PRIMER Top Tips







- Primer Shortcuts
- Panel Configuration
- Quick Pick
- Find Tool
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- Saving Views
- Part Tree Assemblies & <u>Contents</u>
- Object Menus
- Model Building from CSV
- Dummies and Seats
- <u>Assembly Replace</u>
- <u>Compare Models</u>
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- Mesh Quality & Modifying
- SPC Colour Plotting
- Scripts Released with Primer

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- What's New PPT





• Press "?" to bring up the programmable Shortcuts menu.

		Prog	rammable Shortcut Keys		?_
F	Restore Defaults Save to Preference	s Dismiss		Shortcut	Javascript
Re	load Preferences Clear All			Macro	
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F2		Macros	Cycle View Fwd conise/De-iconise	Orient menu	
F3		Javascripts		Remove menu	
F4		Quick Pick Toggle	Tidy all	Rigidify menu	
F5 F6		Find attached	Close All	Seatbelts menu	
F7		Reset Entity Visibility	Airbags menu	Seatsquash menu	
		Reset Item Attributes	Assign mass menu	Shortcut menu	
F8		Autoscale	Attached menu	3D Mouse Shortcut menu	
F9		Zoom	Blanking menu	Split menu	
F10		Zoom in	BOM menu	Transfer menu	To a main
F11		Zoom out	Check menu	Units menu	Zoom in
F12		Centre toggle	Clipboard menu	View menu	
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В	Blanking menu	Reverse all blanking	Connection menu	Toggle current Pred Pick	
С	Quick pick close polygon	Lock toggle	Cut sections menu	Toggle all Pred Pick	Shortcut menu
D	Drag cut plane	Hidden Line Plot	Drag cut plane	Quick pick selection mode	
Е	Entities menu	Line mode plot	Cut plane node pick	Quick pick close polygon	
F	Shaded Contour Plot	Shaded Plot	Display Options menu	Quick pick reject last pt	
G		Continuous Tone Plot	Dummies menu	Quick pick restart polygon	Zoom in
н	Hidden Line Plot	Shaded Contour Plot	Entities menu	Quick pick undo last action	
1	Iconise/De-iconise	Vector Plot	FMH menu		Shortcut menu
J	Find attached	► Cycle no/free/all overlay	Forming menu		
К	Reset Item Attributes	+XY view	Groups menu		
L	Line mode plot	► +YZ view	Write image file menu		
М	Measure menu	► +XZ view	Include menu		
Ν	Cut plane node pick	► +ISO view	IPP menu		
0	Display Options menu	-XY view	Javascript menu		Zoom out
Ρ	Toggle all Pred Pick	► -YZ view	Macro menu		
Q	Quick pick selection mode	► -XZ view	Measure menu		
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V	View menu	► v View me	nu	4	
w	Write image file menu	w Write im:	age file menu	4	

 By right-clicking on and any of the keys it is possible to view and change the action as well as assign macros or JavaScript's to an empty key.



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Slide 4

PRIMER Shortcuts - Iconise



PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) PRIMER 111 - 64 bit (build 13879), Licensed to : Ove Arup (AT&R London) P	Press "i" to iconize all open panels.
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Slide 5

PRIMER Shortcuts - Tidy



	Press "t" to tidy and iconize all open panels at the top left hand corner of the display window.
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Slide 6

PRIMER Shortcuts – Close Panels

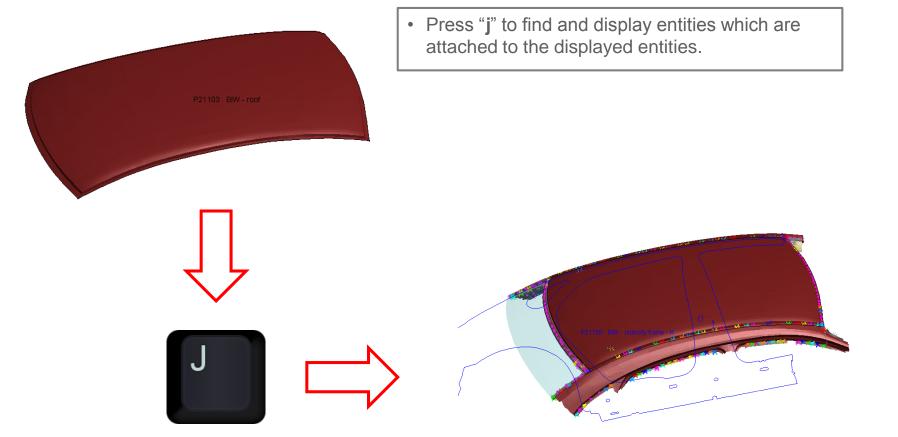


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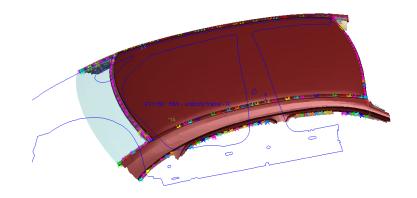




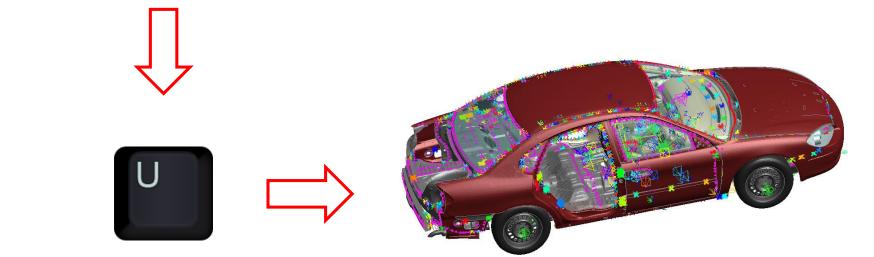


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• Press "u" to un-blank all parts.



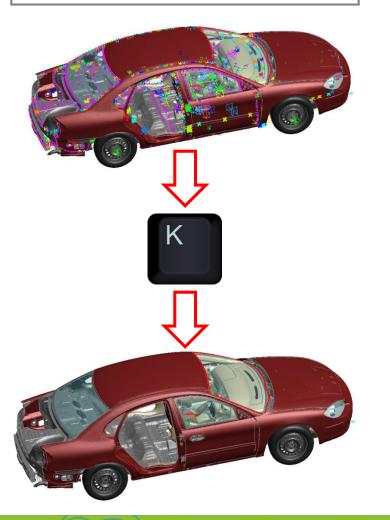


Slide 9

PRIMER Shortcuts – Entities



• Press "k" to view the default entities.



• Press "e" to bring up the entities menu.



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PRIMER Shortcuts – Toggle Quick Picks



 Most functions in Primer allow the user to pick parts or other entities to perform an action. In these cases the "Quick Pick" bar only allows the user to pick an entity of that type.

 Press "q" to toggle between the standard "Quick Pick" bar and the one driven by the Primer function.



PRIMER Shortcuts – Overlays



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 Press "y" to cycle through the different overlays (None, Boundaries Only, All edges).



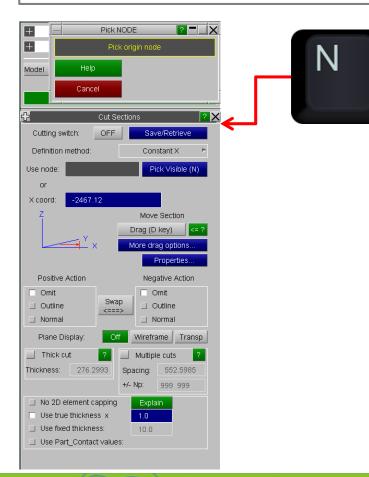


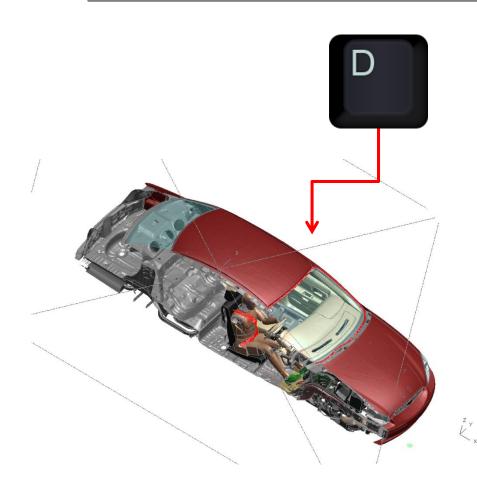
PRIMER Shortcuts – Cut Sections



 Press "n" to bring up the Cut Sections menu. By default it is ready to pick a node to cut through (in constant X).

2. Press "**d**" to activate the drag option (use mouse to drag).





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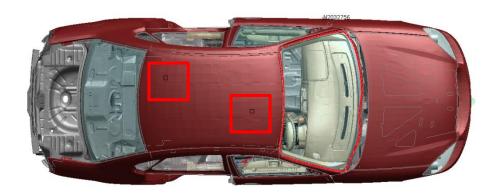
PRIMER Shortcuts – Measure



• Press "m" to bring up the Measure menu.



• By default it will be ready to pick two nodes.

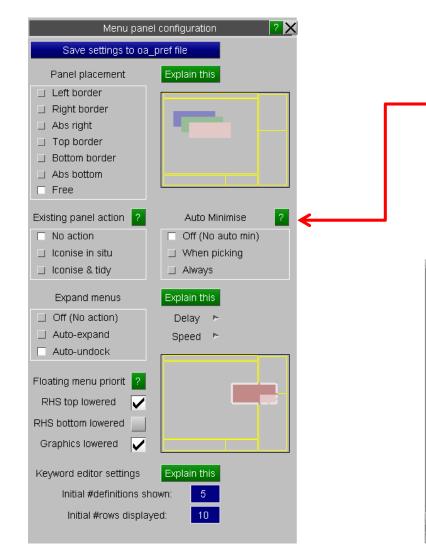


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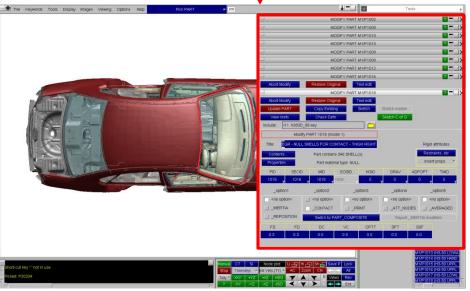
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- The Panel Configuration Menu found under "Options"->"Panel behaviour" allows the user to set the location and behaviour of the pop-up panels in Primer.
- For example, selecting "**Abs right**" forces all panels to open at the top right hand corner of the Primer window.



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PRIMER – Quick Pick

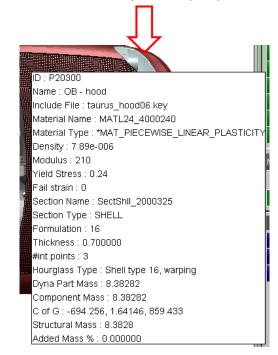
part.



• By default the "quick pick" menu is set to "Blank". A lot of users forget how many other actions can be performed by changing the action in the drop down menu.

