

# Modelling Bridging using Tekla Structures

*Date 15<sup>th</sup> May 2007*

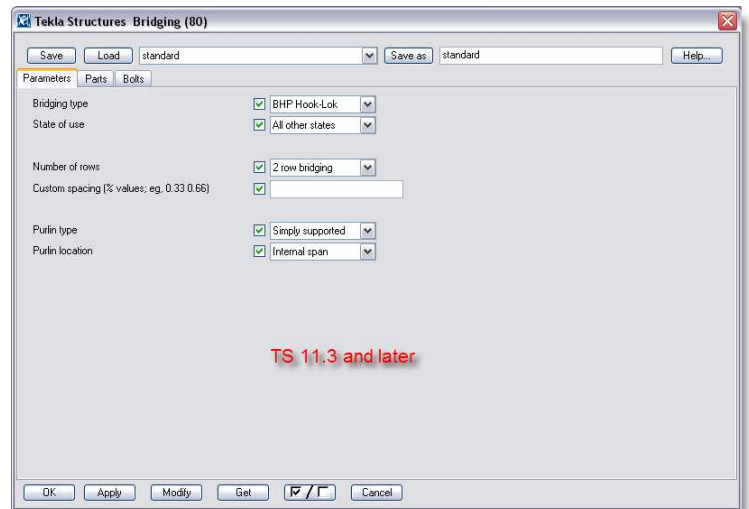
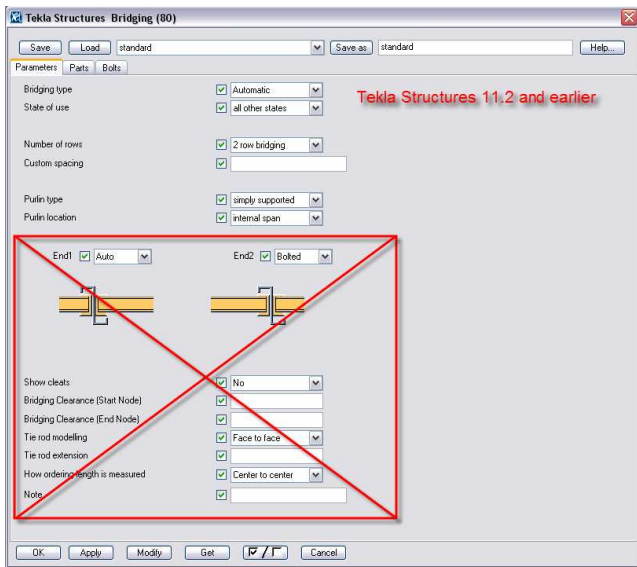
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## 1.0 - Changes made to the Bridging Component (80) for TS11.3

In response to the numerous requests to improve the functionality of the Bridging Component (S80) Tekla made some improvements for version 11.3. Not all the improvements were successful but I will list below the changes that have been made and what the current issues are. These are the changes that were made:

