

# General Arrangement Drawings

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# Contents

12	Gen	eral Arrangement (GA) Drawings	3
	12.1	Creating GA Drawings	3
	12.2	Editing GA Drawings	22
	12.3	Updating GA Drawings	27

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# 12 General Arrangement (GA) Drawings

# In this lesson We will look more closely at the features of general arrangement (GA) drawings in Tekla Structures. We will create GA drawings, modify and update them. We will also introduce tools for adding details and section views to the drawings.

A general introduction to GA drawings and an example of creating GA drawings is presented in the Lesson 10 Principles of working with drawings. Also see the help file for more information **Help: Drawing > Getting Started with Drawings > General arrangement drawings...** 

## 12.1 Creating GA Drawings

We will now create general arrangement drawings from the following Basic Model 1-2 views:

- 3D view
- Elevation views from grids A, F, 1, 4, 7
- Foundation plan

We will also add a few details to the GA drawing.

### Adjust model views for GA drawings

Before we start linking model views to the GA drawing, we need to review the views and, if necessary, modify or create new model views.

Modify 3d view

- 1. Open the 3D view.
- 2. Double-click in the view background and click the Filter... button in the View properties dialog.

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- 3. Filter out profiles D64\*, P18\*, 175\* -> click **Modify**. (If you have a concrete frame, also set the display not to show reinforcements in the **View setup** dialog, which opens by clicking **Display**... in the **View properties** dialog.)
- 4. Rotate the 3D view to you liking (**Ctrl + middle mouse button**).





The 3D view will appear in the GA drawing in the same rotation angle as it is in the model view.

- 5. Close the view.
- 6. Check that other model views (grid A, F, 1, 4, 7 and plan 0) are displaying the necessary information:
  - Filter unnecessary parts out.

- Restrict work area to show only the part of the model you want visible (fit work area / pick work area).
- Rotate 3D views to your liking.
- Make sure that the plan and elevation views are in 2D mode.



E.g. Foundation plane (view Plan 0).



E.g. Elevation at gridline 4.

## Create detail model views

Create connection basic views

We can add any existing view to a GA drawing. We will now create detail views of two steel connections, or, in case you have modeled a concrete frame, of two concrete connections. Follow the corresponding instructions.

### Detail views of steel connections:

1. Highlight the connection symbols at grid intersection A4 at the +13400 elevation.



2. Right-click and select: Create view > Component basic view.

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3. Filter out all concrete parts from the view.

# Detail views of concrete connections:

1. Highlight the connection symbol at grid intersection A7 at the +7350 elevation.



2. Right-click and select: Create view > Component basic view.



3. Filter out or hide the slabs. Use Shift+2 to show the connection in shaded wireframe, but the rest in rendered view.

4. Rotate the 3D view so that you get the best view of the connections.



 Double-click on the background of the basic view and change the name of the view to (e.g. gridline location) Connection A/4 @ Roof level.

🕅 View properti	es
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🗹 Name:	Connection A/4 @ Roof level
View type:	Rendered
Projection:	🗗 Orthogonal
	f <b>i</b> 3D

#### 6. Click Modify.

7. The view title bar is changed according to the name (Connection A/4 @ Roof level). You should also see this view in the **Open named view** list.

Create a similar detail view from the connection at grid intersection B4 at the Roof level.

4. Rotate the 3D view so that you get the best view of the connection.



5. Double-click on the background of the basic view and change the name of the view to (e.g. gridline location) Connection A/7 @ level +7350.

🕅 View properti	es	
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🔽 Name:	Connection A/7 @ level +7350	
View type:	Rendered	
Projection:	🗇 Orthogonal	
Angle	∰ 3D	

#### 6. Click Modify.

7. The view title bar is changed according to the name (Connection A/7 @ level +7350). You should also see this view in the Open named view list.

Create a similar detail view from the connection at grid intersection B7 at the same level.

