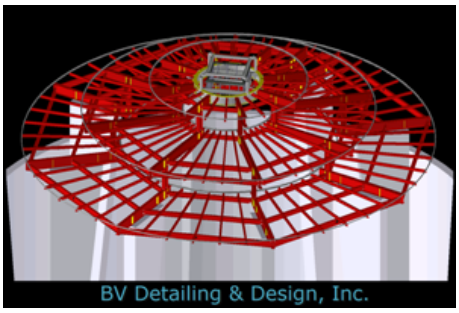

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General Instructions for Adding and Editing EmbedPL members

EmbedPL members can be added in Modeling several ways. See Figure 1 for an image of the initial entry options dialog box and Figure 2 for member material orientation. The member line is always along the top edge of the plate material.

- Preselected member - If a Beam or Joist member is preselected, variable self.option is set to "Preselected member" and the initial entry options dialog box is bypassed. If the wrong type of member is preselected, the initial entry options dialog box will appear. The preselected member will be used to establish member placement and member attributes (see Setup Tab information).

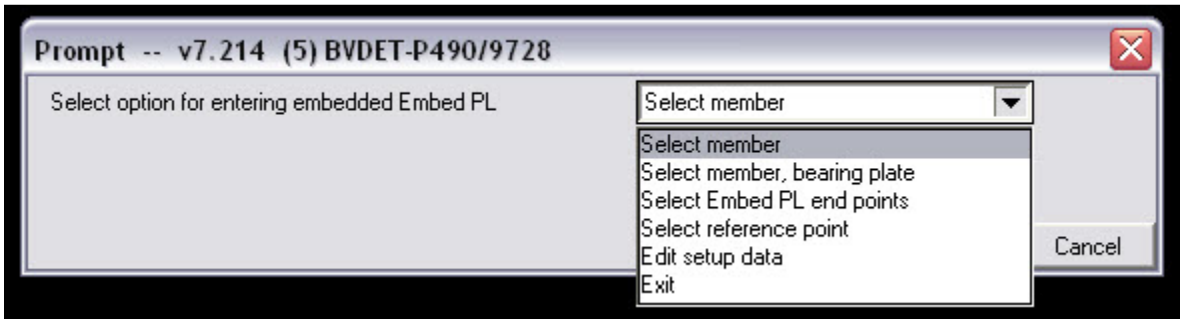

Figure 1

- Select member - The user will be prompted to select a Joist or Beam member. The selected member will be used to establish member placement and member attributes (see Setup Tab information).
- Select member, bearing plate - - The user will be prompted to select a Joist or Beam member. The selected member will be used to establish member placement and attributes will be set for the EmbedPL to be positioned as a bearing plate.
- Select Embed PL end points - The user will be prompted to select the end points of the member. There is no Left or Right end but Point 1 and Point 2 instead. The orientation of the material to the member line will remain constant regardless of the plan rotation.
- Select reference point - The user will be prompted to select the center point of the member.

- Edit setup data - The Setup Tab will appear in its own window. See Figure 3. "Determine variables options" controls whether various member attribute default values are set by reading the setup data from disk or the last entered values are used. Setup data for studs EmbedPL variables can be modified through this screen. Setup data is stored in XML format in file EmbedPLData.xml. The XML file can be edited in a text editor, XML editor such as XML Notepad, and etcetera. The author recommends Notepad++ for direct editing of the setup data.
- Exit -Add EmbedPL member is canceled. The user can select the "Cancel" button also.

