



How to Carry Out Problem Solving

Value Chain Competitiveness (VCC)

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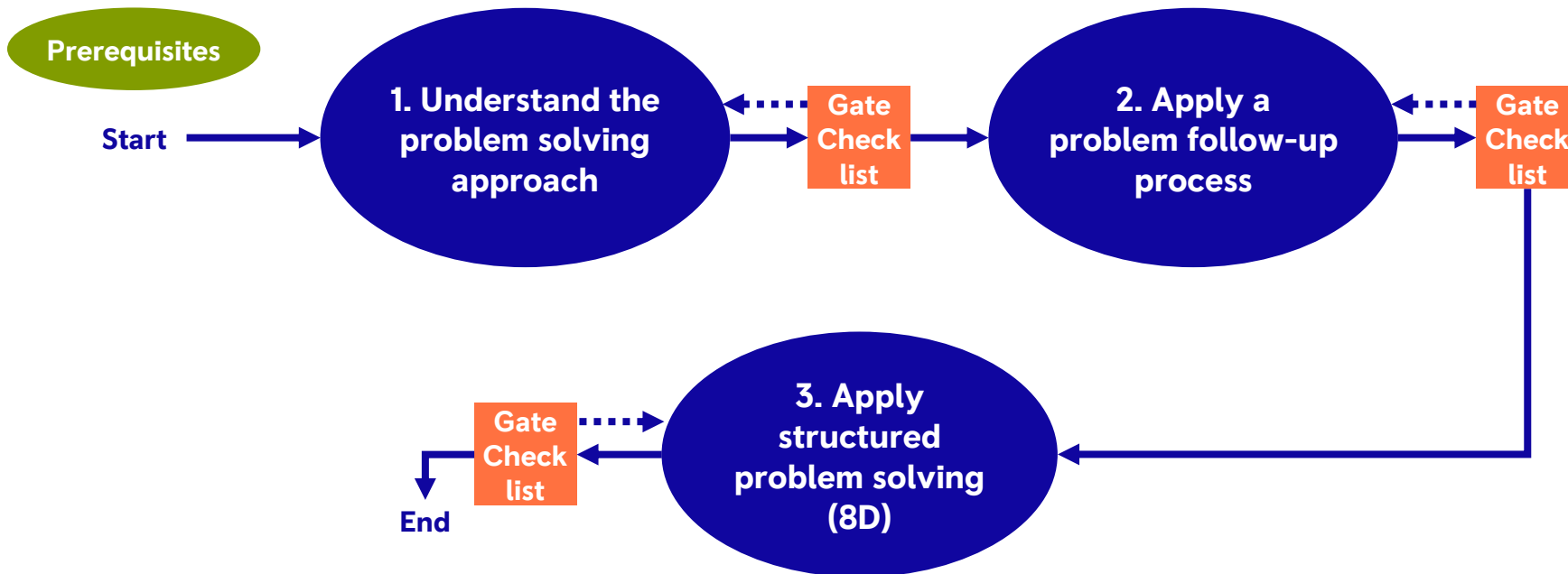
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How to Carry Out Problem Solving



Scope

Objectives & Principles





This 'How To' will enable you to:

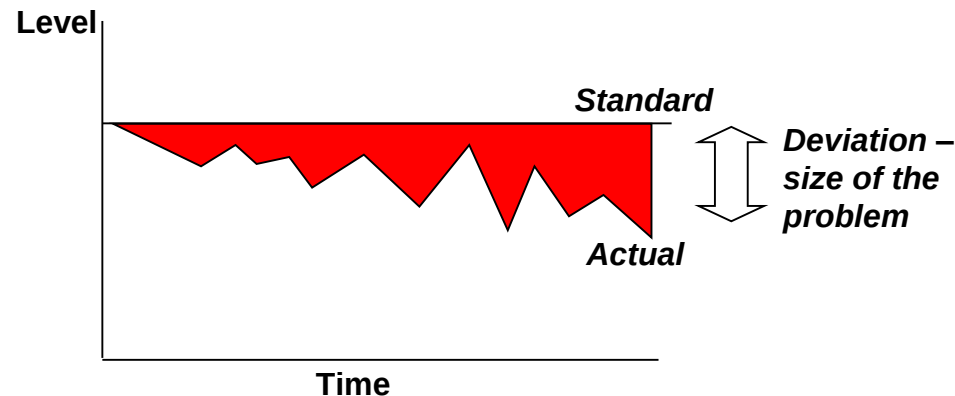
- Understand techniques for practical problem solving and develop an approach for applying them
- Understand and apply a practical problem solving process used to manage the majority of problems encountered – the problem follow-up process or 3Cs (concern, cause, countermeasure)
- Understand and apply the 8D process (8 Disciplines)

