VANTAGE

Multi-Discipline Supports

User Guide



MDS11.6

Issue 270605 Rev 0

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1 Introduction

1.1 About this User Guide

This document provides guidance to the design engineer on how to create supports using the Multi Discipline Supports (MDS) application. It is assumed that the design engineer has a basic understanding of the program.

1.2 Overview of the MDS application

The MDS application allows you to create supports for piping, cable racks, and HVAC. It is highly interactive, enabling you to design supports with the minimum of effort. The MDS application is also highly configurable, allowing the administrator to define project-related defaults, to control the design of supports, and to determine the range and types of ancillary components that can be used on a project.

The standard framework supports in the MDS application are designed using structural sections and are template driven. A default set of structural templates based on British Standard steelwork sections is supplied with the MDS application. Any relevant national standard for steelwork sections can be used by configuring the supplied templates. For further information refer to the *Framework Template Administration Guide*.

If the templates supplied do not suit your project or company requirements, get your MDS administrator to configure them, or contact AVEVA Solutions to investigate your requirements and create a special. The requirement to add an extra member to an existing template configuration is an example of a special. The extra member would be designed as, or converted to, a special and then added to the template with the standard Beams and Columns application.

Ancillaries are elements, such as u-bolts, bolt-on shoes, anchors, or slip-units, which are attached to pipes. Ancillaries associated with the template are those suitable for, or available with the standard.

Ancillaries for cable trays and HVAC, sometimes referred to as fixings, are deemed to be the responsibility of the relevant contractor and are not dealt with in this application.

The creation of every support follows this process:

1. Select a support type from a menu or icons.
2. Enter a name for the support.
3. Create a datum atta (attachment) and select an ancillary type.
4. Set distance and/or position for the datum atta.
5. Choose the steelwork from a list of available sizes.
6. Create using the required creation method.
7. Select miscellaneous options.
8. Select the packing if required.
9. Complete the process (the Integrity Checker runs automatically at this point).

1.3 Administrator's role

The administrator is responsible for the initial setup of the default files and the design template database associated with the MDS application.

1.4 MDS catalogues and specifications

The MDS application is supplied with a catalogue and specification. The range of bores and components in the catalogue are fixed.

The **/MDS** specification contains all ancillary types, and the **/MDF** specification contains the SREF attachments for standard frameworks.

The **/MDP** specification contains the preliminary support type available within the MDS application.

The **/RPAD-MDS-PLATE-MATERIAL** specification contains the material used for reinforcing pad type supports.

Caution: The catalogue and associated specifications must NOT be modified.

2 Starting the application

1. Start the Design General Application (default start-up). The Design General Application start-up form (Figure 1) is displayed.

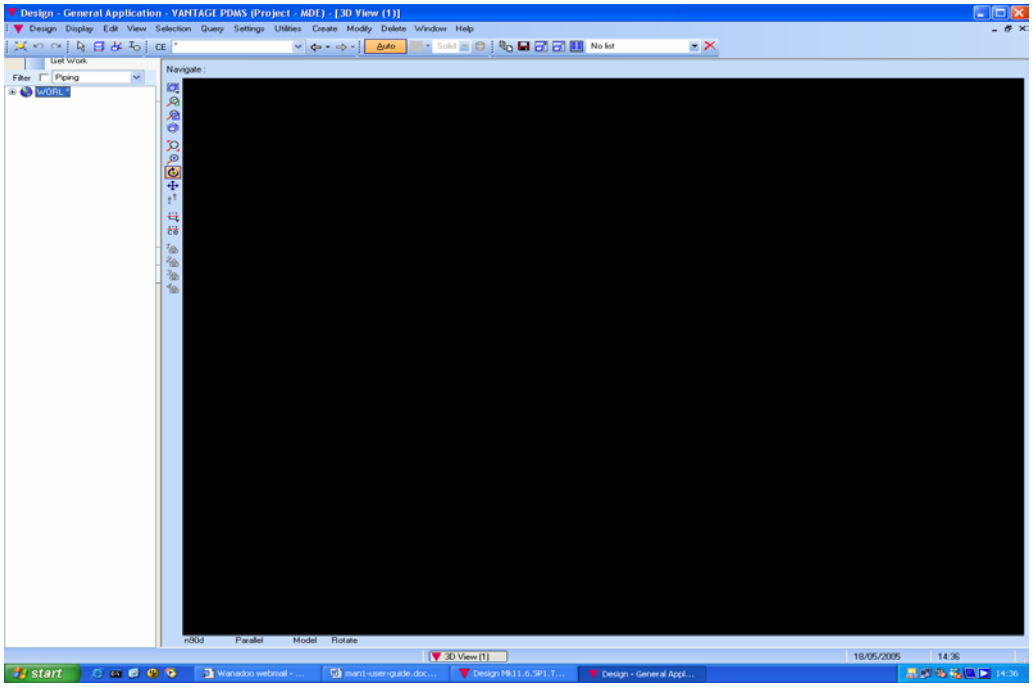


Figure 1 General Application form

2. Select **Design>Multi Discipline Supports…** from the main menu (Figure 2).

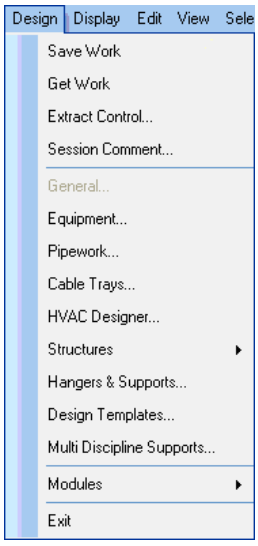


Figure 2 Design pull-down menu

The start-up form re-initialises to become the main menu bar (Figure 3), which includes all functions specific to the MDS module.

The system tests for the existence of the design template database **/MDS/TEMPLATES** and the **/MDS** and **/MDF** specifications. If neither of these exists, MDS entry is stopped, an error message is displayed, and you re-enter the Design General Application. If this occurs, ask your administrator to add these databases to your MDB (Multiple Database).

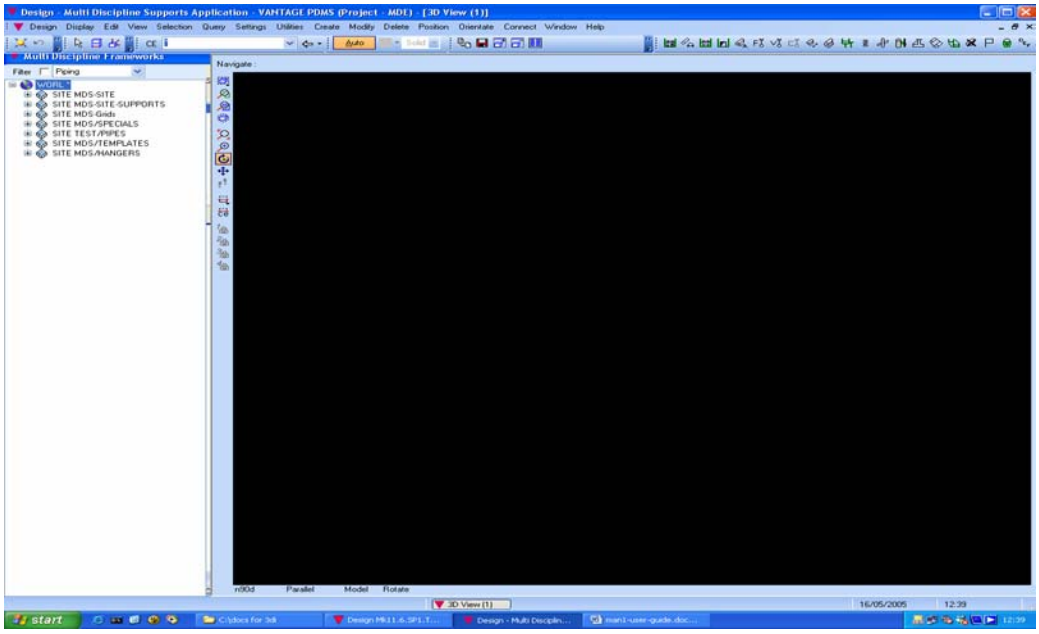


Figure 3 Main Menu Bar form

Simultaneously, the application overlays a form (Figure 4) listing all valid zones found in the current MDB. The default file **DES-SUPP-ID** controls the selection of which zones are displayed. For more information on how these zones are selected, refer to the *MDS Administration User Guide.*

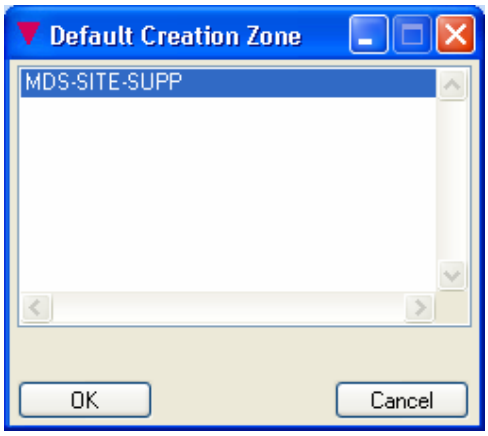


Figure 4 Default Creation Zone form

3. Select a zone in which to create your support structures. Two tool bars (Figure 5) are located under the main menu bar.

Icons which control the general setup and display operations are positioned on the left.

The icons to the tight of centre are short cuts to all the available menus in the MDS application. Place the cursor over each of these icons to display an associated tool tip.

Note: Toolbars now conform to standard Windows operation and can be repositioned in a number of ways. Beware that some icons may be hidden if you re-arrange the toolbars. The hidden icons on any toolbar can be accessed using the drop-down arrow at the right-hand end of the toolbar.

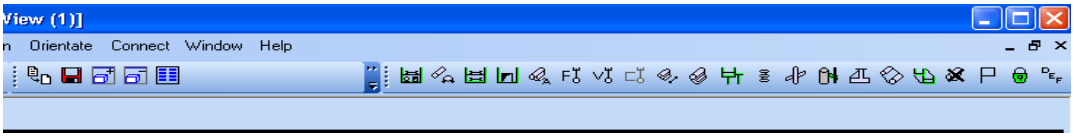


Figure 5 General setup and shortcut toolbars

Each icon and its assigned action or purpose is listed in Table 1 below.

	Multi discipline supports			General supports
	Cable racking supports			HVAC supports
	Anchors			Fixed hangers
	Variable hangers			Constant hangers
	Guides and stops			Slip units
	Specials			Springs
	Trunnions			Vessels supports
	Branch reinforcements			Copy supports
	Modify support			Delete support
	Preliminary support			Lock/unlock support
DEF	Defaults			Wizard
	Reports			Manuals

Table 1 Menu shortcut icons

2.1 Creating a multi discipline support

1. Select the **Create** pull-down menu (Figure 6).

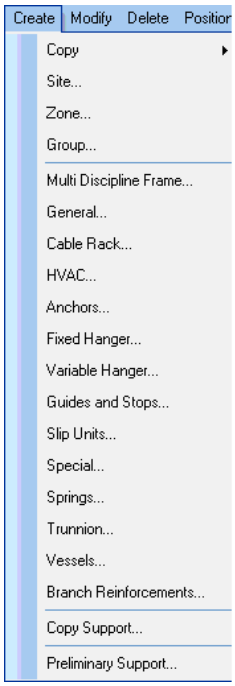


Figure 6 Create menu

2. Click on **Multi Discipline Frame…**. A form similar to the example shown in Figure 7 is displayed.

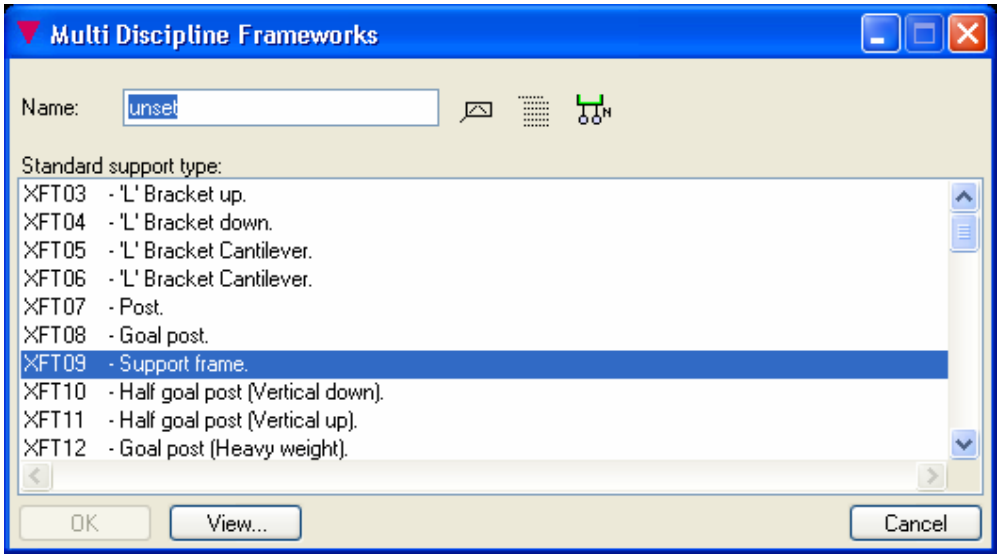


Figure 7 Multi-discipline Frameworks selection form

This form contains all the available supports for the MDS application default file DES-SUPP-DEFS, which is located in the project default directory.

You can also create support groups using the icon. Group names are identified by the suffix, [1]. Hangers can be added to the main framework support group and detailed as one entire MDS support drawing.

Any unavailable support requires a different description to be displayed, or requires a different name to the standard name supplied. Such names can be modified in this file. Refer to the *Administrators User Guide* for further information.

In the example shown in Figure 7, the prefix X has been added to all support default names.

3. Enter a name as follows:

   a. Enter the name of the support to be created.

      If you enter a legal name in the **Name** field then click the **OK** button, the form becomes active. Notice that in Figure 7, no name is specified and so the **OK** button is inactive.

      or…

   b. Click on the AutoName button at the top of the form. An automatically generated name is filled in (Figure 8) and the **OK** button is now active.

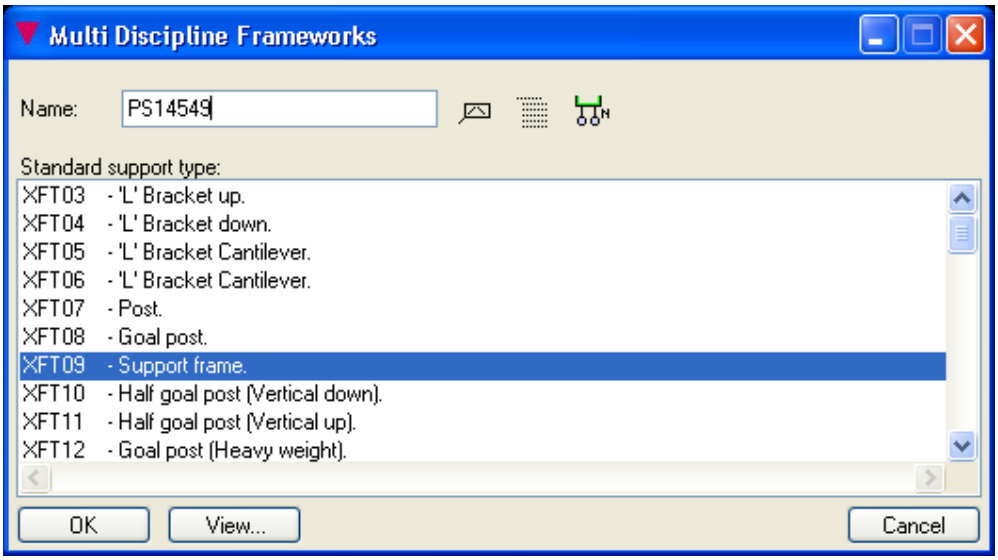


Figure 8 Multi Discipline Frameworks selection form, with auto-naming

4. Click on the required support type.

Note: Do NOT click on **OK** at this time.