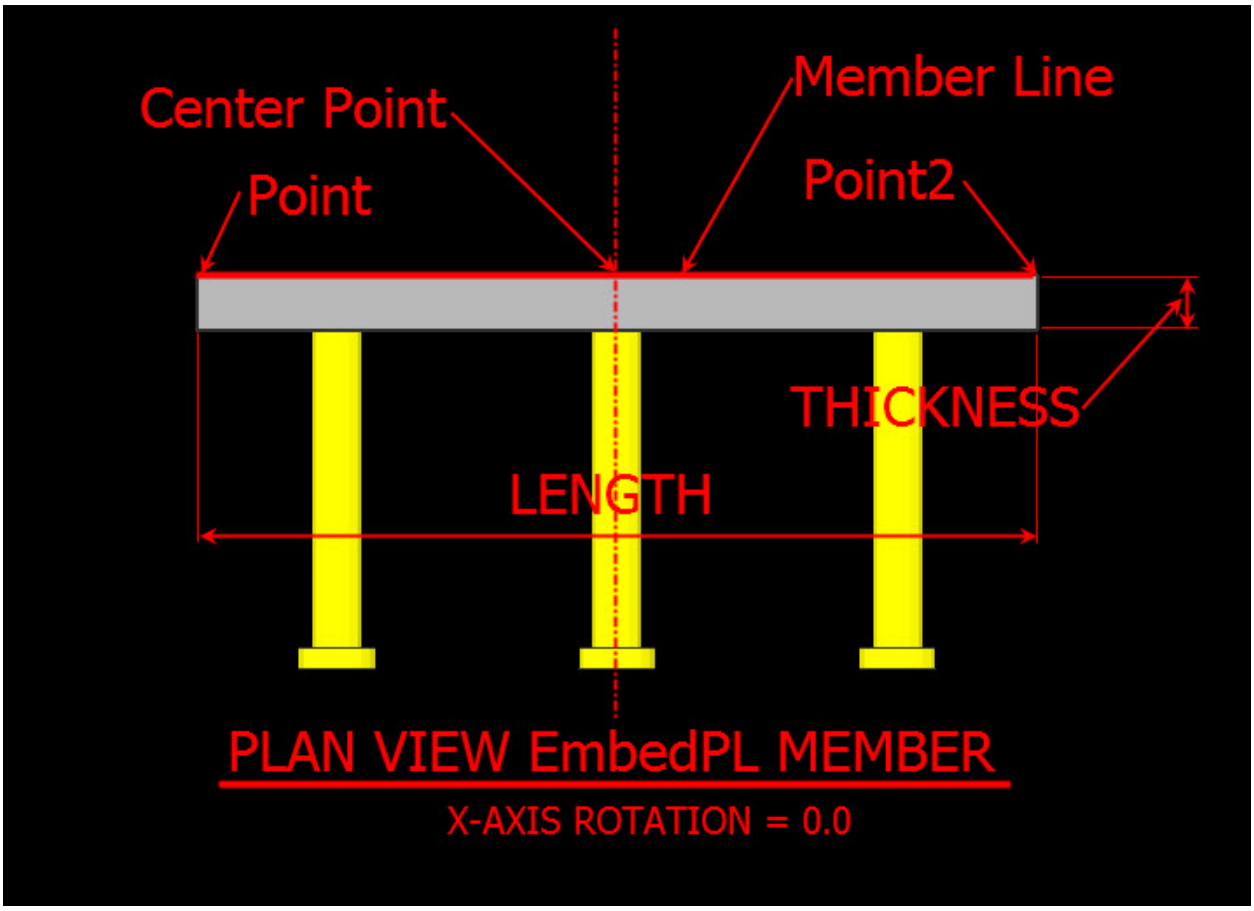

Figure 2

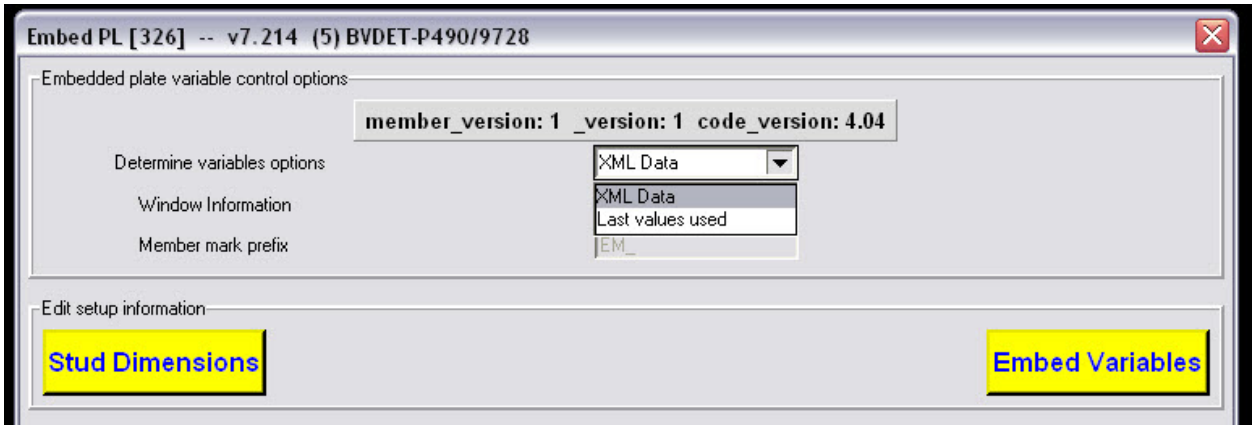

Figure 3

The General Tab will have different fields based on the option selected.

- The fields available under "Preselected member" or " Select member" option are shown in Figure 4. The "Plate Anchor Type" field is on the master widget and is common to all options. The member vertical slope is set to 0.0. The member "X" axis rotation is counter-clockwise when viewed along the member line from Point 2 toward Point 1.

Figure 4

- The fields available under "Select member, bearing plate" are shown in Figure 5. The member "X" axis rotation defaults to 90.0 degrees. This places the anchors on the underside of the plate material. The elevation of the bearing plate is calculated to be at the bottom of the beam or underneath the bearing shoe of a joist, assuming the member is not sloping. The EmbedPL can be moved and rotated manually as required for a sloping beam.

Figure 5

- The only field available under the " Select Embed PL end points" option is the member "X" axis rotation as shown in Figure 6.

Figure 6

- The fields available under the "Select reference point" option are shown in Figure 7. The point selected is the center point of the member line.

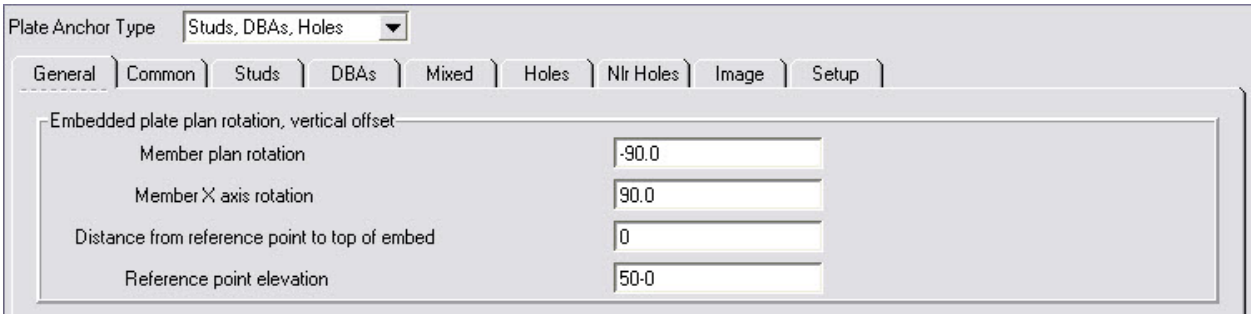

Figure 7

- The General tab options under member edit are shown in Figure 8. The fields on the master widget are "Model Complete" and "Swap end points". "Model Complete" is read-only. The value of "Model Complete" can be set with Update Status. "Swap end points" is a CheckBox and will increment/decrement the current value of Member plan rotation. When an EmbedPL member is moved or stretched and Point 2 is toward the left of Point 1 with respect to the model, the points will swap when the member is regenerated. This does not happen when an EmbedPL member is copied (versions 7.214 and earlier). This is a limitation of all custom members. The "Swap end points" CheckBox was added to facilitate swapping the end points back.
- Note that the center point of the member is maintained when entering a new value for the Member plan rotation and Member vertical slope. The Embed elevation is always at the center point of the member line.

Figure 8

- The balance of the General tab has fields common to all member add options and member edit as shown in Figure 9. Note that the center point of the EmbedPL member is maintained when changing the length of the member.
- The "Minimum plate dimensions" are displayed on the master widget when there are anchors or anchor holes required by the current field selections. The buttons along the bottom are similar to the buttons displayed on regular SDS/2 member screens. The Plate material color field has a right click menu option "Color Dialog". Selecting that option brings up a custom widget for selecting the material color. See Figure 10.