Objective and Principles



Definition: A problem is anything that deviates from the ideal situation or standard

- Three main factors to consider:
 - The standard
 - The deviation away from the standard
 - Time elapsed (for history / trend)
- Problem solving is about logically and methodically analysing the process, evidence and behaviours to:
 - protect the customer and downstream areas from further escapes
 - isolate non-compliance
 - determine the root cause of problems (& escapes) and fix it permanently



- Effective problem solving is only finished when we can:
 - conclusively prove the causes that we have identified
 - demonstrate that we have delivered a sustained fix
 - implement the fix in all similar products and processes required

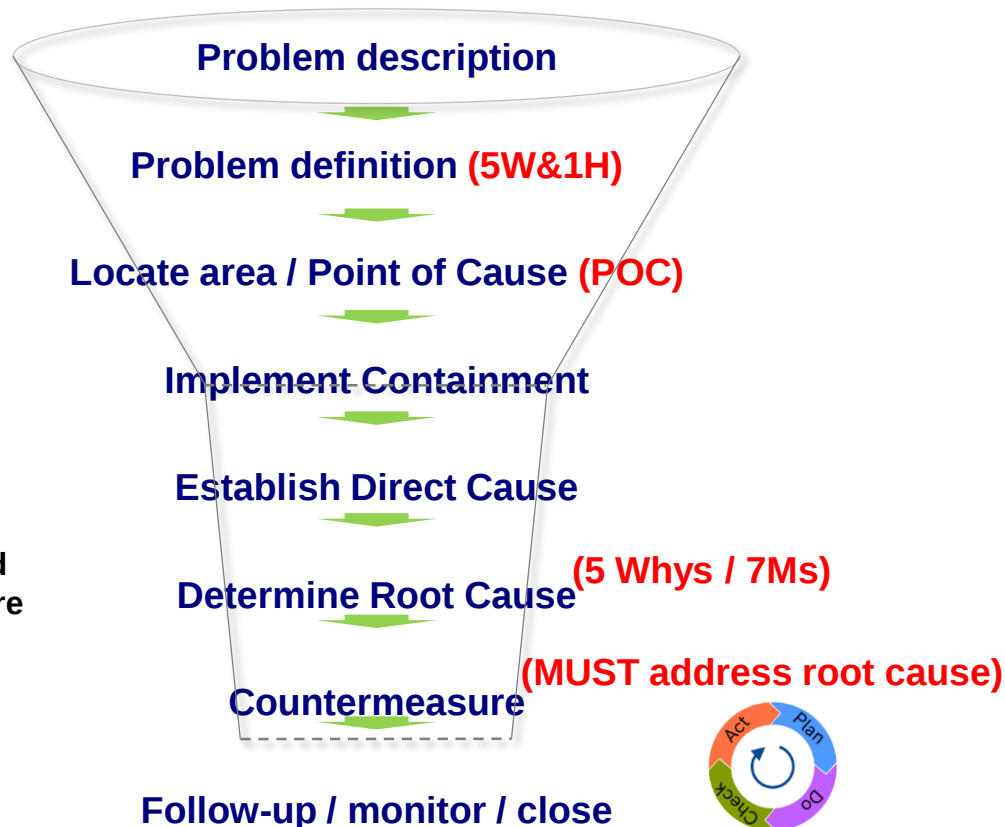
Objective and Principles



'Standard' approach

Grasp the situation / understand the problem

Investigate and countermeasure





Prerequisites



Knowledge:

