

# The 8D method



**Problem solving  
Root cause analysis (RCA)**

# The 8D method

**Problem solving** is pre-eminently a process that has many uncertainties and is therefore **difficult to plan and control**.

Depending on the scope and context of your project, there may be dozens to hundreds of these problems, ranging from small to large and varying in importance. Some problems occur with the end user (often called *field problems*), some problems affect the production or logistics process, and some are discovered during the project itself (for example, during testing).

Resolving problems can have a major impact on your project; because of the capacity it requires, because it disrupts your existing plan and **because the progression of a problem-resolution process can be difficult to predict**.

**The 8D method helps you structure your problem resolution efforts and make your progress measurable. The method was made popular by Ford** and consists of eight logical steps (D1 through D8). These steps provide structure and peace of mind at times when you face a lot of external pressure and have to rely largely on your gut feelings.

*Source: The Complete Project Manager, 2016*

# The process steps of the 8D method

8D step	Description	Visible to the client (interim result)
D1 ↓	Establish the <b>TEAM</b>	Problem recognized, point of contact available
D2 ↓	<b>DESCRIBE</b> the problem	
D3 ↓	Implement and verify <b>INTERIM</b> containment actions	Interim solution, no further escalation
D4 ↓	Identify the <b>ROOT CAUSE</b>	Cause identified
D5 ↓	Choose and verify the <b>SOLUTION</b>	Plan developed
D6 ↓	<b>IMPLEMENT</b> the (permanent) solution	Permanent solution
D7 ↓	Prevent <b>RECURRENCE</b>	No recurrence in the future
D8 ↓	<b>CONGRATULATE</b> the team	

Source: *The Complete Project Manager, 2016*

# The 8D method: why?

- It provides **structure** to a process that is difficult to plan and control.
- **It prevents people from skipping steps** or thinking in solutions too quickly (*jumping to conclusions bias*).  
*For example: already implementing corrective actions when the formulation of the problem is actually not supported by the stakeholders at all.*
- It enables a **combination of pragmatism, long-term solution and process improvement**:
  - **3D**: Temporary solution ("sticking a band-aid") to prevent further escalation.
  - **6D**: Final solution has been implemented.
  - **7D**: Prevent the problem from occurring again (*process improvement* step)
- **The progress in the "definition and analysis phase" is made measurable** (D1-D5). In problem-solving, this phase is the most important and often longer than the implementation phase (which is what most progress and reporting methods focus on). *There is no solution yet, but there is progress!*
- By using the **maturity grid** in reporting, you can visualize the status and progress of the total range of problems and consequently make clear **which actions have priority**. With this you create stability in the chaos!

# The 8D methodology: documentation and reporting (1/3)

**ASMPT 8D Report**

**SUPPLIER 8D Type**  
In Supplier Name below

**CUSTOMER 8D**

Suzhou

Phase: 3C, 3C+K  
No. 194 by No Road  
Yuhua  
JINSHI  
China

Add CUSTOMER NAME →

ASMPT Part No. (x)  
Part System Description  
Supplier Part No.  
ASMPT Part No. (x)  
Original ASMPT Works Order  
CPO Number  
Blank  
Sheet

8D Originator (ASMPT Code)  
Customer Contact(s)  
Customer POC Email  
Customer 8D Ref No.  
Cost Part No. (x)  
Original Works Order  
Qty. (Units Returned)

Date Raised

**D1: TEAM FORMATION**  
Other Team Members

**D2: PROBLEM DESCRIPTION**

HOW - "IS"/"IS NOT" Type here:

WHEN (is the problem observed)

WHERE (is the problem)

WHO (is required)

HOW OFTEN (is the problem observed)

**STATEMENT GUIDANCE:**

- Be sure to include specific information as to the exact problem, such as where located, how many affected, since when, etc.
- Be sure to include any existing measurable data, such as deviations in performance values, measured non-conformance features characteristics etc.
- Where possible include any supporting photo's or documents that illustrate the issue and clarify where possible.
- Be sure to include why the problem has arisen, e.g. if not a deviation from standard then does it impact the operational performance of the system or interfaces. Was anything else change that might be relevant?