At any time when the form shown in Figure 7 or Figure 8 is displayed, you can click on the **View** button to see the engineering drawing corresponding to the selected support. See the example in Figure 9.

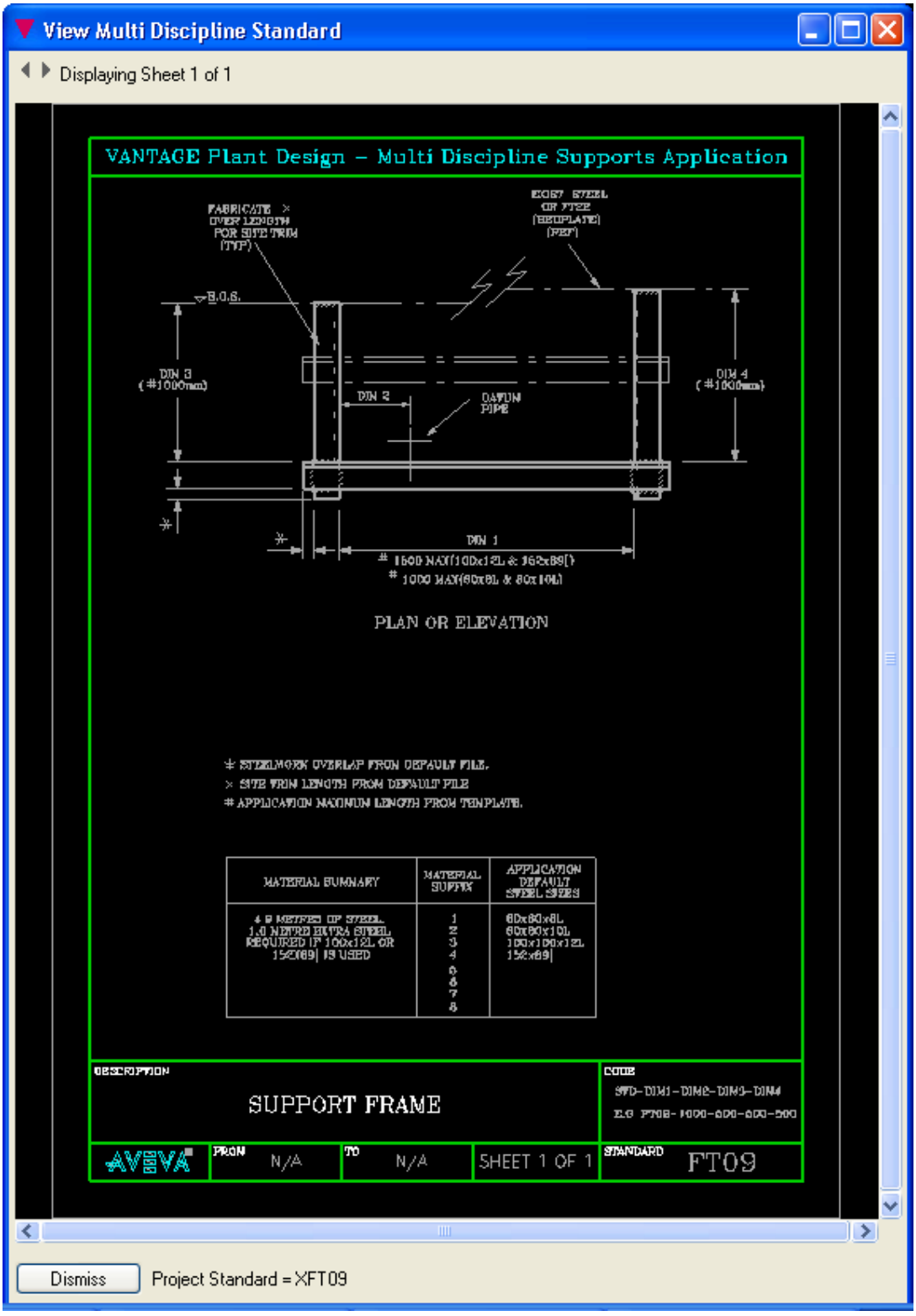


Figure 9 Engineering drawing for the selected support

5. Right-click on the **AutoName** button and the button bar shown in Figure 10 is displayed.

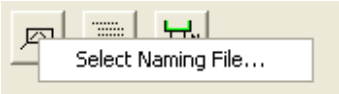


Figure 10 Initiate selecting a different naming file.

6. Click on the **Select Naming File...** panel. The AutoNaming File form (Figure 11) is displayed. This allows you to select:
   a. a different AutoNaming file for the session,

      or…

   b. a different AutoNaming file set for the zone.

   Refer to the *MDS Administration User Guide* for further information.

   Note: Figure 8 remains displayed.

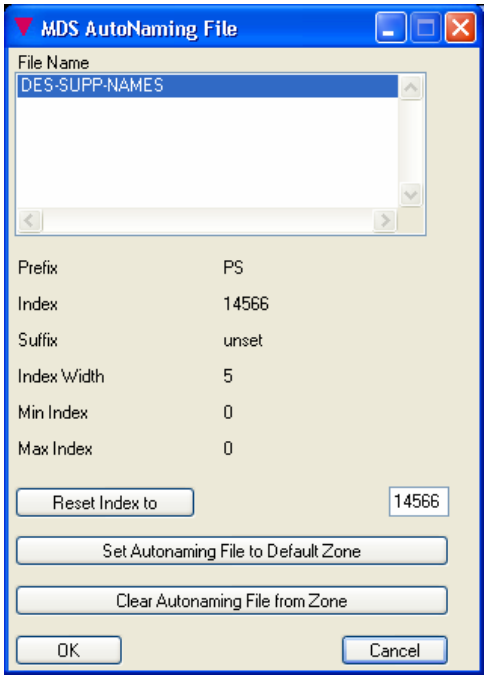


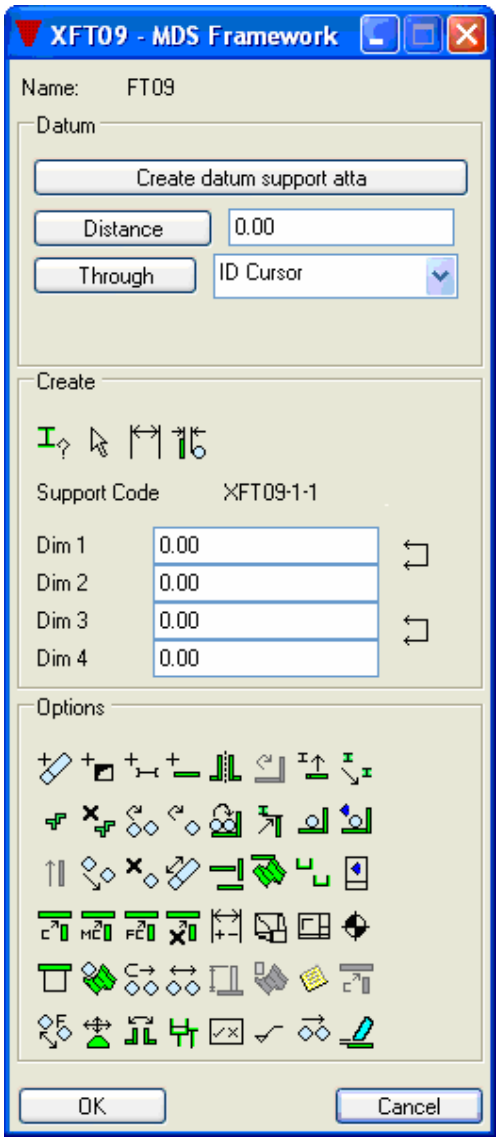
Figure 11 AutoNaming File form

   You can also select a zone, which is used to create all the support structures, by clicking on the Default Creation Zone button  on the Multi Discipline Frames form.

7. Select the support type required.
8. Click on the **OK** button. The type is selected and the form closes. Refer to the *MDS Administration User Guide* for further information.

Example: Creating a support type

In this example you will create support type XFT09, using the name FT09

1. Click on the **OK** button shown in Figure 8. A form similar to that shown in
2. 

3. Figure 12 is displayed.

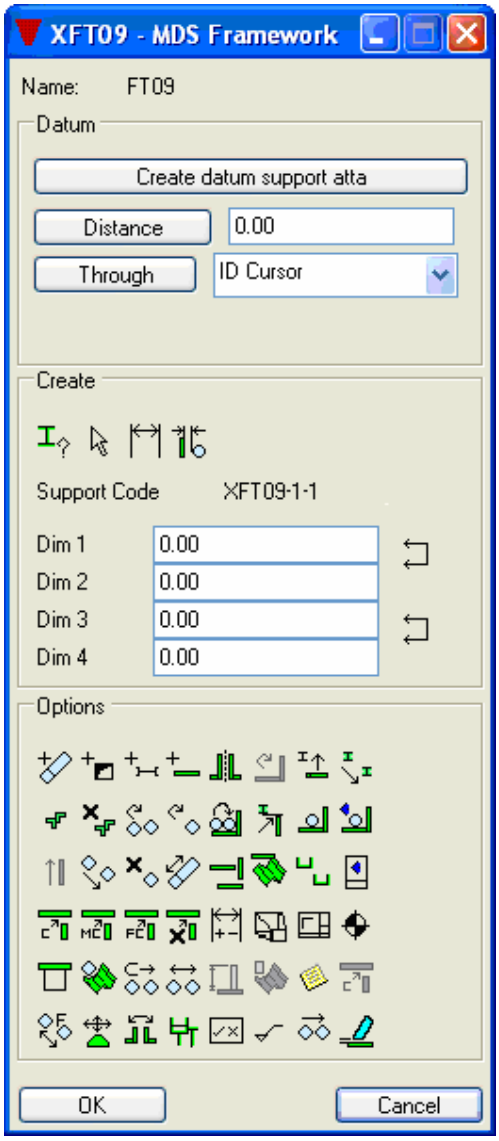


Figure 12 XFT09 form

See section 2.6 for a descriptive overview of the icon functions.

4. Ensure that the pipes, cable rack, or HVAC you need to support are added to the Drawlist, along with any other elements needed to create the support. This may include steelwork and panels, depending on the creation mode that is to be used. They must be added to the graphical view to be identified.

5. Create the datum atta. This is the attachment on the first pipe that is associated with the support structure. This *must* be a pipe, not a cable rack or HVAC element.

   To create the datum atta select the **Create datum support atta** button at the top of the form. You are presented with the cursor so that you can identify a pipe. When you have done this, the Ancillary Selection form containing a filtered list of all the available ancillaries at the selected pipe bore, is displayed (Figure 13). These may be restricted for each framework type. For more information refer to the *MDS Administration User Guide*.

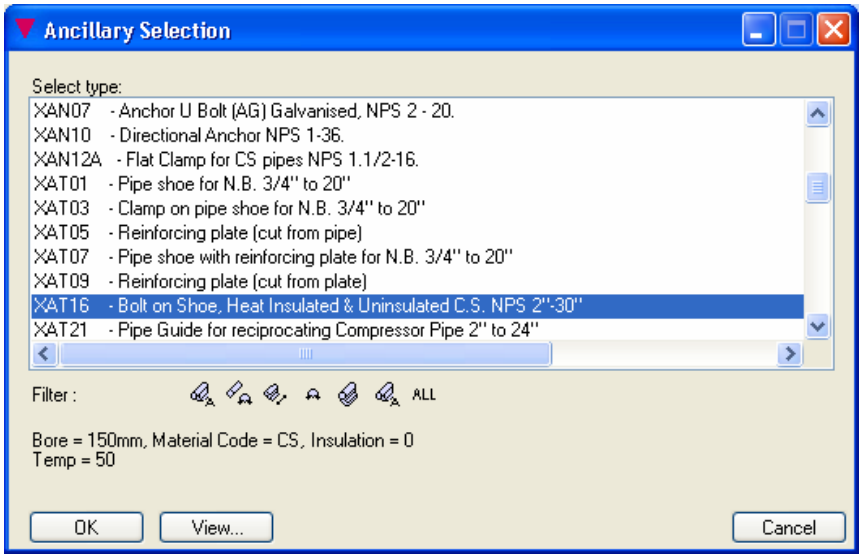
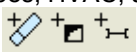


Figure 13 Ancillary Selection form

6. Select the ancillary XAT16 (Bolt on Shoe) from the form. Click on the **OK** button. The application now creates the pipe shoe on the selected pipe and positions it at the previous component or branch start, with a graphical tag of Datum for easy recognition. The **Create Datum support Atta** button is deactivated.
7. Position the shoe on the pipe using:
   a. the **Distance** button, with a distance value placed in the text field next to it,

      or:..

   b. any of the **Through** button available options. These include; Through ID Cursor, Through Back Mark, and so on.
8. Continue to add all the pipes, HVAC, and cable racks to the support. These can be added using the first three icons  on the XFT09 form.

   The application now positions the new attachments with respect to the datum atta.

   The example in Figure 14 shows two pipes, HVAC, and cable rack elements added to the support.

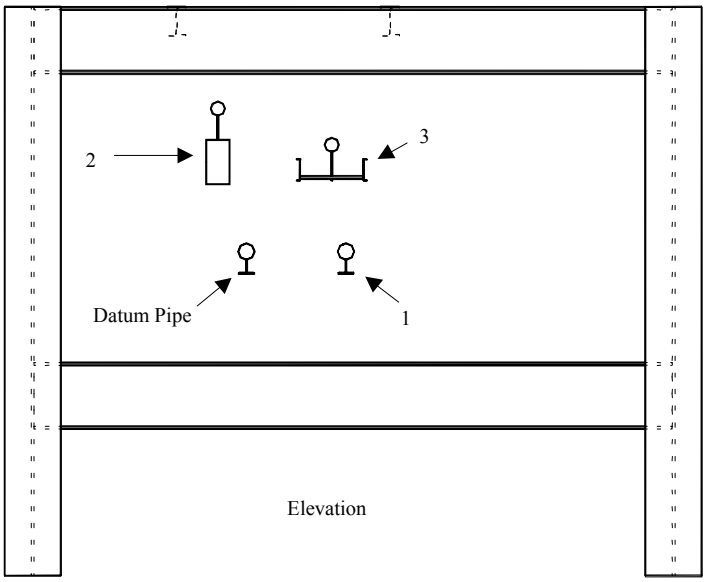


Figure 14 Design screen 1

Notice that the HVAC and cable rack support attachments have a 'lollipop' representation. This is because the fixings to the steelwork are regarded as supplied by the HVAC and cable rack contractor; no allowance is made for the selection of different fixings in the MDS application. The 'lollipop' representation is removed when the support is completed, returning to its original drawing level before the support was created. There are no obstruction properties associated with the lollipop representation and no clashes are reported.

9. Choose the template required to create the support.
10. Select the steelwork size icon .
11. Select a template available from the list presented on the form (Figure 15). The template list shows all available templates. For this exercise, choose the second option, 80x80x10 Angle, Internally Welded.

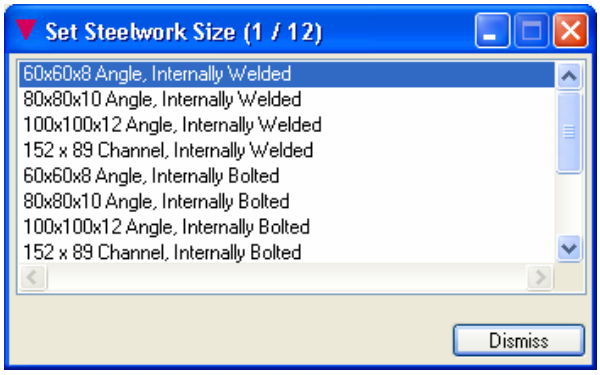


Figure 15 Set Steelwork Size selection form

12. Click **Dismiss** to access the selection and return to the Ancillary Selection form (Figure 13).
13. Click on **OK**.

