

Effect of insertion point on beam reactions

Test Problem	
Name:	Effect of insertion point on beam reactions
Description:	How insertion point affects horizontal reactions and flexural response of a simply supported beam.
Program:	SAP2000
Version:	14.2.3
Model ID:	96

Default modeling procedures locate object boundary conditions along the centroid of the cross section. When a simply supported (pin-pin) **frame** object is modeled with a top-center or bottom-center **insertion point**, internal **constraints** are generated which have the effect of a vertical offset. A kinematic result of this modeling technique is the generation of longitudinal forces which act on an arm about the neutral axis. If this behavior is not desired, one support may be changed from a pin to a roller condition such that horizontal reactions are released. This behavior may be exhibited when **bridge objects** are supported by **bearing links** located at the bottom of the bridge girders.

Presented in Figure 1 are visuals which depict how standard and offset objects:

- Are displayed in the software interface.
- Are kinematically related to the analytical model.
- Respond under flexural loading.

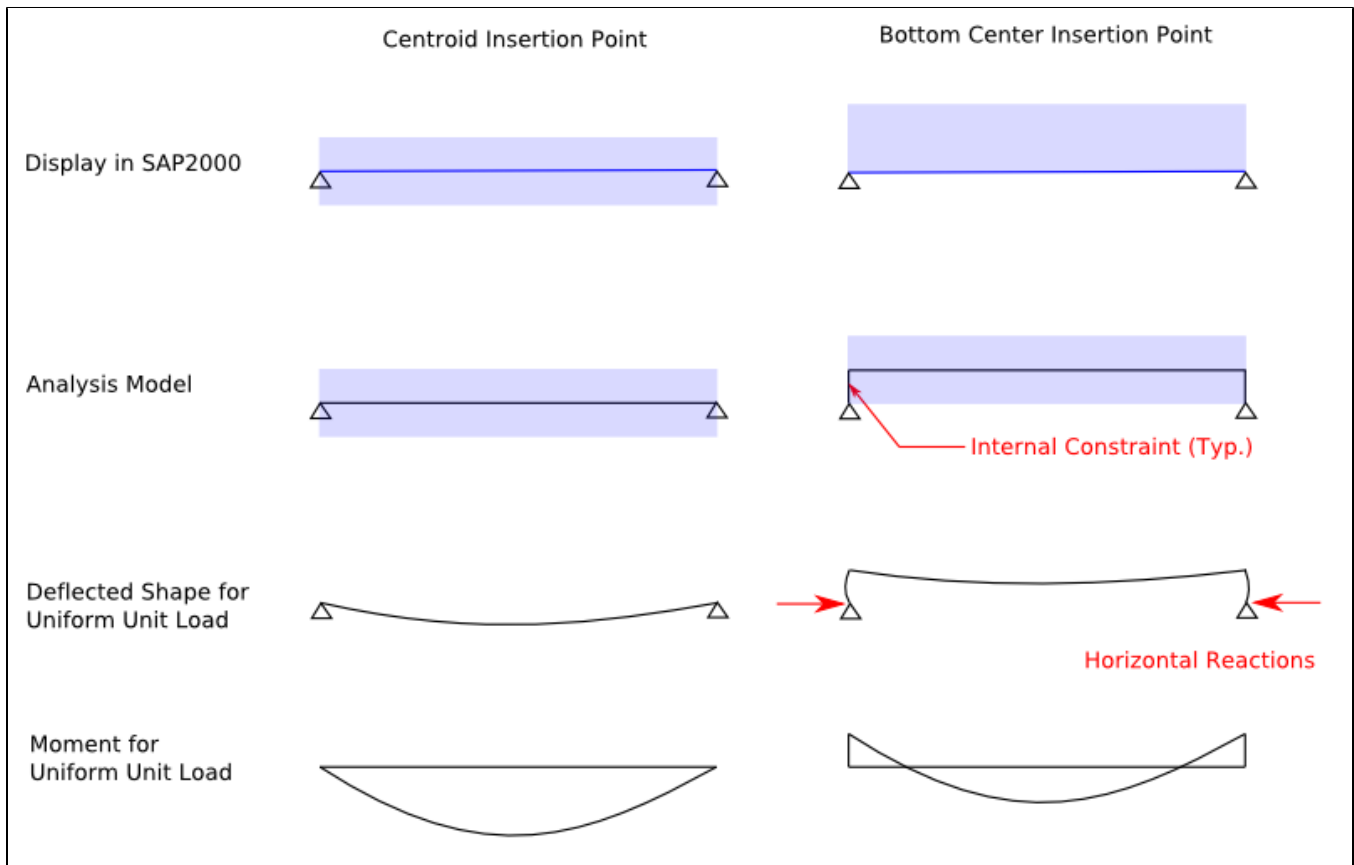


Figure 1 - Simply-supported beam with center and bottom-center insertion points

The images from Figure 1, as they appear in SAP2000, are given in Figure 2:

