protected from the symptom of the problem?
The 8D Problem Solving Process

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“Define and Verify Root Causes” Key Activities

**Purpose:** Isolate and verify the root cause by testing each root cause theory against the Problem Description and supporting data. Isolate and verify the place in the process where the effect of the root cause could have been detected and contained but was not (escape point).

- Establish any additional data collection plans needed to learn more about the problem and/or possible causes.

- Utilize the Cause & Effect Matrix, Why-Why Diagram or Fishbone Diagram created earlier to identify the most likely cause(s).

- Isolate and verify the most likely cause(s) by testing each Root Cause Theory against the Problem Description and the collected data.

- Isolate and verify the place in the process where the effect of the root cause could have been detected and contained but was not (escape point).
Comparative Analysis

- The Comparative Analysis is the third part of the 8D Problem Solving Process Worksheet.

- The Comparative Analysis connects the facts from the Problem Description ("IS – IS NOT" Matrix) with the analysis of possible causes using the Process Flowchart and the C&E Matrix or Why-Why Diagram or Fishbone Diagram.

- **Step 1:** Compare each “IS” with its corresponding/contrasting “IS NOT”. List any known **distinctions** and uncommon factors that could explain the “IS” and “IS NOT”.
  - Ask: What is unique, odd, different, distinctive, unusual about the “IS”? 
  - Consider the possible causes identified so far.

- **Step 2:** List all known **changes** in distinctions and uncommon factors.
  - Ask: What has changed in, on, around or about this distinction and uncommon factors?
Comparative Analysis - Example

- **Problem Description:**
  - “WHAT” IS – The Red Makers leak
  - “WHAT” IS NOT – The Blue Markers could leak, but are not

- **Comparative Analysis:**
  - **Distinctions**
    - 1. Different Color Plastic
    - 2. Different Color Ink
    - 3. Strawberry Scent in Red Marker
  - **Changes**
    - 1. New Plastic Supplier (5 weeks ago)
    - 2. Added Powder to Red Marker (2.5 weeks ago)
## Comparative Analysis

### PROBLEM SOLVING PROCESS WORKSHEET

<table>
<thead>
<tr>
<th>Problem Statement</th>
<th>Red Felt Tip Marker Leaks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What?</strong></td>
<td></td>
</tr>
<tr>
<td>Object:</td>
<td>Red felt tip marker</td>
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<tr>
<td>Blue, black or green marker</td>
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<tr>
<td><strong>Where?</strong></td>
<td></td>
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<tr>
<td>Defect:</td>
<td>Leaks</td>
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<tr>
<td>Totally dry</td>
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<td><strong>When?</strong></td>
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<tr>
<td>First seen two weeks ago</td>
<td>Before two weeks ago</td>
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<tr>
<td><strong>How Big?</strong></td>
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<tr>
<td>All red felt tip markers (100%)</td>
<td>Just some red felt tip markers (less than 100%)</td>
</tr>
</tbody>
</table>

### IS

<table>
<thead>
<tr>
<th>Describe what does occur</th>
<th>IS NOT</th>
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<td>Tip</td>
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<td>Barrel (side or base)</td>
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</tbody>
</table>

### IS NOT

<table>
<thead>
<tr>
<th>Describe what does not occur, but could occur</th>
<th>Distinctions</th>
<th>Changes</th>
<th>Test for Most Likely Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>What could explain the IS-IS NOT? (People, Methods, Material, Machines, Environment)</td>
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<tr>
<td>What has changed in, on, around or about this distinction? When did it change?</td>
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<tr>
<td>Define Possible Root Cause Theory</td>
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</table>
Case Study Group Work 3

The Task:

- Study the “Felt Tip Marker” Case Study (Part 2) thoroughly
- Perform a Comparative Analysis on the “Felt Tip Marker” Case Study

OPEX PROBLEM SOLVING PROCESS WORKSHOP

FELT TIP MARKER CASE STUDY

John is one of our training consultants who takes a long time to make his point. His last expense report included a business expense for cleaning his shirt. Laundry is not a valid business expense unless the consultant is on the road for at least three days. When asked why he claimed the “business” expenses he explained that one of the red markers we gave him leaked … all over his shirt.
## Case Study - Comparative Analysis