## Setup GA drawing properties

Set drawing<br/>propertiesBefore we can start creating GA drawings we need to setup the drawing properties.<br/>See the online help files for more details.

Help: Drawing > Getting started with Drawings > Drawing reference > General arrangement drawing...

1. Select Drawing > General arrangement drawing...

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2. In the Create general arrangement drawing dialog box click Drawing properties...

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Connection	B/4	a	Poof	level		
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	Reinforcement	] 🗹	Reinforcement marks	] 🗹	Filter
•	Component	] 🗹	Component mark	] 🗹	Neighbor part filter
•	User defined att	ributes.			
01			Modifu Get	না	Cancel

- 3. Change the following attributes for the 3D GA drawing:
  - Change name to 3D (Name field)
  - View scale to 1:100 (View... button)
  - Turn off gridlines (Grid... button)
  - Turn off center lines (**Part**... button)
  - Turn off welds (**Weld**... button). If you have modeled a concrete frame, instead, turn off reinforcing bars (**Reinforcement**... button).

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UN. APRA MODEL	OK.	Apply Modify Get F/F Ca	ancel

4. Click **OK** in each child dialog box to lock the settings. And then click **OK** to in the main GA drawing properties dialog to lock all the settings.

## Create a GA drawing from one model view

We will create a general arrangement drawing from the 3D model view using the drawing properties set in a previous chapter.

Create drawing out of 3D view

1. Select **3d** view from the **Create general arrangement drawing** dialog.



- 2. Check-mark Open Drawing.
- 3. Click Create.

In a few moments Tekla Structures opens a drawing created from the 3D view.



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## Create a GA drawing using more than one model view

Now we will create another GA drawing using more than one model view and automatically bring those views into the GA drawing.

Adjust drawing properties

**Create drawing** 

out of Grid view

and detail

- 1. Click the **Drawing properties**... button in the **Create general arrangement drawing** dialog, and change the following:
  - Change the name to Elevation @ Grid 4 (Name field)
  - Change drawing size to 830\*287 (Layout... dialog)
  - 2. Click on **OK** for each of the dialogs to lock the settings.

To create GA drawing using more than one model view:

- 1. Highlight view GRID 4 and one of the two connection views you created earlier.
- 2. Select All selected views to one drawing.
- 3. Check mark **Open drawing**.
- 4. Click Create.

39					1
Connection	1 A/4 @	Roof	level		
Connection	1 B/4 @	Roof	level		
GRID 1					
GRID 2					
GRID 3					
GRID 4					
GRID 5					12
GRID 6					1
GRID 7					
GRID A					
GRID B					
GRID C					100
GRID D					1
Options			-		
All selected vie	ews to one	e drawin	g 🔽 Dra	wing prope	rties

In a few moments Tekla Structures opens the GA drawing with the selected model views.



- 5. Double-click on the blue border of the main view. In the **View properties** dialog box, change the following:
  - Turn on the gridlines (**Grid**... button)
  - Set the part marks visibility to distributed (**Part mark... > General**)
  - Turn off the part marks out of the view plane (**Part mark... -> General**)
- 6. Double-click on the blue border of the detail and change the following:
  - Change the scale to 1:20 (**Scale** field)
  - Change the bolt mark visibility to distributed (Bolt part... -> General)



7. Close the drawing.



If part or bolt mark visibility properties are set to something other than **None** and another view is added to drawing, all the deleted part marks will reappear.

## Add another model view to an existing GA drawing

We will now create another detail for the Grid 4 drawing using the same view properties as the existing detail.

Link another model view to GA drawing

- 1. Open a model view at the second connection you created a view of (for steel frame connection at B/4 @ Roof level, for concrete frame B/7 @ level +7350).
- 2. Open GA drawing Elevation @ Grid 4.
- 3. Double-click on the **Create view from model view** icon to open the view properties.



