

FREQUENTLY ASKED QUESTIONS (FAQ`s)

TOPICS (alphabetical order):

- 1) **Brand X**
- 2) **Cost**
- 3) **Data Gathering / Input / File Compatibility**
- 4) **Goodness-of-Fit (GOF) Display**
- 5) **Look and Feel**
- 6) **Monte Carlo Simulation**
- 7) **Program Size**
- 8) **Weibull Engineering . . . What is it?**
- 9) **Weibull Library Database**

1) **Brand X?**

There are other Weibull programs on the market... Why should I use your software?

This question is asked often. Here are the most important answers. The SuperSMITH(TM) package by Fulton Findings™ is the best software for Weibull Engineering and variability modeling analysis, because we did the following first and are still currently the main innovators in Weibull technology. We are:

1. **FIRST** to develop and market widely-used Weibull Engineering software.

NOTE: The software was originally named WeibullSMITH(TM), then WinSMITH(TM), and finally SuperSMITH.

2. **FIRST** to present Weibull Engineering workshops teaching novice and advanced users.

NOTE: The wildly popular Weibull Engineering workshop was first developed by Dr. Bob Abernethy

3. **FIRST** to advocate regression over likelihood when appropriate for small complete data samples.
4. **FIRST** to develop p-value estimates (pve%) for regression goodness of fit.
5. **FIRST** to promote minimizing x-axis error in the regression solution for point-by-point data.
6. **FIRST** to offer Abernethy risk analysis for failure forecasting.
7. **FIRST** to implement easy-to-use optimum replacement analysis.
8. **FIRST** with Weibayes (1-parameter Weibull) for better small sample solutions.
9. **FIRST** to automate Weibayes test planning.
10. **FIRST** to develop parameter as function of engineering variable (PFEV) for accelerated testing.
11. **FIRST** with Sica-Luko test correction.
12. **FIRST** in reduced bias adjusted (RBA) parameters for likelihood solution.
13. **FIRST** in reduced bias comparison for significant difference between data sets.
14. **FIRST** in easy-to-use confidence contours for design comparison.
15. **FIRST** in developing likelihood ratio confidence bounds for probability plotting.
16. **FIRST** to offer automated warranty format data analysis.
17. **FIRST** with Ybath(TM) advanced mixture analysis for multiple occurrence mechanisms.
18. **FIRST** to implement Barringer Process Reliability (BPR) plotting.
19. **FIRST** with 1-Click BPR solution.
20. **FIRST** to offer automated subpopulation (Batch) detection.
21. **FIRST** with Vasan-Fulton usage-to-test ratio (FUTR).
22. **FIRST** to show occurrence point display on a probability density function (PDF) plot.
23. **FIRST** to provide a Weibull calculation software module for use in other programs.
24. **FIRST** to have automatic Weibull Library item generation.
25. **FIRST** to perform Weibull/Lognormal goodness-of-fit power studies.
26. **FIRST** to offer an extreme-value-based outlier test.
27. **FIRST** to include total uncertainty adjustment for confidence bounds.
28. **FIRST** with assurance bounds for the probability plot fit line.
29. **FIRST** to provide benchmarking with classic case studies from industry.
30. **FIRST** with multiple language choices for Weibull software.

NOTE: This all started with the first handbook for Weibull engineering, THE NEW WEIBULL HANDBOOK(c), by Dr. Bob Abernethy. Most of the techniques described above were developed by Dr. Bob (a few by Wes Fulton and a few others by Carl Tarum) with exclusive research and are **NOT AVAILABLE ELSEWHERE**. Because of this and more which sets us apart and way ahead of any competition out there, we are **FIRST** in worldwide use. The term **FIRST** here means we did it first and are still the best at it. No others can make so many substantial claims with respect to Weibull techniques.

2) Cost

Why are your software prices so small compared to other expert system software?

When we decided to write the software that would become world standard, we also decided to make sure that all businesses and professionals could afford it. Our goal is to provide the highest quality software to the most people. We have set our prices accordingly and will continue to pace the market and keep prices down. It is a source of gratification to us that our software is the most popular and most frequently used.

3) Data Gathering / Input / File Compatibility

How can I enter new data or existing data easily? Can I use data from other sources and from old versions of Fulton Findings software?

Data gathering can be accomplished in SuperSMITH or with any standard software. SuperSMITH has a data entry spreadsheet for fast input of new data. If data has been accumulated in other software, it is easily entered into SuperSMITH. You can get data from any standard source and import it into our latest software with a few mouse clicks. You can copy your existing data into the Windows clipboard and then paste it into our software by clicking on the SuperSMITH insert icon. For very large data sets (too big for the clipboard) you can first store your data to a file in text format and then click on the SuperSMITH open-file icon to import. All SuperSMITH files are compatible with all later versions of the software and with all previous versions of the software (upward and downward compatible). Good luck in trying to get that level of compatibility with other software.

4) Goodness-of-Fit (GOF) Display

Where is the goodness-of-fit shown?

