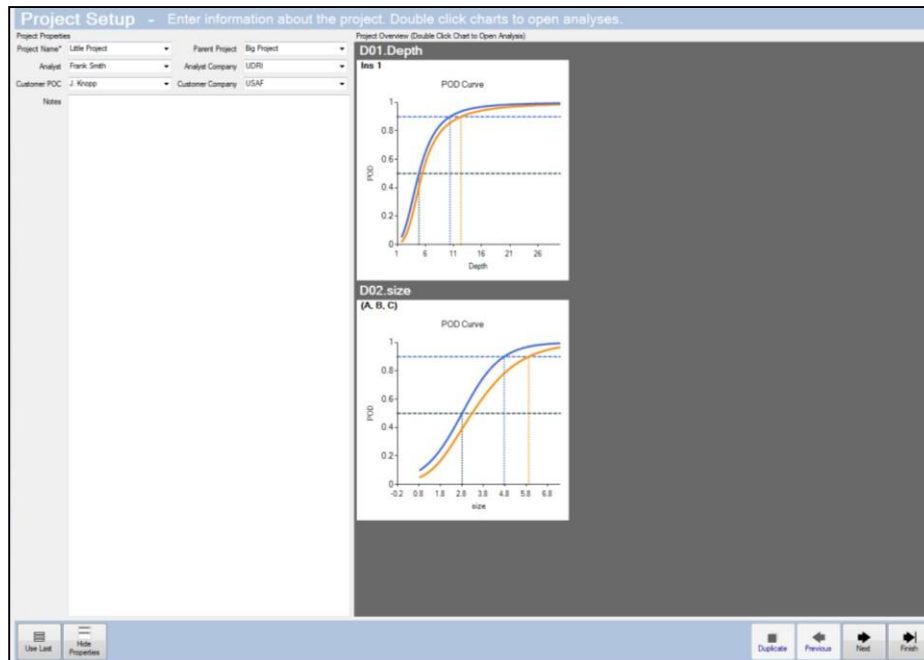


POD v4.5 Project Setup Step



Overview

The Project Setup step is the first thing you see when you open up a project file or start a new project. This step helps you perform two main tasks. The first is helping you enter information about your project as quickly as possible. The second is to help you see your progress made so far with your analyses in your project by showing you a Project Overview.

Tasks

Entering Project Information

Entering project information is tedious but is also important because it helps you recall why you generated this data when you need it later. In order to make this go as quick as possible, POD v4.5 remembers what you have entered into each text box in previous files. So instead of typing in the same information for every project file, you can fill out your project information with a couple clicks.

Considerations When Entering Project Information

- The only box that is required is the Project Name. Everything else is optional.

Tips for Entering Project Information

- You can fill in project properties by selecting an item from the dropdown list that is filled with previously used values.
- While filling in project properties, POD v4.5 will auto-suggest previously entered values based on what you typed so far.
- Pressing the Use Last button is usually the quickest way to fill out your project information.

Project Overview

In order to help you keep track of the analyses in your project, POD v4.5 shows you a list of POD curves that have been generated so far. If the analysis has not been performed yet, the chart will be empty. The charts are grouped by Data Source and flow in order to make it easier to find the analysis you are looking for.

Tips for Using the Project Overview

- Open an analysis by double clicking on the corresponding chart in the Project Overview.
- Hovering the mouse over a chart will show additional information about the analysis including the a50, a90, a90/95, and selected metrics for the POD curve.

Available Actions



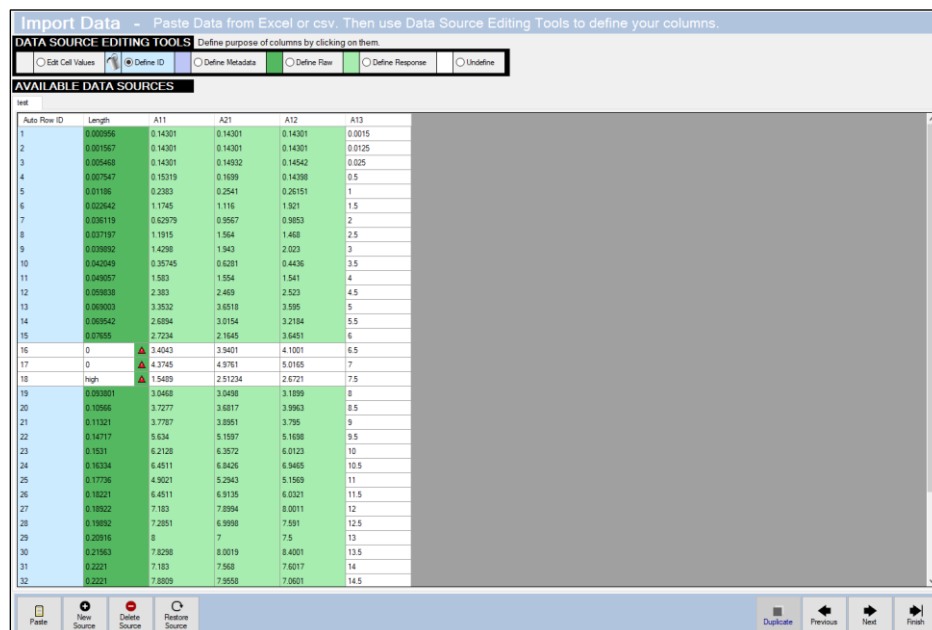
Use Last loads the project properties of the last project that POD v4.5 opened. This allows you to fill out nearly all of the project properties with a single click.



Hide Properties maximizes the space available for the Project Overview panel. This is helpful for low resolution screens where space is limited or if you want to see more charts at once.

Keyboard/Mouse Shortcuts

- **Ctrl + L** - Press **Use Last** button.
- **Ctrl + [** - Press **Hide Properties** button.
- **Ctrl + E** – Presses **Export To Excel...** in file under the tool strip menu
- **Ctrl + S** – Saves the current open .pod file if already exists. Opens the save as explorer if it doesn't.
- **F12** – Activates the save as option under file in the tool strip menu
- **Double Click POD Chart** - Opens corresponding analysis.
- **Mouse Hover Over Chart** - Shows additional POD analysis parameters.
- **Move Mouse Over Chart Clipboard Icon** - Displays Chart Image Export tool. The tool allows you to choose a ratio for the picture export and it will be copied to the clipboard. This picture can then be pasted to outside sources such as excel or Microsoft word.



Import Data Step

Overview

The Import Data step helps you get your data from your Excel and .csv files into POD v4.5. The software relies strictly on pasting the data from the clipboard. This allows you to quickly copy data from multiple worksheets or files without having to worry about the specifics of each data location.

What's a Data Source?

A Data Source is all of the data related to a single specimen set. Data Sources have four column types: ID, Metadata, Flaw and Response. There is no limit on the number of Data Sources in a project.

Considerations for Data Sources

- Each Data Source must have at least one ID, Flaw and Response column.
- You can have multiple ID columns. They will be chained together for data point labels.
- Not every column has to be defined.

Tasks

Steps for Pasting Data into POD v4.5

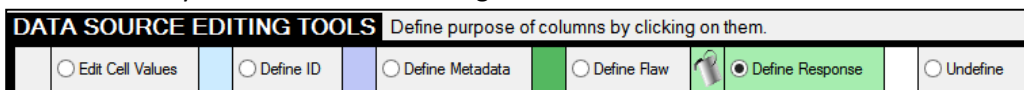
1. Open your Excel file with the data you want to import into POD v4.5.
2. Select your table, including headers, and copy it to the clipboard.
3. Select the Data Source tab you want to copy the data into.
 - a. If you need to make a new Data Source, press the **New Source** button or press Ctrl + G.
4. Press the **Paste** button or press Ctrl + V to paste the data into the Data Source.

Considerations When Pasting Data

- Always include your table's column headers while pasting data into POD v4.
- You can add additional columns of data to a Data Source by pasting multiple times to the same Data Source.
- Each Data Source only supports one specimen set. All data should be from the same specimen set, be in the same order and have the same number of rows.
- Data Sources cannot be modified after analyses have been associated with them.

Steps for Defining Your New Data

1. Select the tool you want from the Editing Tools shown above the Available Data Sources.



2. Move your mouse over the column you want to define. The cursor will become a paint bucket.
3. Click the column anywhere and it will change to the appropriate color.
4. Repeat until all necessary columns are defined.

Considerations When Defining Data

- Cells that cannot be used in the analysis will be painted white and flagged with an icon.
- You can move your mouse over the icon for more details about why it is not included.
- There are legitimate reasons to not include certain cells in your analysis such as data from specimens without a flaw. A flagged cell does not necessarily mean there is an error.

Tips for Defining Data

- There is a quick way to change a column's definition without going back to the Editing Tools: **click the column again**. This will change it to the next definition. If you keep clicking you will cycle through all of the editing tools. You can also hold down Alt to cycle the other way.
- The paint bucket cursor has a small square in the bottom right. That shows you what color the column will be painted when the mouse button is pressed.
- Multiple columns can be defined at once by dragging the mouse while holding down the mouse button.
- Dragging the mouse off of the table will undo any changes made to definitions.
- Holding down Shift on the keyboard can also be used while clicking on columns is another way to define multiple columns at once.

Steps for Modifying Your Data

1. Click Edit Cell Values from the Editing Tools.
2. Click on the cell you want to edit.
3. Type in the new value.
4. Press Enter. The table will automatically update based on the changes you made.

Tips for Modifying Data

- To quickly edit a cell while defining columns, press the spacebar while your mouse over the cell you want to edit.

Steps for Appending Additional Rows

1. Move your mouse to the white row found at the bottom of the table.
2. Click on the cell from the white row that you want to edit.
3. Type a new value into the cell.
5. A new row will be appended to the Data Source and the table will automatically update based on the changes you made.
4. Finish filling in the rest of the values for the new row.