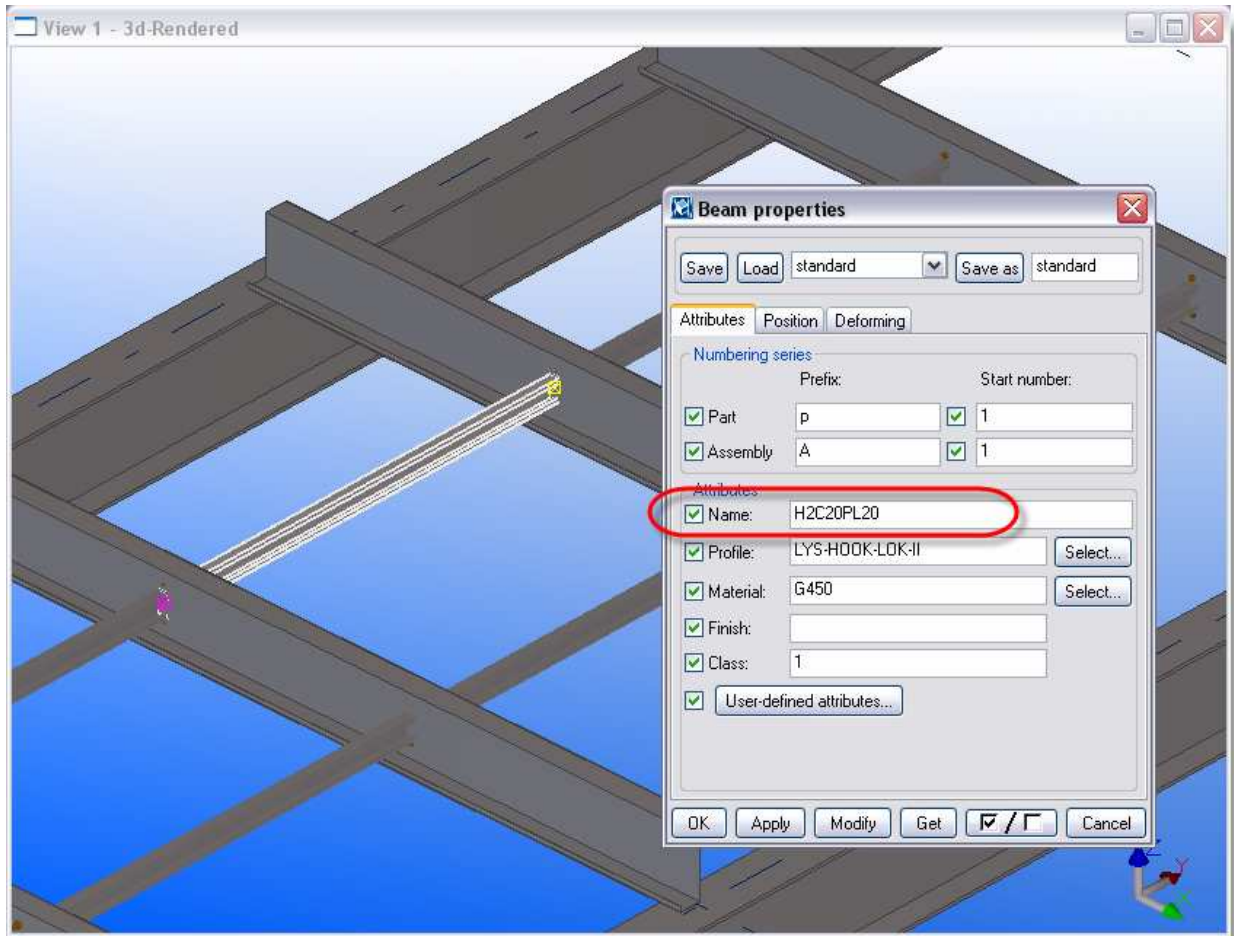
1) Firstly all of the options that were at the bottom of the “Parameters” tab have been removed. Most users reported that they were confusing or didn’t use them anyway.



2) Now the first and last connection in the run of bridging is bolted and the intermediates connections are all a clamp/locator arrangement.

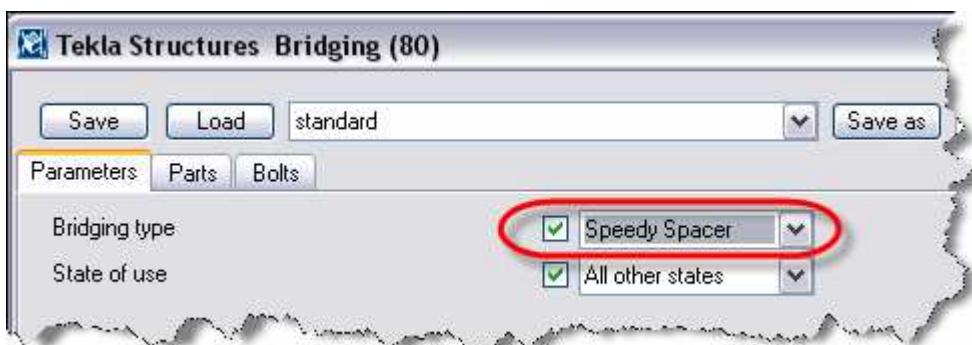
3) Skewed end wall enhancement - Since TS11.3, the Bridging S80 Component will now also work for skewed end wall cases where the Purlins get shorter or longer as they progress down the building. The macro was re-written so that the bridging spacings are now calculated based on the insertion points of the longest Purlin. Previously the bridging spacings were calculated using the distance between the two rafters.

4) All ordering codes are now shown in the main member properties dialog and no longer in the user defined attributes.



5) The User Defined Attributes dialog is no longer used at all for bridging members not even for the length. The length in the report is now as per the length of the Bridge in the model.

6) “Speedy Spacers“, which are gaining in popularity in NSW are now an option when used in conjunction with Stramit Purlins only.