Blank	v PART (any type) v Key in: PP ₽
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Only	
Information	
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Edit	
Keyword	
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Transparency	Þ
Plotting mode	
Locate in Tree	
Part Table	
Sketch	
Find	
and the second second	
. ↓	
 This me 	nu also appears when right-clicking or

• Select "Information" and then click on a part to get the a summary of its properties:







 Select "Label" and click on a part to display the part ID:

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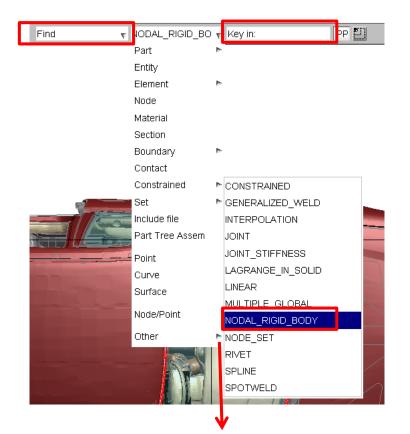
• Select "**Keyword**" and click on a part to open the part's keyword editor:

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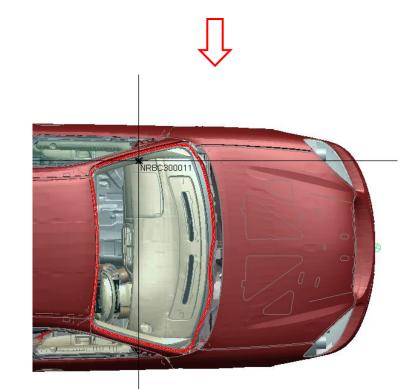
PRIMER – Quick Pick





• By default the entity type is "Part" but this can also be changed.

- Select "Find" and change from "Part" to "Nodal Rigid Body".
- Key in a NRB ID number to get a crosshair at the location of the object.



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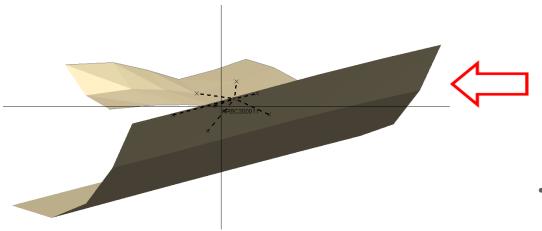
PRIMER – Find Tool



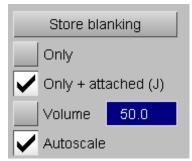
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Find M1/NODAL_RIGID_BODY300011 ? X APPLY RESET VIEW EDIT ITEM Sketch item(s) Set CN (if unset) to centre of sketched item	 Under the Tools menu is the function "Find". This opens a menu that allows the user to find any object in the model and sketch it.
Label sketched item	 The option to display "Only" the entity in question can be very useful as is the "Only + attached" option.
Store blanking SELECT ITEMS ? Only All None îl J Opt Only + attached (J) Filter Vis Key_In Sk Volume 50.0 Vatoscale INRBC300011 Normal draw NRBC350002 stipple NRBC400000 Wireframe draw NRBC400001 NRBC500001 NRBC500001 NRBC500001 NRBC500002 NRBC500001 NRBC500003 NRBC500005 NRBC500004 NRBC500006 NRBC500005 NRBC500007 NRBC500006 NRBC500008 NRBC500007 NRBC500009 NRBC500009	 In our demo, selecting the Nodal_RIGID_BODY 300011 with the "Only" option results in: Water 19 Water 19 Water 19 Water 19 Water 10 Water 11

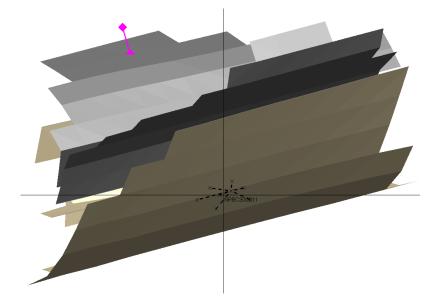
PRIMER – Find Tool







• Selecting "**Only + attached**" displays the NRB and the entities attached to it.



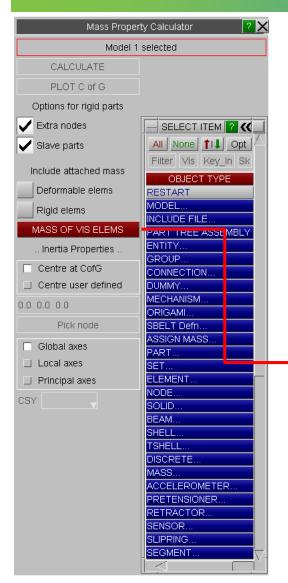


• Selecting a "**Volume**" of 50 displays the entities inside a cube with sides 50, centred at the NRB.

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PRIMER – Mass Property Calculator

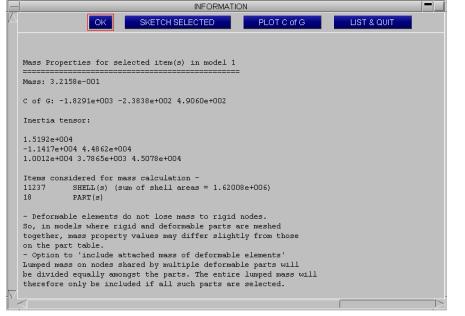


• The Mass Property Calculator found as "**Mass Prop**" in the Tools section allows the user to select elements and obtain a report with the mass, centre of gravity and inertia of the selection.



It is also possible to blank any parts that are not of interest and obtain the report for just the Visible Elements.

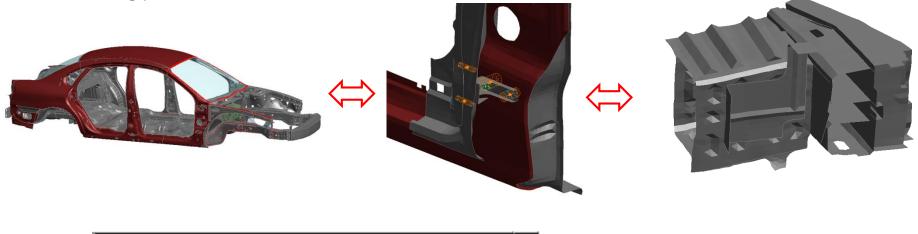
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PRIMER - Saving views



After blanking certain parts or elements, the blanking property status may be saved. The same blanking can be recovered later. "**Property**" includes blanking, colour, transparency, entity visibility status; optionally, it can also include viewing parameters



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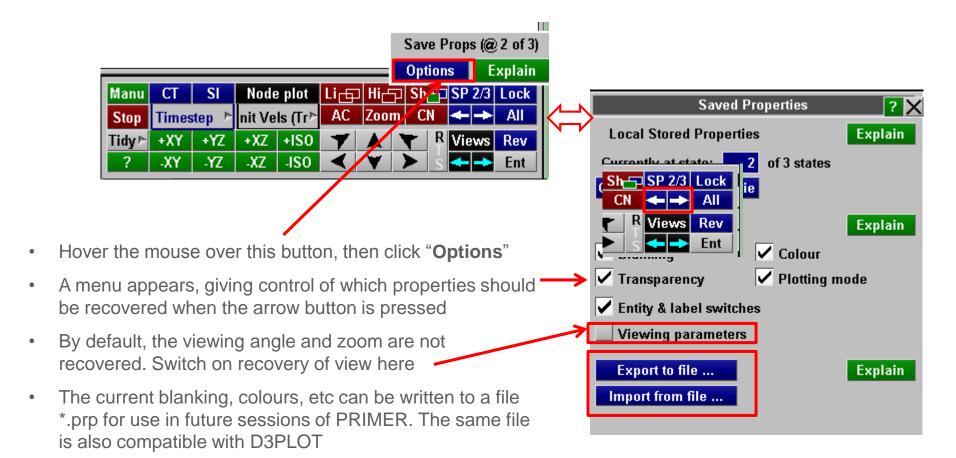
Save some blanking states, then toggle between them using the arrows.

"SP" means "Save Properties"





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PART TREE << Dock Part Tree Sketch Include Opts 🚽 Blank Unblank Only Select Assembly Type 🚽 Refresh Clear Sel all Contents Find 📄 🧰 M1 (DEMO) [m]1 (control_04_comments.key) 🕂 📇 I2 (taurus_rrdoor_07.key) 庄 🛅 I3 (taurus_biw16.key) 1 (taurus_frdoors08.key) 🕀 🛅 I5 (taurus fascia07.key) □ [□ [6 (taurus_hood06.key)] File (taurus_pwr11.key) [] [] [] (seatD_09.key) 🕂 🦰 110 (belt_07.key) 🕂 👝 I11 (h350D_08.key) 🗄 🛅 12 (hvac_03.key) + mil13 (pedals_11.key) 114 (wheel_06.key) Interpretation (transformation of the second sec 🗄 🛅 116 (ip_06.key) 🗄 🛅 117 (column_09.key) [+] [-] 118 (col_cover_03.key) [m]19 (connection_general_04.key) - 120 (connection_vehicle_09.key) 121 (door_trim_lh_01.key)

- The "Part Tree" can be arranged in different ways to help users find parts as quickly as possible.
- Two of the most useful are the "Include" option, which sorts the parts by the include file in which they are defined; and the "Assembly" option, which sorts the parts by user defined assemblies created in Primer.

PART TREE Part Tree Blank Unblank Only Sketch Include Opts 🚽 Sel all Select Assembly Type 🚽 Refresh Clear Contents Find - M1 (DEMO) A9 (For_demo) 🗄 🕂 A10 (body) Head) 🗄 🛺 A13 (Doors) A14 (Engine) A15 (Dummy_Body) A16 (Wheels) A17 (Car_Inside) A18 (Seatbelt)

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PRIMER – Part Tree Assemblies



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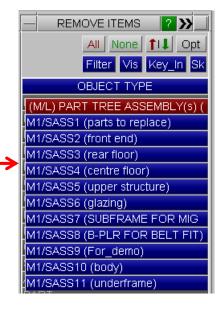
- To view, edit or create new assemblies go to the "Part Tree" menu and click on "Assembly".
- Right-clicking on the model to bring up the "Edit" menu.
- To add a new assembly, click on "**Create Assembly**", give your assembly a name in the pop-up window. Then drag and drop, or cut and paste the parts you wish to add into the assembly.

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- REMOVE ITEMS ? »
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ELEMENT
NODE
SOLID
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SHELL

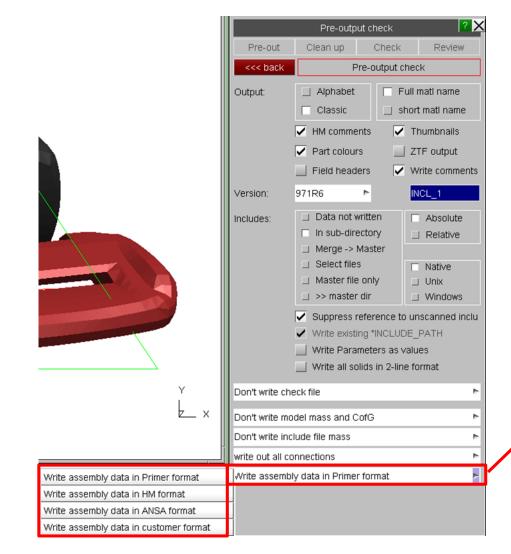
- Most Tools in Primer use the object menu to pick which elements the action will be performed on.
- Part Tree Assemblies created by the user are one of the categories available to users in the object menu.
- Actions can be performed on all the parts belonging to the Part Tree Assembly.



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PRIMER - Part Tree Assemblies





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- Information for the assemblies created in Primer can be saved as comments in the keyword deck or in HM/ANSA format.
- This it done by going to "Model -> Write -> LS-Dyna output options".
- Use the last drop down menu to chose the format in which the Part Tree Assemblies are written.