**D3: CHOOSE AND VERIFY INTERIM CONTAINMENT ACTION(S)** - "Do it within 24hrs"

Action Item No.	Containment	Responsible Name	Date Agreed	Date Action Complete
1				
2				
3				
4				
5				
6				

Stock Location: ASMPT Site

Qty Good

Qty to be Rejected

Stock Location Vend

Qty Good

Qty to be Rejected

**D4: DEFINE AND VERIFY ROOT CAUSE(S)** - (complete any attachments)

Enter Text & Supporting Information here

Click here to add Control Plan  Included

Click here to add FMEA Template  Included

Click here to add 5WHY Decision Tree  Included

Click here to Cause & Effect Diagram  Included

Click here to add IS/ IS NOT ANALYSIS  Included

**D5: CHOOSE AND VERIFY PERMANENT CORRECTIVE ACTION(S)**

Responsible	Target Date	Actual Date

**D6: IMPLEMENT & VALIDATE PERMANENT CORRECTIVE ACTIONS**

Verification Method	Responsible	Target Date	Actual Date

**D7: SYSTEM ACTIONS TO PREVENT RECURRENCE**

Responsible	Target Date	Actual Date

**D8: TEAM AND INDIVIDUAL RECOGNITION**

Name	Recognition	Name Signed by Final Closure	Final Closure Date

**D4: DEFINE AND VERIFY ROOT CAUSE(S)** - (complete any attachments)

Enter Text & Supporting Information here

Click here to add Control Plan  Included

Click here to add FMEA Template  Included

Click here to add 5WHY Decision Tree  Included

Click here to Cause & Effect Diagram  Included

Click here to add IS/ IS NOT ANALYSIS  Included

**D5: CHOOSE AND VERIFY PERMANENT CORRECTIVE ACTION(S)**

Responsible	Target Date	Actual Date

**D6: IMPLEMENT & VALIDATE PERMANENT CORRECTIVE ACTIONS**

Verification Method	Responsible	Target Date	Actual Date

**D7: SYSTEM ACTIONS TO PREVENT RECURRENCE**

Responsible	Target Date	Actual Date

Source: ASMPT, 2003

# The 8D methodology: documentation and reporting (2/3)








8D status in Excel

8D item	Name	Description	Responsible	Current state	Next action	1D	2D	3D	4D	5D	6D	7D	8D
Item 1	[name]	[Description]	[name]	D4 - ROOTCAUSE	[Action description]								
Item 2	[name]	[Description]	[name]	D6 - IMPLEMENTED	[Action description]								
Item 3	[name]	[Description]	[name]	D2 - DESCRIPTION	[Action description]								
Item 4	[name]	[Description]	[name]	D1 - TEAM	[Action description]								
Item 5	[name]	[Description]	[name]	D4 - ROOTCAUSE	[Action description]								
Item 6	[name]	[Description]	[name]	D5 - SOLUTION KNOWN	[Action description]								
Item 7	[name]	[Description]	[name]	D5 - SOLUTION KNOWN	[Action description]								
Item 8	[name]	[Description]	[name]	D3 - CONTAINMENT	[Action description]								
Item 9	[name]	[Description]	[name]	D7 - NO RECURRENCE	[Action description]								
Item 10	[name]	[Description]	[name]	D8 - CONGRATULATE	[Action description]								
Item ...	[name]	[Description]	[name]	D3 - CONTAINMENT	[Action description]								

Source: PULZ, 2022

# The 8D methodology: documentation and reporting (3/3)

8D lifecycle on 'Scrum board'

Back log	1D	2D	3D	4D	5D	6D	7D	8D	Done
									
									
									
									
									
									
									



# The 8D methodology: Maturity grid (overview and priority)

Severity of the problem → ↓8D progress	Safety problem	System out of order	Severe interruption of production	Moderate interruption of production	No effect on production	Total
1D - 2D No temporary solution		2		1	1	4
3D Cause unknown	1	1	1	2		5
4D Solution unknown			1		2	3
5D Solution not yet implemented	1	1	1	2		5
6D Re-occurrence of the problem still possible		2	2			4
<b>Total</b>	<b>2</b>	<b>6</b>	<b>5</b>	<b>5</b>	<b>3</b>	<b>21</b>

