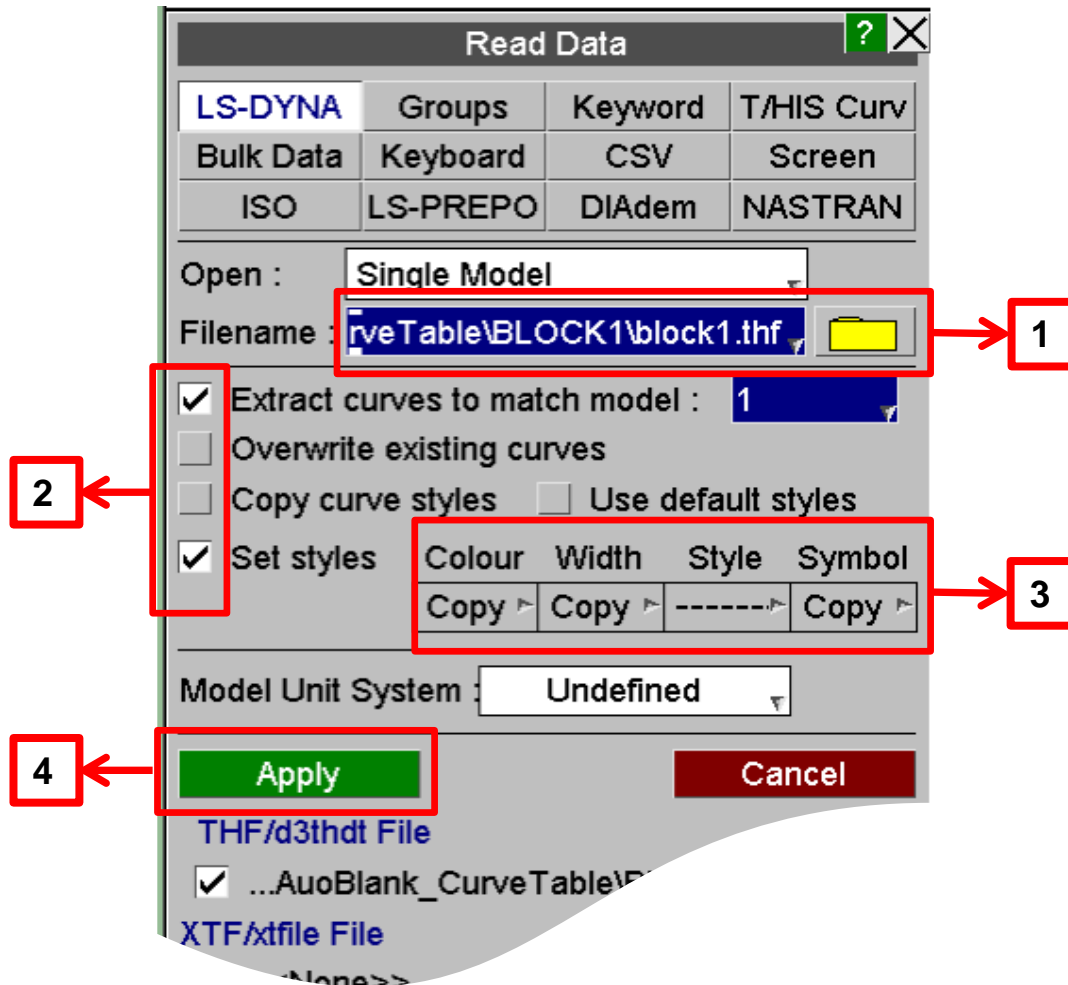


T/HIS Top-tips

- [Extracting Curves to Match Model](#)
- [Auto Blank](#)
- [Changing Model Prefix](#)
- [Creating More Graphs](#)
- [Curve Management](#)
- [Fast-TCF & Multiple Models](#)
- [Digitizing Curves](#)
- [Editing Curves](#)
- [Curve History](#)
- [Datum Lines](#)
- [Shortcuts & Quick Pick](#)
- [Graph Settings](#)
- [Units](#)
- [Line Style](#)
- [Ergonomics](#)

EXTRACTING CURVES TO MATCH MODEL

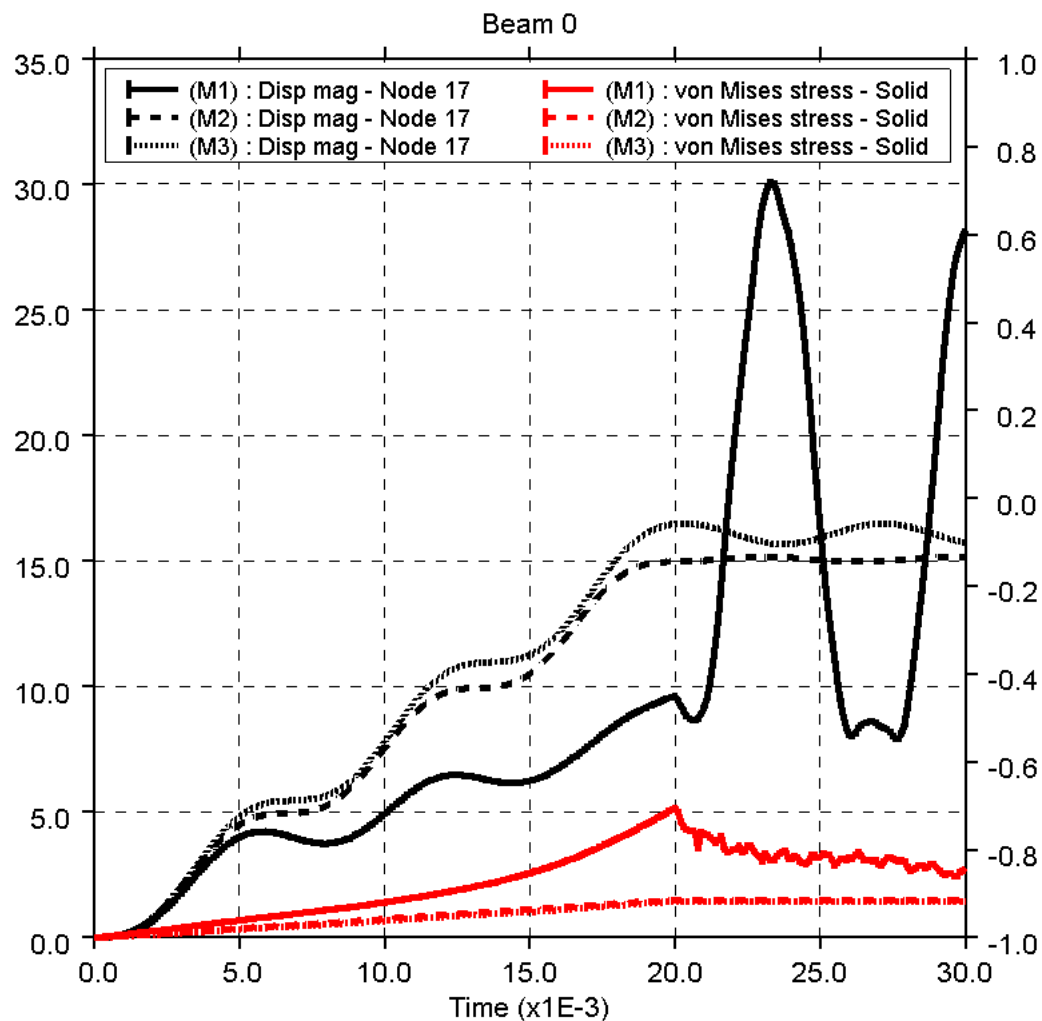


- After reading in a model and picking the curves you wish to plot, click on New Model. You can then read in results from other runs and plot the same variables by following these steps.

- The set styles option allows the user to define the properties of the next set of curves.

Extract curves to match model

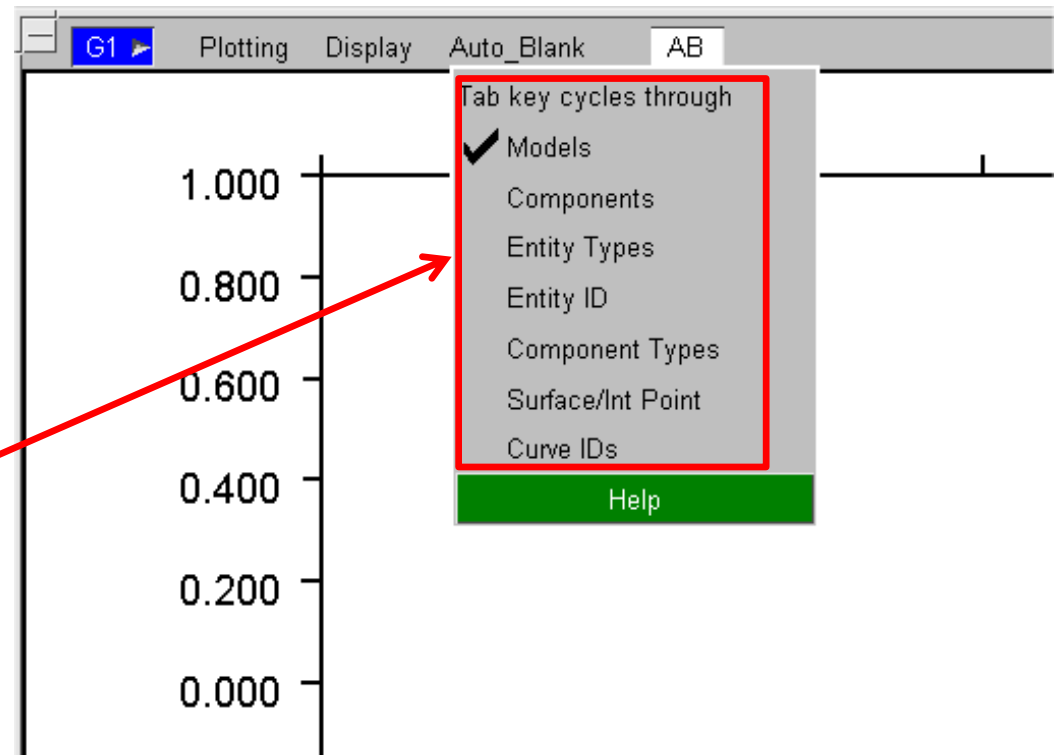
T/HIS

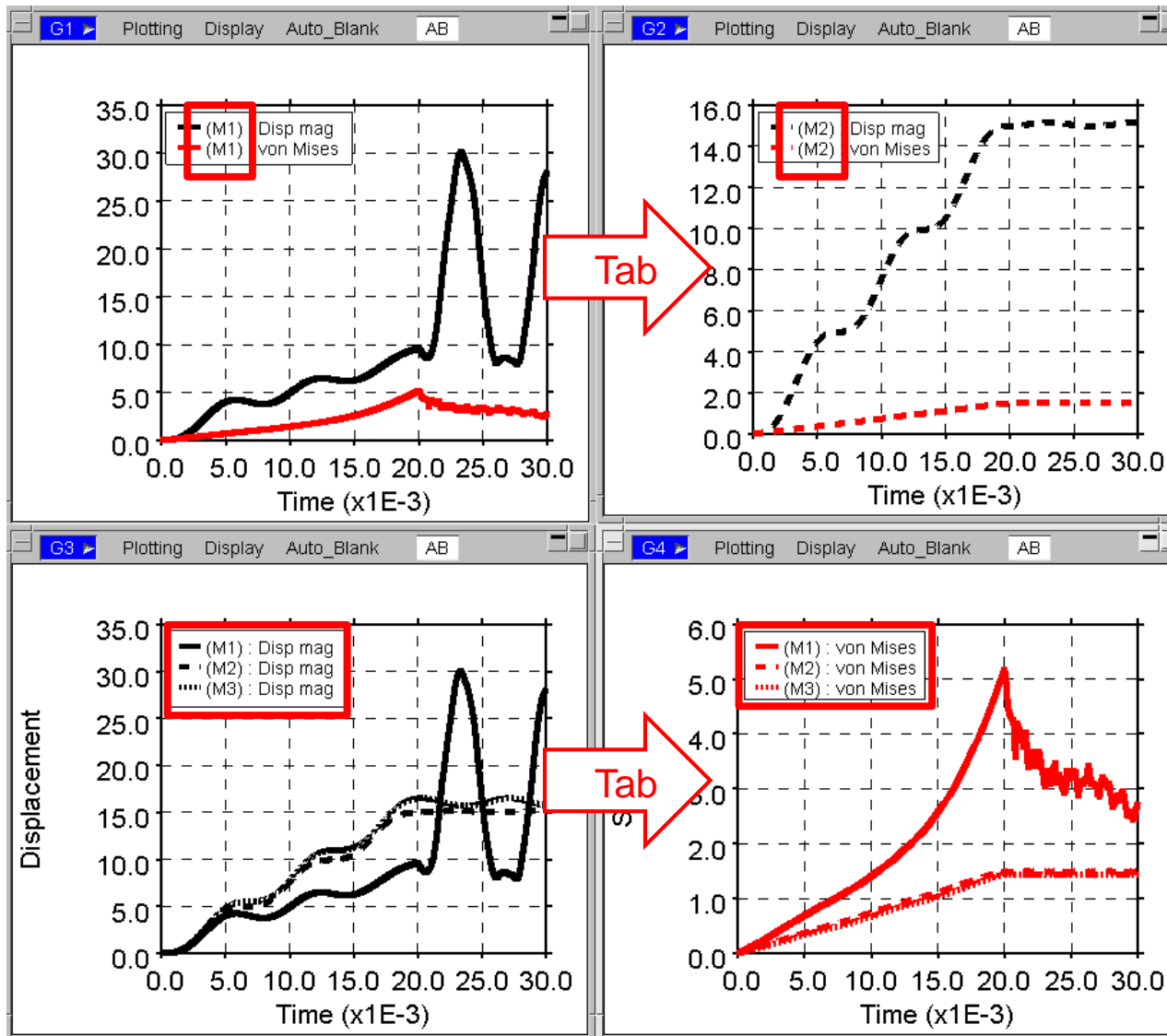


- The result is a set of curves comparing the same results for different model runs.
- Each has its own line style as set in step 3.

AUTO-BLANK

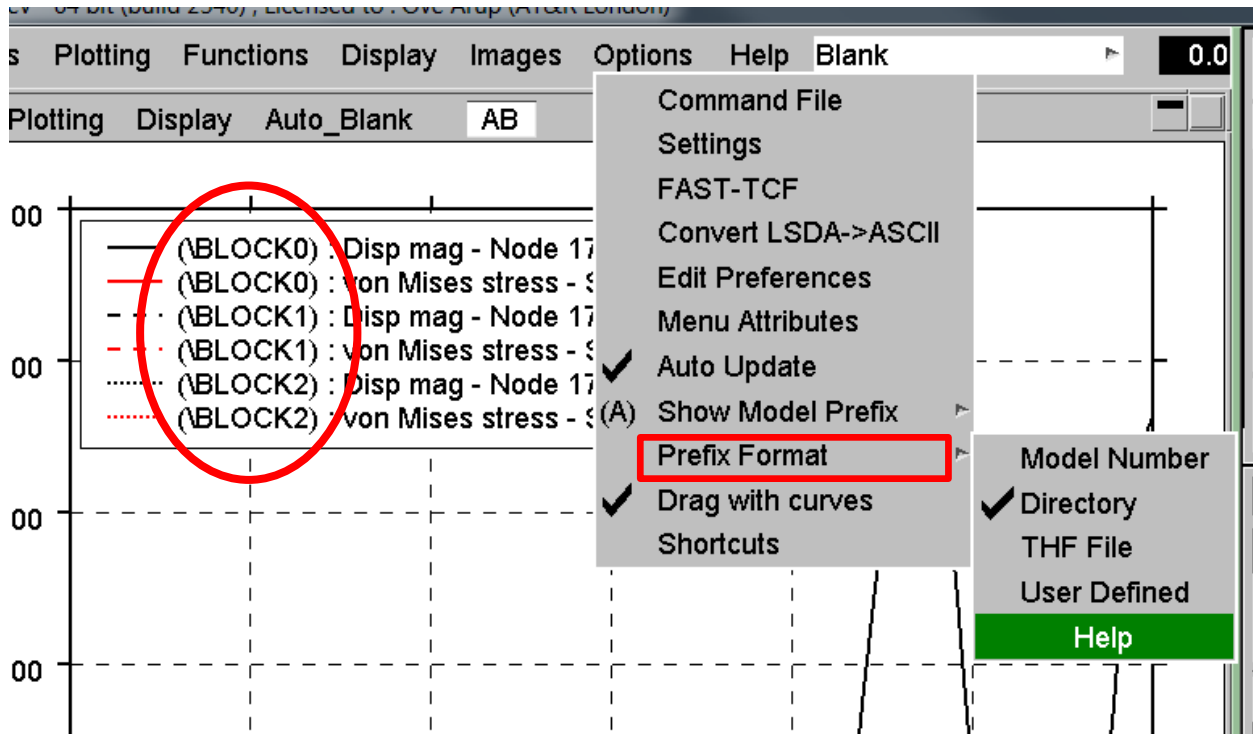
- The Auto Blank menu controls the variable which the Tab key cycles through.
- Pressing the tab key will change the blanking of curves according to the criterion selected in the popup menu.