There are three different options that you can use to create the steel framework:

- Create by Cursor
- Create by Clearance
- Create by Dimensions

You will now create the framework with all three options and see what differences they make.

2.1.1 Create by Cursor

On the XFT09 form:

1. Select the Create by Cursor icon. You are presented with the cursor and prompted from the status form to identify steelwork, boxes, or panels.
2. Select the horizontal steelwork member parallel to the pipes on the left.
3. Select the horizontal steelwork member to the right of the pipes.

   The application now creates the support using dimensions gained from the positions of the identified steelwork. The view appears as shown in Figure 16. When complete, the application fills in all the dimensions with their correct values. These are stored against the support when it has finished, enabling future modifications of the support.

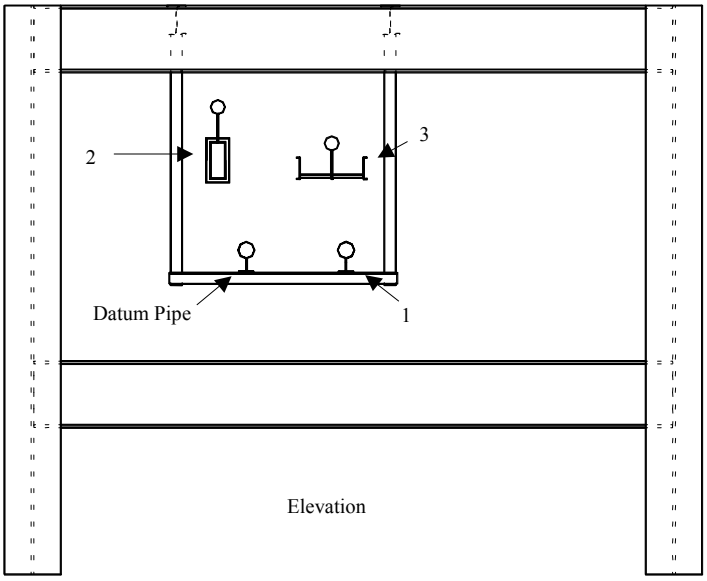


Figure 16 Design screen 2

Now add a cross member to support the HVAC and cable rack.

4. Select the Add Cross Bar icon . You are presented with the cursor and asked to identify the support attachment(s) to support with a cross bar.
5. Identify the HVAC and cable rack 'lollipop'.
6. Click the **Cancel** button on the status form. The application creates the crossbar and positions it at the correct elevation.

   Identify both attachments to which the cross will be attached. This information is used later in the support Integrity Checker to check the packing distance between the cross bar and

the support attachment. The support Integrity Checker is executed whenever you press the **OK** button. The view is then as shown in Figure 17.

Note: The elements to which the cross-beam is attached must be parallel to the pipe run.

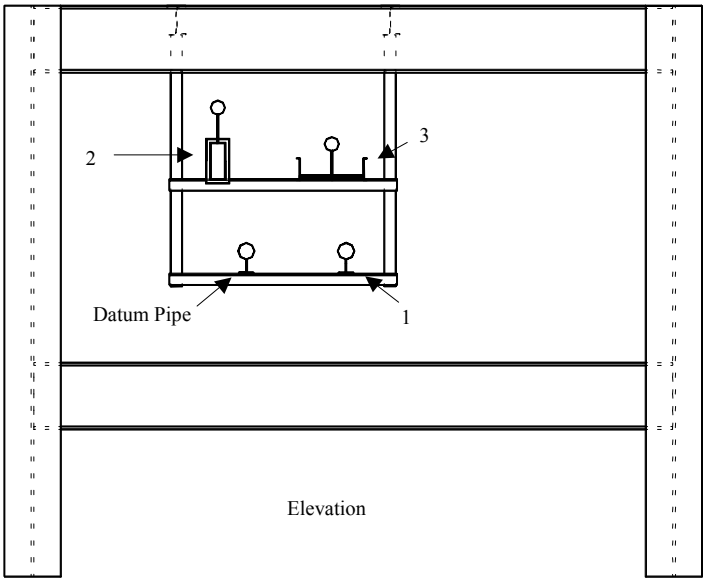


Figure 17 Design screen 3

2.1.2 Create by Clearance

Using the Create by Cursor method, two separate elements must be identified and these elements must be parallel to the pipe run. Using the Create by Clearance method, only one element needs to be identified.

1. Select the Create by Clearance icon . You are presented with the cursor to identify a steelwork member, box or, panel.
2. Select the horizontal steelwork member that is perpendicular to, and above, the pipes.

   The application now creates the support using the dimensions gained from the position of the identified steelwork member. The clearances are calculated from the default values, obtained from the support Application Default form, and are used to calculate the positions of the vertical members.

   These values and all other default values can be queried by displaying the MDS Application Defaults form, from the **Settings>Defaults>Applications** menu item. For more information on this and the other defaults used, refer to the *MDS Administration User Guide*.

   The application fills in all the dimensions with their correct values. The view is then as shown in Figure 18.

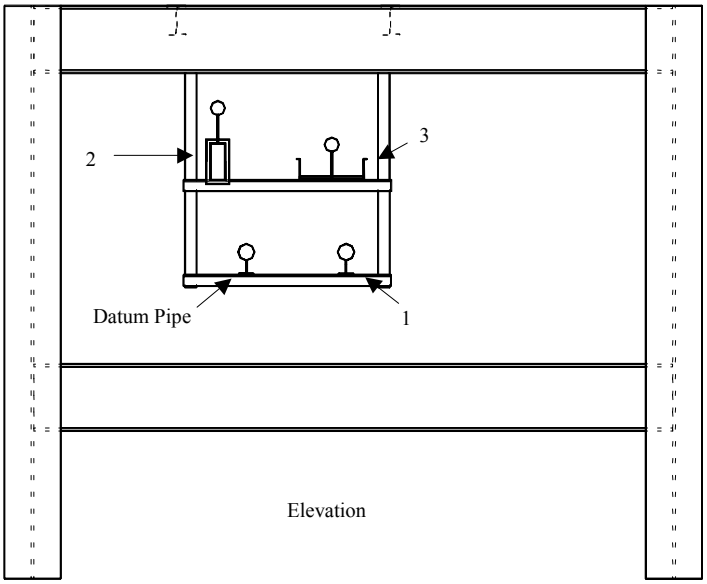


Figure 18 Design screen 4

2.1.3 Create by Dimensions

Use this method when the required steelwork is not yet entered into the 3D model, enabling you to continue working.

1. Enter the following dimensions in the MDS Framework form:

   Dimension 1 = 1300mm
   Dimension 2 = 350mm
   Dimension 3 = 1000mm
   Dimension 4 = 1100mm

   The location of each dimension can be viewed by clicking on the **View...** button. This displays a plotfile with the dimensions shown.

2. Select the Create by Dimensions icon .

   The application now creates the support using the dimensions entered. The view is then as shown in Figure 19.

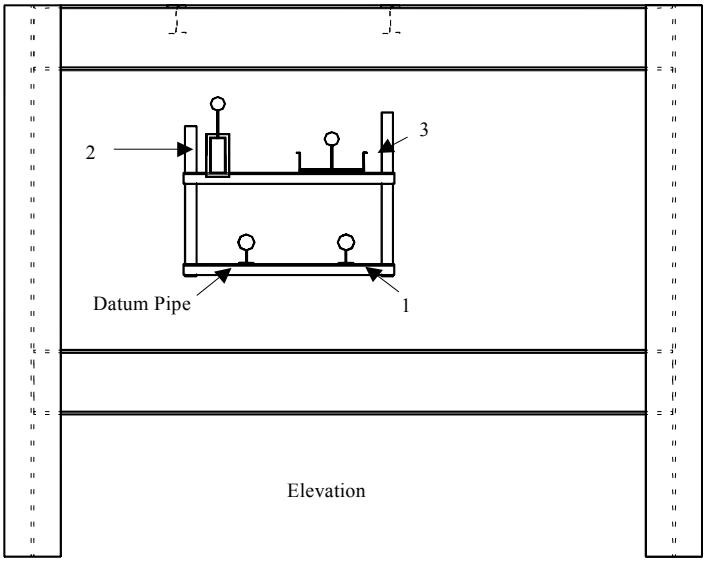


Figure 19 Design screen 5

2.2 Changing the size of the steelwork

To modify the size of the steelwork:

1. Select the Set Steelwork Size form (Figure 15).
2. Select the size required. The application recreates the support using the dimensions that are entered on the form. Try this by selecting option 4, “152 x 89 Channel Internally Welded”. The view is then as shown in Figure 20.

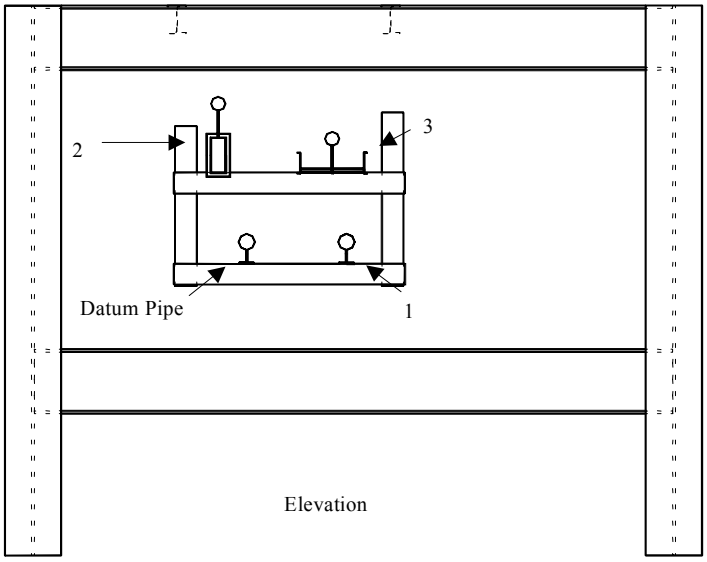


Figure 20 Design screen 5

2.3 Adding a packing piece

Packing pieces are used to make up height differences between the cross bar and support attachments.

1. Select the Add Packer icon from the MDS XFT09 form. You are presented with the cursor and a status line prompt to identify the support atta to add the packing piece to. The Packing Piece form (Figure 21) is displayed.
2. Fill in the form as required.

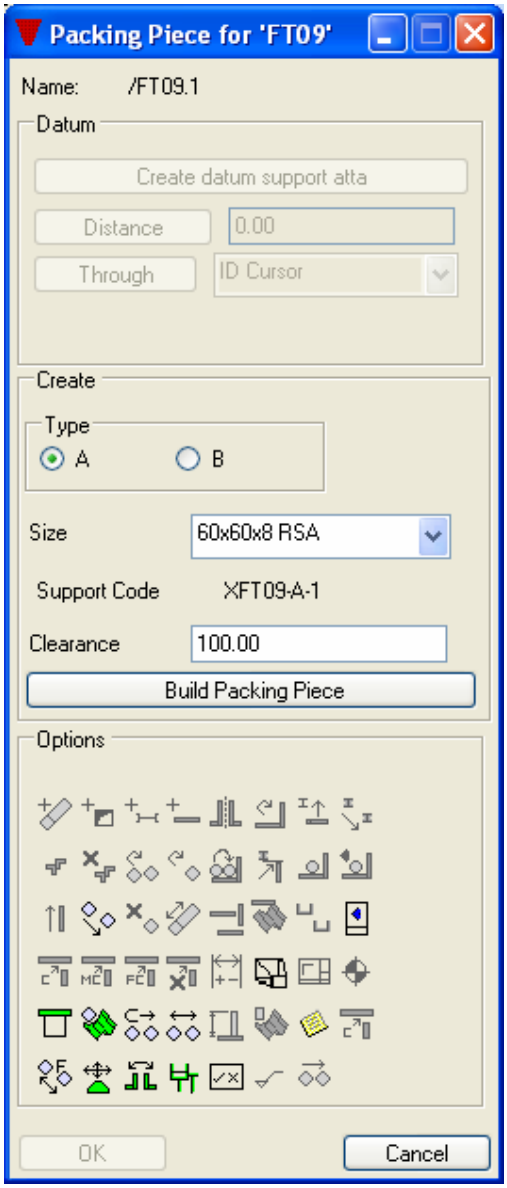


Figure 21 Packing Piece form

2.4 Creating and manipulating connections to external steelwork

After the structural steelwork has been created, it may be necessary to connect it to external steelwork.

To add a connection to external steelwork:

1. Select the Create Connections icon . This creates a connection only if the application knows the identity of the steelwork to connect to.

   If you used the Create by Cursor or Create by Clearance methods the connection to the external steelwork is made automatically.

   Note: It is essential that you have write access to create SNOD/SJOI elements on the necessary external steelwork.

   The SNOD is represented in the graphical view. The MDS application defaults control to the level at which joists can be made to the external steelwork.

   Refer to the *MDS Administration User Guide* for more details.

2. Select the Modify Joints icon . You are presented with a form that displays all the available joints.
3. Select the joint for the joints connected to the external steelwork.

   If you have identified the external steelwork to connect to with either Create by Cursor or Create by Clearance, it is possible that the application will connect to the wrong Pline. This can happen in the case of the SCTN having floating Plines (X) (Figure 22a).

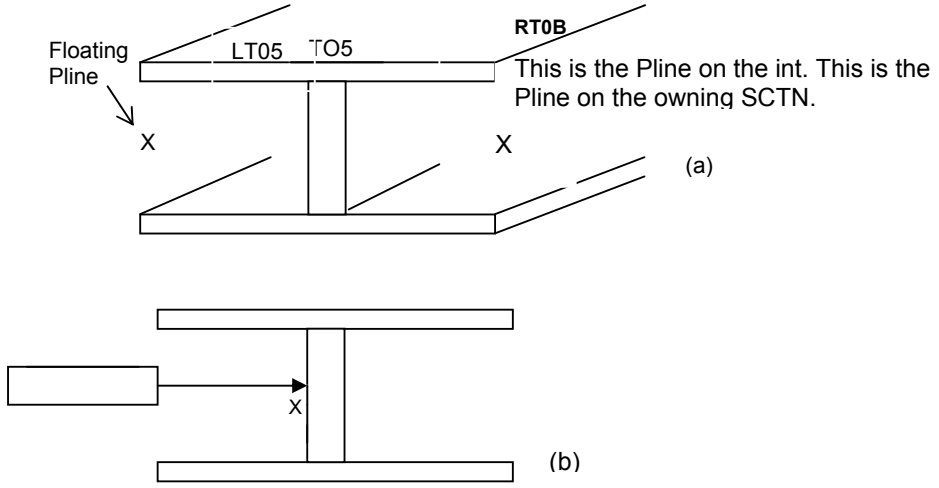


Figure 22 Forced connection to SCTN with floating Plines

You can force-connect the joint to a specific Pline (Figure 22b) by selecting the Force Connect joint icon . You are prompted to identify the required Pline using the cursor.

To delete a connection:

1. Identify the connection with the cursor.
2. Select the Delete Connections icon.

2.5 Ending the creation of a support

When you have finished the support, click on the **OK** button.

The application then performs a series of integrity checks to ensure that the support is completed. If any errors are found the **OK** button is deactivated and the support is not completed until you have rectified the errors. The checks performed are as follows:

Displays a message

- If the packing distance is greater than 2mm but not greater than allowable packing distance.
- If the support is a special, a message is issued to you to create the structural steelwork.
- If no warning or errors are found.

Displays a warning message

- If the maximum length of steelwork is not to be exceeded. In the design template database each member can be given a maximum length that it may not exceed.

Displays an error message

- If the Application Default maximum packing distance has been exceeded.
- If any of the support attachments overlap the crossbar. A maximum overlap value is set on the Application Default form.
- If any of the dimensions associated with the support ancillaries, for example shoes, exceed the values defined in the default file (DES-SUPP-PARS) in the project default directory.
- If any reference used within the MDS application, for example bedplate reference, no longer exists.