- Existing problem solving activities

Commitment:

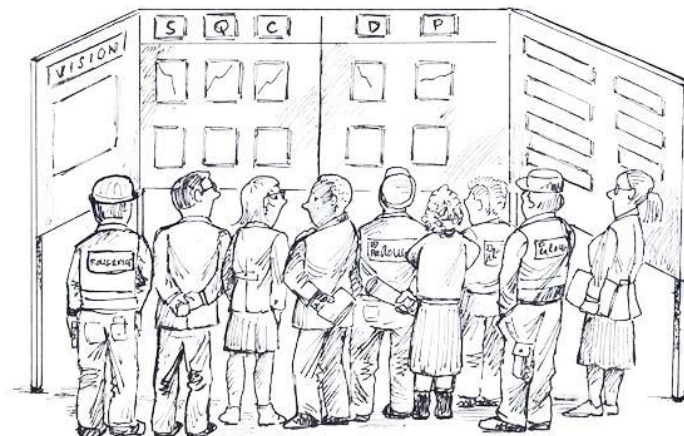
- Buy-in from the team (including the support team) to establish a problem solving process, and to support its effective operation

1. Understand the problem solving approach



Understand problem solving approaches

- The visual management system should allow problems to be highlighted and dealt with immediately, in “real time”
- The responsibilities should be clear and visual showing when to solve problems, when to escalate problems and how to respond to problem escalation
- The environment and leadership support should enable all employees to have a basic capability to solve problems using a structured approach

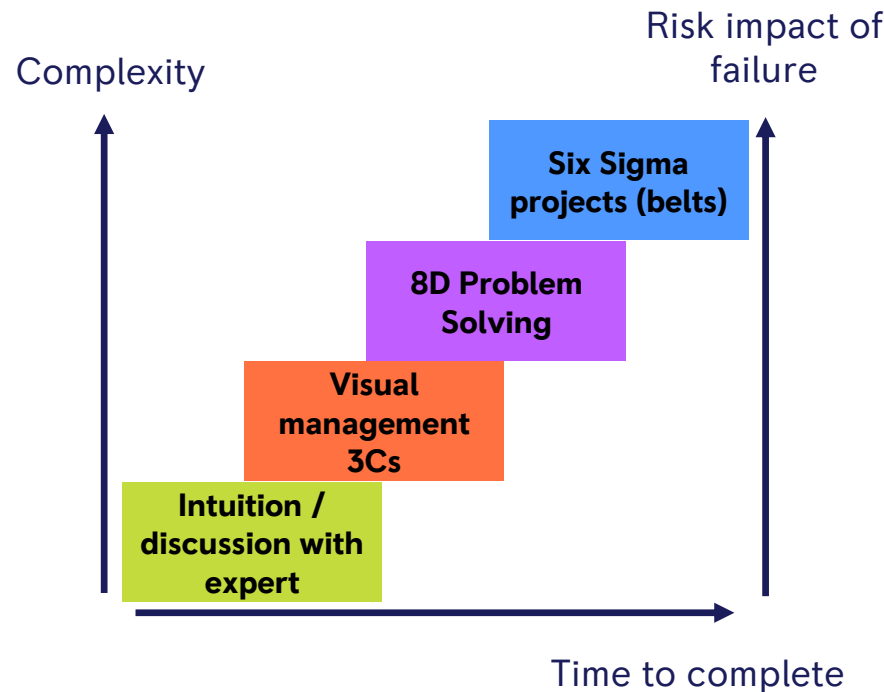


1. Understand the problem solving approach



Understand problem solving approaches

- There are numerous approaches to problem solving considering complexity, time to complete analysis, and risk impact of failure
- The majority of problems can be solved with a simple Concern/Cause/Countermeasure (3Cs) process and a structured problem solving methodology (eg. 8D process)