PRIMER – Part Tree Contents



<< Undock	F	Part Tree		?					
Opts 🔻 Blani	k Unblank	Only	Sketc	Include					
Type Refre	sh Clear	Sel all	Select	Assembly					
Contents List									
🛕 📥 🧰 М1	(DEMO)								
F 🕀 🖻	I1 (control_0	4_comme	nts.key)						
E 🖻	l2 (taurus_rn	door_07.l	key)						
÷	CONSTRAIN	ED (14)							
÷.	DAMPING (8)								
E E	ELEMENT (598)								
	-NODE (770)								
-	PART (9)								
÷.	SECTION (9))							
÷.	SET (15)								
V 🕀 🖻	13 (taurus_bi	iw16.key)							

<< Undo	ck	Blank	Unblank	Only ?X
Keywo	rd	Edit	Refresh	Sketch
Find				
		Entity ID		Title
Δ	200	0000	NRBC20000	000
- I.	200	0001	NRBC20000	001
- 1	200	0002	NRBC20000	002
- 1	200	0003	NRBC20000	003
	200	0004	NRBC20000)04
	200	0005	NRBC20000	005
	200	0006	NRBC20000	006
	200	0007	NRBC20000	007
	200	0008	NRBC20000	008
	200	0009	NRBC20000	009
	200	0010	NRBC20000	010
∇	200	0011	NRBC20000	011

- Another useful function within the "Part Tree" menu is the "Contents" tree.
- This organizes all the different objects by entity type, and can be grouped by which include file they are in by toggling on/off the "**Include**" button.
- Furthermore, by turning on the "List" button the bottom half of the menu will list all the objects found in the selection. Including options to Blank, Unblank, Only, Edit and Sketch.



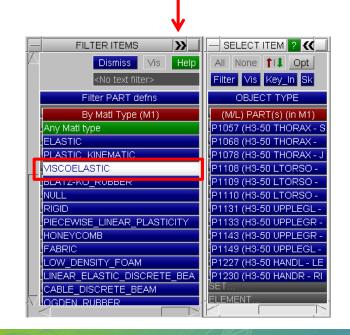
PRIMER – Object Menus



- Most actions in Primer involve using the Object menu to pick which entities the action will be performed on.
- The "Filter" option in the Object menu allows the user to find parts faster, especially in bigger models.

PRIMEF

 In the demo, selecting "Filter by MATERIAL type-> VISCOELASTIC" results in just 12 parts to pick from

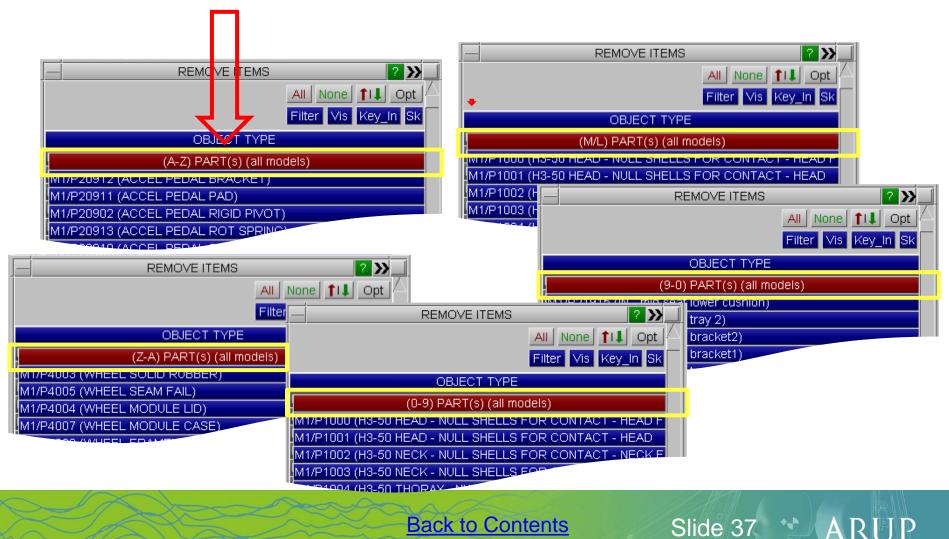


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ARHP

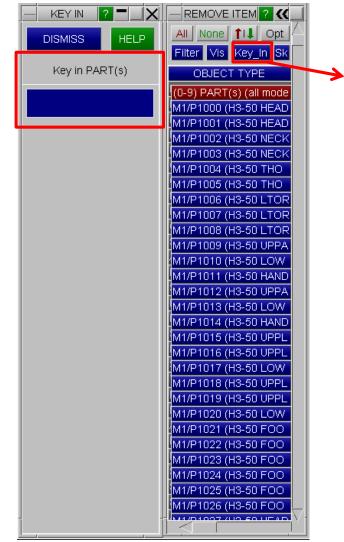


• Clicking on the red bar labelled "**PART(s) (all models)**" sorts the parts in the object menu by different quantities.



PRIMER – Object Menus





The "**Key_In**" command opens a text box for the user to input a particular part number.

- However, it is also possible to include a range, for example: 1000-2000.
- Or key in "101?" to select all part IDs consisting of four numbers beginning with 101.
- Or key in "1*" to select all parts beginning with 1.



ARUP



REMOVE ITEMS	2 >>
	None 1. Opt
Fite	
	options
OBJECT TYPE	Refresh Menus
(0-9) PART(s) (all models)	Add to Clipboard
M1/P1000 (H3-50 HEAD - NULL SHELLS FOR CONTACT - HEAD FRONT)	Rem from Cliphoard
M1/P1001 (H3-50 HEAD - NULL SHELLS FOR CONTACT - HEAD REAR)	Replace Clipboard
M1/P1002 (H3-50 NECK - NULL SHELLS FOR CONTACT - NECK FRONT)	
M1/P1003 (H3-50 NECK - NULL SHELLS FOR CONTACT - NECK REAR) M1/P1004 (H3-50 THORAX - NULL SHELLS FOR CONTACT - SKIN JACKET FRO!	Blank selected
M1/P1004 (113-50 THORAX - NOLL SHELLS FOR CONTACT - SKIN JACKET REAR M1/P1005 (H3-50 THORAX - NULL SHELLS FOR CONTACT - SKIN JACKET REAR	Unniank selected
M1/P1006 (H3-50 LTORSO - NULL SHELLS FOR CONTACT - JACKET TO PELVIS	Our has a set of set of a
M1/P1007 (H3-50 LTORSO - NULL SHELLS FOR CONTACT - ABDOMEN)	Explain
M1/P1008 (H3-50 LTORSO - NULL SHELLS FOR CONTACT - PELVIS SURFACE)	скріант
M1/P1009 (H3-50 UPPARML - NULL SHELLS FOR CONTACT - UPPER ARM LEFT	J)
M1/P1010 (H3-50 LOWARML - NULL SHELLS FOR CONTACT - LOWER ARM LEF	=T)
M1/P1011 (H3-50 HANDL - NULL SHELLS FOR CONTACT - HAND LEFT)	
M1/P1012 (H3-50 UPPARMR - NULL SHELLS FOR CONTACT - UPPER ARM RIGH	HT)
M1/P1013 (H3-50 LOWARMR - NULL SHELLS FOR CONTACT - LOWER ARM RIC	GHT)
M1/P1014 (H3-50 HANDR - NULL SHELLS FOR CONTACT - HAND RIGHT)	
M1/P1015 (H3-50 UPPLEGL - NULL SHELLS FOR CONTACT - THIGH LEFT)	
M1/P1016 (H3-50 UPPLEGL - NULL SHELLS FOR CONTACT - KNEE LEFT)	
M1/P1017 (H3-50 LOWLEGL - NULL SHELL FOR LOWER LEG FLESH)	
M1/P1018 (H3-50 UPPLEGR - NULL SHELLS FOR CONTACT - THIGH RIGHT) M1/P1019 (H3-50 UPPLEGR - NULL SHELLS FOR CONTACT - KNEE RIGHT)	
M1/P1019 (H3-50 COWLEGR - NULL SHELLS FOR CONTACT - NNEE RIGHT)	
M1/P1020 (h3-50 FOOTL - LEFT SHOE TOP - OGDEN RUBBER SHELLS)	
M1/P1022 (H3-50 FOOTL - LEFT SHOE INNER - ELASTIC SHELLS)	
M1/P1023 (H3-50 FOOTL - NULL SHELLS FOR CONTACT - LEFT SHOE BOTTO	M)
M1/P1024 (H3-50 FOOTR - RIGHT SHOE TOP - OGDEN RUBBER SHELLS)	
M1/P1025 (H3-50 FOOTR - RIGHT SHOE INNER - ELASTIC SHELLS)	
M1/P1026 (H3-50 FOOTR - NULL SHELLS FOR CONTACT - RIGHT SHOE BOTT	DM)
M1/P1027 (H3-50 HEAD - SKIN FRONT)	
M1/B1008 (H3 50 HEAD SKULL (BIGID))	, second s

- The options menu "**Opt**" can be useful for blanking and un-blanking selected parts.
- Also, adding or replacing on the clipboard the selected parts or removing the selected parts from the clipboard.

			LIS	TING				
Continue	Next page	Help	Quit	Save-	>File	Skip to end	I S	oool page
Listing of cl	ipboard co	ntents						
Model 1 (DEMO) contains	:						
PART								
1000	1001	1002	1003	1004	1005	1006	1007	
1008	1009	1010	1011	1012	1013	1014	1015	
1016	1017	1018	1019	1020	1021	1022	1023	
1024	1025	1026	1027	1028	1029	1030	1031	
1032	1033	1034	1035	1036	1037	1038	1039	
1040	1041	1042	1043	1044	1045	1046	1047	
1048	1049	1050	1051	1052	1053	1054	1055	
1056	1057	1058	1059	1060	1061	1062	1063	
1064	1065	1066	1067	1068	1069	1070	1071	
1072	1073	1074	1075	1076	1077	1078	1079	
1080	1081	1082	1083	1084	1085	1086	1087	
1088	1089	1090	1091	1092	1093	1094	1095	
1096	1097	1098	1099	1100	1101	1102	1103	
1104	1105	1106	1107	1108	1109	1110	1111	

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Α

PRIMER – Model Building From CSV

Model functions							
Create	Сору	Renumber	Utilities				
Read	Merge	Delete	List				
Write	Build	Contents	Modified?				
Apply	Build from csv targetting file						

- In the Model menu, select "Build" and then "Build from csv targeting file" from the drop down menu. Press Apply.
- It's possible to "Read CSV" file if one has already been made.

_	Model I	ouild from csv	file	<u> </u>
Read (CSV	Write CS\	/	Apply
Diffch	eck	Delete		write includes
	In	teractive mod	el builc	I
Build:	PEDHEAI	2		
Model:	TRIAN\ta	urus_markup.	key	Pick
Impactor:	ips\PEDE	STRIAN\head	l.key	Pick
		Make		
Orien Orien Orien Code Code		N3 is normal to ame/id D0	o impac	tor XZ plane
✓ Depe Type: Method:	Contact XYZ	500000	contac	t name/id
◯ Vertic Chin set r Method:		<none></none>]	
Z (for PED)LEG_LO\	VER) 0.0)	
Offse	t (for depli	oyable bonnet	:s)	
Distance		0.0		
Output dir	-	ado\jlr_top_tip	os\PED	
Output na	ime			
Reporter i	individua			
Reporter	summary			
Edit	loadcases			



- This function is used for impactor positioning in multiple locations on a model.
- Select the "Model" that is to be tested, and the "Impactor" file.
- This will create a certain number of cases with the impactor set up at different locations.
- Select the output directory for all the new models.

