



Supplier Quality Collaborative Efforts for Problem Solving

SUPPLIER IMPROVEMENT COMMITTEE : CO-MAKERSHIP INITIATIVE

July 23, 2020

QUALITY SYSTEMS



Introduction

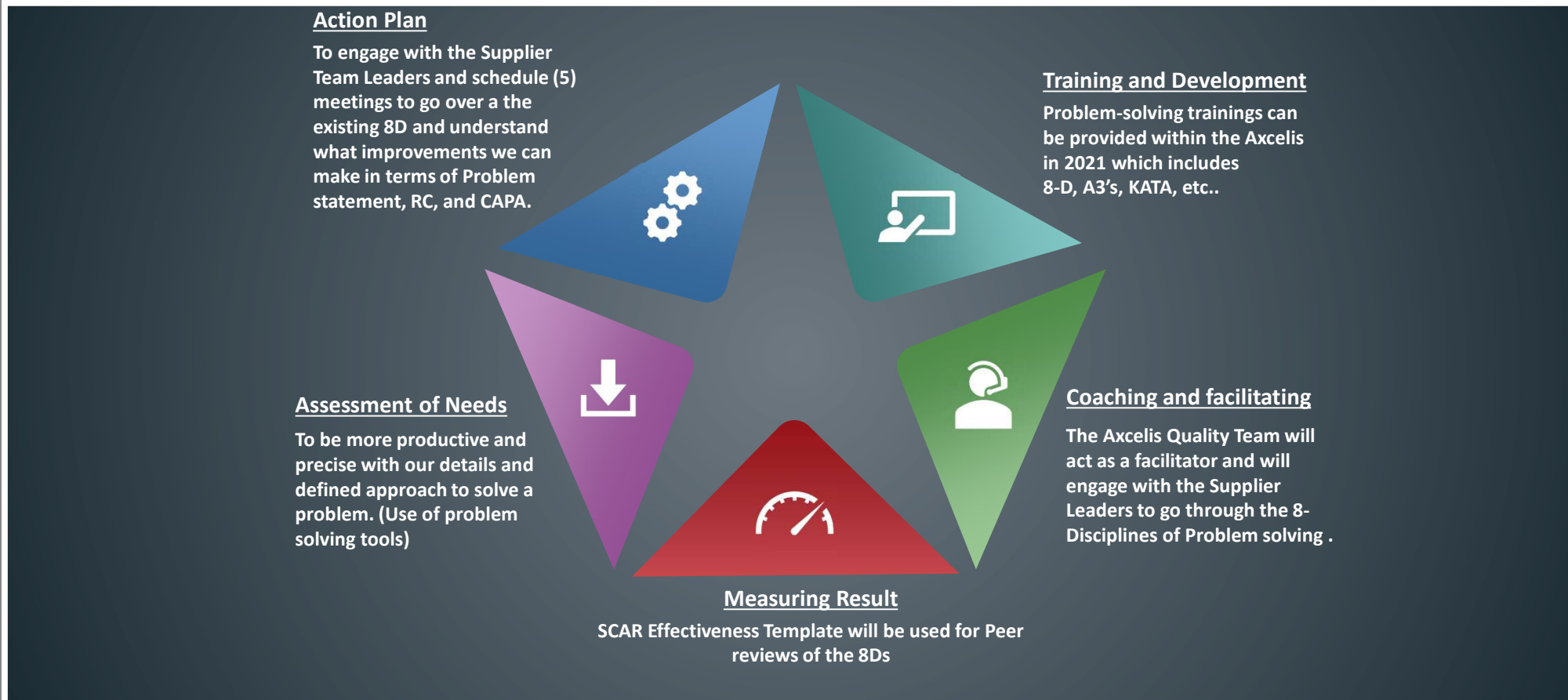
Axcelis Quality Team wants to take this opportunity to thank the teams for actively using the **Problem Resolution Process – 8D SCAR** to track and solve the problems.