Available Actions



Paste will paste data from the clipboard into the active data source. Additional paste actions will append columns to the table.



New Source adds a new Data Source to the project. This appears as a new tab where new data can be pasted.



Delete Source removes the current Data Source from the project.



Restore Source adds a previously removed Data Source back to the project. Sources can only be restored while you remain on this step. They are restored in reverse of their deletion order.

Keyboard/Mouse Shortcuts

- **Ctrl + V** - Press **Paste** button.
- **Ctrl + G** - Press **New Source** button.
- **Ctrl + D** - Press **Delete Source** button.
- **Ctrl + R** - Press **Restore Source** button.
- **Ctrl + 1** – Switch to **Edit Cell Values** tool.
- **Ctrl + 2** - Switch to **Define ID** tool.
- **Ctrl + 3** - Switch to **Define Metadata** tool.
- **Ctrl + 4** - Switch to **Define Flaw** tool.
- **Ctrl + 5** - Switch to **Define Response** tool.
- **Ctrl + 6** - Switch to **Undefine** tool.
- **Spacebar While Over Cell** - Switches to edit mode for that cell.
- **Mouse Hover Cell Notification Icon** – Shows why the cell is not included in the analysis.
- **Hold Shift While Clicking on Columns or Drag the Mouse** – Defines multiple columns at once.
- **Drag Mouse Off of the Table** – Undo any changes made while dragging the mouse.

Configure Data Step

Configure Data - Setup names, units and default values for the new data.

AVAILABLE DATA SOURCES

FLAW INFO

Available Flaws

Length [0.01, 0.35]

Column Info

Name

Length

Unit

Default Values

Range Minimum

Range Maximum

POD Threshold

RESPONSE INFO

Available Responses

A11 [0.2, 0.45]

A12 [0.2, 0.35]

Column Info

Name

Unit

Default Values

Range Minimum

Range Maximum

POD Threshold

DATA TABLE

ID	Length	A11
1	0.00966	0.14301
2	0.001967	0.14301
3	0.005468	0.14301
4	0.007547	0.15319
5	0.01186	0.2383
6	0.02642	1.1745
7	0.04119	0.62979
8	0.037197	1.1915
9	0.03892	1.4298
10	0.042049	0.35745
11	0.04957	1.583
12	0.05838	2.383
13	0.06903	3.3532
14	0.06942	2.6894
15	0.07625	2.224
16	0.09301	3.0468
17	0.10566	3.7277
18	0.11321	3.7787
19	0.14717	5.634
20	0.1531	6.2128
21	0.16334	6.4511
22	0.17736	4.9021
23	0.18221	6.4511
24	0.18923	7.183
25	0.19892	7.2851
26	0.20916	8
27	0.21563	7.8298
28	0.2221	7.183
29	0.2221	7.8099
30	0.22857	7.3191
31	0.23342	8.817
32	0.2409	9.1815
33	0.25013	9.1745
34	0.30674	9.7021

DATA VISUALIZATION

A11 Response vs Length

A12 Response vs Length

A12 Response vs Length

Buttons: Fit All Graphs, Group By Row, Duplicate, Previous, Next, Finish

Overview

The Configure Data step is where you setup the information about your new analysis data and visually confirm that all of your data was properly imported. In order to make confirmation as easy as possible the data table and data visualization are interactive and synchronized to highlight the relation between the two.

Tasks

Entering Information about Your Data Source

Each data source has flaw and response columns associated with it. It is important to take the time to fill in information about these columns so you can share your analyses later and have your data fully defined. If for some reason, you do not have the time right now, you can come back to it later by going back to the Project Setup.

Steps for Entering Flaw Information

1. Select the Data Source you want to work with by clicking on one of the Data Source tabs.
2. Click on one of the Available Flaws items listed under Flaw Info.
3. If you would like to rename the flaw click on the Name textbox below.
4. If your flaw data has a unit, enter it into the Unit text box.
5. By default, POD v4.5 tries to come up with a reasonable range for your flaw data, however if you feel you have more appropriate values enter them into the Flaw Range numeric boxes.
6. Repeat for each flaw in your Data Source.

Considerations When Entering Flaw Information

- Each flaw must have a unique name.
- Flaw names cannot contain certain characters. POD v4.5 will notify you if you use an illegal character.

Tips for Entering Flaw Information

- Each item in the Available Flaws list contains all of the information about the flaw so you know which flaws you still need to define. The format is as follows: Name (unit), [Range Min, Range Max]
- By pressing Up, Down or Enter while filling out the Name text box, you can quickly switch between the available flaws for the data source. This allows you to quickly rename all of your columns without going back to the Available Flaws list.
- The checkboxes located to the left of the input boxes allow you to apply what you're typing into the box to all of the flaw columns at once. POD v4.5 checks the boxes by default where you are most likely to want to apply your values across multiple columns.
- If you realize later you made a mistake setting the flaw range, you can return here and any analysis that is still using your previous range will be updated when you open it.

Steps for Entering Response Information

1. Select the Data Source you want to work with by clicking on one of the Data Source tabs.
2. Click on one of the Available Responses items listed under Response Info.
3. If you would like to rename the flaw click on the Name textbox below.
4. If your response data has a unit, enter it into the Unit text box.
5. Fill in the appropriate censoring range for your response data. POD v4.5 will rarely pick the correct value here as it has no knowledge about how your data was collected.
6. Fill in a value for your POD decision threshold value. While POD v4.5 provides a default guess, it is rarely the one you should use.
7. Repeat for each response in your Data Source.

Considerations When Entering Response Information

- Each response must have a unique name.
- Response names cannot contain certain characters. POD v4.5 will notify you if you use an illegal character.
- Your response range values are important to performing a POD analysis as it has a considerable impact on the results. Your response range is used to censor your data. Please consult Mil Handbook 1823A for further information. It is not a value you should arbitrarily decide.
- You can change your response censor range while performing the analysis, but it is easier to set the range now so it is applied to every analysis you create.
- You can change your POD threshold later while performing the analysis.

Tips for Entering Response Information

- Each item in the Available Flaws list contains all of the information about the flaw so you know which flaws you still need to define. The format is as follows: Name (unit), [Range Min, Range Max], POD Threshold
- By pressing Up, Down or Enter while filling out the Name text box, you can quickly switch between the available responses for the data source. This allows you to quickly rename all of your columns without going back to the Available Responses list.
- The checkboxes located to the left of the input boxes allow you to apply what you're typing into the box to all of the flaw columns at once. POD v4.5 checks the boxes by default where you are most likely to want to apply your values across multiple columns.
- If you realize later you made a mistake setting the response range, you can return here and any analysis that is still using your previous range will be updated when you open it.

Confirming Your Data

There are no set steps for confirming your data as properly imported. POD v4.5 provides several useful features to make this as easy as possible.

Tips for Confirming Data

- If you need to see all of your data at once, press the **Fit All Graphs** button.
- If you want to see your response columns on one graph to see relative differences, press the **Group By Flaw** button.
- Clicking on any point on a chart will highlight the corresponding point in the Data Table.
- Clicking on any row in the Data Table will highlight the corresponding points on the chart. If you charts are grouped by flaw, it highlight only the point for the current response column. If you are displaying individual charts, it will highlight the point for all columns so you can see how the points relate to each other and quickly compare them.

Available Actions



Fit All Graphs switches between two modes. It will either fit all of the graphs on the screen by shrinking them or display the charts in two columns which may require scrolling to view them.

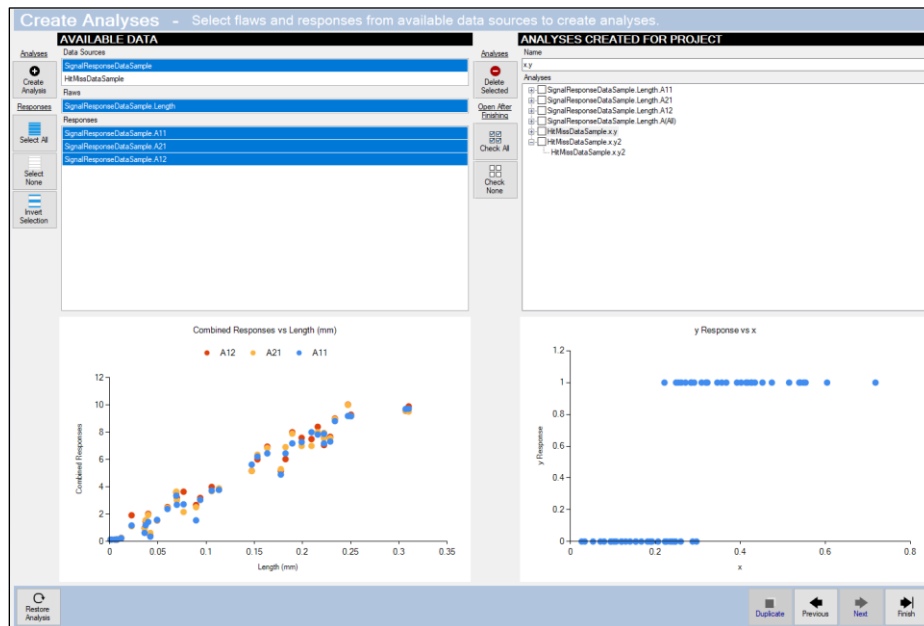


Group By Flaw switches between two modes. It will either group the charts by flaw columns or show each flaw, response pair in a separate chart.

Keyboard/Mouse Shortcuts

- **Ctrl + T** - Press **Fit All Graphs** button.
- **Ctrl + I** - Press **Group By Flaw** button.
- **Mouse Click Individual Chart** – Activates the corresponding flaw and response columns in the Data Table.

Create Analyses Step



Overview

The Create Analyses step is where you create the analyses you would like to perform in your project by selecting flaw and response columns from your data sources. Deciding which columns to use together can be a non-trivial process. Combining columns that are incompatible can result in invalid results. It is highly recommended that you consult Mil Handbook 1823A before creating any analyses so you can understand the pitfalls associated first.