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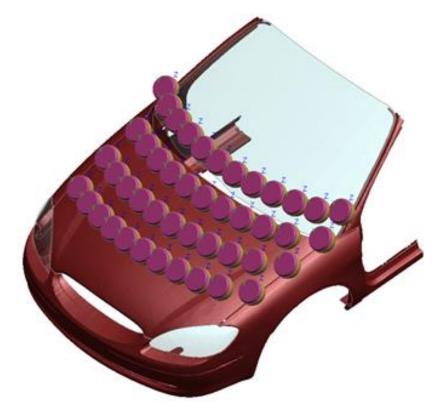


	Return to main panel							
idcases:								
Dir	Zone	×	Y	Sketo	:h all			
		0.0	0.0	Sketch	Рілк	$\left +\right $		
A2D	A2D	040.923	351.707	Sketin	Pick	Х		
A3C	A3C	012.008	11.4222	Sketch	Pick	X X		
A3D	A3D	96.6126	0.53487	Sketch	Pick	Х		
A4C	A4C	96.6126	0.53487	Sketch	Pick	Х		
				Sketch	Pick			
				Sketch	Pick			
				Sketch	Pick			
				Sketch	Pick			
				Sketch	Pick			
				Sketch	Pick			

Insert the locations of the impactor and the name of the directory to be created.

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• Go back to the previous menu and "Write a CSV" file for future use.

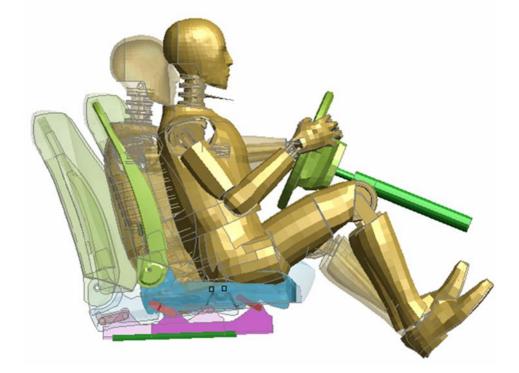


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ARUP

 Open this menu in order to "Edit the Loadcases", from the previous menu "Model Building from CSV".





- One mechanism may be linked to another, e.g. seat squab to dummy pelvis. Then the dummy and seat can be dragged together in a single action.
- Go into "Mechanism -> Position" and drag the seat to the desired location. If the dummy is "slaved" to the seat it will move with it.

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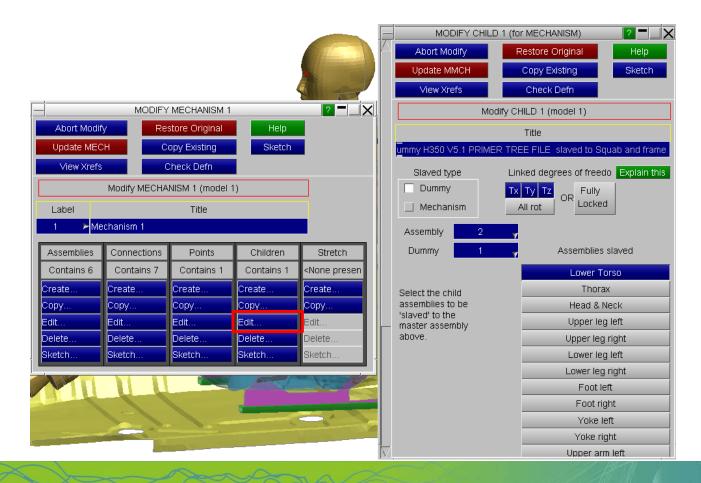
ARUP

PRIMER – Dummies and Seats



PRIMER

• This brings up the menu where the "**Master**" and "**Slave**" assemblies can be selected. It is possible to select which parts of the dummy are slaved to the seat assembly.



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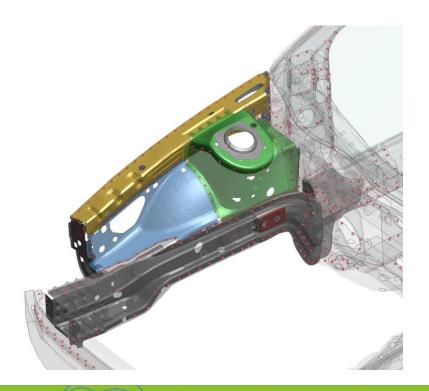
- In most cases after repositioning the seat and dummy it is necessary to re-fit the seatbelt.
- PRIMER remembers the belt information at the end of the keyword files so the belt can be re-fitted in one operation if the dummy is moved
- This can be done by going into "Occupant -> Seatbelts -> Auto-Refit" and selecting Apply if no further changes are to be made.

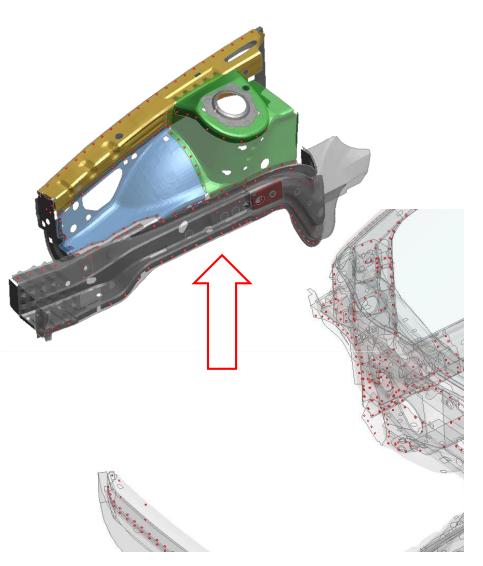






• Old meshes are removed, including any spotwelds and other connected items that are "internal" to the selected parts

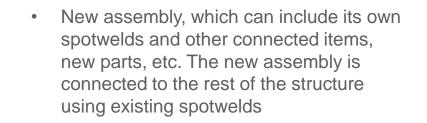




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ARUP



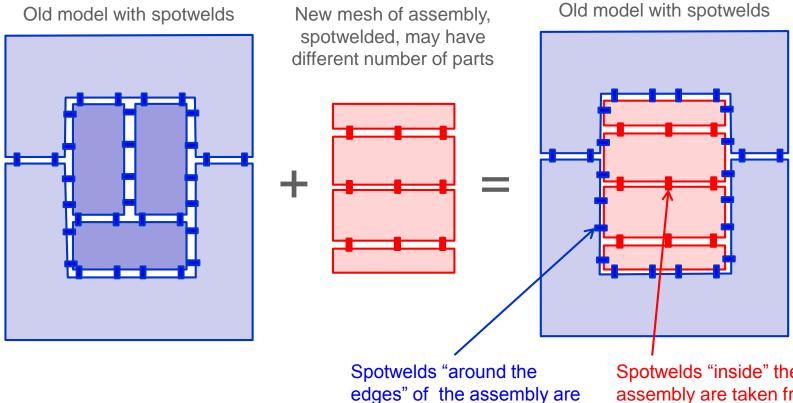


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ARUP





taken from the old model, and re-connected.

Spotwelds "inside" the assembly are taken from the new mesh

ARUP

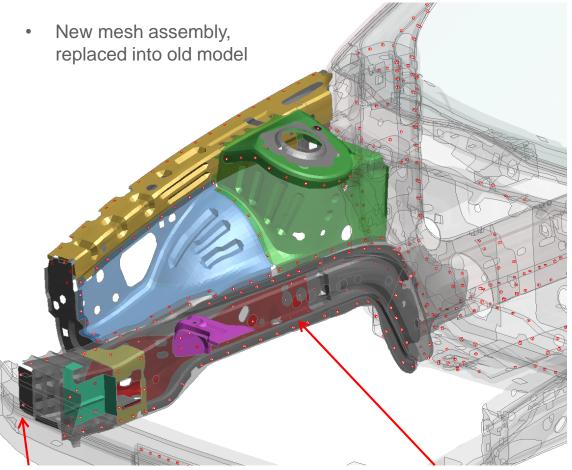
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<u>₽</u>	Pa	ırt	? 🗙
Create Copy Modify	Replace Delete Keyword	Sketch Table Check	Renumber Compare Pen check
🗆 replace mu	gle target par ltiple parts ma rt assembly mections	TChed by ID	EMBL ? (()
Action for *P/ Cartes and the set of the se	et data om source urce matl urce sect urce hgls urce eqos n Assembly sign mass tion deletion ge merge	OBJEC (M/L) PART SASS1 (parts SASS2 (from SASS3 (rear SASS4 (cent SASS5 (uppe SASS6 (glazi SASS7 (SUB	floor) re floor) er structure) ing) FRAME FOR FRAME FOR LR FOR BELT (demo)

Action for *PART data

- When replacing an assembly, if a part in the source model has the same label as a part in the assembly you are replacing in the target model, there are two options available for data on the *PART card:
 - **Retain target data** part will reference the section, material etc. that it references in the target model
 - Set data from source part will reference the section, material etc. that it references in the source model. With this option you can also choose to import the referenced section, material, section, hourglass and equation of state cards from the source model to the target model
- Note that if a part in the source model does not match the label of a part in the assembly you are replacing in the target model, all referenced data (section material etc.) will be copied across



Same capabilities as existing Part Replace: re-creating bolt connections, re-attaching entities to the new mesh, etc

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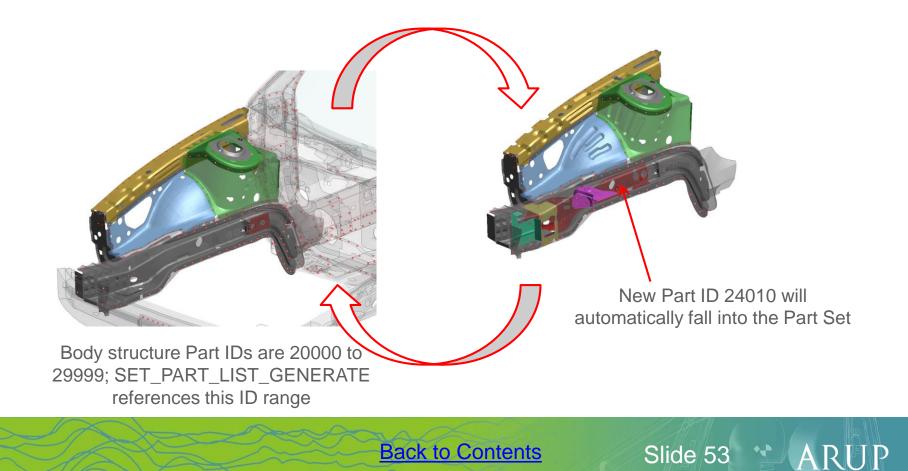
ARUP

Spotwelds "around the edges" of the assembly are taken from the old model, and re-connected

Spotwelds "inside" the assembly are taken from the new model



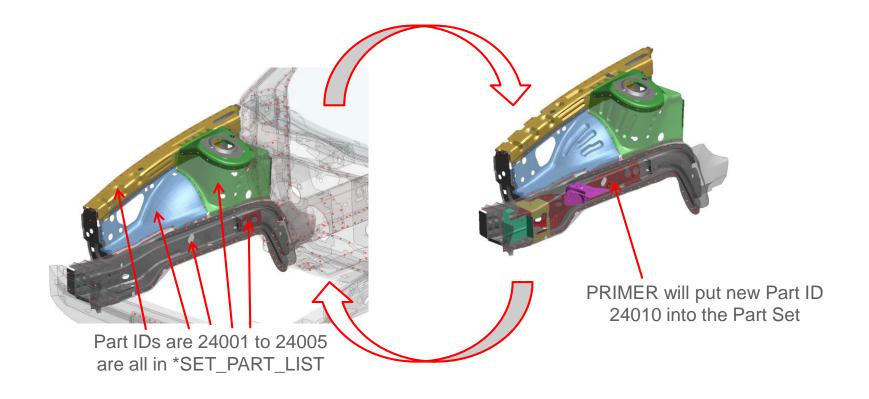
- How to ensure that new parts are in the correct Part Sets for contact, initial velocity, etc?
- Method 1 *SET_PART_LIST_GENERATE.
 - Incoming new parts are correctly numbered to fall within the ID range