4. Click Interrupt (right mouse click > Interrupt).

- 5. Highlight the border of existing detail.
- 6. Click Get on View properties dialog.
- 7. Click **OK**.
- 8. Activate the Create view from model view command again by clicking the icon.
- 9. Minimize the drawing.
- 10. Pick the connection view.
- 11. Maximize the drawing and the detail will have appeared at the bottom left hand corner of the drawing.
- 12. Move the view from bottom left hand corner to a better location.



## Create a detail from the drawing view

Now we will create one more detail for the Grid 4 drawing, so keep the drawing open.

Create another detail

1. Double-click on the Create view from view icon.



- 2. In the View properties dialog, change the scale to 1/20.
- 3. Click **OK**.
- 4. Select an area near the footing at gridline A as shown below.



- 5. The detail should now appear on the drawing.
- 6. Right-click and select **Place views**, or place the view manually.



7. Close the drawing.



If the existing drawing view is in a 3D view, it is difficult to pick the area. Usually, it is easier to create another view in the model and link that model view to a drawing as explained earlier.

## Create multiple GA drawings automatically

Now we will create multiple general arrangement drawings automatically using grid views A, F, 1 and 4.

- 1. Click the **Drawing properties...** button in the **Create general arrangement drawing** dialog and change the following:
  - Change the name to Elevation @ Grid (Name field)
  - Turn on gridlines (Grid... button)
  - 2. Click **OK** for each of the dialogs to lock the settings.

To create multiple GA drawings out of multiple model views:

- 1. Highlight views GRID A, GRID F, GRID 1 and GRID 7.
- 2. From the list box, select **One drawing per view**.
- 3. Click Create.

Connection B/4 @ Roof level GRID 1 GRID 2 GRID 3 GRID 4 GRID 5 GRID 6 GRID 7 GRID 7 GRID A GRID 7 GRID C GRID C GRID B GRID C GRID F CRID F CRID F CRID F Drawing properties	Cre	ate general arrangement drawing	X
CRID 1 CRID 2 CRID 3 CRID 4 CRID 5 CRID 6 CRID 7 CRID 7 CRID 7 CRID 2 CRID 8 CRID C CRID C CRID 8 CRID 7 CRID 8 CRID 7 CRID 4 CRID 7 CRID 4 CRID 7 CRID 4 CRID 7 CRID 6 CRID 7 CRID 7 CRID 7 CRID 7 CRID 7 CRID 7 CRID 7 CRID 7 CRID 7 CRID 8 CRID 7 CRID 7 CRID 7 CRID 7 CRID 7 CRID 7 CRID 7 CRID 7 CRID 8 CRID 7 CRID 7 CRID 8 CRID 7 CRID 8 CRID 7 CRID 9 CRID 7 CRID 9 CRID 9 CRID 7 CRID 9 CRID 9	Conn	ection B/4 0 Roof level	~
CRID 2 GRID 3 GRID 4 GRID 5 CRID 6 GRID 7 CRID 7 CRID A GRID C GRID C GRID C GRID B CRID C GRID F CRID F CRID F CRID F CRID S CRID 5 CRID 3 CRID 4 CRID 5 CRID 6 CRID 7 CRID 7	GRID	1	-
GRID 3 GRID 4 GRID 5 GRID 6 GRID 7 GRID A GRID B GRID C GRID C GRID B GRID C GRID F CRID F CRID F CRID F CRID F CRID S One drawing per view Drawing properties	GRID	2	
GRID 4 GRID 5 GRID 6 GRID 7 GRID A GRID B GRID C GRID C GRID B GRID C GRID F CRID F CRID F CRID F CRID F CRID S CRID S CRID C CRID S CRID C CRID S CRID S	GRID	3	
GRID 5 GRID 6 GRID 7 CRID A GRID B GRID C GRID D GRID B GRID F CRID F CRID F CRID F CRID S CRID F CRID S CRID S	GRID	4	
CRID 6 CRID 7 CRID A CRID B CRID C CRID D CRID B CRID F CRID F CRID F CRID S CRID F CRID S CRID S CRID S CRID S CRID S CRID S CRID S CRID S CRID S CRID D CRID S CRID S CRID D CRID S CRID S CRID S CRID D CRID S CRID S CRID D CRID S CRID S CRID S CRID S CRID S CRID D CRID S CRID S CRID D CRID S CRID S CRID S CRID D CRID S CRID S CRID D CRID S CRID S	GRID	5	
GRID 7 GRID A GRID B GRID C GRID D GRID B GRID F CRID F CRID F CRID F CRID S One drawing per view Drawing properties	GRID	6	
CRID A CRID B CRID C GRID D CRID B CRID F One drawing per view Drawing properties	GRID	7	
GRID B GRID C GRID D GRID B GRID F One drawing per view Drawing properties	GRID	A	
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You will get 4 GA drawings.

