

RAM CONNECTION V8I BASE PLATE DESIGN

Screencast 007

Jason T. Coleman, P.E.
Senior Technical Writer
The Bentley Structural Team



www.bentley.com

INTRODUCTION

The release of **RAM Connection V8i (SELECTseries 3)**, also referred to as version 7.0, includes a number of new features, an improved interface, and a new set of connections for base plates.

STANDALONE EXAMPLE

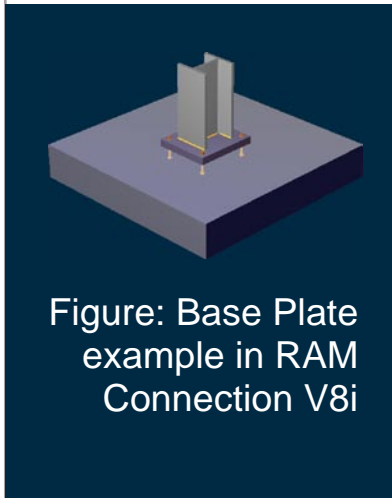


Figure: Base Plate example in RAM Connection V8i

Let's take a look at using RAM Connection Standalone to design a simple base plate connection. I'll start by adding a Live Load type to the loads list. I'll open an empty project file and create a new connection named Example 1. I'll select CB for the connection type, which stands for Column Base. I'll specify some information about the column (W12x120 in A572 Gr50 steel) as well as the dead and live loads being transferred to the base plate (DL: P=-100k, M=83.33ft-kip; LL: P=-160k, M=125ft-kip). Next, I'll generate some load combinations based on the 2006 International Building Code LRFD.

I'm now ready to assign a template to my connection. From the Design ribbon tab, I'll select the *Assign* tool to display the connection template gallery. I'll select the new Base Plate Connections and then a **Smart Fixed Uniaxial Major Axis Base Plate** template. The Connection assignment dialog displays the progress. You can see that my simple base plate is designed and optimized for the default conditions. I'll click the *Edit* link to open the Connection Pad. Here, I can have fine control over all of the connection input. I can edit the base plate conditions, including using stiffeners or shear lugs. I can input conditions for the concrete support and change the anchor bolt settings. Here, I'll simply make sure that headed studs are being used and that a 1 in. thick grout pad is specified. I'll click *Optimize* to make sure that any changes made in the Connection Pad are reflected in my design. I can see from the green light that this design is okay.

For base plates, the Connection Pad has a new tab on the Ribbon bar for Analysis controls. Here, I can review the finite element analysis for base plate and anchor bolt interaction. I noted earlier that load combination D2 was the governing load case, so I can select that load case and review the stresses for both the concrete below the base plate as well as the anchor bolts. If this were a biaxial base plate design, I could also select the direction of loading to display.

I can review drawings on the DXF View ribbon tab as well. Next, I'll select the *Data* tool to open a review of my input and final design results. I can export this to reports from here but for now I'll close this view and select the *Results* tool to open the detailed design report. This report includes geometry checks and base plate steel design checks along with AISC 360-05 and/or Design Guide 1 code references. For additional detail, I can toggle on the *View Formulas* tool to see completed equations for this design. Similarly, the anchor bolt design is performed per ACI 318-08 Appendix D with both visual and numerical check results and code references. Lastly, a summary of the finite element analysis of the concrete and anchor bolt groups is displayed. Similar to the Data report, this report can be exported to a variety of formats for inclusion in project calculations.

INTEGRATED EXAMPLE

Now, let's take a look at how to design a different kind of base plate. This time, I'll start with a braced, steel frame building structure in **RAM Elements V8i (SELECTseries 2)** and design the base plate with gusset brace connections for the entire structure.

I'll need to perform the analysis and member design for the model prior to proceeding with connection design. Once this is done, I'll toggle on the display of the Spreadsheet pane from the Home ribbon tab and then select the Connection tab from within the spreadsheet. The Spreadsheet ribbon tab opens to display the related tools. The Connections spreadsheet is empty, as I don't have any connections assigned yet. I'll then select the

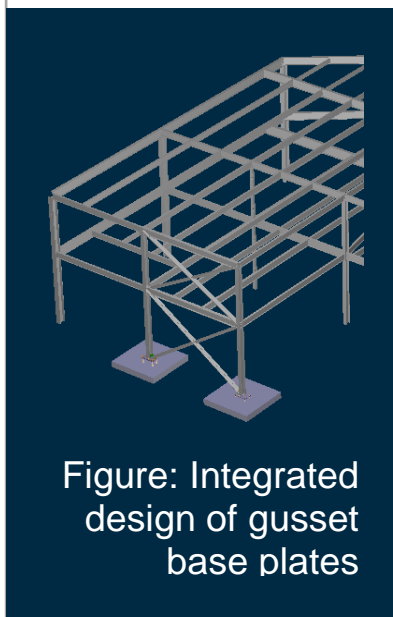


Figure: Integrated design of gusset base plates

Connection spreadsheet tab. I'll make sure that all model elements are selected and then proceed.

In the connection templates catalog, I'll select the Gussets Base Plate template. I'll then select the *Assign selected connection to model* tool from the Spreadsheet ribbon tab. The program processes the appropriate joints for the selected connection template and begins a preliminary design. Once this process is complete, the Information Panel displays any warnings or errors from this process.

It looks like one or more of the gusset base plate connections have some issues, so I'll need to investigate. I'll select one of the isolated connections and click the *Edit* tool to open the Connection pad. I see that this connection has a yellow warning status light, so I'll need to make some changes. This process is repeated as needed for each connection just as you would for any other connection design using RAM Elements.

I can review the Data and Results reports from within RAM Connection just as I was able to do with the Standalone application.

SUMMARY

This has been an overview of using the new base plate design feature in RAM Connection. If you would like to get more information on Bentley products, including licensing and training, or join Be Communities, log on to Bentley.com. Thank you for watching.

Thanks to RAM Connection and RAM Elements Product Manager, Francisco Diego, for his assistance in preparing this screencast for you.