ARUP

- How to ensure that new parts are in the correct Part Sets for contact, initial velocity, etc?
- Method 2 *SET_PART_LIST.
 - If ALL the outgoing parts are in the set, then the incoming parts will all be placed into the set automatically

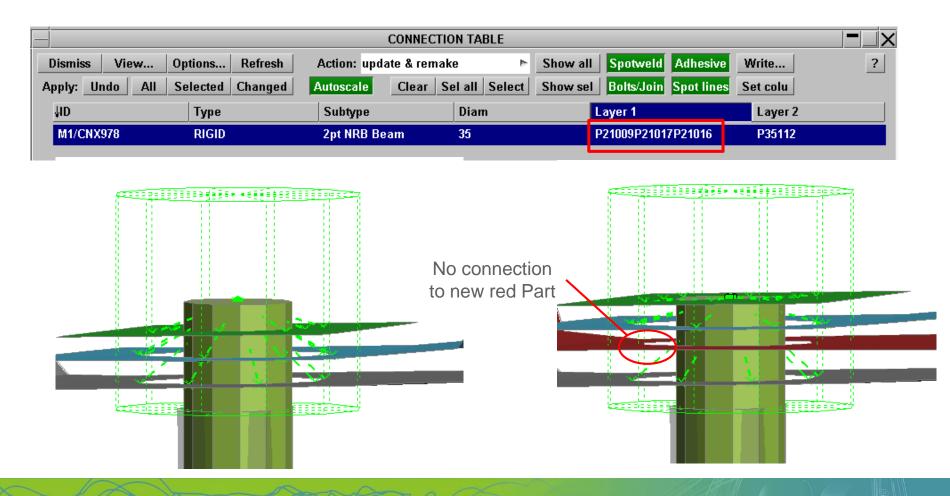






ARL

 Re-connection of bolt connections at the boundary of the new mesh depends on the definition method. If the layer definition consists of Part IDs, the bolt will re-connect only to those Part IDs, not to the new parts





Part Tree

ARUP

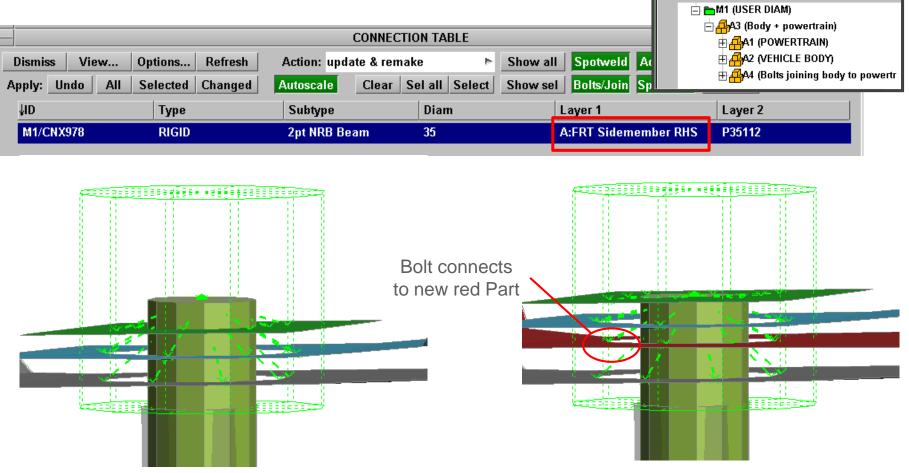
Opts - Blank Unblank Only Sketch Include

Type Refresh Clear Sel all Select Assembl

<< Undock

Content Find

• If Part Set ID or Part Tree Assembly name is used in the bolt definition, and if the new parts are included in that set or assembly, then the bolt will re-connect to the new parts too



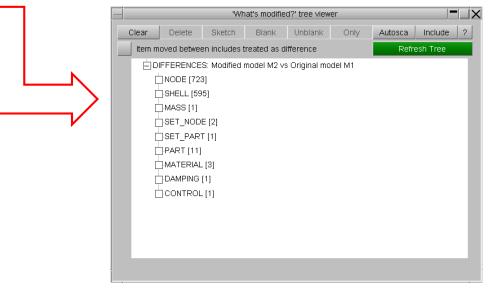
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Model functions										
Create	Сору	Renumb	be Util	ities						
Read	Merge	Delete	Lis	i						
Write	Build	Content	s Mo	dified?						
Apply	M	odel modi	fied?							
Modified Mod 2 (DEMO)										
Compare to:										
Original	Мо	del	File	ile						
Options	1 (DEM	10)								
	Outp	ut to:								
Screen	Clipb	oard	Tree V	/iew						
File	prime	.mod								
🗸 Use na	mes when	comparin	ig para	imet						
Further op	tions for P	art vs Pa	rt comp	oare						
Properties	Properties 🗸 Calculate part masses									
Geometries MIN/MAX: 0.0 10.0										
🖌 Auto fil	ter Parts fo	or geomet	try corr	pari						

- With two versions of a model open in the same Primer window, it is possible to compare the keyword files and find any differences between the two models.
- Go to Model ->Modified? and select one model as the Modified version and one as the comparing version. This can be a model already open, the original version of the current model, or another file which can be read in.
- Turn on the Geometries button if any changes in geometry are to be recorded. Then click on Apply.
- Primer will output a tree viewer listing all the differences.

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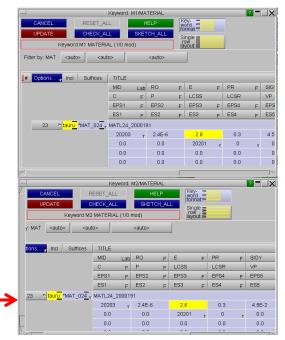


		'Wh	at's modifie	d?' tree viewe	r			-	
Clear	Delete	Sketch	Blank	Unblank	Only	Autos	sca	Include	?
Item mov	ed betwe		Refre	esh Tree					
Δ		M1/PART 20	443		_				
Ē	⊟-M2/								
		M1/PART 20 /PART 21001							
		M1/PART 21	001				av	/ailable act	ions
	ONLY	IN ORIGINAL	MODEL [1]		_			Sketch	
		L [3]					Details		
		R [3]					n/a		
	M2	/MAT_MODIF	IED_PIECE	WISE_LINEAR	R_PLASTIC		n/a		
		M1/MAT_MO	DIFIED_PIE	CEWISE_LIN	EAR_PLAS	БТІСІЛ	n/a		
	M2/	MAT_PIECE	MISE_LINE	AR_PLASTICI	TY 20203			Delete	
		M1/MAT_PIE	CEWISE_L	NEAR_PLAST	FICITY 202	03 🗕		Blank	
	M2/	/MAT_ELAST	IC 20406					Unblank	
		M1/MAT_ELA	ASTIC 2040	6		- e		Only	
								Edit	
								X <mark>r</mark> ef	
							С	opy N 1 ->	M2

- Right clicking on any of the entity differences opens a menu with the option of opening the Keyword.
- This opens a keyword for each model with the differences HIGHLIGHTED!

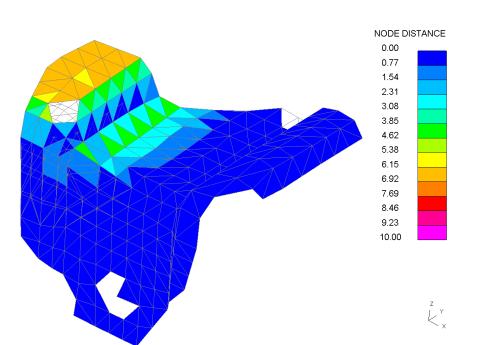
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- In the Part category of the tree viewer, Primer differentiates between differences in the properties or geometry of parts.
- It also list any entities that are only present in one of the models.
- When entities are present in the original model only, it is possible to copy them to the second model.



- Another option available when right mouse clicking on one of the differences is:
 - Checking and contouring geometric differences between parts.

'What's	modified?' ti	tree viewer	X
Clear Delete Sketch Blank Unbla	nk Only	Autosca Include ?	
Item moved between includes treated as d	ifference	Refresh Tree	
DIFFERENCES: Modified model M2 vs	Original mo	odel M1	
INODE [71]			
PART [4]			
DIFFER [4]			
M2/PART 237 [Property]			
M1/PART 237			
M2/PART 353 [Property]			
-M1/PART 353			
-M2/PART 388 [Property][Geom	etry availa	ilable actions	
M1/PART 388		Sketch	
M2/PART 401 [Property]		Details	
M1/PART 401	make	e SET_PART	
MATERIAL [2]	Par	arts -> table	
DIFFER [2]		irts -> geom	
M2/MAT_PIECEWISE_LINEAR_		Delete	
	_	Blank	
	-	Unblank	
	AR_F	Only	
	ĸ	Keyword	
		Edit	
- 		Xref	
	Cop	py M1 -> M2	



PRIMEF

JP

RU

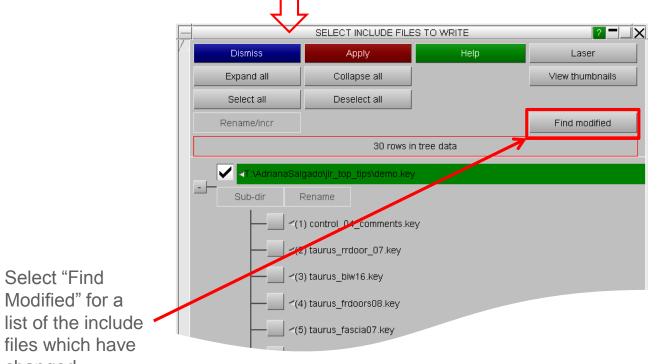
A





	Pre-output	check	? X
Pre-out	Clean up	Check	Review
<<< back	Pre-o	output ch	neck
Output:	 ☐ Alphabe ☐ Classic ✓ HM comminist ✓ Part colou ☐ Field head 	ents 🔽 -	ZTF output
Version:	971R6 🕨	·	NCL_1
Includes:	 □ Data not □ In sub-d □ Merge -> □ Select fil □ Master fi □ >> mastr □ >> mastr ✓ Suppress ✓ Write exist □ Write Para □ Write all s 	irecto > Mas es ile onl er dir reference ting *INC ameters	LUDE_PAT
Don't write	check file		•
Don't write	model mass a	and Cof(} ►
Don't write	include file m	ass	•
write out al	l connections		4
Write asse	mbly data in F	Primer fo	rmat 🕨

- In order to save only the include files with differences in them got to: Write -> LS-Dyna output options, then tick "Select files".
- When saving the file a new window will appear for the user to select the includes to be written.



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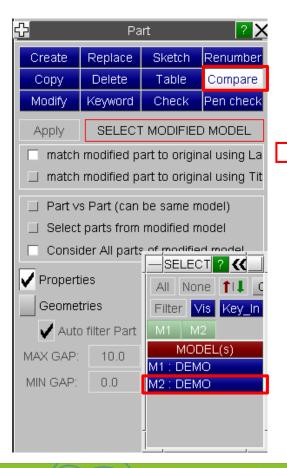
RUP

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changed.

 Another way to compare differences is to go into Part -> Compare and select the modified model.