Gate checklist 1: Understand the problem solving approach



- ☒ Team visual management includes problem solving to manage issues
- ☒ The problem solving process is defined and managed, including
 - ☒ Responsibilities
 - ☒ Escalation
 - ☒ Leadership support
- ☒ The problem solving approach is understood and chosen techniques selected for application



2. Apply a problem follow-up process



Applying the 3Cs – Concern, Cause, Countermeasure

- A 3C sheet is a key visual management tool that helps to share and clearly communicate problem volume and status
- The problem follow-up sheet enables anyone to raise a problem, follow a structured process and share progress towards problem resolution

3C Problem Follow Up Sheet				Championed by			
				Activity/Project			
No. / Date / Raiser	Concern Description / Sketch	Cause (or immediate containment)	Countermeasure Action Steps	Who (Champ)	When (Overall)	Category	Status
	C oncern	C ause	C ountermeasure				

Category	1 Do Now	2 Within 1 week - Team	3 Within 1 week - External Resource	4 Mid-term Activity
Status	Problem Identified	Countermeasure Proposed & Agreed	Countermeasure In-Progress, with Owners and Targets Agreed	Problem Solved and Confirmed by Raiser

C Concern

- Identify the concern

C Cause

- Find the root cause of the concern
- Implement any containment actions

C Countermeasure

- Identify and implement actions that permanently address the root cause



2. Apply a problem follow-up process



Applying the 3Cs – Concern, Cause, Countermeasure

3C Problem Follow Up Sheet				Championed by <i>S. James (Red cell P/L)</i>			
				Activity/Project <i>Red cell team actions</i>			
No. / Date / Raiser	Concern Description / Sketch	Cause (or immediate containment)	Countermeasure Action Steps	Who (Champ)	When (Overall)	Category	Status
1 02 May J. Blogg	Trip hazard identified by crane lifting tackle located on floor to the side of rack #3 (see sketch)	No home location for lifting tackle from date of delivery. Immediate Containment - locate under of rack away from aisle	Agree permanent home location & implement storage solution. Train SS standard & compliance cross-shift.	V. Goode	09 May		

The unique identifier gives an idea of the volume of problems raised. The date shows how long a problem has been open. Raiser id - for further information.

The problem Concern: keep it simple and use facts and data. Use Ws and 1 H where appropriate (what, where, who, why, when, how).

The sheet title box provides traceability to the individual and the related problem activity.



2. Apply a problem follow-up process



Applying the 3Cs – Concern, Cause, Countermeasure

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The problem **Cause**: describe the root cause if known. A risk containment may also be required. Root cause analysis techniques may include the use of a fishbone (or Ishikawa) diagram or a '5 Whys' approach.

The problem **Countermeasure**: describe the root cause if known. A risk containment may also be required. Root cause analysis techniques may include the use of a fishbone (or Ishikawa) diagram or a '5 Whys' approach.

The countermeasure 'who' and 'when' is agreed (not allocated).

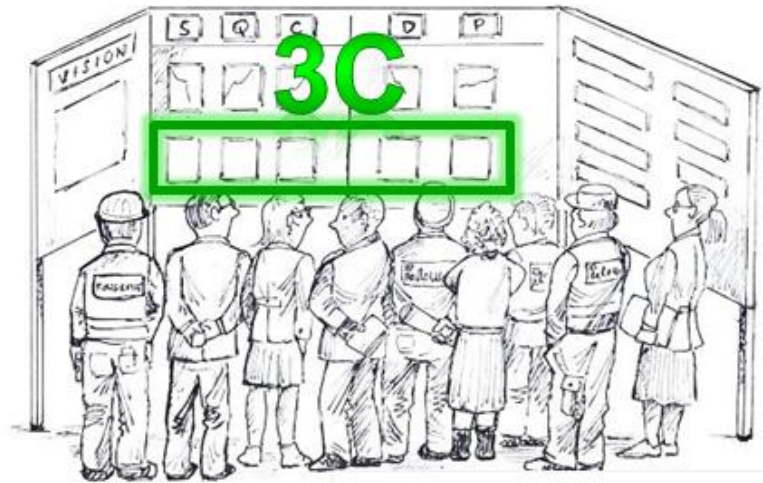
Status tracks the problem to closure, confirmed by the raiser of the problem.