Tasks

Steps for Creating an Analysis

1. Select the Data Source item you want to use to create an analysis.
2. Select one or more Flaws items you would like to use when creating an analysis. Each flaw will generate a corresponding analysis.
3. Select one or more Responses items you would like to use with the selected Flaws.
4. Confirm you have selected the correct data by looking at the chart below.
5. Press the **Create Analysis** button.
6. Check checkbox on the analysis on the Analyses Tree if you want the analysis to automatically open when you finish this step.
7. Repeat until all of your analyses are created.

Considerations When Creating Analyses

- Make sure you understand the associated pitfalls of combining response data before creating any analyses.
- You can multi-select flaws or responses for a given analysis by holding down **CTRL** while clicking.

Tips for Creating Analyses

- Selecting multiple Flaws is an effective way to speed up the analysis creation process.
- POD v4.5 remembers what you have selected when switching between Data Sources so you do not have to remember what you were doing last when you return to that Data Source.
- Make use of the selection tool buttons to the left of the Responses list to create analyses more efficiently.

Steps for Modifying Existing Analyses

1. Select the analysis you want to modify from the Analyses tree.
 - a. To rename the analysis
 - i. Select the Name text box.
 - ii. Type in the new name.
 - iii. Press Enter.
 - b. To delete the analysis, press the **Delete Selected** button.
 - c. To restore a deleted analysis, the **Restore Analysis** button.

Considerations When Modifying Existing Analyses

- You can delete analyses even if you have performed an analysis on the data.
- Analysis names are automatically generated. If you use a custom name, POD v4.5 will not automatically update that name if the column names are changed.
- You can only restore a deleted analysis for as long as you are on this step.

Tips for Modifying Existing Analyses

- Use the shortcut keys to make deleting and restoring analyses more efficient.
- Pressing Enter when done renaming an analysis will move to the next analysis. This makes it easy to rename all of your analyses.

Confirming Data

There are no set steps for confirming your data as properly imported. POD v4.5 provides several useful features to make this as easy as possible.

Tips for Confirming Data

- If you need to see all of your data at once, press the **Fit All Graphs** button.
- If you want to see your response columns on one graph to see relative differences, press the **Group By Flaw** button.
- Clicking on any point on a chart will highlight the corresponding point in the Data Table.
- Clicking on any row in the Data Table will highlight the corresponding points on the chart. If you charts are grouped by flaw, it highlight only the point for the current response column. If you are displaying individual charts, it will highlight the point for all columns.

Available Actions



Restore Analysis adds a previously removed analysis back to the project. Analyses can only be restored while you remain on this step. They are restored in reverse of their deletion order.



Create Analysis creates an analysis using the selected flaws and responses. If multiple flaws are selected, an analysis will be created for each flaw combined with the selected responses.



Select All selects all responses from the Responses list.



Select None unselects all responses from the Responses list.



Invert Selection inverts the selected responses for the Responses list.



Delete Selected deletes the currently selected analysis from the Analyses tree.



Check All checks all of the analyses in the Analyses tree so they are opened when the current step is completed.

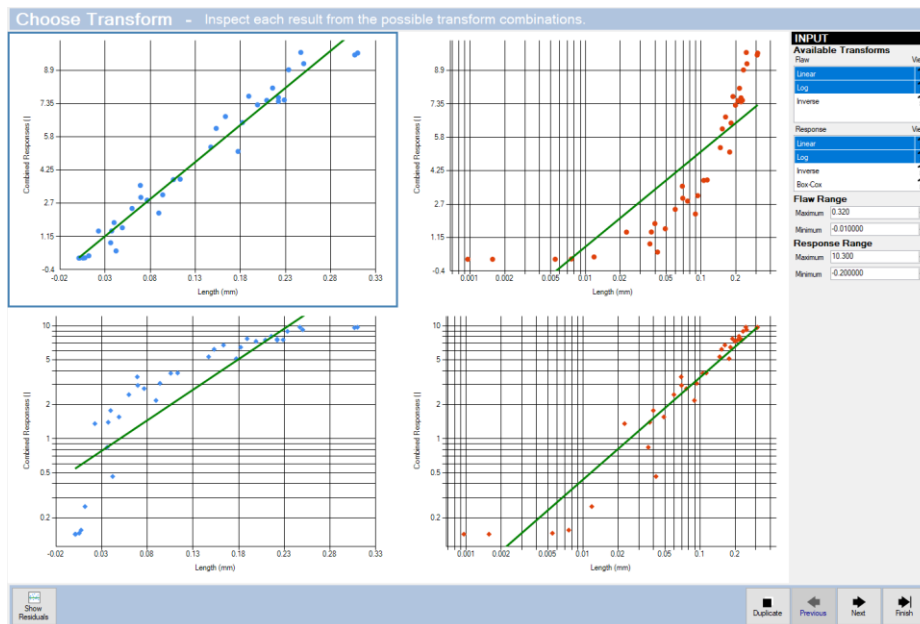


Check None unchecks any currently selected analyses in the Analyses tree. Thus no analyses will be opened when this step is completed.

Keyboard/Mouse Shortcuts

- **Ctrl + R** - Press **Restore Analysis** button.
- **Ctrl + G** - Press **Create Analysis** button.
- **Ctrl + A** - Press **Select All** button.
- **Ctrl + Shift + A** - Press **Select None** button.
- **Ctrl + I** - Press **Invert Selection** button.
- **Ctrl + D** - Press **Delete Selected** button.
- **Ctrl + H** - Press **Check All** button.
- **Ctrl + Shift + H** - Press **Check None** button.

Choose Transform Step for a_{Hat} vs a Analysis



Overview

The Choose Transform step is where you pick your transform for your flaw and response axis to make your data as linear as possible. Choosing your transforms is important to performing a proper a_{Hat} vs a POD analysis. It is highly recommended that you consult Mil Handbook 1823A before selecting your transforms so you can understand the pitfalls associated with choosing them.

Tasks

Choosing Your Transforms

POD v4.5 displays the results of the linear regression for each possible transform combination in a grid. The only data that is shown are the uncensored data points. This means having the correct censor values is important since it will dramatically change the results of the linear regressions POD v4.5 displays. And you can return to this step at any point during the next step if you feel you need to change your transforms and would like to review the charts again. If using the box-cox transform, the chosen value for lambda will be preserved if you return the transform step.

Steps for Choosing Your Transforms

1. Select which of the available transform you would like to view by selecting them from the Available Transforms lists on the right side. Most likely this will be linear and log only.
2. Review your Response and Flaw ranges and update them accordingly.
3. Look at the grid of charts to decide which transform combination gives you the most linear data.
 - a. If still unsure, press **Show Residuals** button to see the data from another viewpoint.
 - b. Also remember you can consult the Mil Handbook 1823A for further insight into this issue.
4. Click on the chart that does the best job of linearizing your data to choose it as your initial transform combination to use for the next step.

Considerations When Choosing Your Transforms

- Review Mil Handbook 1823A if you are unsure how to choose your transforms.

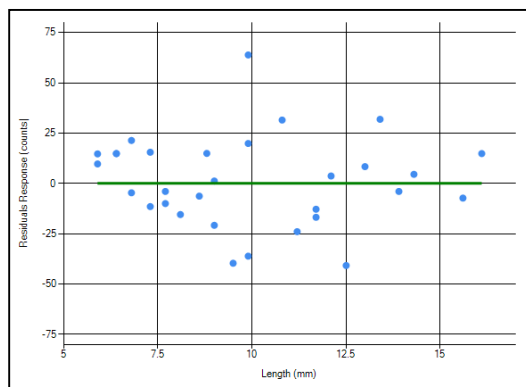
Tips for Choosing Your Transforms

- Press **Show Residuals** button to see the data relative to the linear fit of the data. This can sometimes make it easier to choose your transform combination.
- Moving your mouse over the question marks listed under the view column on the right side of the Available Transforms lists will highlight the charts associated with that transform.
- This is not the only step where you can pick your transforms. The Linear Regression step provides multiple tools to help you pick your transforms as well.
- Each response transform is associated with a data point symbol. Each flaw transform is associated with a color.
- Using the chart's grid spacing and axis labels is a quick way to identify the transform for that axis.

Available Actions



Show Residuals show the analysis data relative to the linear fit. The linear fit is subtracted from the analysis data. This creates a horizontal line with the differences plotted instead of the original data points. Shown below is an example of a residuals plot.

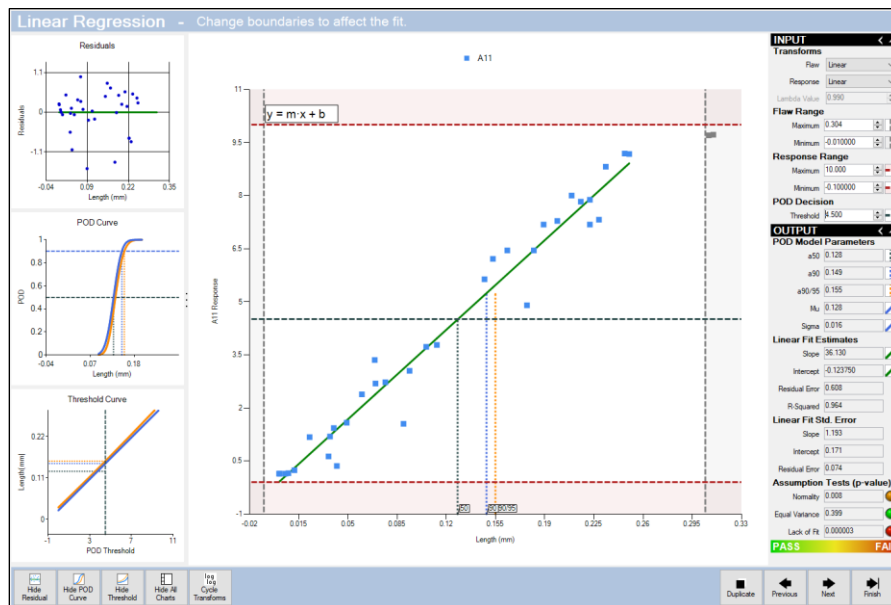


Duplicate duplicates the current analysis and adds it to the project.