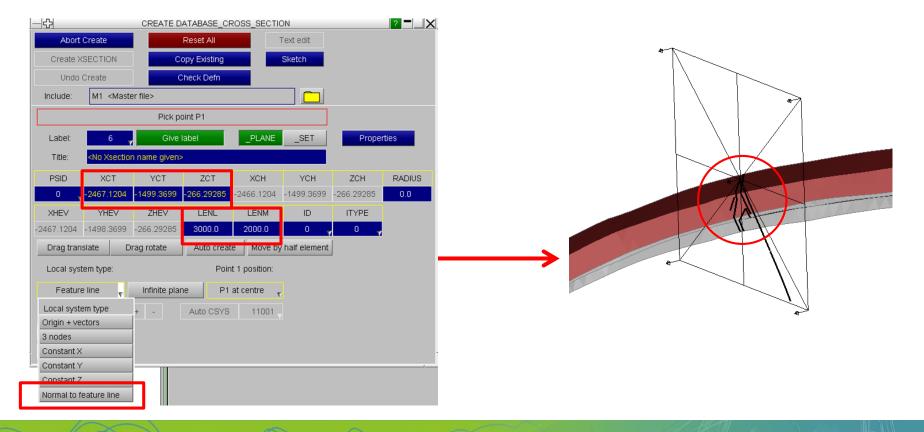


							PART	COMPARE							P	? -
0	Dismiss	View	Refres	sh		Clear	Sel all		show M2	2	value		lifference		igned diff	
	Table Ch	anges:	Undo	D Ap	ply	Removi	e selected		show M1		value		lifference	_ 0	liff as %age	
A	Part ID	Density	Modulus	Struct Ma	Dyna Part	Compone	C of G	Inertia (XX	Inertia (XY	Lumped M	Dyna Ad	%Added	Include	Numel	Smallest	Smalles
	M1/P202	1.2e-006	2	0.119723	0.116039	0.119723	[-1.832e+	(5.440e+0	[1.204e+0	0	0.000282	0.243814	taurus_fa	11543	2.247e-0	3.379e-
	M2/P202	1.2e-006		0.119723	0.116039	0.119723	[-1.832e+	[5.440e+0	[1.204e+0	0	0.000243			11543	2.369e-0	3.379e-
	M1/P202	1.2e-006	2.8	4.43261	4.41317	4.43261	[-2.349e+	[1.548e+0	[-1.244e+	0	0	0	taurus_fa	9414	2.540e-0	4.520e
	M2/P202	1.2e-006	2.8	4.43261	4.41317	4.43261	[-2.349e+	[1.548e+0	[-1.244e+	0	0	0	taurus_fa	9414	2.540e-0	4.520e
	M1/P202	7.89e-00	210	3.48065	3.43193	3.48065	[-1.061e+	[9.542e+0	[-3.686e+	0	0.001977	0.057607	taurus_fa	3219	7.915e-0	4.756e
	M2/P202	7.89e-00	210	3.48065	3.43193	3.48065	[-1.061e+	[9.542e+0	[-3.686e+	0	0.001977	0.057607	taurus_fa	3219	7.915e-0	4.756e
	M1/P202	1.2e-006		0.032601	0.031446	0.032601	(-1.563e+	[6.871e+0	[1.583e+0	0	3.84273e			3228	9.979e-0	1.501e
	M2/P202	1.2e-006	1.8	0.032601	0.031446	0.032601	[-1.563e+	[6.871e+0	[1.583e+0	0	0			3228	1.052e-0	1.501e
	M1/P202	7.89e-00	210	3.47608	3.42502	3.47608	[-1.065e+	[9.503e+0	[3.650e+0	0	0.001980	0.057832	taurus_fa	3219	7.915e-0	4.756e
	M2/P202	7.89e-00	210	3.47608	3.42502	3.47608	[-1.065e+	[9.503e+0	[3.650e+0	0	0.001980	0.057832	taurus_fa	3219	7.915e-0	4.756e
V	M1/P202	1.2e-006	2	0.378131	0.378131	0.378131	[-3.186e+	[4.859e+0	[3.270e+0	0	0	0	taurus_fa	1845	2.167e-0	3.258e

- This brings up a table of all the model parts and their differences with the original model.
- The table can be sorted by column and more properties can be added by clicking on "View".



- Cross sections can be created normal to a feature line by selecting this option in the "Local System Type" drop down menu.
- This allows the user to select a point on the feature line (XCT,YCT,ZCT) and the size of the plane (LENL & LENM).
- It is also possible to select the part set that the cross section is applied to (PSID).

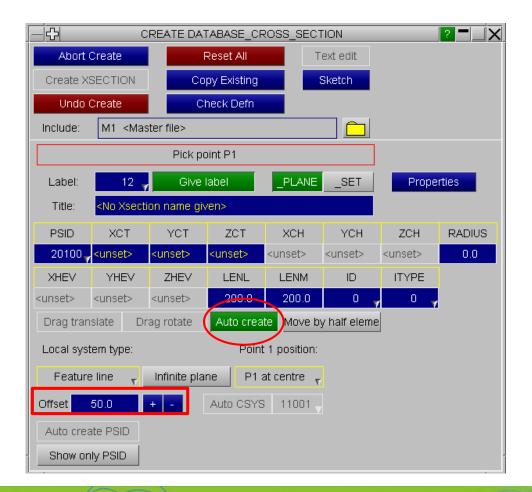


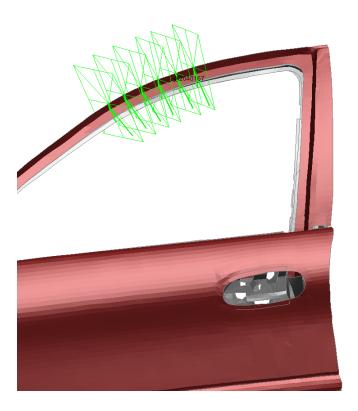


PRIMEF

PRIMER – Cross Sections

- Turn on the Auto Create option and set the Offset to 50 (or desired amount).
- Press "+" to create multiple cross sections along the feature line at a constant distance.





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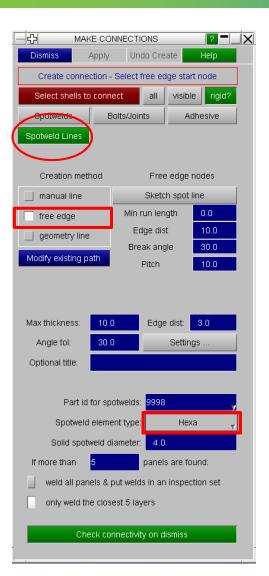
Α

PRIMEF

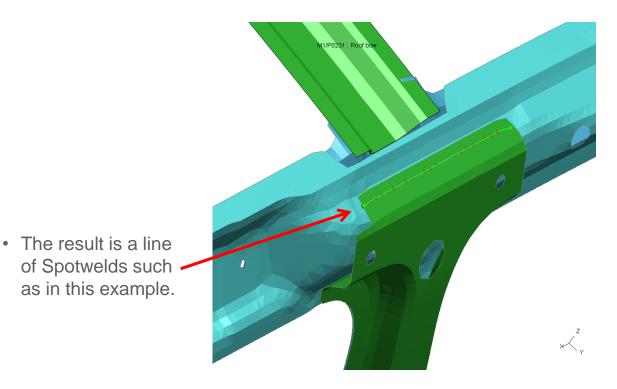


PRIMER – Connections





- A useful feature of Primer connections is that a line of Spotwelds can be created along a free edge.
- Set the distance from the edge and the size and type of the Spotweld element.
- Pick the parts to be joined and two nodes defining the free edge. Then click Apply.



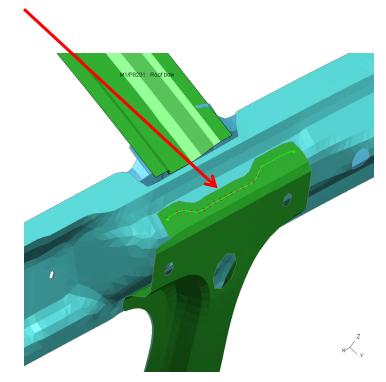
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PRIMER – Connections



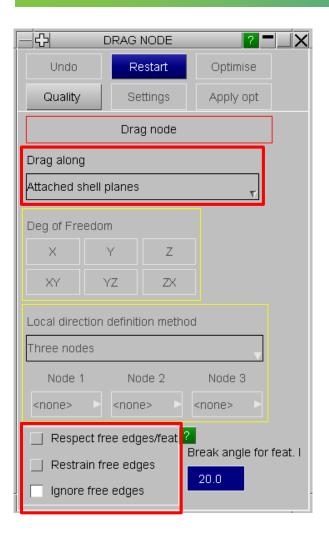
л С	Pa	art	? >			
Create	Replace	Sketch	Renumber			
Сору	Delete	Table	Compare			
Modify	Keyword	Check	Pen check			
Next >	SELE	CT TARGET 1	Part(s)			
🔲 replace si	ngle target pa	t				
replace m	ultiple parts m	atched by ID				
replace pa	art assembly					
🗌 renumber	option	- PART	2 🕊			
connection	n option	All None	↑ I↓ Opt			
🔲 assign ma	ss option	Filter Vis	Key_In_Sk			
re-attach i	•	M1 M2	M3			
set contro		(M/L) PART(s) (M1)				
transfer og	otions	M1/P8231 (R M1/P8700 (P:				
Re-att	ach?	M1/P8710 (P	· · ·			
🗸 remake conr	nections	M1/P8712 (P				
🗸 non-structur	al items	M1/P9998 (S M1/P82151 (F	· · · · ·			
🗸 structural ite	ms	M1/P99999 (I	· · · · ·			
🗸 masses						
🗸 import shells	on solid part					

- If one of the parts that were welded together needs to be replaced, first load the new version of the part.
- Go to Part -> Replace, select the old and new parts and make sure the "re-attach options" include "remake connections".
- The Spotwelds are re-made by Primer so that they still follow the free edge defined earlier.



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PRIMER – Mesh Quality and Modifying



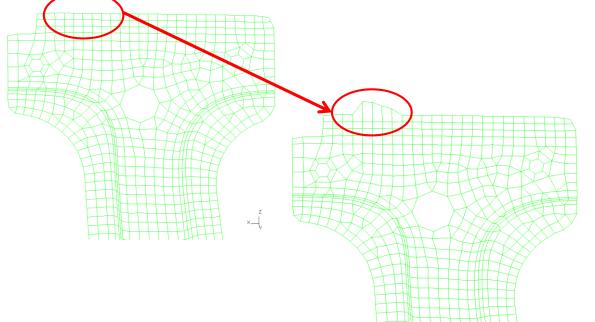
• A useful tool in Primer to make small changes to the mesh is "Drag Node".

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• This allows the user to move nodes along different directions, with the added feature of respecting or not any free edges.



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PRIMER – Mesh Quality and Modifying



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• To visualize the quality of the elements turn on the "Quality" button.

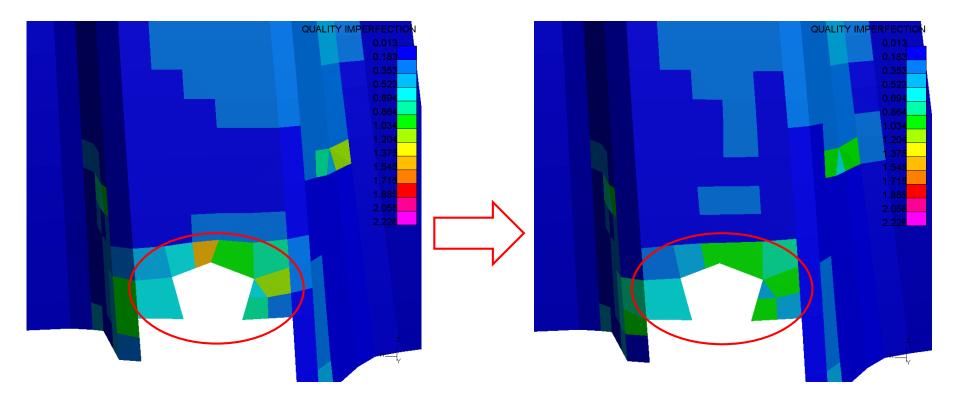
PRIMEF

- This plots the quality imperfection of each element by default.
- In order to change the plot click on "Settings". This brings up the "Element Quality Settings" menu where the user can select what is visualized.
- Selecting the Failed Criteria box allows the user to only colour the elements which are failing given a user defined criteria.
- Click on "Element quality options" to specify the criteria.