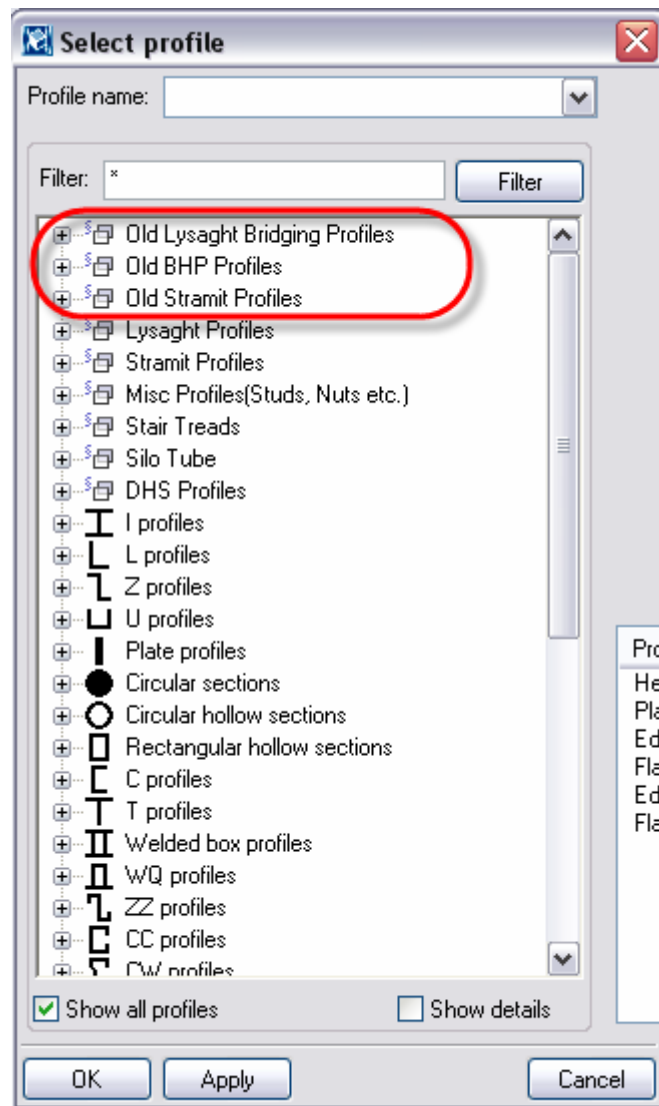


## 2.0 - Changes made to the Bridging Component (80) for TS13.0

1) The brnam.dat file has been revised to now call up LYS\* profiles for all Bridging members and not BHP\* profiles such as BHP-HOOK-LOKII and BHP-CONVENTIONAL etc..

### 2) Updated Profile Catalog for TS13.0

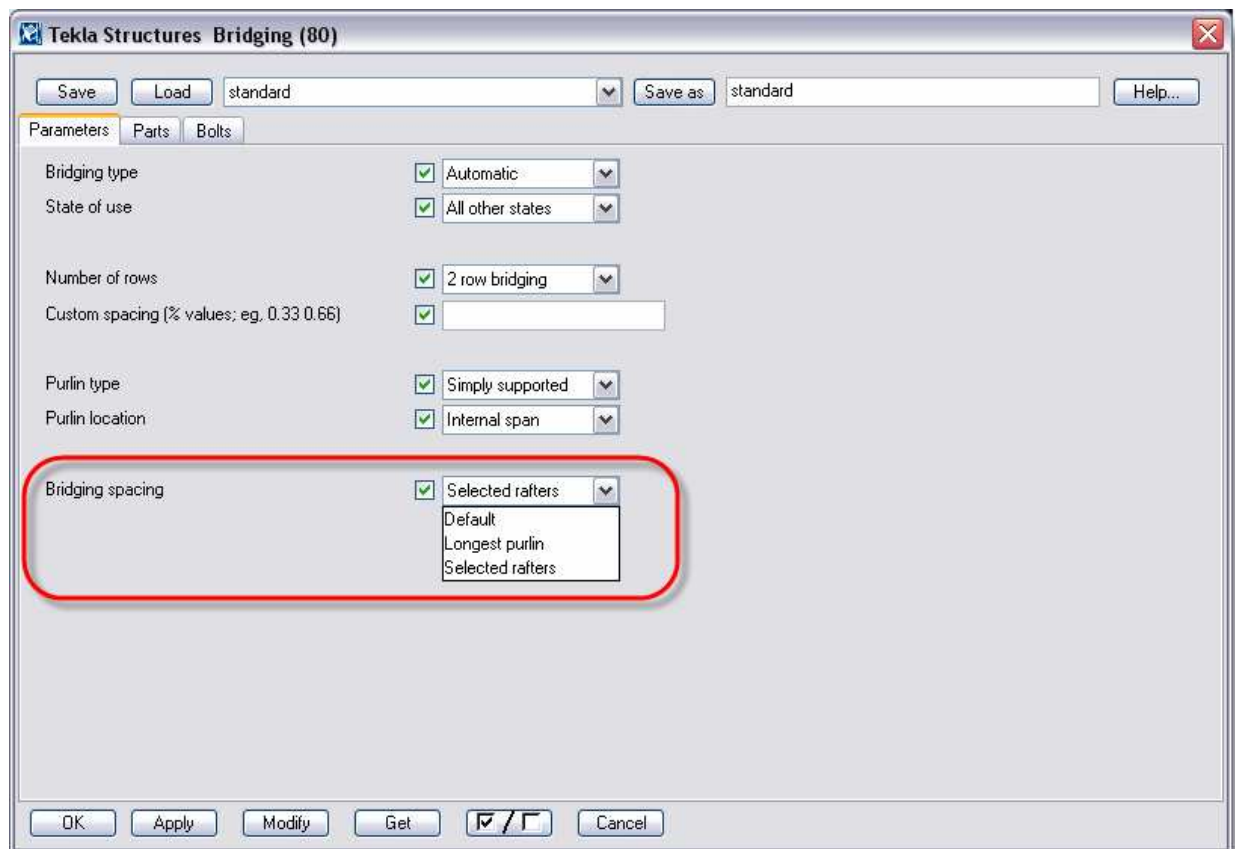
We have updated the profile catalog for TS13.0 to separate out the old Bridging profiles from LYS, BHP and Stramit that we should no longer be using. They are now grouped together at the top of the profile catalog branch as shown here. Do not use these profiles as the Bridging list report will not list them.



