Tutorial for AutoCAD Structural Detailing - Steel 2010

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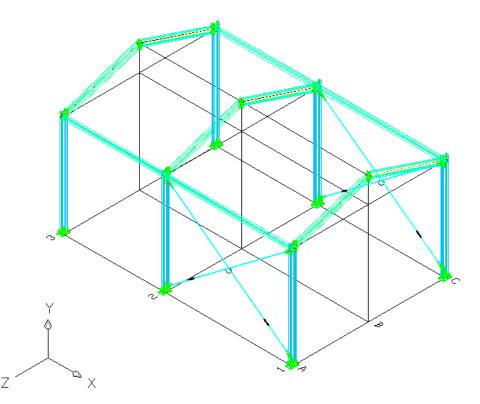
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1. EXAMPLE OF APPLICATION OF THE AUTOCAD STRUCTURAL DETAILING - STEEL PROGRAM: STEEL WORKSHOP

Use AutoCAD Structural Detailing - Steel for preparing steel workshop drawings. In this example, you learn the step-by-step method for framework and section modeling, editing the framework, and arranging elements in the final drawing layout. The drawing below shows an axonometric view of the workshop.



To use this documentation, follow these basic usage rules:

- Any icon symbol click the icon with the left mouse button.
- {x} select the 'x' option from the dialog.
- <u>text</u> enter the underlined text on the command line of the program, and then press Enter.
- LMC and RMC use the mouse buttons (Left Mouse Click and Right Mouse Click, respectively).

To start AutoCAD Structural Detailing - Steel, click ²⁵⁰ on the desktop (or click Start menu > AutoCAD Structural Detailing), and then select the Steel module. The software will include options (such as an extended menu, additional toolbar, tabs and the Object Inspector dialog) for preparing drawings.

1.1. Configuration

1.1.1. Preferences

| Performed Operation | Description |
|--|--|
| 1. (Preferences) | The Preferences dialog displays, where you can adopt basic parameters applied in AutoCAD Structural Detailing. |
| 2. LMC the Structural Detailing tab | Changes the dialog appearance. |

| General settings - Steel - Reinforcement | Select a drawing templat | e and workspace name | | |
|--|--------------------------|---------------------------|---|--------|
| | Steel: | RBCS-044.dwt ASD Steel | • | Search |
| | Reinforcement: | RBCR-044.dwt | • | Search |
| | Formwork Drawings: | RBCX-044.dwt | - | Search |
| | | ASD Formwork Drawings | | |
| | | | | |

| 3. | LMC the Steel settings | Changes the dialog appearance. |
|----|--|--|
| 4. | Under Display, select the options and define the values as shown below | Allows the selected elements to display in the graphical editor. |

| General settings Steel Profiles Plates Workframes Connections Bolts and Welds Ten Reinforcement | Display ✓ Workframes ✓ Connection marks Symbols of assemblies Symbols of groups Symbols of schemes ✓ Bolts ✓ Welds ■ Redraw acceleration |
|--|--|
| | Distance behind UCS 500 Marking of machinings |

| 5. | LMC Profiles in the selection tree | Changes the dialog appearance. |
|----|---|--|
| 6. | Under Profiles, select the options as shown below | Allows the selected elements to display in the graphical editor. |

| General settings | Profiles displaying Axis only Without roundings Detailed |
|------------------|---|
| | Local coordinate system Bounding boxes Centerline Insertion line |

| 7. | LMC Plates in the selection tree | Changes the dialog appearance. |
|----|---|--|
| 8. | Under Plates, select the options as shown below | Allows the selected elements to display in the graphical editor. |

| General settings | Local coordinate system Bounding boxes Middle surface Insertion plane |
|------------------|--|
|------------------|--|

| 9. | LMC selectio | Workframes on tree | in | the | Changes the dialog appearance. |
|-----|-----------------|------------------------------|----|-----|---|
| 10. | | Workframes, as shown belo | | the | Allows the description of workframe lines to display. |

| General settings Genera | Linetype Labels I Show labels | |
|--|---|--|
| | Frame shape 1 Text style RBCS_mod | |

| 11. | LMC selectio | Connections n tree | in | the | Changes the dialog appearance. |
|-----|-----------------|-----------------------|--------|------|--|
| 12. | Select I | n absolute draw | ving u | nits | The size of labels for defined connections (spheres) is expressed in units used in AutoCAD®. |

```
13. For Size, enter 150
```

Specify the size of a connection symbol.

| General settings | Connections Size: 150 In absolute drawing units |
|--|---|
| Workframes Connections Bolts and Welds Reinforcement | Assemblies Size: 20 © Relative to the screen Color: Red © In absolute drawing units |
| | Groups Size: 20 |
| | Schemes Size: 20 Color: Red In absolute drawing units |

| 14. LMC Bolts and Welds in the selection tree | Changes the dialog appearance. |
|--|---|
| 15. Select the options as shown below | Chooses whether to display bolts and welds as simplified or detailed. |

| General settings | Bolts display C Simplified C Exact | |
|------------------|---|---|
| | Welds display ○ Simplified - line ○ Full body | Mark Size Size Felative to the screen In absolute drawing units |

| 16. OK | Closes the Preferences dialog. |
|---------------|--------------------------------|

1.1.2. Project preferences

| | Performed Operation | Description | |
|----|---|---|--|
| 1. | (Project preferences) | The Project Preferences dialog displays, where you can adopt basic parameters applied in AutoCAD Structural Detailing - Steel (the parameters are saved in a DWG file). | |
| 2. | LMC General in the selection tree, and select the options as shown below | | |

| 🌬 Project preferences | | × |
|--|--|---------------------------|
| General Units Materials Profiles Styles Connectors Standards | Standard Image: Standard Tolerances 0.01 Parts identifying during positioning 0.01 Contact of welded parts 1 Arc display accuracy 128 | Default Save Delete |
| L- Project Info | Automatically create groups for the assemblies Automatically update connections Create assemblies from loose parts Simplified modeling of connectors Nomenclature of assemblies Text Main part name Family + main part name Family = main part name | OK Cancel Help |

3. **LMC** Units in the selection tree, and select the options as shown below

| k Project preferences | | | × |
|---|---|--|------------------------|
| Project preferences General G | Unit system Imperial Work units: Type: Description format: Table styles: | Metric Decimal Decimal 0.000 Decimal 0.00 0 0 0 0 | Default Save Delete OK |
| | | | Cancel Help |

4. LMC Materials in the selection tree, and select the options as shown below

| 📐 Project preferences | | | | × |
|--|---|--|-----------------------------|---------------------------|
| General Units Materials Profiles Styles Connectors Standards Project Info | List of materials STEEL 43-245 STEEL 43-25 STEEL 43-25 STEEL 50-325 STEEL 50-340 STEEL 50-355 STEEL 55-415 STEEL 55-430 STEEL 55-450 | Default materials Profiles Plates User parts Bolts Finishing of surface | STEEL V STEEL V 4.6 V | Default Save Delete |
| | Database | Add new | Remove | OK Cancel Help |

5. LMC Profiles in the selection tree, and select the options as shown below

| 📐 Project preferences | | × |
|---|---|-----------------|
| General Units Materials Profiles | Profiles database | Default Save |
| - Styles | Database Database name Database description | Delete |
| - Connectors | Herein Anderson British hot rolled section | |
| Standards | RCAT Catpro Produits siderurgiques francais | |
| - Project Info | RARB ARBED European section ranges | |
| | | OK |
| | List of profiles | Cancel |
| | | Help |

| 6. | LMC Styles in the selection tree, and select the options as shown | |
|----|--|--|
| | below | |

| 📐 Project preferences | | | × |
|--|--|---|---|
| General Units Materials Profiles Standards Standards Project Info | Table styles Bills of materials Plates summary Profiles summary Profile summary (by section type) Table of user parts List of elements List of elements List of elements Bolts lists Cuts lists Table of bolt assign List of marks | Standard Standard | Default Save Delete OK Cancel Help |
| 7. LMC Connectors in the selection tree, and select the options as shown below | | | |
| General Oefault type Materials Offault type Site Oefault Site Oelete | | | |

| Styles | | Delete |
|---|--|----------------------|
| Connectors | Standard: PN-83_M-82343 💌 🦳 | |
| Connectors Standards Project Info | Colors By type By grade By diameter Workshop: Yellow Site: Magenta Out of date: Red Out of date: Red Out of date: Red Out of date: Red | OK Cancel Help |
| J | | |
| | | |

| 8. | LMC Standards in the selection | |
|----|---------------------------------|--|
| | tree, and select the options as | |
| | shown below | |
| | | |

| roject preferences | | | |
|----------------------------------|---------------------|---------|--------------|
| General Units Materials | | | Default |
| Profiles Styles Connectors | Structural standard | EC3 | Delete |
| Standards Project Info | Drawing standard | ISO-129 | |
| | | | |
| | | | |
| | | | OK Cancel |
| | | | Help |

| 9. LMC Project Info, and then enter the project data | |
|--|--|
| 10. OK | Closes the Project preferences dialog. |