Quality Mindset: Quality Begins with Me is more than a banner or slogan, it's personal - a personal decision and collective. When we each take personal ownership for our Quality (products and services), our work products, our work areas, our outputs –we can make a difference toward OUR goals and Improve the Customer Experience.

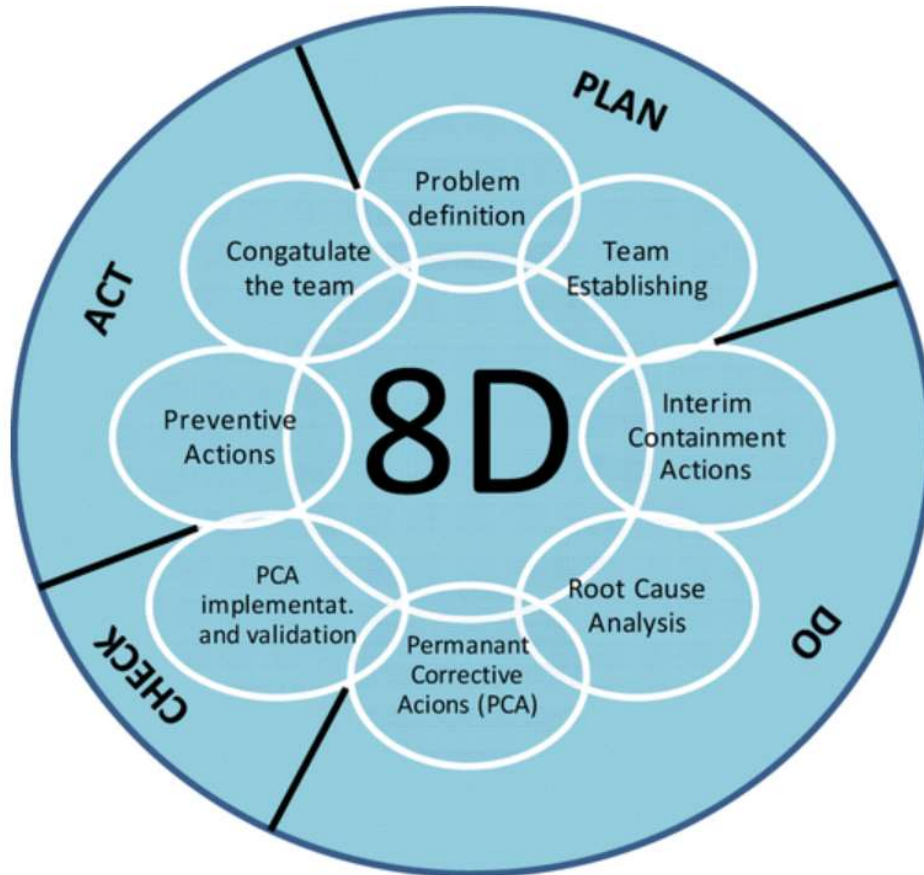
Axcelis Co-Makership: Remember, working together toward common goals begins with living our values (Quality, Teamwork, Empowerment, Accountability, Speed and Opportunity) and a Quality mindset which requires our personal and collective commitment. Our success begins with you, and when you participate with a Quality mindset and take action we improve!

Why a Structured Problem Solving: It is required for the customer and to prevent recurrence. Our customers have raised the bar on Quality (which was expected) to better serve their customer's requirements and market expectations. Some customers specifically request an 8D method. Robust and rigorous problem solving using 8D methods is necessary for some select problems, not all. That is why we use 8D selectively for Process Critical Items (PCI) and when required by customers. 8D Effectiveness assessment defines the expectations of an effective problem resolution process.

Purpose



8-Disciplines of Problem Solving PDCA Model



- D1 – Define the Team
- D2 – Describe the Problem
- D3 – Interim Containment Actions
- D4 – Root Cause Analysis
- D5 – Corrective Action(s)
- D6 – Verification & Implementation
- D7 – Preventive Action(s)
- D8 – Congratulate the team

D1- Define the Team

It is imperative to have the right team to solve the problem. Things that we must consider while defining the team to solve a problem are

- The team is cross-functional
- The right Team Leader will drive the team to solve the problem efficiently and effectively.
- The team should not be more than 3-6 people unless the problem has an enormous scope.