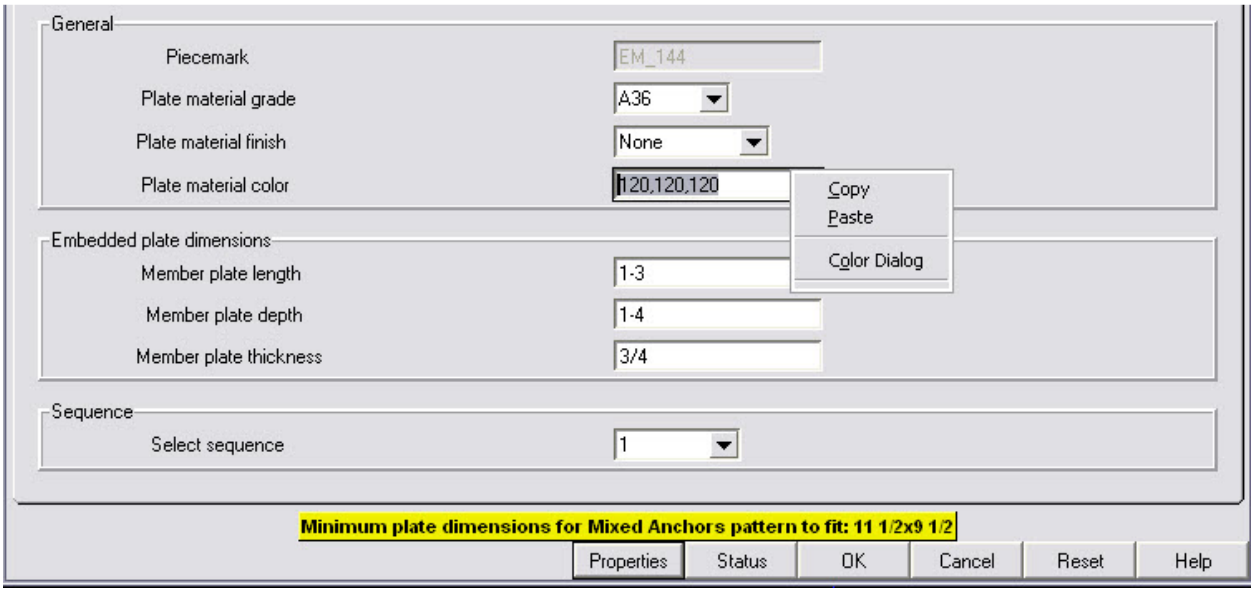

Figure 9

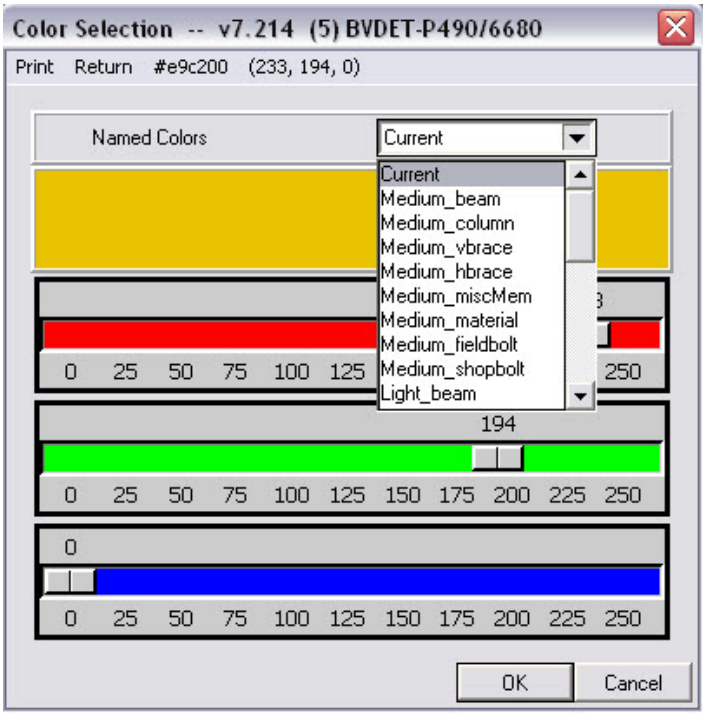

Figure 10

Anchor Types

There are three anchor types:

Studs - The options for the stud anchors are set on the "Studs" tab (Figure 11).