- E.g. use Tab key to cycle between Models and Components.

CHANGING MODEL PREFIX



- Under Options -> Prefix Format the user can change the prefix from the default (Model Number) to the directory, the filename, or add a custom name.
- This makes it easier to differentiate between each curve.

CREATING MORE GRAPHS

Create More Graphs

T/HIS



1

2. Type in the number of graphs to create, then click on Create Graphs.

3. The new graphs are added to the Display window.

CURVE MANAGEMENT

- The curve table can be accessed from the Curve Manager by clicking on “Table”:

ID	Label/Group Name	Model/File	Type	Entity ID	Component	Style
1	Disp mag - Node 17	1	Node	17	Disp mag	—▲—
2	von Mises stress - Solid 57	1	Solid	57	von Mises stress	—■—
3	Disp mag - Node 17	2	Node	17	Disp mag	---◇---
4	von Mises stress - Solid 57	2	Solid	57	von Mises stress	---X---
5	Disp mag - Node 17	3	Node	17	Disp mag	...X...
6	von Mises stress - Solid 57	3	Solid	57	von Mises stress	...○...
1	Model_1	N/A	GROUP	*	*	Mixed
2	Model_2	N/A	GROUP	*	*	Mixed
3	Model_3	N/A	GROUP	*	*	Mixed

- Rows can be sorted by clicking on the column headers.
- Columns can be moved to different positions in the table by dragging column header to the desired position.

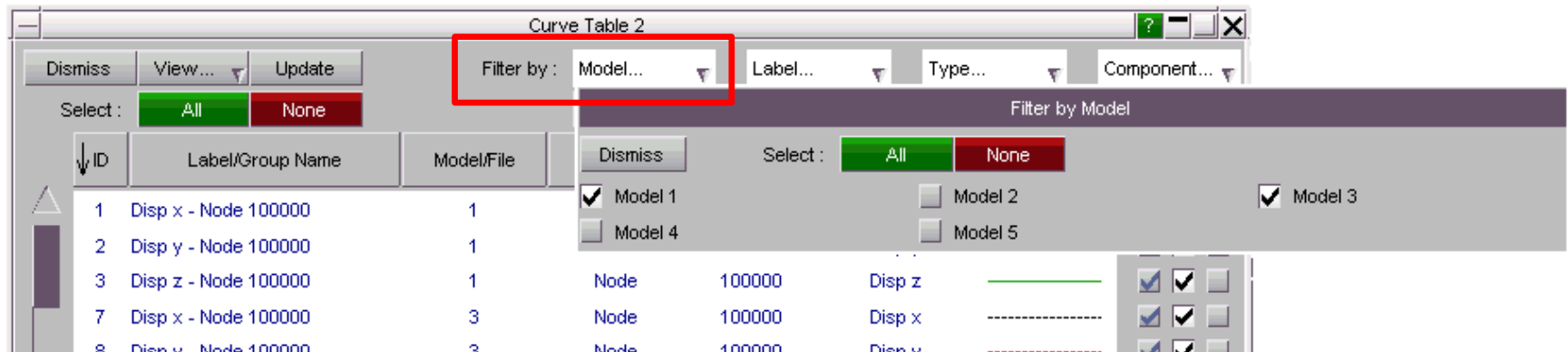
Curve Table						
Dismiss		View...	Update	Filter by :		
				Model...	Label...	Type...
Select :		All	None	Clear All Filter Options		
ID	Label/Group Name	Model/File	Type	Entity ID	Component	Style
1	Disp mag - Node 17	1	Node	17	Disp mag	
2	von Mises stress - Solid 57	1	Solid	57	von Mises stress	
3	Disp mag - Node 17	2	Node	17	Disp mag	
4	von Mises stress - Solid 57	2	Solid	57	von Mises stress	
5	Disp mag - Node 17	3	Node	17	Disp mag	
6	von Mises stress - Solid 57	3	Solid	57	von Mises stress	
1	Model_1	N/A	GROUP	*	*	Mixed
2	Model_2	N/A	GROUP	*	*	Mixed
3	Model_3	N/A	GROUP	*	*	Mixed

* 1 2 3 4

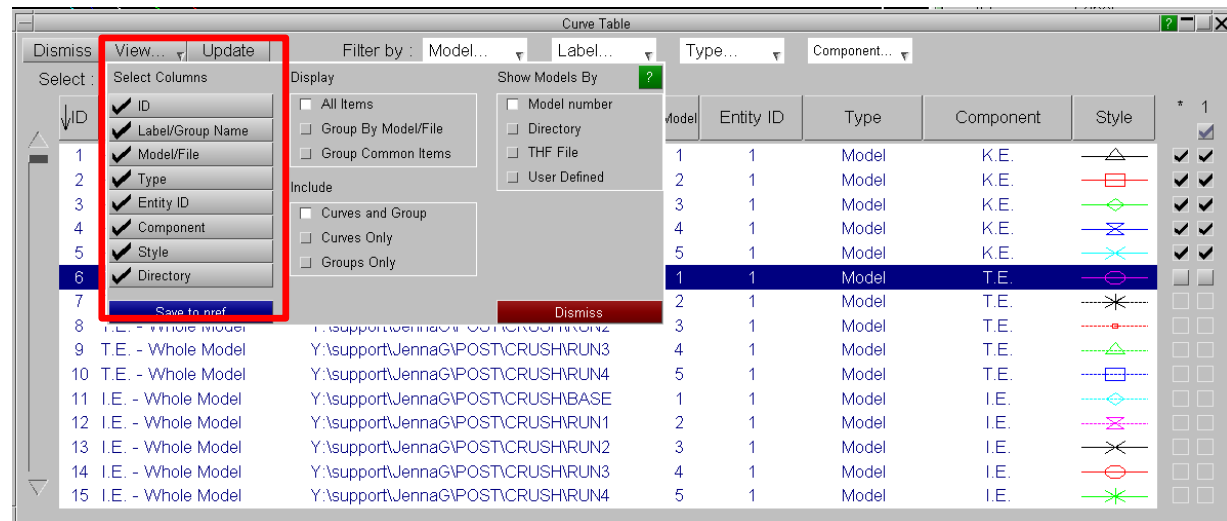
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- Graphs can be populated by ticking and un-ticking each curve or group in the right hand side menu.
- Each column represents a graph in the T/HIS window.

- The contents can be filtered using different options

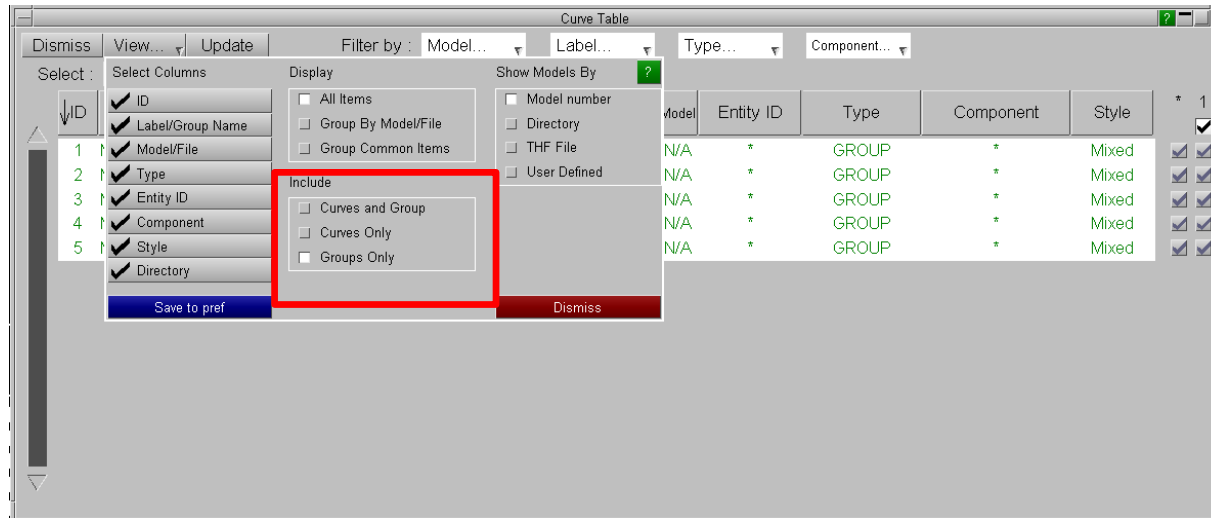


- The user can select which columns should be displayed in the table. For example, you can choose to view directory.



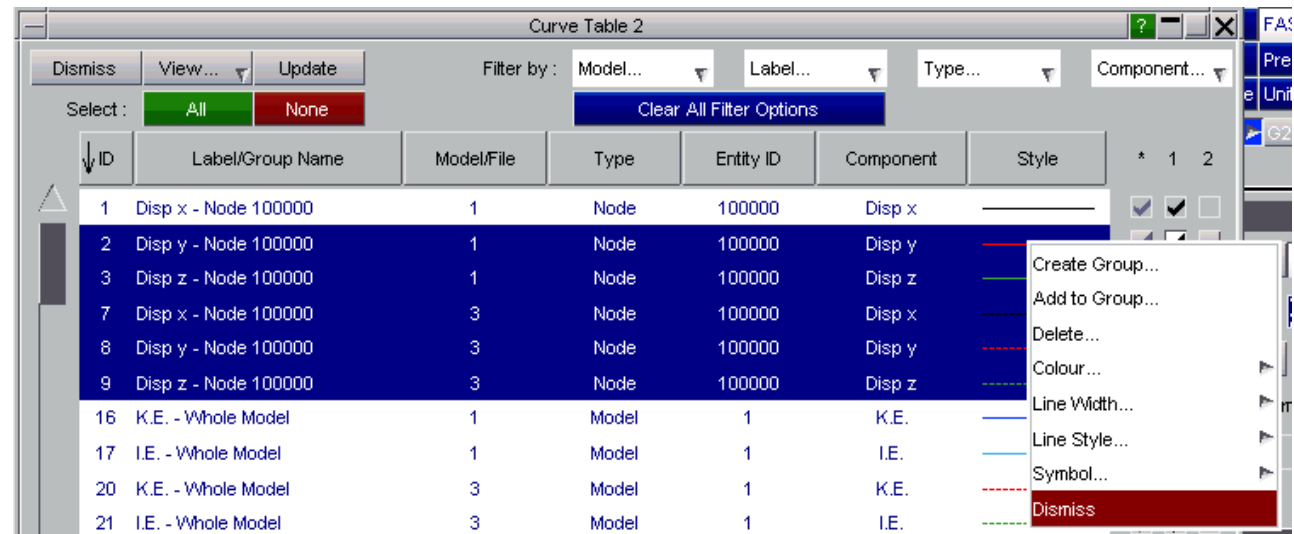
Curve Table

T/HIS

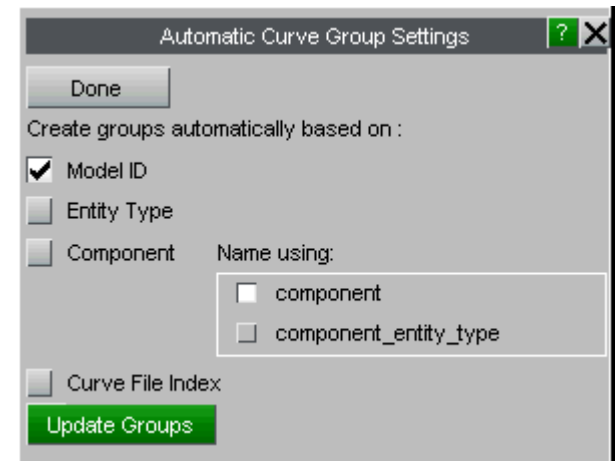
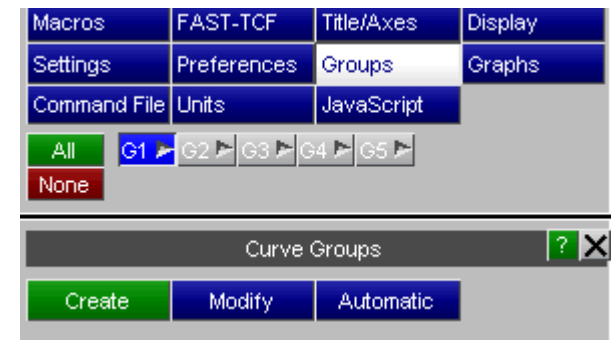


- T/HIS automatically includes Curves and Groups to the curve table by default. It is now possible to select 'Curves Only' and 'Groups Only'.
- These options can also be saved to preferences.

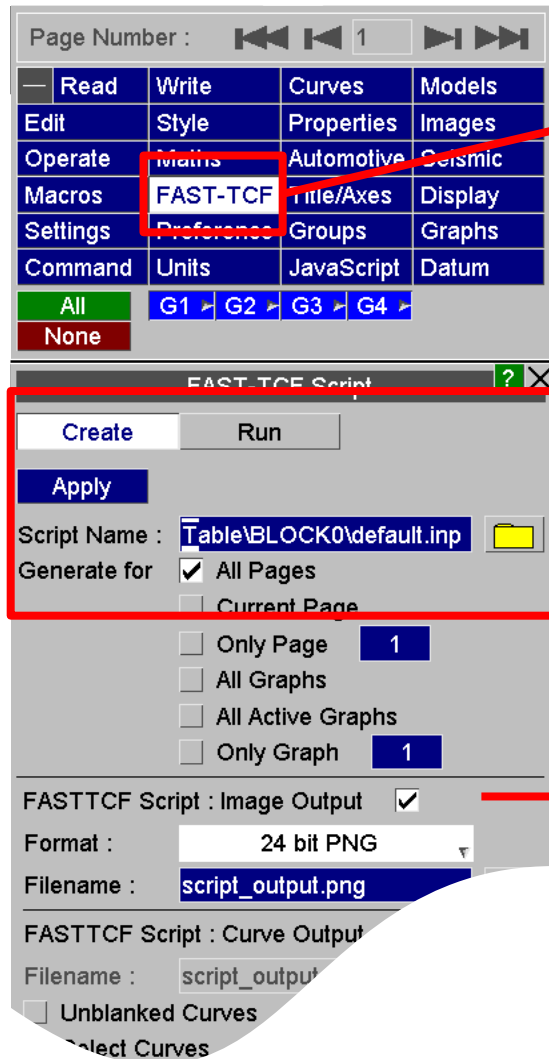
- Curves can be deleted, grouped or modified once selected in the table.



- The Curve Groups menu contains an option to control the creation of automatic curve groups. These groups can then be used to select curves used in operations or to control the blanking and unblanking of curves.
- By default T/HIS will automatically create a curve group for each model and place any curves from that model in the group.
- Groups can also be created based on
 - Entity Type
 - Component
 - Index in curve file
- Groups can be created after curves have been read in by using “Update Groups”
- Preference options can be used to set the default groups that are created.