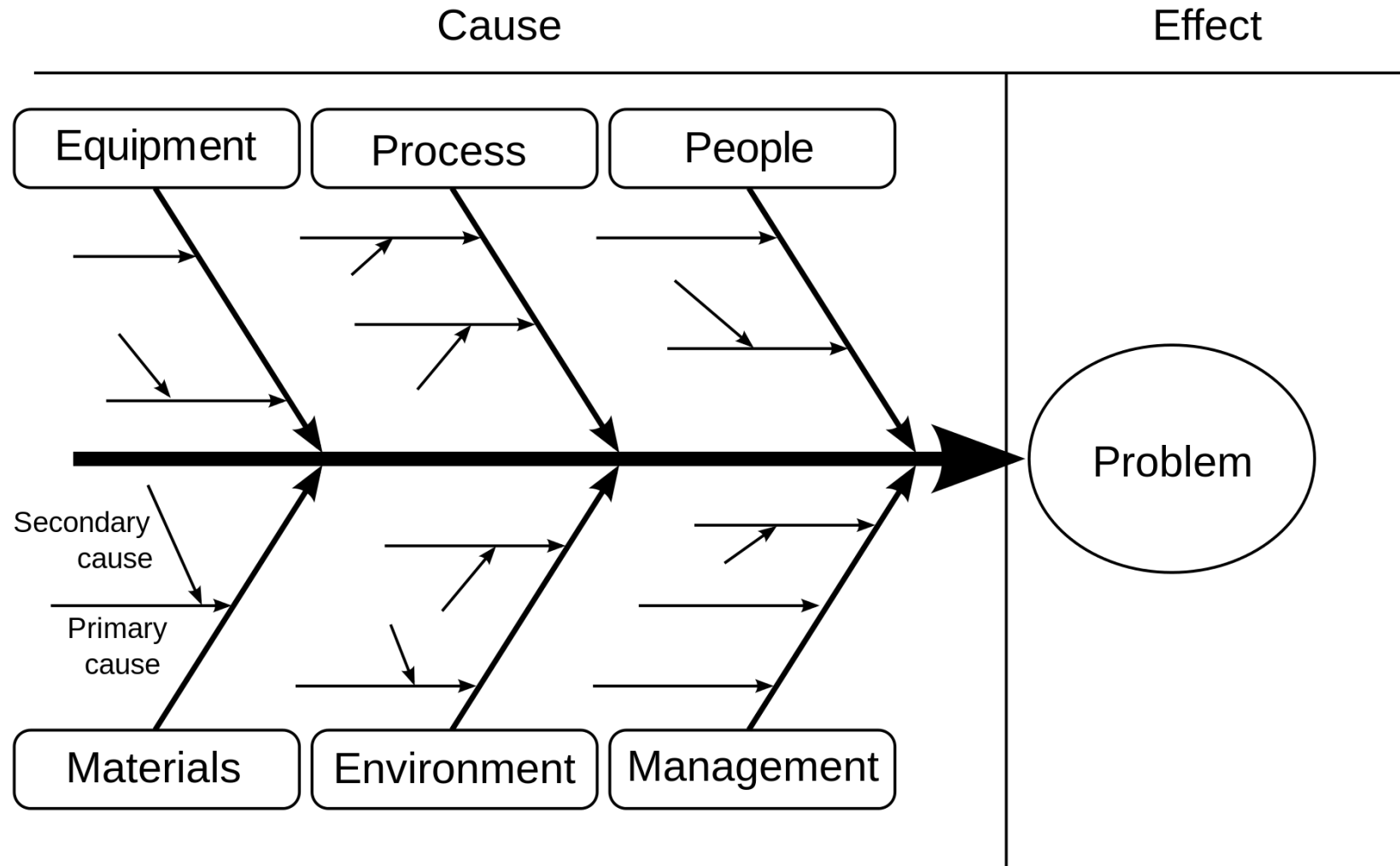


## Tools: D4 step → Ishikawa diagram (1/9)

The **Ishikawa diagram** (also known as a **fishbone diagram**) is a tool designed to identify possible causes of problems.

This method was developed by Kaoru Ishikawa who was working at Kawasaki Heavy Industries in Japan at the time. He saw that people in the factory were often overwhelmed by the large number of factors (potentially) affecting a process. To make this easier and more manageable, he devised a simple and graphical tool to orderly display potential causes of a problem or effect.

# Tools: D4 step → Ishikawa diagram (2/9)



Source: Wikipedia, 2022

# Tools: D4 step → Ishikawa diagram (3/9)

**The diagram distinguishes between possible causes and effects.** The right side describes the effect or problem caused. On the left side, the possible causes are mapped out. The possible causes are divided into **six categories**, again branching into sub-causes. The six M's are used for this purpose:

**Manpower:** Is the problem well understood? Is there good communication? Are those involved experienced enough and well-trained enough?

**Machines** (Machinery, tools & computers): Are the right machines, tools and software being used? Can these tools themselves cause a problem? Are the machines safe to use?

**Measurement:** How do we measure quality? What are the criteria? How reliable are these measurements? How often do they take place?

**Materials:** What materials are used? What is the quality of these?

**Mother Nature** (Environmental Factors): What influence does the environment have? Consider, for example, weather, vibration, noise, elevation.

**Method:** How are logistics, communication, labeling and recordkeeping done? How are the processes set up and adhered to?

