

NEW FEATURES IN RAM CONNECTION V8/

Structural Team Screencast 005

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INTRODUCTION

Hello, and welcome to the **Bentley Structural Team** screencast. I'm *Jason Coleman*; a *Senior Technical Writer* with Bentley Systems.

Today, I'm going to show you a preview of some of the new features available in **RAM Connection V8i** — which is release 5.5 — particularly as they apply to the design of braced frame connections.

NEW FEATURES

Some of the new features found in this release are:

- AISC 341-05 provisions for braced frame connections
- Shear lag brace reinforcement
- New reports have been included for seismic provisions
- New DXF graphics

INTEROPERABILITY

Bentley is committed to interoperability. This commitment reduces error and engineering time by eliminating the need for recreating data. Of course, RAM Connection can be used for the design of a connection as a standalone application. It can also be used to design connections for joints specified in the RAM Structural System, RAM Advanse, or STAAD.Pro. Additionally, connection detailing and geometry information can be exported to ProSteel for fabrication detailing, a capability found only in RAM Connection.

EXAMPLE

I'll be using the standalone application of RAM Connection to show this example of a column beam brace connection. The features are the same when RAM Connection is accessed from one of Bentley's design programs:

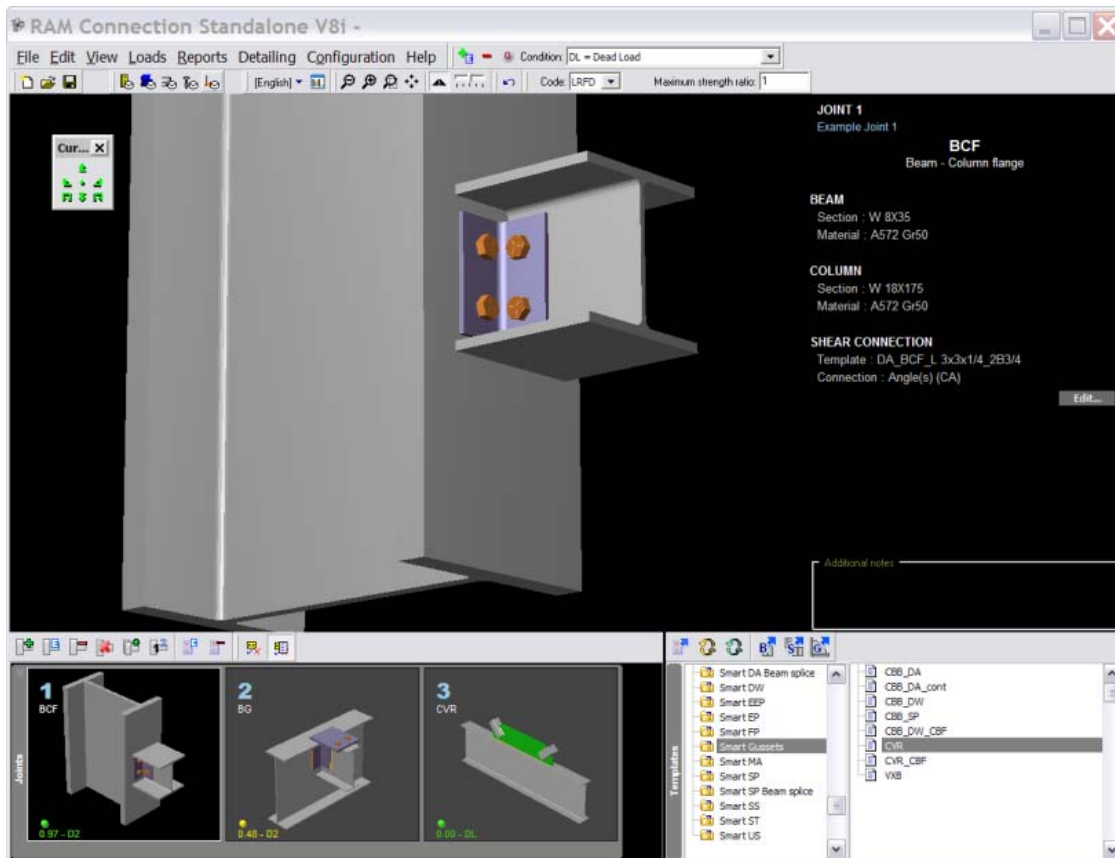


Figure: RAM Connection Standalone application window.