### 3) Bridging spacings can now be based on longest Purlin or Rafter centres

In TS11.3 we made a change to the Bridging macro to allow it to work correctly on skewed end bays where the last Rafter is skewed relative to the rest of the rafters therefore causing the Purlins to get shorter along the run. The macro therefore was changed to calculate the Bridging Spacings on the longest Purlin but unfortunately that decision caused us problem. We found that there were then problems when users did not model their Purlins from centerline of Rafter to centerline or Rafter and in cases where they had double span Purlins.

So for TS13.0, Tekla have changed the macro so that you now have a choice as to how the Bridging Spacings are calculated. See below:



### 3.0 - Using the Bridging (80) component

Unfortunately the Tekla Help files for this component are not up to date so we have put together some information here to allow you to understand better how the Bridging Component works.

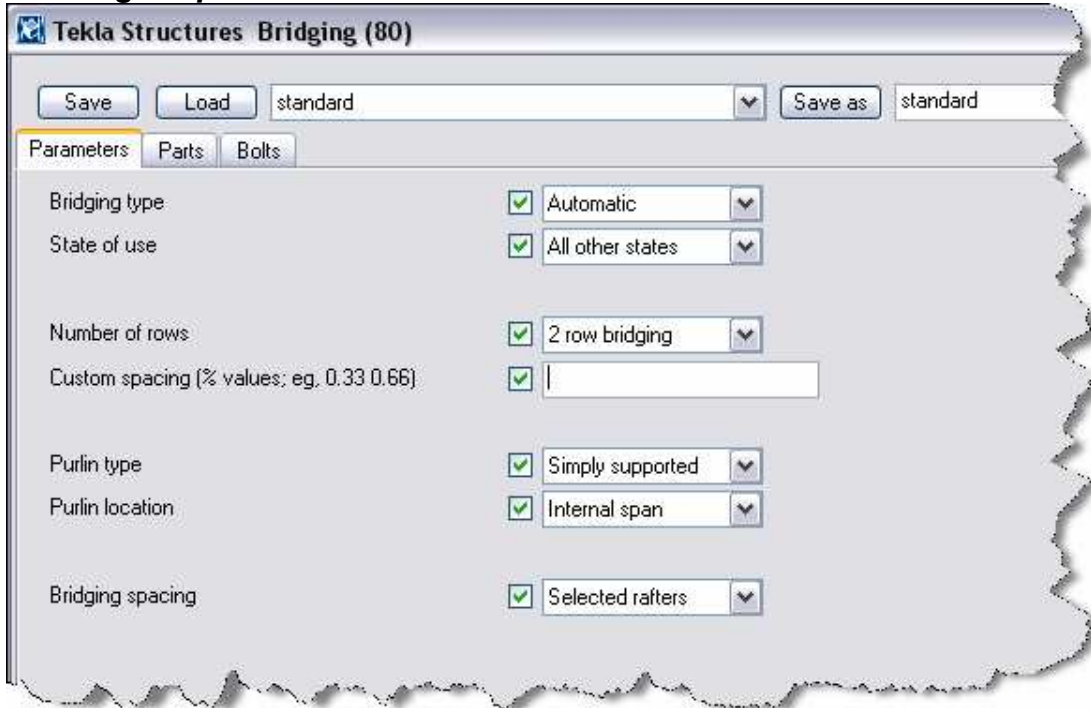
This macro creates Bridging elements for the following types of Australasian Cold-rolled profiles:

- **Lysaght**
- **Stramit**
- **Dimond**

#### *To use....*

1. Open the Bridging (80) Component dialog by double-clicking the Bridging icon or choosing the component from the Component Catalog.
2. Set the properties as required in each. See the 'Defining properties' section below for more details.
3. Click the **Apply** button, then click the **OK** button to close the dialog box.
4. Pick the first rafter.
5. Pick the second rafter.
6. Pick the first Purlin.
7. Pick the remaining Purlins in one direction only..
8. Click the middle mouse button to end picking.