Change drawing

properties

**Create GA** 

grid views

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We still need to modify the GA drawing names.

1. Open the first drawing on the list.



- 2. Check the view title to see which gridline it represents.
- 3. Double-click on the background of the drawing to open the drawing properties.
- 4. Change the name to, e.g., Elevation @ Grid F.

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- 5. Click **Modify** and the name changes on the list.
- 6. Repeat for the rest of the drawings.

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## Create an empty GA drawing and add model views interactively

	In certain situations (multi-user for example) it is necessary to first create empty GA drawings and later link the model views interactively. By using this method each user can have GA drawings reserved for their use.				
Change drawing properties	1. Click the <b>Drawing properties</b> button on the <b>Create general arrangement drawing</b> dialog, and change the following:				
	• Change the name to Foundation ( <b>Name</b> field)				
	• Change the drawing size to 830*584 (Layout dialog)				
	• Set the part marks visibility to none ( <b>Part mark&gt; General</b> )				
	• Set the part marks out of view plane not visible( <b>Part mark&gt; General</b> )				
	2. Click the <b>OK</b> button for each of the dialogs to lock the settings.				
Create empty GA	To create an empty GA drawing and add the model view interactively:				
drawing	1. Open the model view, Plan +0.				
	<ol> <li>Open the GA drawing creation dialog, Drawing &gt; Create general arrangement drawing.</li> </ol>				
	3. Select <b>Empty drawing</b> from the drop down menu.				
	4. Check-mark <b>Open drawing</b> .				
	5. Click Create.				

Views		
GRID 1		~
GRID 2		-
GRID 3		
GRID 4		
GRID 5		
GRID 6		
GRID 7		
GRID A		
GRID B		
GRID C		
GRID D		
GRID E		
GRID F		
PLAN		~
Options		
Empty drawing	🔽 Drawing prop	erties
🗹 Open drawing		



Link model view to drawing

- 1. Open the drawing.
- 2. Minimize the drawing.
- 3. Double-click on the Create view from model view icon.



- 4. Change the scale to 1/100.
- 5. Click **OK**.

Save	Load standard	Sa Sa	ve as	
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y min:	-350.00	y max:		
depth-:	1000.00	depth+:	7000.00	
View extens	ion for neighbor parts:		0.00	
Reflected	No 😒			
Unfolded	No 💌			
Pa	rt 🔽 🛛 Bolt		Neighbor part	
Part r	nark 🗹 🛛 🛛 Bolt mar	k	Neighbor part mark	
	eld 🔽 Connection	mark 🗹	Grid	
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- 6. Pick the model view.
- 7. Maximize the drawing and the model view has been placed on the drawing.
- 8. Right-click and select **Place views**.



## Create a detail using area select

We will now create detail from the footing at A/1.

#### Create detail

- 1. Minimize the drawing again.
- 2. Double-click on the icon Create view from model by area.

## 

- 3. Change scale to 1/20.
- 4. Click **OK**.
- 5. Pick area around the footing at grid intersection A/1.



- 6. Maximize the drawing and the view will have been placed on the drawing.
- 7. Right-click and select Place views.



