

Modeling techniques FAQ



This page is devoted to **frequently asked questions** (FAQ) related to [Modeling techniques](#).

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How is flange local buckling checked?

Extended Question: I am interested in loading the flange of a W-section column, but the load seems to transfer through the center of mass. How is flange local buckling modeled and analyzed?

Answer: Flange local buckling may be evaluated by creating a [local model](#) where [shell](#) objects simulate the column web and flanges. Loads and boundary conditions should be applied in a manner which correctly accounts for interaction with the global model.

Additional information is available in the [warping](#) article.

How is a deep beam modeled?

Answer: [Frame](#) objects may be used to model deep beams since frame formulation includes both bending and shear deformation. While this should be sufficient for global response, a more refined [local model](#) may be necessary for localized response. [Shell](#) and [solid](#) objects may be useful for creating a local model, and such specialized methods as strut-and-tie modeling may be worthwhile if analysis and design involves reinforced-concrete materials.

How is a simple beam model subjected to cyclic loading?

Answer: Cyclic loading may be evaluated through either of the following methods:

1. [Time-history](#) analysis, where the dynamic effects of load application are taken into account. Dynamic effects are dependent upon the rate of load application, along with properties inherent to the structure itself, such as natural frequencies. Load may be applied slowly, in a quasi-static manner, such that dynamic effects are negligible, or at the rate desired. To gauge the sensitivity of response, various rates may be applied and compared.
2. [Staged-construction](#) analysis, where the entire structure is added in the first stage, then separate stages are defined for each increment of load application.

How is safety factor considered during analysis and design?

Answer: Depending on design methodology, safety factors may be considered by applying a factor which either reduces the resistance of structural members (ASD), or increases the magnitude of loading (LRFD). This may be accomplished through a number of means, including factored [load combinations](#), allowable stresses, resistance factors, etc. The modeling procedure appropriate for any given project depends on the building code being followed. [CSI](#) Software then enables factored load combinations and design procedures to be based on allowable stresses or ultimate resistance.

Is there a command to copy objects along with their assignments?

Answer: The replication feature replicates objects along with their assignments, including loads, [restraints](#), [constraints](#), etc. Replication, however, is not applicable to group assignments, as is described in the [Replication of group assignments](#) article.

Cut, copy, and paste commands only transfer the geometry and connectivity of selected objects, and not their assignments. To copy assignments with the objects modeled, select Assign > Copy Assigns *and* Assign > Paste Assigns.