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ARMS
RELIABILITY

Isograph's FaultTree+ goes Enterprise

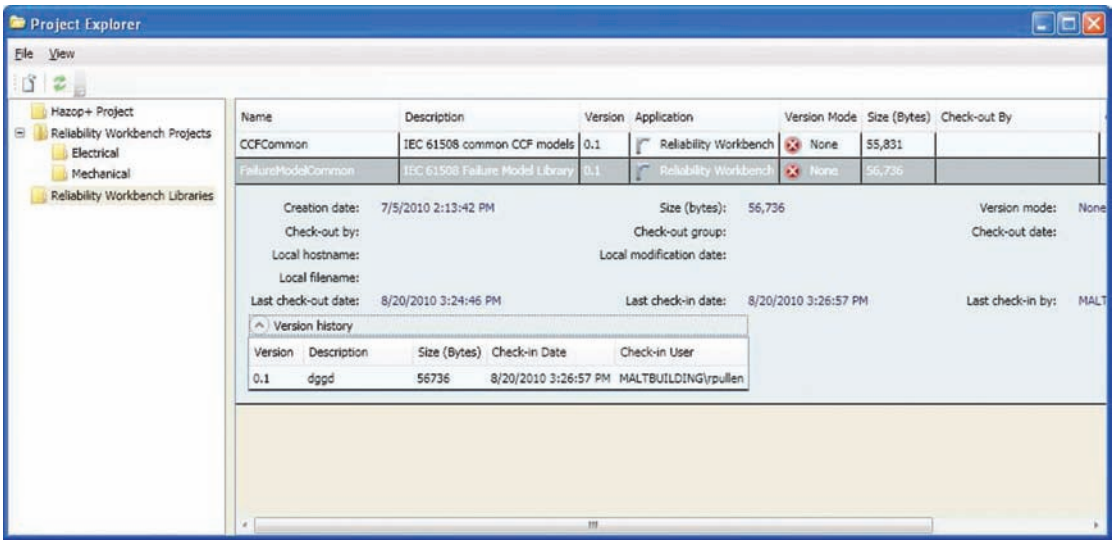
ENTERPRISE SYSTEM

Isograph's new Reliability Workbench V11 (incorporating FaultTree+) may now be licensed as an Enterprise System. Organizations may now install a centralized database system containing project and libraries in a controlled environment with user groups and roles. Licensed enterprise users may check projects in and out of the Enterprise System and access centralized libraries and parts data for which they have the appropriate permissions. Enterprise administrators may implement project versions where appropriate.

The Enterprise System Server requires the following:

- Net Framework 4.0 Full
- SQL Server 2005 or SQL Server 2008.

All versions of SQL Server 2005 and SQL Server 2008 are supported including the Express editions. It is strongly recommended that the optional Management Studio is installed for all the Express editions. RWB client applications may access an installed Enterprise System if they have an Enterprise license. Users will be able to check out a project for modification so long as they have the necessary permissions and later check the project back in to the system. If they are disconnected from the network for any reason they may check in a project at a later date. Libraries may be opened for copying data into projects or checked-out for modification. Administrators may upload non-enterprise projects into an Enterprise system and set up new projects with or without version control.



Checking Out a Library from the Enterprise System

NEW FEATURES OVERVIEW

Version 11 represents a major new development of the widely used Reliability Workbench program incorporating Isograph's leading-edge FaultTree+ product into a single powerful integrated environment for reliability and safety analysis.

Developed for Microsoft's latest .Net framework it provides all the rich graphical user interface features you would expect for a modern application. You can now perform Weibull analysis and link results to fault tree failure models. New IEC 61508 failure models have been included together with SIL requirement calculations.

The Isograph Parts Library may now be customized with user parts and linked directly to project data. It also includes the new NPRD 2011 data package. Data may now be imported from SQL Server and Oracle databases to any of the standard project tables. Multiple libraries may now be concurrently opened. Fault tree calculations can now benefit from parallel processing on multi-thread processor machines. Multiple Markov models may now contained within a single project and the appearance of Markov diagrams has been enhanced with the introduction of Bezier curves.

The enhancement to the user interface brings flexible grid controls with powerful find and replace, sorting and customization of data displays. Improved dialogs provide easier access to data with dialog resizing and additional object search facilities. Many project elements may be organized into groups or types for easy management and notes and hyperlinks have been extended to many new objects. The new Report Designer provides additional features such as PDF file creation.

A new and rich API (Application Programming Interface) has been added allowing .Net programmers to quickly build interfaces to other applications. All the standard project tables may now be accessed through the DLL (dynamic link library) facility.

