

## RCM2 Analysis Meeting Assessment

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In order to effectively and efficiently analyze equipment systems, it is important for RCM facilitators to develop skills that will enable them to effectively assess the complexity of the analysis and to use this information to plan the meetings. As with all new skills, this requires some practice in order to become proficient. This document is intended to support and guide facilitators by providing a form which can be used during analysis planning.

A system is made up of components - many of these components may have been subjected to analysis previously although in different operating contexts. The form shown in this document is for guidance only and should not be used for other than estimating the number of meetings needed to complete an analysis on equipment.

The average total failure modes are for guidance only and it is important that the facilitator uses his / her judgment and experience to assess the complexities of the analysis.

Here at Blue Sky Reliability we recommend completing your RCM analysis in a one week format (i.e. nominally 40 hours). Naturally, this varies with each analysis you plan.

**What, when and who**

The top of the assessment form records the system, date and name of the facilitator.:

<b>Equipment to be analyzed:</b>	<i>Product movement system</i>	<b>Date:</b>	<i>2/9/15</i>	<b>Facilitator:</b> <i>Ivor Headache</i>
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**How many failure modes?**

As shown in the example below, the facilitator has estimated a total of 15 failure modes associated with the controls for the motors in the system. This process is repeated for all significant components or subsystems that are within the scope of the proposed analysis. Any components or subsystems that are not included in this form can be noted at the bottom of the form and their estimated number of failure modes recorded.

<b>Component or sub system</b>	<b>Average total failure modes</b>	<b>How many components or sub systems?</b>	<b>Estimated number of failure modes</b>	<b>Comments</b>
Motor controls	6	<i>2</i>	<i>15</i>	<i>Includes local motor isolation</i>
Electric motor and coupling assembly	10	<i>2</i>	<i>20</i>	<i>1 x 12 HP, 1 x 25 HP motor</i>

### **Calculating the number of analysis meetings**

Once all of the estimated failure modes components or subsystems that are within the scope of the proposed analysis have been recorded, a total can be calculated. By dividing the estimated total number of failure modes by the facilitator's hourly completion rate it is possible to calculate the estimated number of meeting hours needed to complete the analysis.

			<b>Total:</b> 223	Estimated meeting hours to analyze: 40
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### **How many failure modes per hour?**

Experienced facilitators can regularly achieve six completed failure mode analyses per meeting hour. If the facilitator estimates that he /she can complete five failure modes per meeting hour the number of meetings needed will increase. In the example shown below, at least one extra meeting should be planned.

			<b>Total:</b> 223	Estimated meeting hours to analyze: 45
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### **Other things to consider**

The accuracy of an estimation for the number of meetings needed can be affected by factors such as:

- Analysis team skills and experience
- Unforeseen complexity for some of the failure modes (the team is unable to identify root causes)
- The need for highly specialist input to the analysis

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**EXAMPLE OF A COMPLETED ASSESSMENT FORM**

<b>Equipment to be analyzed:</b>	<i>Product movement system</i>		<b>Date:</b>	<i>02/09/15</i>	<b>Facilitator:</b>	<i>Ivor Headache</i>
<b>Component or sub system</b>	<b>Average total failure modes</b>	<b>How many components or sub systems?</b>	<b>Estimated number of failure modes</b>		<b>Comments</b>	
Motor controls	6	2	15		<i>Includes local motor isolation</i>	
Electric motor and coupling assembly	10	2	20		<i>1 x 12 HP, 1 x 25 HP motor</i>	
Pump assembly	10	2	20		<i>positive displacement pumps (96 and 200 GPM)</i>	
Each Audible / visual indicator at local panel	3	14	42			
Each protective device (i.e. PRV, anything that relieves an abnormal condition)	3-5	8	33		<i>Same devices used on both systems.</i>	
Each Alarm device (false alarm, no alarm, out of calibration {hidden})	3	10	30			
Each Containment (leaks from seals, flanges, impact damage etc.)	6	2	12		<i>Product and lubrication contained</i>	
Appearance	6-10	1	6		<i>See photos</i>	
Safety (guards, railings, platforms, signage, interlocks etc.)	10	1	7			
Access	5	N/A				
Valves	2-5	N/A				
Each Lubrication point	1-3	6	18		<i>Oil bath and grease nipples</i>	
Unique identification of equipment (dirty, obscured, missing, incorrect etc)	4-8	1	10			
Complex electronic control systems	1-3 (can be black-boxed)	N/A				
Other systems or components	As needed	2	10		<i>Belt drives and a rotational widget</i>	
			<b>Total:</b>	<i>223</i>	Estimated meeting hours to analyze: <i>40</i>	

**RCM Analysis Meeting Assessment for you to use – adjust to suit your specific needs**

<b>Equipment to be analyzed:</b>			<b>Date:</b>	<b>Facilitator:</b>
<b>Component or sub system</b>	<b>Average total failure modes</b>	<b>How many components or sub systems?</b>	<b>Estimated number of failure modes</b>	<b>Comments</b>
Motor controls	6			
Electric motor and coupling assembly	10			
Pump assembly	10			
Each Audible / visual indicator at local panel	3			
Each protective device (i.e. PRV, anything that relieves an abnormal condition)	3-5			
Each Alarm device (false alarm, no alarm, out of calibration {hidden})	3			
Each Containment (leaks from seals, flanges, impact damage etc.)	6			
Appearance	6-10			
Safety (guards, railings, platforms, signage, interlocks etc.)	10			
Access	5			
Valves	2-5			
Each Lubrication point	1-3			
Unique identification of equipment (dirty, obscured, missing, incorrect etc)	4-8			
Complex electronic control systems	1-3 (can be black-boxed)			
Other systems or components	As needed			
			<b>Total:</b>	

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