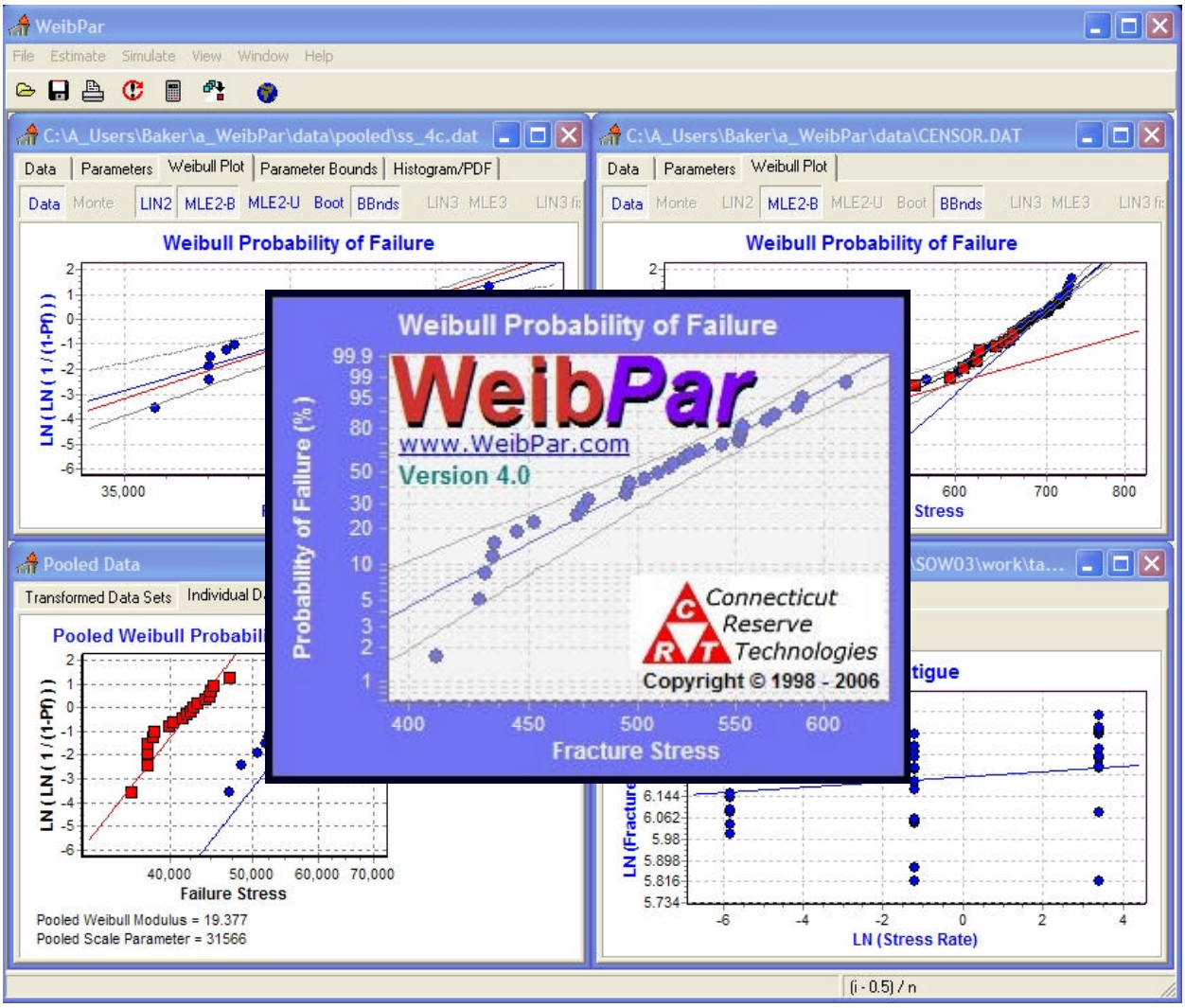
WeibPar 4
User Guide



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Program Features

COMPONENT RELIABILITY: WeibPar interacts with CARES to calculate effective volumes or areas, as well as computing confidence bounds on component reliability through bootstrap techniques. The user must be in possession of the CARES (Ceramics Analysis and Reliability Evaluation of Structures) algorithm to perform these computations. The CARES program evaluates the structural reliability of components consisting of brittle materials.

TIME INDEPENDENT PARAMETER ESTIMATION (Fast Fracture Weibull Parameter Estimation): WeibPar estimates parameters for both the two and three parameter Weibull distributions from uncensored failure strength data. The program displays, both numerically and graphically, the maximum likelihood parameter estimates as well as the linear regression parameter estimates. Regarding the failure data, the user is prompted for the flaw type, volume or surface, as well as the specimen geometry. Current geometries include tensile specimens and bend bar specimens. Direct input of the effective volume or area is available for cases when the user calculates the effective volume or area outside of WeibPar. Additionally, WeibPar will utilize a finite element model of the specimen geometry to calculate the effective volume or area.

The linear regression estimation algorithm and the plotting routines require a data ranking formula. Multiple ranking formula schemes are available as a user option.

Unbiasing factors and confidence bounds are provided on the two parameter maximum likelihood estimates. One set of the bounds is calculated based on the Thoman, Bain and Antle procedure. For this procedure Monte-Carlo techniques were utilized to derive tables of unbiasing factors and confidence bound factors. The second set of confidence bounds is calculated by the likelihood ratio hypothesis test. An additional graphic is provided with this method that shows the confidence "ring" around the parameter estimates. A third set of confidence bounds is calculated based on bootstrap techniques.

WeibPar uses two parameter maximum likelihood estimation techniques to estimate parameters for censored data. Censored data is failure data where each data point has been associated with a flaw type such as volume or surface. Confidence bounds are calculated for censored data via the Bootstrap technique.

WeibPar calculates pooled Weibull parameters from multiple uncensored data sets of different geometries for either volume or surface flaws.

TIME DEPENDENT PARAMETER ESTIMATION (Fatigue Parameter Estimation): WeibPar estimates time dependent parameters from dynamic fatigue data through linear regression techniques. Combined with fast fracture (or Weibull) parameters and the specimen geometry, the time dependent material parameters are calculated. A CMP file may be created for use in the CARES program via the Export results function.

DATA SET GENERATION: Uncensored randomly generated data sets may be created based on the user's input of Weibull parameters and the number of data points. The data sets are created through Monte-Carlo techniques. The generated data sets may be saved to a file.

PRINT, EXPORT: These functions are available from the File menu and allow the user to print the chart or the estimated parameters and export the chart to different file formats such as JPEG, Bitmap or Metafile. Two formatted text files, WPR and CMP, may be created through the export results function. The WPR format includes all plotting information necessary for use in other graphics packages. The CMP file, CARES material parameter file, includes appropriately formatted material parameters for use in reliability analysis.

Installation

This 32-bit program has been designed for Windows XP. The program has additionally been tested under Windows NT, 2000, and XP 64-bit. The program has also been updated for the German and Italian versions of Windows XP.

1. Unzip the zip file into an empty subdirectory.

2. Double click on SETUP.EXE. The SETUP program will guide you through the installation sequence.

3. The SETUP program prompts for an installation directory.

   `C:\Program Files\CRT Inc\WeibPar 4.0\`

   is the recommended directory. This directory will be referred to as `<InstallDir>`.

The files and directory structure after installation:

Subdirectory	File	Description
`<InstallDir>\bin`	`WeibPar.exe`	Main Program
	`Unbias.sup`	Table of unbiasing factors for the MLE2 estimates.
	`CFAlpha.sup`	Table of Confidence Bounds factors for the MLE2 Weibull modulus.
	`CFBeta.sup`	Table of Confidence Bounds factors for the MLE2 Weibull characteristic strength.
`<InstallDir>\examples\…`	*`examples`*	Example files described in the Examples section.
`<InstallDir>\docs`	Guides	User Guides, Theory Guides, License
`<InstallDir>\license`	GetClientInfo.exe	Licensing Files
	Readme.txt	

Uninstall

From the Windows Control Panel click → Add/Remove Programs.

Within the Add/Remove Programs Properties select WeibPar 4.x and click the Remove button. Some files and the directory structure require manual deletion.

Licensing

WeibPar requires a valid license. When a valid license does not exist some of the program functions are limited. The license will allow program use on a single computer for any local (non-network) user of that computer.

NOTE: WeibPar is licensed for SINGLE computer use.

Once the program has been installed follow the steps below to license the program:

N E W I N S T A L L -- New License Required

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1. Initiate the Licensing process.

   WeibPar menu: [Help | License | Client Information]

   The following file will be created and displayed:

`C:\Program Files\CRT Inc\WeibPar 4.0\license\WeibParClientInfo.txt`

2. Email "`WeibParClientInfo.txt`" to License@WeibPar.com

3. Upon validation, the License File "`WeibParLicense.txt`" will be returned to you. Place it in the following directory:

   `C:\Program Files\CRT Inc\WeibPar 4.0\license\WeibParLicense.txt`

U P G R A D E I N S T A L L -- Existing License

Except when otherwise noted, your existing License will work with each program upgrade.

1. Copy the file "`WeibParLicense.txt`" from your previous WeibPar installation.
2. Paste the license file into the following directory:

   `C:\Program Files\CRT Inc\WeibPar 4.0\license\WeibParLicense.txt`

Program Execution

1. Click Start Menu → Programs → WeibPar 4.x

   In this location you will find shortcuts to WeibPar, the User Guide, the Theory Guides, and the License agreement.

