# FMEA Analysis

The current Unipart FMEA is woefully inadequate for the task at present. Crucial data is missing, primarily the process function and requirements; and other data is either lacking in information or is inaccurate (for example the RPN calculations are almost entirely mathematically incorrect).

The “Process Function/Requirements” column should briefly outline the process.

For some rows, the “Potential Effects of Failure” column is either missing or lacking in key detail. This column is very important as it outlines to the Unipart team member the likely outcomes of a part/process failure. This gives team members an idea of what to look out for when inspecting parts. This column will need to be re-written to give greater detail on the outcome of failure.

The severity, occurrence and detection (SOD) are used to calculate the Risk Priority Number (RPN), which is used to identify the failure mode which poses the greatest risk to the quality of the product. At present, the SOD numbers have no key which limits their effectiveness. Hence, a ‘5’ rating for severity, for example, is effectively meaningless without a key. For the purposes of this analysis, it is assumed that a 1-10 scale similar to the ones below were used:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Occurrence | | Severity | | | Detection | |
| rating | frequency of occurrence | rating | Effect of severity | who the severity effects | rating | likely hood of detection |
| 1.- Remote | < 1 : 1,500,000 | 1 | No Effect | - | 1 | Almost certain (process in place) |
| 2. Very low | 1 : 150,000 | 2 | very minor | Discerning customers | 2 | Very High |
| 3. Low | 1 : 15,000 | 3 | minor | Average customers | 3 | High |
| 4. Moderate | 1 : 2,000 | 4 | very low | most customers | 4 | Moderatly high |
| 5. Moderate | 1 : 400 | 5 | low | product functions, minor feature have reduced performance | 5 | Moderatly high |
| 6. Moderate | 1 : 80 | 6 | moderate | as 5, but all minor features fail | 6 | Low |
| 7. High | 1 : 20 | 7 | high | as 6, but reduced performance | 7 | Very low |
| 8. High | 1 : 8 | 8 | very high | product inoperable loss of primary function | 8 | Remote |
| 9. Very High | 1 : 3 | 9 | hazardous | Injury to people | 9 | Very remote |
| 10. Very High | 1: 2 | 10 | hazardous | no warning! | 10 | Absolute uncertainty |

Hence, an accurate key must be implemented to make the SOD numbers, and hence the RPN, useful.

However a more concerning problem is that the RPN numbers, which are calculated by multiplying the severity, occurrence and detection numbers, are almost all mathematically incorrect. For example, a potential failure with an S rating of 9, O rating of 3, and D rating of 7. The S and D ratings would suggest there is a relatively serious problem. However the RPN number, which in theory should be 252, is recorded as zero. This means that despite the very high rating, Unipart would seem to suggest there is no problem. This is concerning as it means serious issues may be completely overlooked.

Hence it is necessary to revise the entire FMEA document. An entirely new FMEA document with a clearer layout should be implemented. This will include a key detailing what each of the SOD ratings means; and will have high RPN numbers highlighted to emphasise their priority.