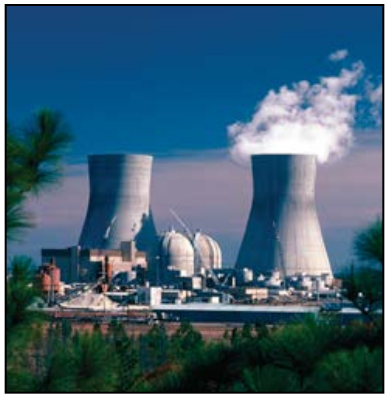
Process, Power and Marine Division

SmartPlant 3D Structure Functions

Management Overview Training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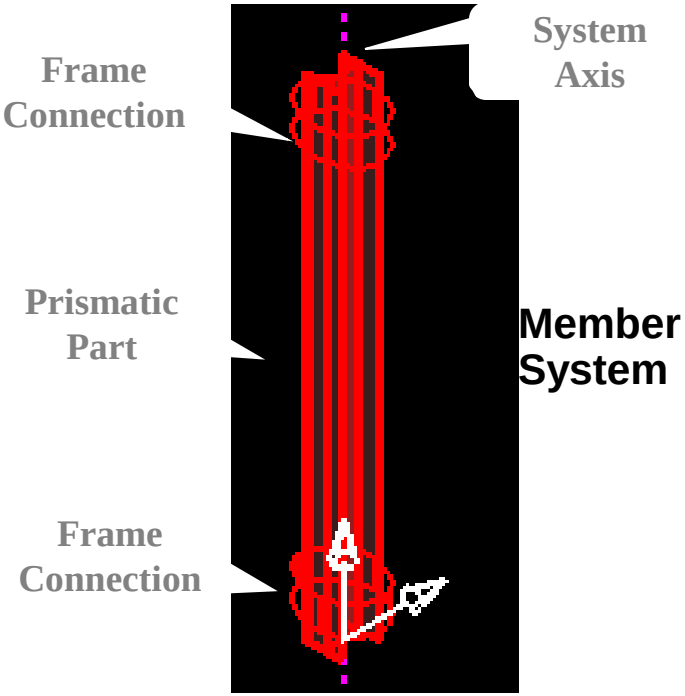
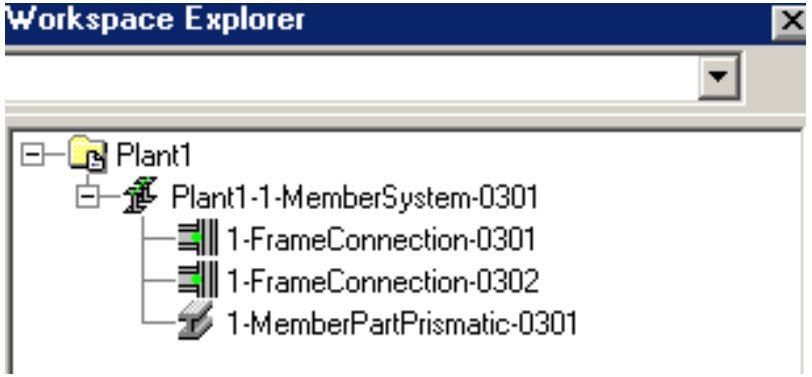
Member System

- Member System is a sequential set of member parts that share a common axis. It is the design parent of other entities, initially the Member Part and two Frame Connections.





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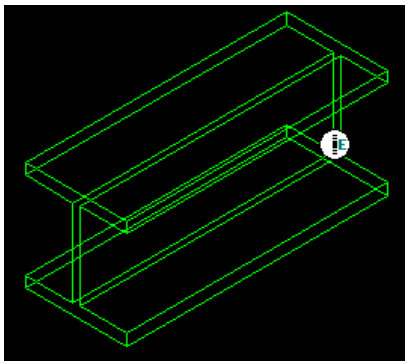
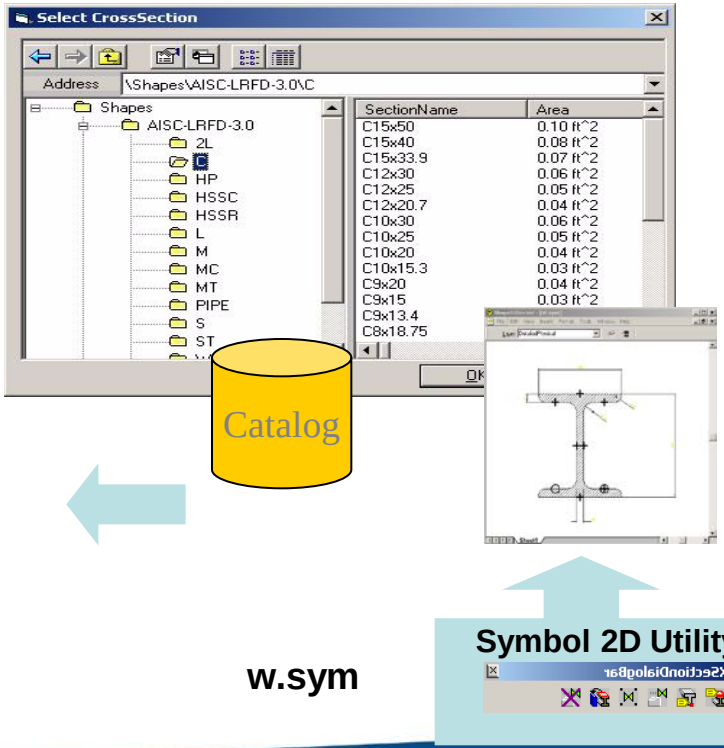
Member Part

- Single-solid entities geometrically described as a surface of projection. The axis of a member part is a portion of the system axis.
- Prismatic Parts will be created by a projection of a cross section definition stored in a parametric symbol file.
- System uses these symbol file to generate the member objects based on reference data stored in the catalog.





