Laboratory 3

Some companies may assign a team to conduct a DFMEA and tell them that their first task is to define the scope of the study. Unless the team members are experienced, this can be a mistake.

Time spent up-front, clarifying the scope before jumping into the DFMEA will be well worth it. Not only will the team assure they aren't working on something outside the scope of their study, but the planning effort will help assure all team members understand the scope the same way. Identification of the team leader should be done during the team start-up [4].

DFMEA Scope Worksheet	
Product:	
Date:	
Scope defined by:	
1	Who is the customer?
2	What are the product features and characteristics?
3	What are the product benefits?
4	Study the entire product or only components or sub-assemblies?
5	Include considerations of raw material failures?
6	Include packaging, storage & transit?
7	What are the manufacturing process requirements & constraints?

The seven-part Scope Worksheet will help the team identify potential failure modes as well as serve to clarify the scope. The seven parts look at the identity of the customer(s), the product features and benefits, whether the entire product or a sub-assembly will be studied, the role of raw materials, packaging, storage & transit issues and operational constraints.

In the first part of the Scope Worksheet, define who (or what) the "customer" of the product or product design is. Second part is to define a product feature. A feature is a characteristic designed into the product. The third part of the Scope Worksheet deals with product benefits. A benefit is the value a particular feature has as seen by the customer.

The fourth part of the scope worksheet deals with defining how much of the design to study. To determine the scope of a Design-FMEA, you need to identify how much of the product you will be studying. Some products are so large, it's best to study them sub-assembly by sub-assembly.

The fifth part of the Scope Worksheet specifies which raw material considerations are part of the scope and which are not. You always need to keep in mind the potential of a raw material failure when conducting a DFMEA.

Once a product is made, it will probably need to be packaged, stored, and shipped. The sixth section of the Scope Worksheet defines whether these activities will be included in the Design FMEA. The seventh section of the Scope Worksheet deals with whether or not operational constraints will be considered in the FMEA.

Examples

An example of a limitation or requirement of the manufacturing process involves the design of a plastic injection moulded part. To be ejected from the tooling, adequate draft must be designed into the part. For example, an injection moulder may only be able to use certain types of plastics on its existing equipment. If a DFMEA identifies a weakness in the material of a moulded part, the equipment constraint should probably be considered when investigating alternative materials.

Process Constraint Example: This part is a cylindrical molded part with straight walls; the initlal design did not have adequate draft.

Process Constraint Example: This foundry has limited casting capacity.

Another example involves a steel foundry. A foundry cannot pour or cast a part larger than its furnace capacity. The size of the furnace places a constraint on the mass of the part design. In this case, the team would need to decide whether the furnace size is going to be considered as a constraint to the design.

The FMEA Team Start-up Worksheet is a handy tool to help the team get started. It serves as initial documentation for the project as well as helps the team clarify roles, responsibilities, and their boundaries of freedom for the project.

FMEA Team Start-Up Worksheet

FMEA Number: _____ Date started: _____
Date completed: _____

Team members: _____ _____
_____ _____
_____ _____

Team leader: _____

Who will take minutes and maintain records? _____

1. What is the scope of the FMEA? Include a clear definition of the process (PFMEA) or product (DFMEA) to be studied. Attach the Scope Worksheet.

2. Are all the affected areas represented?
   YES _____ NO _____ Action: _____
3. Are different levels and types of knowledge represented on the team?
   YES _____ NO _____ Action: _____
4. Are customers or suppliers involved?
   YES _____ NO _____ Action: _____

FMEA Team Boundaries of Freedom

5. What aspects of the FMEA is the team responsible for?

FMEA Analysis	Recommendations for Improvement	Implementation of Improvements

6. What is the budget for the FMEA? _____
7. Does the project have a deadline? _____
8. Do the team members have specific time constraints? _____
9. What is the procedure if the team need to expand beyond these boundaries?
10. How should the FMEA be communicated to others? _____

The top section of the worksheet is a general information section listing the FMEA number, the dates, the team members, the team leader, and the appointed record keeper.

FMEA Team Start-Up Worksheet

FMEA Number: _____ Date started: _____
Date completed: _____

Team members: _____ _____
_____ _____
_____ _____

Team leader: _____

Who will take minutes and maintain records? _____

The middle section of the Team Start-up Worksheet reconfirms the scope, prompts the team to take a look at whether its membership has the knowledge and skills to meet the scope, and clarifies whether customers and/or suppliers are, or are not, actively involved.