2. Use the "File | Open" menu commands or click on the "Open" icon to open a data file. An Open dialog box will appear allowing the user to select the input data set file.

   Choose one of the example data files such as

   ```
   <InstallDir>\examples\fast\Uncen.dat
   ```

3. The file will be scanned for censoring information and the appropriate uncensored or censored dialog will appear.

   Uncensored Time Independent Data: – The user may set:
   a. Specimen Geometry
      i. (None)
      ii. Tensile Specimen
      iii. 3 pt. Bend Bar Specimen
      iv. 4 pt. Bend Bar Specimen
      v. Pure Bend Specimen
      vi. User Input Effective Volume or Area
      vii. Finite Element Model (requires CARES)
   b. Flaw Type of Volume or Surface for ii – vii above
   c. Confidence Level
   d. Whether to calculate the Bootstrap bounds

   If the Advanced button is clicked the user may also
   e. Set the Data Ranking Formula
   f. Analyze J – Integral (J_C) data
   g. Analyze Fracture Toughness (K_{1C}) data
   h. Set the Temperature
   i. Fix the Weibull Modulus
   j. Fix the Weibull Threshold

   Censored Time Independent Data: – The user may enter specimen geometry information and the type of analysis (Volume, Surface, or Unknown) for each censored data set. Confidence Level, Bootstrap calculation, and the Data Ranking Formula options are also available.

   Uncensored Time Dependent Data: – In addition to setting the specimen geometry and flaw type as described above, the user also sets the Time Independent or Weibull parameters. When a Weibull parameter file is open previous to opening the fatigue data, the "From Fast Fracture Data" option will be available. Otherwise the User Input option is always available.

4. Upon opening a valid input file, WeibPar calculates all relevant Weibull parameters or Fatigue parameters, and automatically displays and graphs the results.

5. Multiple data sets may be opened at the same time. Use the "Window" menu for common Multiple Document Interface (MDI) functions.

6. When the user opens multiple uncensored time independent data sets, the "Pool" button may be used to calculate the pooled two parameter maximum likelihood estimates (PMLE2). The first data set with specimen geometry will determine whether a volume or surface pooled analysis will be performed. All valid uncensored data sets of the same flaw population will be pooled.

Data Sets

General Structure

- Data files utilize the *.DAT or the *.TXT extension and are in the format of ASCII text files (same as *.txt).

- Blank lines and comment lines beginning with a "C" are allowed.

Time Independent Data: Also known as fast fracture data, this data typically consists of failure stresses unassociated with time information. Brittle materials fast fracture data is typically characterized by the Weibull distribution.

Uncensored Time Independent Data

- A single column of failure values
- Blank lines and comment lines are acceptable.

```
C An example Uncensored data set

411
429
431
434
435
etc ...
```

Censored Time Independent Data

- Two columns
  - First column contains the failure values
  - Second column specifies the censored group indicator for that failure value. The indicator may be of any character or numeric string (no spaces or special characters). If the string begins with an 'V' or an 'S' than that set will be designated as a volume or surface type flaw for subsequent assigning of specimen geometry. For example, volume, vol, vol1, vol2, etc.

- The columns may be separated by any number of spaces, tabs, or commas.
- Blank lines or comment lines are acceptable.

```
C An example Censored data set

416   sur2
458   vol1
520   sur2
527   sur2
546   vol1
561   sur2
572   vol1
etc ...
```

Pooled Time Independent Data

Uncensored time independent data sets as described above are utilized for the pooled data algorithm. All uncensored data sets open within WeibPar with the same flaw type are included in the pooled set when the pooled data function is initiated.

Time Dependent Data: This data typically consists of failure stresses along with information relating to time (e.g., time to failure, stressing rate, etc.).

Uncensored Time Dependent Dynamic Fatigue Data

- First Line must be "DYNAMIC FATIGUE"
- Two columns
  - First column contains the Stress Rates in units such as Mpa/s or psi/s.
  - Second column contains the failure values
- The columns may be separated by any number of spaces, tabs, or commas.
- The values do not have to be sorted in any particular order. WeibPar will sort them first by the stress rate and then by the failure values.
- Comment lines begin with a "C"
- Blank lines are allowed

```
DYNAMIC FATIGUE

C An example Dynamic Fatigue data set

30    336.6
30    437.7
30    520.5

0.3   336.7
0.3   353.7
0.3   520.4
0.3   541.8

0.003  403.2
0.003  437.6
0.003  444.0
etc ...
```

Program Use

Menus

- File
  - Open — Displays the Open File Dialog, used to open data files.
  - Save Data — Displays the Save File Dialog, used for saving a data file under a different name or to save Monte Carlo generated data.
  - Close — Closes the active data set window.
  - Print — Prints the contents of the window for the active tab of the active data set.
  - Export Results — WPR – Saves the parameter estimates and the plotting information to a formatted text file.
    CMP – Saves the material parameter estimates to a formatted text file for use with the CARES program.
  - Export Graph — Allows the users to export the active chart to a Bitmap, Metafile, Enhanced Metafile or JPEG file.
  - [Files] — A list of previously opened files that may be used to reopen those files.
  - Exit — Exits the application.

- Tools
  - Recalculate — Redisplays the Data Type dialog for reanalysis of a data set.
  - Generate Data — Opens the Generate a Data Set dialog. Uses the Monte-Carlo technique to randomly generate time independent data sets according to user input Weibull parameters.
  - Pool Data — Calculates the pooled parameter estimates given all open Uncensored Time Independent data sets of the same flaw type.
  - CARES Interface — Displays the CARES Interface window that provides advanced feature interaction with the CARES program.
  - Set CARES.EXE… — Creates the link to the CARES program.

- Window
  - Hide Parameters — This function toggles whether the left hand data view screens are shown or hidden.
  - Tile — Tiles the open child windows
  - Cascade — Cascades the open child windows
  - Arrange Icons — Arranges all minimized child windows to the bottom left of the Main window.

- Help
  - User Guide — Displays the User Guide PDF (Adobe Acrobat required).
  - Fast Fracture — Displays the Time Independent Theory Guide PDF.
  - Time Dependent — Displays the Time Dependent Theory Guide PDF.
  - Ceramic Reliability — Open a Web browser and links to CeramicReliability.com.
  - Program Updates — Open a Web browser and links to the download section of WeibPar.com.

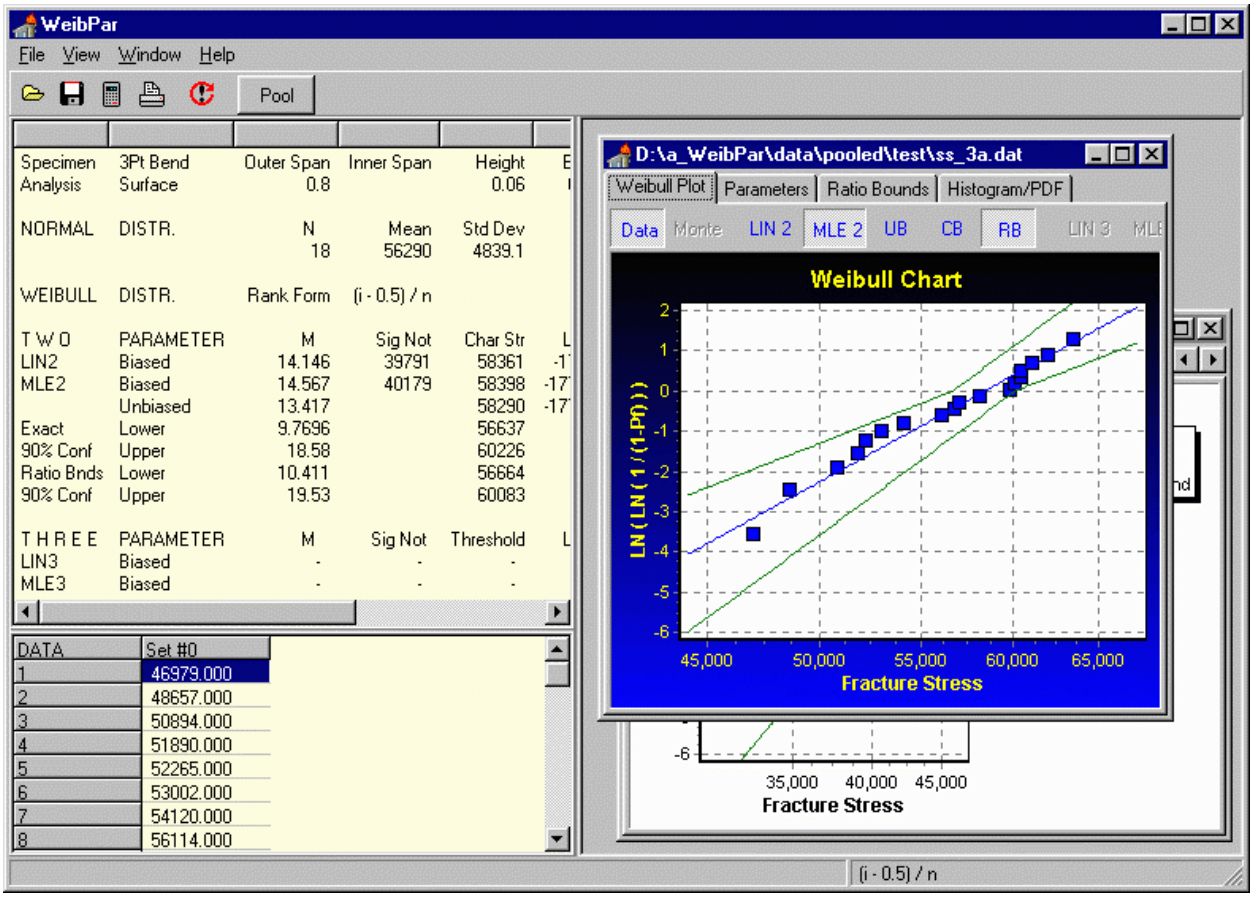
- Update Guides — Open a Web browser and links to WeibPar.com where the most current versions of the guides may be downloaded.
- Support — Opens a Web browser and links to WeibPar.com where support information may be reviewed.
- Terms Of Use — Opens the CRT Terms of Use Agreement.
- License – Directions — Opens the License Readme.txt file that contains the step-by-step instructions for licensing the program.
- License – Client Info — Creates the WeibPar Client Information file necessary for License generation.
- About — Displays the splash screen that includes version information.