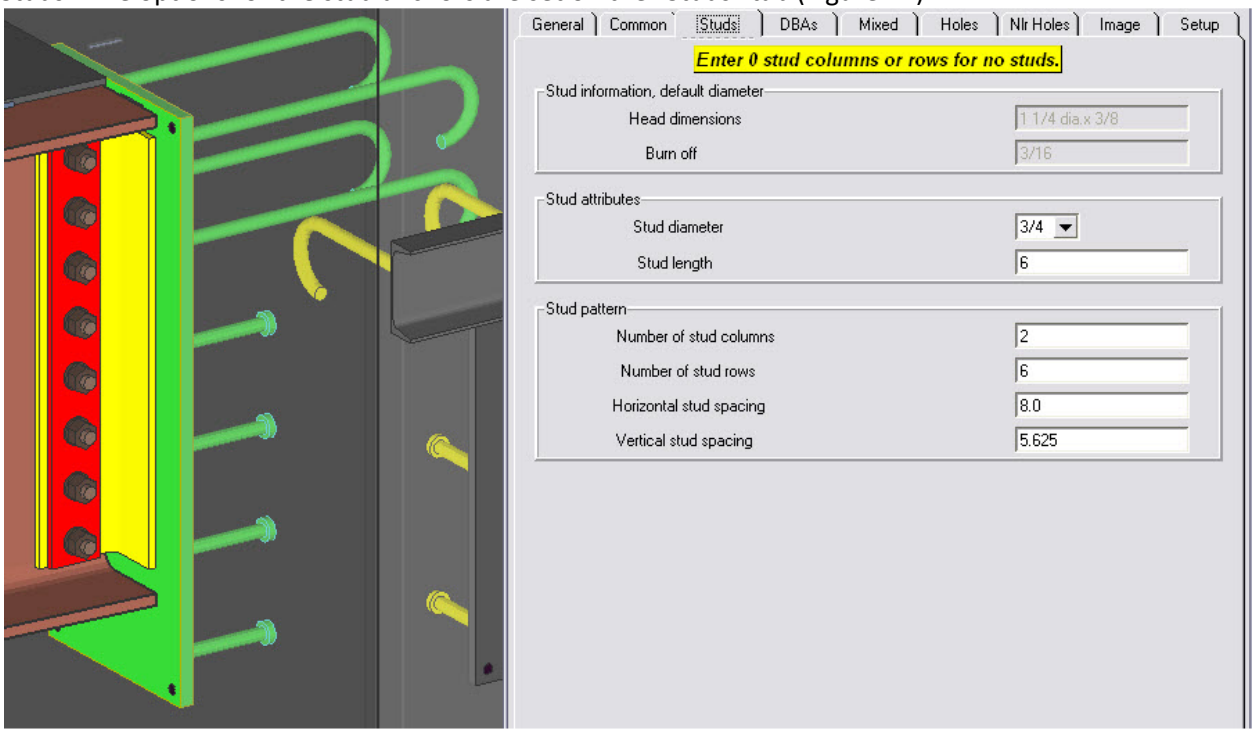

Figure 11

Deformed bar anchors (DBAs) - Straight, square bend hook and J-hook DBAs can be added. The material description is set to "#6REBAR" (for ¾Ø) if grade is "A706", otherwise it is set to 'DBA3/4" (Figure 12). The rotation of bent DBAs will vary depending on the model orientation. It's best to work in plan.

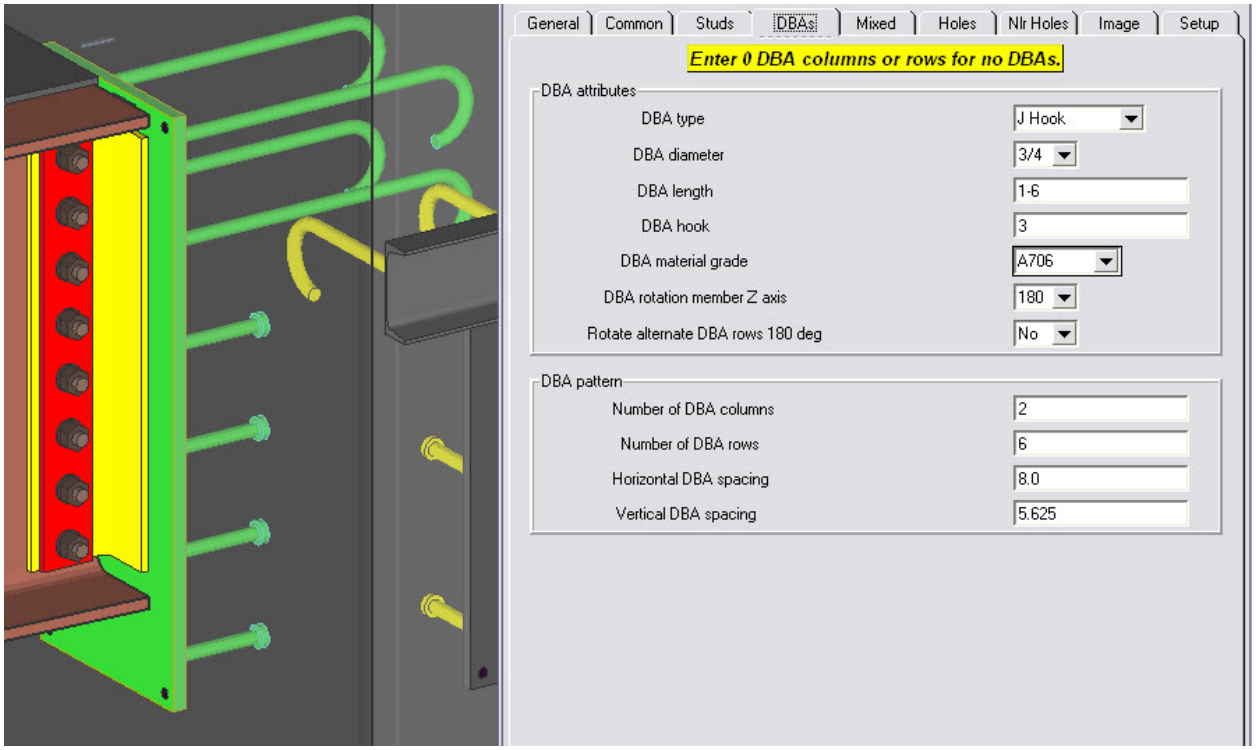

Figure 12

Holes - Hole pattern attributes are controlled on the "Holes" tab (Figure 13).