2. Apply a problem follow-up process



Applying the 3Cs – Concern, Cause, Countermeasure

- Regular reviews should be held to confirm progress, share status and take action where required
- Wherever possible, problems and concerns should be solved by the local team
- In some cases, for example repeat concerns, more help may be required
- An escalation process should be implemented to enable support to be allocated to overcome more difficult issues
- The 3C process is a great tool for recording, visualising and solving problems to continuously improve performance



3	Blade scrapped during re-cut process	Wrong re-cut programme selected	Create SOP for selecting re-cut programme	Stuart	Fri 11th Feb	2	
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Single 3C strips can be separated to be worked on by individuals or teams



Gate checklist 2: Apply a problem follow-up process



- ☒ The problem follow-up process is understood by all
- ☒ The principles of the 3C sheet are incorporated into the applied follow-up process
- ☒ The problem follow-up process is being managed, with
 - ☒ Regular reviews taking place within local team
 - ☒ Escalation being supported
- ☒ Root cause issues are being resolved



3. Apply structured problem solving (8D)



Plan-Do-Check-Act thinking through the 8 disciplined steps (8D)

0	1	2	3	4	5	6	7	8
Implement immediate containment and prepare	Form the team	Define the Problem	Develop containment action	Identify and verify Root Cause	Identify Corrective Action	Implement Corrective Action	Define and plan Preventative action	Recognise the team



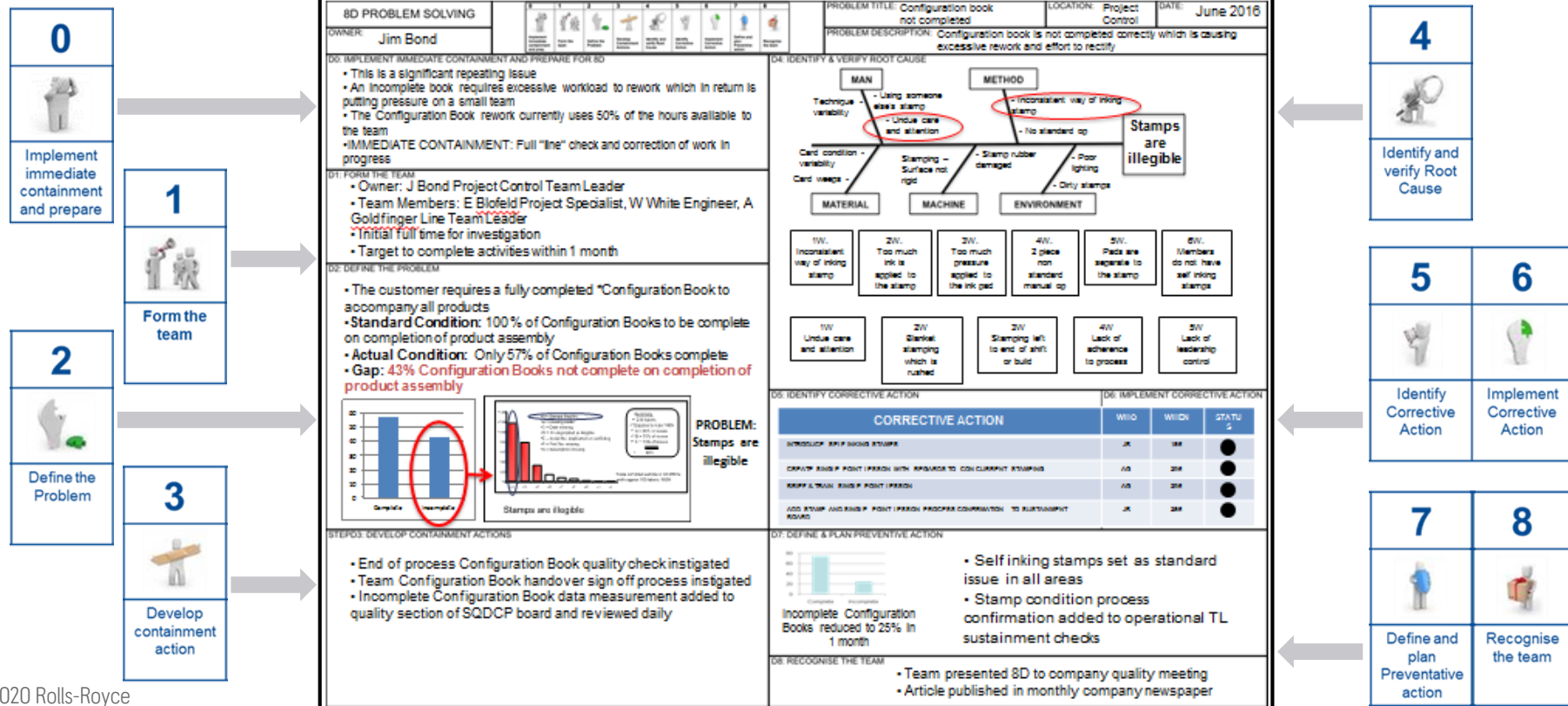
3. Apply structured problem solving (8D)