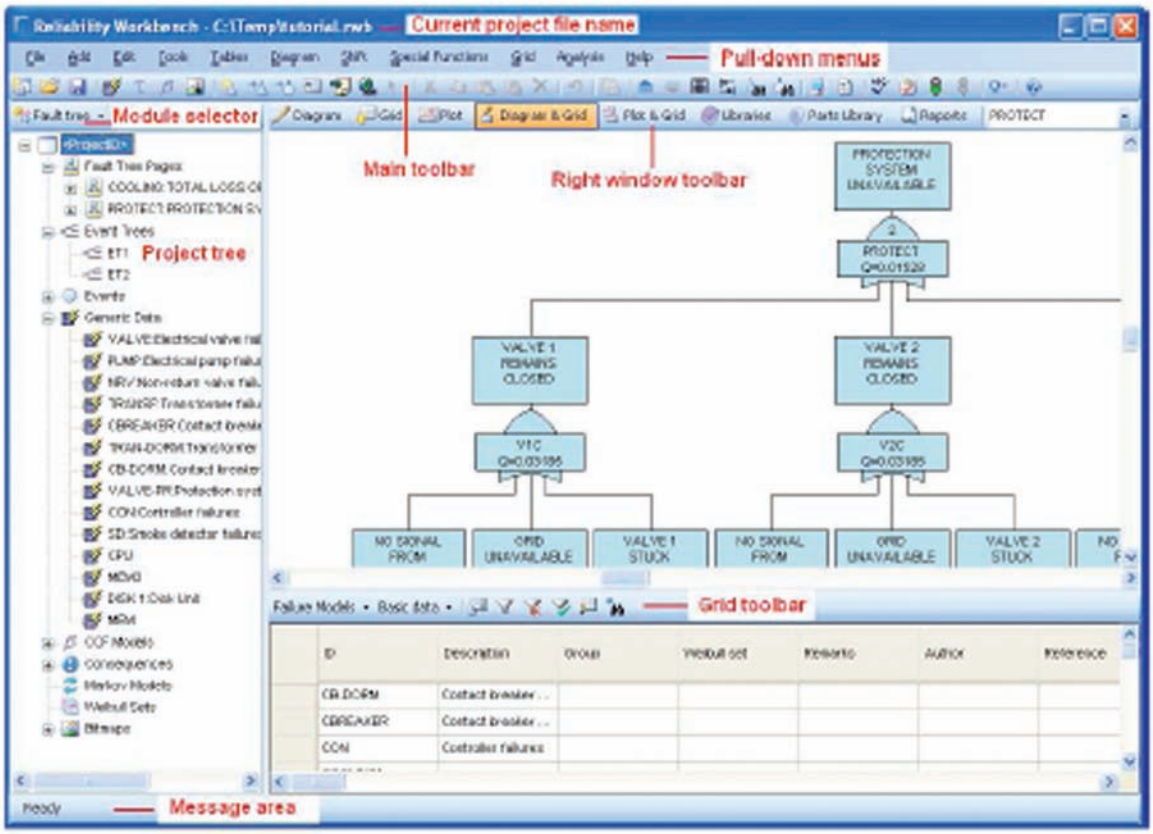
Projects may now be stored in compressed or XML format and benefit from automatic data validation routines.

Enterprise Version

One of the major advances is the introduction of the Enterprise Version. Organizations may now install a centralized database system containing project and libraries in a controlled environment with user groups and roles. Licensed enterprise users may check projects in and out of the enterprise system and access centralized libraries and parts data for which they have the appropriate permissions. Enterprise administrators may implement project versions where appropriate.

INTERFACE ENHANCEMENTS

Running under the Microsoft .Net Framework, Reliability Version 11 provides the 'look and feel' of a modern Windows application. The project tree control is more extensive allowing greater direct access to project tables. The window layout is more flexible allowing users to display combinations of plots, grid controls, libraries, diagrams and reports.