D1: Make a Team

❖ Who is right resource person

❖ Correct team member is very important

- commitment
- resources
- skills
- authority

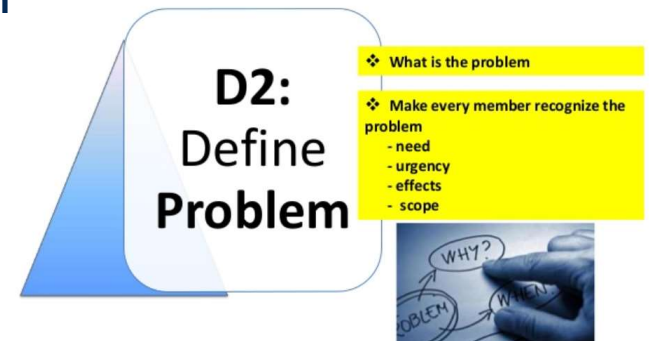


D2- Describe the Problem

The key to success in problem-solving is to have the right problem statement upfront. The excellent problem statement covers all the details in terms of

- WHO,
- WHAT,
- WHERE,
- WHEN,
- WHY,
- HOW & HOW MANY. Identify the gap that needs to be closed by solving the problem.

Tools can turn out to be useful while defining the scope of the problem
(See the next slide)



D2- Describe the Problem

Is / Is Not Analysis

	IS	IS NOT
Who	Who is affected by the problem? Who first observed the problem? (internal/external) To whom was the problem reported?	Who is not affected by the problem? Who did not find the problem?
What	What type of problem is it? What has the problem? What is happening? Do we have physical evidence of the problem in our possession?	What does not have the problem? What could be happening but is not? What could be the problem but is not?
Why	Why it is a problem? Is the process where the problem occurred stable?	Why is it not a problem?
Where	Where was the problem observed? Where does the problem occur?	Where could the problem be located but is not? Where else could the problem be located but is not?
When	When the problem was first noticed? When has it been noticed since?	When the problem could have been noticed but was not?
How Much / Many	Quantity of problem? How Much is the problem causing in dollars, people, & Time?	How many could have the problem but don't? How big could the problem be but is not?
How Often	What is the trend (continuous, random, and cyclical)? Has the problem occurred previously? (If so attach previous analysis)	What could the trend be but is not?

D3- Containment Action(s)

Actions to isolate the effect of the problem until corrective action has been implemented.

- It is essential to contain the problem within the 48 hours after the problem reported (business days).
- Often we mix containment with the corrective action(s). We should always consider that containment works as First Aid until the permanent action is determined.
- When we are addressing actions as containment, we should also make sure that it includes the identification and segregation of all products in all possible locations.

There are certain checkpoints that you can ensure before listing those actions out. (See next slide)



D3- Containment Action(s)

Check Points:

- Have the interim containment measures been verified to work?
- Are they appropriate? Are they effective?
- Has the impact of the interim containment measures been tested to ensure that no additional problems are being created?
- Are the actual additional costs of the containment measures known? Have they been verified that they are “worth” it?
- Never allow an interim containment action to cover the gravity of the problem thus reducing the need for a permanent solution.
- Interim containment if left alone will become part of the process. It can become a hidden action that does not add any value, but adds only cost. In lean manufacturing this is a waste that needs to be removed.
- Containment is NOT a solution, nor is it a corrective action.
- Containment actions could be implemented internally (local inventory, WIP, finished goods), globally (spares depot, repair sites, etc...) at a supplier site or at a customer site depending on the nature of the problem.

D4- Root Cause Analysis

D4 – Root Cause Analysis (Occurrence, Detection or Escape , System)

Defining the root causes of a problem is the core of the 8D problem-solving process. This is normally the toughest aspect of the problem-solving process; if the root causes of the problem were obvious, then the problem would have been solved already. There are usually two families of causes at work when we know there is a problem:

- The first, the causes that appears to be the problem, are frequently symptoms, not root causes.
- The second, the specific causes that allowed the apparent symptoms to occur, are the root causes and often buried deep in the process.