2.6 Modifying a support

You can now modify the support using the various options available on the MDS XFT09 support form (Figure 12). A description of each option, along with its associated icon, is shown in Table 2 below. The access to each icon is dependent on the configuration being used. Icons for unavailable options are greyed out

	**Mirror framework** mirrors the support, perpendicular to the datum attachment, repositioning the framework members through the structure origin.
	**Align support** picks two points with the EDG (Event Driven Graphics) application. It then calculates the distance between the two points, using the datum attas leave direction. This allows you to position the support more accurately.
	**Modify support section** modifies a section belonging to the support with the standard modify section start/end form. If a section is modified using this facility, any future regeneration of the support will not include these modifications and returns to the default configuration.
	**Add packer** adds packing pieces to support attas that are not sitting directly on the steelwork.
	**Delete packer** deletes packing pieces already added to the support framework.
	**Rotate all attas** can be used when the support type is used with vertical pipes. It rotates all the attachments by the angle entered into the text field next to the icon.
	**Rotate atta** rotates individual attas. It rotates the attachment by the angle entered into the text field next to the icon.
	**Modify datum atta** modifies the datum atta from one atta to another.
	**Bedplate reference** associates a support steelwork member with a bedplate. This information is then added to the subsequent drawing, which can be created with the MDS Automatic Drawing Production application.
	**Associate atta** associates an attachment with a crossbar. It allows you to associate an attachment at any time.
	**View associations** shows the support attachments that are associated with each crossbar. This can be very useful if the support Integrity Checker identifies a large packing distance between the support attachment and the associated crossbar. Often the reason for this is that the attachment is associated with the wrong crossbar.
	**Modify atta** modifies the ancillary type or certain dimensions of the support attachment.
	**Delete atta** deletes an attachment from the support framework. The datum attachment cannot be deleted from the support.
	**Nudge** nudges the support with the flow or against the flow, depending on which icon is pressed, by the distance value entered in the text field next to the icons.

	**Spooling** creates spools for the steelwork erection procedure. The MDS ADP drawing displays which spool the steelwork section belongs to in the material list.
	**Set materials** of the steelwork sections.
	**Copy like** identifies another support of the same standard and copies its dimensions. The number of associated pipes, cable trays, and HVAC elements do not have to be the same on each support.
	**View standard** displays the standards associated plot file.
	**Connect template** section to existing main steel.
	**Modify connection** to existing steel.
	**Force-connect** to existing main steel.
	**Disconnect template** sections from existing main steel.
	**Show/hide framework dimensions** graphically displays the dimension of the support standard.
	**Centre on support** refreshes the graphical view with the support being created or modified in the centre. The view scale is not modified.
	**ADP Drawlist control** can be modified from the Design General Application. The support steelwork and all its associated members are added by default. You may add extra elements to the Drawlist up to a maximum of ten. Use this to add steelwork that does not belong to the support framework.
	**Specify a location** position for ADP dimensions.
	**Identifies a trimmer** requirement (by others).
	**Ancillary material** setting.
	**Copy ancillary**
	**Nudge ancillary**
	**Add a note** to the ancillary to appear on the drawing deliverable.
	**Flip ancillary**
	**Data** allows you to store load data against an ancillary.

	**Modify atta properties** modifies the ancillary type or your editable design dimensions of the support attachment.
	**Flip ADP view directions** flips the ADP view directions 180° from the Design General Application, for drawing clarity.
	**Convert to special** converts the existing support to a special support.
	**Isometric control** allows you to control the isometric drawing representation and material list for individual ancillaries/support framework.
	**Create weld** lets you view, create, modify, or delete welding information.
The icons described below are available on other support standards.	
	**Rotate frame** rotates the framework about the datum attachment.
	**Flip field weld** is used when a support type can be built with the field weld at either end of the framework steelwork member. It will place the field weld at the other end of the steel and depict it with a textural aid.
	**Identify steel** for calculation of trunnion lengths.
	**Set trunnion material**
	**Flip atta** flips an attachment within the line; this can be used to flip non-symmetrical attachments.
	**Reconnect** reconnects a hanger to another beam.
	**Trim SCTN** trims or extends identified section ends to a surface.
	**Copy**.

Table 2 Icon overview

To modify a support:

1. Select **Modify>Support** from the main menu. The Modify Support form (Figure 23) is displayed.

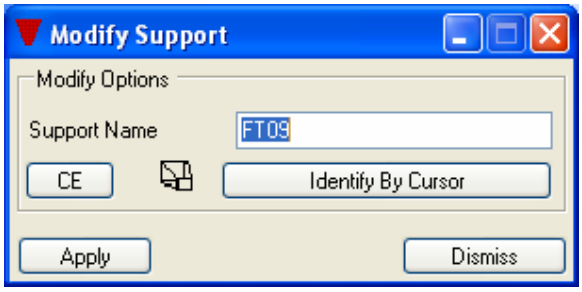


Figure 23 Modify Support form

2. Identify the support you require to modify in one of these ways:
   - Type a name into the **Support Name** text field.
   - Press the **CE** button to modify the current element if it is a support.
   - Click the **Identify By Cursor** button.

   When the support has been identified you can use the Centre on Support icon to view the support in the centre of the graphical view.
3. Click the **Apply** button. The same form as used to generate the support is displayed with all the dimensions correctly filled in. Modification follows the same principles as support creation.

To cancel the support:

1. Select the **Cancel** button while in modification mode.
2. At the prompt confirm this request. The support is regenerated in its original form.

2.7 Deleting a support

Note: Attempts to delete a support attachment while in modification mode stops the process.

To delete a support:

1. Select **Delete>Support** from the main menu, or use the appropriate icon from the tool bar. The Delete Support form (Figure 24) is displayed.

   Note: The buttons on this form are highlighted in red to distinguish it from the Modify Support form.

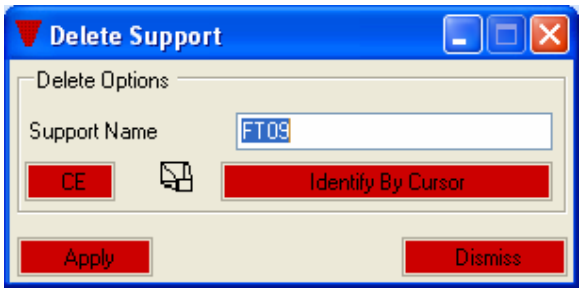


Figure 24 Delete Support form

2. Identify the support you want to delete. The support can be deleted in one these ways:
   - Type a name into the **Support Name** text field.
   - Press the **CE** button to modify the current element if it is a support.
   - Click the **Identify By Cursor** button.

   When the support has been identified, you can use the Centre on Support icon to view the support in the centre of the graphical view.
3. Click the **Apply** button.

2.8 Copying a support

To copy a support:

1. Select **Create>Support...>Copy** from the main menu or use the Copy icon. The Copy Support form (Figure 25) is displayed.

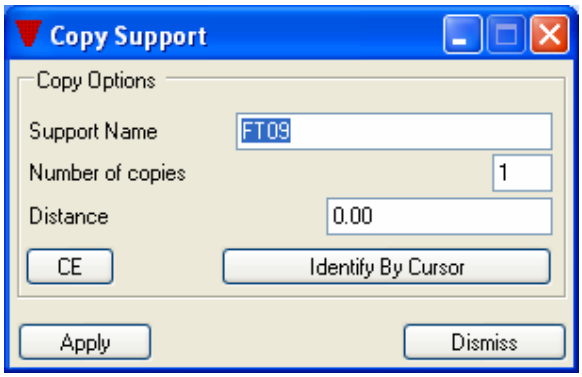


Figure 25 Copy Support form

2. Identify the support you require to delete in one of these ways:
   - Type a name into the **Support Name** text field.
   - Press the **CE** button to modify the current element if it is a support.
   - Click the **Identify By Cursor** button.

   When the support has been identified, you can use the Centre on Support icon to view the support in the centre of the graphical view.
3. Enter a name for the copied support.

   Note: Every copied support must be renamed.
4. Enter the number of copies required.
5. Enter the distance to copy the support.
6. Click **Apply** and then click **Yes** at the Retain the Copy prompt to accept.

2.9 Modifying an ancillary type

To modify an ancillary type:

1. Select the Modify Atta icon on the MDS Framework form. The Modify Atta selection displays the form shown in Figure 26.

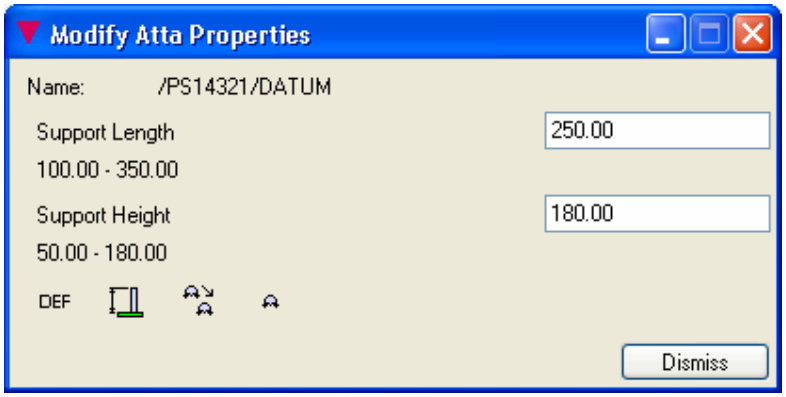


Figure 26 Modify Atta Properties form

The Modify Atta Properties form allows all editable design dimensions of the support attachment to be modified.

2. Select the Modify Ancillary Type icon .
3. At the prompt, select the new ancillary type.

The ancillary type depends on the size of the pipe identified and any restriction of ancillary type that may be created. The type can only be selected if the new type is available at the branch bore size.

2.10 Modifying ancillary dimensions

Note: Not all ancillaries can be modified.

To modify ancillary dimensions:

1. Select the Modify Atta icon . The Modify Atta selection displays the form shown in Figure 26. Forms are context sensitive, and are displayed with the modifiable options only.
2. Type new values in the text fields.

   Note: New values must not exceed the minimum or maximum values defined in the MDS Application Default file DES-SUPP-PARS. An error is issued if the values entered exceed these limits.

3. If required, click on the **Set Parameters to Default** button.

2.11 Modifying a support name

To modify a support name:

1. Select **Modify>Support Name…** from the main menu. The Modify Support Name form (Figure 27) is displayed.

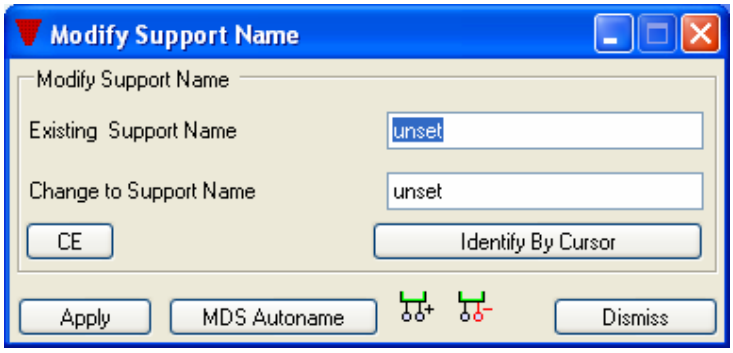


Figure 27 Modify support Name form

2. Identify the support you require to modify in one of these ways:
   - Type a name into the **Existing Support Name** text field.
   - Press the **CE** button to modify the current element if it is a support.
   - Click the **Identify By Cursor** button.
3. Enter the new support name into the **Change to Support Name** text field.
4. Click on the **Apply** button.

2.12 Viewing the application defaults

To view the Defaults in use:

Select **Settings>Defaults>Applications** from the menu. The Application Defaults form (Figure 28) is displayed. For details on each default and its use, refer to the *MDS Administration User Guide*.

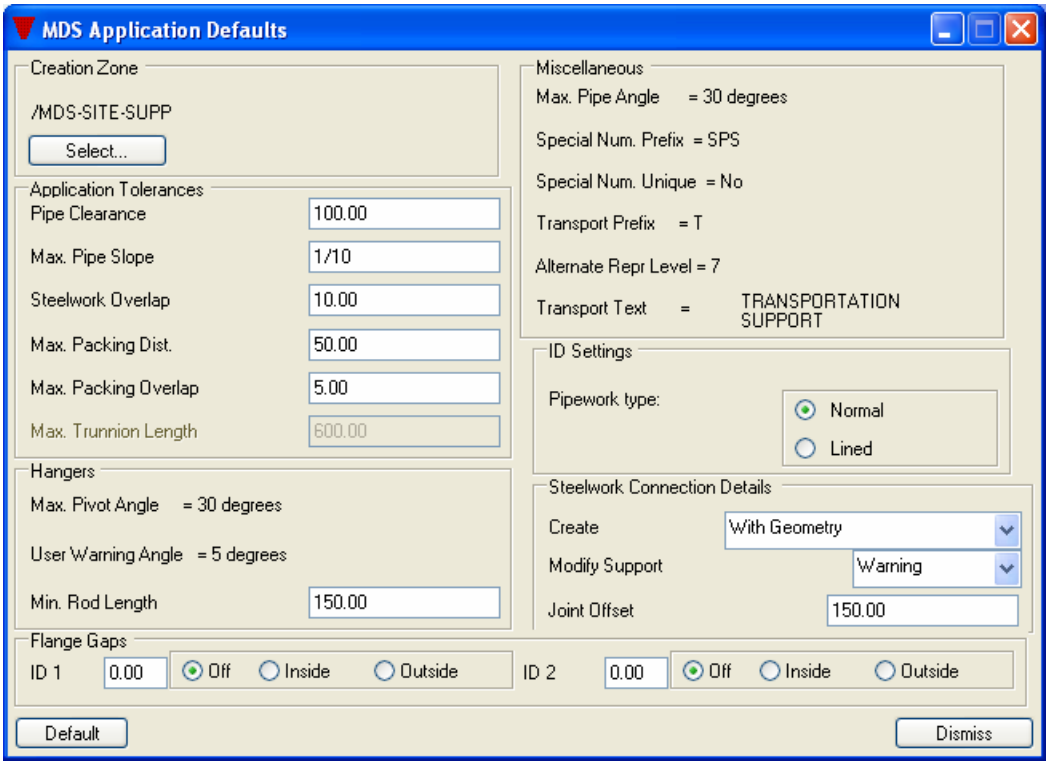


Figure 28 Application Defaults form

2.13 Adding a drawing note

To add a note to the drawing:

1. Click the notes icon on the frameworks form. The Notes form (Figure 29) is displayed.

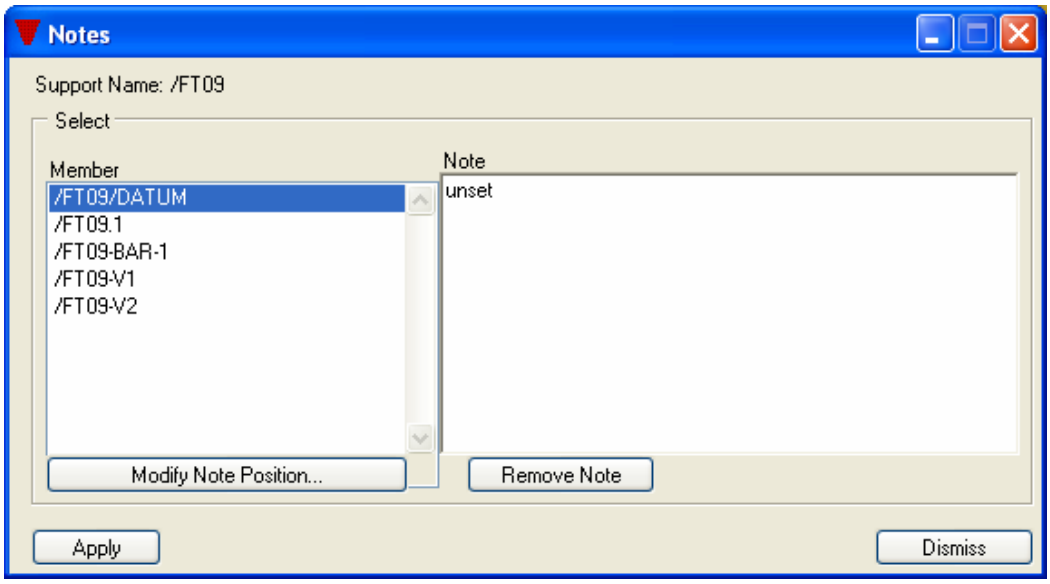


Figure 29 Notes form

2. Select the support to which the comment needs to be added.
3. Type the comment in the **Note** text pane. The comment is added to the drawing above the line identification field.