Upon editing or adding any connections in RAM Connection, you will notice the improved graphics. Connections are rendered not only to scale, with all connection elements shown, but in high resolution 3D – a feature no other connection design software offers.

LOADS

One of the first things that we need to do is to verify that the proper load types are selected in RAM Connection and that we have selected load combinations appropriate for our designs. Launch the Load Conditions dialog by clicking **Loads > Manage Load Conditions** in the main menu. The current load conditions are listed and new ones can be added by clicking the **Add Load Cases From the Most Used List** button. For this example, I'll just use dead load, live load, and seismic loads from east and

west. Current load combinations appear below. Additional load combinations can be added here as well. Click **Ok** to exit the dialog.

The load combinations for these connection designs have been automatically created by selecting a load combinations file. To do this, click **Loads > Generate Load Combinations...** in the main menu. Click the **Open Files...** button to select a combo file. Here, I'm using the IBC 2006 LRFD combos, so I'll select this file. The text file of combination commands is loaded and I can click **Ok** to exit the dialog.

ADD JOINT

To begin a new connection, we must first specify the joint details. Note that this is done only in the standalone application as joints are created in structural modeling software by default. Click the **Add New Joint** button found on along top of the joint selection area. You can also select any previously added joints here in the browser and click the **Edit Joint** button.

The New Joint dialog is launched. We'll first add the member and joint data then load data. First, we must select the joint type from the predefined list. I'm going to select a Column Beam Brace connection (CBB). I'll name my joint Example Joint 4. Next, I'll need to specify if the design is for seismic provisions and, if so, the type of braced frame system the structure is. Here, I'll select **Yes** to design under seismic provisions of AISC 341-05. Seismic provisions for braced frames are a new feature found in RAM Connection V8i. In fact, RAM Connection is the only connection design software to offer brace design required by AISC 341.

I'll specify that my steel structure is an Ordinary Concentrically Braced Frame. Special Concentrically Braced Frames can also be specified. Note that the dynamic help window on the right provides additional explanation for each joint parameter.

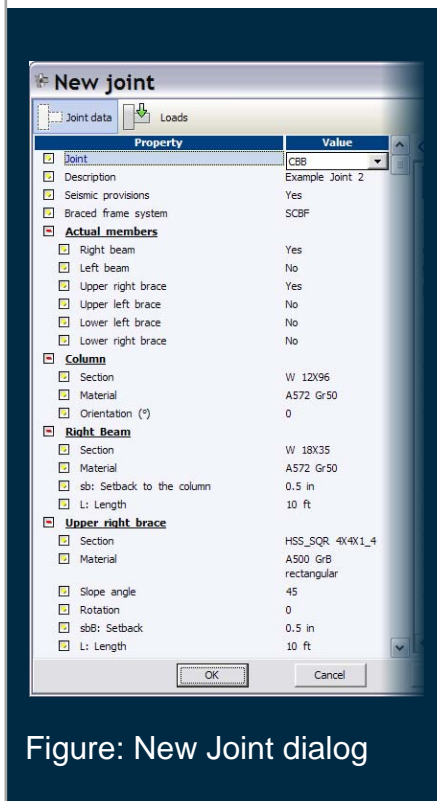


Figure: New Joint dialog

Next, I must describe the joint. I'm going to use the simplest possible Column Beam Brace, which is only one brace framing into a beam on one side of a column. Simply answer the Yes or No questions to specify what your connection looks like. Again, this information is only required in the standalone application.

