

Course challenge exercise

Create foundation walls, footings, and rebar.

With the provided Revit models, **03_ARCHITECTURAL.rvt**, and the template **Structural Analysis-DefaultMetric.rte**, you will use the skills that you learned in the course to solve this final challenge. By using the linked architectural model as a guide, create a 457mm concrete foundation wall, footing and add horizontal and vertical reinforcing.

Complete the required activities:

- Start a new structural model using the Structural Analysis-DefaultMetric.rte template.
- Link the model 03_ARCHITECTURAL.RVT model using the Internal Origin-to-Internal Origin placement.
- Set the Discipline parameter in Level 1 to Coordination.
- Create a T.O.FOOTING level at -3084 mm below Level 1. Add a 457 mm foundation wall extending from Level 1 to the top of footing level. Add this to the entire exterior of the building.
- In the top of footing level, add a bearing wall footing to the base of the new foundation wall.
- Duplicate the existing bearing footing type in the model and create: Bearing Footing - 762 x 305. Once the footing type is created, select the perimeter walls to place it under.
- Add a section to the wall once the bearing footing has been placed. Set the scale to 1:25. Set the Detail Level to Fine.
- Add a keyway by using the Cut Profile tool and selecting Boundary between faces option. Make the keyway 4" x 2".
- Add 19 mm rebar perpendicular to cover at a spacing of 305 mm.
- Add 19 mm rebar parallel to cover at a spacing of 305 mm.

Success Criteria:

- **Model consistency:** The architectural model is linked and at the internal origin of the model. The foundation wall is from Level 1 to Top of Footing.
- **Concrete elements sized properly:** The foundation wall is the correct thickness, the keyway is the correct size, and the footing is the correct size and thickness.
- **Correct reinforcing is added:** The reinforcing is the correct size and spacing. The reinforcing is in the correct planar direction.

What to Submit:

- **Revit model file (.RVT)** – The structural model with the foundation walls, footings and rebar completed.

Grading Rubric

	Advanced	Proficient	Basic	Emerging
Linking the architectural model	The architectural model is linked to the internal origin. In the properties, the discipline is set to Coordination.	The architectural model is displayed. In the properties, the discipline is set to Coordination.	The architectural model is displayed. In the properties, the discipline is set to Structural.	The architectural model is linked center-to-center
Create the foundation wall	The foundation wall is modeled with the correct top and bottom constraints. The wall is the correct thickness and	The foundation wall is modeled with the correct top and bottom constraints. The wall is the default thickness,	The foundation wall is modeled from level 1 with an offset of 4572mm.	The foundation wall is a generic wall.
Add the footing	The footing is sized with 153mm thicker than the bearing wall. The thickness is 305mm.	The footing is sized with 153mm thicker than the bearing wall. The thickness is 610mm.	The footing is a retaining footing.	No footing has been placed.
Creating the keyway	The cut profile tool was used. The keyway is at the specified dimensions.	The cut profile tool was used. The keyway is not drawn at the correct dimensions.	The cut profile tool was used. The keyway was cut but not using the between two elements tool.	There is no keyway added to the footing.
Adding horizontal bars	Bars have been placed perpendicular to cover with a maximum spacing of 305mm. The rebar is against the cover settings in the wall. The rebar is the correct size and shape.	Bars have been placed perpendicular to cover with a maximum spacing of 305mm. The rebar is against the cover settings in the wall. The rebar is the incorrectly sized.	Bars have been placed perpendicular to cover without the correct spacing and size.	No bars have been placed.
Adding Vertical bars	Bars have been placed parallel to cover with a maximum spacing of 305 mm. The rebar is against the cover settings in the wall. The rebar is the correct size and shape.	Bars have been placed parallel to cover with a maximum spacing of 305 mm. The rebar is against the cover settings in the wall. The rebar is the incorrectly sized.	Bars have been placed parallel to cover without the correct spacing and size.	No bars have been placed.