1.2. Framework Definition

| | Performed Operation | Description | | |
|----|--|---|--|--|
| 1. | \otimes | Selects axonometric view (SW isometric view). | | |
| 2. | (Create workframe) | The Workframe dialog displays, where you can define a workframe that simplifies the definition of a 3D structure model. | | |
| 3. | Box | Selects the box workframe, and changes the appearance of the dialog. | | |
| 4. | For Name, enter Workframe | Defines the workframe name. | | |
| 5. | On the Size/Division tab, enter: 6000 / 2 for Width 9000 / 2 for Length 4000 / 1 for Height | Defines workframe parameters. | | |
| 6. | For Length, select Non-uniform | Allows definition of non-uniform distribution of the workframe Length (see the drawing below). | | |

| 📐 Workframe | | × |
|---|---|-------------------------------|
| Name Workframe Box Box Roof Prism Surface only Left diagonal Right diagonal | Size/Division Axes descriptions Width (X) 6000 / 2 - Non-uniform Length (Y) 9000 / 2 - Von-uniform Height (Z) 4000 / 1 - Non-uniform | Create Match properties |
| ✓ Without description ✓ Show axes on drawings | Close | Help |

| 7 | The Line distribution (length) dialog displays. |
|--|---|
| 8. In the Spacing column, enter the following values: 0 5000 4000 | Defines position of the successive distribution axes. Note: Entering a (spacing) coordinate and moving the cursor to any edit field (or clicking OK) results in automatic calculation of the spacing value (coordinate). |

I

| | Spacing | Coordinate |
|---|---------|------------|
| | 0 | 0 |
| | 5000 | 5000 |
| | 4000 | 9000 |
| * | | |

| 9. | ОК | Defines axis distribution (along the length), and closes the Line distribution (length) dialog. |
|-----|--|---|
| 10. | LMC the Axes descriptions tab | Changes the dialog appearance. |
| 11. | For Length, define the following parameters: Prefix - leave the field empty Start value - 1 Step – 1 | Defines length description parameters. |
| 12. | For Width, define the following parameters: Prefix - leave the field empty Start value - A Step – 1 | Defines width description parameters. |
| 13. | For Height, select User-defined | Lets you define a description of the non-uniform distribution of the workframe height. |

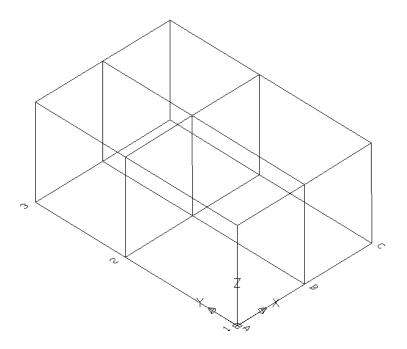
| 🎉 Workframe | | × |
|----------------|---|---|
| Name Workframe | Size/Division Axes descriptions | |
| | Prefix Start Step | |
| Box 🛱 | value Value Width (X) A Image: Create Image: Create | |
| Roof 🖉 | | |
| Prism 🕅 | Length (Y) 1 1 C Left User-defined Match properties | |

| Surface only Left diagonal Right diagonal Without description Show axes on drawings | |
|---|---|
| | |
| 14. 📖 | The Lines distribution (length) dialog displays. |
| | |
| 15. Enter the following values: | Defines height description parameters, and closes the |

| 15. Enter the following values: + 0 + 4000 OK | Defines dialog. | height | description | parameters, | and | closes | the |
|---|--------------------|--------|-------------|-------------|-----|--------|-----|

| 🔔 Li | ines (| distribution (length) 📃 🗖 | × |
|------|--------|---------------------------|---|
| 1 | | +0 | |
| 2 | | +4000 | |
| | * | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | OK Help | |
| | | | |

| 16. Kreate) | Starts defining the insertion point for the workframe, and closes the Workframe dialog. |
|--|---|
| 17. 0,0 in the command line | Defines the insertion point. |
| 18. F8 | Turns on ortho mode (this key should be pressed only if the orthogonal mode is off), RMC . |
| 19. Using the cursor, specify the direction as parallel to X axis of the global coordinate system. | Inserts the workframe (see the drawing below), and opens the Workframe dialog. |

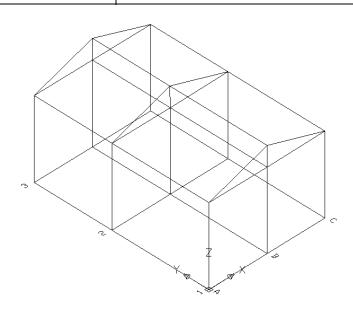


| 20. | Selects the workframe type (wedge), changes the dialog appearance. |
|---|--|
| 21. For Name, enter Roof | Defines workframe name. |
| 22. On the Size/Division tab, enter: 6000 / 2 for Width 9000 / 2 for Length 1000 / 1 for Height 3000 for Vertex | Defines workframe parameters. |
| 23. Select Without description | Axes of the defined workframe will be drawn without description. |

| 📐 Workframe | × |
|--|--|
| Name Roof | Size/Division Axes descriptions |
| Box Box Roof Prism Surface only Left diagonal Right diagonal | Width (X) 6000 / 2 Image: Non-uniform </td |
| ✓ Without description ✓ Show axes on drawings | Close Help |

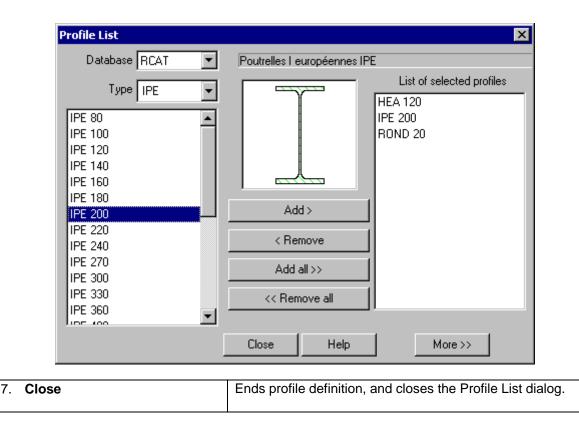
| 24. | Starts defining the insertion point for the workframe, and closes the Workframe dialog. |
|-----|---|
| | |

| 25. F3 | Turns on OSNAP function, which allows automatic location of snap points (this key should be pressed only if the function is off). |
|---|---|
| 26. Using OSNAP, define the workframe beginning point as the point of intersection of the following axes: A; 1; + 4000 | Defines the workframe insertion point. |
| 27. Using the same method, define the point positioned at the intersection of the following axes: C; 1; + 4000 | Inserts the workframe (see the drawing below), and opens the Workframe dialog. |
| 28. Close | Closes the Workframe dialog. |

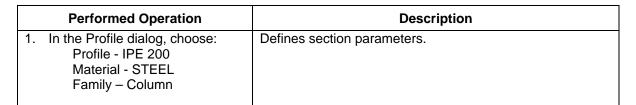


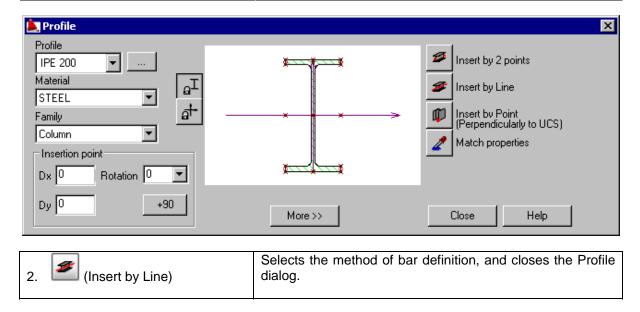
1.3. Profile Definition

| | Performed Operation | Description |
|----|--|--|
| 1. | (Profiles) | The Profile dialog displays. |
| 2. | | The Profile List dialog displays, where you can add profiles from available databases to the list. |
| 3. | For Database, select RCAT | Chooses the Produits siderurgiques francais folder. |
| 4. | For Type, select IPE | Selects the section type, and changes the appearance of the left panel. |
| 5. | From the left panel, choose the section: IPE 200, and click Add> | Adds section IPE 200 to the list of selected profiles. |
| 6. | Using the same method, add sections ROND 20 and HEA 120 | Adds profiles to the list. |