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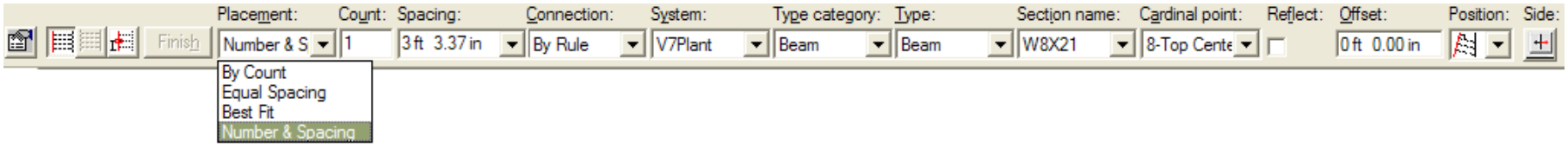
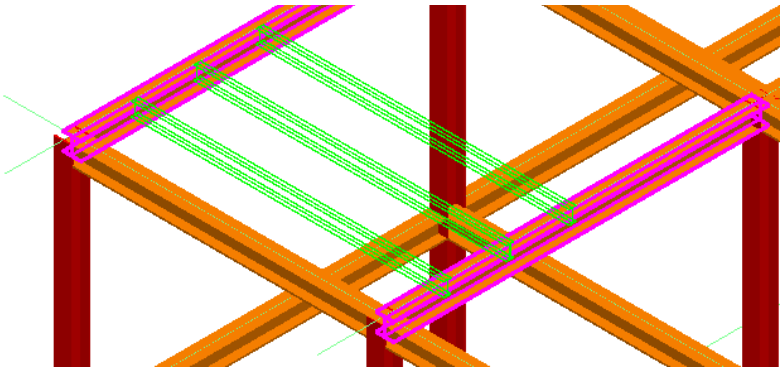
Productivity Commands – Framing Members

Interior framing members

- Allows number and precise spacing to be defined
- Starting point to be defined or defaulted
- Remembers selected members
- Allows continuation mode





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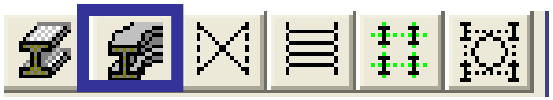
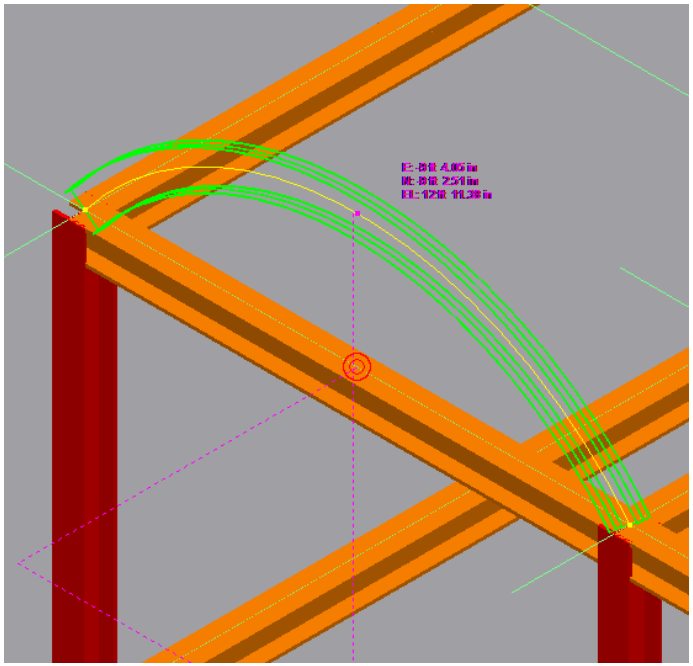
Curved Members

- Allows curved (arc) member to be placed
- Supports framing and positioning of standard members
- Can be split like a member system (curve-curve split)
- Defined by 3D path
- Reportable like other members





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Frame Connections

- The Frame connection is a positional constraint mechanism that help user to position and optionally orient the member system to the supporting member system.
- Provide offsets for the further configuration of the framing connection
- The catalog provides four types of positioning connections:
  - Flush
  - Seated
  - Centerline
  - Axis
  - Corner Brace
  - Surface
  - Unsupported
- Manual or Automatic rule-based selection

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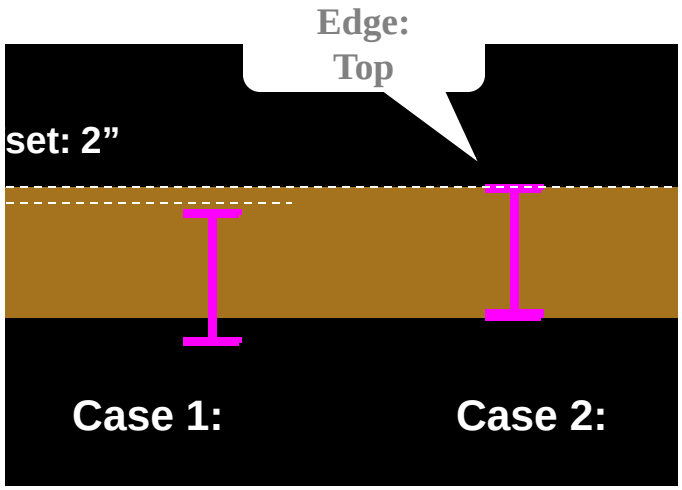
Frame Connection Example - Flush