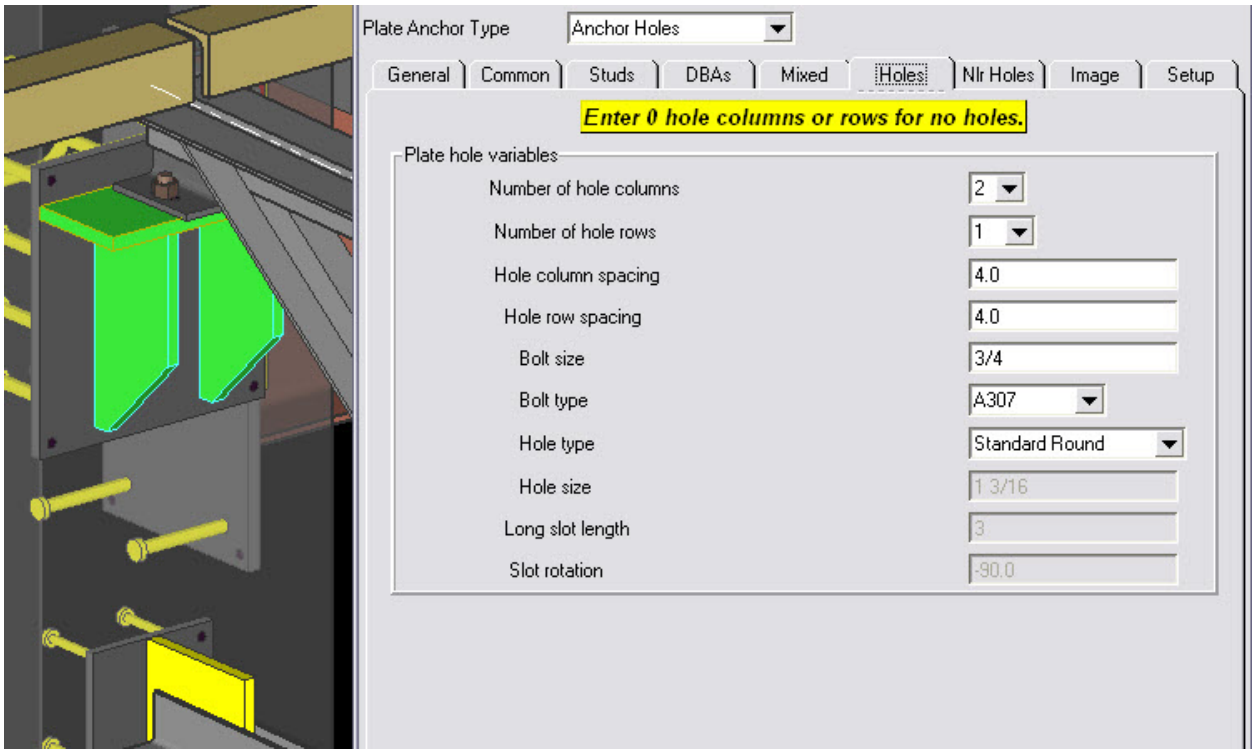

Figure 13

The three anchor types can be mixed on the same member

The anchor type for a member is selected on the master widget:

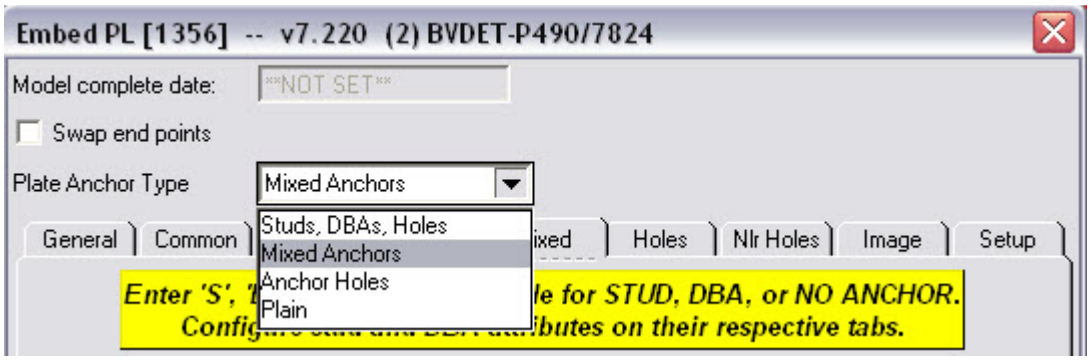

Figure 14

The "Mixed Anchors" option offers the greatest flexibility (Figure 15). The vertical and horizontal spacing can be a single value or a varying spacing. For example, if the required spacing between three columns of anchors is 6,9,6, the user would enter "6,9,6" in the" Horizontal spacing anchor" field.

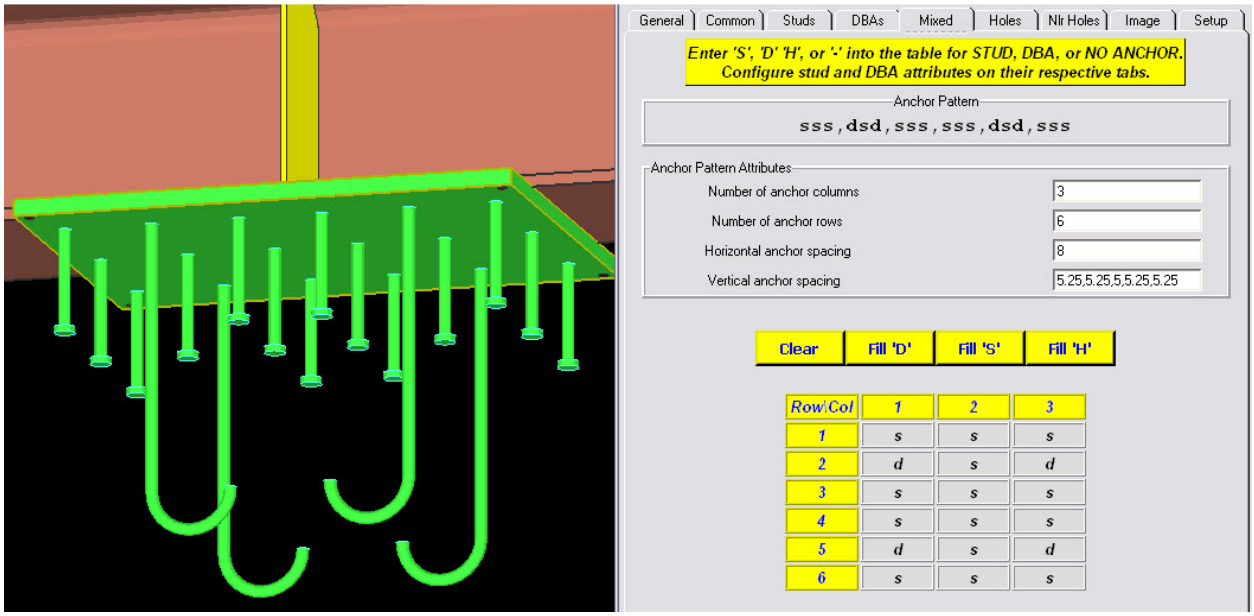

Figure 15

Anchor finish, material color, and anchor pattern offsets attributes are controlled on the "Common" tab.