### PROBLEM SOLVING PROCESS WORKSHEET

**Problem Statement**
(What is wrong with what?):

Red Felt Tip Marker Leaks

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</tr>
</thead>
<tbody>
<tr>
<td><strong>What?</strong></td>
<td><strong>Object:</strong> Red felt tip marker</td>
<td>Blue, black or green marker</td>
<td>Red Plastic - Red Ink - Strawberry scent (2.5 weeks ago)</td>
<td>New Plastic Supplier (5 weeks ago) - Added Powder (2.5 weeks ago)</td>
</tr>
<tr>
<td></td>
<td><strong>Defect:</strong> Leaks</td>
<td>Totally dry</td>
<td></td>
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<tr>
<td><strong>Where?</strong></td>
<td>Tip</td>
<td>Barrell (side or base)</td>
<td>Felt Material</td>
<td>New Felt Supplier (1 Week ago)</td>
</tr>
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<td>Both our place and next door</td>
<td>Just us or just next door</td>
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<tr>
<td></td>
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<td>No other places/customers</td>
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</tr>
<tr>
<td><strong>When?</strong></td>
<td>First seen two weeks ago</td>
<td>Before two weeks ago</td>
<td>New Outside Sleeve Packaging (2 Weeks ago)</td>
<td>New Outside Sleeve Packaging (2 Weeks ago)</td>
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<tr>
<td></td>
<td>Daily</td>
<td>Just some days</td>
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<td>Continuing</td>
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<td>All ten per day</td>
<td>Less than 10 per days</td>
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<td></td>
<td>Slow drip</td>
<td>Steady or pressurized stream</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Definition Possible Root Cause Theory

Object: Red felt tip marker
Blue, black or green marker
Red Plastic - Red Ink - Strawberry scent (2.5 weeks ago)
New Plastic Supplier (5 weeks ago) - Added Powder (2.5 weeks ago)

Defect: Leaks
Totally dry

Tip
Barrell (side or base)
Felt Material
New Felt Supplier (1 Week ago)

Both our place and next door
Just us or just next door
All other places/customers

First seen two weeks ago
Before two weeks ago
New Outside Sleeve Packaging (2 Weeks ago)
New Outside Sleeve Packaging (2 Weeks ago)

Daily
Just some days

Continuing
Stopped

Last ten days shipments
Just some daily shipments

Upon arrival
Develops later (on shelf) in supply room

All red felt tip markers (100)
Just some red felt tip markers (less than 100)

All shipments
Just some shipments

All ten per day
Less than 10 per days

Slow drip
Steady or pressurized stream
In Phase 2 of the Fishbone Diagram, the team tries to reduce the large number of possible causes to a short list of most likely causes, using the Problem Description, Comparative Analysis, data analysis and the team’s combined process knowledge and experience.

Remember, the root cause(s) convincingly supports and explains ALL facts available and thus accounts for the problem. So, you need to ask yourself “If this would be the root cause of the problem, would it explain the Problem Description?”
Root Cause Theory Testing

- **Step 1:** Use the 8D Problem Solving Process Worksheet, supported by the C&E Matrix or Why-Why Diagram or Fishbone Diagram, to formulate Root Cause Theories based on the identified most likely cause(s) of the problem.

- **Step 2:** Enter a short description of a Root Cause Theory as header into the last column of the 8D Problem Solving Process Worksheet.

- **Step 3:** Assess the Root Cause Theory against each “IS” – “IS-NOT” statement.
  - Enter a “+” if the theory explains or does not conflict with the “IS”–“IS-NOT” statement.
  - Enter a “-” if the theory conflicts with the “IS”–“IS-NOT” statement.
  - Enter a “?” if you are not sure and further investigation may be necessary.

- **The Root Cause(s) convincingly supports and explains ALL “IS”–“IS-NOT” statements and thus accounts for the problem.**
## Root Cause Theory Testing