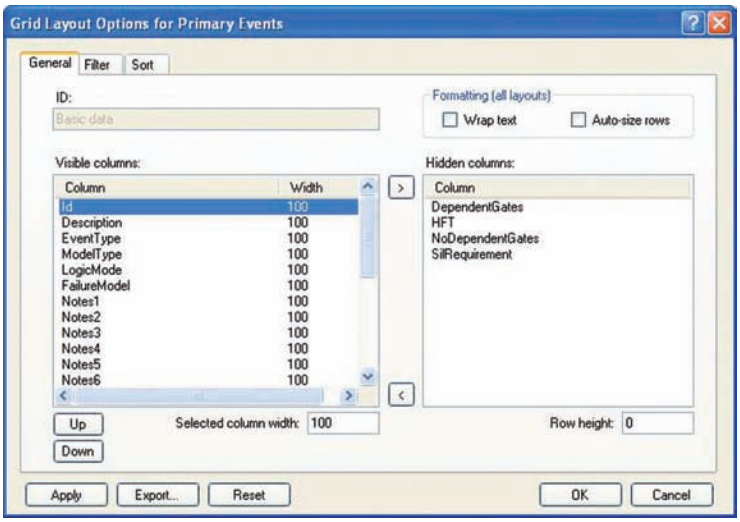
Main window layout

Project Tree Control

The project tree control now includes additional project elements such as Prediction derating definitions and RBD CCF models. Many project elements such as Weibull sets, CCF and Markov models may be organized into groups and types making access through the tree and grid controls far easier. The order of objects may be changed in the tree control using the Move Up and Move Down pop-up menu options.

The Grid Control

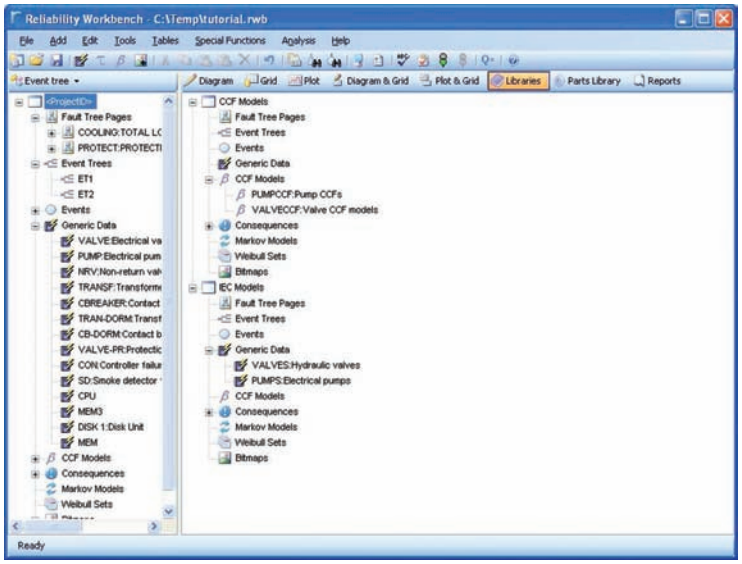
The Grid Control now displays data from all the standard project tables and allows users to easily sort and filter the displayed data. In addition to standard grid layouts, users may now produce their own customized layouts which may be saved and exported to other users if required. Flexible grid layouts empowers users to view the data they wish to see by quickly switching between different layouts. Individual properties may then be modified within the grid control or use made of the powerful Find and Replace option. Grid controls can respond to a Filter by tree control option that automatically filters data according to the selected node in the project tree control.



Building a Custom Grid Layout

Multiple Libraries

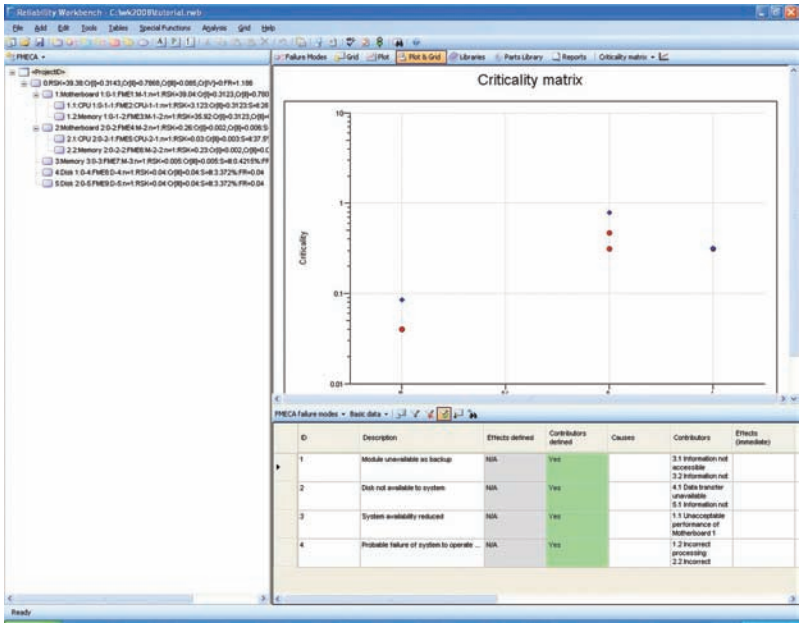
All modules now provide access to multiple libraries. This allows users to construct libraries of different types of data and concurrently access the data from different libraries. Data may be dragged from a library onto the appropriate node in the project tree control.