Buttons

- Open — Displays the Open File Dialog, used to open data files.
- Save — Displays the Save File Dialog, used for saving a data file under a different name or to save generated data.
- Print — Prints the contents of the window for the active tab of the active data set. Used for either text pages or graphs.
- Recalculate — Redisplays the Data Type dialog for reanalysis of a data set.
-
- Pool Data — Calculates the pooled parameter estimates given all open uncensored data sets of the same flaw type.
- CARES Interface — Displays the CARES Interface window that provides advanced feature interaction with the CARES program.
- Generate Data — Opens the Monte Carlo dialog, used to generate random data sets according to user input Weibull parameters.

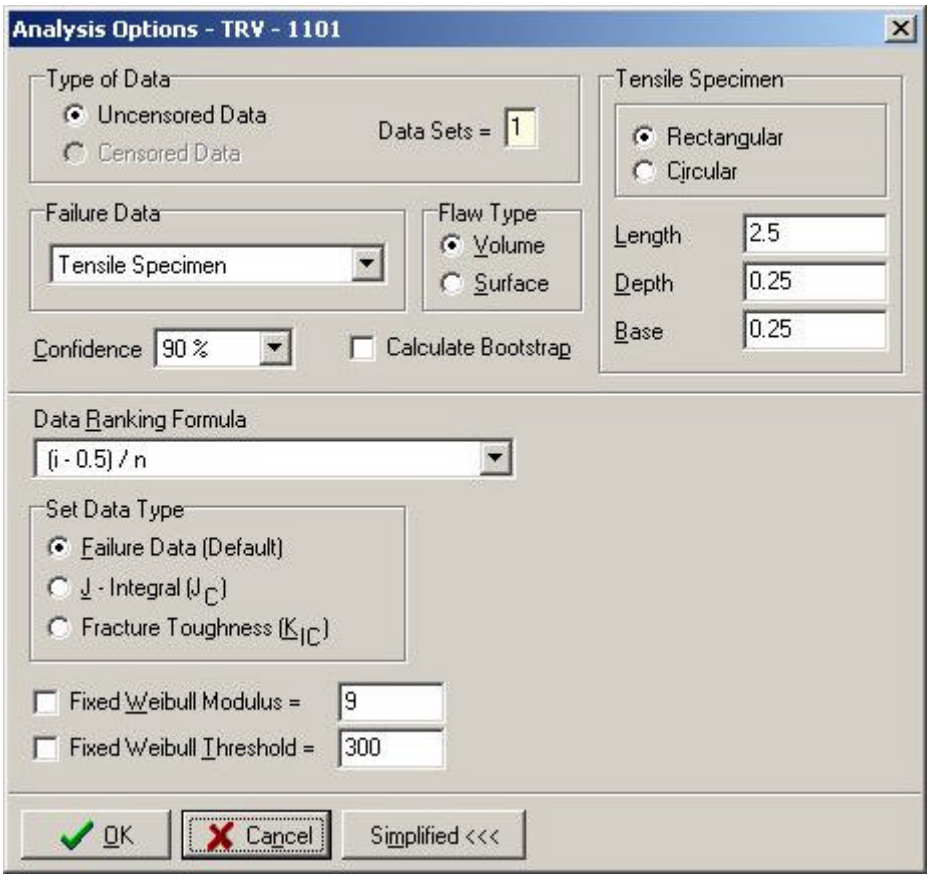
Windows and Dialogs

Main Window – Main application window. This window contains the menu system, the button icons, the child windows (Data File window and Pooled Data Window), and when [Window | Hide Parameters] is not checked the top left window pane shows the parameter estimates for the active data file and the bottom left window pane shows the failure data. For censored data sets the Data pane will split the groups of data into separate columns.



The main window and all its components are sizeable. The program will track and restore the user's settings (sizes and positions).

Analysis Options Dialog – Time Independent: This dialog is displayed after opening a data file or updating (reanalyzing) a data file. The program recognizes whether the data set is uncensored or censored and configures itself accordingly.



Use the Advanced and Simplified buttons to reveal or hide the advanced options.

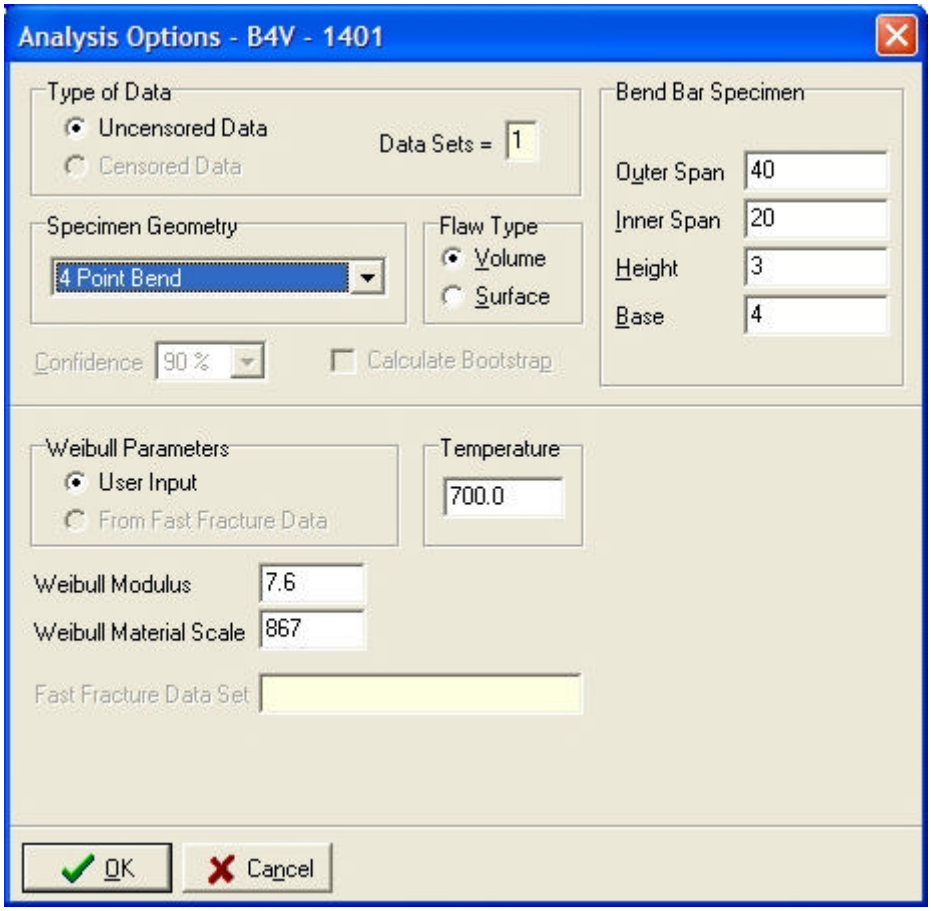
For uncensored data sets the user has a choice of failure data, J Integral data or Fracture Toughness (K_{IC}) data. Failure Data additionally consists of the following types: Raw data, Tensile specimen, 3 Point Bend Bar specimen, 4 Point Bend Bar specimen, Pure Bend specimen, and a User option of directly inputting the Effective Volume or Area. As each of these specimen types are selected the user is prompted for the appropriate dimensions and the type of flaw that the data set represents.

The Confidence Level allows the user to choose which level to calculate the confidence bounds for the Exact method (from the Thoman, Bain, and Antle tables), the Likelihood Ratio method based on the χ^2 distribution, and the Bootstrap method.

The Data Ranking Formula option is used both in the plotting of the data sets and in the linear regression estimator algorithm.

The J Integral and Fracture Toughness (K_{IC}) data represent special cases where the Weibull moduli are fixed known values, 2 and 4 respectively. The user may additionally choose to have the parameter estimates for a data set calculated given either a fixed Weibull Modulus or a fixed Threshold value.

Analysis Options Dialog – Time Dependent: For time dependent data the specimen geometry section is the same as described above. Note that the following discussion references a specific type of time dependent data, i.e., dynamic fatigue (or the application of a monotonically increasing load until failure).