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PRIMER – Mesh Quality and Modifying





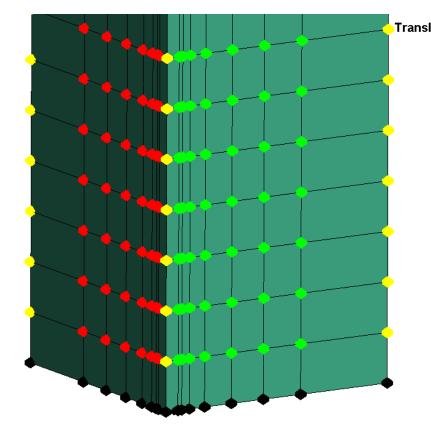
• It's useful to have the quality setting on when dragging nodes in order to visualize any improvements, given that the contour updates in real time.

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PRIMER - SPC display

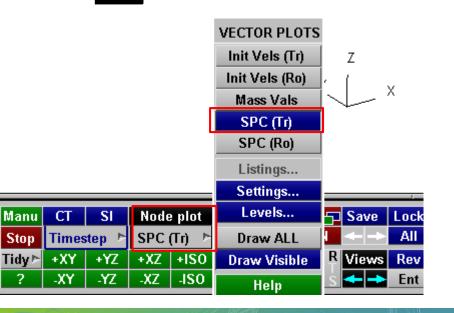


XGlobal)XYZZXYZYZZXYZZ

Translational or rotational restraints applied by either *BOUNDARY_SPC or MAT_RIGID can be plotted in PRIMER. The colour indicates the degrees of freedom of the SPC.

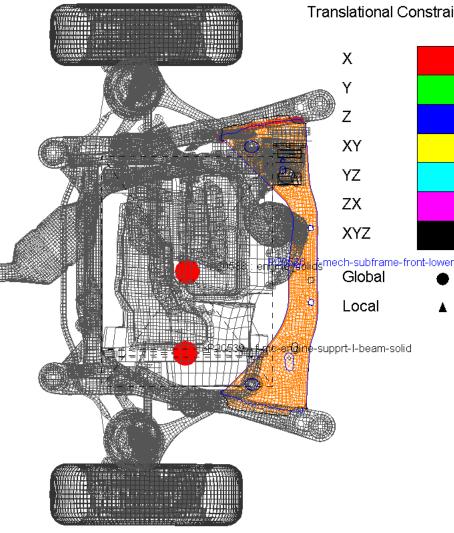
PRIMEF

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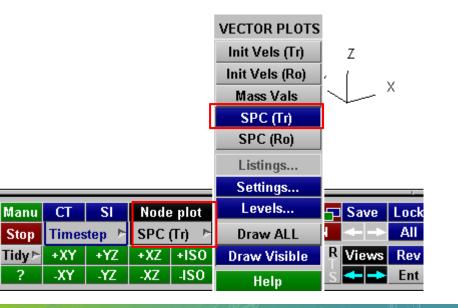
PRIMER - SPC display



Translational Constraint



For *MAT_RIGID, a larger circle is drawn at the Centre of Mass. This may be hidden inside the part; we recommend to draw in Line mode.



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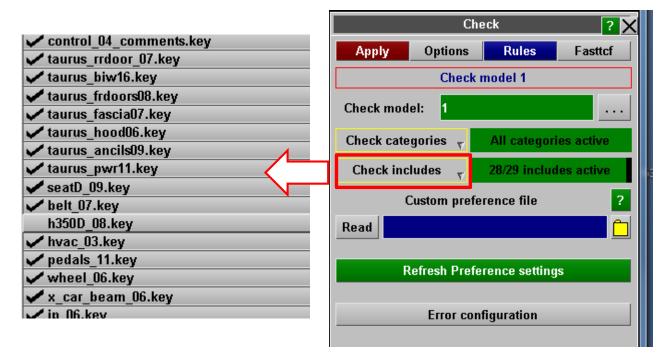
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When I perform a Model Check, how can I stop Primer reporting errors in standard dummy models?

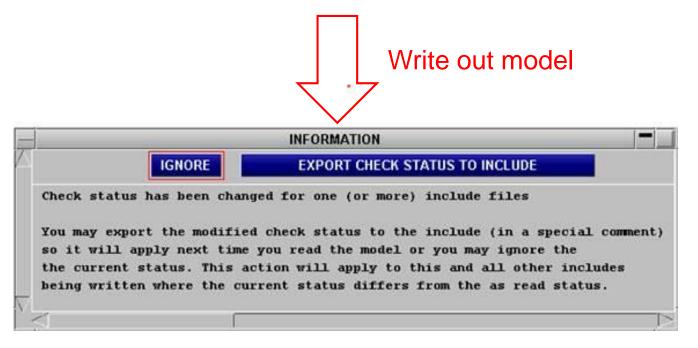
How can I find errors in the Include file for which I am responsible?



Switching off the checking for an Include File means "do not check the entities in this Include File". Entities in other Include files might still have errors caused by entities in the switched-off Include Files, and these errors would still be reported.

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Comment at top of Include File

// (same comment could be added by text-edit)

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\$PR_SUPPRESS_INCLUDE_CHECK



ARUP

_					Error tree	viewer	
Recheck	Clear	->error mo	de ->it	em mode	list	show tags	?
Autofix	Delete	Sketch	Blank	Unblank	Only	Autosca	Recheck
⊨ E	RROR [11]						
	CONNECT	ION [3]					
0	CONSTRA	INED [1]					
_ [NODAL_R	IGID_BODY [1	1]	How	can I s	top Prime	er reporting a certain type of error?
L C	SPOTWEL	.D [1]					
L C	CONTACT	[3]					
C	DEFINE_C	URVE [1]					
0	-BEAM [1]						
E	MATERIAL	. [3]					
	⊞ MAT_2	4 etc: <lcss< td=""><td>> curves s</td><td>tarts at yiel</td><td>ld stress Y</td><td><= 0.0 (4)</td><th></th></lcss<>	> curves s	tarts at yiel	ld stress Y	<= 0.0 (4)	
		4 etc: <lcss< td=""><td></td><td></td><td></td><td></td><th>_</th></lcss<>					_
	⊞ MAT_2	4 etc: table c	urves cros	s at strain ·	< EPPF (1)		
E E	NODE [1]						
C							
	CUSTOM						
Ėν	ARNING [11	-					
	-NODAL_R	IGID_BODY [2	2]				



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_				E	Error tree v	viewer	
Recheck	Clear	->error mo	de ->i	tem mode	list	show tags	?
Autofix	Delete	Sketch	Blank	Unblank	Only	Autosca	Recheck aff
⊨ E	RROR [11]						
	CONNECT	ION [3]					
	CONSTRA	INED [1]					
	NODAL_R	IGID_BODY [1]				1. Switch on "Tags"
	SPOTWEL	.D [1]					2. Note the Tag for this type of error
	CONTACT	[3]					
	DEFINE_C	URVE [1]					
	-BEAM [1]						
E	MATERIAL	. [3]					
		24_10: MAT_2	24 etc: <1	.CSS> curve	s starts at	yield stress Y	Y <= 0.0 (4)
	⊡ M_ST_	24_04: MAT_2	24 etc: <1	.CSS> curve	does not	begin at strai	ain X = 0.0 (6)
	<u></u> <u> </u>	24_07 MAT_2	24 etc: ta	ble curves c	ross at stra	ain < EPPF (1	1)
	NODE [1]						
	- PART [2]						
	CUSTOM	CHECK [1]					
ĖΝ	VARNING [11]					
	-NODAL_R	IGID_BODY [2	2]				



M_ST_24_07	WARNING
M_ST_24_10	IGNORE
PART_122	ERROR

3. Create "error configuration file"

4. Set preference to refer to this file

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ARUP

_		Prefer	ences for Primer
File	e Edit	1	
Δ.	🛨 assign_mass	Name:	primer*error_configuration_file
Ē	⊥ attached	Type:	<string></string>
	🕂 binary	Description:	user file to configure error/warning/ignore status
	⊢ checking	Active:	
	_rechecking_level		
	🕂 contact	Value:	C:\Program files\Oasys12\error_config.txt
	error_configuration_file		
	error_tags		
	⊕ -history		
	⊞ include		

PRIMER

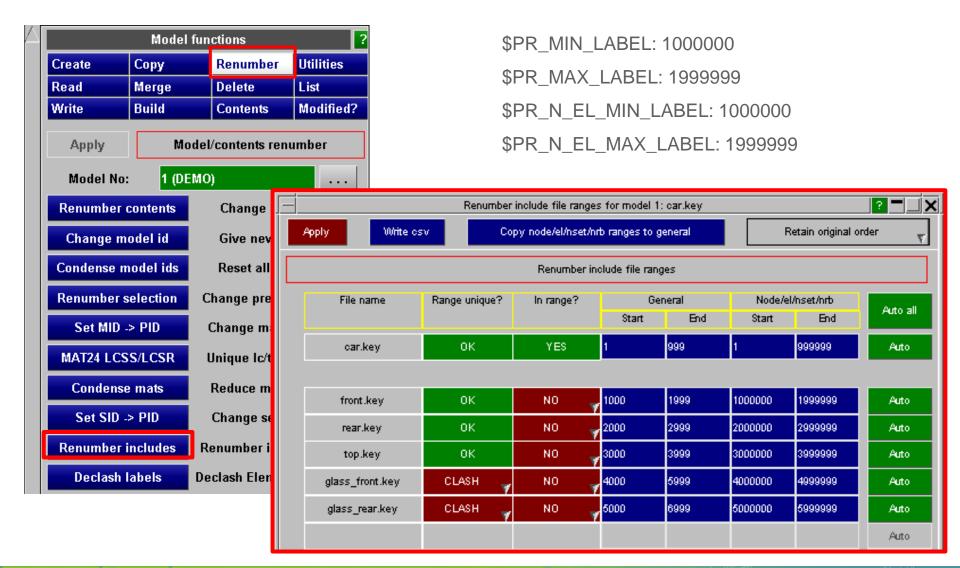
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My company has a numbering scheme defining the IDs for each Include File. What is the easiest way to implement that in Primer?

