 

**IET 330-330L Design for Manufacturability**

# Spring 2015

# Department of Applied Engineering and Technology

# College of Science and Technology

Morehead State University

**Individual Assignment 4: Design for X (Questions)**

**Chapter 10: Failure Modes, Design for Reliability, Safety, and Environment**

1. Consider the potential *design or manufacturing defects* in a typical steam iron sold for home use. List some failure modes, causes, and effects. Describe the severity of the effects. (5 points)

|  |  |  |  |
| --- | --- | --- | --- |
| Failure mode | Causes | Effect(s) | Severity |
| Damaged plate | Scratches | Burned clothes | 4 |
| Steam nozzle blocked | Hard water buildup | Steam won't spray | 3 |
| Cord damaged | Cord stripping away near the plug | Causes shorting | 10 |
| Cracked water tank | Damages caused by improper handling | No water for steaming clothes | 4 |

1. I have listed the 6 basic types of hazards below. Please give an example of a product that you own or have used for each of them. (5 points)

|  |  |
| --- | --- |
| 1. entrapment | Chain on my bike |
| 2. contact | Hot burner on my stove |
| 3. impact | Crowbar |
| 4. ejection | Lawn mower |
| 5. entanglement | Hand mixer  |
| 6. noise and vibration | Weed eating  |

1. Consider the design of a new **weed whacker** that uses a small gasoline engine to power a rotating cutter blade 6 in. long by 2 in. wide by ¼ in thick. Use the safety hierarchy to make recommendations to protect users from injury or property damage. (5 points)

|  |  |
| --- | --- |
| 1. Eliminate the hazard | Automate weed eating so robots can do it |
| 2. Protect against the hazard | Install guard around moving blade |
| 3. Warn against the hazard | Place warning labels on the unit  |
| 4. Provide training | Offer at home training sessions for new weed eater  |
| 5. Provide personal protection | Wear safety goggles and ear plugs and gloves and long sleeves and jeans and steel toed boots |

1. **Failure Mode and Effects Analysis (FMEA)** **[10 points]**

**(For this question, you must relate your answer to the part / subassembly / product that you choose for group Project.**

Carefully review Example (Pages 231) of the text.

List possible failure modes, causes, and effects, as well as recommended corrective action for your part/ subassembly / product, that you choose for group project.

**Total score = 25 points.**