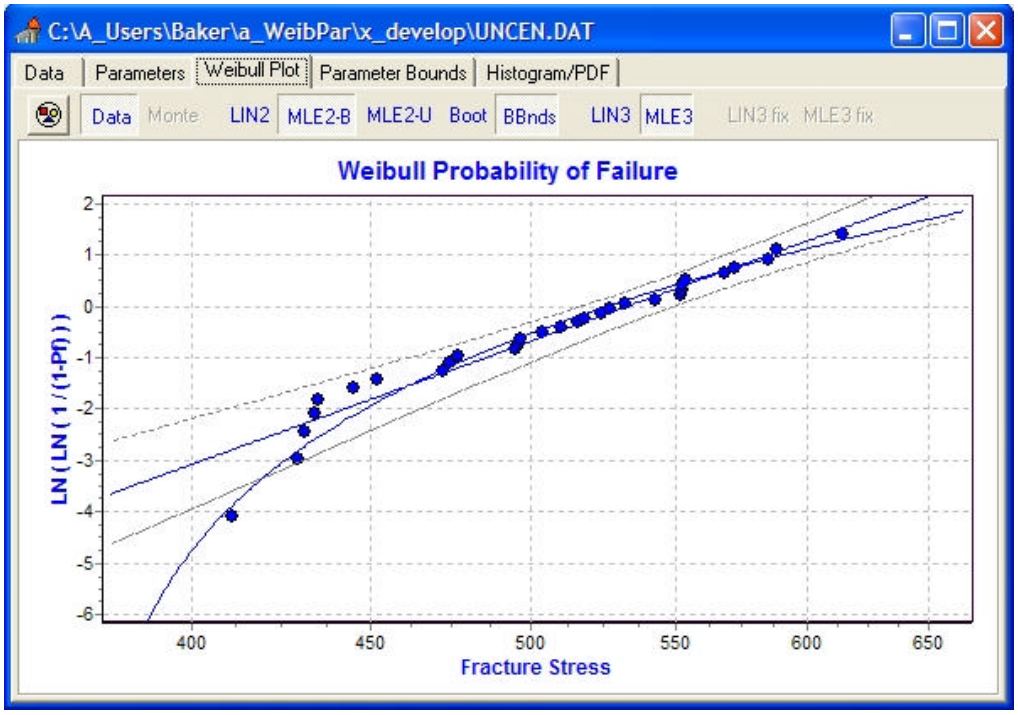
The Weibull parameters section is used in conjunction with the specimen geometry to calculate the time dependent material parameters. Without the fast fracture parameters, the calculated time dependent parameters are specimen specific not material specific.

To link the fast fracture parameters from a data set:

1. First open and evaluate the fast fracture data set.
2. Next open a time dependent data set. The "From Fast Fracture Data" option will be available.

Notes: If multiple fast fracture data files are open the "active" window will be linked. To link to another fast fracture data file, the time dependent data set must be closed and reopened.

Weibull Data File Window – For each fast fracture data set that is opened, a Weibull Data File Window will be displayed. The Filename is listed across the top border of the window. The tabs located below the top border contain information regarding the parameter estimation results.



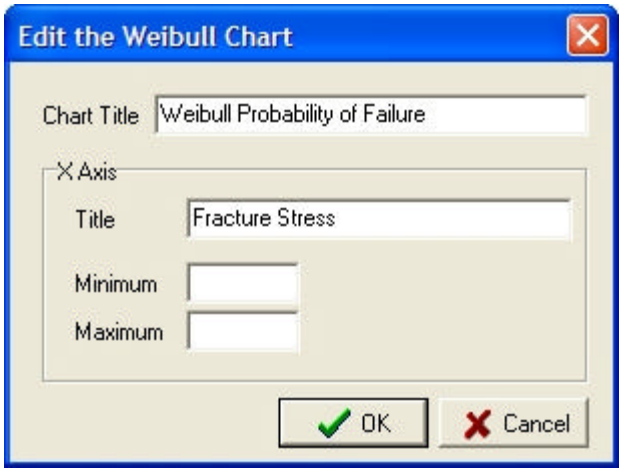
The 'Weibull Plot' tab displays a graphical representation of the data set and its parameter estimates. Options for this plot include hiding and showing particular parameter estimates and/or the failure data. In the example above, along with the failure data, the biased MLE 2 or maximum likelihood two parameter estimates (blue straight line) and the MLE 3 (blue curve) are shown along with the Bootstrap confidence bounds.

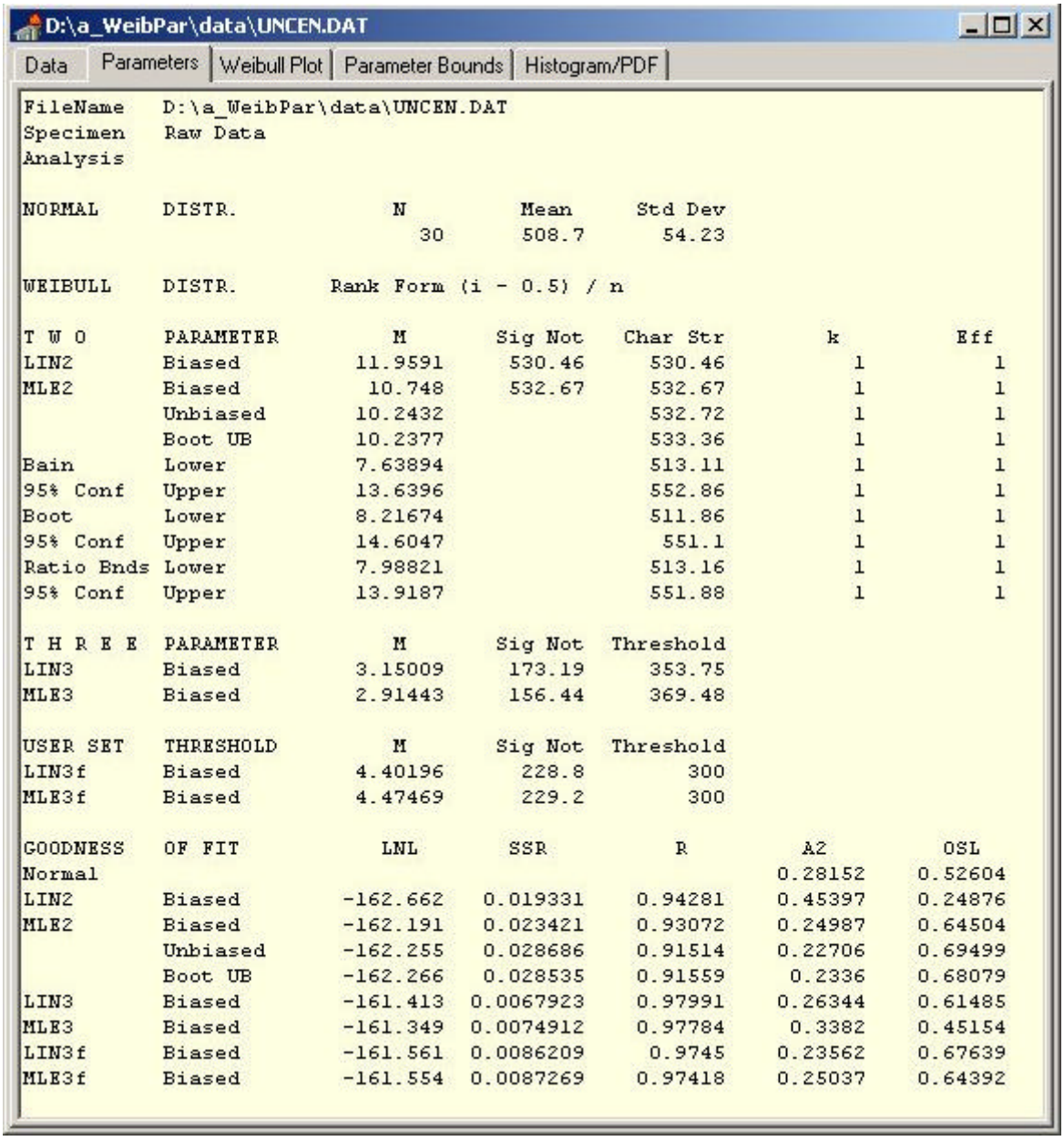
Additional plotting options include the two parameter linear regression line, the unbiased MLE 2 line, MLE2 Bootstrap line estimate, the three parameter linear regression line, and when the user supplies a fixed threshold value the LIN 3 fix and MLE 3 fix lines will also be available.

Use the  icon to edit the chart.

The Chart title, the X-axis title, and the minimum and maximum values for the X-axis may be modified. The X-axis values must encompass the data.

Clear the entry to reset any of the values to their defaults.