The project tree control in the left window and two attached libraries in the right-hand window

Multiple Window Displays

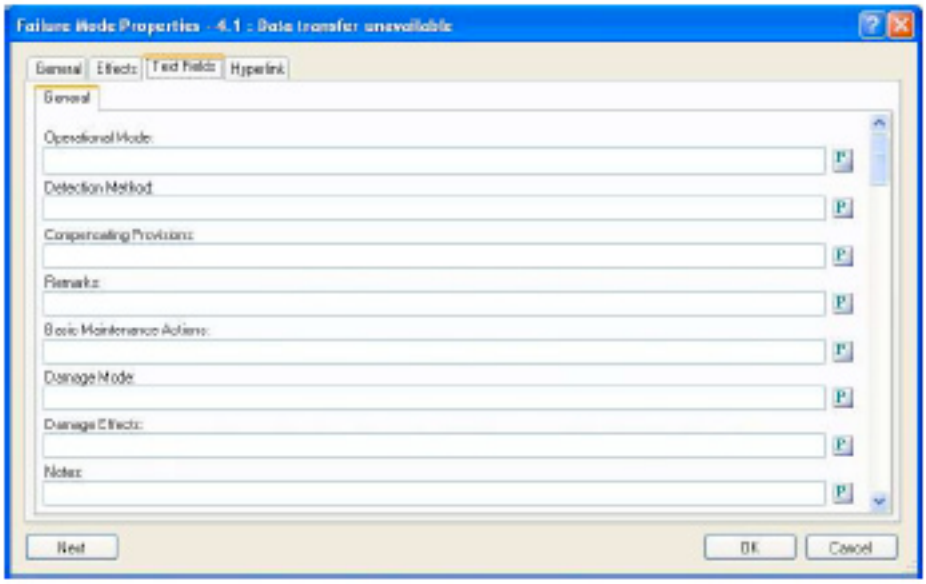
Users may now display combinations of windows to the right of the project tree control.



Multiple window display in the FMECA module

Resizable Dialogs

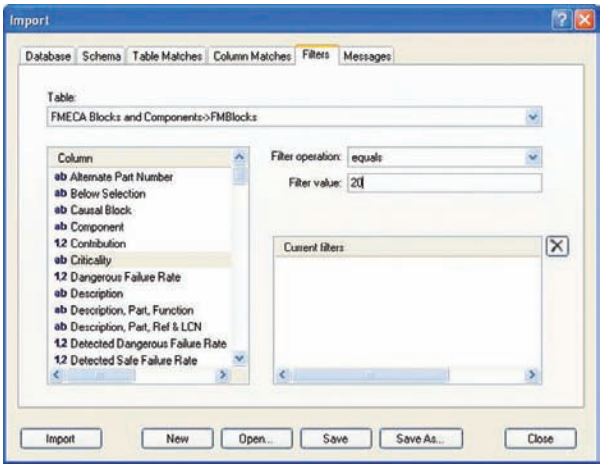
Many dialogs are now resizable allowing users to easily edit data in large text and notes fields.



NEW IMPORT AND EXPORT FEATURES

The new import and export facilities now allow you connect to SQL Server and Oracle databases. In addition you may import data from and export data to XML format files and the clipboard. Data filtering functions are also provided. Data validation checks are also now performed during the import process and any errors reported to the user. The import and export facilities connect to the following external formats:

- Access databases
- SQL Server databases
- Oracle databases
- Excel files
- XML files
- Text files
- Windows clipboard



Filters Tab in the Import Dialog

NEW GENERAL FUNCTIONALITY

Multiple Undo Operations

Users may now set the number of Undo operations as a general application setting.

Default Folder Locations

Users may now set default folder locations for projects, libraries, import/export templates etc. as a general application setting.

Declassification

Users may now declassify a project by removing all descriptive text from the project tables. This is useful if a project needs to be sent to your support center for advice on issues affecting the project in question.

Groups and Types

The concept of object groups and types has been extended to allow Weibull sets, Markov models, CCF models and generic failure data to be organized in groups and hierarchical structures. Groups and types are particularly useful for organizing data in the project tree control.

NEW FEATURES FOR THE FAULT AND EVENT TREE MODULES

Extended Failure Models

The range of failure models has been extended to include the IEC 61508 model and a new steady-state model. The range of models provided is listed below.