Tools to be used:

Pareto Charts	Affinity Diagram	Brainstorming Session
5-Whys Process	Fishbone Diagram	Fault Tree Analysis
Statistical Analysis	ANOVA	DOE
Regression Analysis	Hypothesis Testing	GR&R
Flow Charts	Audits	FMEA

D4:
**Root Cause
& Escape
Points**

- ❖ Brainstorming
- ❖ Ask all , ask everything
- ❖ Duplicating the problem

Know the data

- Lot history
- Trends
(Yield, Cpk, Control Charts)

Know your Person/Process

- do you have proper person
- do you have enough controls

Know your tools

- ✓ Y – Y Analysis
- ✓ Fish Bone Diagram

If you only have a hammer as a tool,
you tend to see every problem as a nail.
- Abraham Maslow



D4- Root Cause Analysis

Check points:

- Make sure the cause identified is not just a symptom but is the actual root cause.
- Do not cure the symptom, as this may be the reason for the problem to recur.
- Ask the Root Cause Question: “Do these causes explain all that is known about what the problem is, as well as all that is known about what the problem isn’t?” This is really a two-part question: make sure the root causes found fit both the “is” and the “isn’t” sections of the question. If the causes being tested don’t fit both, then they are probably not the root causes.
- Have the root causes identified been verified? Verification may require a series of confirmation runs.
- Can you induce the failure? (turn the failure mode on/off)
- How did it happen? How did it get out?



D4- Root Cause Analysis

D4 – Root Cause Analysis (Occurrence, Detection or Escape , System)

■ Occurrence Root Cause

This is the cause that enabled a problem to occur, ex: a software bug that caused a wafer dosing issue- for technical root causes, corrective action is usually some change to technical documentation or design.

■ Escape Root Cause

Escape causes to address the question: “How did the problem escape our function/process to the Internal or External customer.” For escape root causes, corrective/preventive action may be changed to processes that include more controls, checks, reviews, etc.

■ System Root Cause

This is the cause that answers the question: “How did our system/process allow the problem to be created?”. For system root causes, corrective/preventive action is typically changing to our process documentation

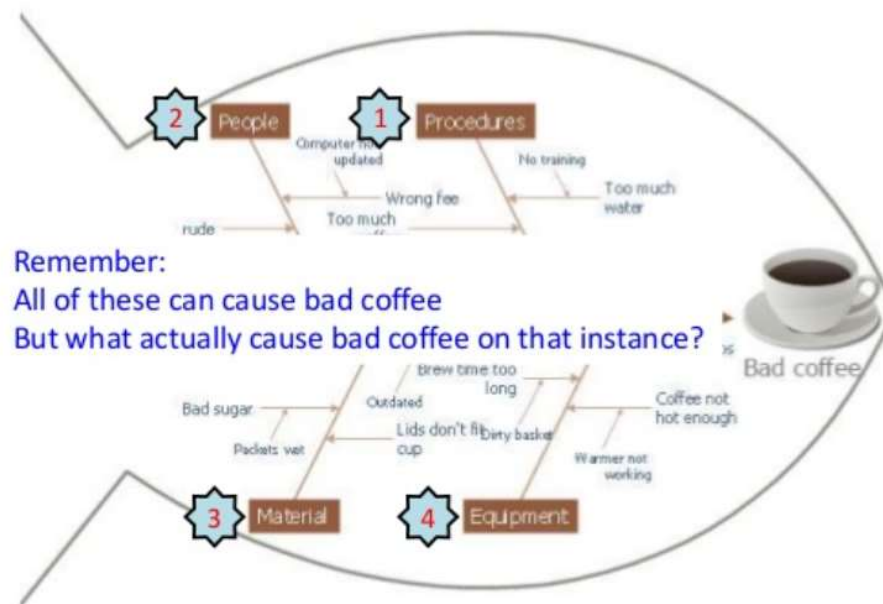
Tools help problem solvers to get to the True Root Cause.(See next slide)