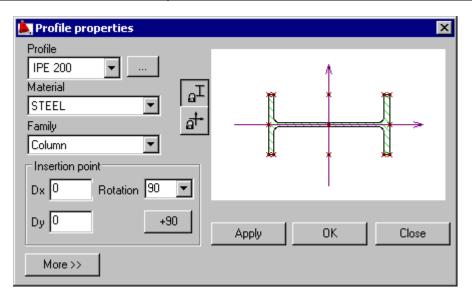
1.3.1. Column Definition



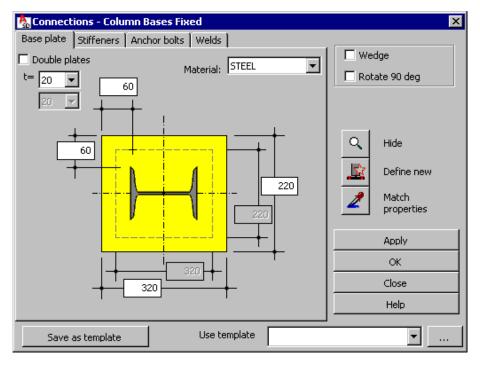


| page: 15 |
|-----------------|
|-----------------|

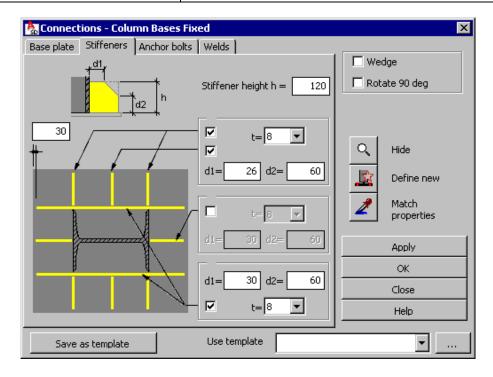
| 3. | LMC the vertical line passing through the points in the crossing of the following axes: A; 1;+ 0 A, 1,+4000 ; RMC and Close | Defines the line of bar insertion. |
|----|---|---|
| 4. | (Zoom Window) | Zoom in to the defined column. |
| 5. | LMC the defined bar | Selects the column. |
| 6. | RMC, and click Modify | Selecting this from the context menu opens the Profile properties dialog. |



| 7. For Rotation, select 90 | Selects value of the angle by which the selected element will be rotated. |
|-----------------------------|--|
| 8. Apply, OK | Rotates the selected bar by the defined angle, and closes the Profile properties dialog. |
| 9. | Zoom in to the bottom part of the defined column. |
| 10. 📥 (Column base - fixed) | Chooses the option used for definition of a fixed column. |
| 11. LMC the defined column | The Connections - Column Bases Fixed dialog displays. |



| | Move the dialog so that you can see the bottom part of the column as well. |
|---|---|
| 12. On the Base plate tab, enter the values as shown above, and then click Apply | Defines dimensions of the column base plate. Note: After you click Apply, the defined base plate will display in the drawing (in the model region). |
| 13. LMC the Stiffeners tab | Changes the dialog appearance. |



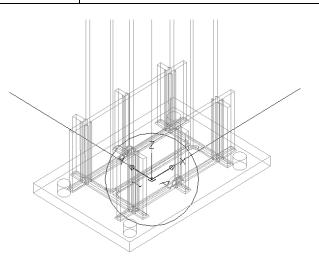
| 14. On the Stiffeners tab, define the values as shown above, and click Apply | Defines geometry of stiffeners. |
|---|-------------------------------------|
| 15. LMC the Anchor bolts tab | Changes the dialog appearance. |
| 16. On the Anchor bolts tab, define the values as shown below, and click Apply | Defines parameters of anchor bolts. |

| 🏡 Connections - Column Bases Fixed | × |
|--|----------------------------|
| Base plate Stiffeners Anchor bolts Welds | |
| Hole dia. 22 Bolt dia, 16 | ☐ Wedge ☐ Rotate 90 deg |
| Ancher bolt FAJ-M16-500-W | |
| | Q Hide |
| | Define new |
| | Match properties |
| | Apply |
| Database Standard nuts Vame M16 V | ОК |
| | Close |
| Database Standard washer Name M16 | Help |
| Save as template Use template | ▼ |

| 17. LMC the Welds tab | Changes the dialog appearance. |
|---|---|
| 18. On the Welds tab, enter values as shown below | Defines welds that join the column with the spread footing. |

| 🇞 Connections - Column Bases Fixed | × |
|--|--|
| Base plate Stiffeners Anchor bolts Welds | |
| | ☐ Wedge ☐ Rotate 90 deg |
| | Image: Apply OK Close Hide |
| Save as template Use template | . |

| 19. Apply, OK | Closes the Connections - Column Bases Fixed dialog. The |
|---------------|---|
| | defined connection and the connection symbol (color |
| | circles) display. |
| | |

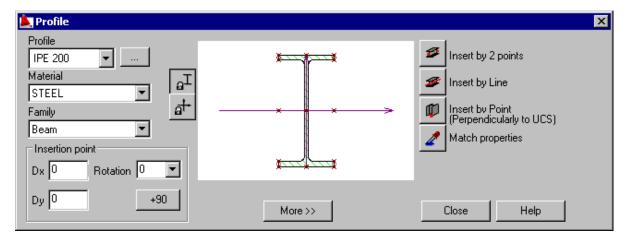


| 20. (Zoom Extents) | Zooms so that the whole structure is comprised in the view, and all drawing elements display in the greatest possible scale. |
|--|--|
| 21. LMC the earlier-defined column and spread footing | Selects the column with the spread footing. |
| 22. | Selects the option which enables copying selected elements. |

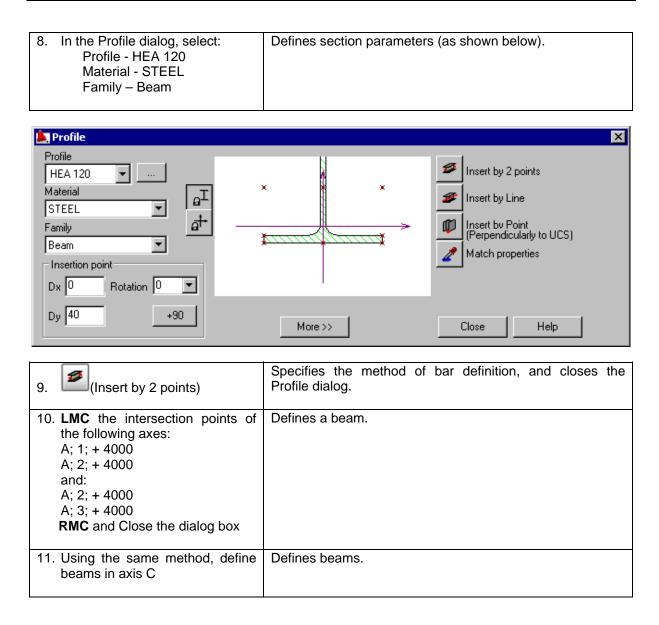
| 23. LMC the point at the intersection of the following axes: A ; 1; + 0 | Indicates the base point. |
|---|---|
| 24. LMC the point at the intersection of the following axes: C ; 1; + 0 | Indicates the target point, and copies selected elements. |

1.3.2. Beam Definition

| Performed Operation | Description |
|---|------------------------------|
| 1. (Profiles) | The Profile dialog displays. |
| 2. In the Profile dialog, select: Profile - IPE 200 Material - STEEL Family – Beam | Defines section parameters. |



| 3. | (Insert by 2 points) | Selects the method of bar definition, and closes the Profile dialog. |
|----|---|---|
| 4. | LMC the intersection points of the following axes: A; 1; + 4000 B; 1; + 5000 and: B; 1; + 5000 C; 1; + 4000 RMC and Close the dialog box | Defines a beam. |
| 5. | | Sets the front view. Note: Check whether the angle of beam insertion is correct and if necessary, correct it in the manner shown above. |
| 6. | \otimes | Selects an axonometric structure view (SW isometric view). |
| 7. | Ð | The Profile dialog displays. |