- Flush Connections
  - Use one of the two sides of the supporting member to positioning the supported member
  - Rule-based Offset



Connection Properties

Flush-Top

Property	Value
Edge	Top
Reflect	False
Side	Top Or Right
Offset	0 ft 2.00 in
Offset Direction	Vertical

Connection Properties

Flush-Top

Property	Value
Edge	Top
Reflect	False
Side	Top Or Right
Offset	0 ft 0.00 in
Offset Direction	Vertical

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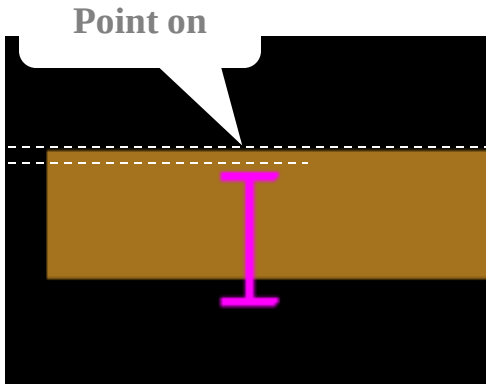
Frame Connection Example - Axis

- Axis Connections
  - Use a point on the supporting member to positioning the supported member
  - Rule-based Offset
    - Axis Along
    - Axis End
    - Axis Colinear



Connection Properties

Axis-Along

Property	Value
Supporting CP	0-None
X Offset	0 ft 0.00 in
Y Offset	0 ft 0.00 in
Z Offset	-0 ft 2.00 in
Coordinate System	Global

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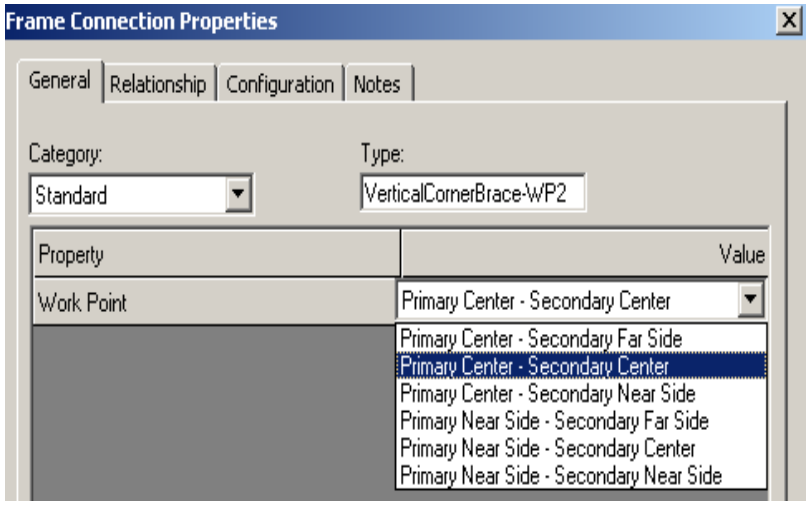
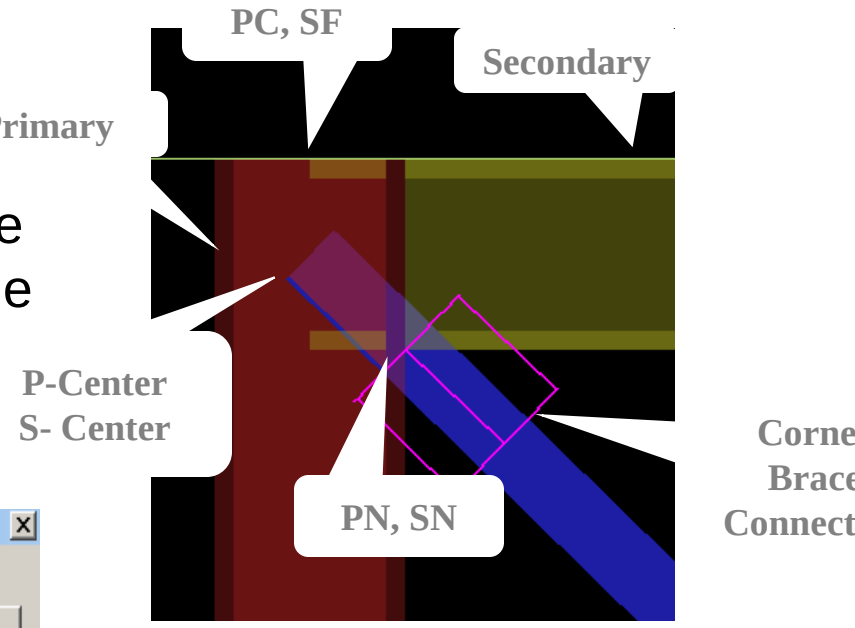
Frame Connection Example – Vertical Brace

- Vertical Brace Connections
  - Use two member connections on the supporting member in positioning the supported member
  - Rule-based Offset





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Assembly Connections

- The Assembly connection is the controlling object that creates the set of detailed end-treatment features and generates the physical parts that connect two or more member parts.
- Asynchronous process
- Detailed end-treatment features
  - Planar cutbacks and copes with clearances and skew control
- Part generation
  - Gusset and base plates, bolts, welds, etc