Now, I'll provide section, material, and geometry information for each of the members which frame into my new joint. I'm using a W12x96, A572 grade 50 steel column. The beam and brace will be connected to the flange, so the orientation is left at 0°. The beam is a W18x35 of the same grade. I'll keep a 1/2 in. set-back from the column flange and specify the beam length as 30 ft. Lastly, my brace member is a square HSS 8x4x3/8, A500 Grade B rectangular. The slope is 26.6° from the horizontal. The rotation is 0°, the setback 1/2 in., and the length is 33.5 ft.

Now, I'm ready to enter in load data, which I do by first clicking the Loads button at the top of the dialog. Beam and column loads are entered in the top table, while brace loads are entered in the lower table. Note that for any cell that I click in, the current units are displayed on the right. I'll enter in load values for my joint:

Column Axial Load:	DL = 60.8k
	LL = 99k
Beam Shear:	DL = 12.4k
	LL = 22.5k
Brace Force:	EQx = 75.5k
	EQz = -75.5k

Once the loads are added, click OK to exit the New Joint dialog.

CONNECTION ASSIGNMENT

The joint is now shown fully rendered and now the connections need to be assigned. Each connector requires assigning and for this connection, we have two: A beam web shear connector to the column face and a gusset plate for the bracing member. Connection assignments are made using the template library.

For the CBB connection, we can use a single smart connection for both the beam and brace member to connect to one another and to the column. Click the Gusset Connections button to display the sub-menu of Smart Gusset connections. Then click select CBB_SP from the list. A dialog presents information on the connection's application.

Using the smart connection allows the connection parameters to be specified automatically. The current load condition can be toggled, along with the design methodology. The Joint selection area has toggles for displaying the design ratio for the currently selected or critical load condition. For detailed design results, we will launch the report viewer.

REPORTS

I'll open the connection pad by clicking the Edit link in the main window to review the connection details. Here, I can see my input along with all of the detailing information for this connection. I can also review and print this information by clicking the **Data Report** button. This report includes:

- All input data
- A detail sketch and connection information
- All loads considered

It is important to review the design checks which have been made in the design of this connection. This is done by clicking the **Results Report** button. This report includes:

- A table of geometric considerations with the values and status of each check
- The Design checks for each failure state – by connection element – including a graphical

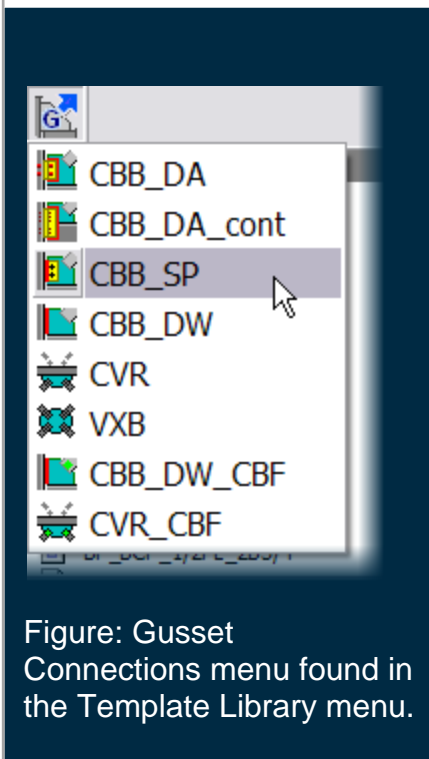


Figure: Gusset Connections menu found in the Template Library menu.

representation of the design ratio and code references.

Note that all designs are per AISC 360-05, with the seismic provisions of AISC 341-05 applied for braced connections as specified when the joint was created.

A full report containing data and results for all connections in this file can be viewed by clicking **Reports > Connection Detail** from the main menu.

This has been a screencast of new features in **RAM Connection V8i**. If you'd like to get additional information, sign up for training courses, or learn more about our licensing programs, please visit Bentley.com. Thank you for watching.

Special thanks to Francisco Diego, Product Manager for RAM Connection and RAM Advanse at Bentley, for his help in preparing this screencast.