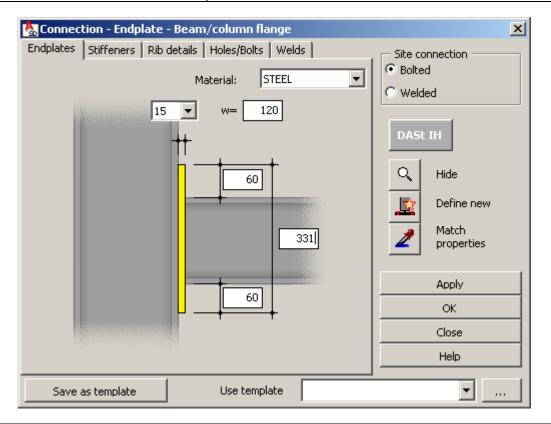


1.4. Connections

1.4.1. Definition of Column-Beam Connection

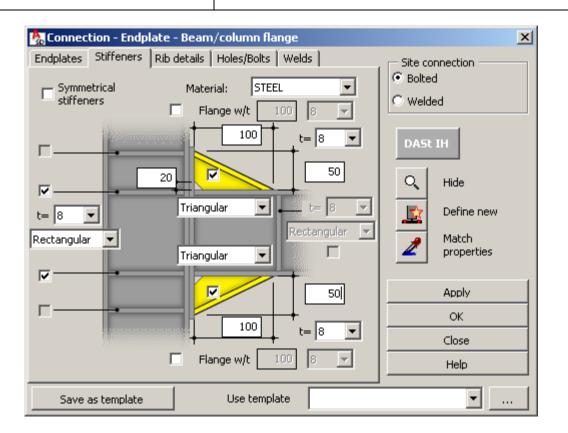
| | Performed Operation | Description |
|----|---|--|
| 1. | 1 | Sets the front view. |
| 2. | (Endplate: beam to column flange) | Starts definition of a column-to-beam connection. You are prompted, in the command line, to select a column. |
| 3. | LMC the column on the left in the drawing | Selects the column, and you are then prompted to select a beam. |
| 4. | LMC the beam adjacent to the selected column | Selects the beam, and opens the Connection - Endplate - Beam/Column Flange dialog. |

5. On the Endplates tab, define parameters as shown below, and click **Apply** Selects endplate parameters, and changes the appearance of the connection in the drawing within the model region.



6. **LMC** the Stiffeners tab

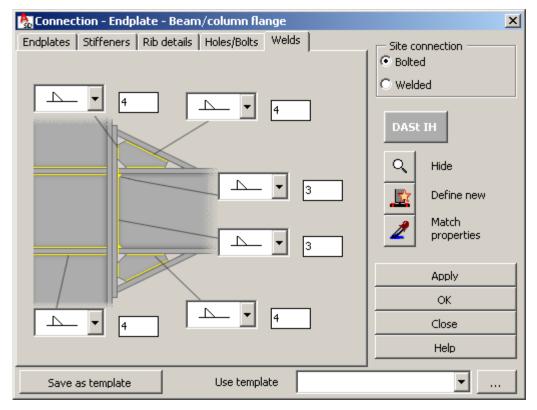
Changes the dialog appearance.



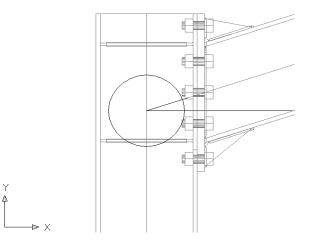
| 7. | Specify parameters as shown above, and click Apply | Selects parameters that determine the stiffener geometry, and changes the connection appearance in the drawing. |
|----|---|--|
| 8. | LMC the Holes/Bolts tab | Changes the dialog appearance. |

| 🏝 Co | onnection - Endplate | Beam/column flange | × |
|------|---|---|---|
| Endp | olates 🛛 Stiffeners 🗍 Rib | letails Holes/Bolts Welds Site connection | |
| 30 | | | |
| | | 25 Hole dia. 18 DASt IH | |
| | •• • | Hide | |
| н | \$\$ | 75 65 65 75 Define new | |
| | | | |
| | ~~~~~ | 26 Apply | |
| | w | ок | |
| | iolts | ade: 4.6 Settings | |
| |)iameter: 16 🔽 G | rade: 4.6 Settings Help | |
| | Save as template | Use template | |

| 9. Specify parameters as shown above, and click Apply | Defines bolt parameters. |
|--|---|
| 10. LMC the Welds tab | Changes the dialog appearance. |
| 11. Define parameters as shown below, and click Apply | Defines parameters of a (fillet) weld joining the beam with the endplate. |



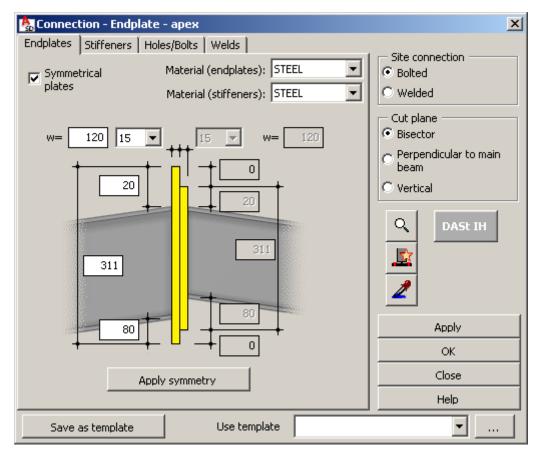
| 12. OK | Defines the connection, and closes the dialog. The defined connection displays in the model region. |
|---------------|---|
| 13. | Zoom in to the column on the left and the beam adjacent to it (see the drawing below). |



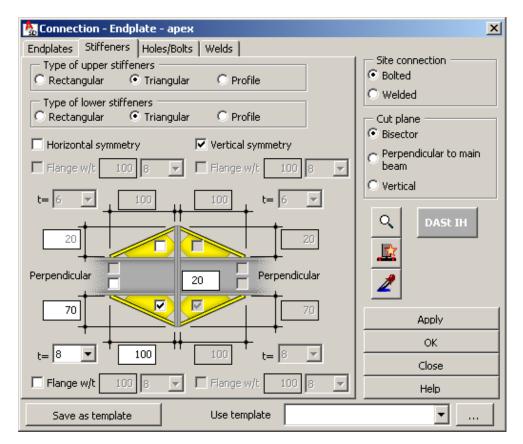
| 14. Using the same method, | define |
|----------------------------|--------|
| the Column-te | o-beam |
| connection in axis C | |
| | |

1.4.2. Definition of a Beam Connection

| Performed Operation | | Description | |
|---------------------|--|---|--|
| 1. | (Zoom Window) | Zoom in to the middle part of the beam. | |
| 2. | (Endplate: apex) | The Beam-to-beam dialog displays, and you are prompted to select the main beam. | |
| 3. | LMC the beam on the left side of frame | Selects the main beam, and you are then prompted to select the secondary beam. | |
| 4. | LMC the beam on the right side of frame | Selects the secondary beam, and opens the Connection - Endplate - Apex dialog. | |
| 5. | On the Endplates tab, define parameters as shown below | Selects endplate parameters. | |



| 6. | LMC the Stiffeners tab | Changes the dialog appearance. |
|----|-----------------------------------|--------------------------------|
| 7. | Select the options as shown below | Selects stiffener parameters. |