### Defining Properties...



Field	Description	Options
<b>Bridging type</b>	Use the Automatic option to have Tekla Structures calculate the bridging type using the brnam.dat file and based on the Purlin profile. eg. If you use Lysaght Purlins, a Lysaght Bridging system will be used. The component searches for the first line in the brnam.dat that contains the matching profile name compared to the Purlin.	<ul style="list-style-type: none"> <li>• Automatic (default)</li> <li>• LYS Hook Lok</li> <li>• LYS Conventional</li> <li>• Dimond FastBRACE</li> <li>• Dimond Hi Span</li> <li>• Stramit</li> <li>• Stramit Conventional</li> <li>• Stramit Rod</li> <li>• Speedy Spacer</li> </ul>
<b>State of use</b>	In Victoria and Tasmania different Bridging Codes are used. Choose the applicable state that the Bridging will be ordered from	<ul style="list-style-type: none"> <li>• V/T</li> <li>• All other states</li> </ul>
<b>Number of rows</b>	Defines the number of Bridging Rows	<ul style="list-style-type: none"> <li>• 1 Row Bridging</li> <li>• 2 Row Bridging</li> <li>• 3 Row Bridging</li> <li>• Custom</li> </ul>
<b>Custom Spacing</b>	If 'Custom' is chosen in the option above, enter percentage values in the Custom spacing field to indicate the length between the rafters	
<b>Purlin Type</b>	If you did not select the 'Custom' option in the Number of rows field, select an option from the dropdown list to define the Purlin type	<ul style="list-style-type: none"> <li>• Simply supported</li> <li>• Continuous</li> <li>• Lapped</li> </ul>
<b>Purlin Location</b>	If you did not select the Custom option in the Number of rows field, select an option from the dropdown list to define Purlin location	<ul style="list-style-type: none"> <li>• Internal Span</li> <li>• End Span</li> </ul>

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## 4.0 - Data Files Used by the Bridging (80) Component

The same 3 data files are used by the Cold Rolled Overlap (1) Component and the Bridging (80) as before.

- overlap.dat
- brloc.dat
- brnam.dat

### overlap.dat file

The overlap.dat file located in the C:\TeklaStructures\\*version\*\environments\australasia\profil\cr folder contains the data that the Bridging S80 component uses for the hole diameter and locations of its Bridging Holes. This same data file is used by the Cold Rolled Overlap 1 component as Bridging holes are always the same size and on the same gauge as regular Purlin connection holes.

### brloc.dat file

The brnam.dat file located in the C:\TeklaStructures\\*version\*\environments\australasia\profil\cr folder contains information about the location of bridging profiles. It is unusual that you will ever need to edit this file as we have already set it up to the Purlin manufacturers recommended spacings but more information can be obtained via the 'Help' button in the Bridging S80 macro dialog.

### brnam.dat file

The brnam.dat file located in the C:\TeklaStructures\\*version\*\environments\australasia\profil\cr folder contains the data that the Bridging S80 component uses to choose the applicable Bridging Profile and Bridging Code from.

The file is a simple ASCII text file and can be edited with any text editor such as NotePad or WordPad and can also be edited using Microsoft Excel.