2.14 Adding a support to the drawlist

To add all the members of a support to the drawlist:

Select **Utilities>Add support(s)** and then click on one of the following sub-menu options.

- **Explicit**: enter the support name into the displayed form.
- **All Below CE**: select CE to add all members below the current element in the hierarchy.
- **All**: add all supports within the current multiple database.

2.15 MDS administration options

The MDS administration options have been added to assist you. An explanation of each option and how it can be used is given below.

2.15.1 Reloading defaults

To load the latest defaults to the MDS Application Default files DES-SUPP-DEFS and DES-SUPP-PARS:

1. Select **Settings>Defaults>Dimensions>Settings** from the main menu. The Dimension Defaults form (Figure 30) is displayed:

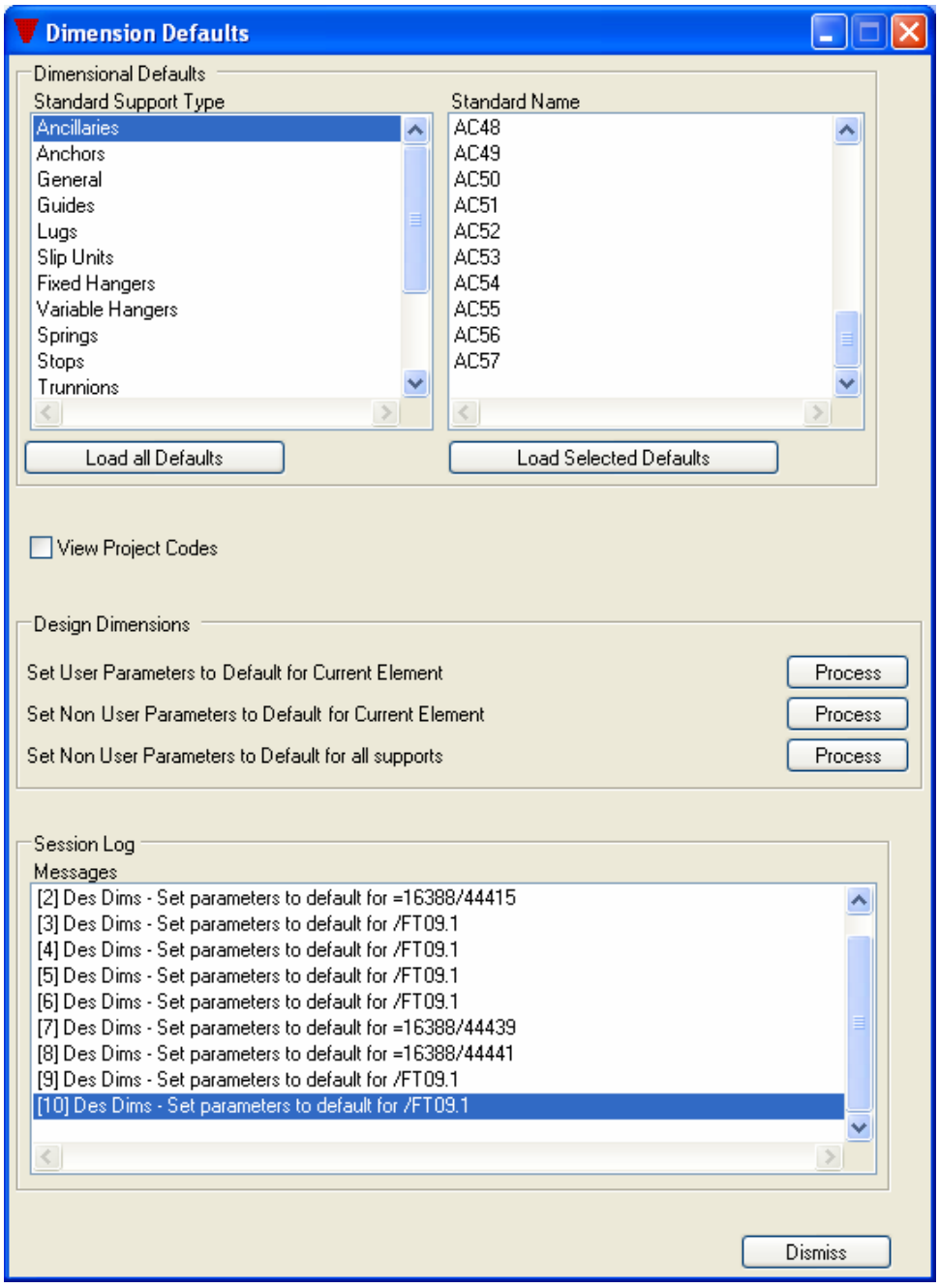


Figure 30 Dimension Defaults form

2. Load all defaults for a type or load individual names using the **Load all Defaults** and **Load Selected Defaults** buttons respectively. A session log is displayed at the bottom of the form.
3. If required reload the defaults for design dimensions. Click the **Process** button for one of these options:
   - Set user parameters to default for the current element
   - Set non-user parameters to default for the current element
   - Set non-user parameters to default for all supports

2.16 Align a guide to a support

A guide associated with a support is also modified if the support is modified. Use this option to realign the guide with its associated support where the guide has not been modified for some reason.

To align a guide to a support:

Select **Modify>Align Guide to Support** from the main menu.

2.17 Associate a pad with a shoe

If a pipe shoe has a reinforcing pad it must be associated with the shoe. This allows the shoe to recognise the pad thickness. If for some reason the pad and shoe are not associated, use the **Modify>Associate Pad with Shoe** menu selection.

2.18 Querying the size of an ancillary

To query the size of an ancillary:

Select **Query>Properties…** from the main menu. The sizes, descriptions and other relevant details are displayed using the data set supplied with the application. An example of a shoe is shown in Figure 31.

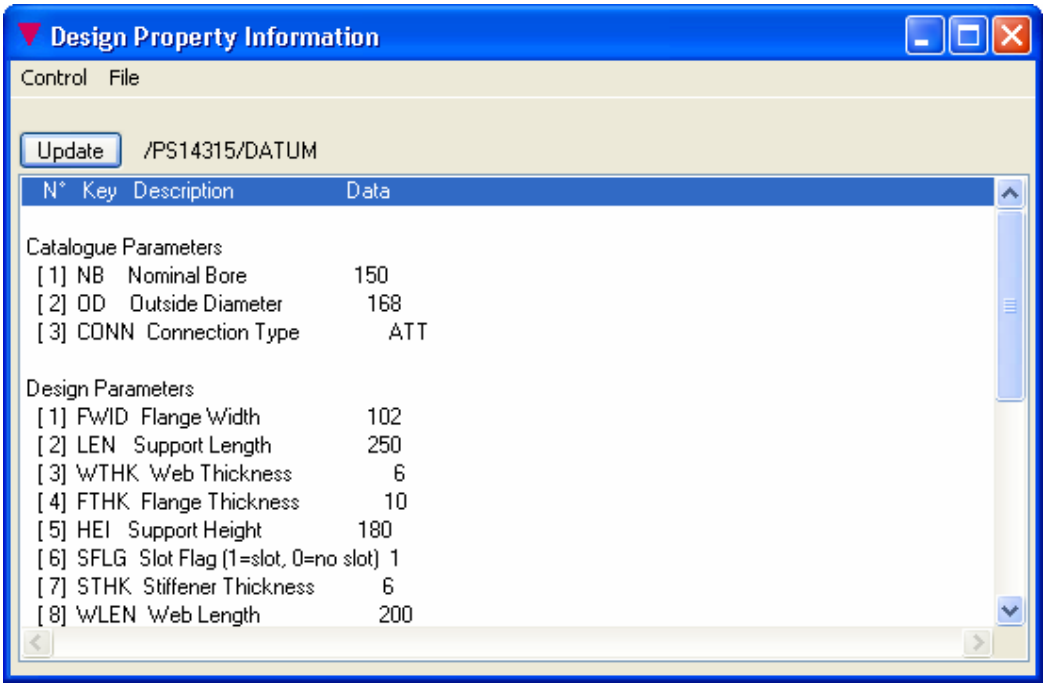


Figure 31 Ancillary Property Information form

2.19 Special supports

2.19.1 Creating a special support

When a project requires a support that does not conform to any of the supplied configurations, it can be created as a Special Support. It can be assigned a support name and a special support number. This special support number can be unique to one support, or it may be used on several supports. This is controlled via the DES-SUPP-DEFS default file. For details on modification of this value, refer to the *MDS Administration User Guide*.

A prefix is used to identify a special support and is also controlled by the same default file.

The Special support type can be:

- Multi Discipline
- Cable racking
- HVAC

To create a special support:

1. Select the Special Support icon from the tool bar, or select **Create>Special...** from the main menu. The Special Support details form (Figure 32) is displayed.

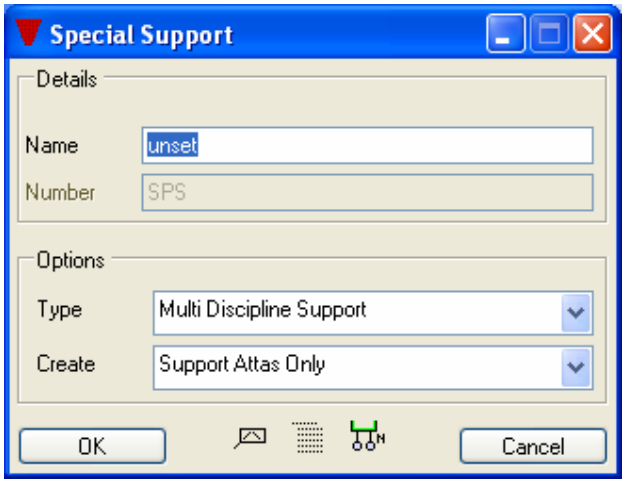


Figure 32 Special Support form

2. Enter a name, or go to the next step if you intend to use the auto-name facility.
3. Enter a number.
4. Select the type.

   If the default setting is for a unique support number, then the special support number is checked to ensure that it is unique.

5. Click the **OK** button or click the **AutoName** button to use the auto-name facility. The Special MDS Framework form (Figure 33) form is displayed.

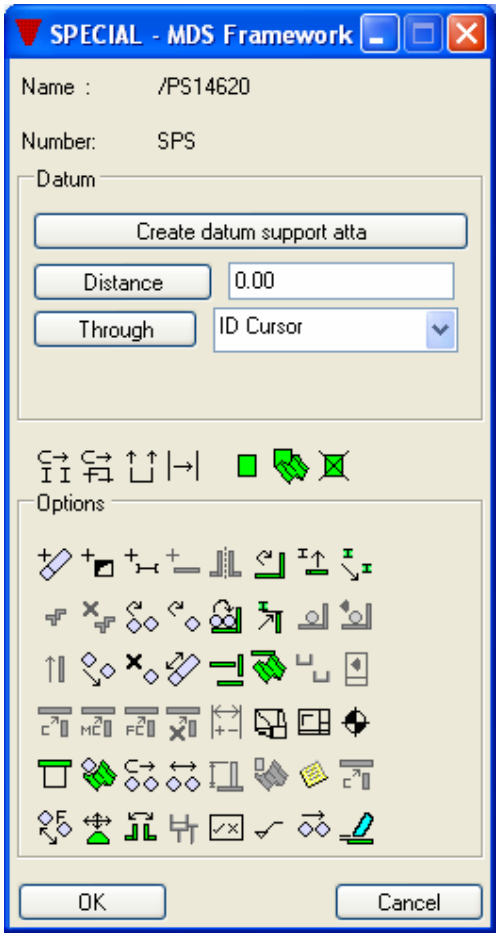


Figure 33 Special MDS Framework form

6. Select all the elements to be supported.
7. Position the support in the same way as for the Multi Discipline Support example.

   Note: The only difference is that no steelwork section can be created.

8. Click on the **OK** button.

A minimal check is performed by the support Integrity Checker. A message is displayed in the support Integrity Check form informing you that you can now use the steelwork application to create the steelwork members required to complete the support framework.

A structure element is created so that you can create the steelwork within it using the same name as the support name. The MDS Automatic Drawing Production application produces a drawing similar to any of the standard support types.

For an overview of the icon functions see Table 2 on page 23.

2.19.2 Creating a special support from a combination of standards

The Special Support form can also be used to create a special support from a combination of standards.

To create a special support from a combination of standards:

1. Select the From Existing MDS supports option in the **Create** field on the Special Support form (Figure 34).

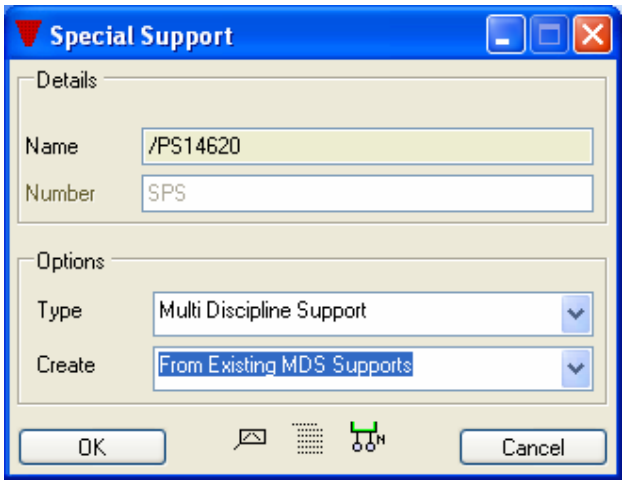


Figure 34 Special Support form

2. Click on **OK**. The Create a Special Support form (Figure 35) is displayed.

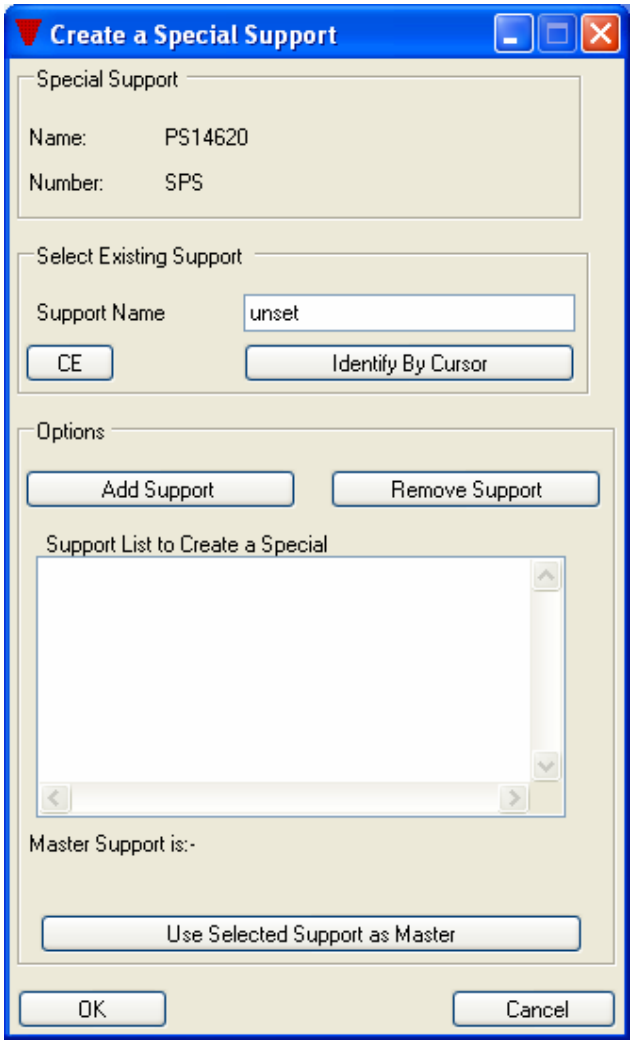


Figure 35 Create a Special support form

3. Identify each existing support in turn and add it to the list of supports to be combined.

   The first support identified is used as the master support. The datum atta of this support is used as the datum atta for the resulting special support.