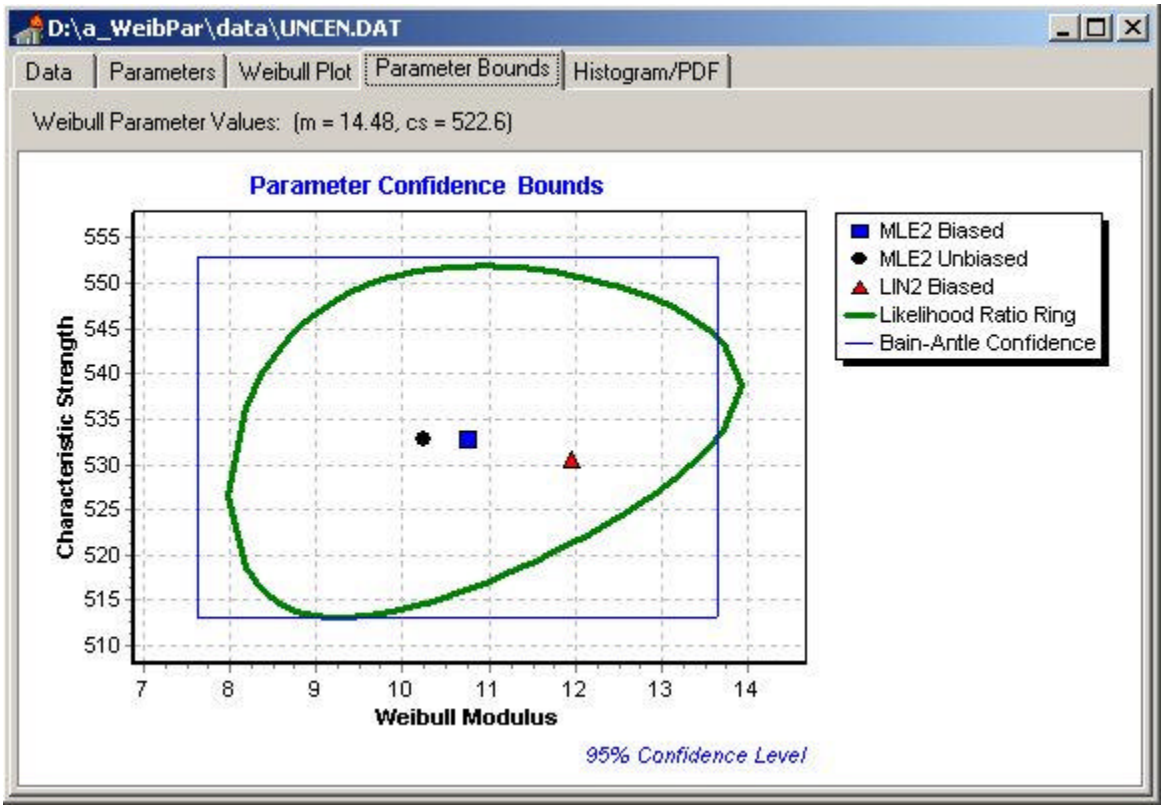

```
FileName    D:\a_WeibPar\data\UNCEN.DAT
Specimen    Raw Data
Analysis

NORMAL      DISTR.             N          Mean      Std Dev
                              30         508.7        54.23

WEIBULL     DISTR.        Rank Form (i - 0.5) / n

T W O       PARAMETER          M        Sig Not    Char Str          k          Eff
LIN2        Biased          11.9591      530.46      530.46          1            1
MLE2        Biased           10.748      532.67      532.67          1            1
            Unbiased        10.2432                  532.72          1            1
            Boot UB         10.2377                  533.36          1            1
Bain        Lower           7.63894                  513.11          1            1
95% Conf    Upper           13.6396                  552.86          1            1
Boot        Lower           8.21674                  511.86          1            1
95% Conf    Upper           14.6047                   551.1          1            1
Ratio Bnds  Lower           7.98821                  513.16          1            1
95% Conf    Upper           13.9187                  551.88          1            1

T H R E E   PARAMETER          M        Sig Not   Threshold
LIN3        Biased          3.15009      173.19      353.75
MLE3        Biased          2.91443      156.44      369.48

USER SET    THRESHOLD          M        Sig Not   Threshold
LIN3f       Biased          4.40196        228.8         300
MLE3f       Biased          4.47469        229.2         300

GOODNESS    OF FIT             LNL         SSR           R          A2          OSL
Normal                                                          0.28152     0.52604
LIN2        Biased          -162.662    0.019331     0.94281    0.45397     0.24876
MLE2        Biased          -162.191    0.023421     0.93072    0.24987     0.64504
            Unbiased        -162.255    0.028686     0.91514    0.22706     0.69499
            Boot UB         -162.266    0.028535     0.91559     0.2336     0.68079
LIN3        Biased          -161.413   0.0067923     0.97991    0.26344     0.61485
MLE3        Biased          -161.349   0.0074912     0.97784     0.3382     0.45154
LIN3f       Biased          -161.561   0.0086209      0.9745    0.23562     0.67639
MLE3f       Biased          -161.554   0.0087269     0.97418    0.25037     0.64392
```

The 'Parameters' tab contains a printout of the calculated statistics along with the geometry and other options that were setup in the Analysis Options dialog for this data set. The parameters are described below. For further details please refer to the Time Independent Theory Guide.

M, Sig Not, Char Str — Weibull Slope, Weibull Material Scale, and Characteristic Strength parameters respectively.

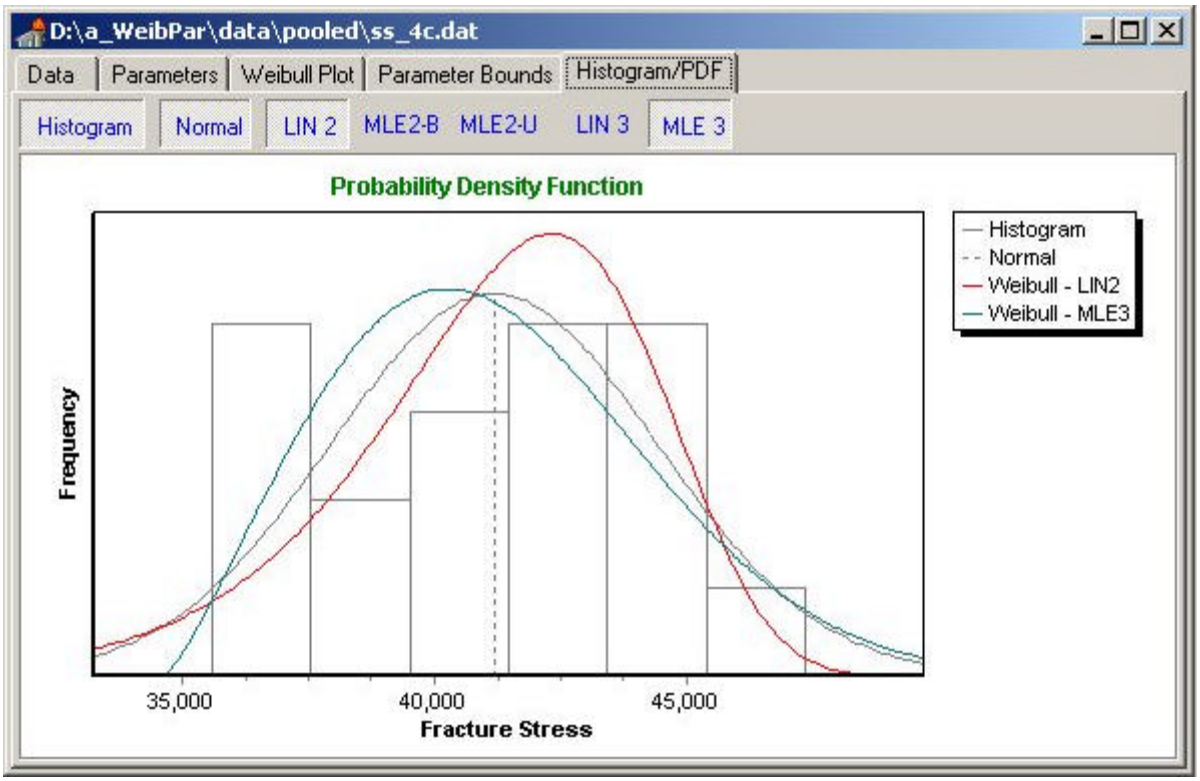
k, Eff — Specimen Geometry Constant and Effective Volume (or Area) typically signified by kV (or kA).

LIN2, LIN3, LIN3f	Linear Regression estimation for 2 parameter, 3 parameter and 3 parameter with a fixed threshold.
MLE2, MLE3, MLE3f	Maximum Likelihood estimation for 2 parameter, 3 parameter and 3 parameter with a fixed threshold.
Bain, Boot, Ratio	Upper and Lower confidence bounds on the parameter estimates from the Bain, Antle, Thoman tables, from the Boostrap technique, and from the Likelihood Ratio technique.
LNL, SSR	Natural Log of the Likelihood and the Sum of the Squared Residuals.
R, A2, OSL	Regression Coefficient, Anderson Darling, Significance Level



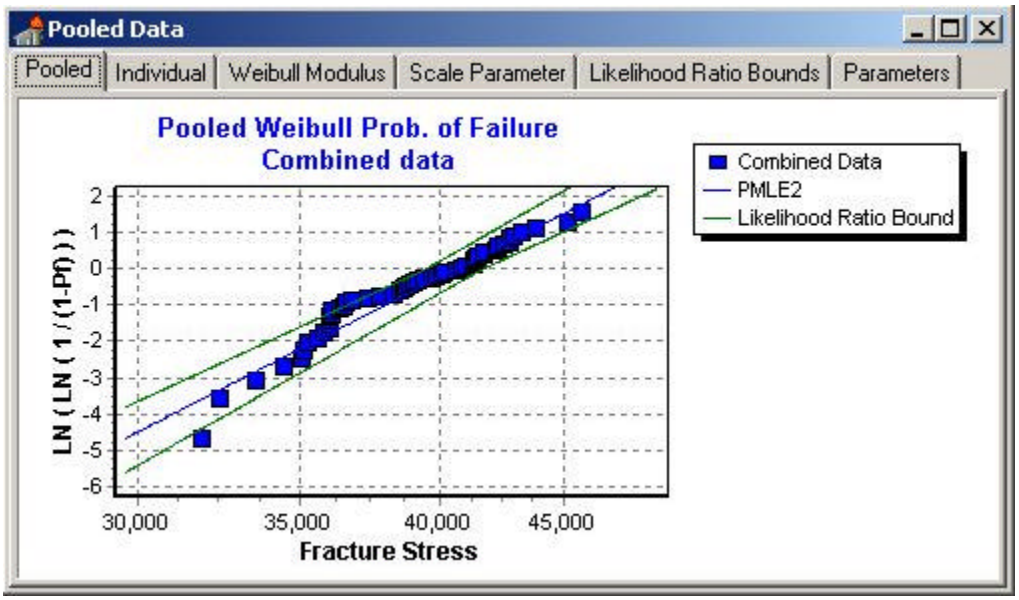
The 'Parameter Bounds' tab shows the confidence bounds around the parameter estimates. In this case there is 95% confidence that the true population parameters fall within the bounds. The ring was calculated by the Likelihood Ratio technique. The rectangle was calculated via the Bain, Antle, Thoman confidence tables. The extremes of these bounds are reported on the 'Parameters' page discussed previously.