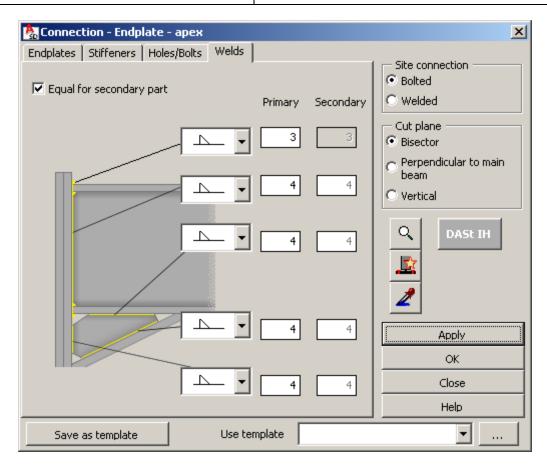


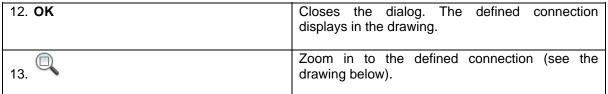
| 8. | LMC the Holes/Bolts tab | Changes the dialog appearance. |
|----|------------------------------------|--------------------------------|
| 9. | Specify the options as shown below | Selects bolt parameters. |

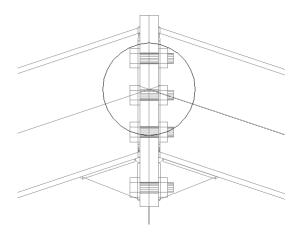
| 🏝 Co | 🍇 Connection - Endplate - apex 🛛 🔀 | | | | |
|-------|------------------------------------|--|--|--|--|
| Endpl | ates Stiffeners Holes/Bolts Welds | Site connection Bolted | | | |
| - | Rows: 4 🛨 | Cut plane Bisector Perpendicular to main beam | | | |
| н | | C Vertical DASt IH | | | |
| | Its Its Grade: 4.6 V Settings | Apply OK Close Help | | | |
| | Save as template Use template | | | | |

 10. LMC the Welds tab
 Changes the dialog appearance.

 11. Specify the options as shown below
 Selects weld parameters.

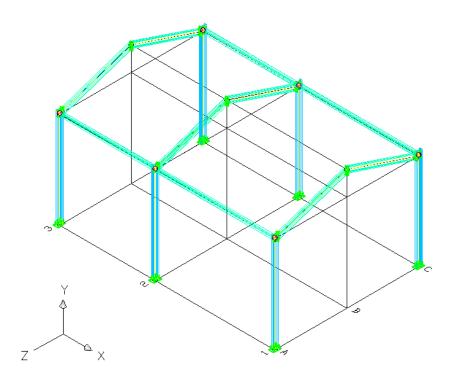






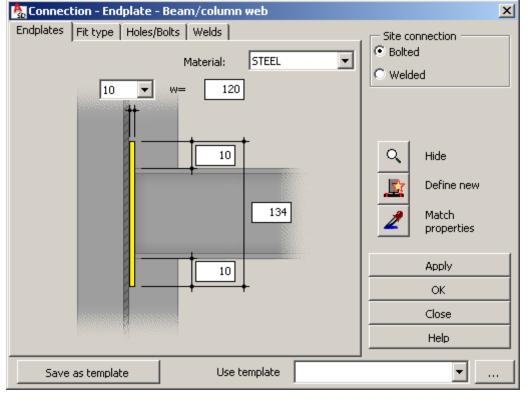
1.5. Copying of a Frame

| | Performed Operation | Description | | |
|----|--|---|--|--|
| 1. | \otimes | Selects axonometric view (SW isometric view). | | |
| 2. | In the drawing area, select the defined structure frame | Selects all the frame elements. | | |
| 3. | Сору) | Selects the option which enables copying selected elements, type M (Multiple) | | |
| 4. | LMC the point at the intersection of the following axes: B; 1; + 0 | Indicates the base point. | | |
| 5. | LMC the point at the intersection of the following axes: B; 2; + 0 B; 3; + 0 | Indicates the target points, and copies the selected elements. | | |
| 6. | \otimes | The defined structure is shown below. | | |

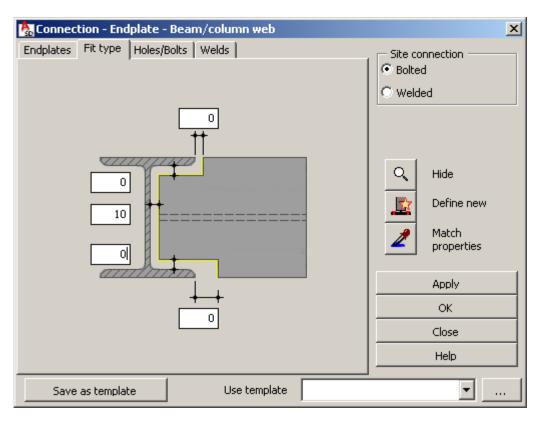


1.6. Definition and Copying of a Connection

| | Performed Operation | Description |
|----|---|---|
| 1. | (Endplate: beam to column web) | Starts defining a Column-to-beam connection. You are prompted to select a column. |
| 2. | LMC the column located at the intersection points of the following axes: A; 1; + 0 | Selects the column, and you are prompted to select a beam. |
| 3. | LMC the beam adjacent to the selected column | Selects the beam, and opens the Connection - Endplate - Beam / Column Web dialog. |
| 4. | On the Endplates tab, specify parameters as shown below, and click Apply | Selects endplate parameters, and changes the appearance of the connection in the drawing on the model layout. |



| 5 | . LMC on the Fit type tab | Changes the dialog appearance. |
|---|---------------------------|--------------------------------|
| 5 | | Changes the dialog appearance. |
| | | 6 6 1 1 |
| | | |



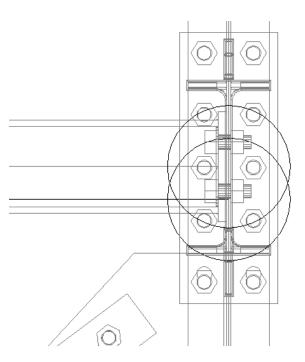
| 6. | Specify parameters as shown above,and click Apply | Defines parameters that determine the fitting geometry, and changes the connection appearance in the drawing. |
|----|--|---|
| 7. | LMC the Holes/Bolts tab | Changes the dialog appearance. |

| 🏝 Co | 🍇 Connection - Endplate - Beam/column web 🛛 🛛 🛛 🔀 | | | | | × | |
|--|---|---------------------------------|------|-------------------|-----|---------|---------------------|
| Endplates Fit type Holes/Bolts Welds Site connection | | | | | | | |
| 25 | 70 | | | Columns: Rows: | 2 + | C Welde | |
| | ++++++++++++++++++++++++++++++++++++++ | ♦ ♦ ▲ ▲ | _ 37 | Hole dia. | 18 | ٩ | Hide |
| н | ++ ++ ++ ++ | ♥ ♥ ♦ ♦ ♦ ♦ | 60 | | | | Define new |
| | •• • | • • • | - | | | 2 | Match properties |
| l | | <u> </u> | 37 | | | | Apply |
| — Be | Bolts OK | | | | | | |
| | Diameter: 16 V Grade: 4.6 V Settings | | | | | | |
| | Help | | | | | | |
| Save as template Use template | | | | | | | |

| 8. | Specify parameters as shown above, and click Apply | Defines bolt parameters. |
|----|---|--|
| 9. | LMC the Welds tab | Changes the dialog appearance. |
| 1(| 0. Define parameters as shown below, and click Apply | Defines parameters of a (fillet) weld that joins the beam with the endplate. |

| 🍇 Connection - Endplate - | Beam/column web | × |
|----------------------------|-----------------|-----------------|
| Endplates Fit type Holes/E | | Site connection |
| | | |
| | | Apply |
| | | ОК |
| | | Close |
| | | Help |
| Save as template | Use template | |

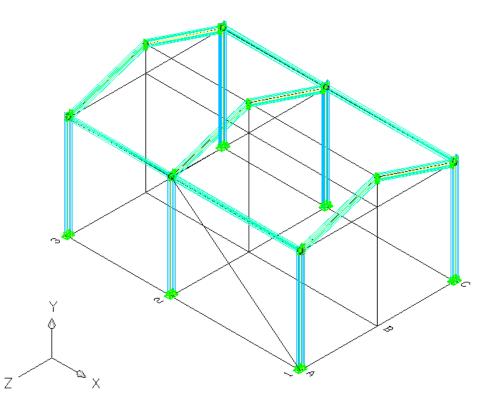
| 11. OK | Defines the connection, and closes the dialog. The defined connection is displayed on the model layout. |
|---------------|---|
| 12. 🗊 , 🔍 | In the left view, zoom in to the column and the beam adjacent to it (see the drawing below). |



| 13. 🖗 , 🙉 | Selects axonometric view (SW isometric view), and zooms so that all drawing elements display in the greatest possible scale. |
|--|--|
| 14. (Copy connection) | Lets you copy selected connections, and you are prompted to select a connection. |
| 15. LMC the previously defined beam-to-column web connection (sphere on point positioned at the intersection of the axis A;1;+4000) | Selects the column - beam connection, and you are prompted to select an object. |
| 16. Cross - window on the whole structure, Enter | Indicates the profiles to which the selected connection will be ascribed (if all profiles in the structure model are indicated, the program will find all the profiles that can be ascribed the selected connection), and closes the dialog. The copied connections display in the model region. |