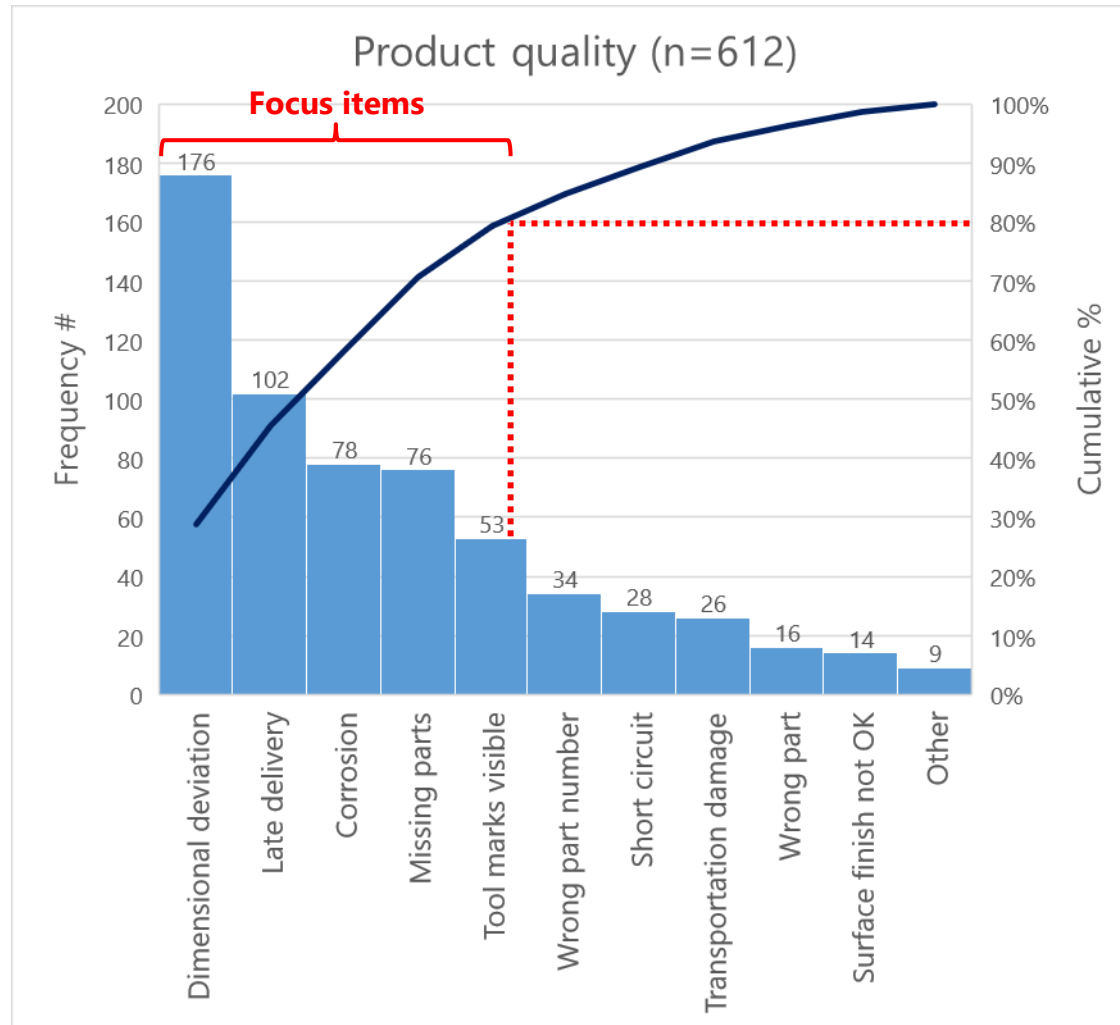
## Tools: D4 step → Pareto analysis (4/9)

When analyzing problems, **Pareto analysis** is a useful tool for identifying the cause/effect relationship of problems. Pareto analysis, also known as **Pareto principle or the 80-20 rule**, assumes that a large majority of problems (80%) can be traced to a few major causes (20%). The theory behind Pareto analysis originated in 1897 when the Italian economist Vilfredo Pareto developed a formula for the unequal distribution in terms of wealth in his country.

The Pareto analysis is a great tool to **create overview, to focus on the issues with the greatest improvement potential and to evaluate the impact of the solution**. You do this by comparing **the relative frequencies** in the issues that arise.