BACK

Map

NEXT

8D problem solving report 'on a single page'





3. Apply structured problem solving (8D)



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Implement immediate containment and prepare	Form the team	Define the Problem	Develop containment action	Identify and verify Root Cause	Identify Corrective Action	Implement Corrective Action	Define and plan Preventative action	Recognise the team

0: Implement immediate containment and prepare

- Define initial problem symptoms
- Engage stakeholders
- Review problem type history
- Have we seen it before?
- Is emergency action necessary?
- Is an 8D appropriate?

1: Form the team

- Identify key stakeholders & develop a communication plan
- Identify team members
 - Full time / part time
 - Sponsor / investigation owner / coach
- Develop top level plan

3. Apply structured problem solving (8D)



0	1	2	3	4	5	6	7	8
								
Implement immediate containment and prepare	Form the team	Define the Problem	Develop containment action	Identify and verify Root Cause	Identify Corrective Action	Implement Corrective Action	Define and plan Preventative action	Recognise the team

2: Define the Problem

- Describe the problem
 - What, where, who, why, when and how? (5Ws & 1H)
- Establish objectives
- Build a timeline of events
- Define boundaries
 - What extent of the value stream is involved?
- Collect and analyse data
 - Decisions based on facts
 - Use 7 Quality tools (break down the problem)