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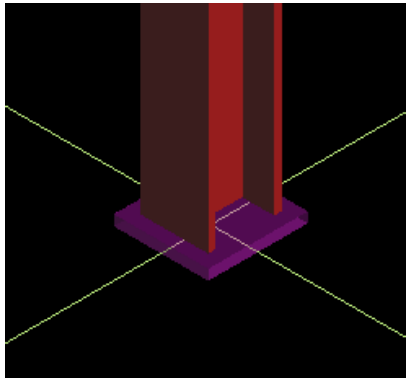
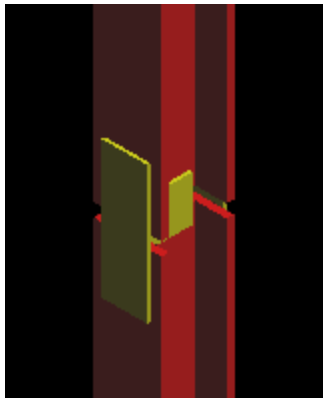
Assembly Connection Example – Column

- Column Base Plate Assembly Connection
  - Offsets
  - Cutback clearance
  - Part (Base plate)
- Splice Assembly Connection
  - Optional Flange and Web Plate w/Thickness
  - Clearance
  - Symmetry
  - Parts (Flange and Web plates)





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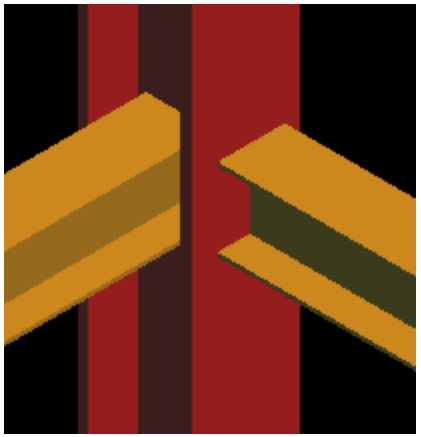
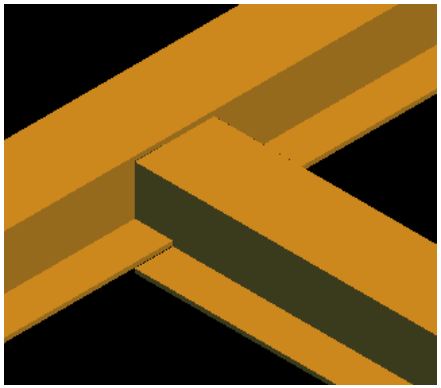
Assembly Connection Example - Fitted

- Fitted Assembly Connection
  - Offsets
  - Rule-based application of “Cope” features
    - Squared
    - Planar
  - Independent Flange/Web Clearance values
  - Parts (*Gusset plate)*





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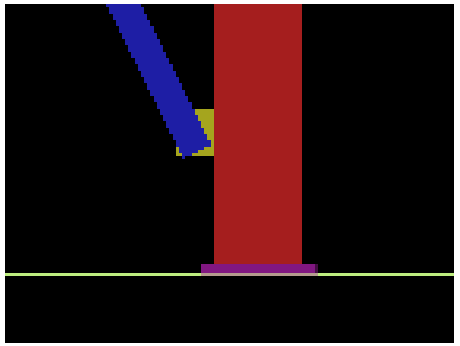
Assembly Connection Example – Gusset

- Corner Gusset Plate Assembly Connection
  - Rule-based offset positioning
  - Clearance
  - Squared or Skewed planar cut
  - Part (Gusset plate)

- Column Base Brace Assembly Connection
  - Rule-based offset positioning
  - Clearance
  - Squared or Skewed planar cut
  - Part (Gusset plate)



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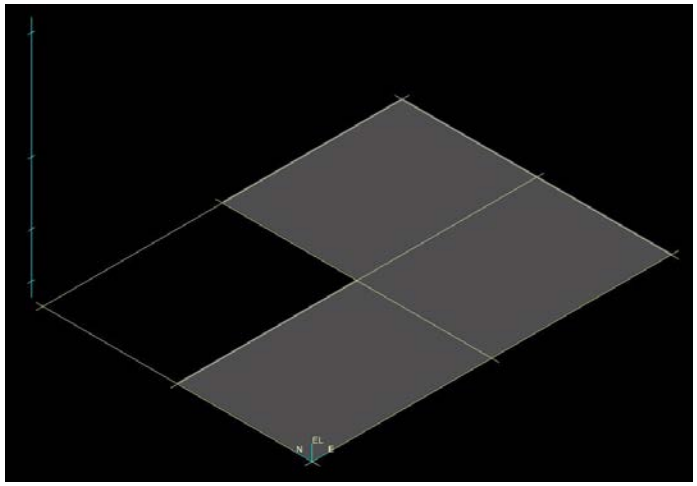
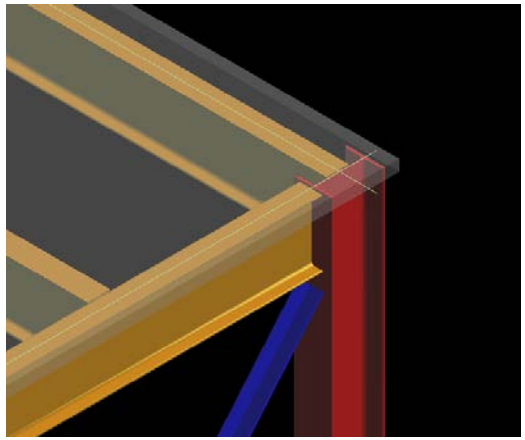
Slabs

