

Screencast 001

RAM Structural System: Concrete Shear Wall Design Module I

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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 briefly demonstrate the **Concrete Shear Wall Design Module** in the **RAM Structural System**. This module is a new feature in the version 12 release. It performs the design of reinforced concrete shear walls for gravity, wind, and seismic loads.

Design criteria are based on either the American or British design codes.

Let's briefly take a look at the building we'll be using as an example. This is a relatively simple, steel framed building with three concrete shear walls. One of the walls has openings at each floor. This building was modeled in the **RAM Structural System Modeler**, with the walls of course flagged as lateral load resisting elements. Note that complex wall systems can also be easily modeled in RAM, and can be just as easily designed with the module we're looking at today. Complicated opening schemes do not require any additional hand calculations; they're handled as well. Any changes can easily be made in RAM modeler and the design process is simply re-run. No need for updating anything else.

Next, after we've finished the modeling work, we open up the **RAM Frame** module. Concrete shearwall design is tightly integrated with **RAM Frame**, which performs all the meshing and frame analysis for you. In fact, users of other RAM modules will find the process of designing concrete shear walls to be familiar.

Integration with **RAM Frame** is also leveraged in the generation of load cases. Here, all the load cases to be considered for this structure have previously been generated, as well as the load combinations to be used. However, we will also specify load combinations within the concrete shearwall design module. We'll analyze the structure here in **RAM Frame**.

Next, we'll exit RAM Frame and open up the **RAM Concrete Design Module**.

In the Mode drop down list, you'll notice that version 12 adds Concrete Shear Wall. We select this mode. The icons to the right of the drop down list are the ones we will use to move through the required steps for design. Each step has easy automation tools for quickly design wall systems, as well.

Let's set the current view to *not* show the gravity columns and beams so we can get a better view of the concrete shear wall lateral system.

First, we must assign the Wall Design Groups. These groups are independent of the wall groups that you might assign using Frame. These create *design* groups; which will collect together different walls we wish to have the same final reinforcing design. You can group walls by any method you wish. For example, all the walls within a single stairwell have the same bar patterns or walls with end piers have different patterns than walls without. Walls are easy to group and it's a very flexible system.

After assigning our wall design groups, we will move on to bar patterns. You may specify virtually any bar pattern you can think of, or simply use the automated default bar patterns. Bar patterns can quickly and easily be generated. Here, we'll assign the same basic pattern to all the walls.

Next, we next specify the stations for which the designs will be performed. This is done by creating vertical and horizontal section cuts. You may specify your own section cuts, or simply use the automatic section cut generator. It also provides for section cuts at and around openings. We'll use this on all our sections.

Now, we click on “Design All.” The design process can take several minutes, depending on the number of wall groups, section cuts, and load cases you have in your model. Here, we’ll skip ahead to review the design results.

Note that section cuts that have all passed have changed from yellow to green if all checks were okay. Section cuts that have checks that were no good or had a geometry problem show as red and user assigned sections are in blue. We’ll see more of that in a moment. We click “View/ Update” to view the results for a section cut on a particular wall. We can see the bars in the section. The results table shows the combined axial force and moment demand; as well as the interaction ratio for each load combination. Interaction surfaces are also shown. Shear, reinforcing, and design warnings – if there are any. And here we see the summation.

Let’s change the bar pattern to create some additional reinforcement on this section of the wall. We can see this change shows up in the section cut window, as well. Now we click analyze to check the new design. RAM takes just a moment to update the changes to the database. Let’s review the results by clicking on Summary. Note that all passes and check are shown in green, provided that the wall section works. And we see here that this one works fine.

Horizontal, vertical, and segment forces are can also be shown. Let’s click “Okay” to go back to the Shear Wall Module.

Here, we can see that the user specified bar pattern is frozen for design and shows up as blue.

We can view the final results that will show up on our construction documents by clicking “Show Bar Pattern Assignments.”

This has been a screencast to introduce you to Concrete Shear Wall Design in version 12 of the RAM Structural System. 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.