Step-by-Step RED Procedure

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- Course Website > Lessons > Failure/Fully Plastic Action > Assignment (<u>http://classes.mst.edu/ide120/lessons/failure/assignment/index.html</u>)
- 2. Select the number/picture of the failed specimen you looked at.
- 3. Select "Functional Model" on the top right.
- 4. Open the RED website in another tab or browser (<u>http://idecms.srv.mst.edu/ide/</u>)
- 5. Click "Use Preloaded Data."
- 6. Click "Electromechanical."
- 7. Choose Human Centric/Unmanned, System/Subsystem combination based on what you think fits your specimen.
 - a. Human Centric/Unmanned Is it something that humans interact with directly or frequently? Or is it a part in a machine that rarely sees direct human interaction?
 - i. Examples of Human Centric pliers, bike pedal
 - ii. Examples of Unmanned bolt, shaft
 - b. System/Subsystem Is it the whole product or just a part of it?
 - i. Examples of System pliers
 - ii. Examples of Subsystem bolt, shaft, bike pedal
- Choose the functions applicable to the specimen by looking at the Functional Model that you have open in another tab or browser. The functions are listed in the blue boxes. Choose multiple functions by Ctrl + click. Some of the functions listed on the functional model may not be in the database.
- 9. Click Submit.
- 10. The program will give you a fever chart showing functions at high/med/low risk of failure and have two options: "Download Text Report" and "Download Excel Report."
 - a. Personally, I had trouble downloading the excel report, so I clicked "Download Text Report" and then when the screen came up with all the data jumbled up, I right clicked on it and selected "Export to Microsoft Excel."



b. Click "Import."



d. You should get something that looks like the following:

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5	Export Solid											
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11	Failures Seen										- 8	
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13	Abrasive Wear										- 8	
14	Adhesive Wear										- 8	
15	Biological Corrosion										- 8	
16	Brittle Fracture										- 8	
17	Buckling										- 8	
18	Cavitation Erosion										- 8	
19	Corrosion Fatigue										- 8	
20	Cracking										- 8	
21	Creep										- 8	
22	Crevice Corrosion										-8	
23	Deformation Wear										- 8	
24	Direct Chemical Attack										- 8	
25	Ductile Rupture										-8	
26	Electric Field Coupling										-8	
27	Electrical Overstress										- 8	
28	Electrostatic Discharge										- 8	
29	Erosion Corrosion										- 8	
30	Force induced Deformation										- 8	
31	Fretting Fatigue										- 8	
32	Callies										- 8	
2.4	Galvanic Corrosion											
26	High Cycle Estimue											
35	Hydrogen Damage											
30	Impact Fracture											
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For your discussion in the report, be sure to mention some of the high risk failure modes that the program gave you (in this example, just high cycle fatigue and brittle failure, you don't have to mention the function, like export solid or secure solid, etc.). Also, you need to include screen shots of the Fever Chart and the Functions at High Risk in Appendix B. Examples are below:



Figure 1: Sample Fever Chart

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53	Functions at High Risk									
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56	Export Solid fails due to High Cycle Fatigue at (5, 5)									
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58	Secure Solid fails due to High Cycle Fatigue at (5, 5)									
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60	Import Solid fails due to High Cycle Fatigue at (5, 5)									
61										
62	Import Solid fails due to Brittle Fracture at (5, 3)									
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64	Secure Solid fails due to Brittle Fracture at (5, 3)									
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Figure 2: Sample Excel RED Readout - Fuctions at High Risk

If this process doesn't work for you, look at the official tutorial at http://classes.mst.edu/ide120/lessons/failure/assignment/red tutorial.pdf.