### PROBLEM SOLVING PROCESS WORKSHEET

<table>
<thead>
<tr>
<th>Problem Statement</th>
<th>Red Felt Tip Marker Leaks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem Statement</strong></td>
<td><strong>Red Felt Tip Marker Leaks</strong></td>
</tr>
<tr>
<td><strong>What?</strong></td>
<td><strong>Object:</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Defect:</strong></td>
</tr>
<tr>
<td><strong>Where?</strong></td>
<td><strong>Define Possible Root Cause Theory</strong></td>
</tr>
<tr>
<td>Where is the object when the defect is observed? Where is the defect on the object? Are there any pattern or trends identifiable?</td>
<td></td>
</tr>
<tr>
<td><strong>When?</strong></td>
<td></td>
</tr>
<tr>
<td>When was the defect observed first? Can or was the defect be observed before, during or after other events? When since has the defect occurred? Are there any pattern or trends identifiable?</td>
<td></td>
</tr>
<tr>
<td><strong>How Big?</strong></td>
<td></td>
</tr>
<tr>
<td>How many objects have the defect? What is the size of a single defect? How many defects are on each object? Are there any pattern or trends identifiable?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IS</th>
<th>IS NOT</th>
<th>DISTINCTIONS</th>
<th>CHANGES</th>
<th>TEST FOR MOST LIKELY CAUSES (+) (-) (?)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe what does occur</td>
<td>Describe what does not occur, but could occur</td>
<td>What could explain the IS-IS NOT? (People, Methods, Material, Machines, Environment)</td>
<td>What has changed in, on, around or about this distinction? When did it change?</td>
<td>&lt;Define Possible Root Cause Theory&gt;</td>
</tr>
</tbody>
</table>

2 3 2 2
## Root Cause Theory Testing - Example

### PROBLEM SOLVING PROCESS WORKSHEET

<table>
<thead>
<tr>
<th>Problem Statement</th>
<th>Red Felt Tip Marker Leaks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(What is wrong with what?):</strong></td>
<td><strong>Is</strong></td>
</tr>
<tr>
<td><strong>Describe what does occur</strong></td>
<td><strong>Describe what does not occur, but could occur</strong></td>
</tr>
<tr>
<td><strong>What?</strong></td>
<td>Object: Red felt tip marker</td>
</tr>
<tr>
<td><strong>Defect: Leaks</strong></td>
<td>Totally dry</td>
</tr>
<tr>
<td><strong>Where?</strong></td>
<td>Tip</td>
</tr>
<tr>
<td>Where is the object when the defect is observed? Where is the defect on the object? Are there any pattern or trends identifiable?</td>
<td></td>
</tr>
<tr>
<td><strong>When?</strong></td>
<td>First seen two weeks ago</td>
</tr>
<tr>
<td>When was the defect observed first? Can or was the defect be observed before, during or after other events? When since has the defect occurred? Are there any pattern or trends identifiable?</td>
<td></td>
</tr>
<tr>
<td><strong>How Big?</strong></td>
<td>All red felt tip markers (100)</td>
</tr>
<tr>
<td>How many objects have the defect? What is the size of a single defect? How many defects are on each object? Are there any pattern or trends identifiable?</td>
<td></td>
</tr>
</tbody>
</table>
Root Cause Verification

- **Active Verification** is a process where …
  - … the problem solver uses the variable thought to be the root cause to make the effect come and go. Both coming and going are important tests to confirm root causes.

- **Passive Verification** is done by observation.
  - With passive verification, you look for the presence of the root cause without changing anything. If you cannot prove the presence of the root cause, then chances are great that this most likely cause is not the root cause.

**Step 1:** Identify, document and perform a passive and/or active root cause verification method.

**Step 2:** Continue with the 8D Problem Solving Process if the passive and/or active root cause verification was successful. Otherwise, develop and test additional Root Cause Theories.
Escape Point Identification

Control System: A control system is a system deployed to monitor the product or process and ensure compliance to Customer requirements. It consists of responsibilities, procedures and resources.

Control Point: A control point is a location within the control system where the product or process is checked for compliance to certain specified requirements. There may be multiple locations within a control system.

Escape Point: The escape point is the earliest location in the process, closest to the root cause, where the problem could have been detected, but was not.

Step 1: Using the Process Flowchart, identify Escape Point(s) for the verified root cause(s).

Step 2: Determine if Control Points were missing or ineffective to detect the root cause of the problem at the escape point.
“Phase 4” Checklist Questionnaire

Root Cause(s):

- The factual information in the Problem Description has been updated?
- Differences unique to the “IS” when compared to the “IS NOT” have been identified?
- For a “Change-Induced” problem, changes in or around the differences have been uncovered?
- The root cause theories developed have been tested against each “IS” - “IS NOT” statement?
- The final root cause theory accounts for all “IS” - “IS NOT” statements?
- For multiple root causes, the causes were reviewed to determine if, collectively, they account for all of the problem description?
- The root cause(s) was/were verified passively and actively?
“Phase 4” Checklist Questionnaire

Escape Points:

☑ The process flow was reviewed and control points associated with the root cause(s) identified.

☑ A determination was made as to the existence of a control system to detect the problem?

☑ If a control system exists, changes from its original design (if any) have been identified?

Project Management:

☑ The Project Champion has reviewed and supports the analysis, findings and conclusions?