- Fixed
- Rate
- MTTF
- Dormant
- Sequential
- Standby
- Time at risk
- Binomial
- Poisson
- Rate-MTTR
- Weibull
- Fixed-phased
- Rate-phased
- IEC 61508
- Steady state

Extended Importance Measures

The importance measures have been extended to include the Risk Reduction Worth and Risk Achievement Worth methods.

Linking to Weibull Analysis

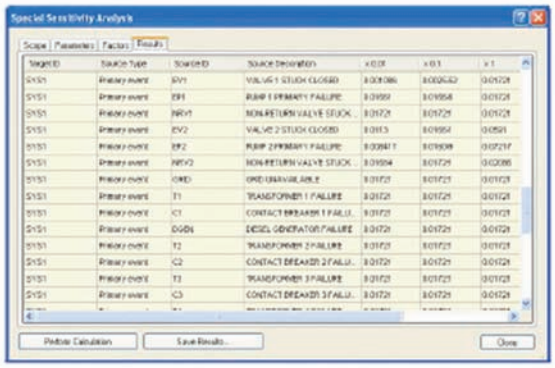
The Weibull failure model may now directly connect to Weibull sets in the new Weibull module.

Improved Calculation and Modularization Functionality

Fault and event tree calculation methods can now take advantage of parallel processing for machines with multiple processors. Cut sets may now be viewed in expanded mode or modularized mode in the Results Summary dialog.

Special Sensitivity Analysis

The special sensitivity analysis facility has been extended to allow the selection of multiple target objects. The results may be viewed in the Special Sensitivity Analysis dialog before saving the results to file.



New IEC 61508 HFT determination

If you are using the new IEC 61508 failure models RWB will automatically determine HFT (hardware fault tolerance) requirements where appropriate.

IEC 61508 Dormant Models

The averaging algorithms for multiple dormant failures in a cut set are now performed for up to 4 dormant failures in a cut set.

Alias for Consequence Weight Property

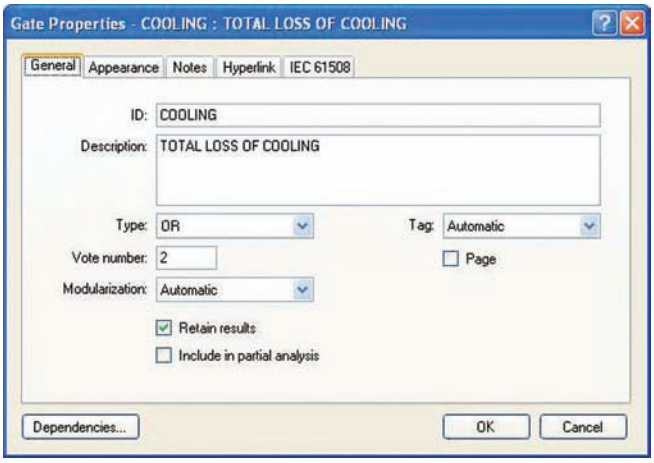
Users may now specify an alias for the weight description for each consequence category. For example, The term 'weight' might be replaced with 'Release level' or 'Expected fatalities' for environmental and safety categories respectively. Weight alias setting are defined in the Consequences tab of the Project Options dialog.

Groups and Types

The concept of object groups and types has been extended to allow Weibull sets, Markov models, CCF models and generic failure data to be organized in groups and hierarchical structures. Groups and types are particularly useful for organizing data in the project tree control.

Improved Dialogs

The format of dialogs has been improved by providing tab layouts



Notes and Hyperlinks

Eight customizable notes fields and a single hyperlink are now provided for RBD blocks, failure models, CCF models, consequences, Markov models and Weibull sets. Now you can also add notes and hyperlinks to the fault and event tree diagrams (as separate entities rather than attachments to the gates and events).

Grid Control

Data may now be displayed and modified from the powerful new grid control facility. Users may create and save their own grid layouts and use the Find and Replace, Sort and Filter facilities provided.

Multiple Libraries

Multiple fault and event tree libraries may now be attached and used to populate the current project.