4. If you require a different support to be used as the master, select the support from the list and click the **Use Selected Support as Master** button.

5. Click on the **OK** button.

The list of supports is taken and the databases are configured so that the individual supports are created as one support under the new name.

2.19.3 Creating a project special support

A project special can be copied into an existing special framework. This speeds up the process of creating a special support with a complicated configuration and can be used repeatedly on a project.

Project specials are pre-defined in a site called /MDS/SPECIALS. This has three zones containing the respective special types:

- /MDS/SPECIALS/PIPE
- /MDS/SPECIALS/HVAC
- /MDS/SPECIALS/TRAY

Project specials for piping – /MDS/SPECIALS/PIPE zone

This zone contains all the available project specials for piping.

1. Select the Create from Atta option in the Create field on the Special Support form (Figure 34). The Special MDS Framework form (Figure 33) form is displayed.
2. Select the  Copy Project Special icon. A list of the available templates is displayed (Figure 36).

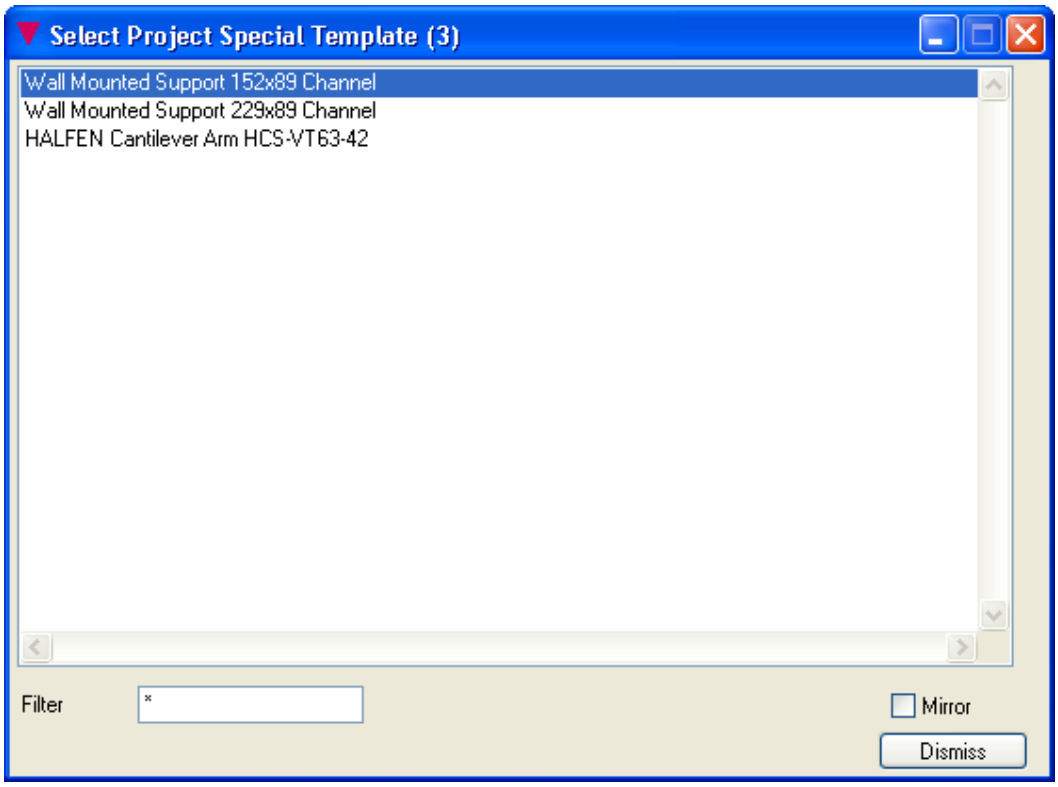


Figure 36 Select Project Special template form

3. Select the type of standard the steelwork configuration. This is copied to the datum support. An example of the selected support configuration is shown in Figure 37.

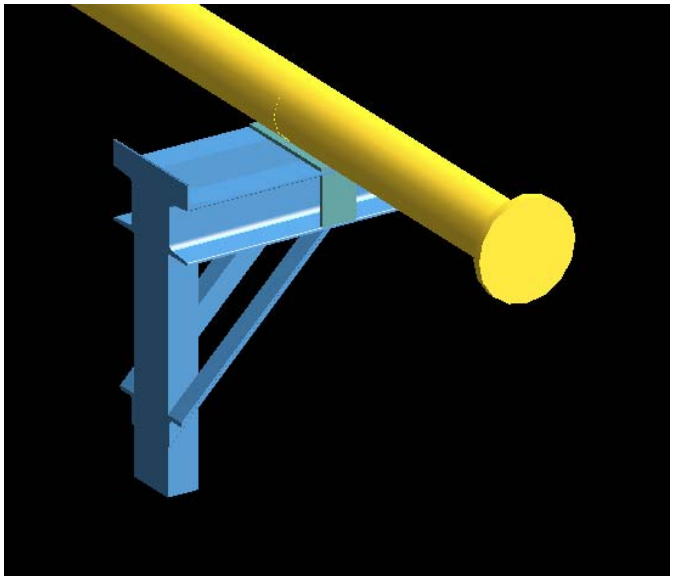


Figure 37 Example of a Project Special support configuration

When the application copies the steelwork, no resizing is performed. You must complete the special support according to your requirements.

Project specials for HVAC - /MDS/SPECIALS/HVAC zone

This zone contains all the available project specials for HVAC ducts.

1. Select the Create from Atta option in the **Create** field on the Special Support form (Figure 34). The Special MDS Framework form (Figure 33) form is displayed.
2. Select the Copy Project Special icon . A list of the available templates is displayed. This list is similar to that for piping (Figure 36).
3. Select the type of standard for the steelwork. The configuration is copied to the datum support.

   The project specials for HVAC are based on a 500mm by 500mm duct and the framework is modified to suit the new size of duct required.
4. Modify the interface points with other steelwork.

Note: The automatic support modification to suit the supported HVAC duct size on creation/selection is *only* available for the HVAC project special templates.

For more information on the configuration of these HVAC projects special frameworks, refer to the MDS document, *Framework Template Administration Guide*.

Project specials for tray - Zone /MDS/SPECIALS/TRAY

This zone contains all the available project specials for cable trays.

1. Select the Create from Atta option in the **Create** field on the Special Support form (Figure 34). The Special MDS Framework form (Figure 33) form is displayed.
2. Select the Copy Project Special icon . A list of the available templates is displayed. This list is similar to that for piping (Figure 36).

3. Select the type of standard the steelwork configuration. This is copied to the datum support.

When the application copies the steelwork no resizing is performed. You must complete the special support according to your requirements.

2.19.4 Creating a special SCTN from the copy section icon

The Copy Section icon  allows you to copy *any* SCTN member from the current special support, on all special supports.

Note: This is not restricted to the Copy Project Special option.

To create a special SCTN:

1. Click on the icon and the Identify Section to Copy prompt is displayed.
2. Select an SCTN member of the current special support.

   A message appears to indicate that the identified section has been copied and moved up 300mm. The section name becomes support name-Vnn.

You can copy as many SCTNS as required and if necessary use the standard Beams and Columns application to complete the design of the special support.

2.19.5 Including a section into a special support using the Include a Section into Special icon

The Include Special Section icon  allows you to include any SCTN member that is not part of the current special support into the current special support for all special supports.

To include the SCRN member:

Click on the icon and the Include Section into Special prompt is displayed.

The SCTN on the selection of an SCTN member is included in to the current support with its original name.

You can include as many SCTNs as required and, if necessary, use the standard for Beams and Columns application to complete the design of the special support.

2.19.6 Creating a stiffener box in a special support using the Create a Stiffener Box icon

The Create Stiffener Box icon  allows you to copy a Stiffener Box into the current special support for all Special supports.

To create a stiffener box, click on the icon.

This creates a substructure in the current special support named /supportname/SUBSnn with a BOX beneath in the hierarchy. It has a default size of XLEN 100, YLEN 100, and ZLEN 100.

You can create as many stiffener boxes as required and, if necessary, use the standard positioning menu to position the stiffener boxes to complete the design of the special support.

2.19.7 Modifying a stiffener box material or size from the Modify Stiffener Box Material/Size icon

The Modify Stiffener Box icon allows you to modify a stiffener box material/size that is part of any special supports.

To modify a stiffener box:

1. Click on the icon.
2. Select a stiffener box member. A list of all stiffeners is displayed (Figure 38).
3. Select each existing stiffener in turn in the **Select Stiffeners** list.

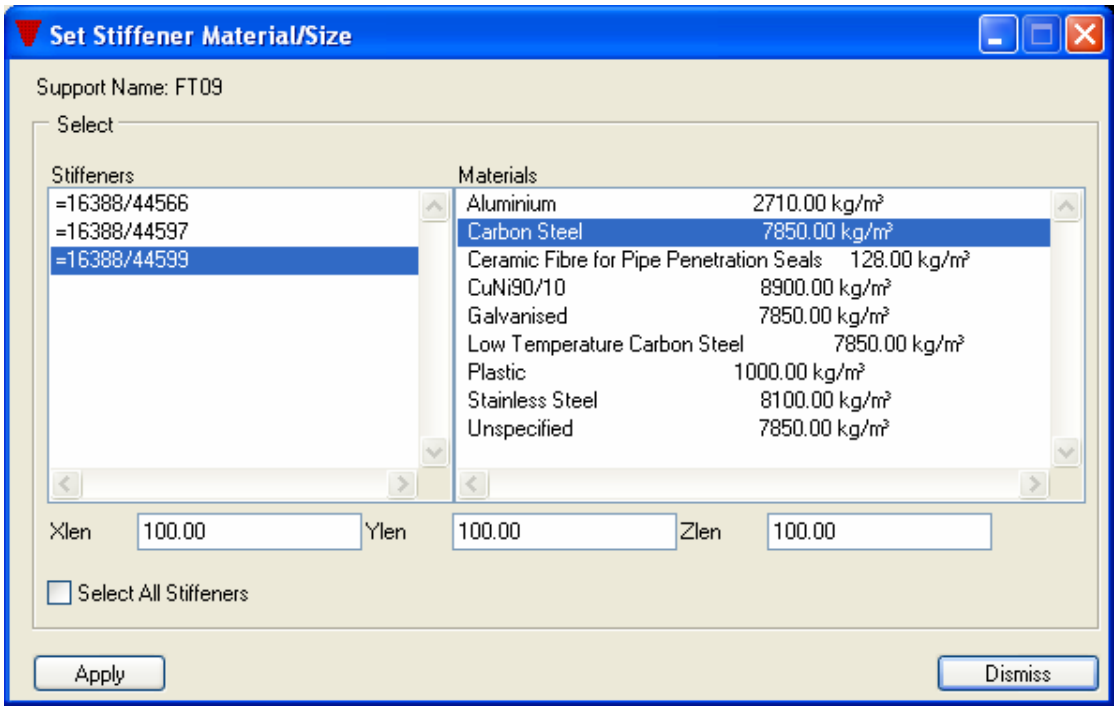


Figure 38 Set Stiffener Material/Size form

4. Modify the **Xlen**, **Ylen**, and **Zlen** dimension attributes.
5. Select all the stiffener elements using the **Select All Stiffeners** check box or individually select them from the **Materials** list.
6. Select a material from which the stiffener is to be made. Click on the appropriate entry in the Properties Database.
7. If necessary, use the standard positioning menu to position the stiffener boxes to complete the design of the special support.

2.19.8 Moving an HVAC project special joint or SCTN with the Move a Project Special Joint/SCTN icon

The Move a Project Special Joint/SCTN icon allows you to extend certain SCTN ends depending upon the MDS template special configuration.

1. Click on the icon and the Identify Section/Joint to Move prompt is displayed.
2. Select a section and the Identify Element to Move prompt is displayed.
3. Select the item to move. The section end extends to the element selected.

Note: You are not allowed to select SCTNs that are part of the current special support.

2.19.9 Modifying a special section with the Modify Section icon

The Modify Section icon allows you to extend any special section SCTN end, rotate special sections using **Bangle**, flip special sections, and modify the special section justification.

1. Click on the icon and the prompt Identify Steelwork Member to Modify the position of the start or end is displayed.
2. Select a section and the Modify Special Section form (Figure 39) is displayed.

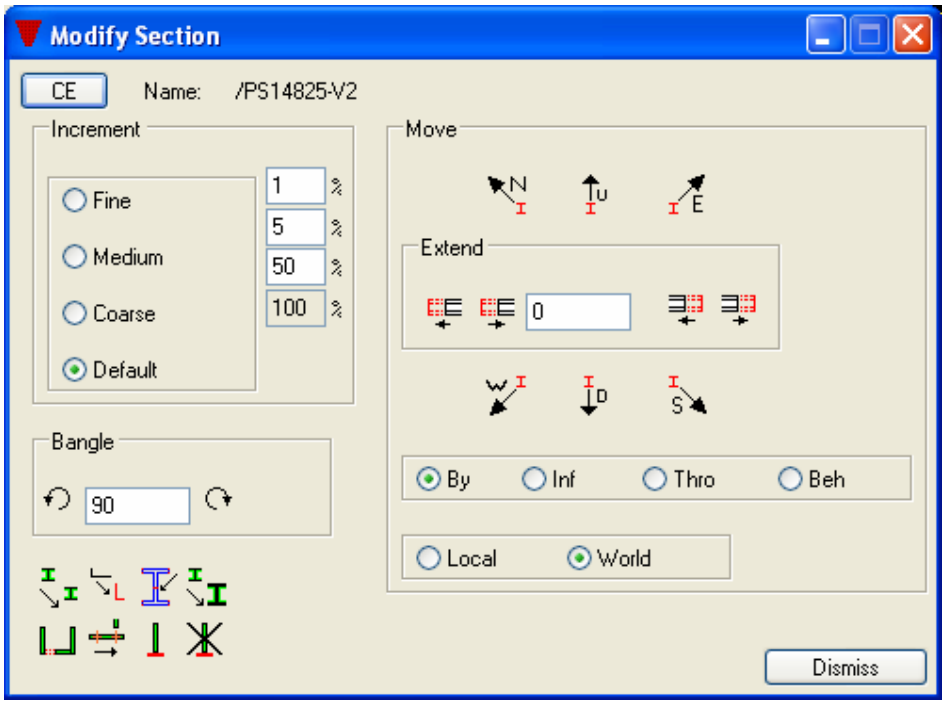
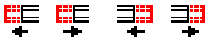


Figure 39 Modify Special Section form

3. Move each of the existing MDS sections in turn using the Move icons, for example

moves the current section north and  moves the current section down. The **CE** button allows you to change to other sections that are part of the special supports.

You can also extend or shorten the current section start/end by a distance you input in the **Extend** text field. Use the  icons to extend/shorten by the value you entered.

Note: The value you enter is treated as an absolute and therefore no positive or negative sign is required.

You can control the overall percentage movement and extension/shortening of the section using the Increment text fields.

The **Default** percentage field is set to 100%. If you select **Medium** percentage increment at 5%, the selected section is moved or extended/shortened by 5% of the **Extend** text field value. All of the **Increment** fields except the **Default** can be modified.

4. You can control the overall rotation angle using the **Bangle** text field. The default value is 90° and the maximum allowed is 180°.
5. Use these icons at the bottom of the form to perform further modifications:

 Modify the current section start/end position.