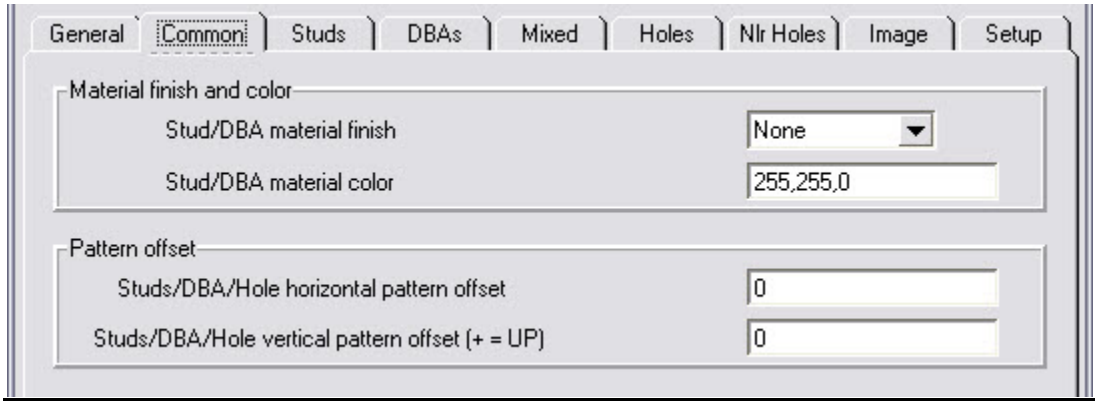

Figure 16

Nailer holes in opposite corners or four corners can be added and are controlled on the "Nlr Holes" tab.

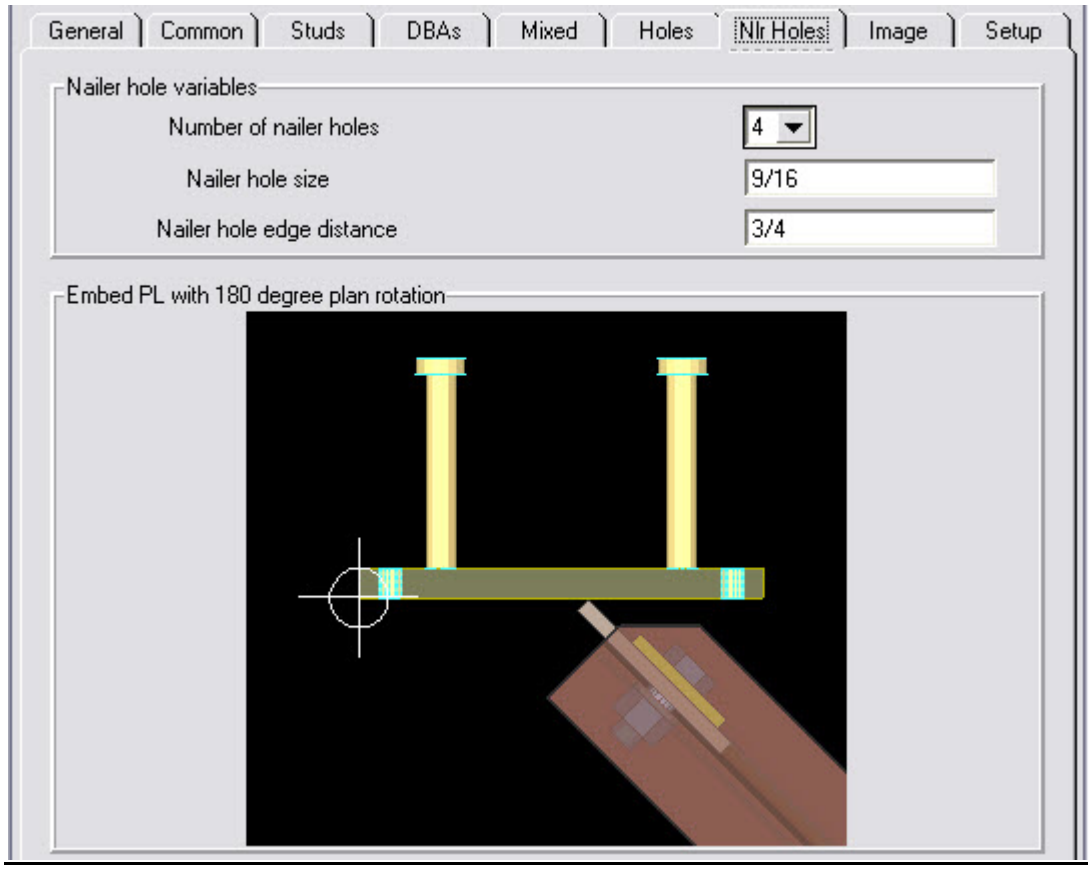

Figure 17

For additional information, the following documentation from the source code file "EmbedPL.py" is included as well as the version notes.

Add embedded plates with studs for beam connections to concrete foundation or shear walls, for beam and joist bearing plates, or for Misc Rectangular Plate members. The location can be set by selecting a beam or joist member or by picking the member end points.

Suggested model orientation is plan view for selecting point locations or any orientation when selecting or preselecting a member. The user enters the embedded plate plan rotation when selecting a member for reference or selecting a reference point. For a plan rotation of 0.0 degrees, the member line will be from left to right, the plate thickness will be below the member line, and the studs will be pointing toward the bottom of the screen. For a plan rotation of 180.0 degrees, the member line will be from right to left, the plate thickness will be above the member line, and the studs will be pointing toward the top of the screen. User can enter an X axis rotation. The studs point UP with an axis rotation of -90 and down with an axis rotation of 90.

Studs will be applied to the plate material NS face.

Nailer holes can be added in opposite corners or all corners [0,2,4].

Default embedded plate sizes and member piece marks can determined by option 'XML Data' (dictionary EmbedPL.xmlDoc.plateinfo is accessed, default values are based on member nominal depth) or option 'Last values used'. This is only valid if a reference member is selected. The reference member can be a Joist or Beam.

The center point on the length of the custom member is calculated and kept.

Custom member data is serialized to disk. The file extension of the data file is 'extra'. Each custom member file will have a companion 'extra' file.