☑ 8D Problem Solving Process Worksheet & Project Documentation has been updated?
The 8D Problem Solving Process

1. Establish the Team
2. Describe the Problem
3. Develop Interim Containment Actions
4. Define and Verify Root Causes and Escape Points
5. **Choose and Verify Permanent Corrective Actions**
6. Implement and Validate Permanent Corrective Actions
7. Prevent Recurrence
8. Recognize Team and Individual Contributions
“Choose Permanent Corrective Actions” Key Activities

**Purpose:** Select the best Permanent Corrective Actions to remove the root cause and to address the escape point in the process. Verify that both decisions will be successful when implemented and not cause any undesirable effects.

- Develop solution(s) to remove the root cause(s)
- Develop solution(s) to address the escape point(s)
- Select the best solution(s) to remove the root cause(s)
- Select the best solution(s) to address the escape point(s)
- Verify that effectiveness of the selected solutions
- Verify that selected solutions do not cause any undesirable effects
Mistake-Proofing Principles, Methods & Devices

Six Mistake-Proofing Principles
1. Elimination
2. Prevention
3. Replacement
4. Facilitation
5. Detection
6. Mitigation

Five Mistake-Proofing Methods
1. Variation Control
2. Workplace Organization
3. Identification
4. Process Checks
5. Poka-Yoke Devices

Seven Mistake-Proofing Devices
1. Guide “Pins”
2. Error Detection & Alarms
3. Limit Switches
4. Sensors
5. Vision Systems
6. Counters & Timers
7. Checklists
SIM cards only fit one way. The right way.

Expose your team to (simple) everyday Mistake-Proofing devices and examples and make them think about how they could use these concepts in their own work area.
Double-Team & Multivoting

3 - 5 Solutions

Three Solutions from the 1. Double Team

1 2 3

4 5 6

Selection of the 2-3 most voted solutions

5 3 1

Three Solutions from the 2. Double Team

3 - 5 Solutions

3 - 5 Solutions

3 - 5 Solutions
Double-Team & Multivoting

Double team ("2&2") is a team working technique which ensures everybody’s contribution in creating ideas.

1. Present the problem statement
   Team Leader ~ 2 min

2. Create ideas (3-5 ideas per person)
   All Individually ~ 10 min

3. Discussion of ideas in double teams
   Double Teams ~ 15 min
   ➢ choose the 3 best ideas
   ➢ hang on the wall

4. Present ideas to the entire team
   Double Teams ~ 5 min
   ➢ no discussion

5. Place similar solutions into groups
   Team ~ 5 min

6. Voting
   All Individually ~ 5 min
   ➢ 5 votes per person
   ➢ max 2 votes per solution
   ➢ max 1 vote for own solutions

7. Counting the votes
   Team Leader ~ 5 min

8. Choose the solution(s) with most votes
   Team ~ 2 min
“Phase 5” Checklist Questionnaire

Solution Selection:

- Criteria have been established for selecting solutions for root cause(s) and escape points?
- Project Champion agrees with selection criteria?
- The right experience is on the team to choose the best solutions?
- Full range of alternatives have been considered for the solutions?
- The features and benefits for the perfect choice have been preserved?
- A risk analysis was performed on the solutions selected?
- All affected parties were consulted on the selected solutions?
- Consideration has been given to the resources required for the implementation and ongoing support or maintenance of the solutions?
“Phase 5” Checklist Questionnaire

Solution Verification:

- Evidence (proof) exists that these solutions will resolve the problems at the root cause level?
- Variables measured during the verification step ensure sound verification?
- Verification methods evaluated the solutions over the full range of operating conditions?

Project Management:

- 8D Problem Solving Process Worksheet & Project Documentation has been updated?
The 8D Problem Solving Process

1. Establish the Team
2. Describe the Problem
3. Develop Interim Containment Actions
4. Define and Verify Root Causes and Escape Points
5. Choose and Verify Permanent Corrective Actions
6. **Implement and Validate Permanent Corrective Actions**
7. Prevent Recurrence
8. Recognize Team and Individual Contributions
“Implement Permanent Corrective Actions” Key Activities

**Purpose:** Plan and implement selected Permanent Corrective Actions, remove the Interim Containment Action. Monitor long-term results.