Keyboard/Mouse Shortcuts

- **Ctrl + T** - Press **Show Residuals** button to switch between showing the linear fits and residuals of the fits.
- **Click Chart** - Selects the transform combination associated with that chart as the transform to use with your analysis.
- **Mouse Over Question Marks** - Highlights the charts on the grid associated with that transform. This is a quick way to identify charts if you are unsure which transform they are associated with.
- **Ctrl + Alt + D** - Press **Duplicate** button to duplicate the current analysis.

Linear Regression Step for aHat vs a Analysis



Overview

The Linear Regression step is where you perform a POD analysis. This is the most complex step in POD v4.5 so expect to make numerous references to Mil Handbook 1823A if you are unfamiliar to POD analysis so you can learn about the pitfalls you may encounter and the general approach to aHat vs a analysis.

Tasks

Linear Regression Input Controls

On the far right side is where you will find all of your input controls. This includes your transforms, lambda value (disabled when not using box-cox), flaw range, response range and POD decision.

Steps to Changing Numeric Input Values (Three Methods)

1. Changing numeric value by typing in the value
 - a. Click on the numeric input on the right side that you want to change.
 - b. Type in the new numeric value.
 - c. Press enter.
2. Changing numeric values by dragging lines
 - a. Move mouse over one of the lines on the regression chart.
 - b. Hold down the left mouse button while dragging the line.
 - c. Move to new location of the chart.
 - d. Let go of the left mouse button.
3. Changing numeric values by clicking on the chart
 - a. Move mouse to where you want the line to be on the regression chart.
 - b. Left click on the chart.
 - c. Select the corresponding menu item from the context menu.

Tips for Changing Numeric Input Values

- For the Flaw Range and Response Range line pairs, lines will automatically update when dragged over each other. For example, the Flaw Minimum line will become the Flaw Maximum line when dragged higher the Flaw Maximum line.

Steps for Changing Your Transforms

1. Click on the Flaw or Response dropdown control from the right side.
2. Select the new transform.

Tips for Changing Your Transforms

- Press **Cycle Transform** button to quickly cycle between log-linear combinations of flaw and response transforms.
- Inverse transform is rarely used and can result in a long POD calculation time if used incorrectly.
- Box-cox transform is a new transform option added to POD v4.5. An optimal value for lambda will be picked when box-cox is selected, but you have the option of manipulating lambda manually if you wish using the numeric box labeled 'lambda value'.

Steps for Toggling Data Points

1. Move mouse over the data point you want to toggle.
2. Right click on the data point.
3. Select *Toggle Response On/Off* or *Toggle All Response* from the context menu.

Considerations When Toggling Data Points

- Data points should only toggled when there is proper justification for removing them.
- POD v4.5 still displays a semi-transparent POD and Threshold curve of the analysis results without the points removed.
- The analysis is not considered finished until a comment is provided for each point describing why it was removed. This is done on the next step.

Tips for Toggling Data Points

- Large section of points can removed by changing the Response Range of the analysis.

Steps for Resizing Left Side Charts

1. Move mouse over the vertical resizing bar next to the side charts.
2. Hold down the left mouse button.
3. Move the bar left or right depending on the size of charts you want.
4. Once the desired chart size is shown let go of the left mouse button.

Tips for Resizing Left Side Charts

- The process of resizing the charts includes a message to tell you when you have moved the mouse far enough.
- Resizing is organized by the number of charts to display at once with a range of 1 to 6 charts.
- Charts can be hidden if not needed.
- Charts can be scrolled to there are more charts visible than viewable.
- Keyboard shortcuts are also available for resizing and hiding the side charts.

Resizing Right Side Controls

For low resolution screens, the right side controls may need to be resized due to lack of vertical space. This can be done by pressing one of the buttons located next to main Input and Output labels as highlighted in red. The buttons can expand the controls into a two column mode using left button. The Input and Output controls can be temporarily hidden by pressing the right button.



Available Actions



Hide Residuals hides/shows the residual plot.



Hide POD Curve hides/shows the POD curve plot.



Hide Threshold hides/shows the POD Threshold curve plot.



Hide All Charts hides/shows all of the side charts.



Cycle Transforms cycles through all log-linear transform combinations for flaw and response data.



Duplicate duplicates the current analysis and adds it to the project.

Keyboard/Mouse Shortcuts

- **Ctrl + 1** - Press **Hide Residual** button to show/hide the residual plot.
- **Ctrl + 2** - Press **Hide POD Curve** button to show/hide the POD plot.
- **Ctrl + 3** - Press **Hide Threshold** button to show/hide the POD threshold plot.
- **Ctrl + 1 + Shift** - Show one side chart.
- **Ctrl + 2 + Shift** - Show two side charts.
- **Ctrl + 3 + Shift** - Show three side charts.
- **Ctrl + 1 + Shift + Alt** - Force the residual plot into view if visible.
- **Ctrl + 2 + Shift + Alt** - Force the POD plot into view if visible.
- **Ctrl + 3 + Shift + Alt** - Force the POD Threshold plot into view if visible.

- **Ctrl + O** - Press **Hide All Charts** button to show/hide all side charts.
- **Ctrl + T** - Press **Cycle Transforms** button to cycle through all of the linear-log transform combinations.
- **Click Point on Regression Chart** - Shows context menu with value of the point and options to moves lines to that point, toggle the point from the analysis or toggle all points at that flaw size.
- **Click on Regression Chart** - Shows context menu with value at that location and options to move lines to that point.
- **Ctrl + Alt + D** - Press **Duplicate** button to duplicate the current analysis.

Document and Export Step

Document and Export - Document why points were removed from the analysis. Export to Excel if needed.

ID	Response Name	Flow	Response	Comment
38	A11	5.710	5.710	Data Point is Invalid
37	A11	5.707	5.702	Data Point is Invalid

DOCUMENTATION
Point Removed Comment (Enter to Apply, Shift+Enter to Add to Templates)
Data Point is Invalid
Comment Templates (Click to Copy to Comment, Shift+Click to Apply)

Select All
Select None
Insert Selection
Select Empty
Copy Back Comment
Remove Comment

Apply Comment
Add to Templates
Delete from Templates

Export Analysis
Export Project

Duplicate
Previous
Next
Refresh

Overview

The Document and Export step is where you document why you removed data points from the analysis if you did remove them. It is critical that you document your reasons because data points should not be removed unless there is a valid reason to do so. Therefore, anyone using your results would need to be made aware that points were removed and why. In addition, since this is the last step of the POD analysis, you can export either the current analysis or the entire project to Excel.

Tasks

Steps for Documenting Removed Points with New Comments

1. Select one or more rows from the Removed Points list.
2. Select Point Removed Comment textbox.
3. Type in your reason for removing the point from the analysis.
4. Press Enter or click **Apply Comment** button.
5. Repeat steps 1 through 5 until all points are documented.

Considerations When Documenting Points

- The analysis cannot be finished until all of the removed points are documented.
- Make sure your comments are useful to people who will use your analysis results later.

Tips for Documenting Points

- The entire step is designed to make documenting points as easy as possible. Learn the shortcuts to make documenting less tedious.
- **Select Empty** button lets you quickly select newly removed points.
- You can copy multiple comments to the Point Removed Comment textbox at once by using the **Copy Back Comment** button. The comments are joined together as a single comment.

Steps for Documenting Removed Points with Comment Templates

1. Select one or more rows from the Removed Points list.
2. Select template from Comment Templates list.
3. Click on Point Removal Comment textbox.
4. Modify the comment as needed.
5. Press Enter or click **Apply Comment** button.
6. Repeat steps 1 through 5 until all points are documented.

Tip for Using Comment Templates

- Press Shift when pressing Enter or press **Add to Templates** button to add the text in the Removal Comment textbox to the Comment Templates list.
- Press Shift when clicking on a comment in the Comment Templates list to immediately apply it to the selected removed points.
- Templates can be removed from the Comments Templates list by pressing **Delete from Templates** button.
- Create comment templates whenever possible. It will help you comment future removed points with a couple mouse clicks.

Steps for Exporting Your Analysis to Excel

1. Press Export Analysis.
2. Choose folder to save the analysis.
3. Modify the automatically generated file name if needed.
4. Press Enter or click the Save button.

Steps for Exporting Your Project to Excel

1. Press Export Project.
2. Choose folder to save the project.
3. Modify the automatically generated file name if needed.
4. Press Enter or click the Save button.

Tip for Exporting Data

- Projects can be exported at any time by selecting Export to Excel... from the File menu located in the upper left corner of the main window.

Considerations When Exporting Data

- While POD v4.5 does not prevent you from exporting analyses where removed points were not documented, the Excel sheet will contain the comment “ANALYST DID NOT COMMENT ON WHY POINT WAS REMOVED FROM THE ANALYSIS!”
- It is recommended to only export analyses with undocumented points when the exported file will only be for personal use. Shared results should always be documented.

Available Actions



Select All selects all points from the Removed Points list.



Select None unselects all points from the Removed Points list.



Invert Selection inverts the selected points for the Removed Points list.



Select Empty select points from the Removed Points list that have not been documented yet.



Copy Back Comment copies back one or comments from the selected points to the Point Removal Comment textbox.



Remove Comment removes the comment from the selected points.



Apply Comment applies the comment in the Point Removal Comment textbox to the selected points.



Add to Templates adds the text in the Point Removal Comment textbox to the Comment Templates list.



Delete From Templates removes the selected template from the Comment Templates list.



Export Analysis exports the current analysis to an Excel file.



Export Project exports the entire project to an Excel file.