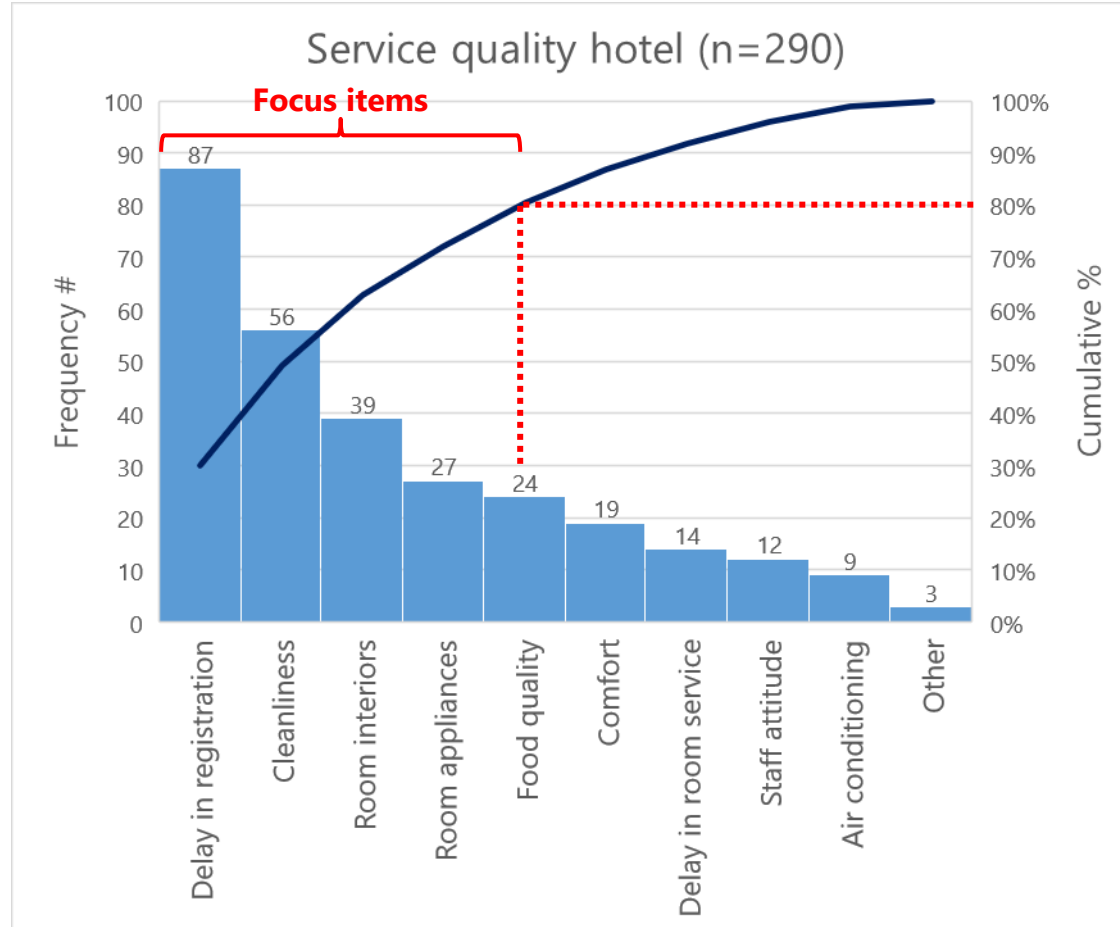
Once the root causes are identified, other complementary techniques such as the Ishikawa diagram can be used to identify and address the root causes of the problems.