1. What is the scope of the FMEA? Include a clear definition of the process (PFMEA) or product (DFMEA) to be studied. Attach the Scope Worksheet.

2. Are all the affected areas represented?
   YES _____ NO _____ Action: _____
3. Are different levels and types of knowledge represented on the team?
   YES _____ NO _____ Action: _____
4. Are customers or suppliers involved?
   YES _____ NO _____ Action: _____

The bottom section of the Worksheet helps the team clarify its boundaries of freedom for the project. Question 5 helps clarify whether the team is to conduct the analysis (and then stop), or develop recommendations (and then stop), or continue work on the FMEA through the implementation stage. Other boundaries of freedom issues include things such as limitations on financial expenditures, deadlines, and predefined time constraints. The worksheet completes the up-front planning stage by determining the communication expected from the team.

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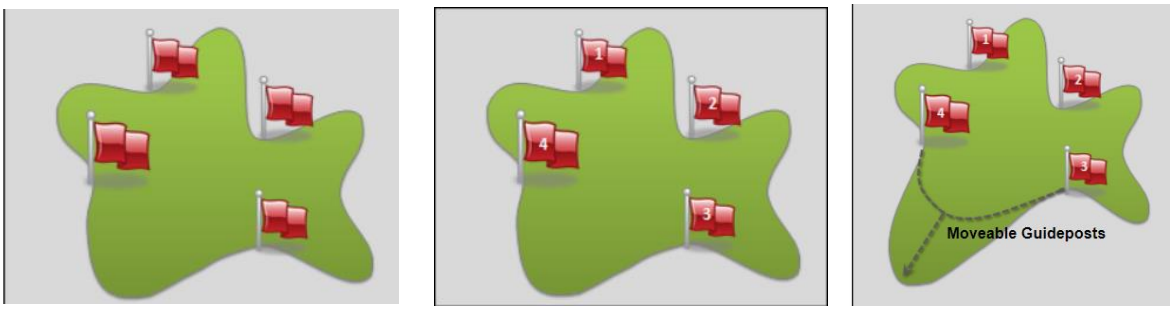
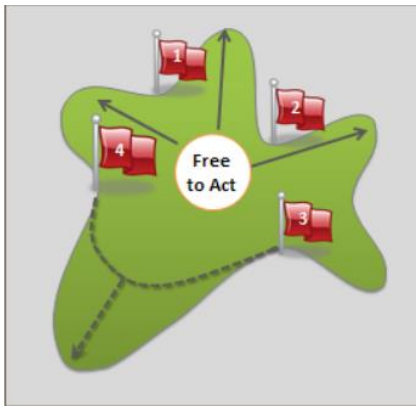
Once a team is formed, it needs to understand the parameters within which it can work. Another way to think of these parameters is as boundaries of freedom. The term "Boundaries of Freedom" may sound like an oxymoron because boundaries and freedom seem to be at opposite ends of the spectrum. However, for a team, boundaries of freedom are a very liberating and empowering thing. Boundaries of freedom set up the playing field for the team up front so that there are no surprises down the road.



Boundaries of freedom are held in place by guide posts. Some of these guideposts are fixed boundary stakes and apply to everyone in the organization while others are more flexible and may be different for different teams. Fixed boundaries start off with the agreement that data, not opinions and guesses, will be the judge. Fixed boundaries of

freedom include guidelines such as safety and environmental regulations and company procedures and policies.

Moveable guideposts are typically set by the management of your organization. The moveable guideposts are set according to the knowledge and experience level of members of the FMEA team. The higher the demonstrated skill and experience level of the team, the wider the boundaries are typically set. The moveable guideposts include the amount of time or money the team can spend on the FMEA process, the deadline for completing the FMEA and communication requirements.



Teams with clearly defined boundaries of freedom are more effective; they are free to act within their boundaries.

FMEA team boundaries as well as other team guidelines should be documented at the beginning of the FMEA. A Team Start-Up Worksheet will assure team members clearly understand their responsibilities as well as their boundaries of freedom.

With completed FMEA Scope & Team Start-up Worksheets, your team is on its way to a successful FMEA! As your DFMEA team works through the analysis, you will be using an FMEA Analysis Worksheet to help focus and document the project.