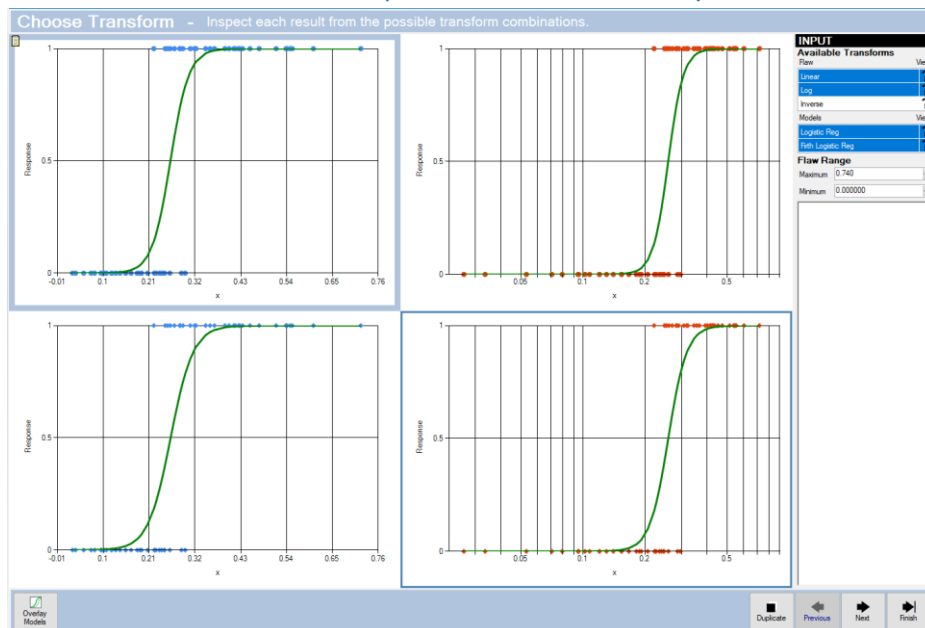


Duplicate duplicates the current analysis and adds it to the project.

Keyboard/Mouse Shortcuts

- **Ctrl + A** - Press **Select All** button.
- **Ctrl + Shift + A** - Press **Select None** button.
- **Ctrl + I** - Press **Invert Selection** button.
- **Ctrl + Shift + I** - Press **Select Empty** button.
- **Ctrl + B** - Press **Copy Back Comment** button.
- **Ctrl + D** - Press **Remove Comment** button.
- **Ctrl + G** - Press **Apply Comment** button.
- **Ctrl + Shift + G** - Press **Add to Templates** button.
- **Ctrl + Shift + D** - Press **Delete from Templates** button.
- **Ctrl + E** - Press **Export Analysis** button.
- **Ctrl + Shift + E** - Press **Export Project** button.
- **Enter** (for Point Removal Comment textbox) - Press **Apply Comment** button.
- **Enter + Shift** (for Point Removal Comment textbox) - Press **Apply Comment** and **Add to Templates** buttons.
- **Mouse Click** (for Comment Templates list) - Copy template to Point Removal Comment textbox.
- **Mouse Click + Shift** (for Comment Templates list) - Apply template to selected points.
- **Ctrl + Alt + D** - Press **Duplicate** button to duplicate the current analysis.

Choose Transform Step for Hit Miss Analysis



Overview

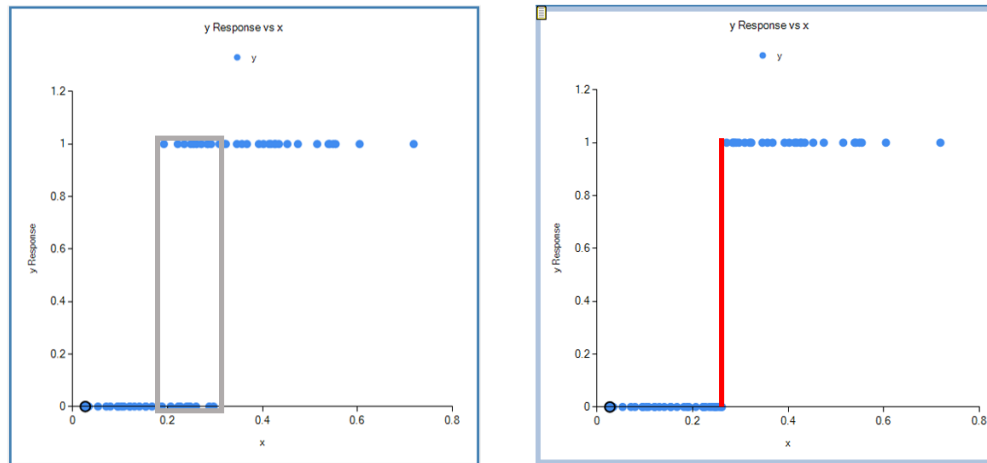
The Choose Transform step is where you pick your transform for your flaw and model that best represents your data. Choosing your transform and model is important to performing a proper hits miss POD analysis. It is highly recommended that you consult Mil Handbook 1823A before selecting your transforms or model so you can understand the pitfalls associated with choosing them.

Tasks

Choosing Your Transforms

POD v4.5 displays the results of the hit miss regression for each possible flaw/model combination in a grid. And you can return to this step at any point during the next step if you feel you need to change your flaw/model pair and would like to review the charts again.

Choosing Your Model



PODv4.5 offers two model types to choose from along with its transforms, *maximum likelihood logistic regression* and *firth's bias-reduced logistic regression*. Choosing the appropriate model depends on the behavior of the data. Maximum likelihood logistic regression works well when there is plenty of overlap between the hits and misses. Firth's bias-reduced logistic regression works well when dealing with near or total data separation and/or unusual cases such as outliers. This can be illustrated in the diagram above. On the left, we have good overlap for the hits and misses. Thus, Maximum likelihood logistic regression would be a good choice since it can converge at an optimal value. On the right, however, we see that the 1s and 0s have complete separation. Thus, Firth's bias-reduced logistic regression would be an appropriate choice since Maximum likelihood logistic regression would likely fail to converge.

Steps for Choosing Your Transforms

1. Select which of the available transform you would like to view by selecting them from the Available Transforms lists on the right side. Most likely this will be linear and log only.
2. Review your Flaw range and update it accordingly. Most likely it will not need to be changed.
3. Look at the grid of charts to decide which flaw/model combination gives you the best fit.
 - a. If you are having a hard time comparing models, press **Overlay Models** button to show the outputs on top of each other. You can also check how well the model fits the data by checking the likelihood ratio test in the [hit miss regression step](#).
 - b. If the data is separated (no overlap of 1s and 0s), then the text box on the right will notify the user and will recommend to use *firth logistic regression*. Firth logistic regression capable converging with separated data.
 - c. Also remember you can consult the Mil Handbook 1823A for further insight into this issue.
4. Click on the chart that does the best job of representing your data to choose it as your initial flaw/model combination to use for the next step.

Considerations When Choosing Your Transforms

- Review Mil Handbook 1823A if you are unsure how to choose your transform or model.

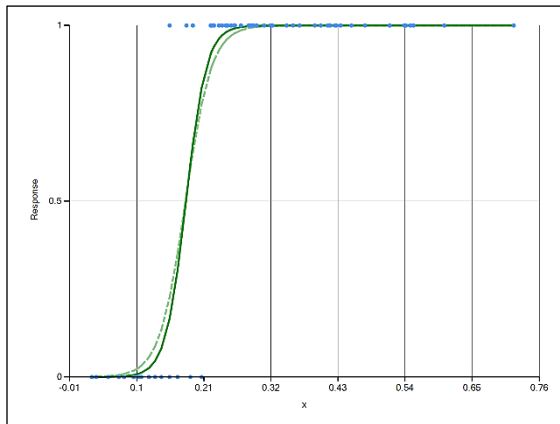
Tips for Choosing Your Transforms

- Press **Overlay Models** button to more easily directly compare the fits of each model.
- Moving your mouse over the question marks listed under the view column on the right side of the Available Transforms lists will highlight the charts associated with that transform or model.
- This is not the only step where you can pick your transform or model. The Hit Miss Regression step provides multiple tools to help you pick your transform and model as well.
- Each model is associated with a data point symbol. Each flaw transform is associated with a color.
- Using the chart's grid spacing and axis labels is a quick way to identify the transform for that axis.

Available Actions



Overlay Models show the fits of the models overlaid on top of each other so they can be more easily compared. Dashed lines are used for other models. Shown below is an example of an overlaid plot.

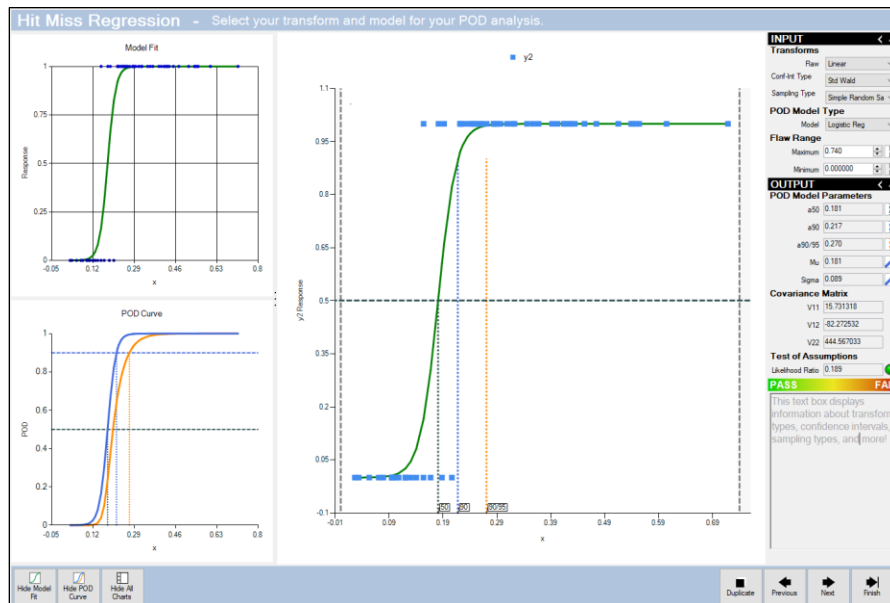


Duplicate duplicates the current analysis and adds it to the project.