The 'Weibull Parameter Values' reveals the Weibull parameters for the current mouse location as the user moves the mouse over the graph.

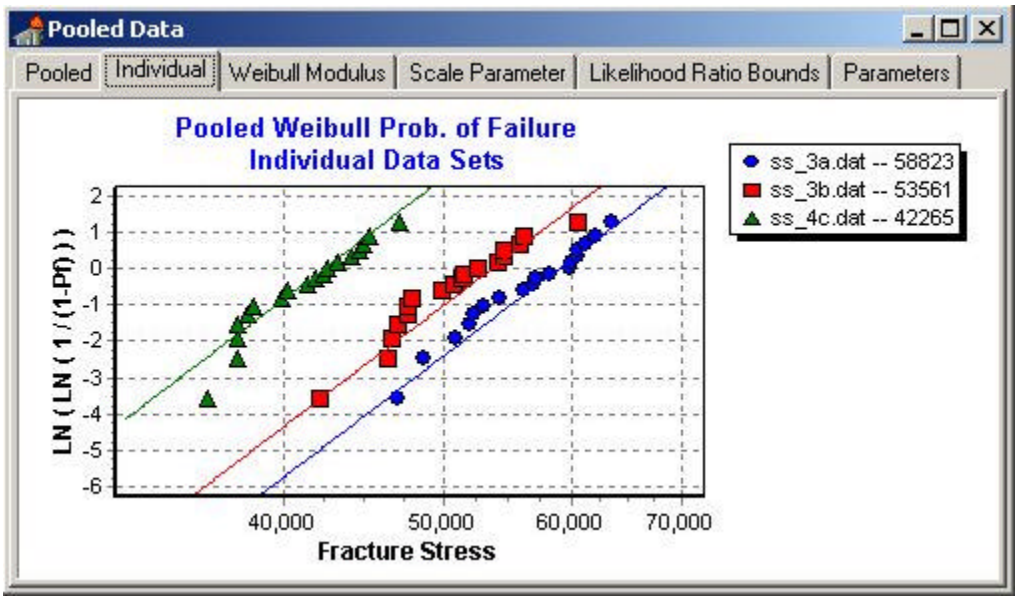


The 'Histogram/PDF' tab shows the histogram for the data set, the probability density function (PDF) for the normal distribution, and the PDF for each of the Weibull distribution estimates. Once again the user can choose which components to hide and which to show. Above the histogram, the normal PDF, the LIN2 PDF, and the MLE3 PDF are plotted.

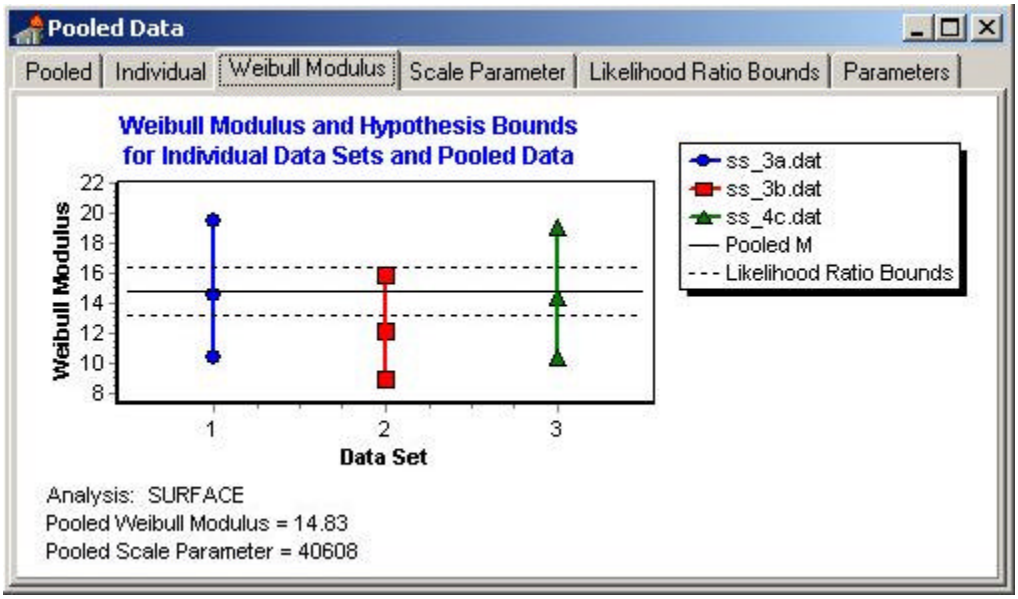
Pooled Data Window – The pooled data windows displays the results of pooling multiple Uncensored data sets that are of the same flaw type (volume or surface). The technique for pooling data utilizes the maximum likelihood estimation for two parameter Weibull distributions. The following screen shots demonstrate the pooling of three data sets each containing 18 failure stresses. The first two data sets are three point bend bar data with two different geometries. The third data set is four point bend bar data with a third geometry.



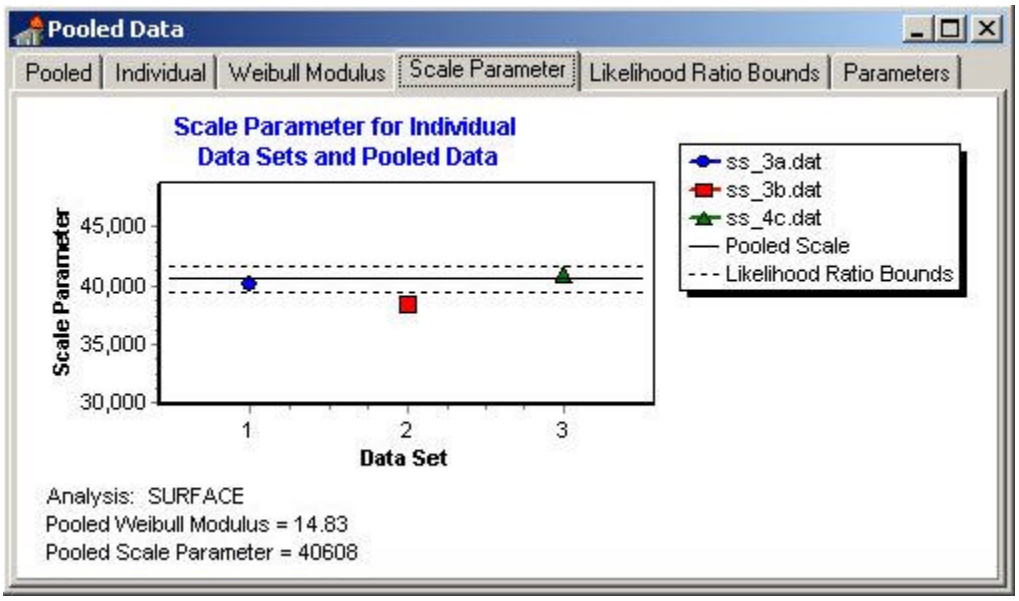
The 'Pooled' tab shows the result of transforming the pooled failure data each according to its own geometry into the geometry independent space. In this space the pooled data may be plotted as one data set against the estimates of the Weibull modulus and the material scale parameters.



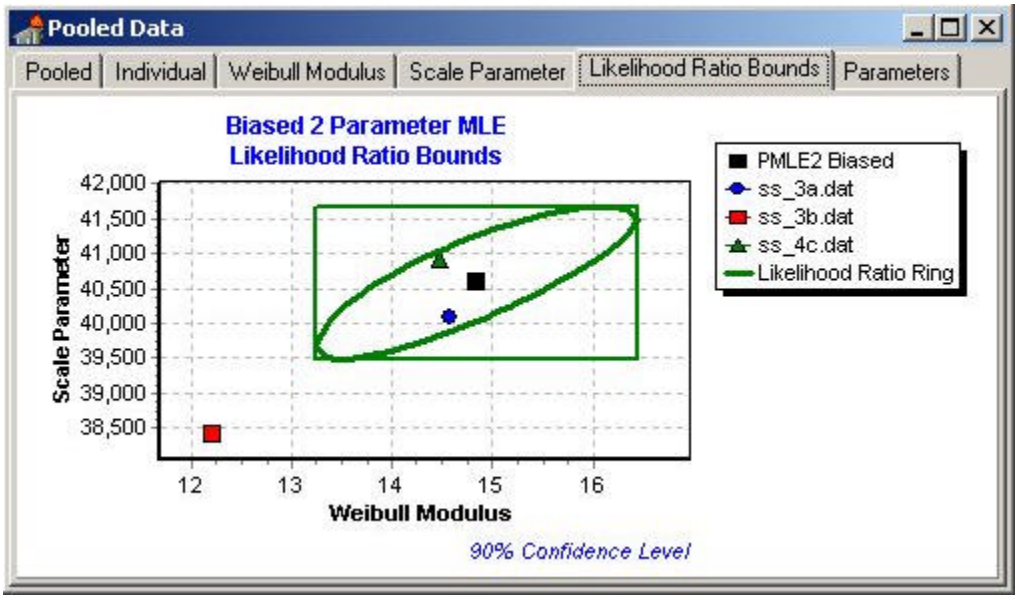
The 'Individual' tab displays the three data sets in the geometry dependent space. The estimated lines each share the common slope of the pooled Weibull modulus. The unique characteristic strength values are a function of the pooled material scale parameter, the pooled modulus, and the geometry of each data set.