Microsoft Excel - brnam.dat

File Edit View Insert Format Tools Data Window Help

Snagit Window

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	BridgingType	PurlinProfile	BridgingProfile	-	0	1	-	StartBridge	-	IntermediateBridges	-	EndBridge	-	StartHoleProperties	InterHoleProperties	EndHoleProperties		
2																		
3	BHPHook-Lok	LYS-C10010	LYS-HOOK-LOK-II	-	0	1	-	H2C10PB10	-	H2C10PL10	-	H2F15DL10	-	22	11	22		
4	BHPHook-Lok	LYS-C10012	LYS-HOOK-LOK-II	-	0	1	-	H2C10PB10	-	H2C10PL10	-	H2F15DL10	-	22	11	22		
5	BHPHook-Lok	LYS-C10015	LYS-HOOK-LOK-II	-	0	1	-	H2C10PB10	-	H2C10PL10	-	H2F15DL10	-	22	11	22		
6	BHPHook-Lok	LYS-C10019	LYS-HOOK-LOK-II	-	0	1	-	H2C10PB10	-	H2C10PL10	-	H2F15DL10	-	22	11	22		
7	BHPHook-Lok	LYS-C15012	LYS-HOOK-LOK-II	-	0	1	-	H2C15PB15	-	H2C15PL15	-	H2F15DL15	-	22	11	22		
8	BHPHook-Lok	LYS-C15015	LYS-HOOK-LOK-II	-	0	1	-	H2C15PB15	-	H2C15PL15	-	H2F15DL15	-	22	11	22		
9	BHPHook-Lok	LYS-C15019	LYS-HOOK-LOK-II	-	0	1	-	H2C15PB15	-	H2C15PL15	-	H2F15DL15	-	22	11	22		
10	BHPHook-Lok	LYS-C15024	LYS-HOOK-LOK-II	-	0	1	-	H2C15PB15	-	H2C15PL15	-	H2F15DL15	-	22	11	22		
11	BHPHook-Lok	LYS-C20015	LYS-HOOK-LOK-II	-	0	1	-	H2C20PB20	-	H2C20PL20	-	H2F20DL20	-	22	11	22		
12	BHPHook-Lok	LYS-C20019	LYS-HOOK-LOK-II	-	0	1	-	H2C20PB20	-	H2C20PL20	-	H2F20DL20	-	22	11	22		
13	BHPHook-Lok	LYS-C20024	LYS-HOOK-LOK-II	-	0	1	-	H2C20PB20	-	H2C20PL20	-	H2F20DL20	-	22	11	22		
14	BHPHook-Lok	LYS-C25019	LYS-HOOK-LOK-II	-	0	1	-	H2C25PB25	-	H2C25PL25	-	H2F25DL25	-	22	11	22		
15	BHPHook-Lok	LYS-C25024	LYS-HOOK-LOK-II	-	0	1	-	H2C25PB25	-	H2C25PL25	-	H2F25DL25	-	22	11	22		
16																		
17	BHPHook-Lok	LYS-C30024	LYS-HOOK-LOK-II	-	0	1	-	-	-	-	-	-	-	22	11	22		
18	BHPHook-Lok	LYS-C30030	LYS-HOOK-LOK-II	-	0	1	-	-	-	-	-	-	-	22	11	22		
19	BHPHook-Lok	LYS-C35030	LYS-HOOK-LOK-II	-	0	1	-	-	-	-	-	-	-	22	11	22		
20																		
21	BHPHook-Lok	LYS-SC15010	LYS-HOOK-LOK-II	-	0	1	-	H2C15PB15	-	H2C15PL15	-	H2F15DL15	-	22	11	22		
22	BHPHook-Lok	LYS-SC15012	LYS-HOOK-LOK-II	-	0	1	-	H2C15PB15	-	H2C15PL15	-	H2F15DL15	-	22	11	22		
23	BHPHook-Lok	LYS-SC15015	LYS-HOOK-LOK-II	-	0	1	-	H2C15PB15	-	H2C15PL15	-	H2F15DL15	-	22	11	22		
24	BHPHook-Lok	LYS-SC15019	LYS-HOOK-LOK-II	-	0	1	-	H2C15PB15	-	H2C15PL15	-	H2F15DL15	-	22	11	22		
25	BHPHook-Lok	LYS-SC15024	LYS-HOOK-LOK-II	-	0	1	-	H2C15PB15	-	H2C15PL15	-	H2F15DL15	-	22	11	22		
26	BHPHook-Lok	LYS-SC20012	LYS-HOOK-LOK-II	-	0	1	-	H2C20PB20	-	H2C20PL20	-	H2F20DL20	-	22	11	22		
27	BHPHook-Lok	LYS-SC20015	LYS-HOOK-LOK-II	-	0	1	-	H2C20PB20	-	H2C20PL20	-	H2F20DL20	-	22	11	22		
28	BHPHook-Lok	LYS-SC20019	LYS-HOOK-LOK-II	-	0	1	-	H2C20PB20	-	H2C20PL20	-	H2F20DL20	-	22	11	22		
29	BHPHook-Lok	LYS-SC20024	LYS-HOOK-LOK-II	-	0	1	-	H2C20PB20	-	H2C20PL20	-	H2F20DL20	-	22	11	22		
30	BHPHook-Lok	LYS-SC25015	LYS-HOOK-LOK-II	-	0	1	-	H2C25PB25	-	H2C25PL25	-	H2F25DL25	-	22	11	22		
31	BHPHook-Lok	LYS-SC25019	LYS-HOOK-LOK-II	-	0	1	-	H2C25PB25	-	H2C25PL25	-	H2F25DL25	-	22	11	22		
32	BHPHook-Lok	LYS-SC25024	LYS-HOOK-LOK-II	-	0	1	-	H2C25PB25	-	H2C25PL25	-	H2F25DL25	-	22	11	22		
33																		
34	BHPHook-Lok	LYS-SC30019	LYS-HOOK-LOK-II	-	0	1	-	-	-	-	-	-	-	22	11	22		
35	BHPHook-Lok	LYS-SC30024	LYS-HOOK-LOK-II	-	0	1	-	-	-	-	-	-	-	22	11	22		
36	BHPHook-Lok	LYS-SC30030	LYS-HOOK-LOK-II	-	0	1	-	-	-	-	-	-	-	22	11	22		
37	BHPHook-Lok	LYS-SC35024	LYS-HOOK-LOK-II	-	0	1	-	-	-	-	-	-	-	22	11	22		
38	BHPHook-Lok	LYS-SC35030	LYS-HOOK-LOK-II	-	0	1	-	-	-	-	-	-	-	22	11	22		
39																		
40	BHPHook-Lok	LYS-Z10010	LYS-HOOK-LOK-II	-	0	1	-	H2C10PB10	-	H2C10PL10	-	H2F15DL10	-	22	11	22		
41	BHPHook-Lok	LYS-Z10012	LYS-HOOK-LOK-II	-	0	1	-	H2C10PB10	-	H2C10PL10	-	H2F15DL10	-	22	11	22		
42	BHPHook-Lok	LYS-Z10015	LYS-HOOK-LOK-II	-	0	1	-	H2C10PB10	-	H2C10PL10	-	H2F15DL10	-	22	11	22		