- Example:
 - Barrier:
 - Dummy (driver):
 - Dummy (passenger):
 - Engine:
 - Suspension:
 - Body:

1-999999 1000000-19999999 2000000-29999999 5000000-59999999 6000000-69999999 10000000-199999999





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- Some PRIMER capabilities are issued in the form of scripts.
- See Tools=>Scripts



			То	ols			
Ass	sign ms	Conn	ectio	Mass F	rop	Remo	ve
Atta	ached	Cut s	ect	Measu	re	Rigidif	v
Bla	nking	Find		Mecha	nis	Script	
BO	M	Grou	ps	Meshin	g 🧳	Units	
Che	eck	Inclue	de	Occup	ant 🚽	Xrefs	
Clip	board	Load	Path	Orient			
Coa	at	Macro	0	Other	7		
+			Keyw	ords			Ţ
Mod	lel	Part tr	ee	Script			
		•		NOT	<u>а</u> ст		
		Currei	nt laye	r: NOT (SET		
R	Run	Chec	k E	Incrypt	D	ebug	?>
Me	erge						
	Jav	aScrip	ot exec	ution wi	indov	N	
E	ile:						<u> </u>
F	lle:						
		File	enco	ding: L	ATIN	J 1	7
	М	emory	size ((MB):	25		
				Sho	ortcu	t keys	
Δ	Spie	der	Bean	1->IGE	Con	apute F	м
	· · ·						_
				ert spot			_
	FMVSS			moved		ti Paran	_
	Multi-du	immy	SPH-	MESH	Sec	tion pro	р
	create_	webg	pede	strian_i			

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	Kr I								2 - X		
					Impact po	ints visuali:	sation				
5- 50-55	× ×	x	Y	Z	Horizo Max	ontal appro: Min	ach angle Actual	Vertical Angle	Velocity	Sketch all	
	AP1	2201.75	-518.47	1242.02	255.00	192.00	223.50	AUTO	6666.67	Visualise	?
	AP2	2048.91	-574.93	1154.02	255.00	192.00	223.50	AUTO	6666.67		?
	AP3	1927.73	-609.67	1090.47	255.00	192.00	223.50	AUTO	6666.67	Visualise	?
	BP1	2730.10	-435.10	1350.97	345.00	195.00	270.00	AUTO	6666.67	Visualise	?
	1				245.00	405.00	070.00		0000.07	Manallan	0

- Calculates impact points according to rules of FMVSS201
- Angles and velocity can be modified by the user
- Creates impact point file (csv format)

Max	Min	Actual	Angle			
255.00	192.00	223.50	AUTO	6666.67	Visualise	?
255.00	192.00	223.50	AUTO	6666.67	Visualise	?
255.00	192.00	223.50	AUTO	6666.67	Visualise	?
345.00	195.00	270.00	AUTO	6666.67	Visualise	?
345.00	195.00	270.00	AUTO	6666.67	Visualise	?
345.00	195.00	270.00	AUTO	6666.67	Visualise	?
345.00	195.00	270.00	AUTO	6666.67	Visualise	?
345.00	270.00	307.50	AUTO	6666.67 M1	:Main file se	?
345.00	270.00	307.50	AUTO	6666.67	Visualise	?
180.00	180.00	180.00	AUTO	6666.67	Visualise	?
180.00	180.00	180.00	AUTO	6666.67	Visualise	?

PRIMER - Barrier positioning tool

Crash Test Setup								
	RASH TEST	2. VEHICLE	> 3. E	BARRIER NEXT Preferences Cancel Help				
SEARCH:			Search	PREVIEW: Side Impact (Side Impact (R-point))				
FILTER BY: Reg REG. BODY V EuroNCAP EuroNCAP EuroNCAP FMVSS FMVSS FMVSS FMVSS FMVSS IIHS IIHS IIHS UN-ECE UN-ECE UN-ECE			Ustom Groups (all) CUSTOM GROUP My Job 027 <default> Tutorial,0asys Favourites My Job 027,0asys Favourites At+R,Tutorial,My Job 027 Tutorial AT+R,Tutorial,My Job 027 My Job 027,0asys Favourites My Job 027,0asys Favourites Tutorial,0asys Favourites, 0asys Favourites,Tutorial AT+R,Tutorial,0asys Favo</default>	Image: state of the				
posit apply • Inclu	ioning th /ing initia des the (etup script e barrier ar al conditions detailed rule est protoco	nd s es for	EuronNCAP Side Impact (MDB) regulation details: Impact: mobile deformable barrier propelled into side of vehicle Alignment: with R-point Initial Velocity: 50 km/h Height above ground: 300mm Barrier: European mobile deformable barrier • Step 1 — select crash protocol				

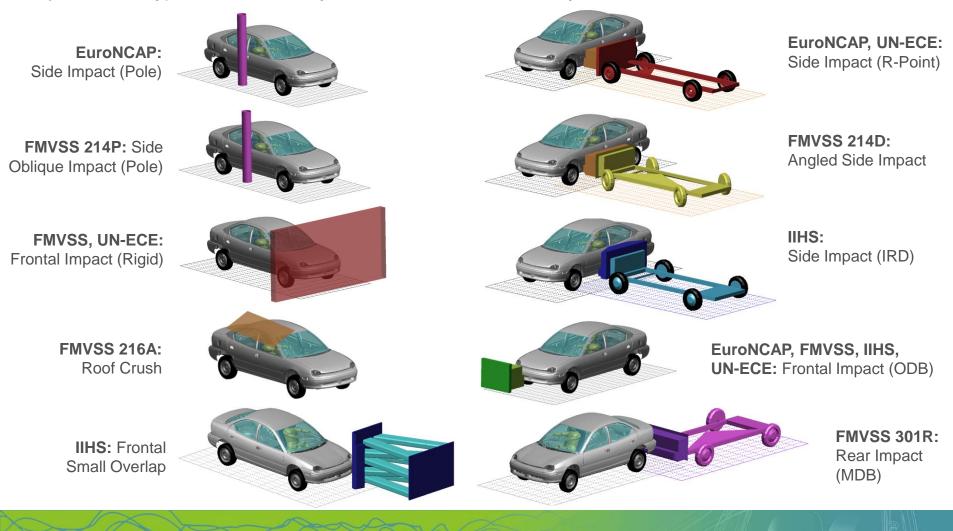
PRIMER

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PRIMER - Barrier positioning tool

The supported crash test protocols are listed here. Small changes to these crash types (e.g. impact velocity) can be made by the user and saved easily:



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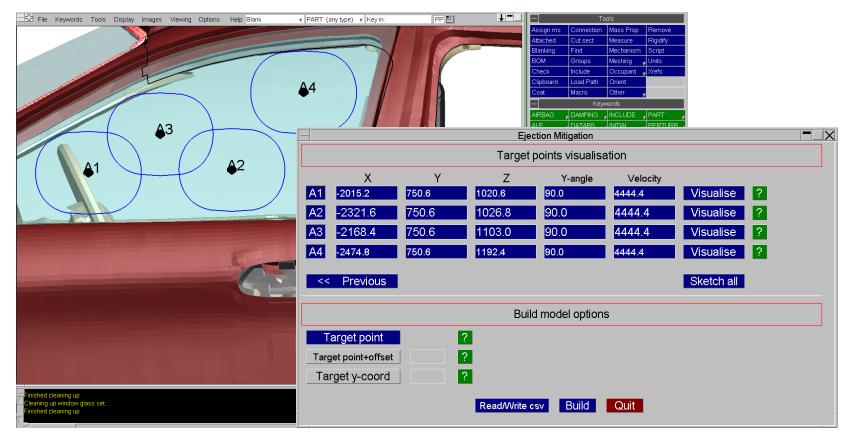
PRIMER - Ejection Mitigation (FMVSS 226)



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- Calculates impact points according to rules of FMVSS 226.
- Multiple models can be built automatically.

PRIMER - SPH Volume Creation Tool



• Script for creation of SPH elements within an enclosed volume.



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- oa_pref files are text files saved on your system that contain preferences used by Oasys software.
- These are useful so you don't have to change settings every time you open PRIMER/D3PLOT etc.
- The file will contain lines that look like this:

primer*display_factor:	1.40
primer*display_brightness:	1.00
primer*display_saturation:	1.00
primer*button_gradation:	0.00
primer*font_size:	default
primer*font_type:	helvetica
primer*background_colour:	WHITE





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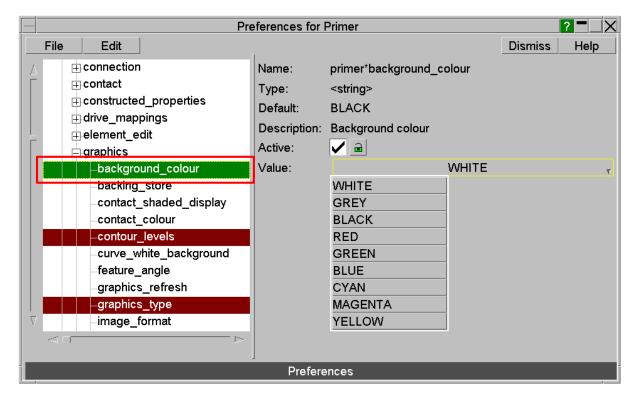
• Preferences can be set in PRIMER through the "Options" menu:

	 File	Keywords	Tools	Display	Images	Viewing	Options	Help Blank	v PAR	T (any
Г						_	🗸 Refre	sh ⊳		
L							Blanki	ng mode 🕞		
L							🗸 Param	neter displ 🗠		
L							Panel be	haviour		
L							Window s	size & layou		
L							Edit prefe	erences		
L							Refresh I	Primer pref		
L							Menu attr	ibutes		
L							Shortcuts	;		
L							Program	options		
L							Pick & Se	elect option		
L										
ι.										



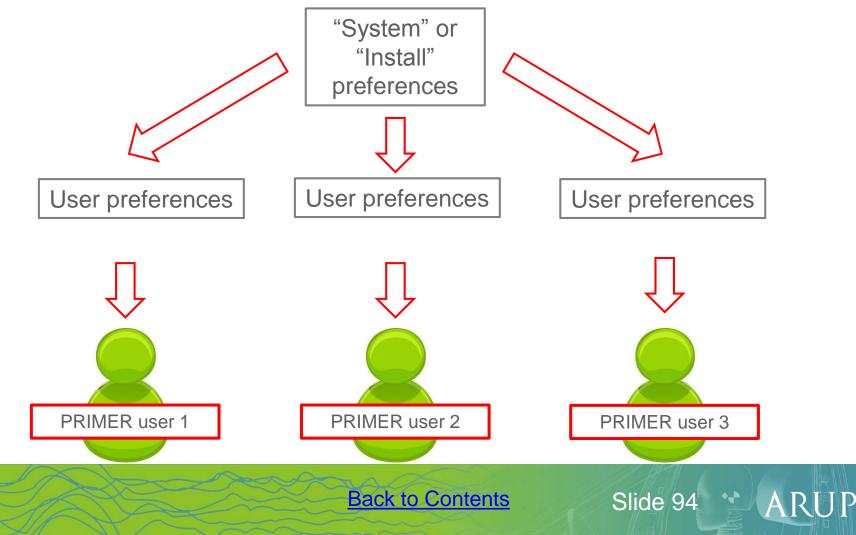


 Preferences can be changed in the preference panel which opens. The example below shows how to change the background colour of the graphics window.





oa_pref files can be read from a number of locations





 When opening the preference panel, you may get a message about modifying the install preferences – this is because preferences can be saved in a number of places:

Preferences for Primer							
File Edit		Dismiss	Help				
File Edit ⊕ All programs ⊕ D3PLOT ⊕ PRIMER ⊕ REPORTER ⊕ SHELL ⊕ T/HIS	Preferences Question Change install preferences? You have permissions to modify the Install preferences (affecting everyone who runs this installation of Oasys Ltd software). Do you want to modify the Install preferences? Yes No	Dismiss					
	Preferences						





- oa_pref files can be stored in 4 locations:
 - OA_ADMIN top level configuration often the same as OA_INSTALL
 - OA_INSTALL
 Installation level (location of executables)
 - HOME users personal home area
 - Current working directory (rarely used)
- Oasys software will read the oa_pref files in the order above. When modifying
 preferences from within the software, if you get the option shown on the
 previous slide, it is because you have permission to change the preferences
 stored in the installation area. If you do have permission and choose not to
 modify the installation preferences, any preference modifications will be
 saved in the HOME area.
- If you do not have permission to change installation preferences, any preference modifications will be saved in the HOME area.





ndon)			
Help Blank	PART (any type)	r Key in:	PP 🛄
User Manual			
Support			
What's New	primer11.pdf		
About			

 Don't forget that every version of Primer comes with a PDF detailing all the new functions added in that version.



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PRIMER Top Tips

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