 Reverses the start and end of the section.

 Modify the current section justification.

 Modify SCTN size.

 Re-align support member.

 Align nodes.

 Add pad.

 Delete pad.

3 Trunnions

A trunnion is designed to a standard. A standard trunnion can have associated ancillaries, which are themselves standards. For instance, a trunnion standard XTT06-Base ELL, and pipe support variable NPS 2-36, requires a reinforcing pad where it is welded to the pipe. This pad is added to the design as a standard general ancillary XAT05-Reinforcing Plate cut from pipe.

Special notes: regarding reinforcing plates for trunnions

1. A plate is cut from an elbow of the same size and is itemized as extra material on the isometric view.
2. To get the best graphical representation of the plate and trunnion in Design, set Holes On and Arctol = 1.

   It is also possible to create just a trunnion branch (**Create>Trunnion**). This is a piece of tube (a new branch is created in the model), that can also have ancillaries associated with it (for example a u-bolt).

To create a standard trunnion:

1. Select the trunnion icon from the tool bar or select **Create>Trunnion...** from the main menu. The form shown in Figure 40 is displayed.

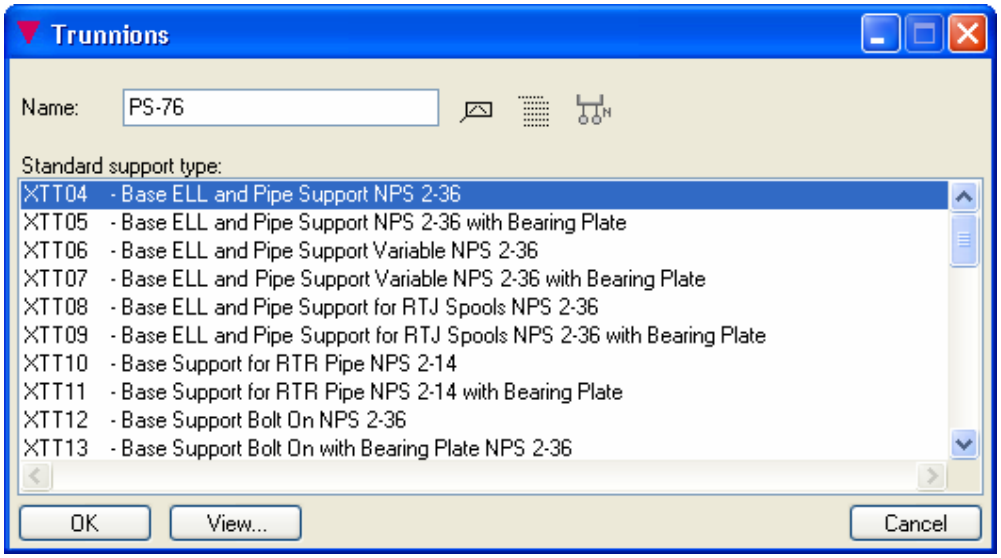


Figure 40 Trunnions form

2. Enter the name of the support to be created. You can also use the auto-naming feature by clicking on the AutoName icon .
3. Select the support type required.
4. Click on **OK** and the form is active.

Refer to the *MDS Administration User Guide* for further information.

Example:

In this example you will create support type XTT04 using the name XTT04.

The form shown in Figure 41 is displayed.

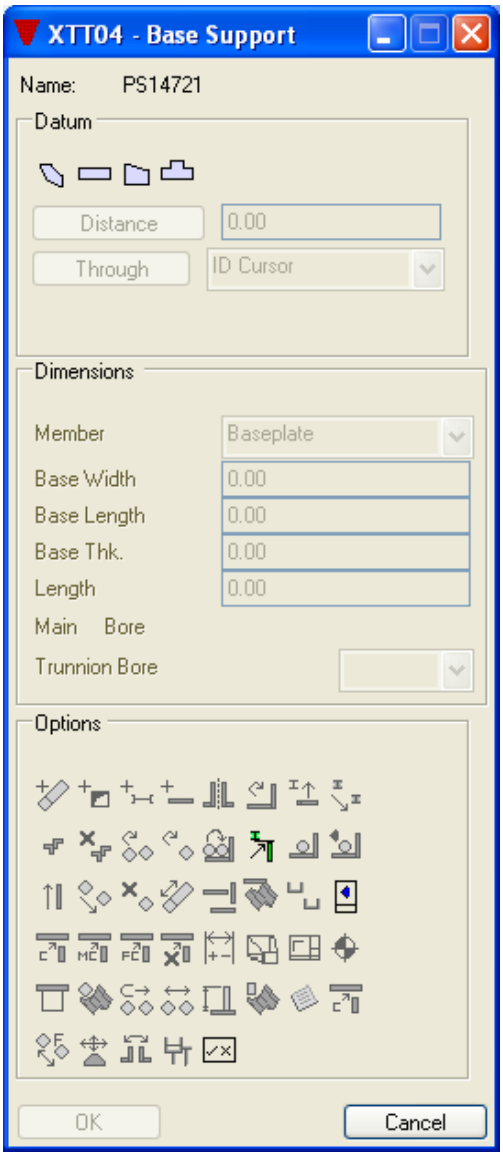


Figure 41 Trunnion Creation form

1. Select one of the following using the icons at the top of the form:
   - Elbow
   - Tube
   - Eccentric reducer
   - Cross
2. Use the cursor to identify a respective branch member applicable to the icon chosen (in this case identify ELBO to create a base support).

3. At the prompt, identify the steelwork you want to connect to. The Select Trunnion Material form shown in Figure 42 is displayed.

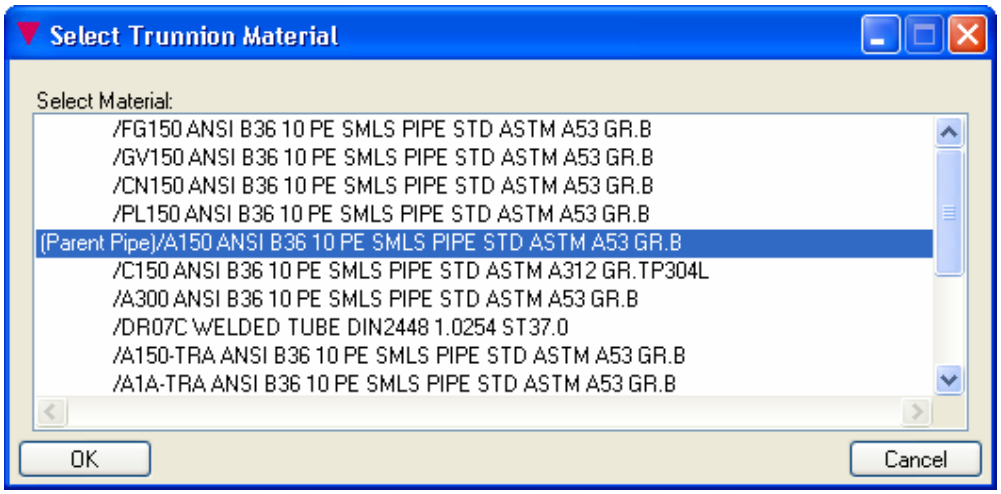


Figure 42 Select Trunnion Material form

4. Select the piping specification of the trunnion material from a list of the available piping specifications in the current MDB. The default pipe specification of the parent pipe (the main branch) is highlighted by default.

   If a trunnion is added to a reducer/elbow and no connection point is found, the current pipe specification is interrogated to find the appropriate reducer/elbow and the specification reference to the new reducer is reset.

   If a trunnion is added to a tee, the tee changes to a cross and scans the current pipe specification for a suitable cross. This is required because a tee has one only connection reference.

   If a trunnion is deleted, any element reselected is replaced with the original specification reference.

5. Click **OK** and the form shown in Figure 43 is displayed with the length and trunnion bores being active.

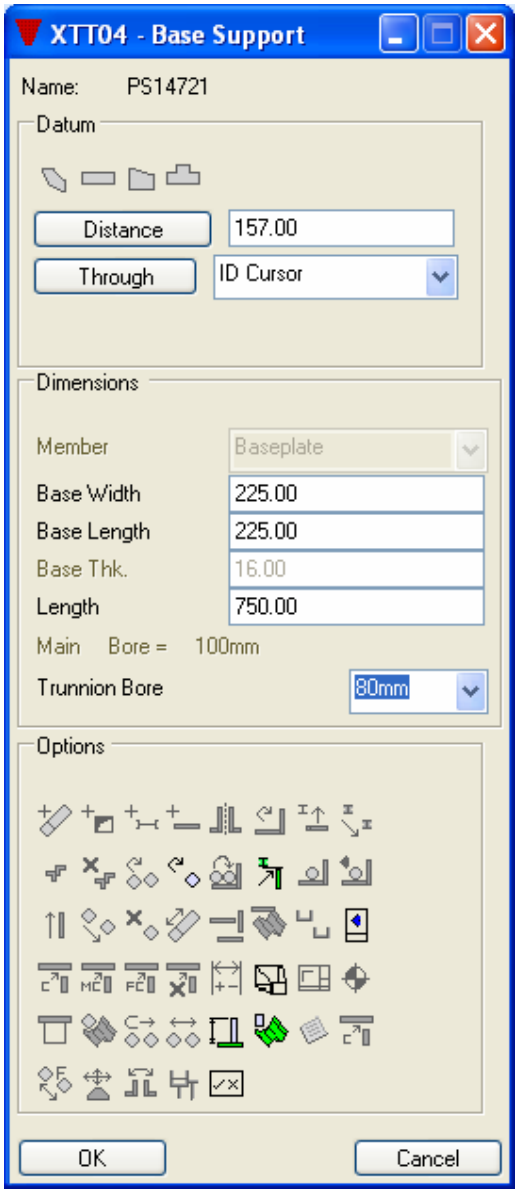


Figure 43 Trunnion Creation form (after selection of BRAN member)

4 Hangers

The standard MDS application for hangers allows you to create fixed and variable pipe hangers. The application is interactive and configurable, and simplifies:

- Definition of project related defaults.
- Control of hanger design.
- Determination of range, types, and configuration of hanger components that can be used on the project.

Hangers are designed using the hanger components catalogue of a given supplier and are template-driven.

The application is supplied with hanger templates from three different hanger component suppliers. The project administrator can configure and customize those templates to adopt any company's hanger configurations or any other hanger components catalogue. For further information refer to the *MDS Administration User Guide*.

4.1 Creating a hanger

There are two ways to access the hanger forms:

1. Click on a hanger icon,  or , from the tool bar,

   or…

2. Select the appropriate hanger from the **Create** drop-down menu (Figure 44).

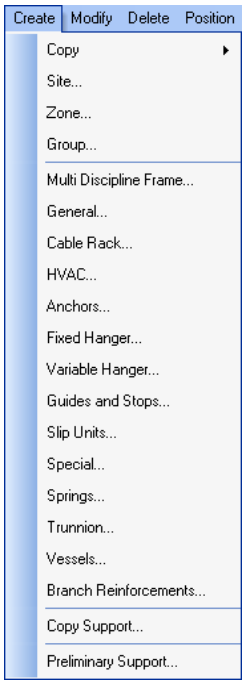


Figure 44 Create menu

3. Choose Fixed Hanger to display the form shown in Figure 45. This shows all the available hanger configurations that can be created.

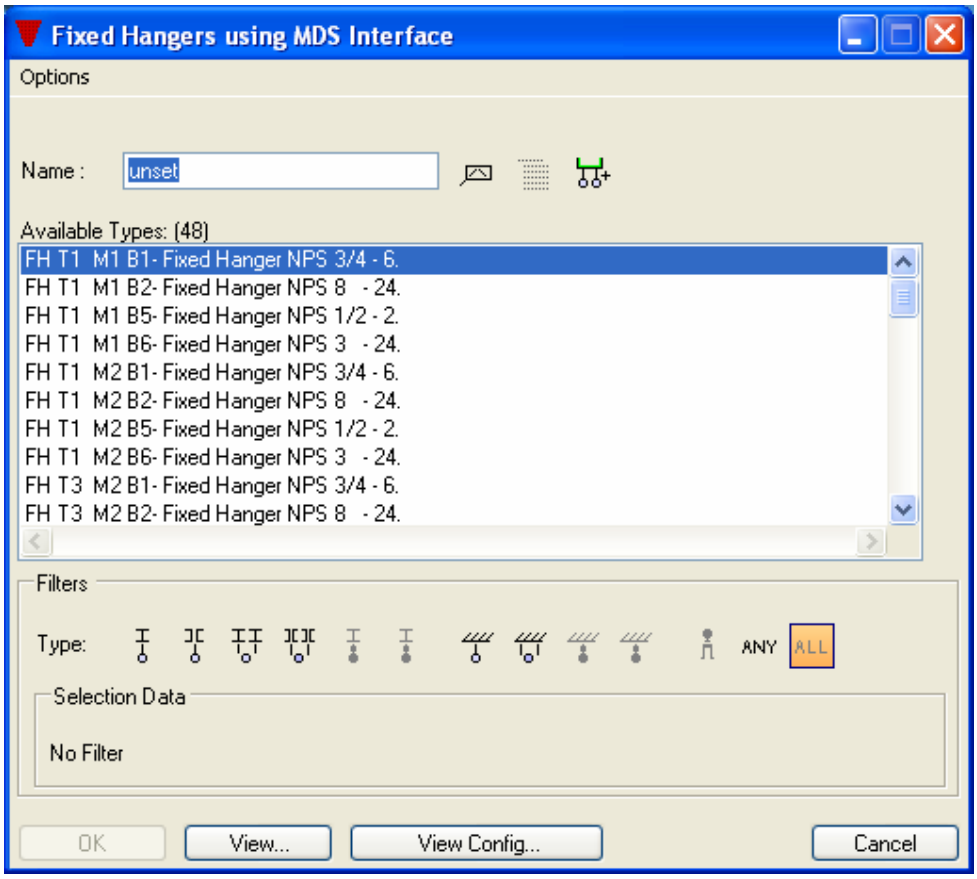


Figure 45 Fixed hangers configuration form

The available types can contain three prefix characters:

- T (Top)
- M (Middle)
- B (Bottom)

Example:

A T1 M2 B4 hanger means that the hanger has a T1 type top connection, M2 type middle connection, and a B4 type pipe connection.

These types of connection can represent the components from different supplier catalogues or different company standards.

1. Enter the name of the hanger to be created. You can also select the AutoName icon to name the support. Refer to the *MDS Administration User Guide* for further information.
2. Click on **OK**. The form becomes active.
3. Select a hanger type from the list.
4. Click on **OK**.

5. Identify the pipe to support and the steelwork beam (if relevant to the selected hanger type) to connect the hanger to.

   Since the list of hanger types contains all the hangers available, regardless of the pipe size, the pipe insulation, and the type of the steelwork connection, you may find that the hanger type selected is not suitable for the pipe to support or is not suitable for an insulated pipe. Avoid this situation by using the filters at the bottom of the form (see Figure 45). This is described in 4.1.1.

4.1.1 Using the filter buttons

The filter buttons (Figure 45) filter the list of available hanger types by the following filtering criteria:

- Hanger category
- Pipe size
- Pipe insulation (YES/NO)
- Top beam type

There are ten filtering categories represented by the following ten buttons:

	Single hangers connected to the bottom of a single beam.		Single hanger connected to civils.
	Single hangers connected to the top of a double-channel beam.		Two hangers connected to civils.
	Two hangers connected to either one or two beams.		Dynamic hanger connected to civils.
	Two hangers connected to either one or two double channel beams.		Angulating spring support to civils.
	Dynamic hanger connected to the bottom of a single beam.		Bottom of pipe supports.
	Angulating spring supports to the bottom of a single beam.	ANY	Show all hanger types for the selected pipe.

By default the ALL filter is activated and the form displays all available hanger categories.

To filter the list, click on one of the filter buttons. The application then prompts you to take further action depending on the filter selected.