1.7. Definition of Bracings

| Performed Operation | Description |
|---------------------|---|
| 1. 🔍 | Selects axonometric view (SW isometric view). |
| 2. | Draws bracing auxiliary lines (using Draw menu > Line in AutoCAD®), as shown below. |



| 3. | \bowtie | You are prompted, in the command line, to select the first auxiliary bracing line. |
|-----|---|---|
| 4. | LMC the auxiliary bracing line | Indicates axis of the first bracing, and you are prompted to select the second auxiliary bracing line. |
| 5. | RMC | If only 1 auxiliary line of the bracing is determined, the other bracing diagonal will be a symmetrical reflection of the diagonal defined by the first line. You are prompted to select the first column. |
| 6. | LMC the column positioned at the intersection of the following axes: A; 1; + 0 | Indicates the first column connected with the bracing. You are prompted to select the second column. |
| 7. | LMC the column positioned at the intersection of the following axes: A; 2; + 0 | Indicates the second column connected with the bracing, and you are prompted to specify limitations. |
| 8. | LMC all the top and bottom limits of the bracing (such asbeam and columns base plates) | Defines bracings limitations. |
| 9. | RMC, RMC | The Parametric structures - Bracing dialog displays. |
| 10. | LMC on the Gusset plates tab | Changes the dialog appearance. |
| 11. | Select the option as shown below | Selects plates parameters. |

| 😽 Parametric structures - Bracing 🛛 🛛 🗙 |
|---|
| Gusset plates Central plate Diagonals Bolts/Welds Angles Offsets Rods T |
| Gusset plate type |
| Automatic |
| 🖸 Rectangular 🔲 Chamfer |
| © Optimized |
| © Plate |
| Gusset plate |
| Material STEEL Plate |
| Thickness |
| Plate width 50 |
| Distance from the edge D |
| Distance to intersection of axes D 200 |
| Chamfering b 0 + b - |
| Gusset plate position in relation to working plane |
| O Front |
| • Center |
| C Behind |
| Save as template Use template |
| Apply OK Hide Close Help |

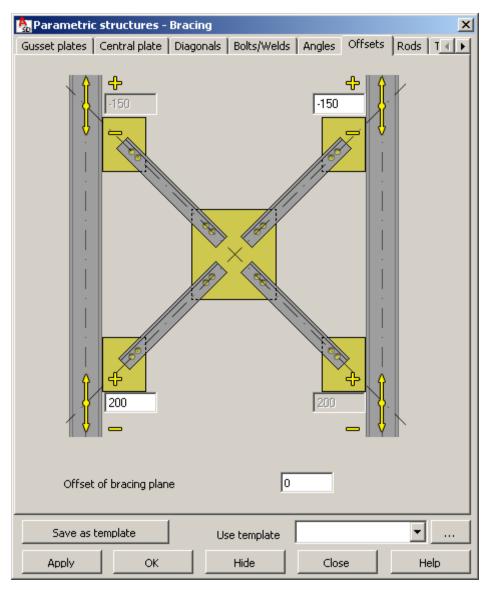
| 12. LMC the Diagonals tab | | |) | Changes the dialog appearance. |
|---------------------------|-----|--------|----------|--------------------------------|
| 13. Select below | the | option | as shown | Selects diagonal parameters. |

| 🎭 Parametric structures - Bracing 🛛 🛛 🔀 | | | |
|--|--|--|--|
| Gusset plates Central plate Diagonals Bolts/Welds Angles Offsets Rods T | | | |
| Crossed bracing Diagonal selection ROND 20 T Profile | | | |
| Single Corner to corner angles | | | |
| C Four-leg | | | |
| Battens | | | |
| Diagonal location in relation to gusset plate | | | |
| • First diagonal in front of the plate | | | |
| C First diagonal behind the plate | | | |
| Crossing type Both diagonal cut | | | |
| Shortening s 100 | | | |
| Width w 20 | | | |
| Diagonal insertion in relation to bracing system line | | | |
| Middle | | | |
| O Diagonal axis | | | |
| O Marking line T 0 | | | |
| Rotation angle 🔽 🗹 Mirror | | | |
| Save as template Use template | | | |
| Apply OK Hide Close Help | | | |

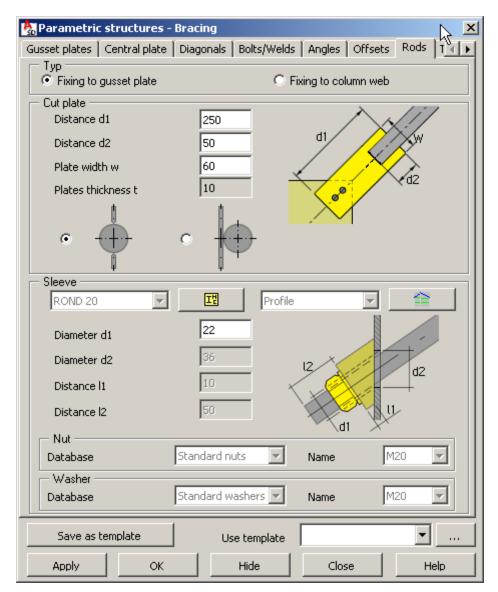
| 14. LMC the Bolts/Welds tab | Changes the dialog appearance. |
|--------------------------------------|-----------------------------------|
| 15. Select the option as shown below | Defines bolt and weld parameters. |

| 🍇 Parametric struc | ctures - Bracing | | | × |
|-----------------------|----------------------|--------------------|---------------|------------------|
| Gusset plates Centr | al plate 🛛 Diagonals | Bolts/Welds | Angles Offs | ets Rods T |
| Connector type — | | | | |
| Bolts | | | | |
| C Welds | | | | |
| Bolts | | | | |
| Diameter | 16 💌 | Grade 4.6 | 5 - | Settings |
| Number of bolts | 2 | | | |
| Distance h1 | 50 | 🔲 x bolt dian | n. | |
| Bolt spacing a | 50 | \Box x bolt dian | n. | o h2 |
| Distance h2 | 50 | 🔲 x bolt dian | n. | |
| | 0 | | 1.5 | ' |
| Slotted | | | | |
| Rotation | | | | |
| Location of opening | - | | | |
| In the central lin | | | ß | |
| C In the diagonal a | axis | | | |
| C In the T-line | 0 | | | <i>62224</i> 722 |
| Welds | | | | |
| Gusset plates | 4 | | Thickness | 4 |
| | | _ | | |
| Profiles | | | Thickness | |
| Save as templa | te Us | e template | | ▼ |
| Apply | ок | Hide | Close | Help |

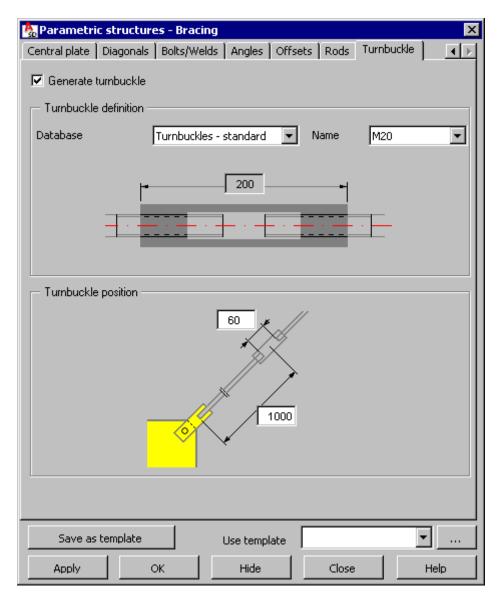
| 16. LMC the Offsets tab | | Changes the dialog appearance. |
|-----------------------------|----------|--------------------------------|
| 17. Select the option below | as shown | Defines rod parameters. |