Defaults data is also saved to disk. The defaults are saved in directory plugins/EmbedPL/Defaults. Images are stored in directory plugins/EmbedPL/Images. The defaults file can be edited to change default values.

You can enter a Embed PL using these options:
Preselected member for reference
Select a member for reference
Select a member for reference, set location as a bearing plate
Select a center WP
Select the two end points

You can do these things with an existing Embed PL:
Copy
Stretch member ends (edit to update)
Move (process or edit to update)
Change elevation
Change slope
Change plan rotation
Change the length (the center point is maintained)

Default Infomation
  Initial screen options:
    Preselected member -
      Accept a preselected Beam or Joist member to determine
      reference point locating the member center point in plan.
    Select member -
      Select a Beam or Joist member to determine reference point
      locating the member center point in plan.

Select member, bearing plate -
Select a Beam or Joist member to determine reference point locating the member center point in plan. Set variables for member to act as a bearing plate
Select Embed PL end points -
Pick member line end points
Select reference point -
Pick a reference point locating the member center point in plan
Exit

Vertical embedded plate offset: self.embed_vertical_offset
Which end of memRef ["Left End", "Right End"]: self.which_end
Member sequence - must be a string: self.plate_seq
Distance from end of Beam/Joist member to EmbedPL member line

Stud Information
Stud diameter ("1/4", "3/8", "1/2", "5/8", "3/4", "7/8", "1"):
self.stud_diam
self.stud_length
self.stud_finish
self.stud_color
self.studCols
self.studRows
Stud spacing along custom member X-axis: self.studXSpa
Stud spacing along custom member Y-axis: self.studZSpa

DBA Information
Type ['Straight', 'Square Hook', 'J Hook']:
self.dbaType
DBA diameter ("1/4", "3/8", "1/2", "5/8", "3/4", "7/8", "1"):
self.dbaDiam
self.dbaLength
self.dbaHook
self.dbaGrade
self.dbaZRot for hooked DBAs
self.dbaCols
self.dbaRows
self.dbaXSpa
self.dbaZSpa
self.stud_finish - Common with studs
self.stud_color - Common with studs

Hole Information
holeCols
holeRows
holeXSpa
holeZSpa
boltSize
holeSize - Enter 0 for SDS/2 to calculate hole size
boltType - Job().bolt_sched()
holeType - ("Standard Round", "Short Slot", "Oversized Round",
"Long Slot", "Anchor Bolt Hole")
slotLength - Enter 0 for SDS/2 to calculate long slot length
slotRot

Stud/DBA/Hole pattern offsets
Pattern offset X direction: self.x_off
Pattern offset Y direction: self.z_off

Plate Information
self.plate_length
self.plate_depth
self.plate_thk
self.plate_finish
self.plate_color
Nailer Holes: (0, 2, 4)
0 = none,
2 = opposite corners,
4 = each corner (integer)
self.nailer_holes (0,2,4)
Nailer hole edge distance: self.nailer_edge_dist
Nailer hole size: self.nailer_hole_size

Custom Member Plan Rotation: self.embed_plan_rotation
Custom Member X Axis Rotation: self.axis_rotation
Main Material Grade: self.plate_grade
Job().steel_grades("Plate").keys()

Access dictionary self.xmlDoc.plateinfo for self.studCols,
self.studRows, self.plate_length, self.plate_depth,
self.plate_thk, self.studXSpa, self.studZSpa, and
self.mark_prefix as a function of self.memRef.nom_depth
self.func_data_or_last = func_data_or_last

Custom member piecemark prefix: self.mark_prefix

3.00 (11/18/09):
Update to custom member EmbedPL.

3.01 (11/24/09):
Implement StateAccessor
Create class for dialog box

3.02 (11/27/09):
Add some rules in dialog box
Get stud and plate data from XML document

3.03 (11/29/09):
Update to custom member _version = 1
Add option for beam bearing plates
Add option to add 'Anchor bolt' holes
Add option to add DBAs straight, square hook, J Hook

3.04 (11/30/09):
Rename to EmbedPL
Change _version to 0

3.05 (12/17/09):
Assign Point3D objects on edited member
self.leftWP, self.rightWP, self.ctrPT

3.06 (12/18/09):
Save doalog box window sizes and positions in XML data file
Enable modification of XML data file data

3.07 (12/19/09):
Rename variables no_cols, no_rows, x_spa, z_spa
to studCols, studRows, studXSpa, studZSpa.
The variable names are not pickled, only the type and value.
Therefore, the variable names can be modified as long as the
number and type of variables pickled remains constant.

3.08 (12/28/09):
varKeys = self.model.plateinfo[optionList[0]] ----->
varKeys = self.model.plateinfo[optionList[0]].keys()
Omit width and height specifications for PlateEditDlg widget.

3.09 (12/31/09):
Translate on self.rp1 to calculate points for studs and DBAs.
Use Transform3D to set rotations for studs and straight DBAs.

3.10 (1/5/10):
Add option to optionDialog "Edit setup data" which bypasses
adding the member. The main dialog box will have only the
"Setup" tab.

3.11 (1/13/10):
Option "Preselected member" - if Beam or Joist member is
preselected, bypass option dialog.

3.12 (1/19/10):
Evaluate selected points by comparing to None instead of True or False.
Point(0,0,0) evaluates False, and will fail the member add.

3.13 (1/21/10):
Set member orientation with SetColumnOrientation()
Rotate plate material: self.plate.rotate(mem, (360,0,0))
Rotate bent DBAs: rb1.Rotate(rb1.Member, (0, 90, self.dbaZRot))

3.14 (2/3/10):
Modify dialog box Setup tab to use Pack geometry manager.
Add option to swap ends
Configure all dialog box frames consistently
Use EmbedPLDialog.MemberAttrController to set sequence, description,
and is existing.

3.15 (2/6/10):
if None not in [leftWP, rightWP]: will cause UnboundLocalError if
leftWP not selected. Initialize end points:
leftWP, rightWP = None, None

3.16 (2/15/10):
Increment dbaZRot by 180 degrees for each subsequent row.

4.00 (3/4/10):
Enable color selection dialog by context menu for color selection Entry
fields. Increment _version to 1. Allow for studs and DBAs to be combined
in a variable pattern. Add option to rotate every other row of bent DBAs
180 degrees to entered rotation.