- Bounded infinite plane geometry
- Derived from a design plane defined by several methods
- Can be bounded by Structure or other general topology (ie. edges, faces)
- Independent segment offsets, constant along the boundary segment
- Composite type/layer definition from reference data





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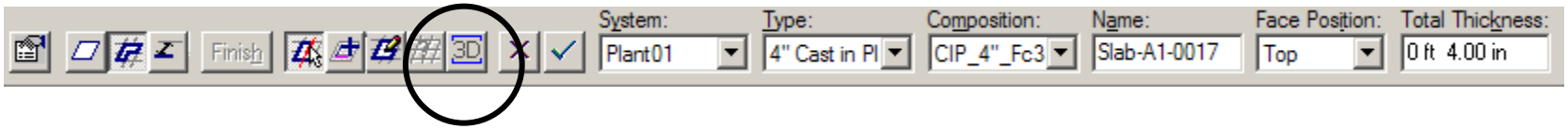
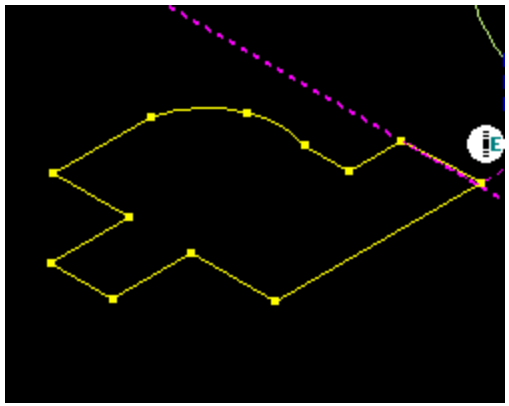
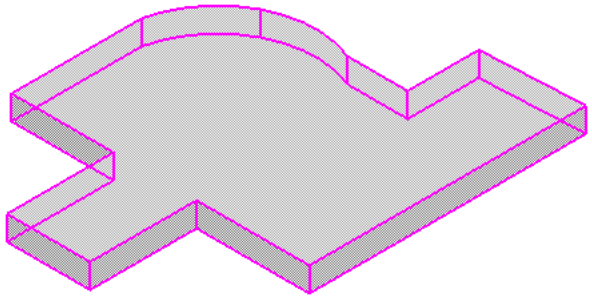
Slabs – Placement Example

Sketch 3D

- Ability to sketch slab boundaries directly in the 3D environment using the sketch service







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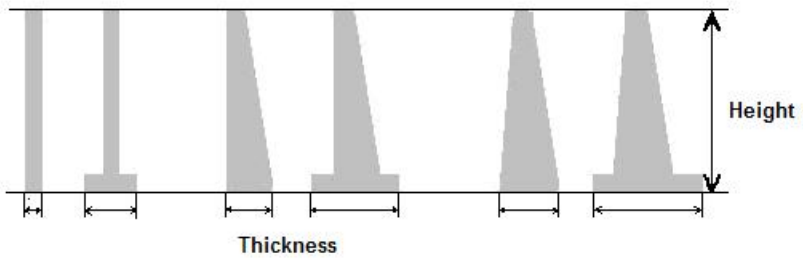
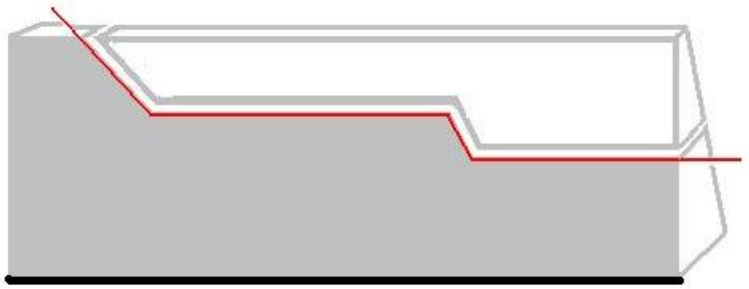
Walls

Wall Command



- Sketch plane
- Path
  - 3D sketch path
  - 2D sketch path
- Routed a set of user definable cross-sections
- Supports Openings
- Allows catalog and custom content for openings such as:
  - Doors
  - Windows
  - Louvers
- Composition and layer concepts
- Bound & trim operators



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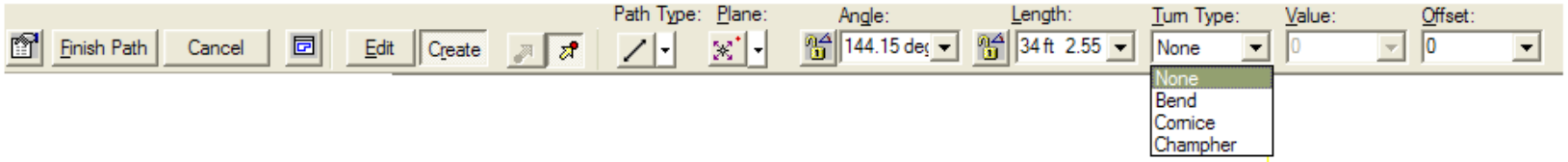
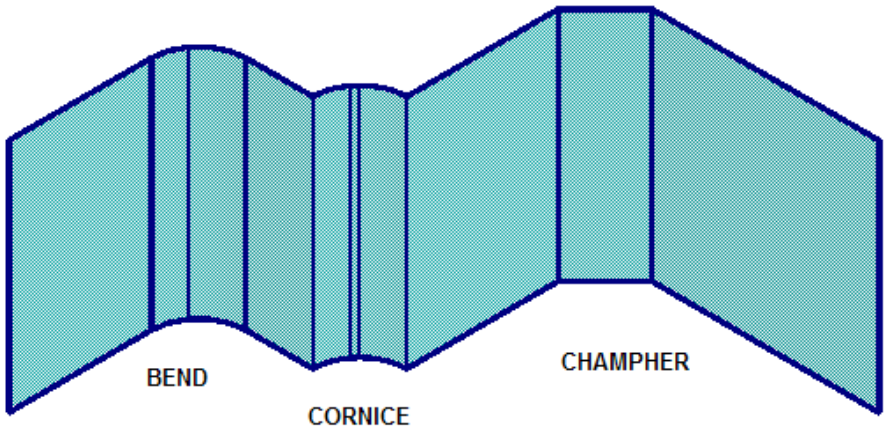
Walls – Place by 3D