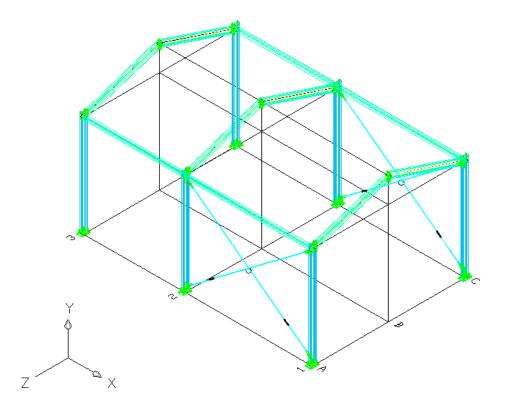
| 18. LMC the Rods tab | Changes the dialog appearance. |
|--------------------------------------|--------------------------------|
| 19. Select the option as shown below | Defines rod parameters. |



| 20. LMC the Turnbuckle tab | | ab | Changes the dialog appearance. |
|----------------------------|-----------|----------|--------------------------------|
| 21. Select the below | ne option | as shown | Defines turnbuckle parameters. |



| 22. Apply, OK | Closes the dialog. The defined bracings display in the drawing (see the drawing below). |
|--|---|
| 23. Using the same method, define bracings in axis C | The defined bracings display in the drawing (see the drawing below). |
| 24. 🖌 | Erase bracing auxiliary lines (using the AutoCAD® Erase tool). |



1.8. Definition of Assemblies

| Performed Operation | Description |
|---------------------|--|
| 1. (Assemblies) | Selecting this lets you create assemblies. You are prompted at the command line whether you want to remove already defined assemblies. |
| 2. <u>Y(es)</u> | Defines assemblies. |

1.9. Positioning of Elements and Groups

| | Performed Operation | Description |
|----|--|---|
| 1. | \otimes | Selects axonometric view. |
| 2. | (Assemblies) – the icon is located on the Model tab of the Object Inspector dialog | Displays assemblies on the list of model elements in the Object Inspector dialog. |
| | object mopeotor dialog | Note: The option may be on by default. |
| 3. | RMC (on the Model tab in the Object Inspector dialog), and click Select all | Selects the entire structure. |
| 4. | (Run automatic positioning) | Selecting this lets you assign positions automatically. |
| 5. | | The Automatic positioning dialog displays. |

| 6. | LMC the General tab | Changes the dialog appearance. | |
|----|---|---|--|
| 7. | For Positioning level, select Both types. For Prefix, select By family. | Selecting these options lets you position single parts and assemblies, as well as adopt (from the family) a character string that determines the prefix ascribed to all the positions. | |
| 8. | Specify the remaining parameters as shown below | Assumes parameters of automatic positioning. | |

| Automatic positio General Additional 1 | | | | | |
|--|-------------|------|-------------------------------|---|--------------|
| Presets Positioning level O Single part | C Assembly | | Both type | 8 | |
| Prefix | 💌 🔽 By fami | ly | | | |
| Format | Start from | Step | | | |
| | | | | | |
| | | | | | <u>R</u> un |
| | | | | | <u>H</u> elp |

| 9. | Run | Starts automatic positioning. |
|----|-----|-------------------------------|
| | | |

1.10.Printout Preparation

1.10.1. Printouts Step by Step

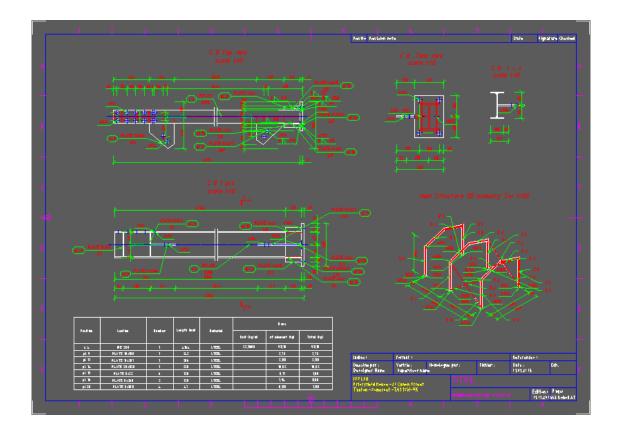
| | Performed Operation | Description | |
|----|---|---|--|
| 1. | LMC the Positions tab in the Object inspector dialog | Changes the dialog appearance; displays the list of available user-defined positions. | |
| 2. | LMC any position (for example, C1 - column positioned at the intersection of the following axes: A; 1; + 0) | Selects a position. | |
| 3. | RMC , and click Attach document | Selecting this from the context menu opens the Select template dialog. | |
| 4. | Select Assembly 1:10, and click OK | Selects the template. The edition layout shows a drawing of the selected assembly in different projections (correspondingly to the selected template). In the object inspector, additional options (tree) display next to the selected position. Note: Active drawing is highlighted in yellow and can be seen on the Positions tab after expanding the available options. | |
| 5. | LMC the Edition layout tab | Moves to the edition layout. | |
| 6. | LMC the top left viewport | Activates the viewport. | |
| 7. | (Adjust style) | The Dimensioning style settings - Assembly dialog displays, where you can modify the dimension style. | |
| 8. | Clear Hidden holes | Changes in dimension style (switch off dimensioning of hidden holes) - compare the drawing below. | |

| 💄 Dimensioning style settings - Assembly | × |
|--|---|
| Style name Assembly - standard Invisible edges ACAD Dimension style RBCS_STANDARD Profile axes Distance to the first dimension line 10 User parts | Red ACAD_IS002W100 ByLayer Blue CENTER ByLayer Thickness ByLayer ByLayer |
| Distance between dimension lines 7 Parts shortening | |
| Extension of axis beyond esge 5 Align arc profiles to the chord Cuts parameters | Min. distance without details 50 Break line ACAD_IS010W' Gap 2 Distance to gap 30 |
| Draw parts in actual location | |
| Front view | Curved parts O Orthogonal O Aligned to curve |
| Dimensions Relative - Chain Ref. Point Dimensions format Relative - Chain Ref. Point Image: Dimensions Down Ref. Point Image: Dimensions Image: Dimensions Image: Dimensions Image: Dimensions Image: Dimensions Image: Dimensions | |
| Tohole | Depth 100 % |
| Acts dimensioning M Hadia Diameters Comments Text placement in viewport Top center %%Pos %%Quant pcs Text style RBCS_desc scale %%Scale Colour Red Position Material Colour Part name Quantity of positions Scale Weight Cut/view name Finishing of surface | Image: Provide with the second symbols Image: Provide with the second symbols Symbols and labels styles Image: Provide with the second symbols Image: Provide with the second symbols |

| 9. | ОК | Closes the dialog. |
|-----|--|--|
| 10. | RMC the Edition layout tab, and click From template | Selecting this from the context menu opens the Select Template From File dialog, where you can select a template. |
| 11. | Open A3 ASD 033.dwt | Selects the template from the list of available templates. amd closes the Select Template From File dialog. |
| 12. | OK in the Insert Layout(s) dialog | Closes the dialog. An additional tab (A3 ASD) displays on the bar at the bottom of the screen. |
| 13. | LMC the A3 ASD tab | Moves to the printout layout. |
| 14. | On the Positions tab of the Object Inspector, select: C1 / C1_drawing / Top view | Selects the view. |
| 15. | RMC , and click Add to current Printout | Selecting this from the context menu causes the view to be displayed within the area of the template. |
| | LMC the target location for the printout | Places the view within the area of A3 ASD template. Note: Clicking the frame of the added view lets you change its size. |
| 17. | Use the same procedure with other positions generated during automatic generation of positions | |
| 18. | LMC the Edition layout tab | Moves to the edition layout. |

