

# HOW TO PERFORM A WEIBULL ANALYSIS?

Quantify Reliability and predict the component's future performance

## 10 STEPS



1. Determine the asset(s) to be analysed



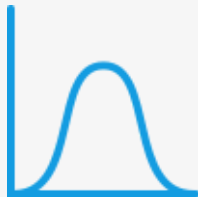
2. Determine the component failure mode for that asset(s)



3. Obtain as much relevant life data as practical



4. Classify life data



5. Select the right lifetime distribution that will fit the life data set and model the life of the component.



6. Estimate the parameters of the life distribution that will make the function most closely fit the life data set.



7. Generate Plots and Calculate Statistical Functions



8. Indicate Confidence Bounds

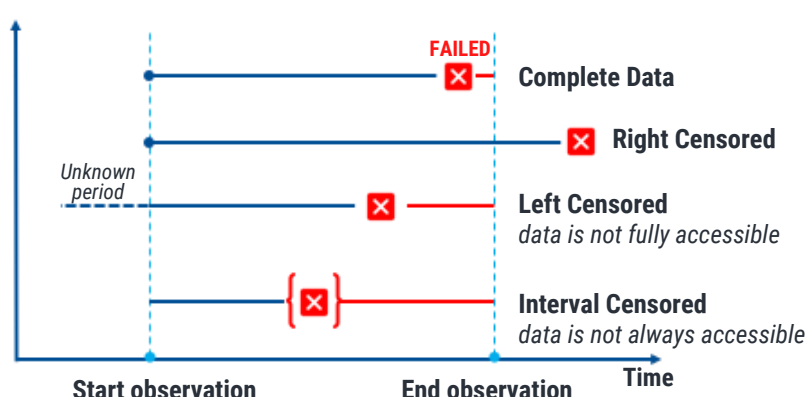


9. Review the Analysis



10. Determine and implement appropriate strategies

### Types of Life Data



### Life Distribution Selection



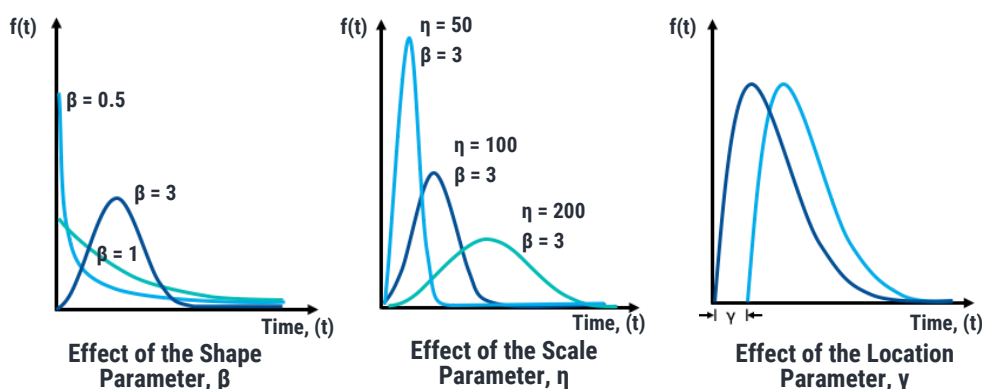
#### Goodness-of-fit tests

- Some Weibull Analysis software has the Goodness-of-fit feature to help. e.g., **ReliaSoft Weibull++**
- Kolmogorov-Smirnov test
  - Normalized correlation coefficient test
  - Likelihood value test

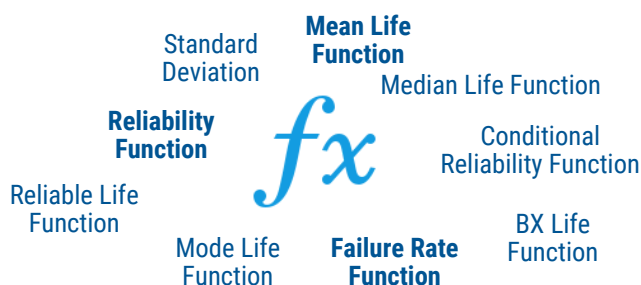
#### A theoretical method

1. Look at the data in question
2. Gather historical information
3. Consult the industry literature to find similar examples.
4. Review the probability distributions
5. Select the right distribution

### Effect of The Parameters



### Statistical Functions



### Review Criteria

- |  |  |
|--|--|
| <p><b>Practical</b></p> <ul style="list-style-type: none"> <li>• Observations</li> <li>• SME Judgement</li> <li>• Variation in data</li> </ul> | <p><b>Graphical</b></p> <ul style="list-style-type: none"> <li>• Fit to line</li> <li>• "S" Shapes</li> <li>• Minimum life</li> </ul>    |
| <p><b>Analytical</b></p> <ul style="list-style-type: none"> <li>• Model fit</li> <li>• Parameters</li> <li>• Assumed beta</li> </ul>           | <p><b>Confidence</b></p> <ul style="list-style-type: none"> <li>• Risk / Level</li> <li>• Outliers</li> <li>• Width (samples)</li> </ul> |

### Reliability Bathtub Curve