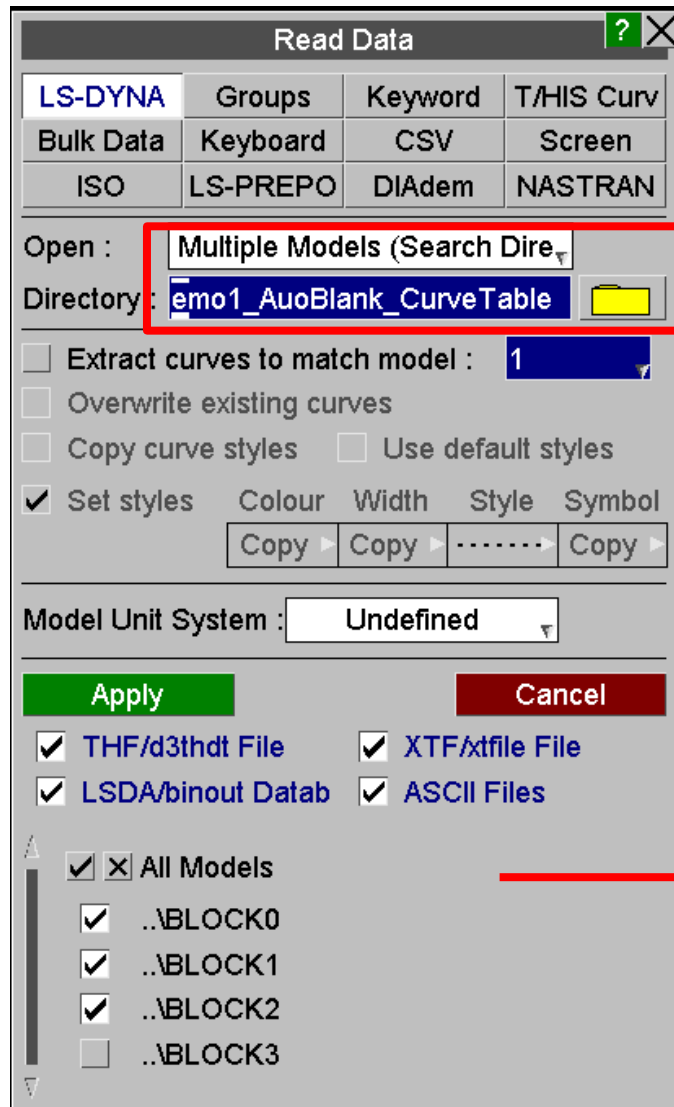
FAST-TCF & MULTIPLE MODELS



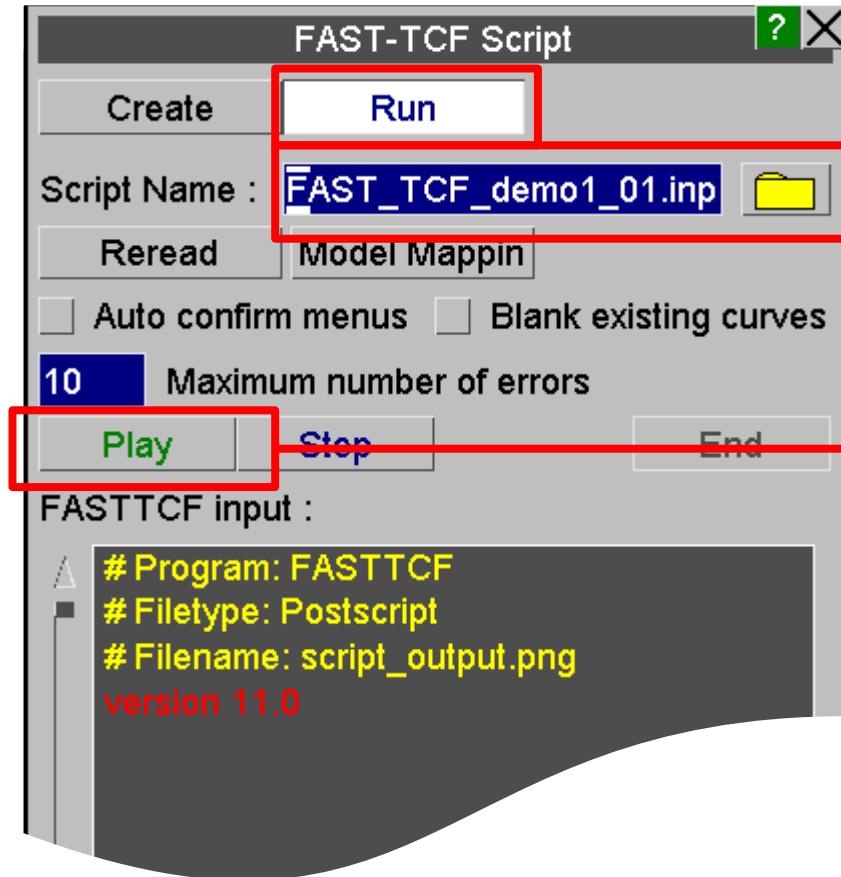
- FAST-TCF creates a .inp file which allows the user to regenerate all curves.

- Press Create and give the script a name, then press apply.

- Other options can be set in order to generate image files with the results from the script.



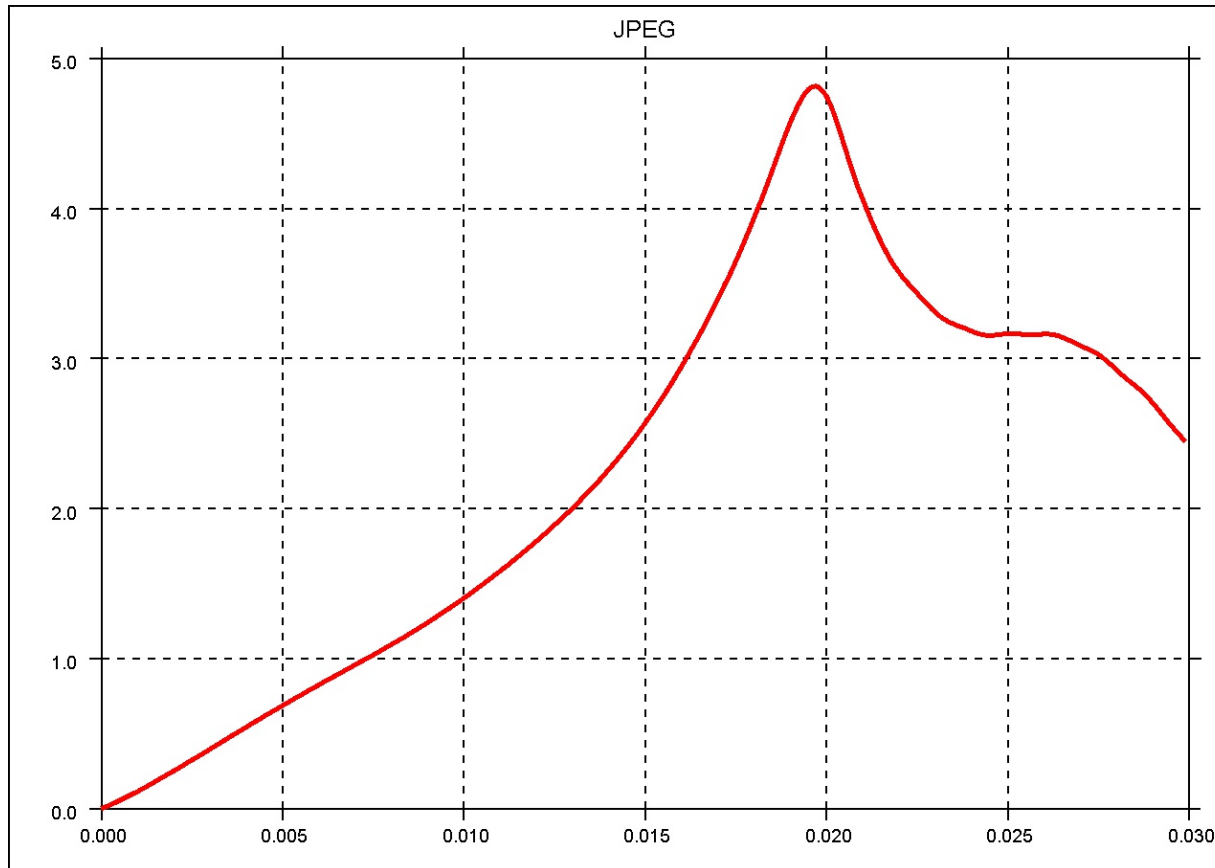
- Open a new session of T/HIS.
- In the READ menu, it is possible to open several models at once by selecting “Multiple Models (Search Directory)” in the drop down menu. Then searching for the directory that contains all the models you wish to open.
- Then select the models needed. In the example above only 3 models are in use so Block 3 is not selected.



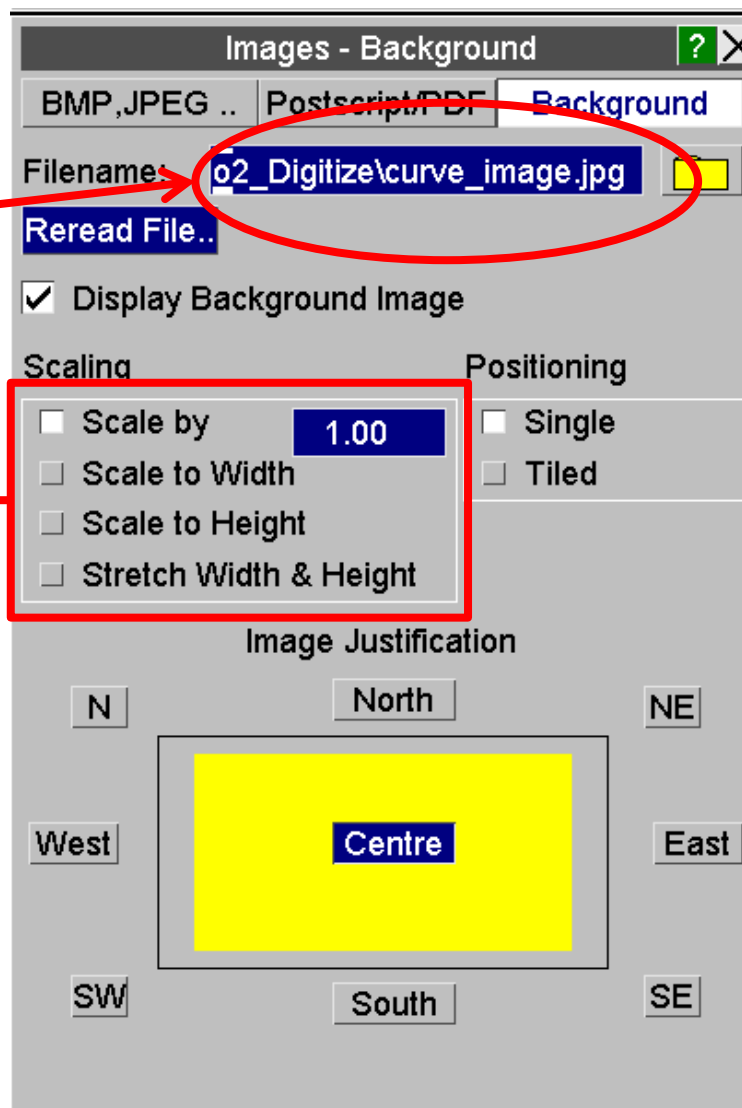
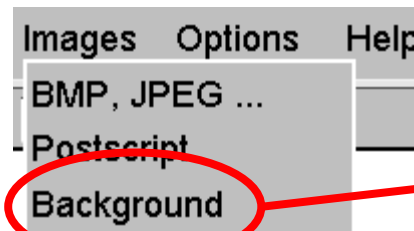
- Click on “Run” and then select the .inp script you saved in the previous step.
- Press Play and watch T/HIS regenerate all the curves as before!

DIGITIZING CURVES

Image File:



- It is possible to digitize a curve taken from a image file (like the one to the left) by using T/HIS “Background” and “Read->Screen” options.

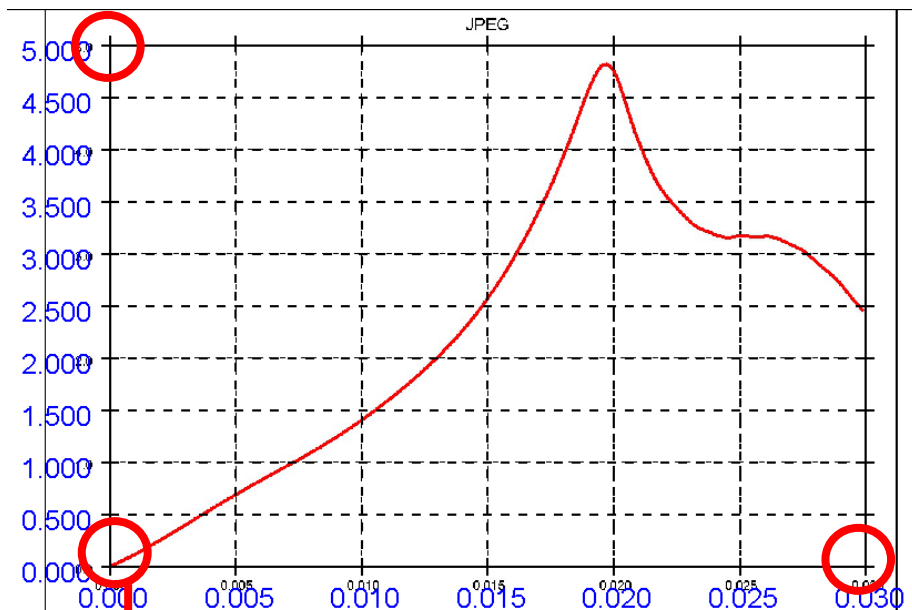
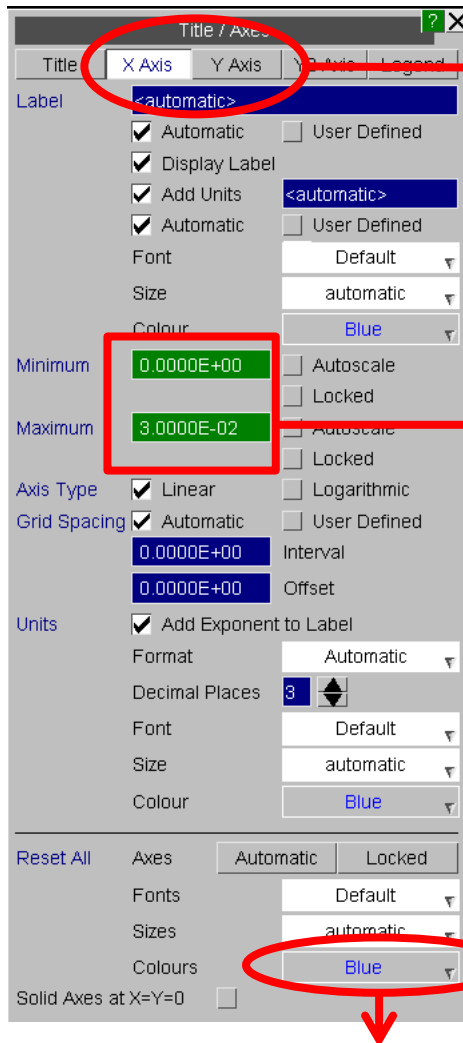


- Use the scaling options to make sure the figure is visible in the T/HIS display area.

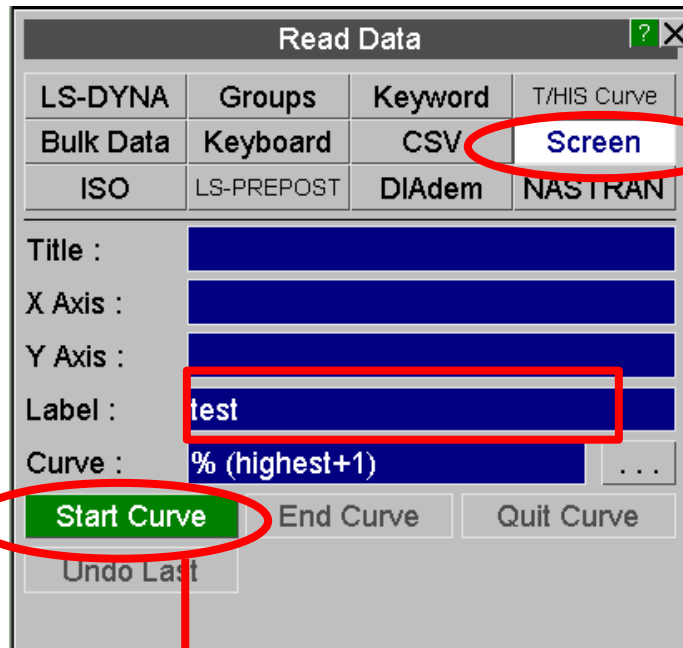
- Pick the curve that is to be Digitized as the background.

Digitizing Curves

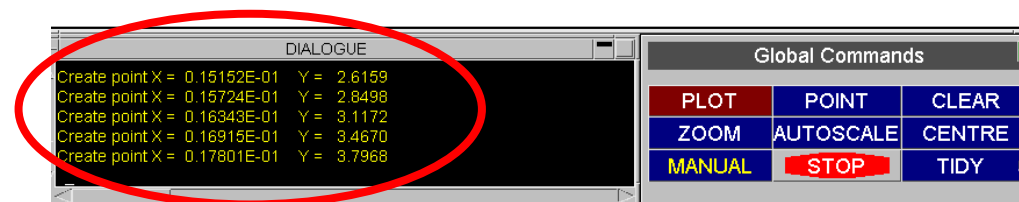
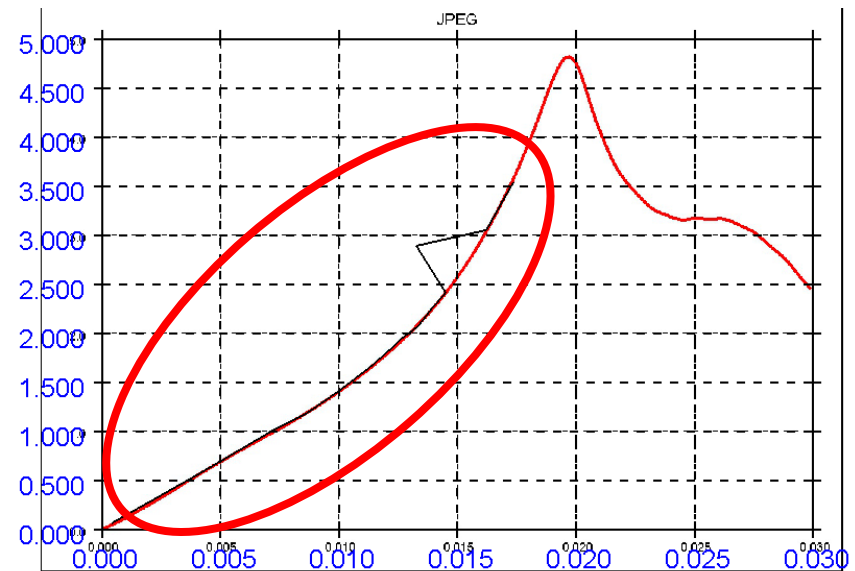
T/HIS



3. Make both axis a distinctive colour.



- Using the Screen option in the Read menu, give your curve a Label and click on Start Curve.