Keyboard/Mouse Shortcuts

- **Ctrl + M** - Press **Overlay Models** button to switch between showing model fit results overlaid on top of each other and individually.
- **Click Chart** - Selects the flaw/model combination associated with that chart as the combination to use with your analysis.
- **Mouse Over Question Marks** - Highlights the charts on the grid associated with that transform or model. This is a quick way to identify charts if you are unsure which transform or model they are associated with.
- **Ctrl + Alt + D** - Press **Duplicate** button to duplicate the current analysis.

Hit Miss Regression Step



Overview

The Hit Miss Regression step is where you perform a POD analysis. This is the most complex step in POD v4.5 so expect to make numerous references to Mil Handbook 1823A if you are unfamiliar to POD analysis so you can learn about the pitfalls you may encounter and the general approach to hit miss analysis.

Tasks

Hit Miss Regression Input Controls

On the far right side is where you will find all of your input controls. This includes your flaw transform, confidence interval type, sampling method, model (link function), and flaw range. Confidence interval type and sampling type are both new features to PODv4.5. They can potentially be helpful in getting more accurate results for the POD curve and the $a9095$ curve. A quick help text box displays information about a given option in all four of the drop down boxes when the user hovers over an option. It will also inform the user of the computation time if a particular input takes longer to execute.

Steps to Changing Numeric Input Values (Three Methods)

1. Changing numeric value by typing in the value
 - a. Click on the numeric input on the right side that you want to change.
 - b. Type in the new numeric value.
 - c. Press enter.
2. Changing numeric values by dragging lines
 - a. Move mouse over one of the lines on the regression chart.
 - b. Hold down the left mouse button while dragging the line.
 - c. Move to new location of the chart.
 - d. Let go of the left mouse button.
3. Changing numeric values by clicking on the chart
 - a. Move mouse to where you want the line to be on the regression chart.
 - b. Left click on the chart.
 - c. Select the corresponding menu item from the context menu.

Tips Changing Numeric Input Values

- For the Flaw Range line pairs, lines will automatically update when dragged over each other. For example, the Flaw Minimum line will become the Flaw Maximum line when dragged higher the Flaw Maximum line.

Steps for Changing Your Transform or Model

1. Click on the Flaw or Model dropdown control from the right side.
2. Select the new transform or model.

Tips for Changing Your Transforms

- Inverse transform is rarely used and can result in a long POD calculation time if used incorrectly.

Steps for Changing Your Confidence Interval Method or Sampling Method

1. Click on the Conf-Int Type or Sampling Type dropdown control from the right side
2. Select a new Conf-Int Type or Sampling Type. The full names for the Conf-Int types are stated in the quick help box.

Tips for Changing Conf-Int type

- Standard Wald is the traditional way of calculating an a9095 curve for POD. It can be calculated quickly, but can be inaccurate due to the normality assumption and linear interpolation issues
- Modified Wald is a way to deal with the linear interpolation issues by generating 500 normally distributed crack sizes to fit the curve to. Also can be calculated fast, but still relies on the assumption that the transformed responses are normally distributed.
- LR (Likelihood Ratio) confidence interval fits a 95% confidence interval by maximizing the ratio of likelihoods. It is much more accurate than the Wald confidence interval since it does not assume normality of the transformed responses, but is time consuming to calculate (~ 5 to 10 seconds).
- MLR (Modified Likelihood Ratio) is similar to LR except it applies higher order approximation to deal with potential smoothing issues that LR has with the a9095 curve. It is also very slow (~10 to 15 seconds).

Tips for Changing Sampling Type

- Simple Random Sampling preserves the data 'as is'.
- Ranked Set Sampling generates 30 datasets based on the original data by using ranked set sampling data collection method.
- Ranked set sampling can be combined with any transform type, model type, or confidence interval. Note that combining ranked set sampling with LR or MLR can be VERY slow (upwards of 20 minutes). A dialog box will warn the user prior to executing if this combination is picked.

Steps for Toggling Data Points

3. Move mouse over the data point you want to toggle.
4. Right click on the data point.
5. Select *Toggle Response On/Off* or *Toggle All Response* from the context menu.

Considerations When Toggling Data Points

- Data points should only be toggled when there is proper justification for removing them.
- POD v4.5 still displays a semi-transparent POD and Threshold curve of the analysis results without the points removed.
- The analysis is not considered finished until a comment is provided for each point describing why it was removed. This is done on the next step.

Tips for Toggling Data Points

- Large section of points can be removed by changing the Response Range of the analysis.

Steps for Resizing Left Side Charts

1. Move mouse over the vertical resizing bar next to the side charts.
2. Hold down the left mouse button.
3. Move the bar left or right depending on the size of charts you want.
4. Once the desired chart size is shown let go of the left mouse button.

Resizing Right Side Controls

For low resolution screens, the right side controls may need to be resized due to lack of vertical space. This can be done by pressing one of the buttons located next to main Input and Output labels as highlighted in red. The buttons can expand the controls into a two column mode using left button. The Input and Output controls can be temporarily hidden by pressing the right button.



Tips for Resizing Left Side Charts

- The process of resizing the charts includes a message to tell you when you have moved the mouse far enough.
- Resizing is organized by the number of charts to display at once with a range of 1 to 6 charts.
- Charts can be hidden if not needed.
- Charts can be scrolled to there are more charts visible than viewable.
- Keyboard shortcuts are also available for resizing and hiding the side charts.

Available Actions



Hide Model Fit hides/shows the model fit plot which uses the proportions of all inspections at each flaw size.



Hide POD Curve hides/shows the POD curve plot.



Hide All Charts hides/shows all of the side charts.

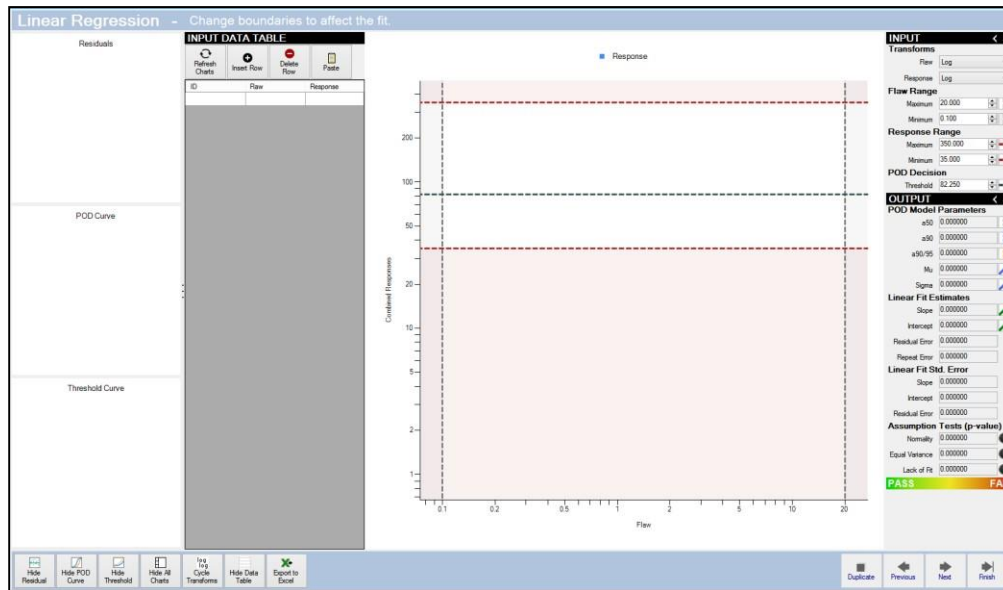


Duplicate duplicates the current analysis and adds it to the project.

Keyboard/Mouse Shortcuts

- **Ctrl + 1** - Press **Hide Model Fit** button to show/hide the residual plot.
- **Ctrl + 2** - Press **Hide POD Curve** button to show/hide the POD plot.
- **Ctrl + 1 + Shift** - Show one side chart.
- **Ctrl + 2 + Shift** - Show two side charts.
- **Ctrl + 1 + Shift + Alt** - Force the model fit plot into view if visible.
- **Ctrl + 2 + Shift + Alt** - Force the POD plot into view if visible.
- **Ctrl + 0** - Press **Hide All Charts** button to show/hide all side charts.
- **Click Point on Regression Chart** - Shows context menu with value of the point and options to moves lines to that point, toggle the point from the analysis or toggle all points at that flaw size.
- **Click on Regression Chart** - Shows context menu with value at that location and options to move lines to that point.
- **Ctrl + Alt + D** - Press **Duplicate** button to duplicate the current analysis.

aHat vs a Quick Analysis



Overview

The aHat vs a quick analysis is designed to provide immediate feedback for an operator collecting data. It is not meant to replace a traditional POD analysis. As such, the input data is the only data that can be exported to Excel.

Tasks

Initial Inputs

POD v4.5 provides a way for the user to input ranges and meta-information before doing the quick analysis. Because the data being entered may be from a collection in progress, the user needs to input the ranges of the input data manually so the graphs can be setup properly. Below is an example of the initial input needed for an aHat vs a quick analysis.

Please provide information about the person collecting the data, the specimen set and instrument used.

Operator:

Specimen Set: Units:

Instrument: Units:

Please provide flaw range of the specimens used and the response range of the instrumentation used before continuing.

Specimens Flaw Range

Maximum:

Minimum:

Instrumentation Response Range

Maximum:

Minimum:

Steps to Filling out Initial Inputs

1. Fill in operator's name.
2. Select previously entered specimen set name or type in a new one.
3. Specify the unit of the specimen set.
4. Select previously entered instrument name or type in a new one.
5. Specify the unit of the instrument.
6. Set the specimen's flaw range.
7. Set the instrument's response range.
8. Hit the **Apply** button.