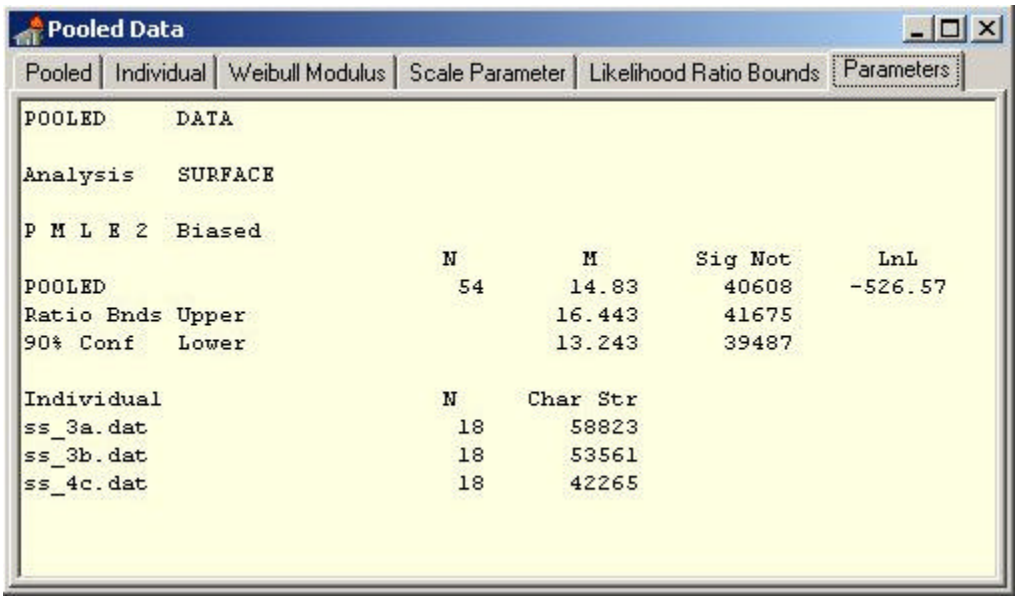
The 'Weibull Modulus' tab shows the individual data set Weibull moduli with error bars based on the likelihood ratio confidence bounds. The solid horizontal line is the pooled Weibull modulus with its confidence bounds represented by the dashed horizontal lines. The confidence bounds on the pooled modulus are tighter than the individual data set bounds because there is more data (54 points) in the pooled data set.



The 'Scale Parameter' tab plots the individual data set scale parameters against the pooled scale parameter. Confidence bounds for the individual data sets were calculated on the characteristic strength parameter. These confidence bounds cannot be readily transformed into confidence bounds on the individual data set scale parameters; therefore, error bars representing confidence bounds are not plotted for the individual data sets.



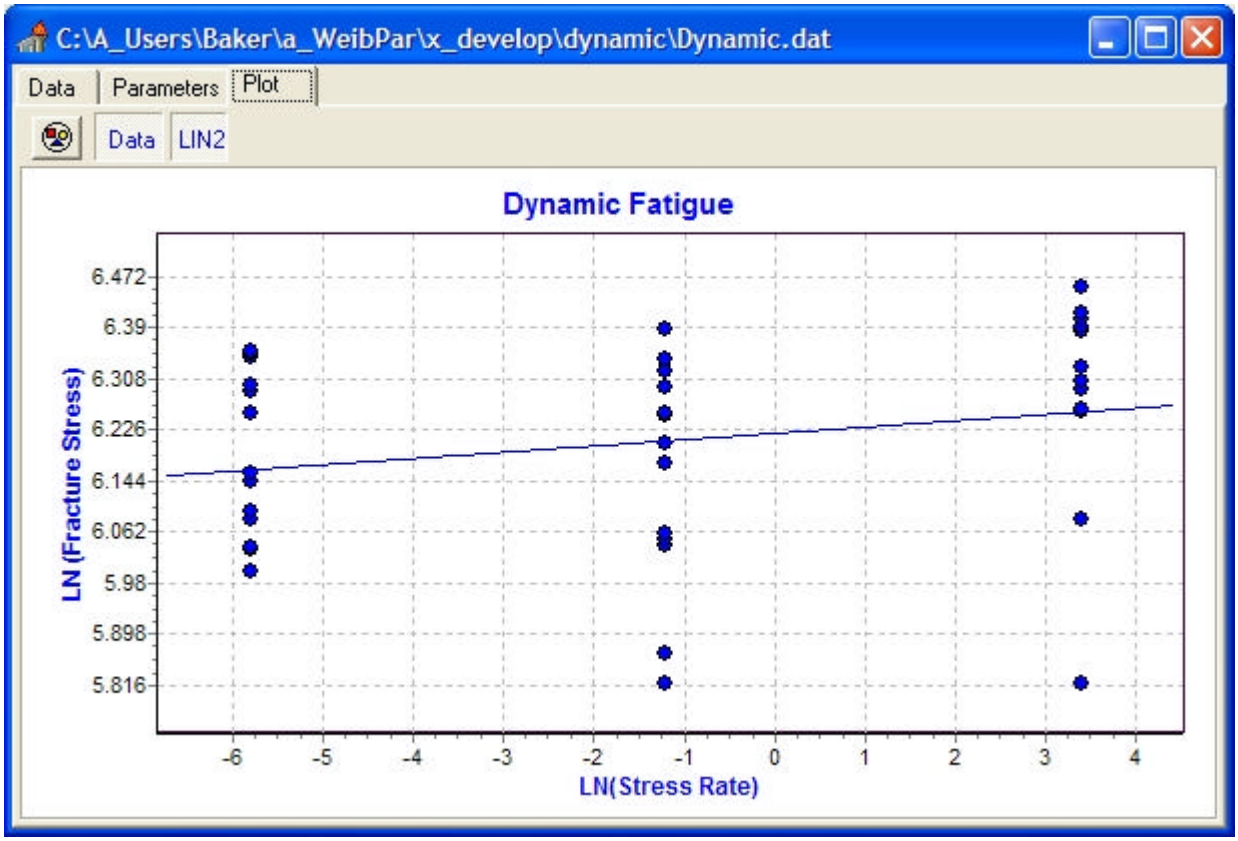
The 'Likelihood Ratio Bounds' tab shows a confidence ring around the parameter estimates, in this case the 90% confidence ring. The individual data set parameter estimates are also plotted. This graph basically combines the previous two graphs. The rectangle around the ring defines the extremes of the ring. These extremes are reported in the parameters section.



The 'Parameters' tab shows the parameter estimation results for the pooled data.

Time Dependent Data File Window – For each data set that is opened, a Time Dependent Data File Window will be displayed.

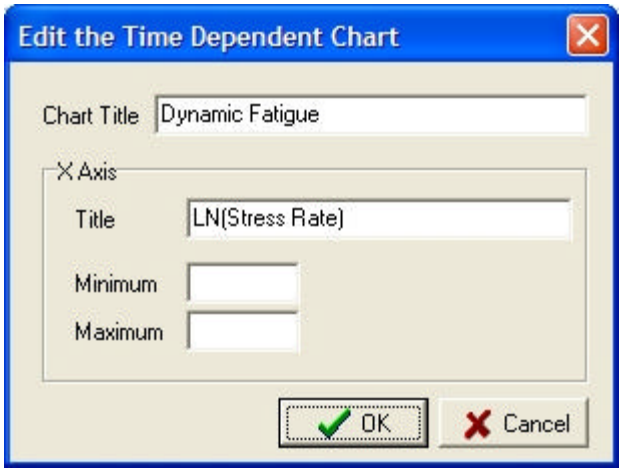
The 'Plot' tab displays a graphical representation of the data set and its parameter estimates.



Use the  icon to edit the chart.

The Chart title, the X-axis title, and the minimum and maximum values for the X-axis may be modified. The X-axis values must encompass the data.

