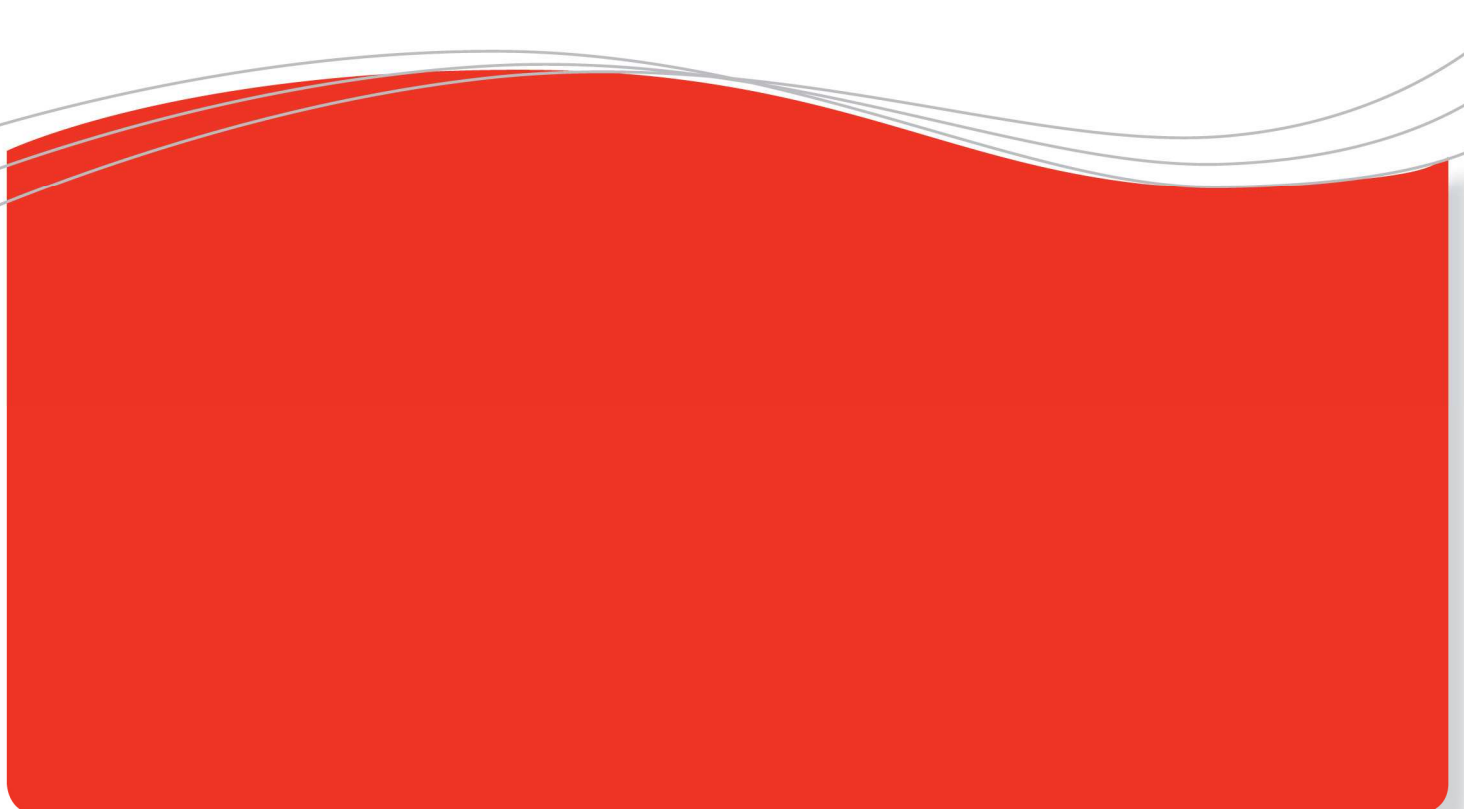




Is Excel the right tool for FMEA ?



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Introduction

When most people start with FMEA they immediately turn to Excel to create the templates. The spreadsheet type view of a FMEA template and the calculations for RPN make it logical to think of Excel to document the information.