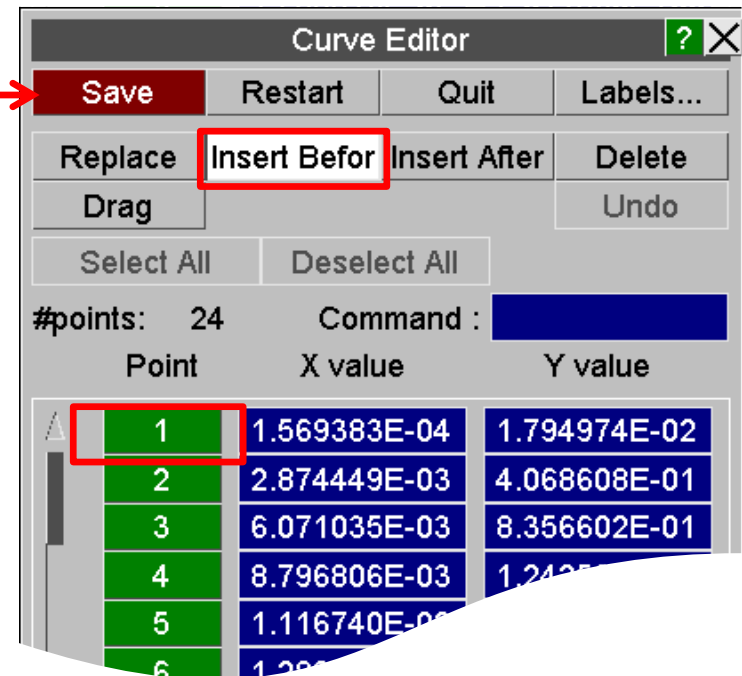
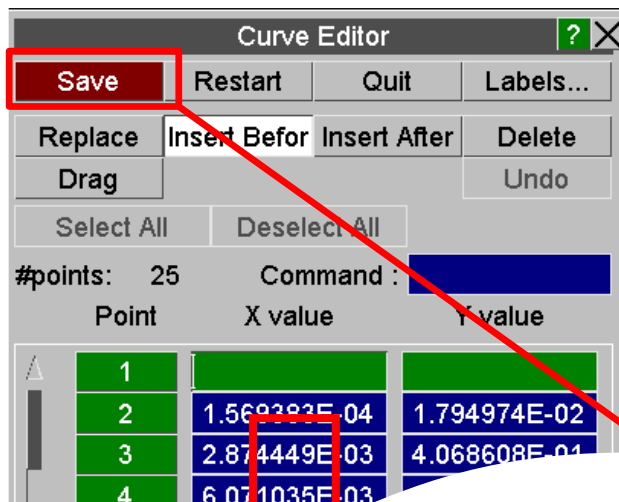
- Click on points inside the axis (along the curve), T/HIS creates these points in as a new curve. When done, click on End Curve in the Read menu. If a mistake is made it's possible to click on Undo Last to remove the point.

EDITING CURVES

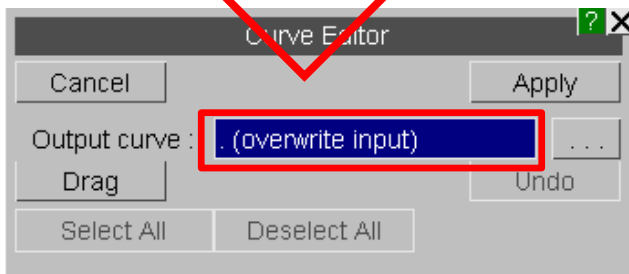
EDIT – Adding Points

T/HIS

1. To add the (0,0) point, select “Insert Before” and then click on the first point. This will create a new line and shift all the other points down.



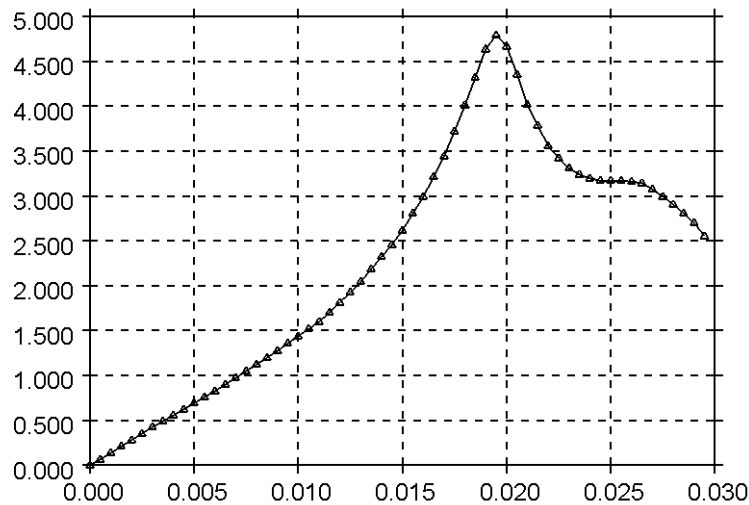
2. After inserting the new points click on “Save” and Output the curve to “Overwrite input” so that it is not saved as a new curve (or type “.” and enter in the text box).
3. Remember to click on Apply.



Regularize Curve

When picking points on the screen it is likely they are not evenly distributed.

1. In order to regularize the curve use the “Automotive” function “REG”.
2. Set the desired interval for points in the x-axis
3. Pick the curve to be Regularized.
4. Press Apply.



The old points are deleted and new ones are evenly distributed along the x-axis.

T/HIS

Page Number : ⏪ ⏩ 1 ⏴ ⏵

Read	Write	Curves	Models
Edit	Style	Properties	Images
Operate	Maths	Automotive	Seismic
Macros	FAST-TCF	Title/Axes	Display
Settings	Preference	Groups	Graphs
Command	Units	JavaScript	Datum

All G1
None

<< Undock Automotive ? ×

C60	C180	C600	C1000	BUT	BUT(p)
FIR	HIC	HIC(d)	3ms CLI	EXC	VC
ASI	THIV	NIJ	TTI	NOR (y	NOR (x
REG	VEC	VEC(2d	ACU	COR1	COR2
COR3					

☒ Copy Style from Input to Output Curve
50000E-03 New X axis interval (dt)

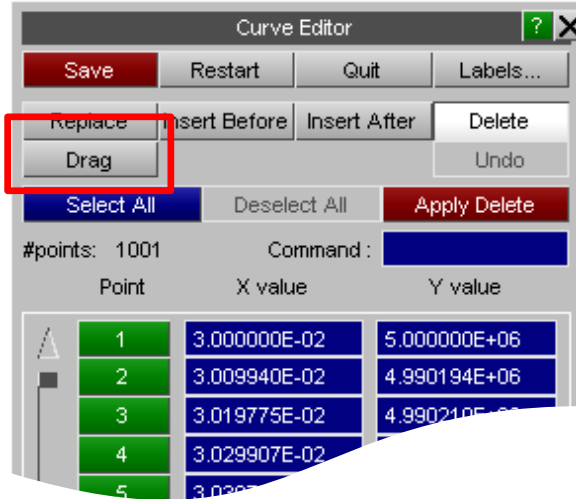
Apply Output (overwrite input) ...

Group 1:# All None Visible(Pick

Filter... Show Groups Key in: ?

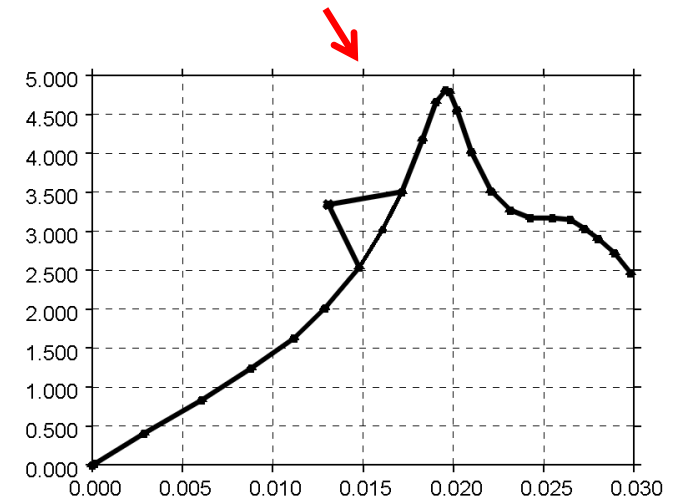
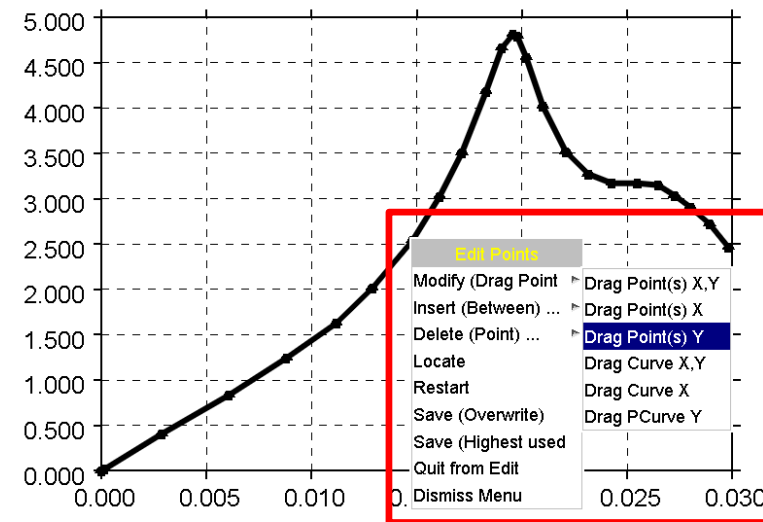
#1 : Digitized

→ Digitized (Reg)



The Edit menu has an option to “Drag” points manually.

1. Click on “Drag” and with the right-hand button select the points to be moved.
2. Move the points to their new location. It’s then possible to “Undo”, “Restart” or “Save” the new curve.



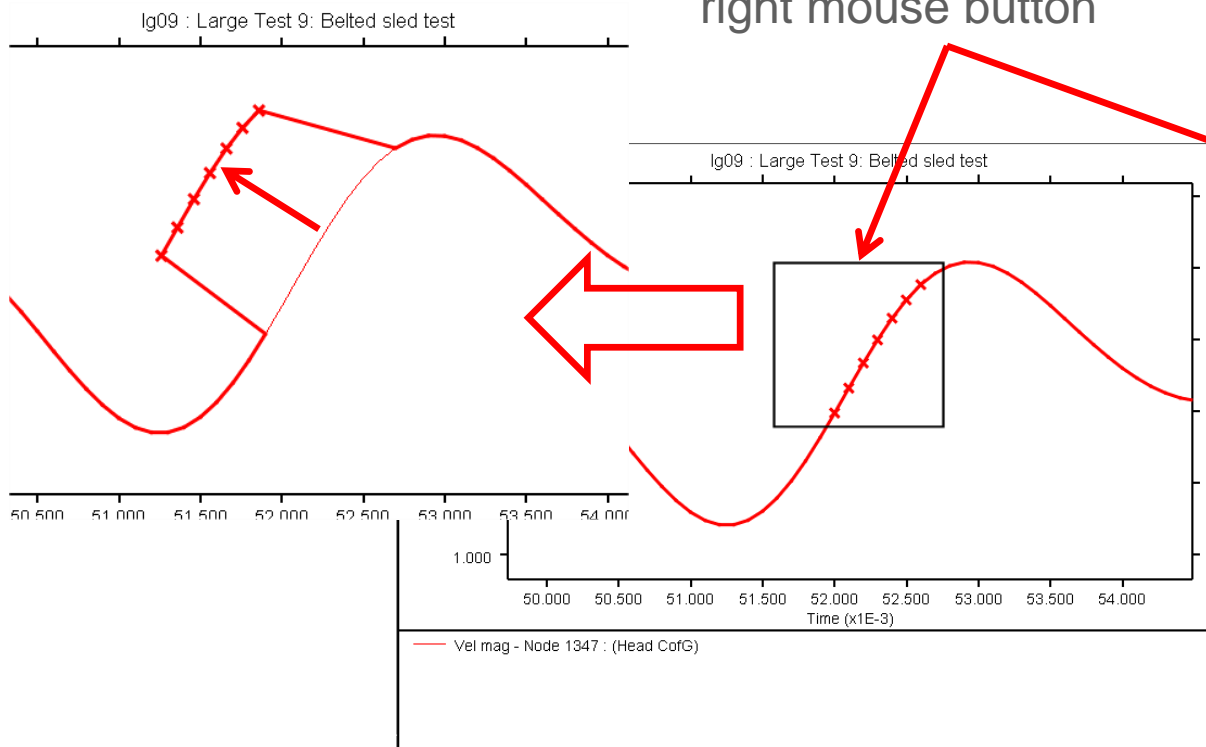
Right-clicking on the points also brings up a menu to specify the direction of dragging, such as only in the Y-direction.

EDIT – Dragging Multiple Points

T/HIS

Multiple curve points can now be selected and dragged in one operation.

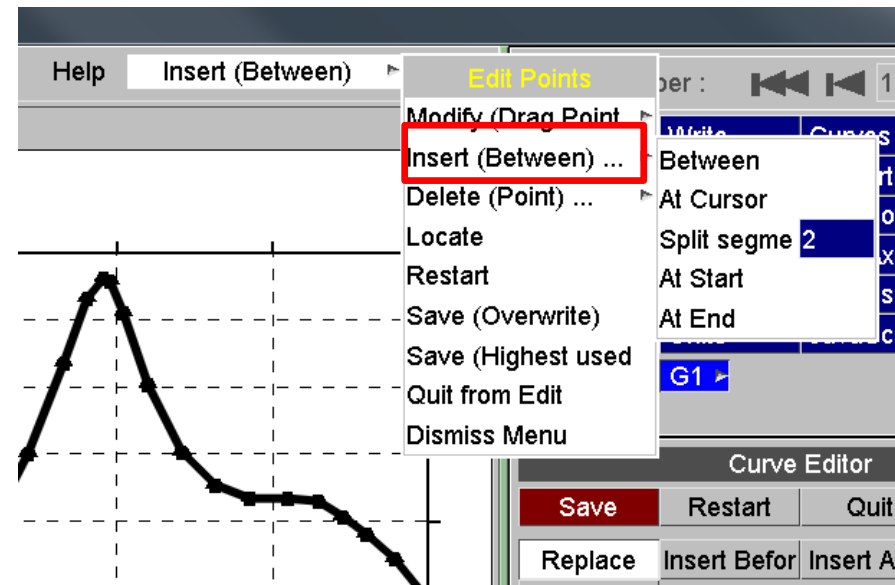
Points can be selected in the menu or by dragging out an area using the right mouse button



Curve Editor			
Save	Restart	Quit	Labels...
Replace	Insert Before	Insert After	Delete
Drag	Undo		
Select All	Deselect All		
#points: 1001	Command :		
Point	X value	Y value	
515	5.139808E-02	1.235265E+03	
516	5.149940E-02	1.298375E+03	
517	5.159774E-02	1.389004E+03	
518	5.169906E-02	1.509807E+03	
519	5.179741E-02	1.649619E+03	
520	5.189873E-02	1.811491E+03	
521	5.200005E-02	1.985004E+03	
522	5.209840E-02	2.157842E+03	
523	5.219972E-02	2.333443E+03	
524	5.229806E-02	2.495005E+03	
525	5.239939E-02	2.646269E+03	
526	5.249773E-02	2.773480E+03	
527	5.259905E-02	2.880491E+03	
528	5.269739E-02	2.958564E+03	
529	5.279871E-02	3.011212E+03	
530	5.290004E-02	3.035723E+03	
531	5.299838E-02	3.033800E+03	
532	5.309970E-02	3.007575E+03	
533	5.320005E-02	2.960429E+03	

A quick way of inserting new points into a curve is using the Quick Pick Menu. In the drop down list select Insert, then pick one of the five options:

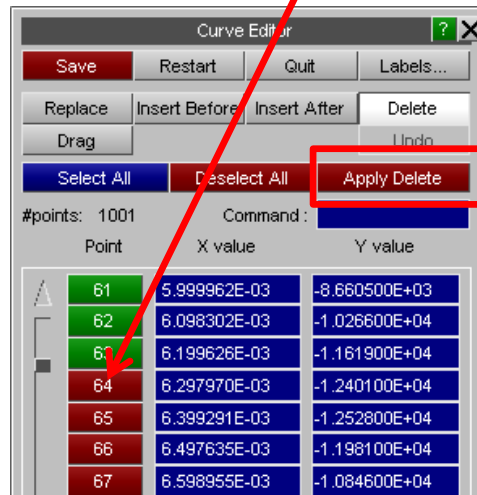
1. Between: Click on the screen and T/his will insert a point as close to where the cursor is, but within the curve.
2. At Cursor: T/his will insert a point wherever the cursor is.
3. Split Segme: T/his will split a segment of the curve in as many parts as specified by the user.
4. At Start.
5. At End.