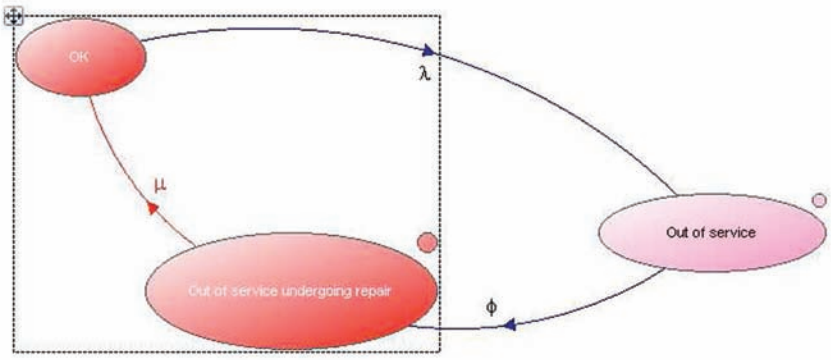
NEW FEATURES FOR THE MARKOV MODULE

Customizing Block Appearance

Individual states may now be resized in the Markov diagram and assigned a local description font other than the default. They may also be assigned an individual background color. Transitions may now be straight or curved using standard Bezier parameters. Transitions may be color coded.

Resize and Shift Enhancements

Users may now resize and shift states in the diagram using interactive selection and drag facilities.

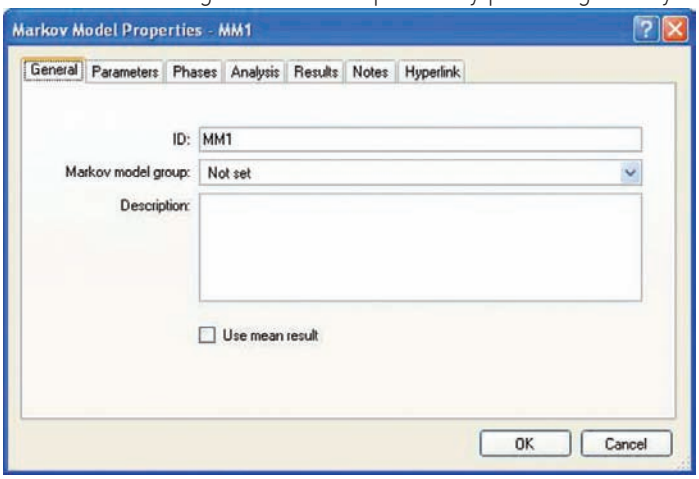


Multiple Markov Models in a Single Project

Markov model data is now stored in a standard RWB project rather than individual Markov files. Markov Model Types Markov models may now be organized into a hierarchy of types. Each Markov model may belong to a single type.

Improved Dialogs

The format of dialogs has been improved by providing tab layouts. The dialog may also be resized by the user.



Notes and Hyperlinks

Eight customizable notes fields and a single hyperlink are now provided for Markov models.

Grid Control

Data may now be displayed and modified from the powerful new grid control facility. Users may create and save their own grid layouts and use the Find and Replace, Sort and Filter facilities provided.

Multiple Libraries

Multiple Markov libraries may now be attached and used to populate the current project.

THE NEW WEIBULL MODULE

The new Weibull module of Reliability Workbench (RWB) analyzes historical failure data by assigning probability distributions that represent the failure characteristics of a given failure mode. The failure distribution assigned to a given set of times to failure (known as a Weibull set) may then be assigned to failure models associated with the RBD, Fault and Event Tree modules.

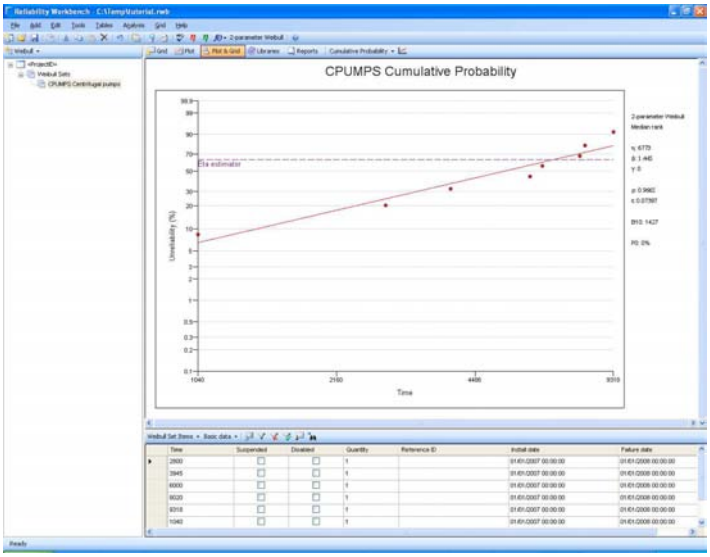
The historical times in a failure Weibull set will represent the age of an equipment at the point of its first failure.