| 19. LMC the top left viewport | Activates viewport. |
|--|--|
| 20. 🔟 (Edit view In full screen) | Maximizes viewport to edition. |
| 21. ^{袁正} (Add cut) | Selecting this lets you make a new element cut, and you are prompted to specify the first point of the cut. |
| 22. LMC above the column near the gusset plate | Defines the first point of the cut, and you are prompted to specify the next point of the cut. |
| 23. LMC below the column | Defines the second point of the cut. You are prompted to specify the next point of the cut. |
| 24. RMC | You are prompted to specify a range. |
| 25. LMC the right side of the cut | Defines the range of cutting. You are prompted to enter the section name. |
| 26. <u>1</u> | Defines the section name. |
| 27. 🖪 (Full screen off) | Closes full screen edition window; 4 viewports with new cut on the bottom right side are shown. |
| 28. Places the new view of cut within the area of A3 ASD template in a comparable way as shown previously | |
| 29. LMC the Model tab, and then select whole structure | Starts creating isometric view of whole structure. |
| 30. RMC the Model tab, and click Group | Defines a group of elements. You are prompted to specify a group type [Assembly/Standard] <standard>.</standard> |
| 31. Enter | Selects the standard type of group, and you are prompted to enter the group name. |
| 32. <u>Main</u> | Defines name of the group. You are then prompted to pick the main part to align. |
| 33. Enter | Defines group coordinate system. |
| 34. LMC the Positions tab in the Object inspector | Changes the dialog appearance; displays the list of available user-defined positions. |
| 35. LMC position: Main | Selects a position. |
| 36. RMC , and click Attach document | Selecting this from the context menu opens the Select template dialog. |

| 37. Select Group-isometry SW 1:50, and click OK | Selects the template. The edition layout displays a drawing of the selected assembly in different projections (correspondingly to the selected template). In the object inspector, additional options (tree) display next to the selected position. Note: Active drawing is highlighted in yellow and can be seen on the Positions tab after expanding the available options. |
|--|--|
| 38. In the area of A3 ASD template, click the Positions tab in the Object inspector, and then select Main / Main_Drawing / Isometry SW | Selects the view. |
| 39. RMC , and click Add to current Printout | Selecting this from the context menu causes the view to display within the area of the template. |
| 40. LMC the target location for the printout | Places the view within the area of A3 ASD template. Note: Clicking on the frame of the added view lets you change its size. |
| 41. LMC the Structure 3D Isometry SW viewport | Activates the viewport |
| 42. (Change view scale) | You are prompted to enter a view scale. |
| 43. Type: 150 | Changes view scale to 1:150 |
| | Places the view within the area of A3 ASD template. Note: Clicking on the frame of the added view lets you change its size. |
| 44. 📴 (List of profiles) | Selecting this option lets you insert (within the printout area) a table with a list of profiles. You are prompted to specify a table range. |
| 45. Enter | Accepts table range: All. You are then prompted to define the point of table insertion. |
| 46. LMC the target location for the table | Inserts the steel table in the indicated place (see the drawing below) |
| | Using the same method, you can create drawings of the remaining positions and compose them in the printout. |



1.10.2. Automatic Printouts

| | Performed Operation | Description |
|----|---|---|
| 1. | LMC the Positions tab in the Object inspector | Changes the dialog appearance; displays the list of available user-defined positions. |
| 2. | LMC any position (for example, C4 - column positioned at the intersection of the following axes: C; 2; + 0) | Selects a position. |
| 3. | RMC , and click Automatic drawings | Selecting this from the context menu opens the Automatic drawing generation dialog. |
| 4. | LMC the Templates tab | Changes the dialog appearance. |
| 5. | Select the option as shown below | Selects template parameters. |

| Family | Single Profiles | Single Plates | Assemblies | User Parts |
|------------------|-----------------|---------------|---------------|------------|
| Column | Profile 1:5 | | | |
| Sub part - plate | | Plate 1:2 | | |
| Plate | | Plate 1:2 | | |
| No family | | | Assembly 1:10 | |
| | | | | |

| 6. | LMC the Formats and scales tab | Changes the dialog appearance. |
|----|---|---|
| 7. | In Arrange views field, for Mode select Assembly and parts | Defines arrange views type |
| 8. | For Part type, select Single profiles, and define scales and formats as shown below | Defines formats and scales for single profiles. |

11. Select the option as shown

below

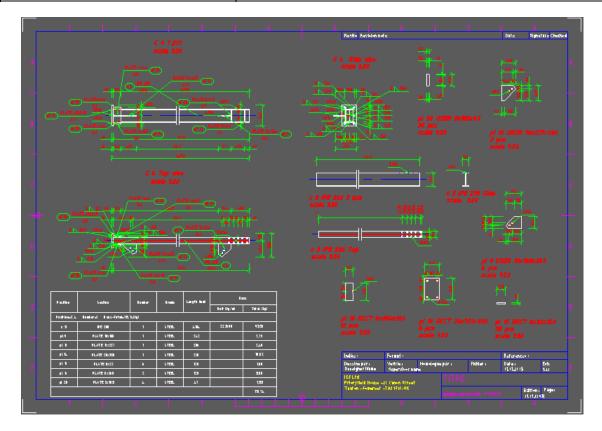
| Automatic drawing generation | × |
|--|---|
| Templates Formats and scales Options Bill o | f materials |
| Formats and scales Part type Scales : 1/ Single Profiles 25 | Formats A3 ASD (420 x 297mm : Orientation: Landscape) |
| Arange views Mode: Assembly and parts Distance between views: 5 Number of views (left): 2 Number of views (right): 2 According to template | Automatic cuts mm Standard view: mm Standard view: Maximum number of cuts: S |
| Using the same method, define scales and formats for Single plates and Assemblies part types as shown above | Generate Cancel Help Defines formats and scales for single plates and assemblies. |
| 10. LMC the Bill of materials tab | Changes the dialog appearance. |

Selects bill of materials parameters.

| Templates Formats and scales Options Bill of materials Image: Add nomenclature Top - Left O Top - Right Standard Image: Standard Image: Standard Image: Standard Image: Standard Image: Standard Image: Standard Image: Standard Image: Standard Image: Standard Image: Standard | х |
|--|------|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| Generate Cancel Help | |
| 12. Generate Starts generating drawing, and changes the dia appearance. | alog |

| No. | Operation | Description | |
|-----|---------------------|-------------|----|
| | Document generation | C 4 | ОК |
| ! | Document generation | C4_c1 | ОК |
| 3 | Document generation | C 4_ pl 11 | ок |
| ļ | Document generation | C 4_ pl 14 | ок |
| 5 | Document generation | C 4_ pl 7 | ок |
| 6 | Document generation | C4_pl5 | 0K |
| r | Document generation | C 4_pl 10 | 0K |
| } | Printout generation | C 4 | OK |

| 13. Close | Closes the tab, and displays the generated drawing (see the drawing below). |
|-----------|---|
| | Note: Double-click any element of the drawing to change its properties (inserts to editor block). |



1.11. Edition of Table Printout

| | Performed Operation | Description |
|----|---|--|
| 1. | Click the Model tab | |
| 2. | (Dynamic UCS) | Lets you dynamically set the coordinate system. You are prompted to select an entity in the command line. |
| 3. | LMC the column positioned to the left of the first frame | Selects the element to which the UCS will be adjusted. A marker enabling definition of the coordinate system displays, and you are prompted to pick the origin. |
| 4. | LMC the point at the intersection of the following axes: A; 1; + 0 | Defines the point of origin of the dynamic coordinate system, and changes the marker appearance. You are prompted to pick the desired direction. |
| 5. | <u>B(ack)</u> | Selects UCS direction. You are prompted whether you want to adjust the view to the UCS plane. Note: You can change the UCS direction graphically using the mouse. Mouse movement changes marker appearance and available options defining direction. |

| 6. | <u>N(o)</u> | Selecting this leaves the view unadjusted. |
|-----|--|--|
| 7. | (Clipping plane on) | Selecting this lets you define a clipping plane. |
| 8. | Leave default values, indicating the position of clipping planes | The elements positioned in the defined clipping plane remain visible on the screen. Note: Position and orientation of the clipping plane are determined by the defined UCS. |
| 9. | | Sets the front view. |
| 10. | (Table manager) | The Table printout manager dialog displays, where you can define (modify) the display of the steel table printout. |
| 11. | Selection | Closes the Table printout manager dialog, and changes the cursor work mode (selection). |
| 12. | Select all truss elements, and then press Enter | Selects elements for which the table will be prepared, and returns to the Table printout manager dialog. |
| 13. | (Automatic adjust) | Fits the widths of table columns to the names of table columns. |
| 14. | Save table (format .xls or .csv) | The Save as dialog displays, where you can save the table in a spreadsheet format. |
| 15. | For File name, enter TABLE 1, and click Save | Saves the file, and closes the Save as dialog. |
| 16. | Close | Closes the Table printout manager dialog. |