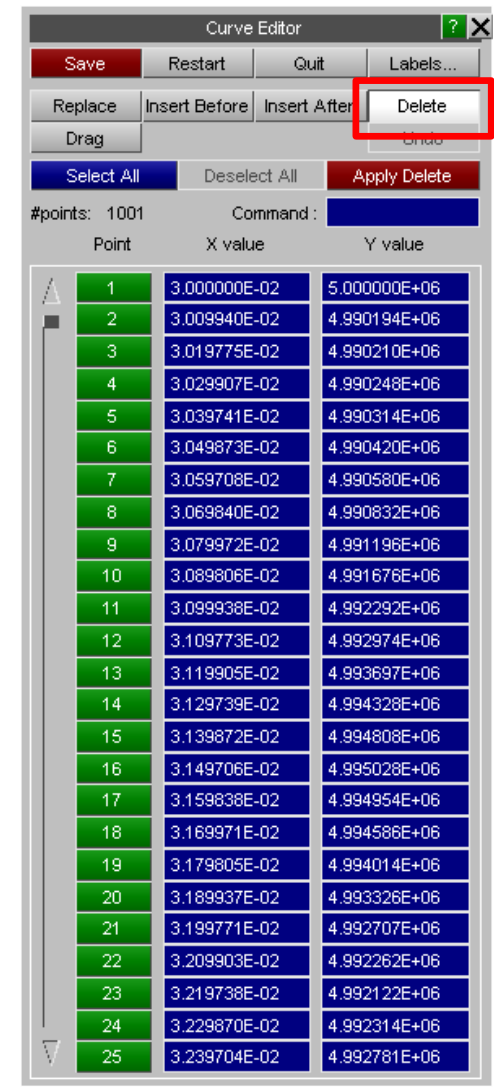
EDIT – Deleting Points

Deleting curve points within the EDIT menu has been modified so that multiple points can be selected and then deleted.

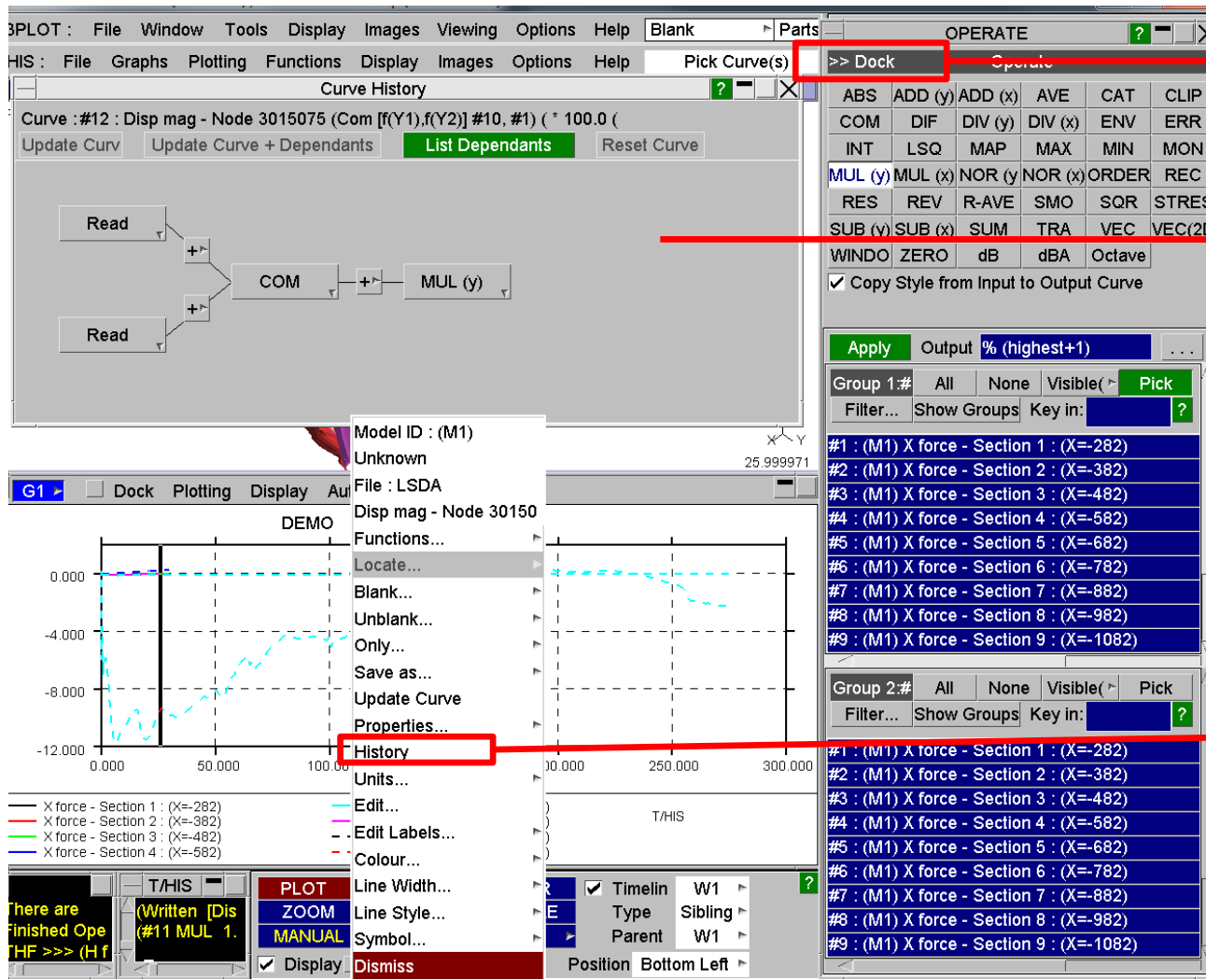
1) As points are selected they are highlighted in red and marked on the screen



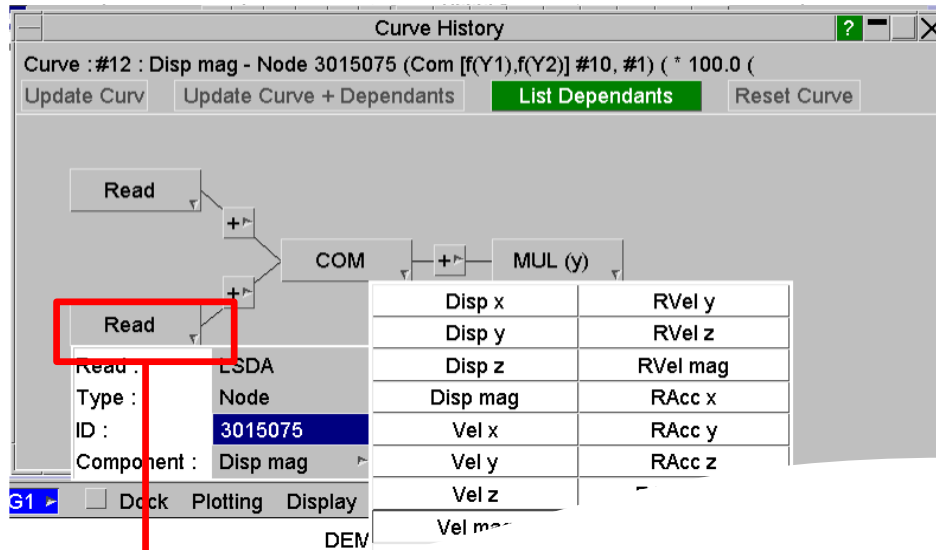
2) Select “Apply Delete” to actually delete the points



CURVE HISTORY

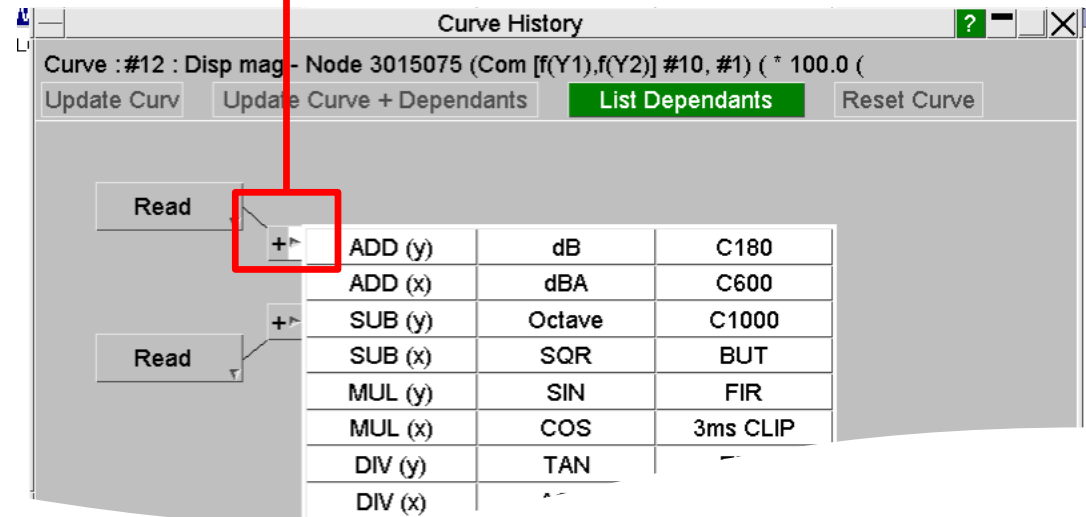


- Dock/Undock Menus
- Curve History Panel allows user to see/change operations on curves. Just right click on operation (eg. "COM") and change operation.
- Bring up "History" of curves by right clicking on the curve in display area.



- Its also possible to change the Curve used in the operation to a different variable.

- Operators can be added in between existing steps.

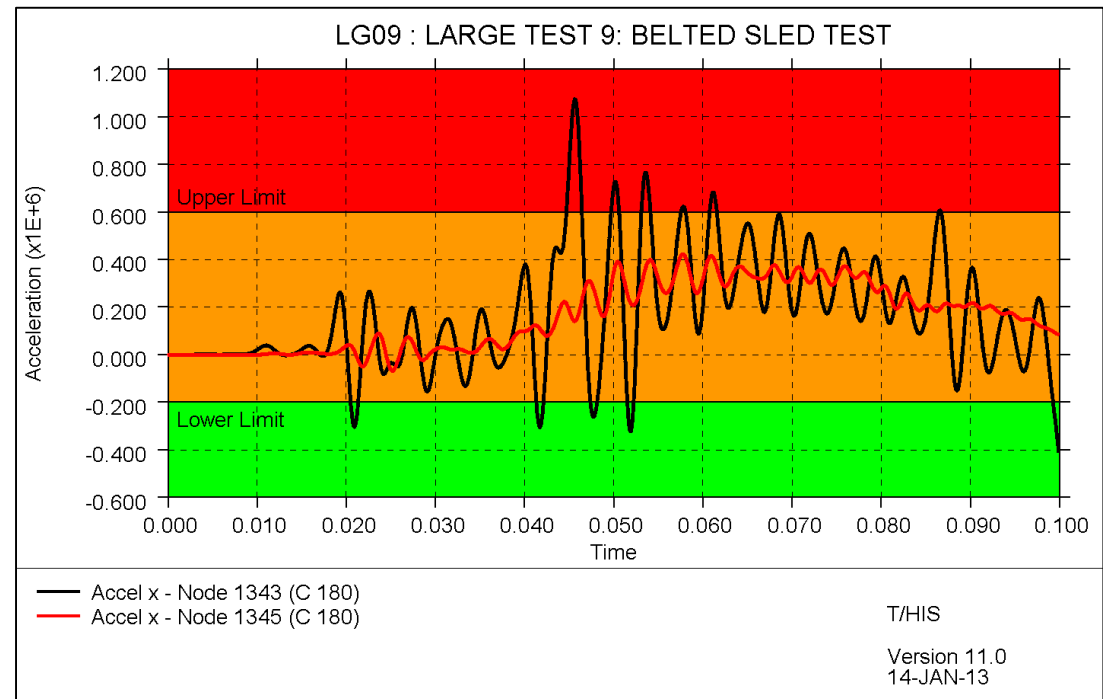
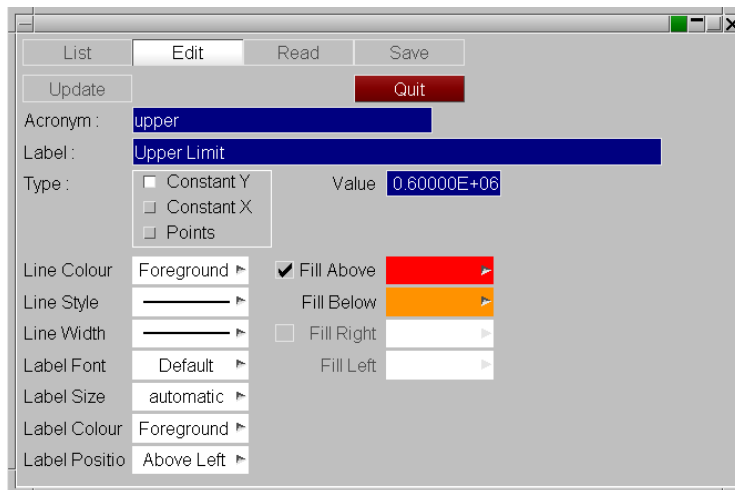


DATUM LINES

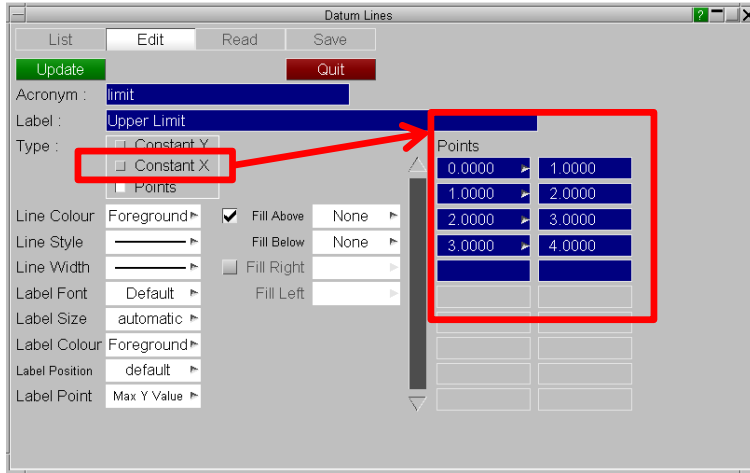
Datum lines can be added to graphs to show limits and reference curves.

- Constant X or Y values
- Curves of X,Y points
- Shade between lines by filling above and below the lines
- Change the individual features of the lines and labels

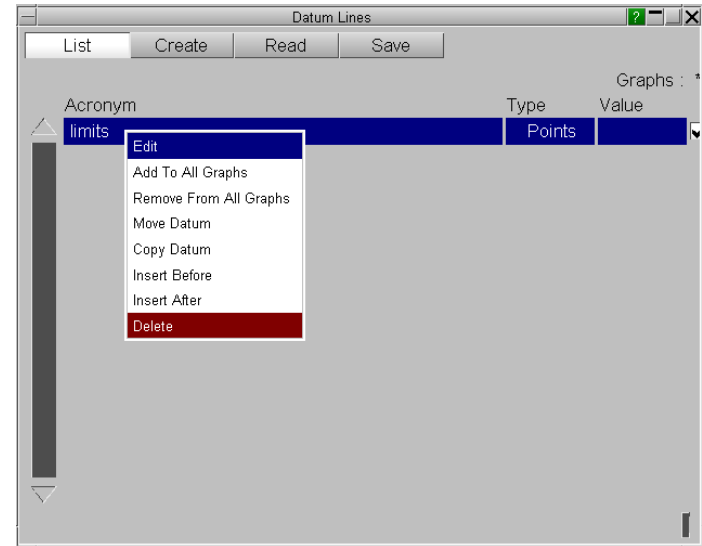
—	Read	Write	Curves	Models
Edit	Style	Properties	Images	
Operate	Maths	Automotive	Seismic	
Macros	FAST-TCF	Title/Axes	Display	
Settings	Preferences	Groups	Graphs	
Command	Units	JavaScript	Datum	



- Datum Lines can also be created from a list of Points:



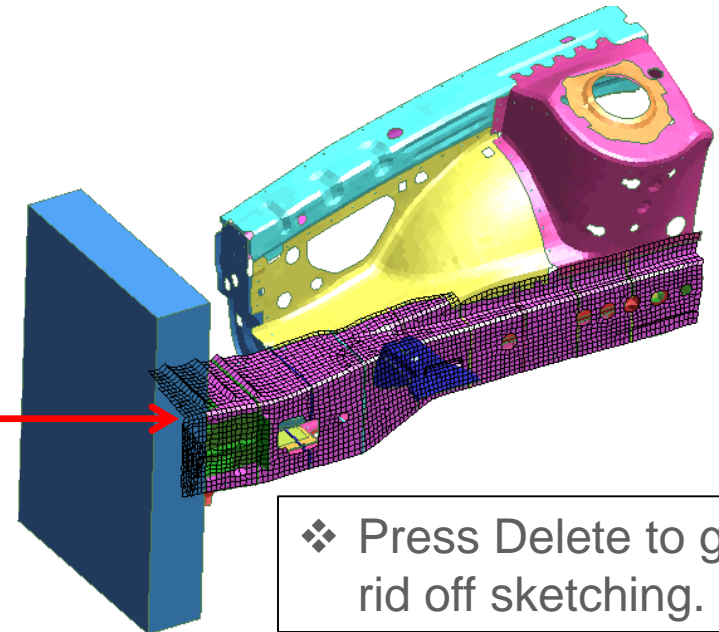
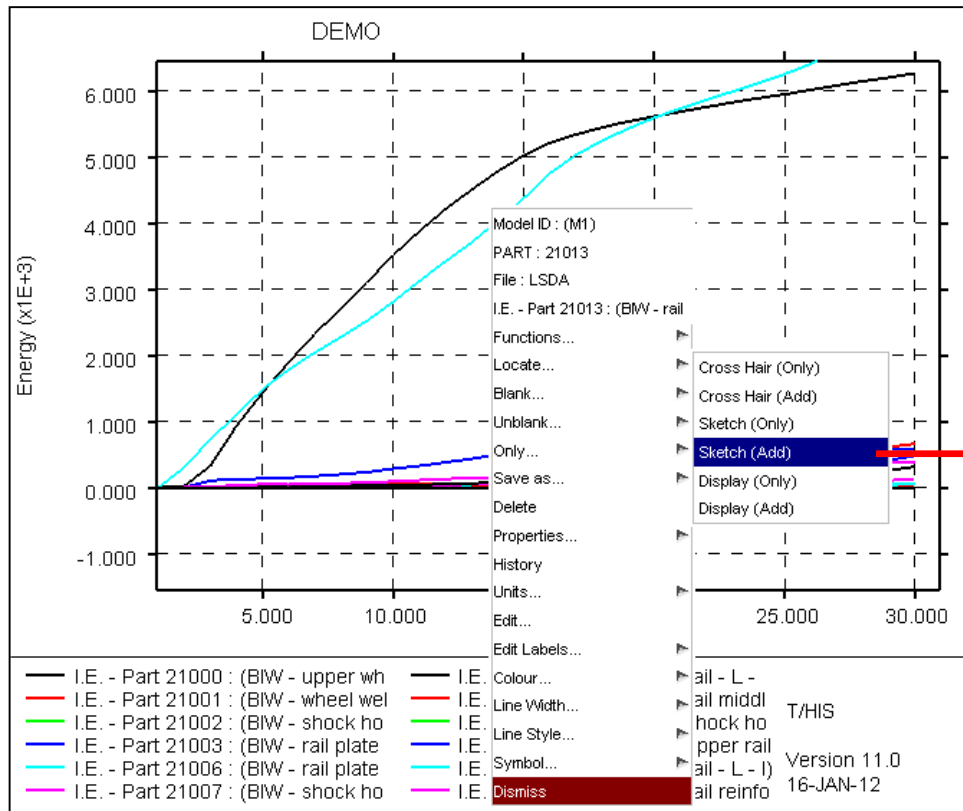
- It is also possible to “Save” Datum Lines to a .dtm file and “Read” it in in another T/his session.