Draw AutoShapes



This file contains the Purlin Manufacturers codes for the bridging elements. Each row defines a specific bridging type, the columns define the following properties:

<u>Column</u>	<u>Description</u>
1	Bridging Type.
2	Profile of the Purlins selected to add Bridging to.
3	Profile to be used for the Bridging.
4	Not used
5	Not used
6	Not used
7	Not used
8	Bridging Code for the first Bridging member in a run
9	Not used
10	Bridging Code for all intermediate Bridging members
11	Not used
12	Not used
13	Bridging Code for the last Bridging member in a run
14	Not used
15	Bolt hole properties for the start clip XY to X:0. Enter a two digit number. It is a 2 digit number to set bolt hole settings for start clip. XY X:0: No bolt or hole at top 1: Hole at top 2: Bolt at top & Y: 0: No bolt or hole at bottom 1: Hole at bottom 2: Bolt at bottom
16	Bolt hole properties for interior clips. XY X:0: No bolt or hole at top 1: Hole at top 2: Bolt at top & Y: 0: No bolt or hole at bottom 1: Hole at bottom 2: Bolt at bottom
17	Bolt hole properties for the end clip.XY X:0: No bolt or hole at top 1: Hole at top 2: Bolt at top & Y: 0:

You may need to adjust the values in the brnam.dat to suit your local suppliers/builders preferences with regards to the bridging ordering codes. I have marked in blue above, the 3 columns you may need to edit.

More information regarding those files can be found in the help files for the bridging (80) and Overlap (1) components.

## 5.0 - Reports

Now that we no longer use (since TS11.3) any User Defined Attributes (UDA's) for the bridging code and length, we revised and renamed the Bridging list report.

The old "Bridging\_List (use with Bridging Macro only).rpt" and "Bridging\_List (use with manual Bridging only).rpt" have now been removed and the new report is simply called "Bridging\_List.rpt".

This report automatically lists only bridging members so you do not need to use a view or select filter.

Simply run a "Create from all" Bridging\_List report and it will select the bridge members based on their PROFILE.

The list of profiles the report searches for are as follows:

**STRAMIT-BRIDGING**  
**STRAMIT-CONVENTIONAL**  
**STRAMIT-BRIDGING-ROD**  
**SPEEDY\_SPACER**  
**LYS-HOOK-LOK-II**  
**LYS-CONVENTIONAL**  
**LYS-BRIDGING-ROD12**  
**LYS-BRIDGING-ROD16**  
**DHS-BRD'G-150/DB89/10**  
**DHS-BRD'G-200/DB89/10**  
**DHS-BRD'G-250/DB89/10**  
**DHS-BRD'G-300/DB89/10**  
**DHS-BRD'G-350/DB89/10**  
**DHS-BRD'G-400/DB89/10**  
**DHS-BRD'G-150/DB89/12**  
**DHS-BRD'G-200/DB89/12**  
**DHS-BRD'G-250/DB89/12**  
**DHS-BRD'G-300/DB89/12**  
**DHS-BRD'G-350/DB89/12**  
**DHS-BRD'G-400/DB89/12**

**NOTE:** If you manually create ANY bridging you must make sure you use one of the profiles shown above or modify the report template, if you do not then it will not appear on the report.

## **6.0 – Future Development plans for Bridging Component (80)**

### **Ref: TSR-1163 – Choosing Bolt Size/Bolt Standard Manually**

In the Bridging (S80) Component, if a user needs to set the 'Bolt Size' or 'Bolt Standard', they need to change the 'Read From' option to 'Dialog'.

We have requested that the Component be changed so that the user can manually choose 'Bolt Size', 'Bolt Standard', 'Tolerance', 'Thread in material' and all the 'Hole / Slotting values' while still leaving the 'Read From' option set to 'Data File' or 'Default'.

[Enhancement expected in TS13.1](#)

### **Ref: TSR-1166 – Last Bridging member goes from face of Purlin and not centreline**

Using Bridging (S80) component, the last bridging member created is always modeled to the face of the web of the Purlin it connects to which is incorrect. All bridging members should be modeled from CL to CL of the supporting Purlins.