# Tools: D4 step → Pareto analysis example (5/9)



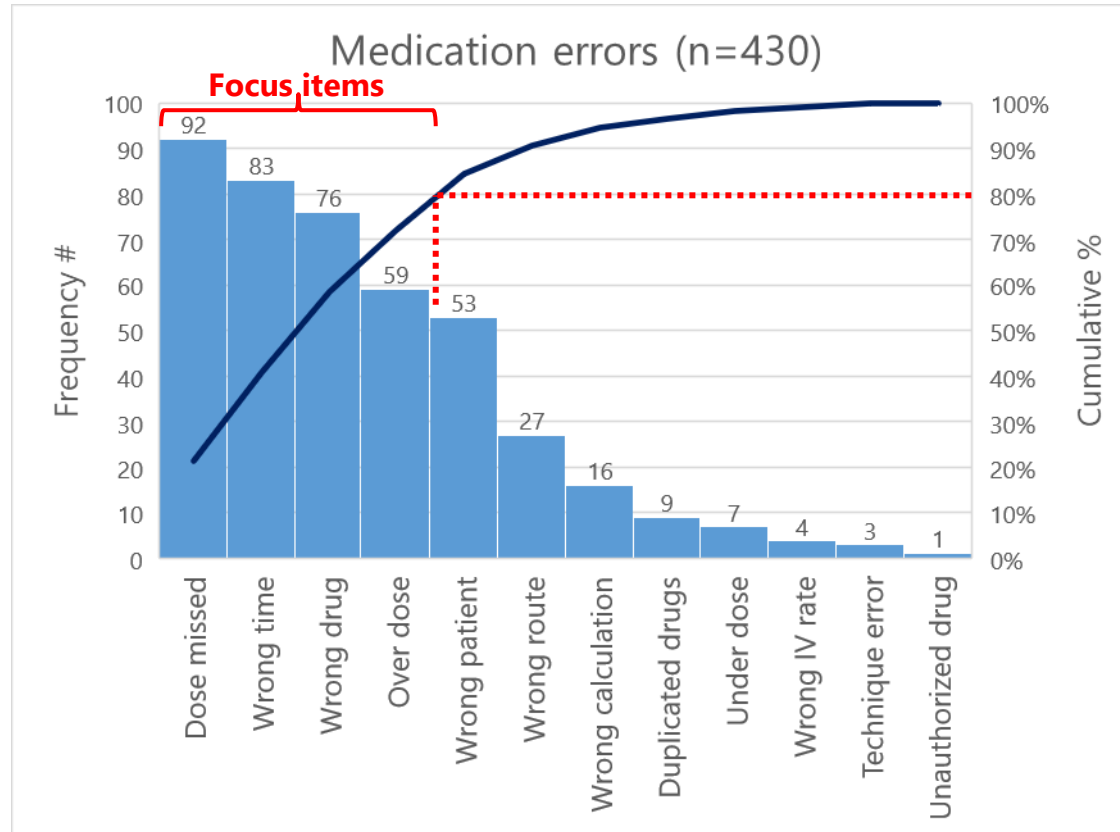
Source: Pulz, 2022

# Tools: D4 step → Pareto analysis example (6/9)



Source: Pulz, 2022

# Tools: D4 step → Pareto analysis example (7/9)



Source: CEC Australia, 2022

## Tools: D4 step → 5 times why (8/9)

To complement the Ishikawa diagram, the "**5 times why**" question technique can be used.

*Five times why* is an **iterative questioning technique used** to examine the cause-and-effect relationships underlying a given problem. The primary goal of the technique is to determine the root cause of a defect or problem by repeating the question "Why?" five times. The answer to the "fifth Why" should reveal the root cause of the problem.

The key is to encourage the problem solver **to avoid assumptions and logical pitfalls** and instead dissect the chain of causality by structurally analyzing all the layers of abstraction to a root cause.

The technique was described by Taiichi Ohno at Toyota Motor Corporation.



# Tools: D4 step → 5 times why (9/9)

**Five times why example:** *The vehicle won't start.*

Why 1? - *The battery is dead.*

Why 2? - *The alternator is not functioning.*

Why 3? - *The alternator's belt has broken.*

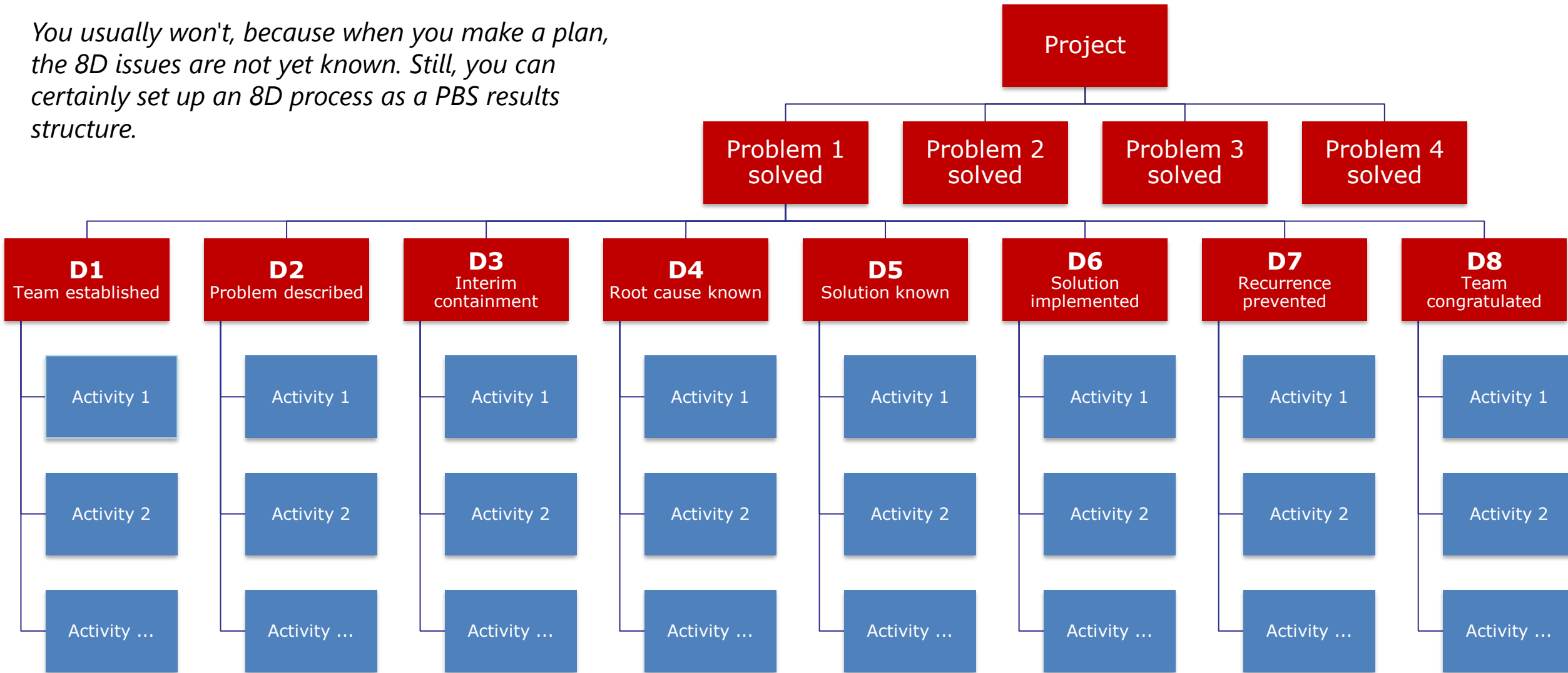
Why 4? - *The alternator belt was well beyond its useful service life and not replaced.*

