

RELEASE AND RESTRAINTS IN ADAPT-FLOOR PRO

This Technical Note explains the available options for specifying the load transfer details between two structural components, and between a structural component and the support of the structure.

In the terminology of BUILDER, the connection between two structural components, such as a beam and a column is defined by the “**release**” condition. This is shown symbolically in Fig. 1 for point B between two structural components. If no release is specified, the program assumes rigid connection between the components, such as point D in the same figure. All structural components are assumed rigidly connected together, unless “released” by the you. The release can be freedom of “translation” or “rotation.” The translation allows one component to displace relative to the other in the direction specified by you. The freedom of rotation allows each component to rotate independent from the other, about the axis defined by you. The default directions are the global axes.

The connection between one or more structural components to the supports of the structure are defined by “**restraints**,” such as points A and C in Fig. 1. Restraints are the property of “supports.” You first need to place a support at the location of your choice, and then define the manner in which you expect the support to behave. The default of the program for a support is full fixity. That is to say, neither translation nor rotation are allowed at the location of the support. But, you can open the restraint properties of the support and change it.

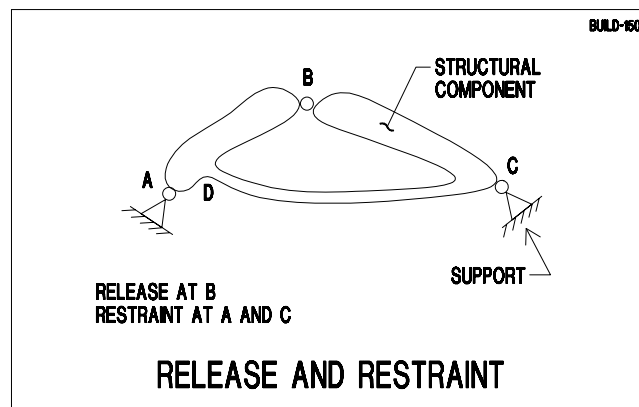


FIGURE 1 RELEASE AND RESTRAINT DEFINITION

Figure 2 shows a beam resting on two columns. The columns are supported at their base by two user defined “supports.” The supports are shown by the small triangles. The type of fixity of the column at its base is defined in the property dialog window of the “supports.”

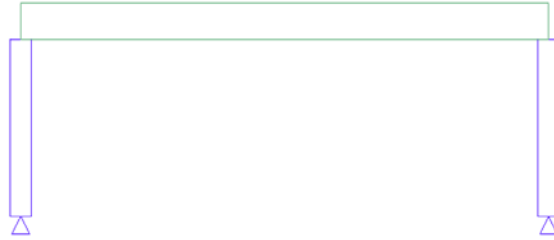


FIGURE 2 ELEVATION OF A BEAM AND TWO COLUMNS

The beam is shown resting on the column. The default of the program is full fixity between the top of the column and the beam. But, you can change the transfer of force between one and the other by specifying a “release” either at the end of the beam or the top of the column.

Since the Modeler (Modeling part of the BUILDER Platform) can operate in two modes, one to generate data for the Equivalent Frame Method (Strip Method), that is to say ADAPT-PT and ADAPT-RC, and the other for the Finite Element Method (Floor-Pro), there are two options in the program for the specification of the boundary conditions. Both options are described in the following.

FLOOR-PRO (Finite Element Method).

Release

The dialog box for the release at the top or bottom of a column is given in **Fig. 3**. As an example, referring to **Fig. 2**, this dialog box will be used to define the rotational fixity at the top of the column (imposition of a hinge between the beam and column).