The standard starting display for graphical goodness-of-fit in the SuperSMITH software is the p-value estimate (pve%). The pve% is based upon the solution correlation coefficient. The correlation coefficient (r) is often used as a goodness-of-fit indication for regression (least squares) fitting. When regression techniques are used for fitting, the square of the r (r^2) can be displayed on the results plot (unless you decide to hide the parameter display) and in the report. The distribution analysis can decide the best-fitting model based on pve%, r^2 in comparison with the critical value (ccc^2), or on a likelihood ratio test. When maximum likelihood methods are used for solution, there is no correlation coefficient generated and no corresponding r^2 or pve% display in the output. If you want to see the correlation coefficient or pve% displayed, simply select method/input format and choose regression. For the likelihood-based solution there is a modification of the Anderson-Darling GOF available (pAD%). The pve% should agree somewhat with the pAD% for the same data set but could differ greatly for unusual data sets.

5) Look and Feel

Why does your software layout look different from the old standard Windows layout?

SuperSMITH (TM) software is the world standard and has a look and feel all of its own. We design our software to be different from the start so that it is easier to use for all of our customers around the world. SuperSMITH provides graphical cues and icons (international symbols) where possible

and expert system programming to make communication easier. Because of this, the program can be translated easily into other languages . . . so far into seven. Years later, we see our screen layout ideas are gaining favor with the big guys. Look at how many icons are showing up on the main pages of new software starting in 1997. Not a penny of royalty has been sent to us yet. We will continue to make the easiest and most friendly software with the simplest user interface, even if it's ahead of its time.

6) Monte Carlo Simulation

Does your software perform Monte Carlo?

Oh, yes! We use Monte Carlo (MC) simulation all over in our programs to get some of the most important results. We use MC for pve% goodness of fit (GOF), for pivotal confidence bounds, for generating a few demonstration samples (with the dice icon), and now for the additional SuperSMITH Dice program for generating data similar to the wire break experiment results we created formerly in the workshop with workshop attendees. But if you are interested in doing your own MC, then we have a few simulation types available with Special Monte Carlo under the dice icon. For a very customized MC simulation of your own design outside of what we provide, we recommend trying a program like Microsoft EXCEL. However, with any simulation program be careful not to exceed the trial quantity easily handled without excessive repeats.

7) Program Size

How advanced can your software be if it loads in only a few seconds?

SuperSMITH (TM) is the most advanced Weibull Engineering software available. Our programming techniques have been the focus of much attention constantly making our competition shake their heads. What they don't know can't hurt us. Yes, we have an incredibly small program size (between 10 and 20 megabytes taking up a tiny fraction of a CD . . . that is megabytes and not gigabytes, and CD not DVD). And yet, SuperSMITH has the most powerful data analysis techniques with the easiest user interface. That is why we are the leaders in Weibull Engineering software and have been for over 30 years. Many Weibull techniques developed in the last 30 years were pioneered by our own Dr. Abernethy, including Weibayes, test substantiation, and failure forecasting. The new Weibull team of Wes Fulton, Carl Tarum, and Dr. Abernethy continue to develop new techniques, like design comparison and advanced mixture solutions, and continue to make the latest research accessible through compact, friendly, powerful software.

8) Weibull Engineering . . . What is it?

What is Weibull Engineering?

We use the term Weibull Engineering (WE) to extend and expand the tools available for problem-solving past the standard Weibull plot. Of course, the focus is on Weibull plotting but not limited to that. WE can use any appropriate distribution model for the associated probability plot like lognormal, normal (Gaussian, bell-curve), extreme-value (Gumbel), and so on. Included tools with WE are failure forecasting, optimum replacement, test planning, Barringer process reliability (BPR),

advanced mixture analysis, design comparison, accelerated test data analysis, quality limit comparison, and especially event rate trending with Crow-AMSAA (C-A) reliability growth and Nelson recurrent event (RE) solution. The number one recommendation for continuous improvement with WE is starting and maintaining a Weibull library as indicated below. There are recommendations for this in Dr. Bob's Weibull handbook. The SuperSMITH software can help with some of the library development effort.

9) Weibull Library Database

What is a Weibull Library?

We reference the Weibull Library as the most important idea to get in Weibull Engineering. It is Dr. Bob Abernethy's term for a database of previous solution results especially but not limited to Weibull Beta parameter values (Weibull slopes). Our #1 recommendation is to start and maintain a Weibull Library saving each solution result for later use. The later use could be to get a more accurate answer with an extremely small input data set, or for Weibayes solution (1-parameter Weibull), or for test planning, or for preliminary reliability models, and so on. The Weibayes method (also named by Dr. Bob) depends on a good estimate of Weibull Beta from solution history. There are two ways to go:

- 1) Your own database
- 2) Somebody else's database

We think the first option is best, because your situation may be significantly different than somebody else's. The SuperSMITH software has basic capability to help in starting and maintaining your Weibull Library. However, there are some existing databases you can access to get started. One was developed by Paul Barringer. Now, that database and others are available online. We link to a database source here, but we caution that your own database is preferred. Use good judgement with any values from a general database.