Why 5? - *The vehicle was not maintained according to the recommended service schedule.*

The questions for this example could be expanded further to a sixth, seventh or higher level, but asking why five times is generally sufficient to get to the root cause.

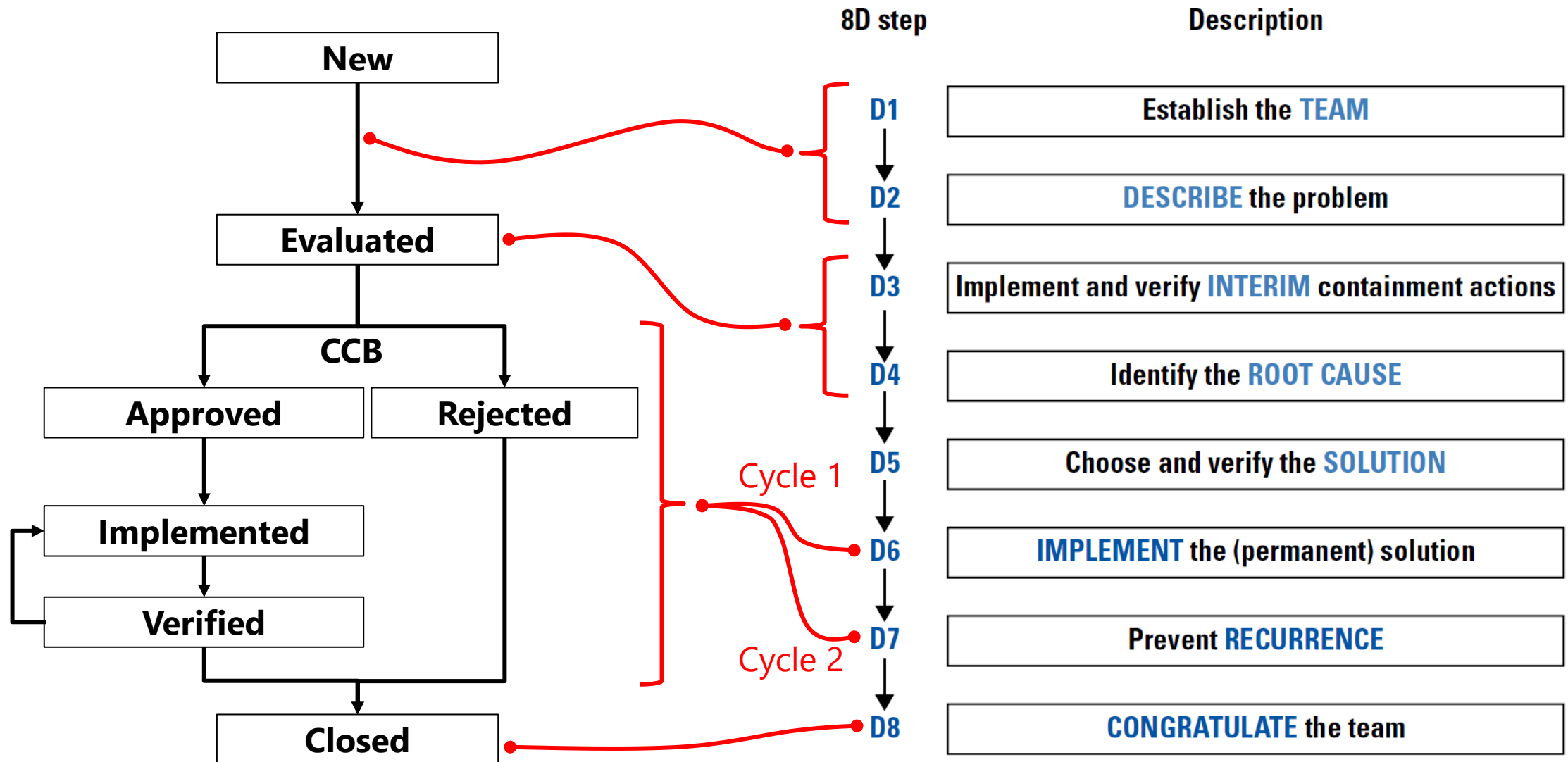
# 8D process integration with the PBS

*You usually won't, because when you make a plan, the 8D issues are not yet known. Still, you can certainly set up an 8D process as a PBS results structure.*