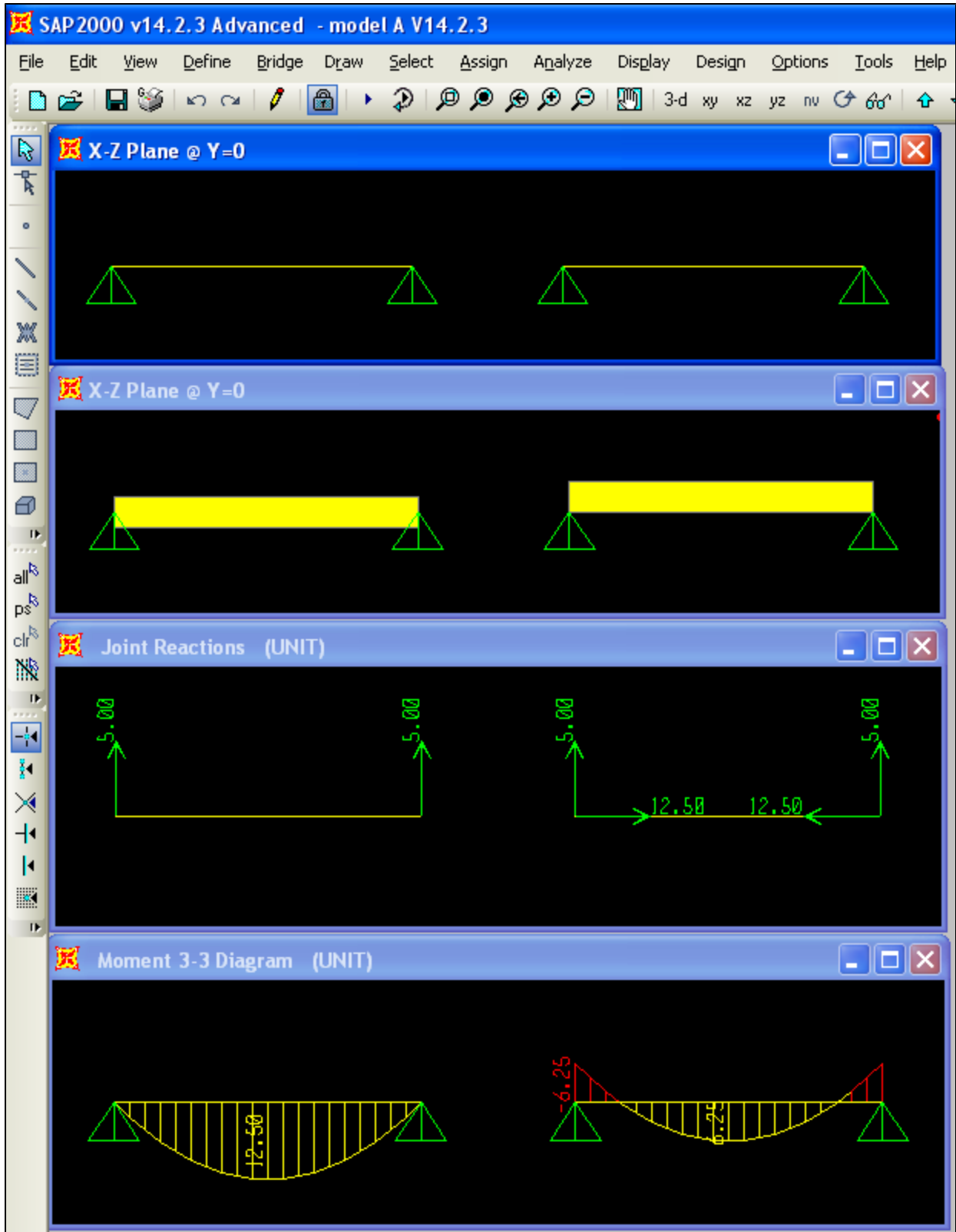


Figure 2 - Images as they appear in SAP2000

See Also

- [Nonzero moment at abutment locations](#) article
- [Verification Example 1-011](#)
- [Area object offset](#) article

Attachments

- [SAP2000 V14.2.3 model](#) (zipped SDB file)