Create new tab for studs and DBAs in a combined pattern with variable
spacing. Tab name is currently 'Mixed'. Spacing format:

'6' - denotes evenly spaced at 6
'6,2,2,6' - denotes spacing between 5 columns

Mixed stud and DBA pattern is entered into a table.

Display an interactive 'Anchor Pattern' that adjusts to table entries.
The pattern is read from the data (XML) file if option 'XML Data' is
chosen.
Example: 'DDD,S S,S S,DDD'
This pattern denotes 3 columns and 4 rows. The top and bottom
rows are fully populated with DBAs and the middle rows are studs
with the middle column omitted.

Display a table to fill with 'D', 'S' or '-' which indicates
DBA, stud or empty at that location.

Add minimum plate dimension label for 'Studs, DBAs, Holes' option.

Add ability to read default data from XML file for joists by joist
series ("G", "LH", "K").

Options are:
'Studs, DBAs, Holes', 'Studs and DBAs', 'Anchor Holes', 'Plain'

New variables:
anchorType
anchorCols
anchorRows
anchorColSpa
anchorRowSpa
anchorPatt
rotateAltDBAs
member_version

4.01 (3/9/10):
Improve functionality of label that displays minimum plate dimensions
to accomodate Stud, DBA and Hole patterns. Calculation is made based
on value of self.anchorType.

4.02 (3/10/10):
User added material will now change elevation with Embed PL member if
member elevation is changed in the member edit screen.
Move minimum plate dimensions label to mainFrame.
Change " " to "0" for anchorPatt. Options are now "D", "S", "0"

4.03 (3/17/10):
Add code to assign grade of stud material to
Job().steel_grades("Shear Stud").keys()[0]
SDS/2 7.208 does not allow assignment of grade to stud material
Grade of stud has no variable available for serialization in this
version (1).

4.04 (5/29/10):
Change option name "Mixed Studs and DBAs" to "Mixed Anchors"
Added support for holes mixed with studs and DBAs
Increase number of rows to 12 for "Anchor Holes" option

4.05 (7/27/10):
Modify description to #8thsRebar and material usage to REBAR if the material grade is A706.
Add condition at Edit() return - If model complete, return False

How many Embed PL members are in the image below?

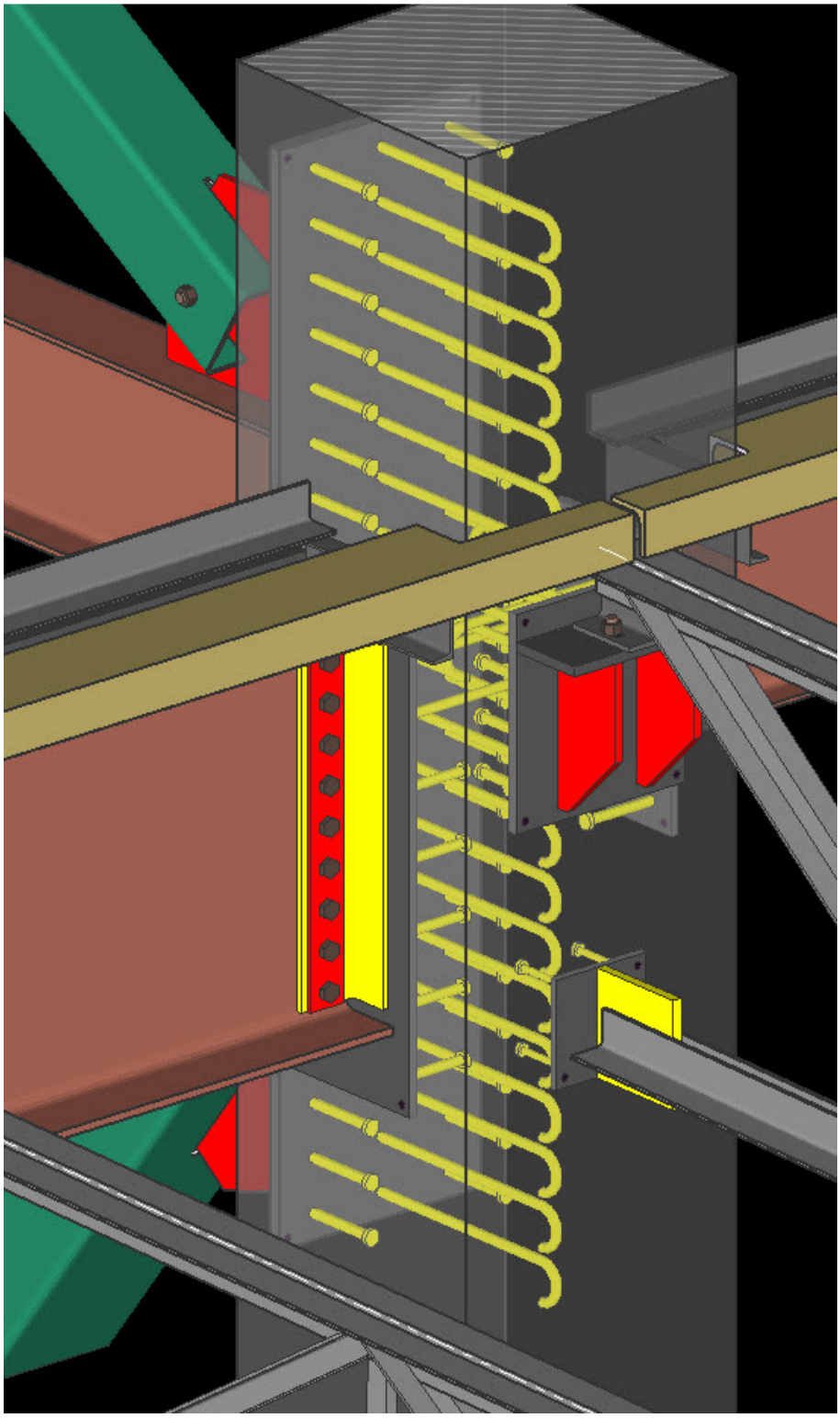

Figure 18