The Weibull module analyzes times-to-failure data using the following distributions:

- Exponential Distribution
- 1-Parameter Weibull Distribution
- 2-Parameter Weibull Distribution
- 3-Parameter Weibull Distribution
- Weibayes

RWB automatically fits the selected distribution to the data provided and displays the results graphically in the form of cumulative probability plots, failure rate plots and probability density function plots. Data may be entered manually by the user or imported from other packages or transferred via the Windows clipboard. New data can be analyzed and assigned in 3 simple steps:

- Enter or import the data
- Select a distribution type
- Assign the Weibull Set to the appropriate failure models in the RBD, Fault and Event Tree modules



EXTERNAL APP FACILITY

This new feature allows RWB users to access external applications from within the Failure Model Properties dialog. Failure models define the failure data associated with RBD blocks and fault tree events and the External Apps facility may be used to populate a failure model with data. Typically the External App facility will allow the seamless download of data from a third party database system containing failure data models. In future this facility may be extended to other objects in a RWB project.

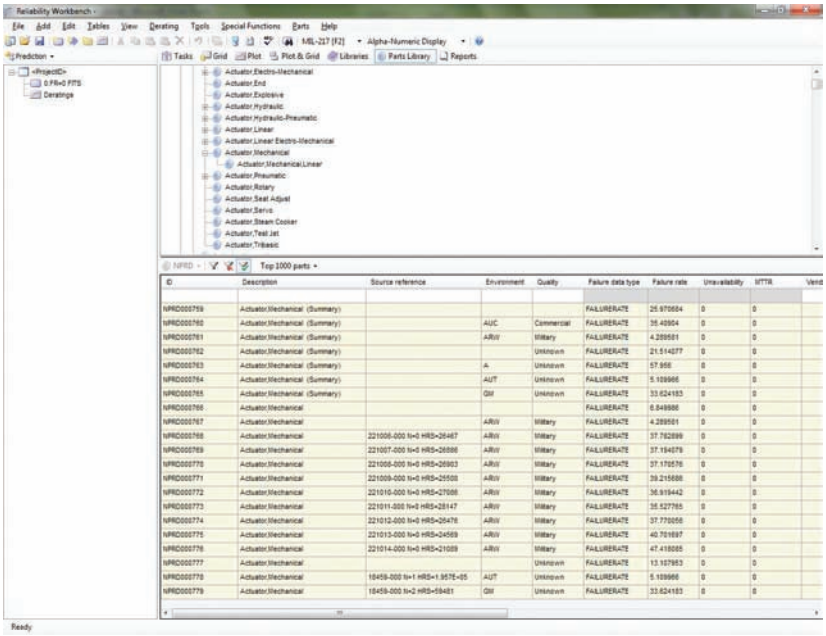
The External App facility requires the third party application to be installed in the form of a .Net assembly and conform to the conventions specified in the section External App Development. An External App license is also required to access this facility.

If you are licensed to use the External App facility and an external application is linked to the RWB application then an External App button will be visible in the Failure Model Properties dialog. The external application may be accessed, and data downloaded to the Failure Model Properties dialog by selecting this button.

Default External App button

NPRD-2011

The new NPRD-2011 failure data package has been added to the Isograph Parts Library allowing users to access over eighty one thousand parts failure rates. The NPRD-2011 data represents a compilation of data collected from the early 1970's through to December 2008, The Isograph Parts Library provides data in a similar format to the NPRD standard published by RIAC. Data is provided for indivudual items under different environment conditions and rolled-up summary data is also provided as in the standard.



REPORT DESIGNER

Reliability Workbench now incorporates Report Designer v2.0. Report Designer supersedes Report Generator; the integral reporting facility provided with Reliability Workbench v10. The following new features have been introduced in Report Designer:

• Report wizard

The report wizard allows the user to quickly create text column, text row, graph or diagram reports. The user can preview the report design as they proceed through each page of the wizard.

• Adobe PDF export

All report types can be published in Adobe PDF (Portable Document Format) to file. The user can select either a quick publishing mode (using the current settings) or a normal mode allowing them to specify PDF generation settings.

• Report folder report type

Report folder reports display one or more text column, text row, graph or diagram reports in a single report. When a report folder report is opened in print preview mode the page numbering is continuous from 1 to the total number of pages in the constituent reports.

• Pie charts

A pie chart style has been added to the graph report type. The pie chart properties include:

- Data label and value positioned either as: inner radial, inner horizontal or outer horizontal
- Detailed data label and value properties (font, color, border, margins etcetera)
- Detailed pie title properties (font, color, border, margins etcetera)

• Panel editor

The panel editor allows rapid editing of report element properties. When a report element is selected the panel editor is displayed with the element's properties. Changes to the element's properties are saved when a new report element is selected or the panel editor Apply button is selected.