Tips for Filling out Initial Inputs

- The additional information inputted about the data initially will be exported along with the input data if the user decides to export the quick analysis to an Excel file.
- POD v4.5 remembers ranges and units of previously used specimen sets and instruments so this part of the analysis can be finished as quickly as possible.

Entering Table Data

Data can be entered by hand or pasted into the table located on the left side of the window.

Steps to Entering Table Data Manually

1. Click on a cell of the all-white input row of the data table.
2. Enter the appropriate value for the selected cell.
3. Input the values for the remaining cells.
4. Repeat steps 1 through 3 until all data is entered.
5. Press **Refresh Charts** button.

Tips for Entering Table Data Manually

- The specimen ID column will be auto-generated if you do not enter it.
- Press **Enter** to move to the next row.
- Press **Enter + Shift** to move to the next cell. Auto-generated IDs will be skipped.
- Use the arrow keys to navigate the table.
- Press **Insert Row** to insert a new row below the currently selected row.
- Press **Delete Row** to delete the currently selected row.
- Press **Refresh Charts** to analyze the data in the table.

Steps to Pasting Data into the Table

1. Open Excel file with the data you want to paste into the quick analysis.
2. Highlight the data without headers.
3. Copy the data to the clipboard.
4. Press **Paste** button.
5. Press **Refresh Charts** button.

Tips for Pasting Data into the Table

- The specimen ID column will be auto-generated if you do not paste it.
- Press **Refresh Charts** to analyze the data in the table.

Steps to Exporting the Data Table

1. Press **Export to Excel** button.
2. Choose folder to save the data table.
3. Modify the automatically generated file name if needed.
4. Press Enter or click the **Save** button.

Linear Regression Input Controls

On the far right side is where you will find all of your input controls. This includes your transforms, flaw range, response range and POD decision.

Steps to Changing Numeric Input Values (Three Methods)

1. Changing numeric value by typing in the value
 - a. Click on the numeric input on the right side that you want to change.
 - b. Type in the new numeric value.
 - c. Press enter.
2. Changing numeric values by dragging lines
 - a. Move mouse over one of the lines on the regression chart.
 - b. Hold down the left mouse button while dragging the line.
 - c. Move to new location of the chart.
 - d. Let go of the left mouse button.
3. Changing numeric values by clicking on the chart
 - a. Move mouse to where you want the line to be on the regression chart.
 - b. Left click on the chart.
 - c. Select the corresponding menu item from the context menu.

Tips for Changing Numeric Input Values

- For the Flaw Range and Response Range line pairs, lines will automatically update when dragged over each other. For example, the Flaw Minimum line will become the Flaw Maximum line when dragged higher the Flaw Maximum line.

Steps for Changing Your Transforms

1. Click on the Flaw or Response dropdown control from the right side.
2. Select the new transform.

Tips for Changing Your Transforms

- Press **Cycle Transform** button to quickly cycle between log-linear combinations of flaw and response transforms.
- Inverse transform is rarely used and can result in a long POD calculation time if used incorrectly.

Steps for Toggling Data Points

1. Move mouse over the data point you want to toggle.
2. Right click on the data point.
3. Select *Toggle Response On/Off* or *Toggle All Response* from the context menu.

Considerations When Toggling Data Points

- Data points should only be toggled when there is proper justification for removing them.
- POD v4.5 still displays a semi-transparent POD and Threshold curve of the analysis results without the points removed.
- The analysis is not considered finished until a comment is provided for each point describing why it was removed. This is done on the next step.

Tips for Toggling Data Points

- Large section of points can be removed by changing the Response Range of the analysis.

Steps for Resizing Left Side Charts

1. Move mouse over the vertical resizing bar next to the side charts.
2. Hold down the left mouse button.
3. Move the bar left or right depending on the size of charts you want.
4. Once the desired chart size is shown let go of the left mouse button.

Tips for Resizing Left Side Charts

- The process of resizing the charts includes a message to tell you when you have moved the mouse far enough.
- Resizing is organized by the number of charts to display at once with a range of 1 to 6 charts.
- Charts can be hidden if not needed.
- Charts can be scrolled to there are more charts visible than viewable.
- Keyboard shortcuts are also available for resizing and hiding the side charts.

Resizing Right Side Controls

For low resolution screens, the right side controls may need to be resized due to lack of vertical space. This can be done by pressing one of the buttons located next to main Input and Output labels as highlighted in red. The buttons can expand the controls into a two column mode using left button. The Input and Output controls can be temporarily hidden by pressing the right button.



Available Actions



Hide Residuals hides/shows the residual plot.



Hide POD Curve hides/shows the POD curve plot.



Hide Threshold hides/shows the POD Threshold curve plot.



Hide All Charts hides/shows all of the side charts.



Cycle Transforms cycles through all log-linear transform combinations for flaw and response data.



Export to Excel exports the data table plus additional information initially entered about the data including operator and specimen set into an Excel file.



Hide Data Table hides/shows the data table.



Refresh Charts runs the POD analysis on the data found in the table.



Insert Row inserts a new row below the currently selected row in the data table.



Delete Row deletes the currently selected row from the data table.



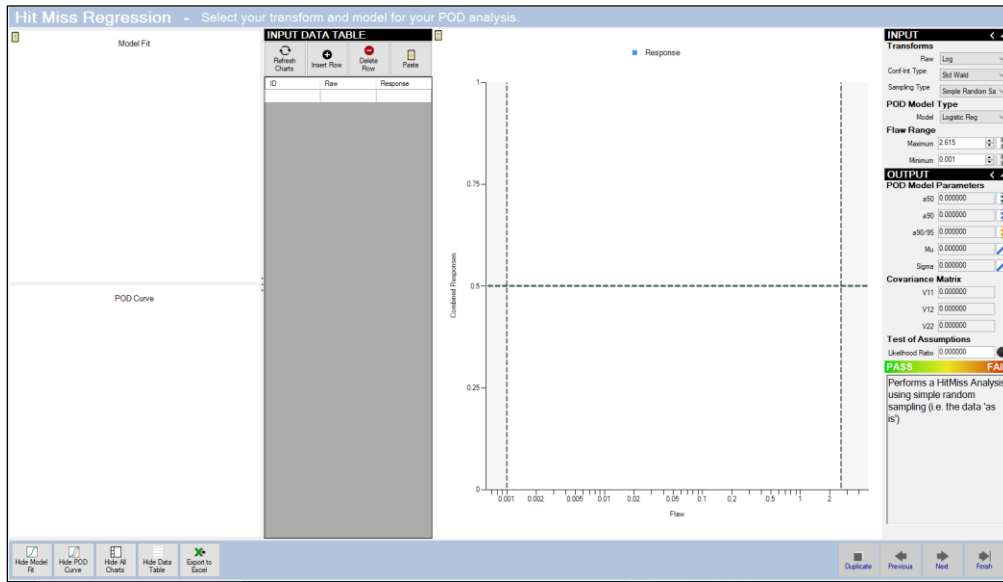
Paste pastes the data found on the clipboard into the data table.

Keyboard/Mouse Shortcuts

- **Ctrl + 1** - Press **Hide Residual** button to show/hide the residual plot.
- **Ctrl + 2** - Press **Hide POD Curve** button to show/hide the POD plot.
- **Ctrl + 3** - Press **Hide Threshold** button to show/hide the POD threshold plot.
- **Ctrl + 1 + Shift** - Show one side chart.
- **Ctrl + 2 + Shift** - Show two side charts.
- **Ctrl + 3 + Shift** - Show three side charts.
- **Ctrl + 1 + Shift + Alt** - Force the residual plot into view if visible.
- **Ctrl + 2 + Shift + Alt** - Force the POD plot into view if visible.
- **Ctrl + 3 + Shift + Alt** - Force the POD Threshold plot into view if visible.
- **Ctrl + 0** - Press **Hide All Charts** button to show/hide all side charts.
- **Ctrl + T** - Press **Cycle Transforms** button to cycle through all of the linear-log transform combinations.

- **Click Point on Regression Chart** - Shows context menu with value of the point and options to moves lines to that point, toggle the point from the analysis or toggle all points at that flaw size.
- **Click on Regression Chart** - Shows context menu with value at that location and options to move lines to that point.
- **Enter + Shift** (while table selected) - Move to the next cell.
- **Enter + Ctrl** (while table selected) - Runs the analysis on the data found in the table.
- **Ctrl + =** (while table selected) - Inserts a new row below the currently selected row.
- **Delete** (while table selected) - Deletes currently selected row.
- **Ctrl + V** (while table selected) - Copies data found on clipboard into the data table.

Hit Miss Quick Analysis



Overview

The hit miss quick analysis is designed to provide immediate feedback for an operator collecting data. It is not meant to replace a traditional POD analysis. As such, the input data is the only data that can be exported to Excel.

Tasks

Initial Inputs

POD v4.5 provides a way for the user to input ranges and meta-information before doing the quick analysis. Because the data being entered may be from a collection in progress, the user needs to input the ranges of the input data manually so the graphs can be setup properly. Below is an example of the initial input needed for a hit miss analysis.

Please provide information about the person collecting the data, the specimen set and instrument used.

Operator

Specimen Set Units

Please provide flaw range of the specimens used before continuing.

Specimens Flaw Range

Maximum

Minimum

Steps to Filling out Initial Inputs

1. Fill in operator's name.
2. Select previously entered specimen set name or type in a new one.
3. Specify the unit of the specimen set.
4. Set the specimen's flaw range.
5. Hit the **Apply** button.

Tips for Filling out Initial Inputs

- The additional information inputted about the data initially will be exported along with the input data if the user decides to export the quick analysis to an Excel file.
- POD v4.5 remembers ranges and units of previously used specimen sets so this part of the analysis can be finished as quickly as possible.