3: Develop containment action

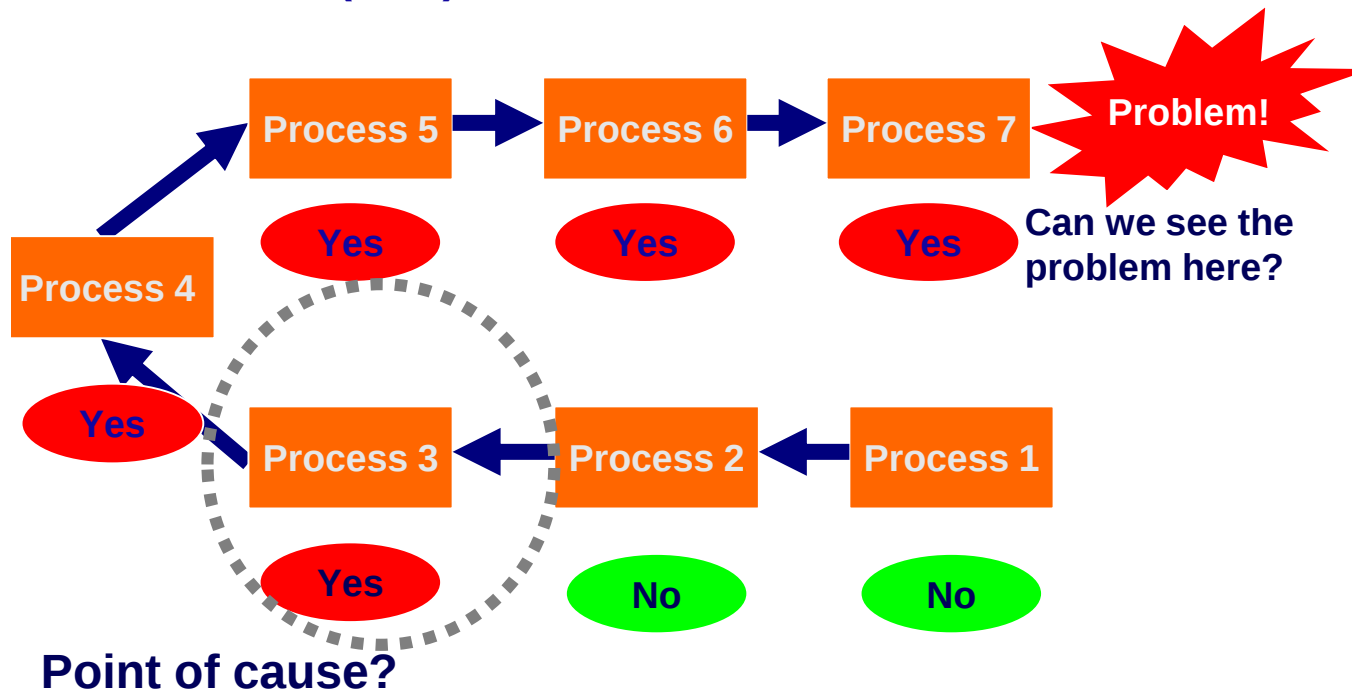
- Protect the customer and your company
- Evaluate the risk
- Contain – Locate, Check, Sentence, Record
- Maintain the supply chain
- Read across

Pareto diagrams **Graphs & control sheets**
Scatter diagram **Check sheets**
Histogram **Stratification**
Cause & effect (fishbone) diagrams

3. Apply structured problem solving (8D)



Establish the Point of Cause (POC)





3. Apply structured problem solving (8D)



Grasp the situation using '5Ws & 1H'

- To understand and communicate the problem effectively, use the 5Ws & 1H tools:

- **What?**
- **Where?**
- **Who?**
- **Why?**
- **When?**
- **How?**



3. Apply structured problem solving (8D)



0	1	2	3	4	5	6	7	8
								
Implement immediate containment and prepare	Form the team	Define the Problem	Develop containment action	Identify and verify Root Cause	Identify Corrective Action	Implement Corrective Action	Define and plan Preventative action	Recognise the team

4: Identify and Verify Root Cause

- Identify possible causes
 - Escape
 - Problem
 - Management system failure
- Evaluate them
- Verify them
- Check for multiple causes

5: Identify Corrective Action

- Develop possible solutions
 - Escape
 - Problem
 - Management system failure
- Evaluate solutions
- Best effectiveness / time / cost balance
- Verify actions address all the causes





3. Apply structured problem solving (8D)



'5 Whys' Root Cause Analysis (RCA)

How many times do you ask why?

- Until you establish the Root Cause of the problem

The Root Cause:

- Rarely obvious
- Established theory may be tested by switching the problem on and off

Containment:

- Often countermeasures cannot be implemented immediately; a containment action will be required
- Implement on the spot to prevent the abnormal occurrence, maintaining the required Customer requirement rate
- A containment must never be interpreted as a countermeasure! Implement with an agreed target closure date, and follow-up with frequent progress / status reviews.

3. Apply structured problem solving (8D)



Taiichi Ohno's '5 Whys' example

Problem: **Robot stops operating suddenly**

1st Why: Why did it stop?