D4- Root Cause Analysis

D4 – Root Cause Analysis (Occurrence, Detection or Escape , System)

Here is an example which shows how it works:

Know your Tools : Fish Bone (Ishikawa) Diagram – when checking all Possibilities'
Sometimes called 'Cause-Effect Diagram



Remember:

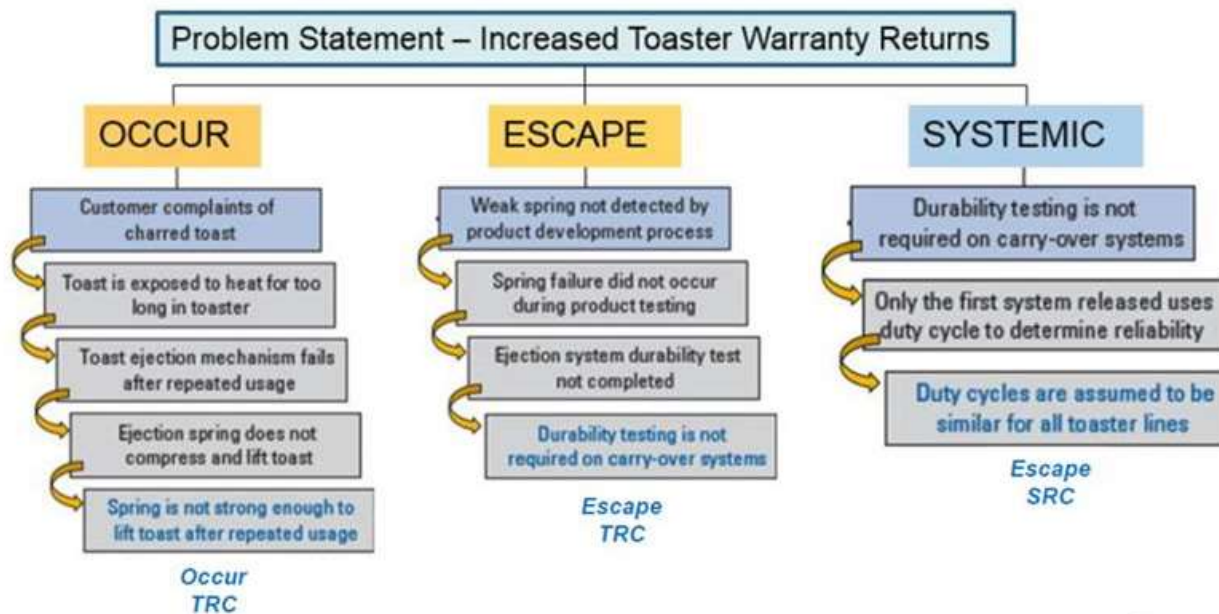
All of these can cause bad coffee

But what actually cause bad coffee on that instance?

D4- Root Cause Analysis

D4 – Root Cause Analysis (Occurrence, Detection or Escape , System)

Here is an example which shows how it works: (5Whys)



D5- Corrective Action(s)

The team should plan and list the corrective action(s) intended to be deployed for Occurrence, Detection, or Escape and System. Action(s) that will address the identified Root Causes and will prevent a recurrence.

Criteria for choosing the best solution:

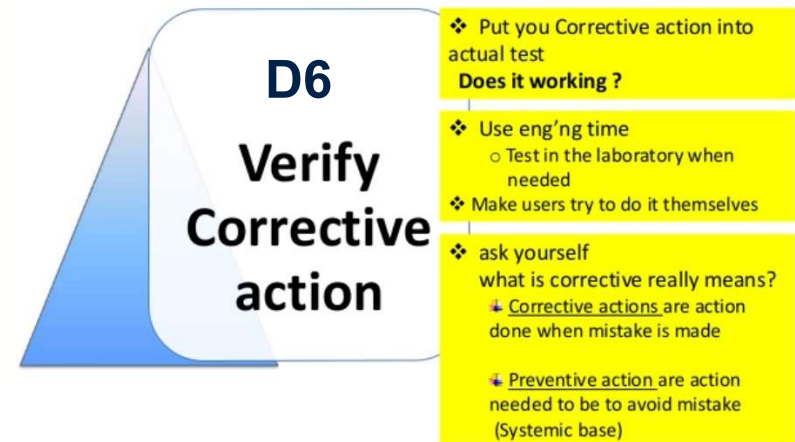
- Practical - The 8D team should be able to implement the solution practically.
- Feasible - The solution must be feasible.
- Cost effective - Implementing and using the solution must be cost effective.
- Robust - The solution shouldn't fail when used in production. Robustness of the solution is an essential characteristic (error proofing, impact-effort matrix)
- Team Champion must have full buy-in to Permanent Corrective Actions and facilitate their implementation.

D6 – Verification of Corrective Action(s)

For a team to “declare victory” in resolving a problem, there needs to be a verification and validation of the corrective action(s). The team needs to ensure that the actions taken were adequate.

Validating the solution is important:

- It is necessary to establish that the solution will make the problem go away without leading into other unwanted issues. That is why the 8D team should try out the solution with small quantities first to verify its effectiveness.
- A design verification test (DVT) and/or a reliability demonstration test (RDT) may be required depending on the solution.
- The solution is first to be tried on small lots to validate that it has indeed solved the problem prior to full implementation.



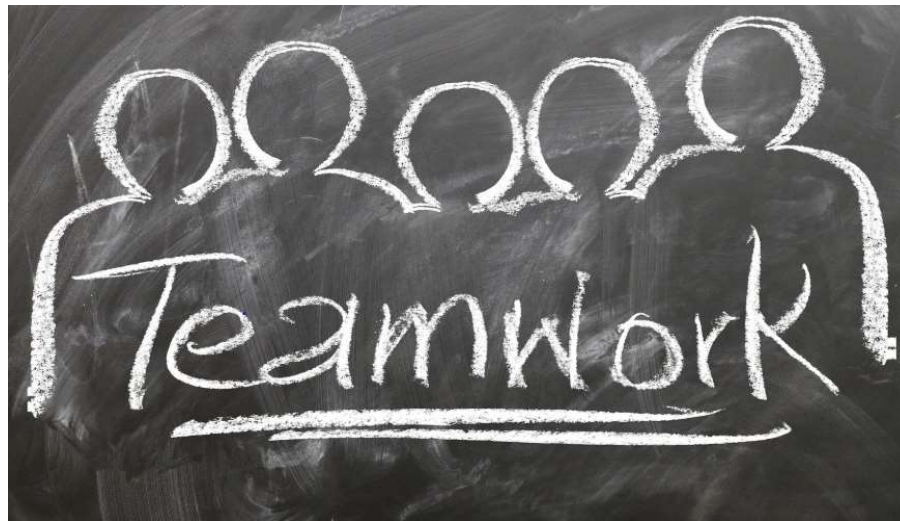


D7 – Preventive Action(s)

- Once a team has identified root cause(s) and corrective actions, it is highly desirable that activities occurred that a customer cannot encounter the same or similar problem from an Axcelis product or service
- Preventive action is a change to a product or management system that is not yet responsible for causing a problem for a customer
- The team should list preventive action investigation steps and any actions taken to mitigate potential issues
- Preventive actions could include:
 - Investigating (and mitigating if appropriate) if the problem observed could occur on other areas of the same product
 - Investigating (and mitigating if appropriate) if the problem observed could occur on a different product
 - Investigating (and mitigating if appropriate) if the process problem could occur in other processes
 - Actions were taken to mitigate issues discovered during the investigation process that may not affect the issue being investigated, but another issue that could have occurred

D8 – Congratulate the Team

- Depending on the scope of the problem resolved, this “D” can be accomplished as the Team leader sending out a “thank you” e-mail to the team members or could be more formal, with more management recognition.



Based in original presentation from Karan Malhotra – Jul 23, 2020

THANK YOU!

Contact your Supplier Quality Team for additional support and clarification.



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