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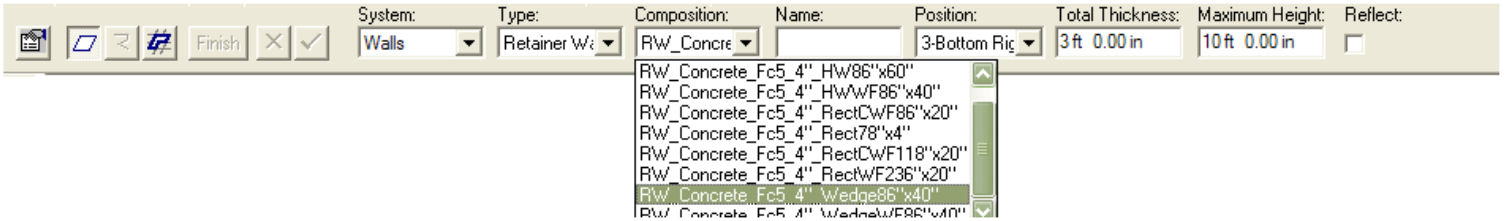
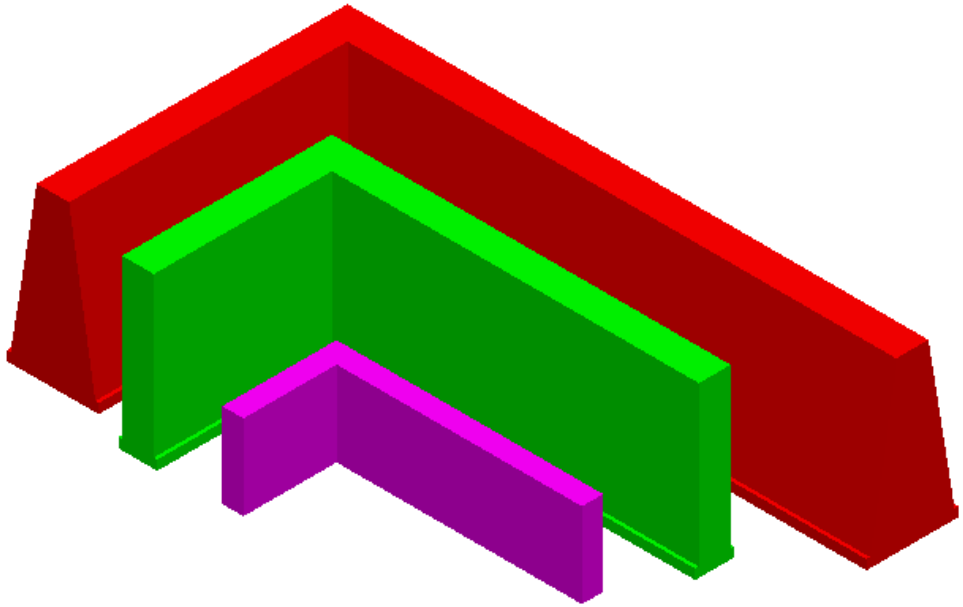
Walls - Examples





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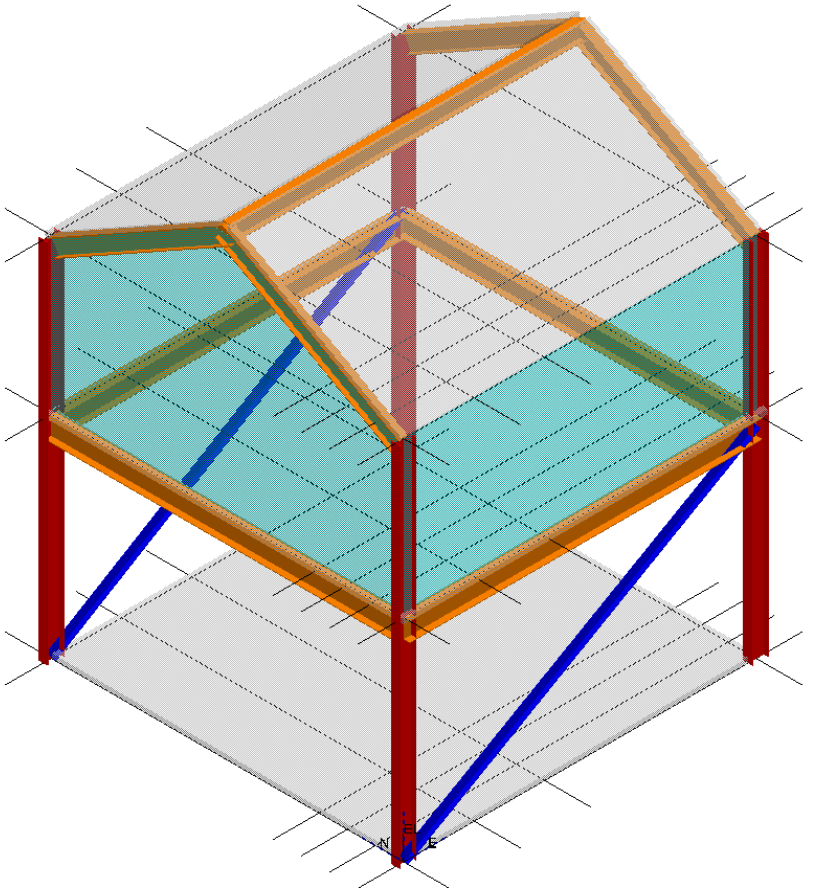
Walls - Examples