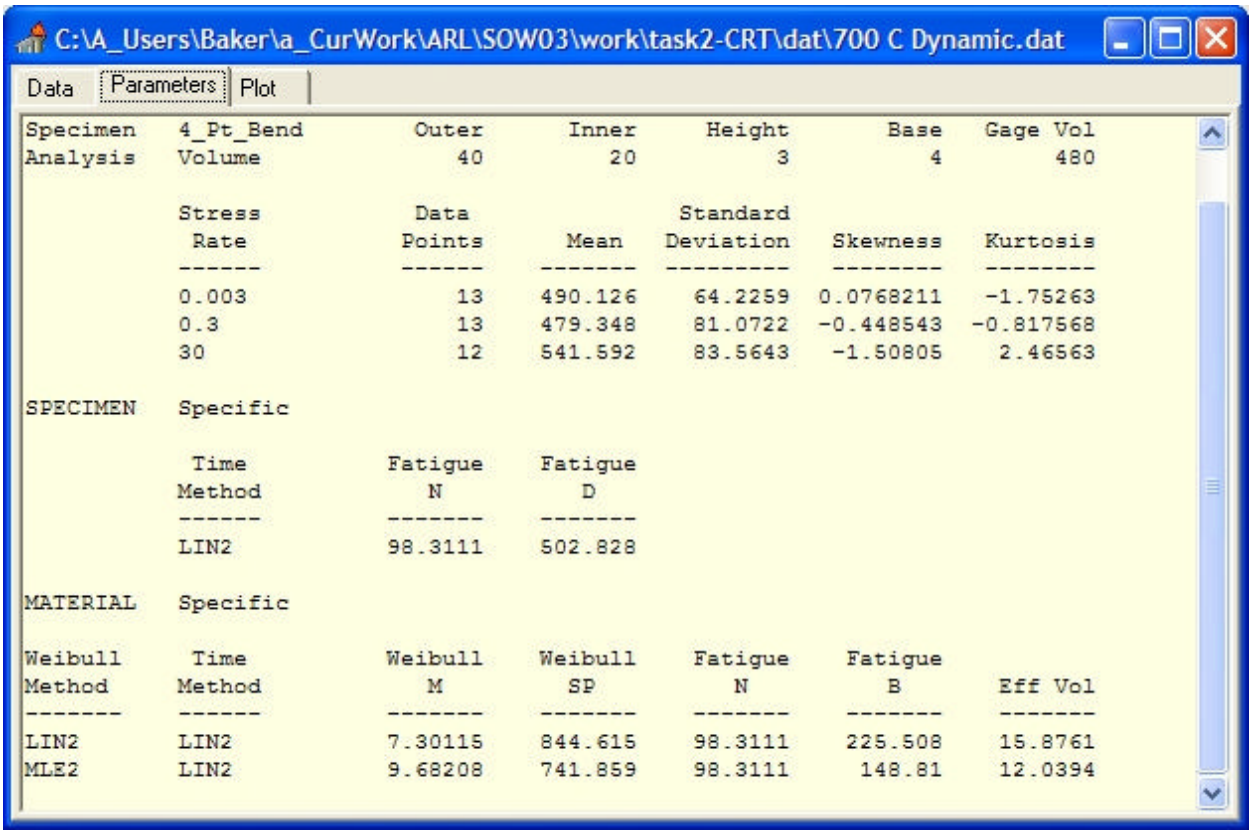
Clear the entry to reset any of the values to their defaults.



The 'Parameters' tab contains a printout of the calculated statistics along with the geometry and other options that were setup in the Analysis Options dialog for this data set. The parameters are described below. For further details please refer to the Time Dependent Theory Guide.

N, D — The specimen specific or raw data parameters. N is the fatigue exponent and D is the Y-intercept.

M, SP, N, B, Eff — Weibull Slope, Weibull Material Scale, Fatigue Exponent, Fatigue geometry independent material parameter, and the Effective volume or area based on M and N, respectively.



Specimen	4_Pt_Bend	Outer	Inner	Height	Base	Gage Vol
Analysis	Volume	40	20	3	4	480

Stress Rate	Data Points	Mean	Standard Deviation	Skewness	Kurtosis
0.003	13	490.126	64.2259	0.0768211	-1.75263
0.3	13	479.348	81.0722	-0.448543	-0.817568
30	12	541.592	83.5643	-1.50805	2.46563

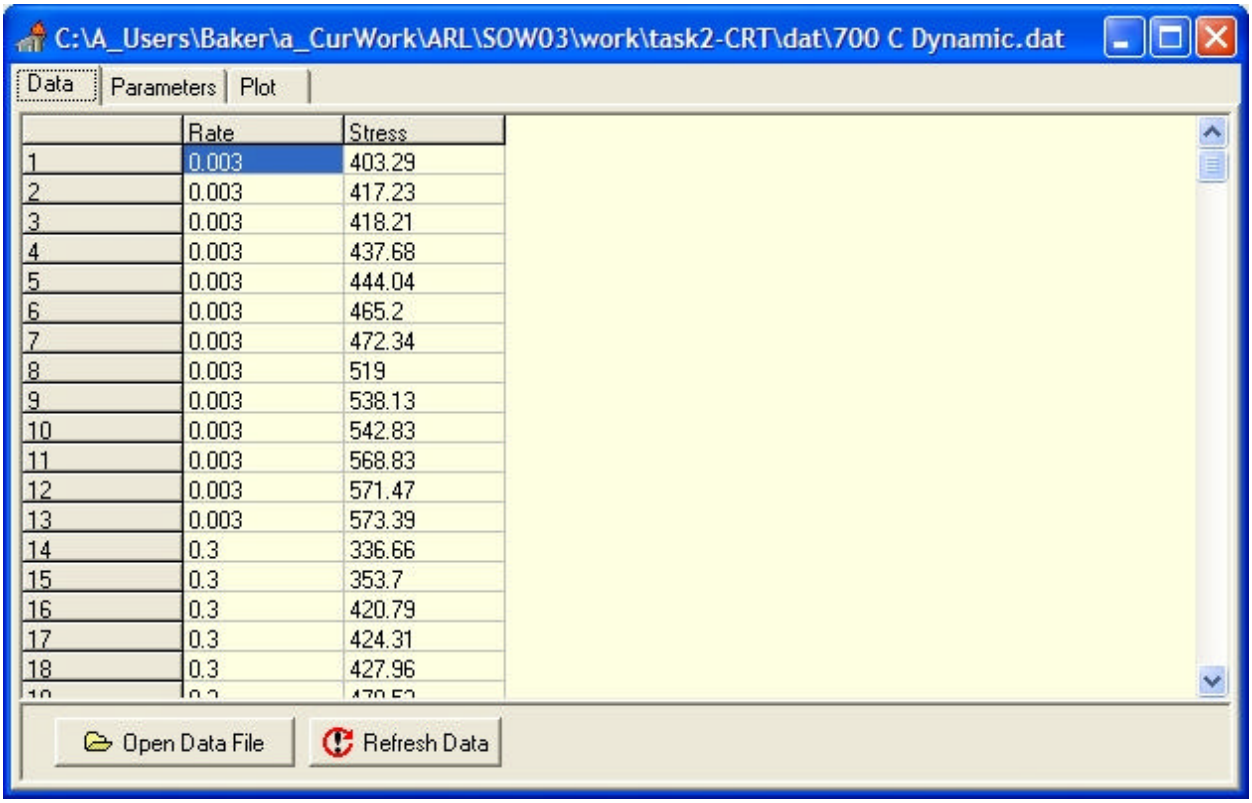
SPECIMEN Specific

Time Method	Fatigue N	Fatigue D
LIN2	98.3111	502.828

MATERIAL Specific

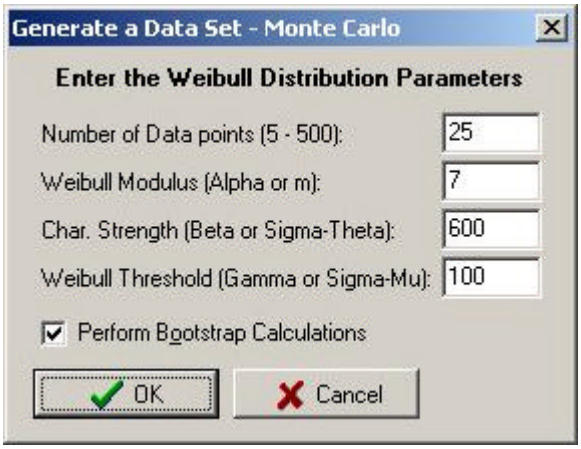
Weibull Method	Time Method	Weibull M	Weibull SP	Fatigue N	Fatigue B	Eff Vol
LIN2	LIN2	7.30115	844.615	98.3111	225.508	15.8761
MLE2	LIN2	9.68208	741.859	98.3111	148.81	12.0394

The 'Data' tab displays the data file and provides access to editing the data through the Windows Notepad editor and subsequent refreshing (reanalyzing) of the data.



	Rate	Stress
1	0.003	403.29
2	0.003	417.23
3	0.003	418.21
4	0.003	437.68
5	0.003	444.04
6	0.003	465.2
7	0.003	472.34
8	0.003	519
9	0.003	538.13
10	0.003	542.83
11	0.003	568.83
12	0.003	571.47
13	0.003	573.39
14	0.3	336.66
15	0.3	353.7
16	0.3	420.79
17	0.3	424.31
18	0.3	427.96

Generate Data Dialog – This dialog prompts the user for the input parameters necessary for the generation of a Weibull distribution failure data set. The threshold value may be set to zero to simulate a two parameter Weibull distribution.



EXAMPLES

Example files have been provided in the following directory:

`<InstallDir>\examples\`

Open the files in a text editor such as the Windows Notepad in order to view comments about each example. Information such as specimen geometry is provided.

Subdirectory	File	Description
`<InstallDir>\examples\…`		
`…\fast`	`Uncen.dat`	Uncensored data set.
	`Uncen3a.dat`	3 parameter uncensored
	`Uncen3b.dat`	3 parameter uncensored
	`Censor.dat`	Censored data set.
`…\fast\pooled`	`ss_3a.dat`	3 point bend – geometry a
	`ss_3b.dat`	3 point bend – geometry b
	`ss_3c.dat`	3 point bend – geometry c
	`ss_4a.dat`	4 point bend – geometry a
	`ss_4b.dat`	4 point bend – geometry b
	`ss_4c.dat`	4 point bend – geometry c
	`ten-1.dat`	Tensile specimen – geometry 1
	`ten-2.dat`	Tensile specimen – geometry 2
	`ten-3.dat`	Tensile specimen – geometry 3
`…\dynamic`	`Dynamic.dat`	Uncensored Dynamic Fatigue
	`Fast uncen.dat`	Uncensored Fast Fracture Data
	`Fast censor.dat`	Censored Fast Fracture Data
`…\Jint`	`JC-80.dat`	J-Integral data set.