- It is possible to edit each Datum Line in the list. Right-click the individual line and click edit.

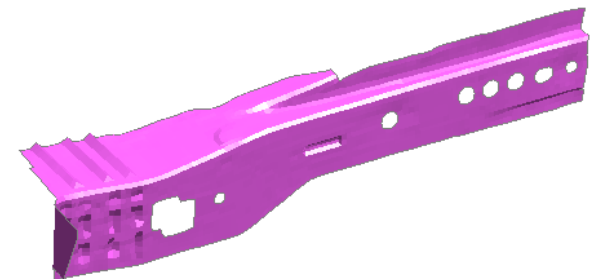
- ❖ If a graph contains multiple Datum lines then they are plotted in the order they are defined. Care should be taken when using the fill options so that you don't obscure other Datum line definitions.

SHORTCUTS & QUICK PICK



❖ Press Delete to get rid off sketching.

- Locate option in the T/HIS Quick Pick menu now offers options to Sketch items.
- Alternatively “Display” can be used to display just the selected item.



Multiple items in T/HIS can now be selected interactively in the D3PLOT window by dragging out an area.

Global	Parts	Part Groups	Nodes
Solids	Beams	Shells	Tk Shells
Stonewalls	Springs	Airbags	Contacts
Geo Contacts	Seatbelts	Retractors	Sliprings
Reactions	Joints	X Sections	Subsystems
Rigid Bodies	Spotwelds	SPCs	Boundaries
FSIs	SPHs	TRACERs	

Select Models New Model Reread Model

Output curve: % (highest+1) ...

Key in: Apply

KE - Kinetic energy
 IE - Internal energy
 HG - Hourglass energy
 TE - Total energy
 XM - X momentum
 YM - Y momentum
 ZM - Z momentum
 VX - Average X velocity
 VY - Average Y velocity
 VZ - Average Z velocity
 MA - Mass
 AM - Added mass
 EKE - Eroded Kinetic energy
 EIE - Eroded Internal energy

Entities <<

Sort By Model ▾

All None

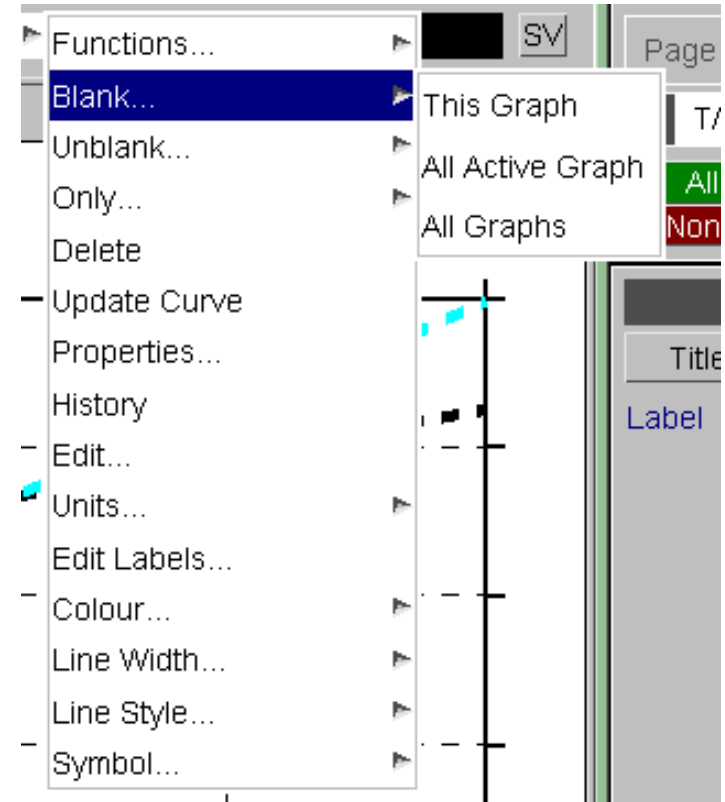
End Picking

Select PART(s)

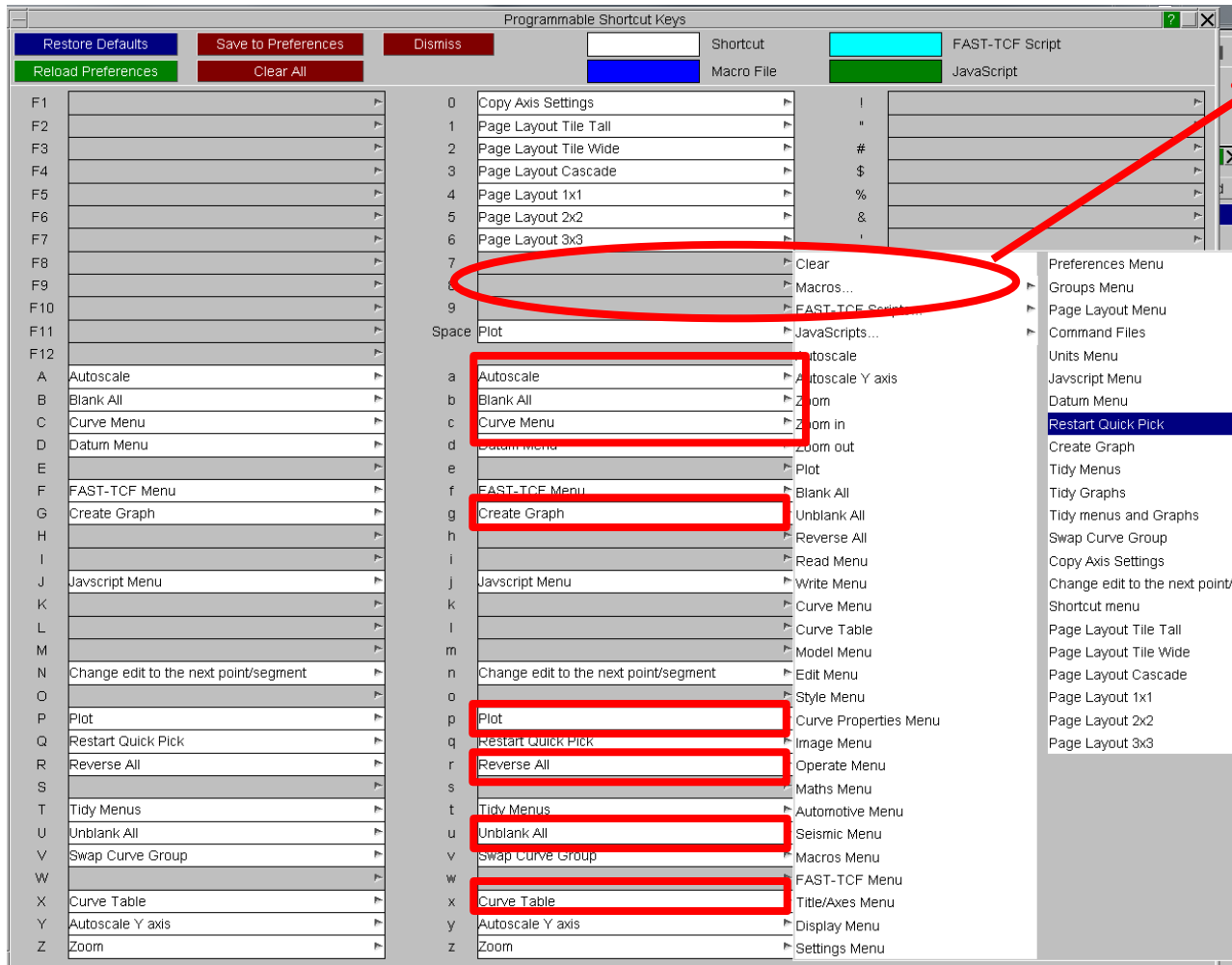
M1:Part 21000 : (Bl
 M1:Part 21001 : (Bl
 M1:Part 21002 : (Bl
 M1:Part 21003 : (Bl
 M1:Part 21006 : (Bl
 M1:Part 21007 : (Bl
 M1:Part 21009 : (Bl
 M1:Part 21010 : (Bl
 M1:Part 21011 : (Bl
 M1:Part 21012 : (Bl
 M1:Part 21013 : (Bl

There are many ways to Blank on T/HIS:

- By clicking on any curve on the graph when the “Quick Pick” option is set to Blank.
- By clicking on one of the lines in the legend (also with “Quick Pick” set to Blank).
- The letter “b” blanks all the curves.
- The letter “u” un-blanks all the curves.

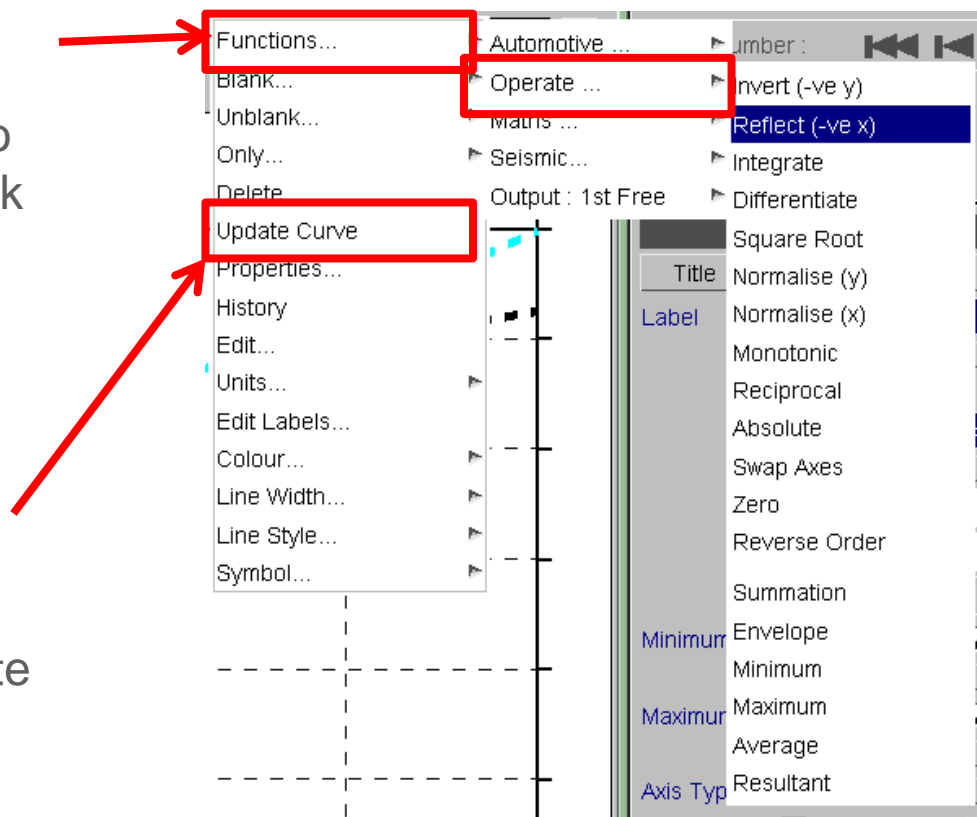


Go to “Options” -> “Shortcuts” to open the Programmable Shortcuts Menu.



- Use one of the free keys to add your own custom shortcuts.
- Some of the most useful shortcuts are:
 - “a” – Autoscale
 - “b” – Blank All
 - “c” – Curve Menu
 - “g” – Create Graph
 - “p” and Space Bar – to plot, i.e. refresh screen
 - “r” – Reverse All
 - “u” – Unblank All
 - “x” – Curve Table

- Other useful shortcuts in the “Quick Pick” Menu are found under Functions->Operate. It is possible to select Invert or Reflect, etc. and click on a curve to create a new one.
- The “Update Curve” option is useful when a model is still running and results are changing. This will update the curve selected with any new data.



GRAPH SETTINGS

Graph Settings – Title/Axes

T/HIS

The screenshot shows the 'Title / Axes' dialog box with the 'X Axis' tab selected. The 'Label' is set to '<automatic>'. The 'Automatic' checkbox is checked. The 'Font' is 'Courier Bold', 'Size' is '12 point', and 'Colour' is 'Col_29'. The 'Minimum' and 'Maximum' values are both set to '<auto>'. The 'Axis Type' is 'Linear'. The 'Grid Spacing' is 'Automatic'. The 'Units' section has 'Add Exponent to Label' checked. The 'Format' is 'Automatic'. The 'Decimal Places' is set to 1. The 'Reset All' section has 'Axes' set to 'Automatic', 'Fonts' set to 'Courier Bold', 'Sizes' set to '12 point', and 'Colours' set to 'Col_29'. The 'Solid Axes at X=Y=0' checkbox is checked.

- The Title/Axes menu allows the user to change the display settings for the graphs.

- As mentioned before, it is possible to set the range for each axis.

- It is also possible to set the amount of decimal places shown on the graph.

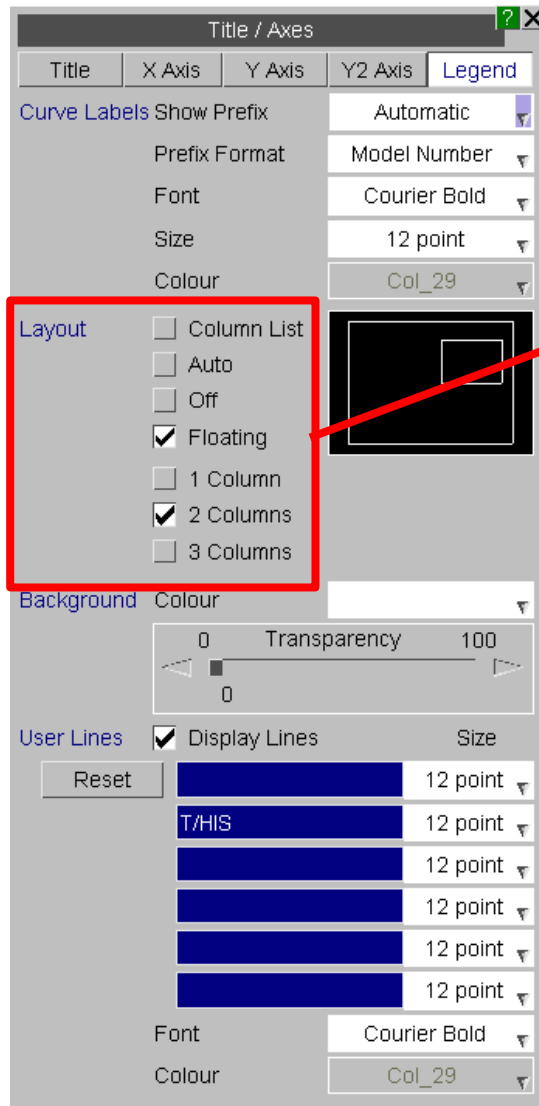
- The Reset All section allows the user to set the Fonts, Sizes and Colours for all axes.