- Bound and Trim wall up to slab
- Bound and Trim wall by wall



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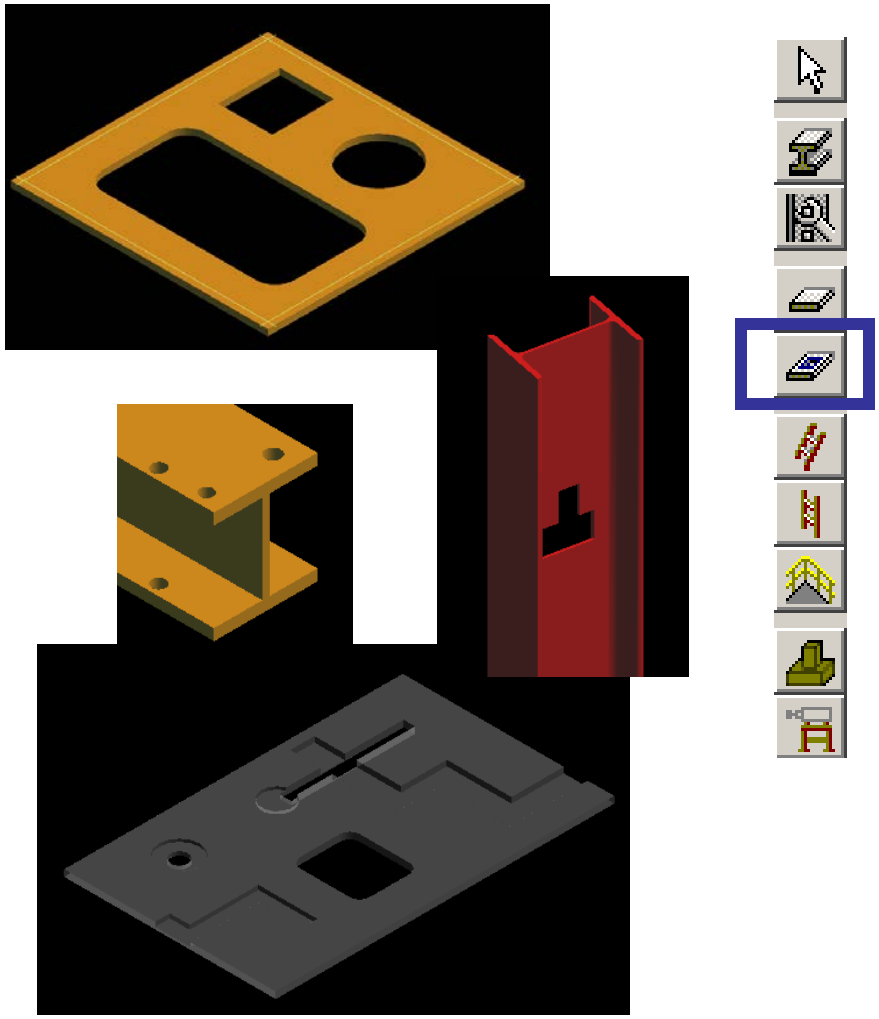
Openings

- Cutout feature that removes material from Slabs, Members
- Cutout operation is performed by using a contour defined by three methods:
  - Bounded by general topology (edges, faces).
  - Sketch method.
  - Select an opening from Catalog
- Supports full-depth or partial-depth cutouts



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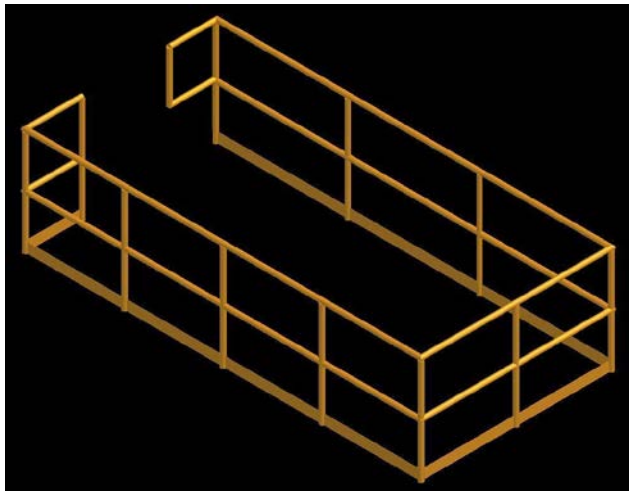
Handrails

- Parametric part class assembly
- Associative construction defined by located path trace
- Various customizable end treatment conditions and connecting conditions
- Defined as customizable catalog part with user-defined attributes
- Supports simple or complex level of detail and multi-representation using “aspects”