- Implement the best solution(s) to remove the root cause(s)
- Implement the best solution(s) to address the escape point(s)
- Validate the effectiveness of the implemented solutions from the Customer perspective
- Monitor the effectiveness of the implemented solutions and assure that they do not cause any undesirable effects
- Remove Interim Containment Action(s)
“Phase 6” Checklist Questionnaire

Planning:

- Need for Permanent Corrective Actions implementation support from other departments has been evaluated?
- Consideration was made to the need of Customer and Supplier involvement?
- An action plan has been defined (responsibilities, timelines, financial resources, support requirements, …)?
- The plan has been communicated to those that have a need to know?
- The Champion agrees with the plan?
- Measurables have been identified for the validating the outcome of the Permanent Corrective Actions?
“Phase 6” Checklist Questionnaire

Validation:

- The Interim Containment Action has been discontinued?
- Validation measurables have been proven that the unwanted effect has been totally eliminated?
- Long-term results are continuing to be monitored?
- The Customer has provided confirmation that the Permanent Corrective Actions are effective?

Project Management:

- 8D Problem Solving Process Worksheet & Project Documentation has been updated?
The 8D Problem Solving Process

1. Establish the Team
2. Describe the Problem
3. Develop Interim Containment Actions
4. Define and Verify Root Causes and Escape Points
5. Choose and Verify Permanent Corrective Actions
6. Implement and Validate Permanent Corrective Actions
7. **Prevent Recurrence**
8. Recognize Team and Individual Contributions
“Prevent Recurrence” Key Activities

**Purpose:** Modify the necessary systems, including policies, methods, and procedures, to prevent recurrence of the problem and similar ones.

- Identify opportunities to improve systems, policies, methods and procedures for the present problem
- Identify opportunities to improve systems, policies, methods and procedures for similar problems
A Control Plan is a written statement of an organization’s quality planning actions for a specific process, product, or service.

The **Objective of an effective Process Control Plan** is to

- operate processes consistently on target with minimum variation, which results in minimum waste and rework
- assure that product and process improvements that have been identified and implemented become institutionalized
- provide for adequate training in all standard operating procedures, work instructions and tools
Out-of-Control-Action-Plans (OCAP)

- The OCAP is a systematic and ideal problem-solving tool for process problems because it reacts to out-of-control situations in real time.
- OCAPs standardize the best problem-solving approaches from the most skilled and successful problem solvers (experts/operators).
- The OCAP also allows (and requires) off-line analysis of the terminators to continually improve OCAP efficiency.
“Phase 7” Checklist Questionnaire

Problem History:

☐ How and where the problem entered the process has been identified?

☐ Why the problem occurred there and why it was not detected has been confirmed?

☐ We have considered whether confusion or lack of knowledge contributed to the creation of this root cause and escape?

☐ Affected parties have been identified?

Corrective & Preventive Solutions:

☐ Policies, methods, procedures, and/or systems have been modified, documented and implemented to prevent recurrence of the root cause(s) and/or escape?

☐ Practices needing standardization have been identified, defined and implemented?
“Phase 7” Checklist Questionnaire

Corrective & Preventive Solutions (cont.):

- Plans have been written to coordinate preventive actions and standardize the practices?
- A method for communicating to those affected by the changes in the new practices has been determined?
- The Champion concurs with the identified corrective & preventive actions and plans?

Project Management:

- 8D Problem Solving Process Worksheet & Project Documentation has been updated?
The 8D Problem Solving Process

<table>
<thead>
<tr>
<th>Step</th>
<th>Task(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Establish the Team</td>
</tr>
<tr>
<td>2</td>
<td>Describe the Problem</td>
</tr>
<tr>
<td>3</td>
<td>Develop Interim Containment Actions</td>
</tr>
<tr>
<td>4</td>
<td>Define and Verify Root Causes and Escape Points</td>
</tr>
<tr>
<td>5</td>
<td>Choose and Verify Permanent Corrective Actions</td>
</tr>
<tr>
<td>6</td>
<td>Implement and Validate Permanent Corrective Actions</td>
</tr>
<tr>
<td>7</td>
<td>Prevent Recurrence</td>
</tr>
<tr>
<td>8</td>
<td>Recognize Team and Individual Contributions</td>
</tr>
</tbody>
</table>
“Recognize the Team” Key Activities

**Purpose:** Complete the team experience and sincerely recognize both team and individual contributions. Celebrate success and identify lessons learned.

- Perform a final review of the problem solving project
- Finalize and archive project documentation
- Recognize the team’s success and individual contributions
- Capture lessons learned and integrate findings into the 8D Problem Solving Process
- Reward and celebrate
The End …

“Perfection is not attainable, but if we chase perfection we can catch excellence.”

- Vince Lombardi