### **Ref: TSR-1200 – Option to define Bridging Codes manually**

New options to be added to Bridging Component (80) to manually input Bridging Codes directly instead of reading from brnam.dat file

### **Ref: TSR-1234 – Bridging Macro does not work correctly on User Defined Cross Section profiles such as NZ based DHS Purlins**

The Bridging S80 component does not work correctly for DHS\* Purlin profiles. These profiles have been inputted into the profile catalog as User Defined Cross Section shapes which is why the problem occurs. We have submitted a development request to have the macro improved so that it will work correctly with these shapes also.

### **Ref: TSR-1235 – Extra codes to be added for two row Bridging**

We have requested an option for the Bridging component to detect if the number of Purlin rows is 2 (ie. One Bridging member only), and then use Bridging codes from Column 9 in the brnam.dat. When there are only 2 Purlin rows, the bridging is typically Bolted-Bolted which therefore requires a unique code. Currently the component will use a bolted-clamp etc.. option

[Enhancement expected in TS13.1](#)

## 7.0 - Manual Modeling of Bridging

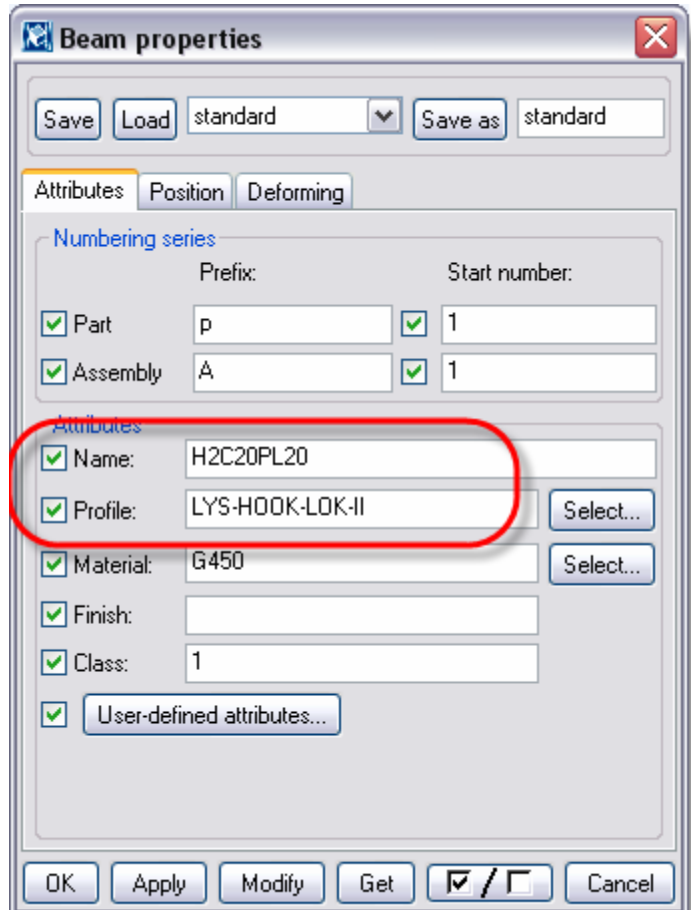
1) If you decide to model any Bridging Components manually please ensure you use only the following Profiles.

STRAMIT-BRIDGING  
 SPEEDY\_SPACER  
 LYS-HOOK-LOK-II  
 LYS-CONVENTIONAL  
 LYS-BRIDGING-ROD12  
 LYS-BRIDGING-ROD16  
 STRAMIT-CONVENTIONAL  
 STRAMIT-BRIDGING-ROD  
 DHS-BRD'G-150/DB89/12  
 DHS-BRD'G-200/DB89/12  
 DHS-BRD'G-250/DB89/12  
 DHS-BRD'G-300/DB89/12  
 DHS-BRD'G-350/DB89/12  
 DHS-BRD'G-400/DB89/12

If you require more profiles please contact us at Pacific Computing for advice.

2) You then nominate the Bridging code in the Part Name field of the Beam Properties dialog as per the example on the right.

3) Model the bridging members from centre of Purlin to centre of Purlin. There is a note on the Bridging report stating that this is how they have been modeled.



## 8.0 – DHS Bridging

We have recently done some work with a NZ user who helped check the codes for us. On their feedback we have modified the codes for the DHS FastBrace Bridging. They should now be correct.

Because the DHS Purlins are modeled with a ribbed flanged, these Purlins were entered into the profile catalog as User Defined Cross section shapes. This causes the Bridging S80 component not to work correctly with these shapes. We have submitted a development request (TSR-1234) to Tekla to have this fixed. In the meantime we have added a range of DHS Purlins that are entered into the catalog as standard lipped Cees. They are named DHS-150\_ etc. To work around the problem of the Bridging macro not working correctly, you can model your job using these new DHS shapes, add the Bridging S80 component, then explode it and change the Purlins to the Ribbed Web DHS Purlins.

We have also added PB1635 bolts to the Australasian Bolt Catalog especially for use with DHS Purlins