The screenshot shows the 'Title / Axes' dialog box with the 'Y2 Axis' tab selected. The 'Add Second Y Axis' checkbox is checked. The 'Label' is set to '<automatic>'. The 'Automatic' checkbox is checked. The 'Font' is 'Courier Bold', 'Size' is '12 point', and 'Colour' is 'Col_29'.

A second Y-axis can be added by ticking this option in the Y2 Axis menu.

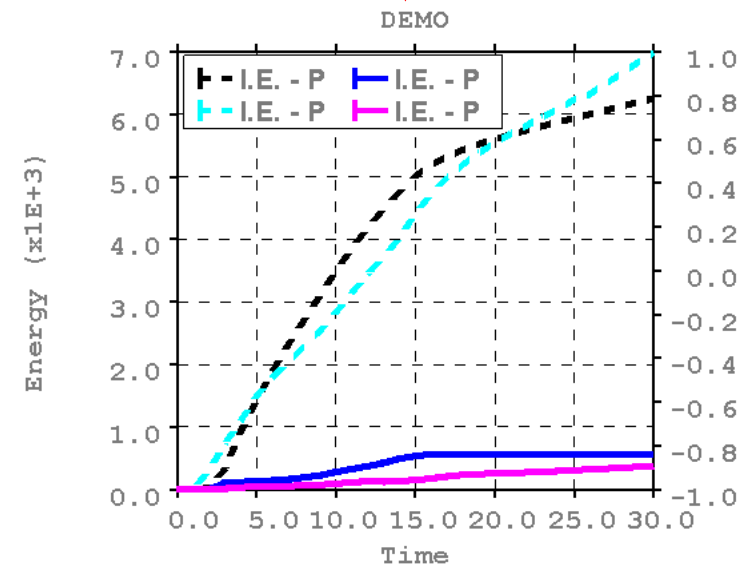
Graph Settings – Legend

T/HIS



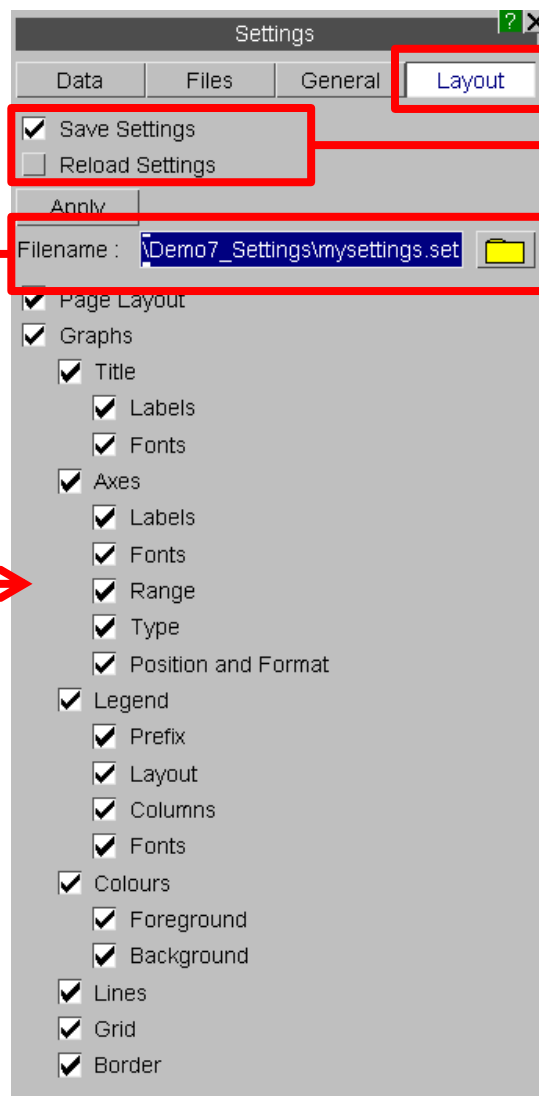
- The Legend menu allows the user to define the location and number of columns in the legend.
- The floating legend can be moved and re-sized manually to the desired location.

The resulting plot.



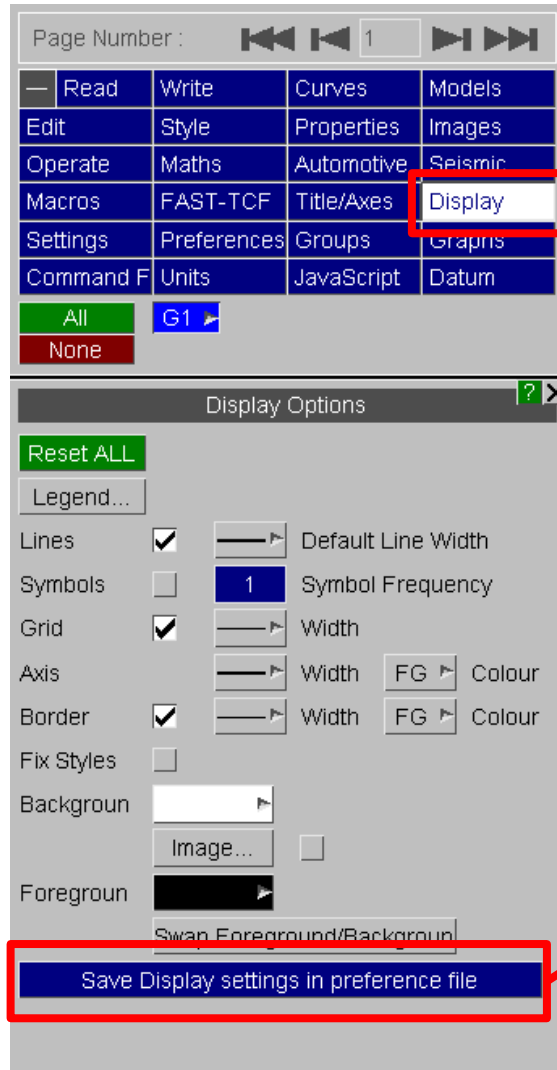
2. Select a directory and file name for the settings file to save, or find the one to reload.

3. Pick the properties that should be saved in your settings file.



1. In Settings -> Layout it is possible to save your current settings or reload a pre-saved settings file.

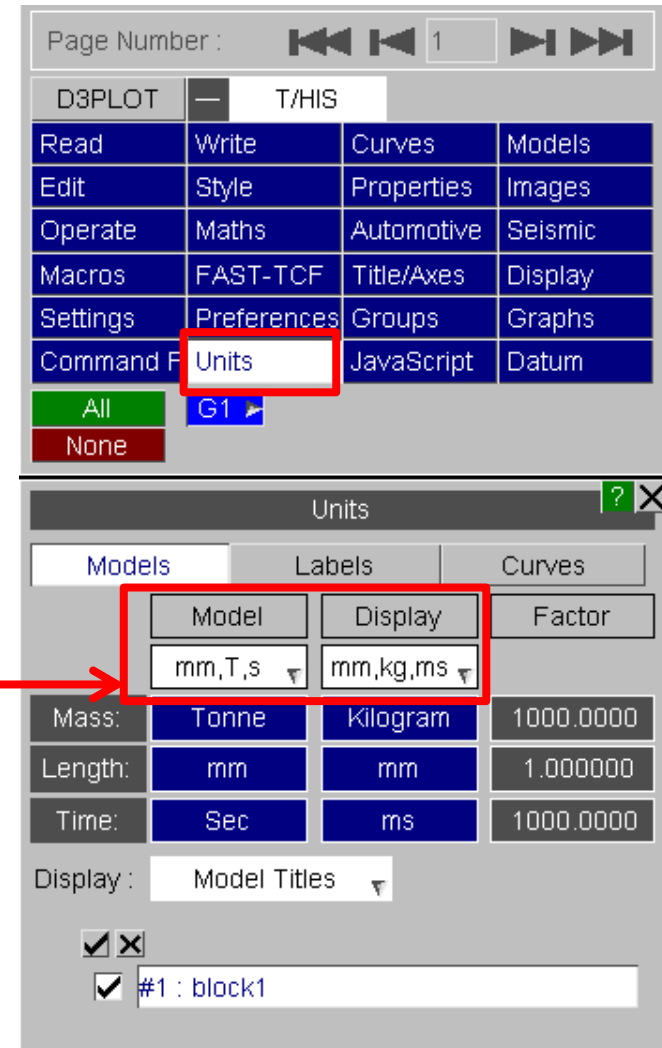
4. Remember to press **APPLY** when done.



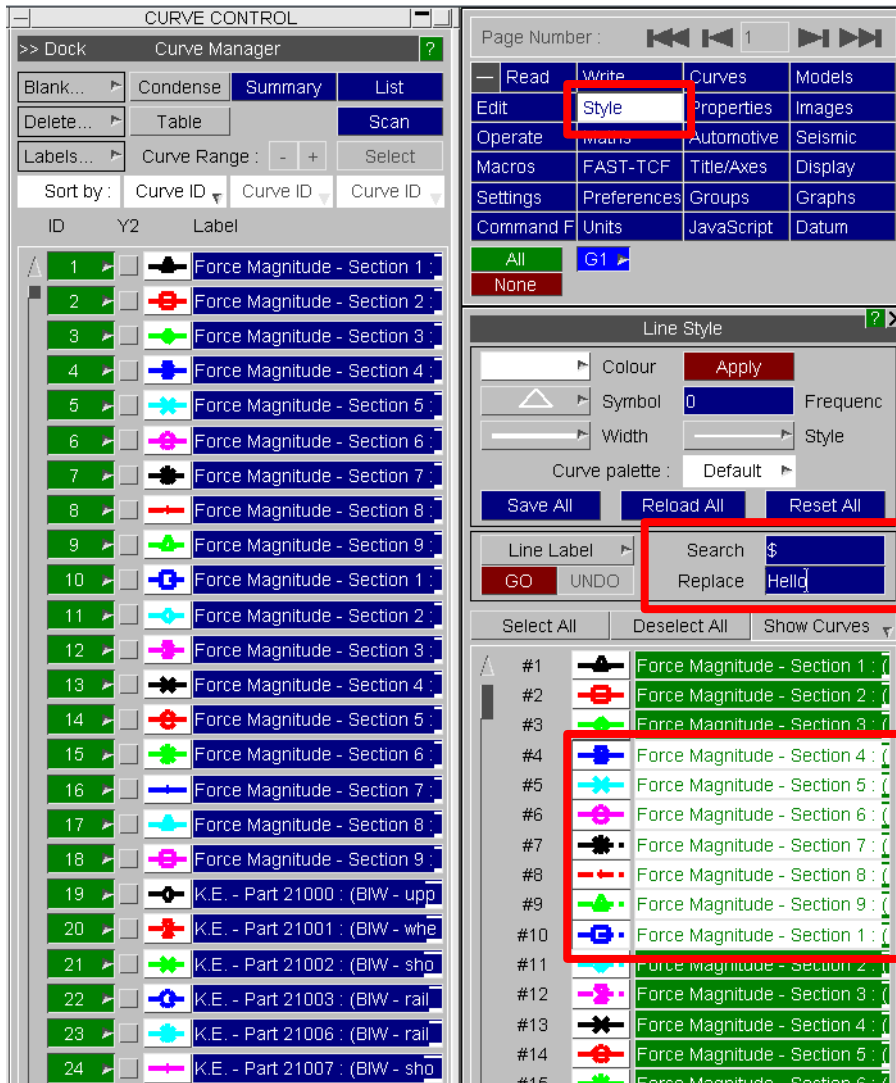
- If the Graph settings are your preference for all projects you can also save the settings to the oa_pref file by pressing the “Save Display settings in preference file” button at the bottom of the Display menu.

UNITS

- In a linked session of D3Plot and T/HIS the Units menu allows the user to plot results with different units. (Note: If data was loaded from a .cur file the user must specify the units of each axis in Units->Curves, see section 5.22.3 of the T/HIS manual for more details).
- If the original model was defined in: mm, T, s and curves are to be plotted in: mm, kg, ms, it is possible to automatically convert the T/HIS curves to the new set of units.

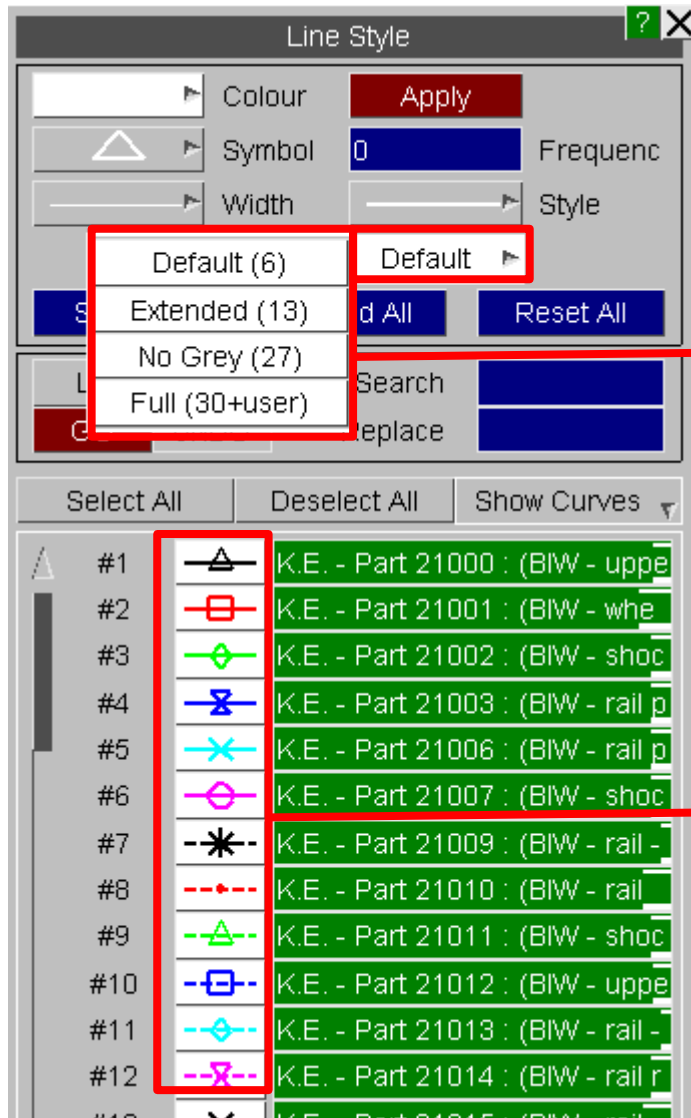


LINE STYLE



1. Undock the Curve Manager, select the Style Menu.
2. Select curves to be re-styled.
3. In the Search box type "\$". This will append text to the end of the label.
4. In the Replace box type in the text to be appended.
5. Press GO.

- ❖ It is possible to type a word in the Search box, such as Magnitude and T/HIS will replace any instance of it with your text.
- ❖ Use "^" in the Search box to append text to the beginning of the label.



- By default T/HIS uses 6 colours for all the curves in any given Graph.
- The number of colours used can be increased in the Style Menu by clicking on the “Curve Palette” drop down menu. Then, choosing one of the three other options available.
- Six repeating colours over all curves (Default).

ERGONOMICS

Resizing Right Hand Menu

T/HIS

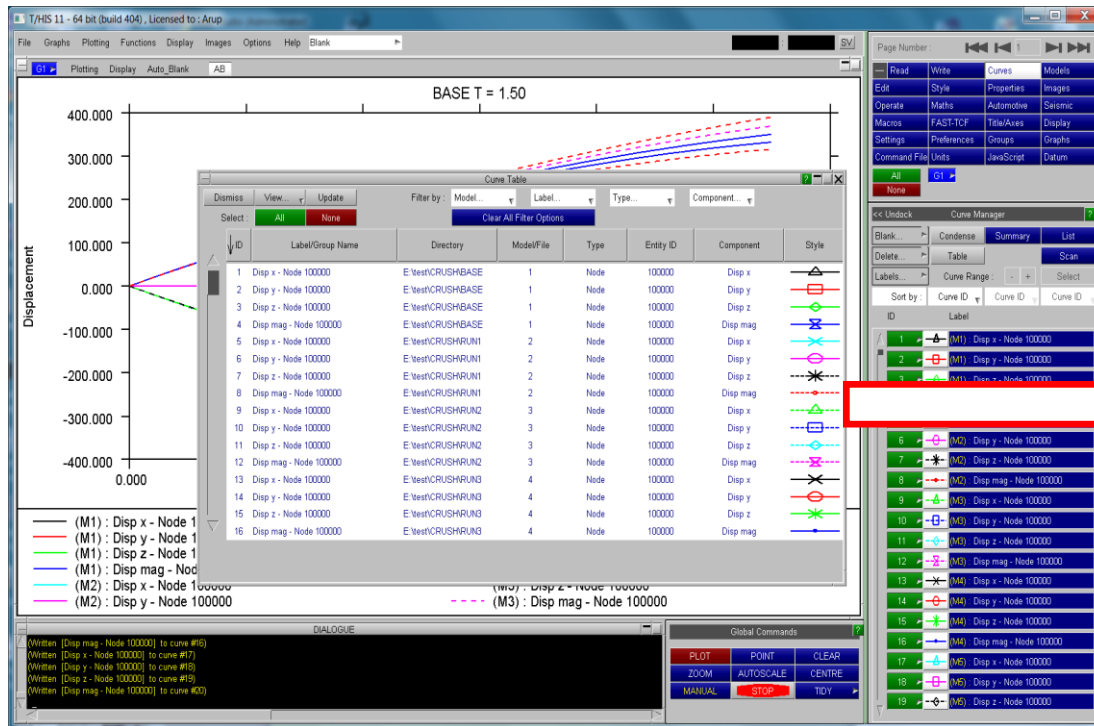
- The width of the right hand menu bar can be adjusted by clicking on the green vertical bar and dragging – e.g. used to reveal longer curve IDs in the Curve Manager.