### Create a section view out of a detail

Now we will create section view from the footing detail that we created earlier.

Create section view

1. Double-click on the icon **Create section view**.



- 2. Change scale to 1/20 in the view properties dialog.
- 3. Click **OK**.
- 4. Pick the section view area as shown below:
  - With points 1 and 2 you will show the location and direction of the cut line.
  - Then with points 3 and 4 you will show the depth and width of the section view, so a pick box which is big enough that all of the necessary parts fit inside.



The section view and cut symbols will appear.



The section view height is same as model height.

- 1. Double-click on the section view blue border.
- 2. Change the height by changing the **y max**: value from 13400 to 500.

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y min:	-800.00	y max:	500.00
depth-:	300.00	depth+:	96.11
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#### 3. Click Modify.

4. Left-click the background of the drawing once and then right-click and select **Place** views.



## 12.2 Editing GA Drawings

Next we will do some editing to the GA drawings. Most of the editing is done exactly like it is done in other types of drawings see: **Help: Drawing > Editing Drawings**.

### Interactive dimensioning

For more information about the different dimensioning tools, see: **Help: Drawing > Dimensioning > Dimension basics > Manual dimensioning**.

### Automatic grid dimensions

Grids can be dimensioned with just a couple of clicks:

#### **Dimension grids**

- 1. Open the Foundation GA drawing.
- 2. Go to Create > Dimension > Grid.

Line Rectangle		
Arc by endpoints and center		
Arc by three points		
Circle		
Circle by three points		
Polyline		
Polygon		
Cloud		
Dimension	D	X
Text		Y
Symbol	•	Ortho
Level mark		Parallel
Revision mark		Perpendicula
Weld symbol		Free
Part marks		Curved
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DWG/DXF		Radius
Hyperlink		Angle
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Section symbol		Parts XY
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Link drawing views		
Copy drawing views with layout		

- 3. Pick the main drawing view.
- 4. Grid dimensions will appear.
- 5. You can pick and move dimension lines anywhere you want them.



## Semi-automatic GA dimensioning

See the online help file for more information about setting up dimensioning properties **Help: Drawings > Dimensioning > Dimension reference > Setup>GA dimensioning**.

**Dimension silos** 

- 1. From the menu, select **Setup > GA dimensioning**...
- 2. Set the properties as shown below:

tomatic GA dimensioning	×
Intersection points	~
Main parts	×
By grid lines	~
Reference lines	×
	tomatic GA dimensioning Intersection points Main parts By grid lines Reference lines

3. Select the silos.



4. Right-click and select **Dimension Parts XY**.

Interrupt	
Dimension Parts	Х
Dimension Parts	Y
<b>Dimension Parts</b>	XY
Part mark	
Update mark	
UCS	,
Zoom	)
Update window	
Next window	

5. Dimension lines from the silos to gridlines appear.



In the same fashion we can also dimension the anchor bolts:

Dimension anchor bolt detail

- 1. Highlight the parts in the anchor bolt detail.
- 2. Right-click and select **Dimension Parts XY**.



And in the section view:

## Dimension anchor bolt cut view

- 3. Double-click on the blue border to open the view properties.
- 4. Click on the Part... button, check-mark Hidden lines: to on and click Modify.
- 5. Highlight just the anchor bolts and the footing.
- 6. Right-click and select Dimension Parts XY.



7. Close the drawing.

## Create a level mark

A level mark can be inserted at any picked point in the drawing and it will automatically give you the elevation of that point.

Create level mark 1. Click the Create level mark icon.



- 2. Right-click and use the **Near** snap override to pick a point at the top of the foundation.
- 3. Freely pick another point to set the direction of the level mark.
- 4. The level mark will appear at the selected location.



## 12.3 Updating GA Drawings

GA drawings are automatically updated when you make changes to the model. However, GA drawing marks are not automatically updated. You need to update these by pressing the **Update marks** button in the drawing list before opening the drawing.