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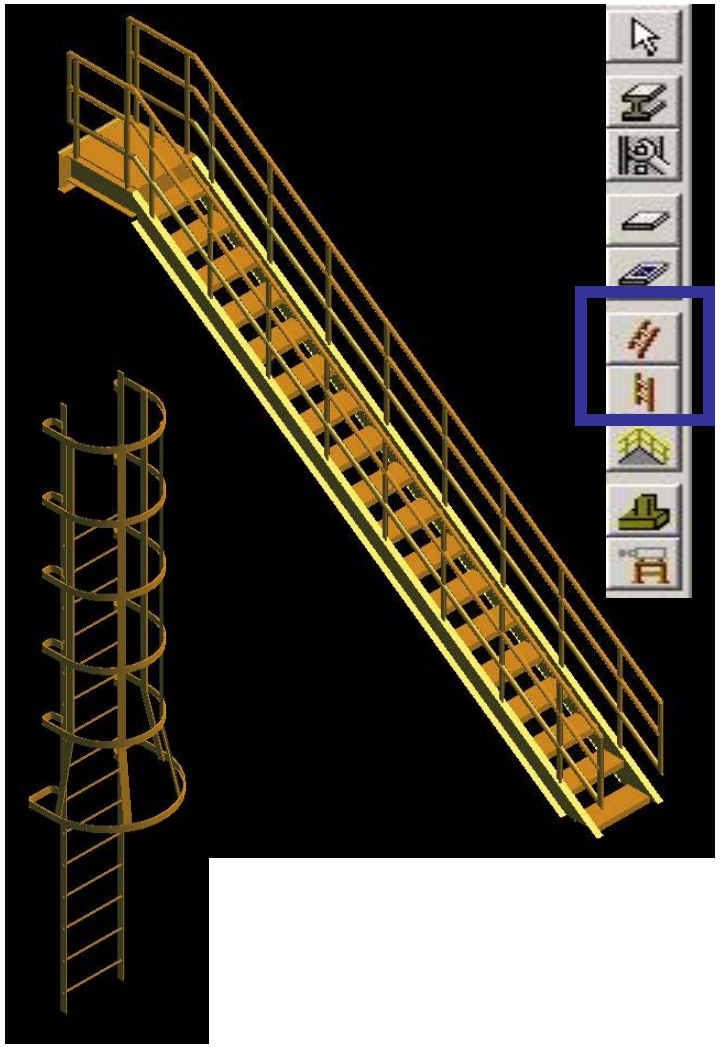
Stairs/Ladders

- Parametric part class assembly
- Associative construction defined by supporting surfaces/edges
- Positioned by offset from referenced surfaces or edges
- Defined as customizable catalog part with user-defined attributes
- Supports simple or complex level of detail and multi-representation using “aspects”



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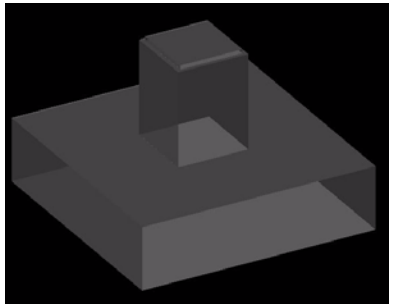
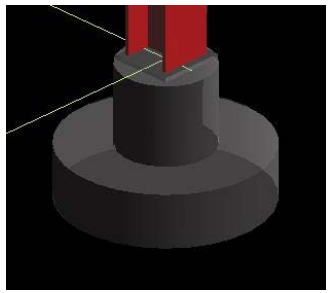
Footings

- Parametric custom assembly
- Associative construction that references Members to position itself
- Supports simple or complex level of detail using “aspects” and either symbol geometry primitives (G-Types) or detailed application object types (grout, Pier, etc)





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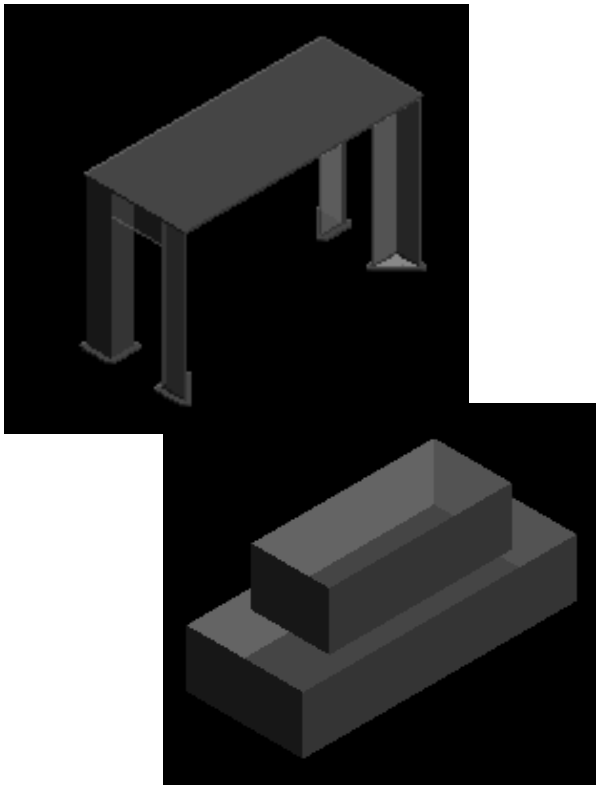
Equipment Foundations

- Parametric custom assembly
- Associative construction defined by Equipment Foundation Ports
- Positioned by port geometry and other bounding surface relationships
- Supports simple or complex level of detail using “aspects” and either symbol geometry primitives or detailed application object types.



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