Entering Table Data

Data can be entered by hand or pasted into the table located on the left side of the window.

Steps to Entering Table Data Manually

1. Click on a cell of the all-white input row of the data table.
2. Enter the appropriate value for the selected cell.
3. Input the values for the remaining cells.
4. Repeat steps 1 through 3 until all data is entered.
5. Press **Refresh Charts** button.

Tips for Entering Table Data Manually

- The specimen ID column will be auto-generated if you do not enter it.
- Press **Enter** to move to the next row.
- Press **Enter + Shift** to move to the next cell. Auto-generated IDs will be skipped.
- Use the arrow keys to navigate the table.
- Press **Insert Row** to insert a new row below the currently selected row.
- Press **Delete Row** to delete the currently selected row.
- Press **Refresh Charts** to analyze the data in the table.

Steps to Pasting Data into the Table

1. Open Excel file with the data you want to paste into the quick analysis.
2. Highlight the data without headers.
3. Copy the data to the clipboard.
4. Press **Paste** button.
5. Press **Refresh Charts** button.

Tips for Pasting Data into the Table

- The specimen ID column will be auto-generated if you do not paste it.
- Press **Enter** to move to the next row.
- Press **Enter + Shift** to move to the next cell. Auto-generated IDs will be skipped.
- Use the arrow keys to navigate the table.
- Press **Insert Row** to insert a new row below the currently selected row.
- Press **Delete Row** to delete the currently selected row.
- Press **Refresh Charts** to analyze the data in the table.

Hit Miss Regression Input Controls

On the far right side is where you will find all of your input controls. This includes your flaw transform, model (link function) and flaw range.

Steps to Changing Numeric Input Values (Three Methods)

1. Changing numeric value by typing in the value
 - a. Click on the numeric input on the right side that you want to change.
 - b. Type in the new numeric value.
 - c. Press enter.
2. Changing numeric values by dragging lines
 - a. Move mouse over one of the lines on the regression chart.
 - b. Hold down the left mouse button while dragging the line.
 - c. Move to new location of the chart.
 - d. Let go of the left mouse button.
3. Changing numeric values by clicking on the chart
 - a. Move mouse to where you want the line to be on the regression chart.
 - b. Left click on the chart.
 - c. Select the corresponding menu item from the context menu.

Tips for Changing Numeric Input Values

- For the Flaw Range line pairs, lines will automatically update when dragged over each other. For example, the Flaw Minimum line will become the Flaw Maximum line when dragged higher the Flaw Maximum line.

Steps for Changing Your Transform or Model

1. Click on the Flaw or Model dropdown control from the right side.
2. Select the new transform or model.

Tips for Changing Your Transforms

- Inverse transform is rarely used and can result in a long POD calculation time if used incorrectly.

Steps for Toggling Data Points

1. Move mouse over the data point you want to toggle.
2. Right click on the data point.
3. Select *Toggle Response On/Off* or *Toggle All Response* from the context menu.

Considerations When Toggling Data Points

- Data points should only be toggled when there is proper justification for removing them.
- POD v4.5 still displays a semi-transparent POD and Threshold curve of the analysis results without the points removed.
- The analysis is not considered finished until a comment is provided for each point describing why it was removed. This is done on the next step.

Tips for Toggling Data Points

- Large sections of points can be removed by changing the Response Range of the analysis.

Steps for Resizing Left Side Charts

1. Move mouse over the vertical resizing bar next to the side charts.
2. Hold down the left mouse button.
3. Move the bar left or right depending on the size of charts you want.
4. Once the desired chart size is shown, let go of the left mouse button.

Tips for Resizing Left Side Charts

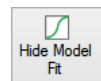
- The process of resizing the charts includes a message to tell you when you have moved the mouse far enough.
- Resizing is organized by the number of charts to display at once with a range of 1 to 6 charts.
- Charts can be hidden if not needed.
- Charts can be scrolled to there are more charts visible than viewable.
- Keyboard shortcuts are also available for resizing and hiding the side charts.

Resizing Right Side Controls

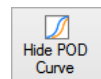
For low resolution screens, the right side controls may need to be resized due to lack of vertical space. This can be done by pressing one of the buttons located next to main Input and Output labels as highlighted in red. The buttons can expand the controls into a two column mode using the left button. The Input and Output controls can be temporarily hidden by pressing the right button.



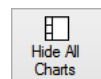
Available Actions



Hide Model Fit hides/shows the model fit plot which uses the proportions of all inspections at each flaw size.



Hide POD Curve hides/shows the POD curve plot.



Hide All Charts hides/shows all of the side charts.



Export to Excel exports the data table plus additional information initially entered about the data including operator and specimen set into an Excel file.



Hide Data Table hides/shows the data table.



Refresh Charts runs the POD analysis on the data found the in the table.



Insert Row inserts a new row below the currently selected row in the data table.



Delete Row deletes the currently selected row from the data table.



Paste pastes the data found on the clipboard into the data table.

Keyboard/Mouse Shortcuts

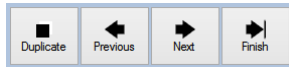
- **Ctrl + 1** - Press **Hide Model Fit** button to show/hide the residual plot.
- **Ctrl + 2** - Press **Hide POD Curve** button to show/hide the POD plot.
- **Ctrl + 1 + Shift** - Show one side chart.
- **Ctrl + 2 + Shift** - Show two side charts.
- **Ctrl + 1 + Shift + Alt** - Force the model fit plot into view if visible.
- **Ctrl + 2 + Shift + Alt** - Force the POD plot into view if visible.
- **Ctrl + 0** - Press **Hide All Charts** button to show/hide all side charts.
- **Click Point on Regression Chart** - Shows context menu with value of the point and options to moves lines to that point, toggle the point from the analysis or toggle all points at that flaw size.
- **Click on Regression Chart** - Shows context menu with value at that location and options to move lines to that point.
- **Enter + Shift** (while table selected) - Move to the next cell.
- **Enter + Ctrl** (while table selected) - Runs the analysis on the data found in the table.
- **Ctrl + =** (while table selected) - Inserts a new row below the currently selected row.
- **Delete** (while table selected) - Deletes currently selected row.
- **Ctrl + V** (while table selected) - Copies data found on clipboard into the data table.

Navigation Options

There are two ways to navigate POD v4.5. Each one will be explained. Choose the method that you like best.

Main Navigation Buttons

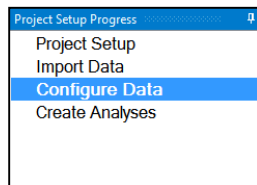
The navigation buttons shown below are located at the bottom right corner of every step. They are the simplest way to navigate POD v4.5 and will be what most new users of POD v4.5 use.



Besides navigation, the buttons also include a button for duplicating the current analysis. This allows you to use different analysis settings on a data set without worry of losing your original input and output values. The duplicated analysis must have a unique name.

Progress List

The progress list is located in the upper left corner of the main window. It displays all of the steps that need to be completed. You can instantly jump to any step on the list by clicking on the item in the list. An example progress list is shown below. Notice that the current step is highlighted.



Available Actions



Duplicate duplicates the current analysis and adds it to the project.



Previous returns to the previous step.



Next goes to the next step.



Finish attempts to traverse through each step automatically until it finishes all steps or runs into an error.

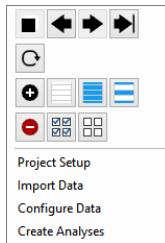
Keyboard/Mouse Shortcuts

- **Ctrl + Alt + D** - Press **Duplicate** button to duplicate the current analysis.
- **Ctrl + P** - Press **Previous** button to return previous step.
- **Ctrl + N** - Press **Next** button to go to next step.
- **Ctrl + F** - Press **Finish** button to finish the current sequence of steps.
- **Mouse Click** - Click on any item in the progress list to jump to that step.

Minimizing Mouse Travel

If you do not want to have to move your mouse to the bottom of the window every time you want to navigate between steps or perform any of the step's actions, you can use the context menu to do all of that as well.

Right click anywhere on the step to reveal a context menu that has the actions and navigations buttons for the current step. Below is an example of a context menu.



Notice that in addition to providing all of the actions and navigation buttons, it provides the progress list so you can also jump to any step.

After clicking on a button, the context menu will not close. This allows you to do repeated presses without having to perform a right click again. This feature also includes navigation buttons. When moving to a new step, the context menu will remain open and the buttons will be updated to reflect the current new step.

All of these features together make using the software very efficient with the mouse even if the user interface doesn't initially look mouse friendly. In addition to keyboard shortcuts, this is probably the most important thing a power user of POD v4.5 can learn.

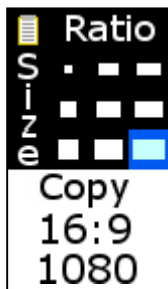
Exporting Charts to the Clipboard

Every chart in POD v4.5 can be copied onto the clipboard to be pasted into Word, PowerPoint or other software that accepts images. The images have been optimized for PowerPoint to look as crisp as possible after pasting them.

When you move your mouse over any of the charts you will notice a clipboard icon appear in the upper left corner of the chart. The icon is shown below.



To open the chart export user interface, move your mouse over the clipboard icon. That will force the interface shown below to appear.



The interface contains a 3x3 grid of rectangles. Each rectangle represents a size and aspect ratio that the chart be set to when it is copied to the clipboard. To copy an image to the clipboard for a given size, click on the corresponding rectangle. To close the user interface, move your mouse away from the area.

Image Resolutions of Exported Charts

Below is a table showing all possible image resolutions.

Aspect Ratio	Size	Final Resolution
1:1	480	480x480
4:3	480	640x480
16:9	480	854x480
1:1	720	720x720
4:3	720	960x720
16:9	720	1280x720
1:1	1080	1080x1080
4:3	1080	1440x1080
16:9	1080	1920x1080