- Adjusting the width of the main menu also reformats the Operate, Maths, Automotive and Seismic menus and allows more curves to be displayed.



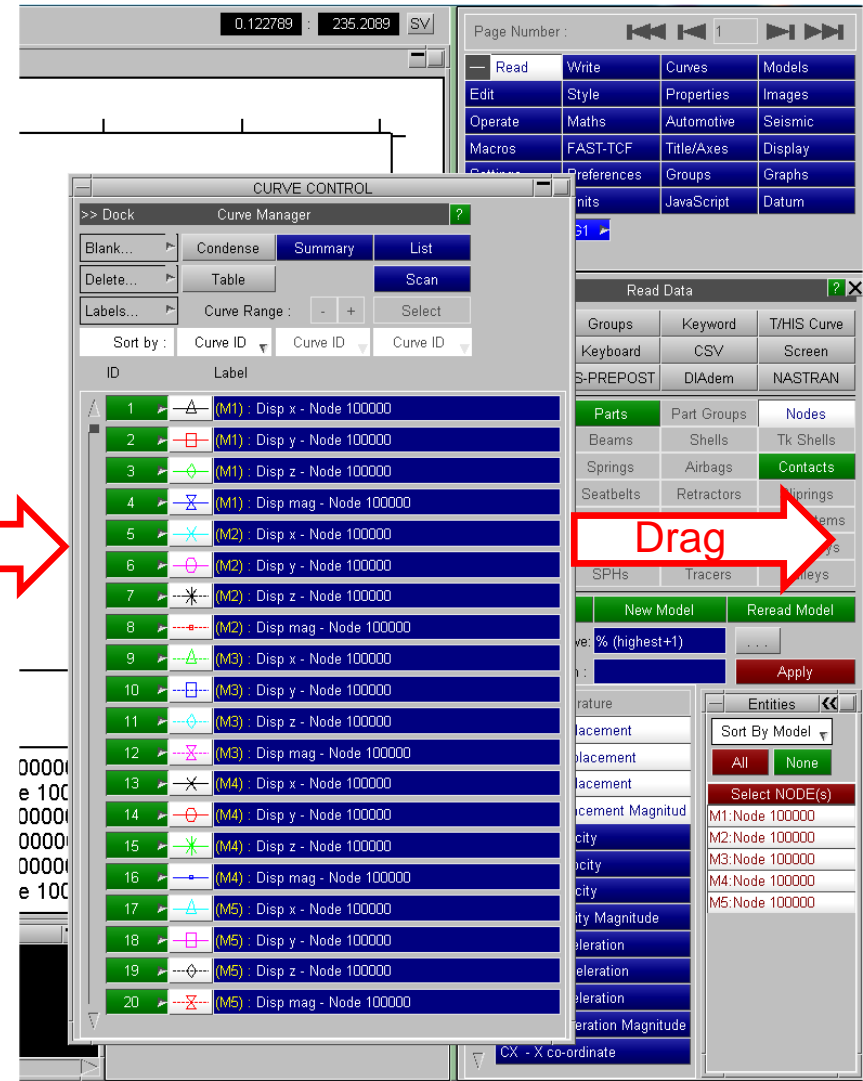
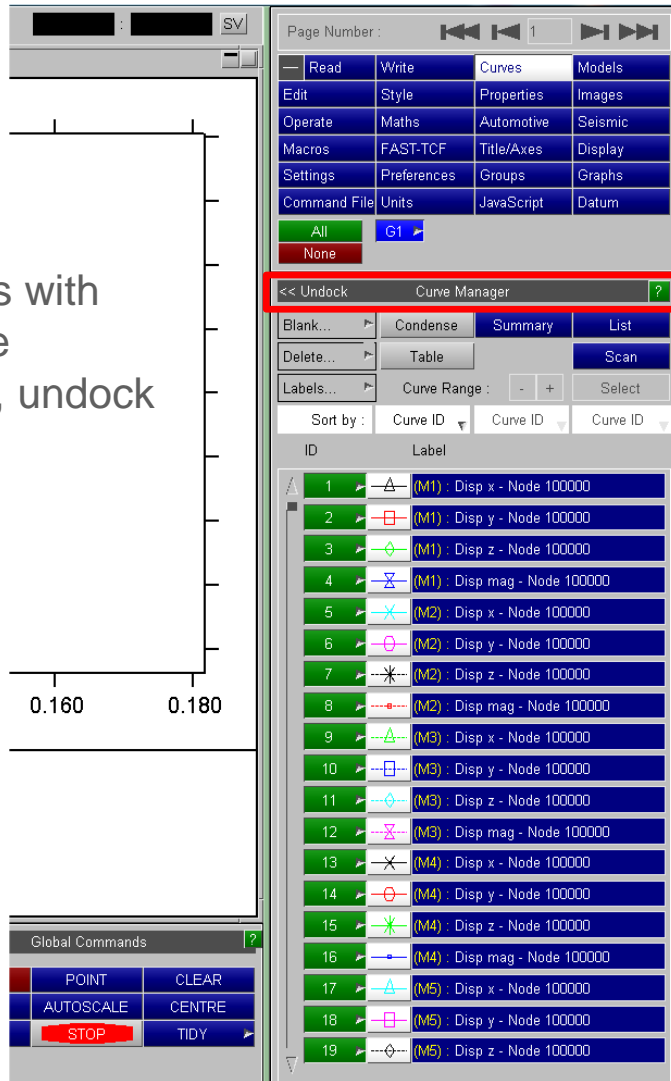
Floating menus can be dragged outside the main T/HIS window.
Useful with wide-screen or dual-screen monitors.

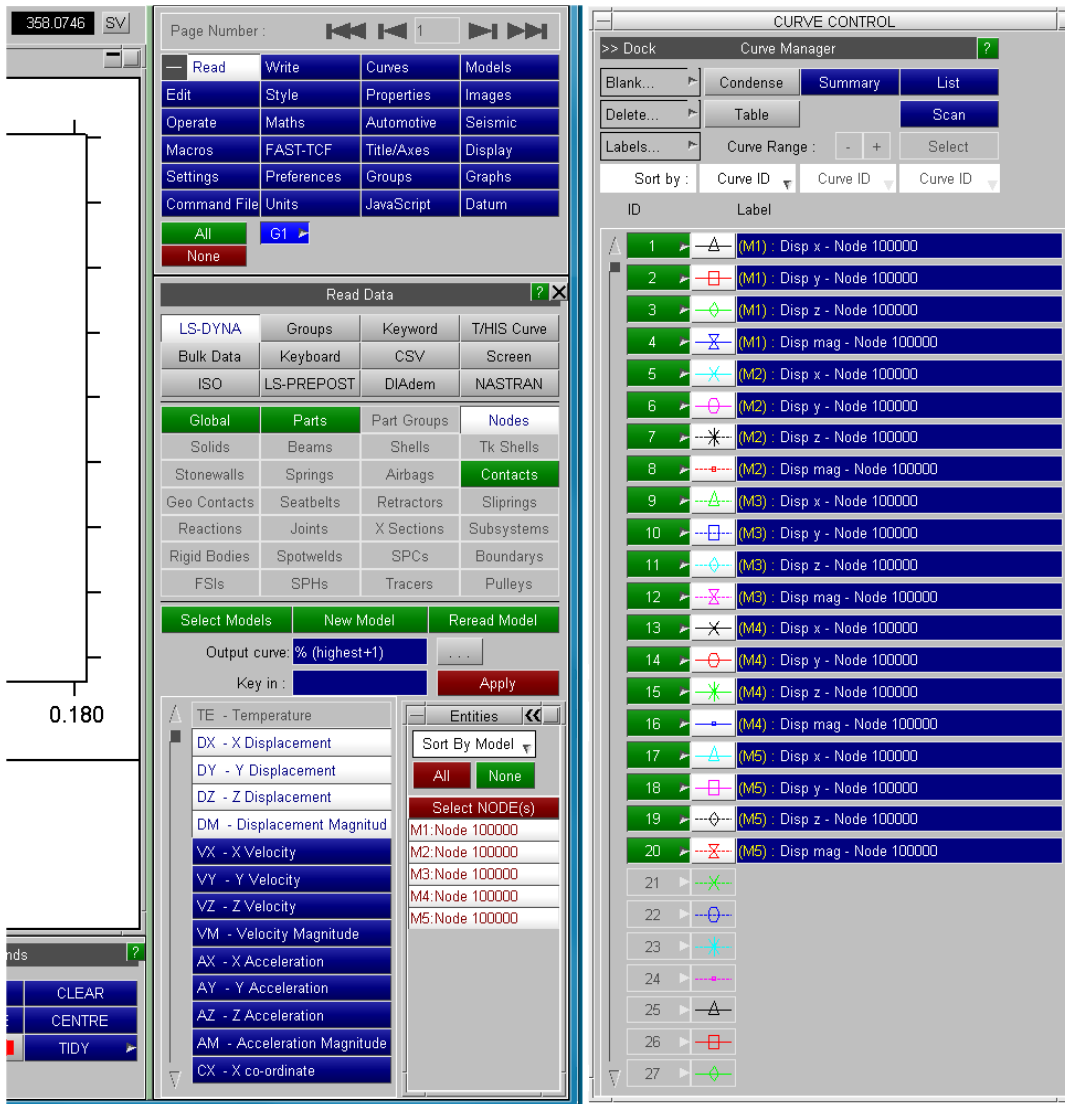


The screenshot shows the T/HIS 11 software interface with a floating menu open. The menu has a "Filter by" section with "Model..." and "Label..." dropdowns, and a "Component..." dropdown. The table has columns: ID, Label/Group Name, Directory, Model/File, Type, Entity ID, Component, and Style. The table lists 16 items, including "Disp x - Node 100000", "Disp y - Node 100000", "Disp z - Node 100000", "Disp mag - Node 100000", and "Disp x - Node 100000".

ID	Label/Group Name	Directory	Model/File	Type	Entity ID	Component	Style
1	Disp x - Node 100000	E:\test\CRUSHBASE	1	Node	100000	Disp x	—▲—
2	Disp y - Node 100000	E:\test\CRUSHBASE	1	Node	100000	Disp y	—■—
3	Disp z - Node 100000	E:\test\CRUSHBASE	1	Node	100000	Disp z	—◇—
4	Disp mag - Node 100000	E:\test\CRUSHBASE	1	Node	100000	Disp mag	—✕—
5	Disp x - Node 100000	E:\test\CRUSHRUN1	2	Node	100000	Disp x	—●—
6	Disp y - Node 100000	E:\test\CRUSHRUN1	2	Node	100000	Disp y	—○—
7	Disp z - Node 100000	E:\test\CRUSHRUN1	2	Node	100000	Disp z	—✱—
8	Disp mag - Node 100000	E:\test\CRUSHRUN1	2	Node	100000	Disp mag	—✱—
9	Disp x - Node 100000	E:\test\CRUSHRUN2	3	Node	100000	Disp x	—■—
10	Disp y - Node 100000	E:\test\CRUSHRUN2	3	Node	100000	Disp y	—○—
11	Disp z - Node 100000	E:\test\CRUSHRUN2	3	Node	100000	Disp z	—✱—
12	Disp mag - Node 100000	E:\test\CRUSHRUN2	3	Node	100000	Disp mag	—✱—
13	Disp x - Node 100000	E:\test\CRUSHRUN3	4	Node	100000	Disp x	—■—
14	Disp y - Node 100000	E:\test\CRUSHRUN3	4	Node	100000	Disp y	—○—
15	Disp z - Node 100000	E:\test\CRUSHRUN3	4	Node	100000	Disp z	—✱—
16	Disp mag - Node 100000	E:\test\CRUSHRUN3	4	Node	100000	Disp mag	—✱—

To do this with the Curve Manager, undock it first

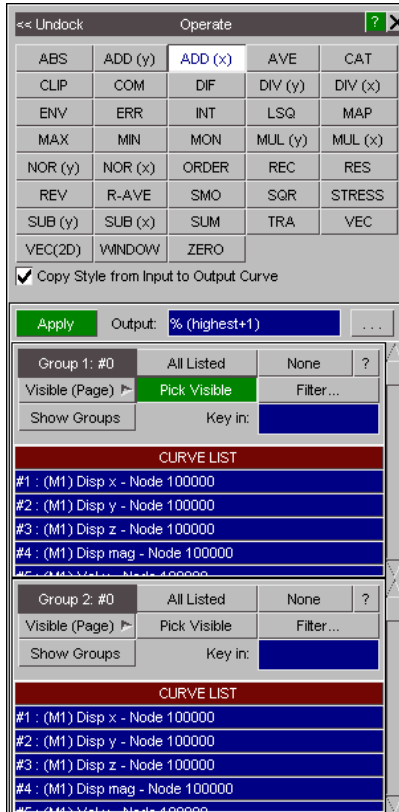




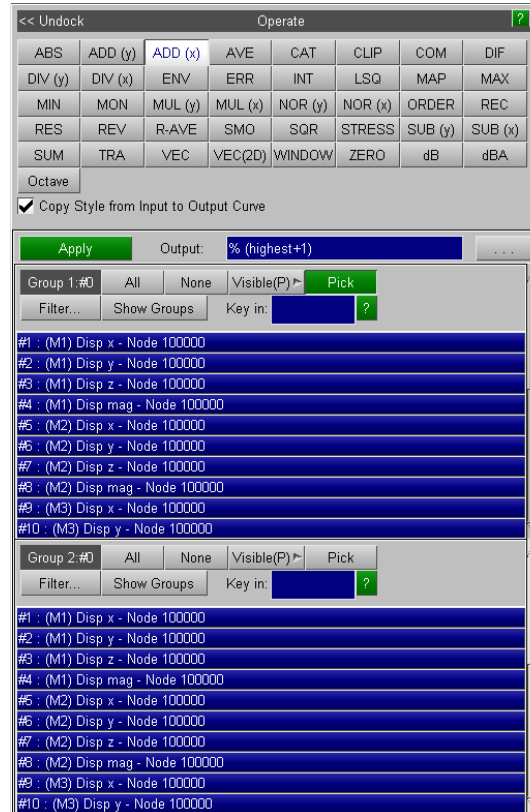
The screenshot shows the LS-DYNA software interface. On the left, there is a menu bar with options like Read, Write, Curves, Models, Edit, Style, Properties, Images, Operate, Maths, Automotive, Seismic, Macros, FAST-TCF, Title/Axes, Display, Settings, Preferences, Groups, Graphs, Command File, Units, JavaScript, Datum. Below the menu bar is a toolbar with buttons like All, None, G1. The main window displays a list of entities, including Temperature, Displacement, Velocity, Acceleration, and co-ordinate. On the right, the Curve Manager dock is visible, showing a list of curves with their IDs and labels. The dock also includes a 'Sort by' dropdown menu and a 'Select' button.

Now the Curve Manager is always available without obscuring other menus

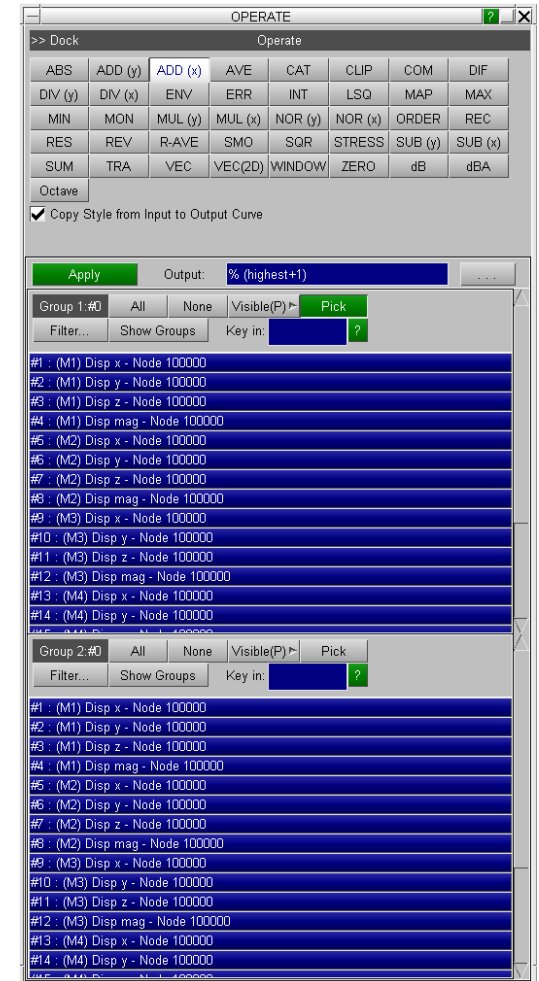
V10



V11 + Wide Menu



V11 + Desktop Menu



- More curves can be displayed in curve operation menus.