• User queries

Text column, text row and graph reports allow the user to select a standard query or specify their own custom query. The user query extends this facility to allow the user to create their own named pre-defined custom queries for a host application. The user queries are selected by name in the report query selection controls in a similar manner to the standard queries. User queries can be exported for use by co-workers, with an import facility provided for import of exported queries.

• Design mode and reading mode

A reading mode has been introduced. Reading mode hides the outline tree and the panel editor and switches the report to read-only mode. In addition the menu bar and standard toolbars are hidden and a special reading mode toolbar displayed. The purpose of reading mode is to maximize the area of the screen available for the actual report display.

• Automatic selection of graph axis type

When graph report data group variables are selected the associated axis type is switched to match the data type of the variable. For example if the variable data type is text the axis type will be switched to label, if the variable type is numeric the axis type will be switched to value.

Reliability Workbench from Isograph

• Filter Not operator added

A Not operator has been added to the column filter in text column reports and the X, Y and X variables filters for data groups in graph reports.

• Filter Like automatic wildcard operator added

A Like automatic wildcard operator has been added to the column filter in text column reports, the group and detail heading filter in text row reports and the X, Y and X variables filters for data groups in graph reports. This operator automatically adds % before and after the operand for the Like operator.

• Show on First Page and Show on Last Page properties

A Show on First Page and Show on Last Page properties have been added to text boxes and picture. Text boxes and pictures with this property will be shown on the specified page regardless of the Show On property (even, odd or all pages)

• Multiple selected diagram categories with category page ordering

One or more diagram categories (up to the number available for the product) can be selected for a diagram report. In addition the category order can be specified for when the report is displayed in print preview mode. Previously only one or all categories could be selected and no page ordering was available.

• Go to page control added to the print preview toolbar.

A page number control has been added to the print preview toolbar allowing the user to enter a page number to skip to when in print preview mode.

• ANSI (Latin) or Unicode encoding for export to text file formats

ANSI (Latin) or Unicode encoding can be specified explicitly when exporting to the various text formats. It can sometimes be necessary to specify the format when exporting to Excel in some locales.

• Report elements generated from a report template are now locked for editing

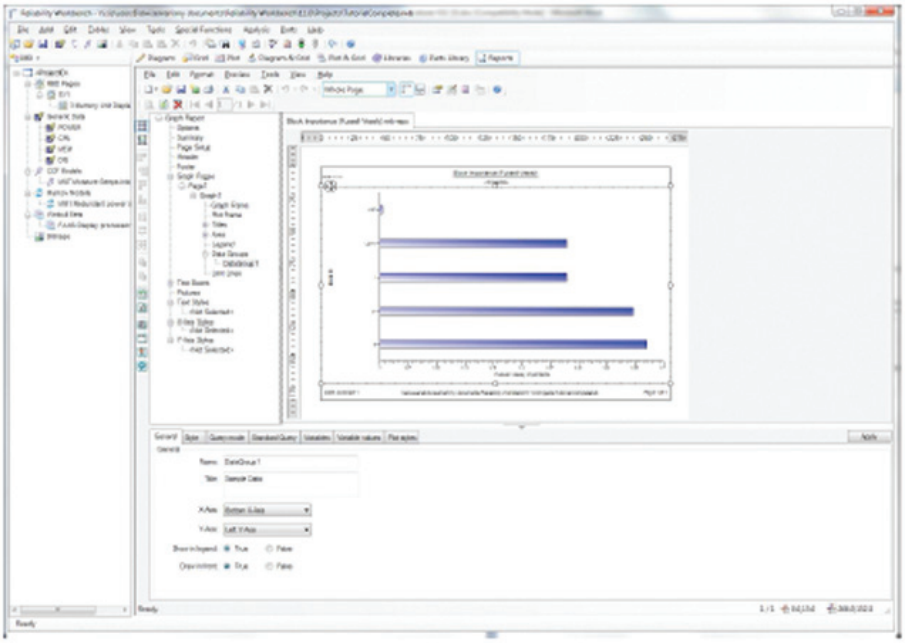
Report elements generated from an applied report template are now locked to prevent editing. They are also displayed with a light blue shading.

• Improved status message display

The status bar now alerts the user to new messages by displaying them in a temporary balloon to attract the user's attention. In addition the user can specify that a message beep is sounded when various message types are displayed.

· Improved SQL query parsing

The SQL query parsing has been improved so that tables names in complex queries are now recognized. This resolves a problem whereby data would not be generated for a SQL query by the host application.



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