Source: PULZ, 2022

# Connection 8D method with change management

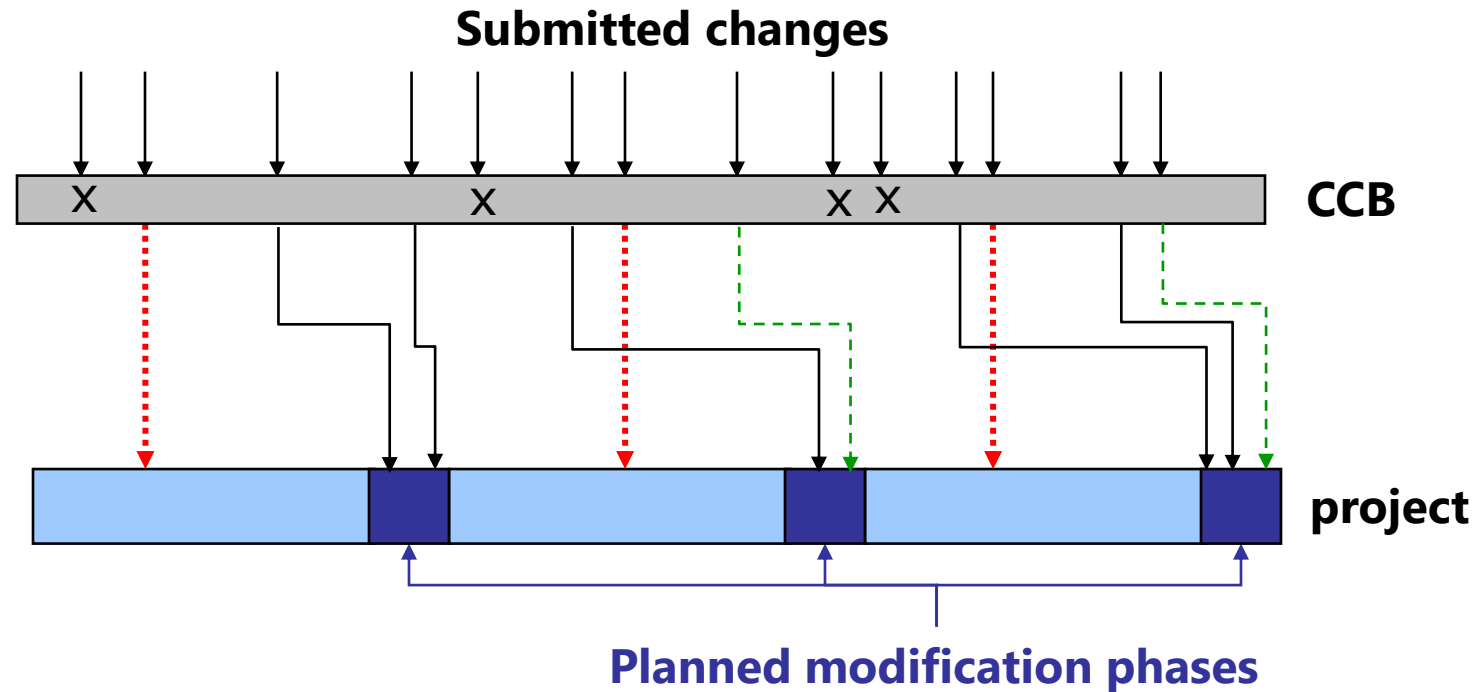


# Changing without disturbance is a specialized job

A proper change process keeps you from chasing your own tail. **By accounting for changes instead of resisting them, you can stay in control even in a dynamic environment.**

The picture on the next slide illustrates the advantages of taking control. Instead of allowing all changes to disrupt your team's daily activities, you can also significantly reduce their impact by filtering, assessing their urgency and planning modification phases in advance. You can plan for changes, even if you do not know what they will be. Estimate the size, set aside a "change budget" and plan modification phases. **By only resolving critical problems right away (and allowing them to disrupt the plan), you can keep other corrections from doing the same** – provided that their size does not exceed the predicted change budget.

# Changing without disturbance is a specialized job



*Only the critical issues  
disrupt your plan.*

- ⋯→ Urgency = critical
- Urgency = high
- - - → Urgency = low



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