

## #2 Moment Transfer

Different types of moment connections result in different types of structural behavior.

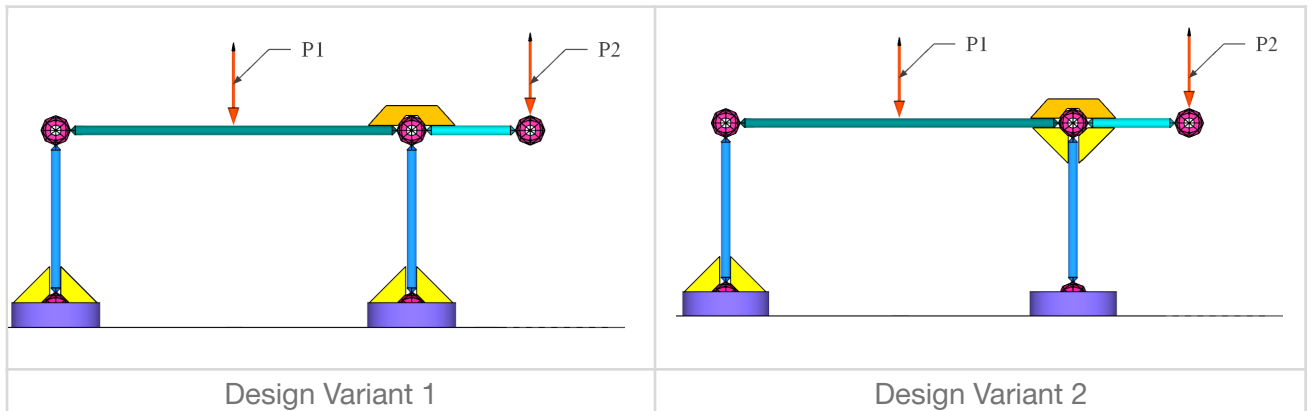
### Part I. Predict it.

The two images below depict two design variants of a structural frame that has been subjected to two vertical point loads. The triangular and quadrilateral elements contain magnets, which connect to the bars. The triangular ones are called RC-01 and the quadrilaterals are called RC-02.

Before you start building ... from a structural perspective, how are these two structures similar? How are they different?

Draw both frames using the conventions that you have learned for structural analysis. Which connections are pinned? Rigid? Fixed? How do we communicate that in our drawings?

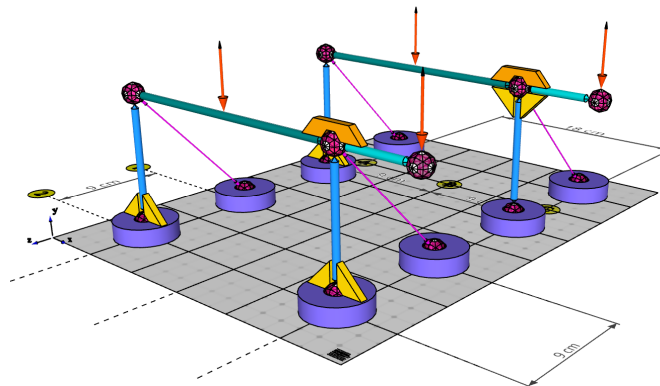
FOR EACH DESIGN VARIANT, imagine that the midspan load  $P_1$  has been applied in isolation (that is, without  $P_2$ ). Sketch the deformed shape of the structure. Also sketch the moment diagram.



### Part II. Build it.

Open the model titled [Structures-02-Moment Transfer at Connections](#).

Build both Design Variants (noting the out-of-plane diagonal bracing).



### Part III. Test it.

FOR BOTH DESIGN VARIANTS: use your finger to gently apply load  $P_1$ . Compare the deformed geometry to the sketch you did previously. Were you correct? If not, please correct your sketch, and write a few sentences that explain what gave you trouble. Compare your moment diagram to the curvatures you observe in the model. Does your moment diagram make sense? If not, correct it.

FOR BOTH DESIGN VARIANTS: visualize the deformation that will occur when you apply load  $P_2$ . Then, apply that force (gently) with your finger. Was your prediction correct? If not, what gave you trouble?

### Part IV. Reflect (make connections, figuratively)

Compare the structural performance of the two frames under the vertical loads  $P_1$  and  $P_2$ . How are they different? How are they similar? Is one better than the other? How so?

Which concepts from prior courses did the experiment clarify for you, if any? Was this activity helpful and useful to you?