Capturing process knowledge using standard FMEAs

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Optimizing the FMEA process by using standard FMEAs

Introduction

A customer requesting a FMEA requires a specific FMEA. Part numbers, classification symbols etc should all be according to the customer’s requirement. This means that we have to make specific FMEAs per customer while a large part of the FMEA is similar between FMEAs. In other cases we may have different machines or production lines – maybe in different locations – with slightly different production or inspection methods. This means the FMEAs must be different for the different locations.

In this document we will explain how you can use standard FMEAs to capture process knowledge and to minimize the efforts to create a specific FMEA.

Different methods to standardize

Everybody who needs to make a FMEA will use existing FMEAs as a starting point. There are a few methods to standardize as much as possible:

1. Create a standard and copy from the standard
2. Link a standard FMEA to a specific FMEA
3. Link a standard FMEA with an option to customize the standard after linking

Ad 1: Copy from a standard

With this method a standard is defined and when a new FMEA needs to be created people start by making a copy of the standard. If an improvement is made to the standard process the standard FMEA will be updated and future FMEAs will use this new standard.

The advantage of this method is people have maximum flexibility after they have made the copy. They basically work with a clean document and can make any change they want. The biggest disadvantage is that if a change is made in the standard process then all existing FMEAs need to be revised.

With this method you will quickly find in practice that people will make changes in the latest FMEA and also don’t go back to the standard to update the standard according to the change made in the latest specific FMEA.

A second disadvantage is that it is more complicated to make different people responsible for a specific process. People are responsible for the complete FMEA so they can also make changes in parts of the FMEA related to standard processes. It requires discipline to make sure people work according to what is agreed.
Method 1 is for example used when people create FMEAs using Excel

**Ad 2: Link a standard FMEA to a specific FMEA**

In the second method it is possible that a standard FMEA is linked to a specific FMEA. In that case people only need to select the FMEA and all information is integrated. The standard FMEA can be highlighted in a different color to indicate it is part of a standard.

![Figure 1: Specific FMEA with link to standard FMEA](image)

In figure 1 you see that the standard process clean door is added to the specific FMEA. The linked process cannot be edited. If a change needs to be made extra steps/functions can be added or the standard FMEA needs to be incorporated in the specific FMEA.

The advantage of this method is that the FMEA can be created very quickly. People only need to select the standard processes and add customer specific issues.

Another advantage is the responsibilities are clearly assigned. The standard FMEA cannot be changed and can only be changed by the people responsible for the standard. If improvements are required this needs to be communicated.

A third big advantage is that if a change is made in the standard it will automatically be updated in all FMEAs using the same standard. People don’t need to update all existing FMEAs separately. Of course this might not be required in some cases but it is up to the person responsible for the standard FMEA to decide if the FMEA improvement will be valid for all FMEAs using the standard.
Although this method will work if you have similar products this method might not work if you have similar processes at different locations. For example you have similar processes in 2 countries but in one country you have added camera inspection. It means the detection control will differ between the 2 countries so also the standard FMEA needs to be changed. The solution to solve this under option 2 is to create a second standard or to incorporate the standard into the specific FMEA and then we are back in the same situation as under option 1: Copy the FMEA

**Option 3: Link a standard with an option to customize after linking**

The third option is a more advanced solution. A standard is linked to a specific FMEA but where applicable differences between processes are added to the standard FMEA. In figure 2 you see how this looks in practice.

![Figure 2: Link standard FMEAs with changes to the standard in DataLyzer FMEA](image)

What you see in figure 2 is that the red cells are part of the standard FMEA and cannot be changed. But specific cell contents for a location can be added to the standard and are shown in black.

The advantage is that this option gives you maximum flexibility while you can still standardize wherever this is required and this will minimize the work needed to create the FMEA. Opening the FMEA also shows quickly where deviations from the standard are applied. This gives you a powerful tool to compare processes and to maximize standardization.

The disadvantage might be that people minimize the number of cells in the standard so it is important that rules are defined how to define standards and communicate about the processes.
The third option requires an extremely flexible database structure because it is essential that no additional setup is required. This process of customizing standard FMEAs needs to go completely automatically and users should not be bothered with setup options per cell.

**Conclusion**

Using standard FMEAs is a powerful tool to capture process knowledge. If an option is added to allow changes in the standard FMEAs whenever a standard FMEA is adopted in a specific FMEA the tool even becomes more powerful because differences will become clearly visible.