However if you look a little bit deeper and you have to create more than a few FMEA's then Excel is certainly not the best choice. In this whitepaper we will explain advantages and disadvantages of using Excel for your FMEA process.

Relational structure FMEA layout

It is easy to be misled by the simple layout of the FMEA template. The FMEA template has a more relational structure than a simple spreadsheet has.

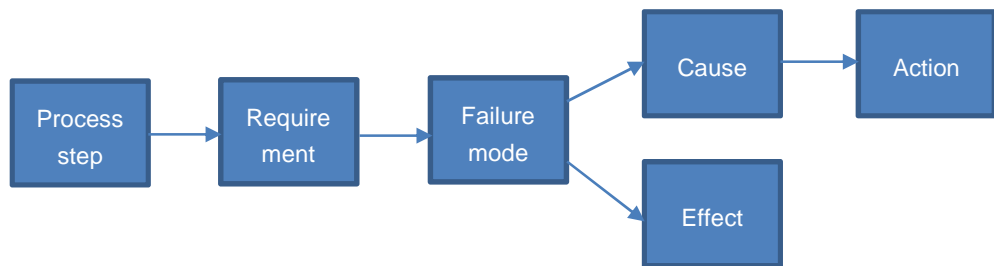


Figure 1: Relational structure FMEA layout

The structure required to set up a FMEA is very strict. One process step has 1 or more requirements. One requirement has 1 or more failure modes etc.

So if people use Excel to create FMEA forms they have to take care that the required structure is properly followed. They also have to combine cells and fill cells not used with a neutral color to create the FMEA layout.

Step / Function	Requirement	Failure Mode	Effect	Severity	Class	Potential Cause of Failure	Current Process			Recommended Action	Responsibility / Target Completion Date	Action Results						
							Controls Prevention	Controls Detection	Detection			RPN	Action taken / Completion Date	Severity	Occurrence	Detection	RPN	
Step 1. / Function	Step 1 Requirement 1. The quick brown fox jumps over the lazy dog.	Step 1 Requirement 1 Failure Mode 1.	Step 1 Requirement 1 Failure Mode 1 Effect 1. Step 1 Requirement 1 Failure Mode 1 Effect 2.	8	SC	Step 1 Requirement 1 Failure Mode 1 Cause 1.	Control prevention 1.	3	Click document spot	4	86	Step 1 Requirement 1 Failure Mode 1 Cause 1 Action 1. / 1-1-2000	Alice Cooper with a big boooooong wide name. / John Smith	2-1-2000	5	6	7	210
						Step 1 Requirement 1 Failure Mode 1 Cause 2.	Control prevention 2.	4	Click document spot	5	160	Step 1 Requirement 1 Failure Mode 1 Cause 1 Action 2. / 3-1-2000	John Smith	4-1-2000				
Step 1 Requirement 2. The quick brown fox jumps over the lazy dog.	Step 1 Requirement 2. The quick brown fox jumps over the lazy dog.																	
Step 2. / Function	Step 2 Requirement 1. The quick brown fox jumps over the lazy dog.	Step 2 Requirement 1 Failure Mode 1.	Step 2 Requirement 1 Failure Mode 1 Effect 1.	8	SC	Step 2 Requirement 1 Failure Mode 1 Cause 1.	Control prevention 1.	3	Click document spot	4	86	Step 2 Requirement 1 Failure Mode 1 Cause 1 Action 1. / 1-1-2000	Alice Cooper with a big boooooong wide name. / John Smith	2-1-2000	5	6	7	210
						Step 2 Requirement 1 Failure Mode 1 Cause 1.	Control prevention 1.	3	Click document spot	4	86	Step 2 Requirement 1 Failure Mode 1 Cause 1 Action 1. / 1-1-2000	John Smith					



Companies often produce standard parts and customer specific parts which have unique process steps. The FMEA needs to reflect this. A second customer specific FMEA which includes the extra process steps should be developed. This is much easier in a relational database than it is in Excel. To facilitate sorting by step the process step field can be divided into 2 fields; one for the process step field and another for the description of the function.