No power as the fuse melted...

2nd Why: Why did the fuse melt?

Current draw was too high for the fuse which overloaded...

3rd Why: Why did it overload?

Excessive friction through inadequate bearing lubrication...

4th Why: Why was the lubrication inadequate?

The oil pump was not drawing enough oil...

5th Why: Why was the oil pump not drawing enough oil?

The pump shaft was worn...

6th Why: Why was the pump shaft worn?

The oil was contaminated with abrasive particles...

7th Why: Why was the oil contaminated?

No oil filter on the intake pump...

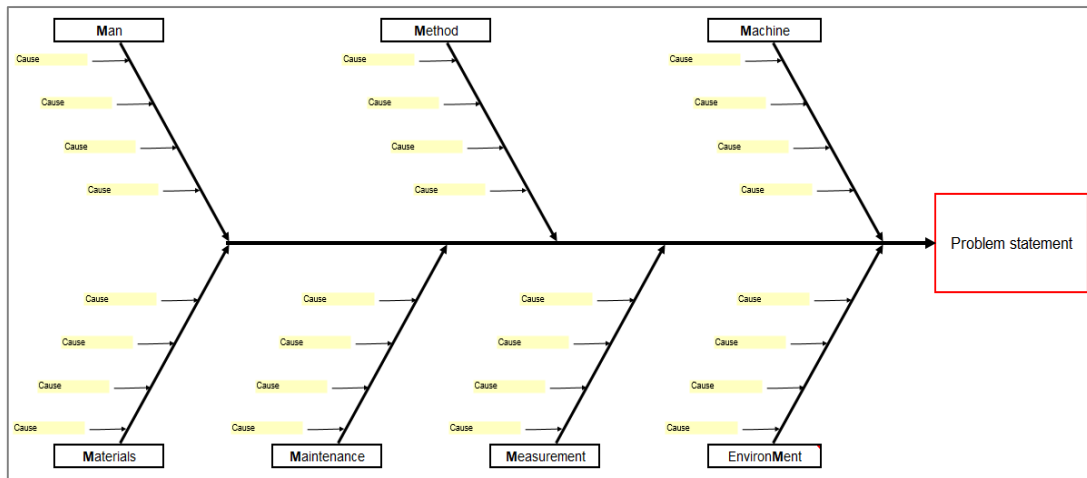


3. Apply structured problem solving (8D)



7Ms Root Cause Analysis (RCA)

Fishbone/Ishikawa Diagram



- **Causal factor** – removal may reduce the risk of a problematic outcome but **won't** remove it with any certainty
- **Root cause** – removal / countermeasure **will** prevent a problem occurring
- Addressing a **causal factor** instead of the **root cause** does not solve the **problem**, so we need to determine the problem root cause through **Root Cause Analysis**

3. Apply structured problem solving (8D)



0	1	2	3	4	5	6	7	8
								
Implement immediate containment and prepare	Form the team	Define the Problem	Develop containment action	Identify and verify Root Cause	Identify Corrective Action	Implement Corrective Action	Define and plan Preventative action	Recognise the team

6: Implement Corrective Action

- Project management
 - Plan
 - Timing
 - RACI (responsible, accountable, consulted, informed)
- Remove containment
- Validate that actions do what they should



7: Define and plan Preventative action

- Identify opportunities for similar problems
- Look for systematic causes
- Identify changes, reinforcements & improvements
- Develop and implement action plans

8: Recognise the team

- Document the investigation
- Look at lessons learnt
- Recognise the team effort / celebrate



Gate checklist 3: Apply structured problem solving (8D)



- ☒ A structured problem solving process is understood by all
- ☒ Appropriate training of structured problem solving has taken place (incl. the 7 quality tools)
- ☒ The principles of the 8 Disciplines are incorporated into the applied process
- ☒ The structured problem solving process is being managed, with
 - ☒ Regular reviews of status and process effectiveness
 - ☒ Escalation being supported
- ☒ Root cause issues are being resolved