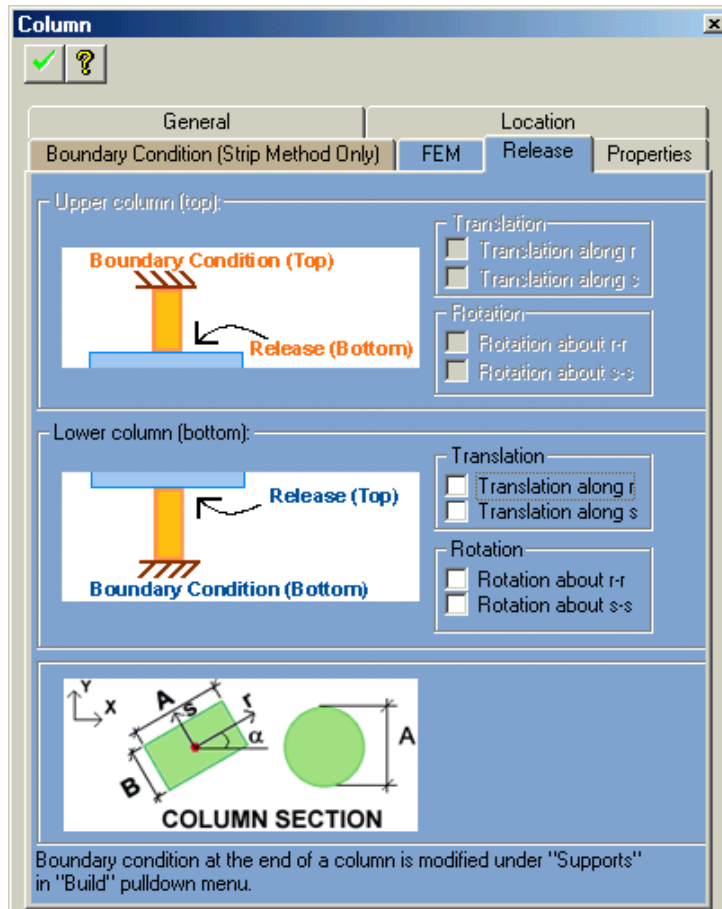


FIGURE 3 RELEASE DIALOG BOX FOR COLUMN

Restraint

The condition of the support shown at the base of each of the columns in **Fig. 2** is defined by the restraint dialog box shown in **Fig. 4**.

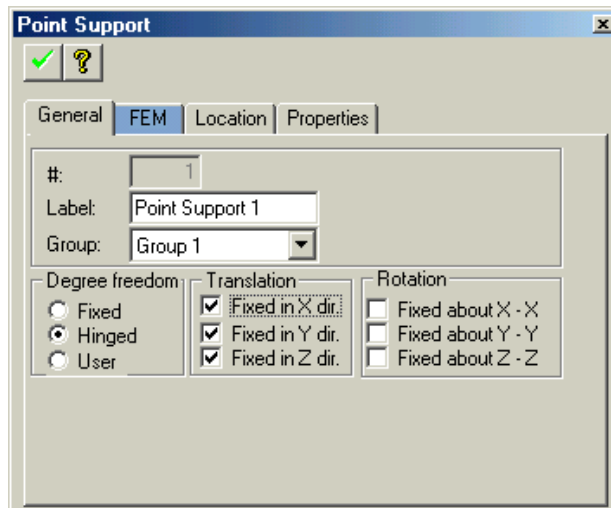


FIGURE 4 RESTRAINT DIALOG BOX FOR POINT SUPPORT

MODELER using Export of Data to ADAPT-PT/RC

Release

The Equivalent Frame Method simplifies the model into a two-dimensional frame, while allowing for the response in the third dimension through the introduction of torsional members on the sides of the columns. The types of fixity or release available in this option are given in **Fig. 5**.

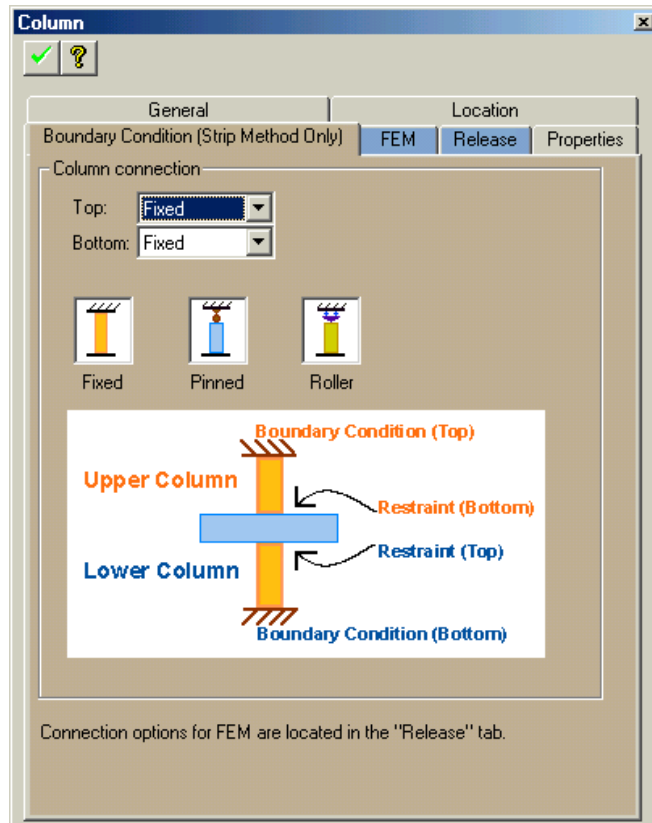


FIGURE 5 RELEASE OPTIONS FOR EQUIVALENT FRAME METHOD (STRIP METHOD)