Step / Function	Requirement
Step 1. /	Step 1 Requirement 1. The quick brown fox jumps over the lazy dog.
Function	Step 1 Requirement 2. The quick brown fox jumps over the lazy dog.
Step 11. / Function	Step 11 Requirement 1. The quick brown

RPN	Recommended Action	Responsibility / Target Completion Date	Action F
			Action taken / Completion Date
96	Step 1 Requirement 1 Failure Mode 1 Cause 1 Action 1.	Alice Cooper / 1-1-2000	Action Taken / 2-1-2000
	Step 1 Requirement 1 Failure Mode 1 Cause 1 Action 2.	John Smith / 3- 1-2000	Action Taken 2 / 4-1-2000
160		<div style="border: 1px solid gray; padding: 5px;"> < januari 2000 > ma di wo do vr za zo 27 28 29 30 31 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6 <input type="text"/> Today: 18-4-2014 </div>	
96	Step 11	Alice Cooper	Action Taken

In the same way the action field actually contains 2 fields: The name of the responsible person and the completion date field. Of course when an action is added to a FMEA the action should be managed. The user needs to be able to view all the open actions and their proposed completion dates.

This type of activity can easily be realized in a relational database but is very hard to implement in Excel. Of course it is possible to realize this functionality in Excel but it is very time consuming.

In practice people using Excel manage the actions by copying them into another system.

Managing versions

Version management is an essential requirement for FMEA. Issued versions should never be changed and the data in versions already issued should still be available. Issue dates should be stored automatically and it should not be possible to change them. If you use Excel you will have to implement a procedure for this. Also you will have to convince the auditor that the procedure is followed by everybody. In a relational database you can automate this procedure and the correct way of working is guaranteed.

Link to the process flow and control plan

A FMEA is normally linked to the process flow and the control plan. The first column in the FMEA generates the first 2 columns of the control plan. In an ideal situation there is also a feedback loop between production control measurements (SPC) and the FMEA process.



Product No: DataLyzer Example FMEA TS16949 - Rev 1 (Draft)		Potential Failure Mode	Potential Effects of Failure	S E V	C L A S	Potential Causes of Failure
Op. 70 / Manual application of wax inside door panel	Cover inner door lower surfaces with wax to specification thickness					

Part / Process Number	Process Name / Operation Description	Machine, Device, Jig, Tools For Mfg.
Op. 70	Manual application of wax inside door panel	Sprayer
		test

This linkage is not possible in an Excel environment. Changes in one of the 3 documents need to be implemented in the other documents as well. This will require another procedure which the auditor will check for compliance.

User management

In organizations there might be different roles related to the FMEA and Control planning process. People might be responsible for creating a FMEA, reviewing a FMEA or are just allowed to view a FMEA. The roles for the same person might be different for different (groups of) FMEA's. Particularly if a company has different locations where similar products are developed the user management can become very complex.

This kind of user management cannot be implemented in an Excel environment.

User Acceptance and implementation of FMEA process

Starting FMEA in Excel will be very easy. You can download sample templates from the internet and within a few minutes you are up and running. As the user is familiar with Excel no time is required to train the user in the use of the system. Especially if users are familiar with the FMEA methodology then Excel will give them an opportunity to make a quick start.

Excel has an enormous amount of flexibility and the user can adapt the templates to their own requirements (layout, colours, line thickness and so on)

A FMEA system based on a real time database will take more time to implement. The requirements of the system need to be established and then the appropriate solution should be



selected. FMEA systems based on a real time database range from 500 US \$ to more than 50.000 US \$ for a site license so it is important that the right tool is selected.

Conclusion

In general you can say that if a company needs an introduction to FMEA or when a company will keep the number of FMEA's limited to a few products then Excel will be adequate. If a company wants to use FMEA and Control Planning as an integral part of the quality planning process it is strongly recommended that they use a FMEA and Control planning software solution based on a real time database system.