View: enables you to display the standard data sheets for the selected hanger.

View Config: displays a 3D view of the selected hanger configuration to enable early model appreciation of the configuration selected.

Example:

1. Click on the  filter (single-hanger connected to a beam). The application prompts you to identify the item you want to support.
2. Identify the item.

Note: At any stage, you can press the **Esc** key to escape the application prompt.

The tube size and the insulation thickness of the identified pipe are displayed in the selection area just below the filter buttons. This area shows the current selection data. The list displays the available hanger configurations for the selected category (single-hanger connected to a beam), pipe bore size, and insulation thickness.

The application prompts you to identify the steelwork beam you want to connect the hanger to. The identified beam type is appended to the selection data in the form selection area.

In the case of double-hangers, or hangers connected to a double-channel beam, the application prompts you to identify the required additional beams.

The form displays a filtered list containing only the hanger configurations that meet the selection criteria (Figure 46).

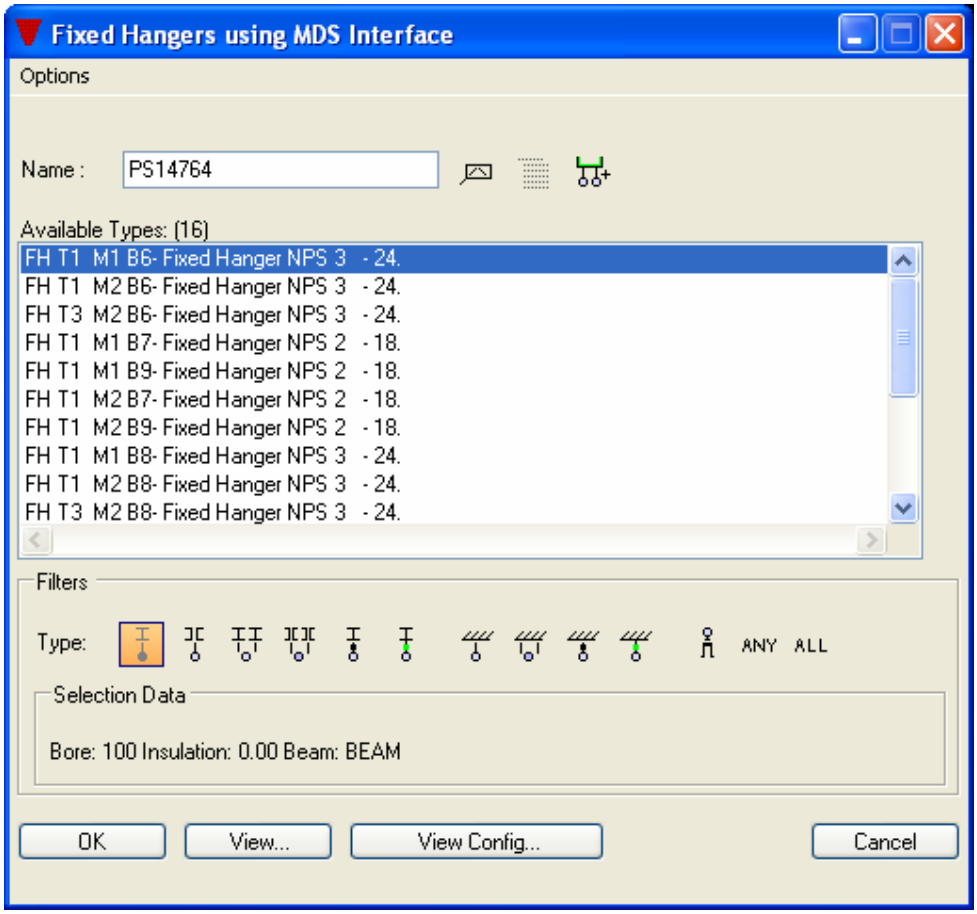


Figure 46 Filtered hanger configurations form

3. Enter the hanger name in the Name input field. You can also use the auto-naming feature by clicking the AutoName icon .
4. Click **OK**.

4.2 Selecting a creation mode

The Hangers form (Figure 47) offers three modes to create hangers.

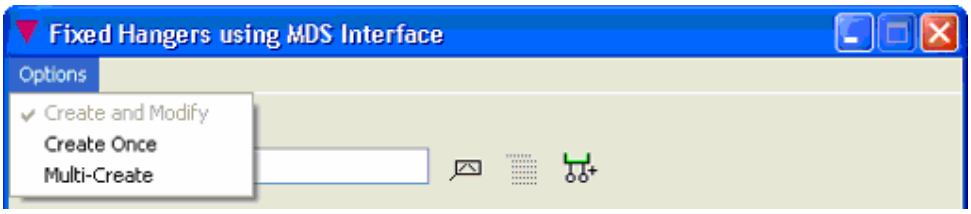


Figure 47 hanger creation options

The options are:

Create and Modify (default mode)

1. Enter the hanger name in the Name input field. The application displays the hanger form (Figure 48).
2. Modify, accept, or cancel the hanger.

If you require another hanger, re-display the Hangers form.

Create Once

This mode creates multiple hangers of the same configuration, or of different configurations, using a minimum of keystrokes.

1. Identify the pipe and the beam(s) required.
2. Click **OK**. The application creates the hanger and activates the ALL button of the hanger configurations form:
3. Enter the name of the next hanger (if any).
4. Click on a filter button.
5. Identify the tube and the beam(s) and create the next hanger. The hanger can be cancelled or modified only by first accepting it and subsequently deleting it or modifying it. Refer to ‘Modifying a hanger' (section 4.4 on page 54).

Multi Create

This mode quickly creates multiple hangers of the same configuration.

Click **OK**. The application creates the hanger and prompts you to select a new pipe and beam(s) for the next hanger. The hangers are named automatically using the naming convention set by the application administrator.

Example:

In this example you will create a hanger configuration of type T1 M2 B6. You will use the name HANG1.

1. Confirm that the current create mode is Create and Modify.
2. Click **OK**. The form shown in Figure 48 is displayed.

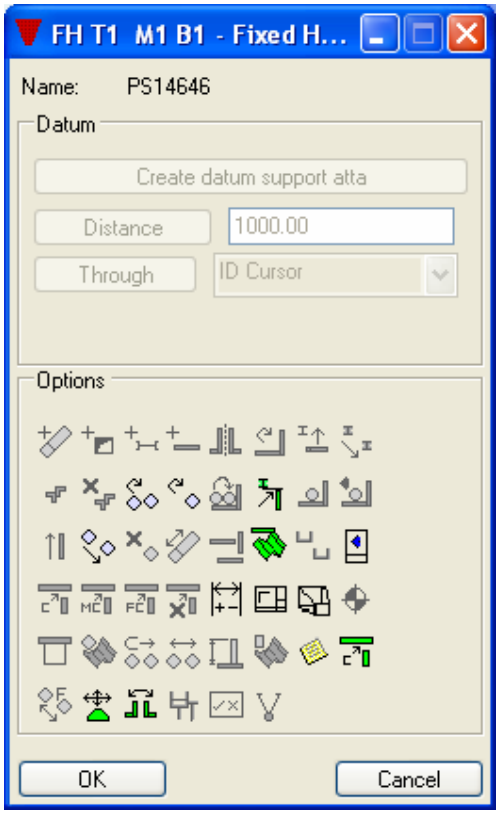


Figure 48 hanger form

The application creates the hanger using the data entered in the hanger configuration form.

If the selected beam intersects with the pipe, then the hanger is positioned at the intersection point. In this case the **Distance** and **Through** buttons become deactivated as the hanger cannot be moved while it is connected to the beam.

You can still move the hanger using the Reconnect to another Beam icon .

If the beam selected is parallel to the pipe, the hanger is positioned as close as possible to the start of the identified beam.

The application tries to locate the position by moving the hanger along the beam until the hanger can be connected vertically.

If the application cannot find a valid connection point on the beam, then an error message is issued and you are allowed to select another beam.

If a valid connection point is found, then the application creates the hanger. In this case the **Distance** and **Through** buttons become activated, allowing you to modify the position of the hanger. Moving the hanger with these buttons also moves the steelwork connection point(s) and associated fitting(s) accordingly.

When creating the hanger, the application does the following:

- Creates an atta in the identified tube.

  The atta name is the same as the hanger name. If the hanger configuration is such that the hanger is connected directly to the pipe, then the hanger is connected to this atta.

  If the hanger configuration is such that the hanger is connected to the pipe through a

trunnion, a welded lug, or any other standard pipe support, then the hanger is connected to the atta of the standard support. The Stex attribute of the hanger atta is set to: Connected to <standard_support_name>. In this case the cref attribute of the hanger atta remains not set.

- Creates the fitting(s) as a member(s) of the steelwork section(s). In the case of a double-channel beam, the fitting is created in only one of the steelwork sections. The name of the fitting is the name of the hanger appended by /FITT/H and by the fitting sequence number (for instance: /HANG1/FITT/H1).
- Creates the hanger and connects it to the atta and to the fitting.

4.3 Ending the creation of a hanger

To end the creation of a hanger:

1. Click **OK** to accept the new hanger.

   or…

2. Click **Cancel** to cancel the new hanger.

You can also use any of the additional icons of the form to perform additional actions such as changing the hanger configuration, rotating the hanger components, or displaying the hanger dimensions.

4.4 Modifying a hanger

After you have created a hanger, you can modify it either just before or after you accept it.

In the later case, re-display the hanger form:

1. Select **Modify>Support…** from the main menu. The Modify support form (Figure 49) is displayed.

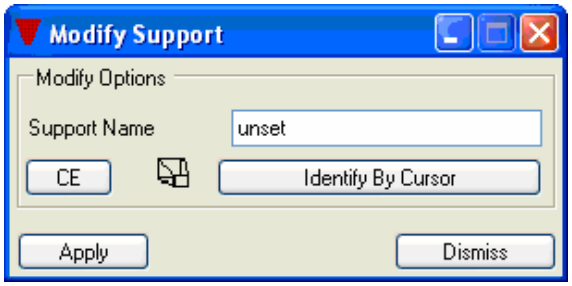


Figure 49 Modify Support form

2. Use one of these options to select the hanger:
   - Type a name into the **Support Name** text field.
   - Press the **CE** button to modify the current element if it is a support.
   - Click the **Identify By Cursor** button.

   In all cases, the name of the hanger is displayed in the support Name text field.
3. Click **Apply**. The hanger form, which is now shown, displays all relevant manipulation icons. For an overview of the icons see Table 2 on page 23.

4.4.1 Rotating all hanger members

All hanger members that can be rotated, rotate about the world z-axis by the given angle. If the hanger has a configuration with more than one hanger, the application prompts you to identify the hanger to rotate.

To rotate all hanger members:

1. Click on the icon. The application displays the Rotate All Hanger Members form (Figure 50).

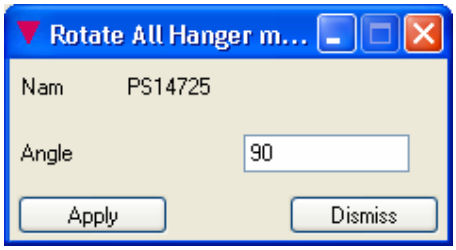


Figure 50 Rotate All Hanger Members form

2. Enter the angle in degrees by which you want to rotate the hanger.
3. Click **Apply**.

4.4.2 Rotating a hanger member

The hanger member rotates about the world z-axis by the given angle. Some components cannot be rotated, in which case the application issues a message to that effect.

Other components can only be rotated together with adjacent components, determined by the application itself. In this case all affected components are rotated.

To rotate a hanger member:

1. Click on the icon on the hanger form. The application displays the Rotate One Hanger Member form (Figure 51).

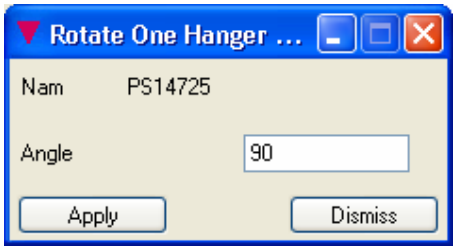


Figure 51 Rotate One Hanger Member form

2. Enter the angle in degrees by which you want to rotate the hanger member.
3. Click **Apply**.

4.4.3 Additional modification options

To make additional modifications click on the icon on the hanger form. The Modify Hanger form (Figure 52) is displayed.

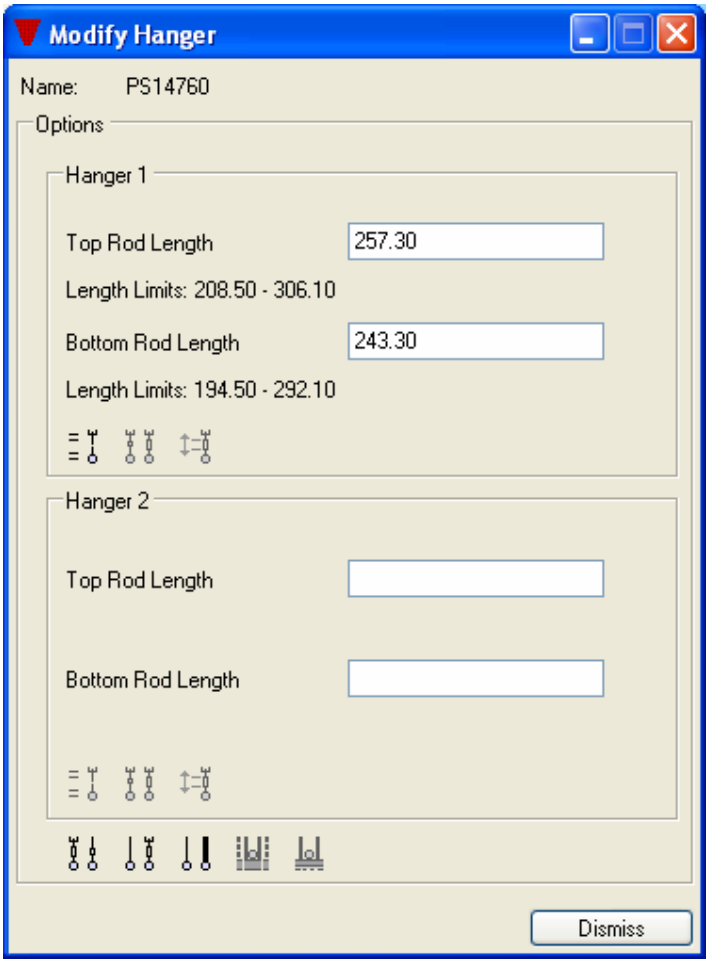


Figure 52 Modify Hanger form

Note: Some of the buttons shown in Figure 52 are deactivated because they are not applicable to the current hanger configuration. The action of all buttons is described later in the section.

Changing rod lengths

The hanger type associated with the hanger form shown in Figure 52 is a fixed single hanger with a turnbuckle and two rods.

You can:

- Change the rod lengths.
- Make the rod lengths equal.
- Change the hanger's configuration (still leaving it as a fixed hanger).

- Transform the fixed hanger to a variable hanger.

Each of these options is discussed in detail. As you proceed, additional buttons become activated and are explained.

To change the rod length:

- Enter the required length in the appropriate input field. The rod length is modified accordingly.

  Each rod has a minimum and maximum allowed length. These values depend on the limits set by the MDS Administrator. Refer to the *MDS Administration User Guide* for more information.

  Changing the length of one rod automatically updates the length of the other rod, such that the total hanger height does not change.

To make the rods lengths equal:

- Click on the  icon.

Modifying the hanger configuration

You can change the hanger configuration with the following restrictions:

- The new and existing configurations must have the same basic connection types. A configuration in which the hanger is connected to the pipe using a pipe clamp can have its configuration changed to a similar configuration with a different type of pipe clamp. However this configuration cannot be changed to a hanger with a connection to a pipe lug or an elbow trunnion. The converse situations are also true.
- If the type of connection to the steelwork of the new configuration is different from that of the existing configuration, the application prompts you to identify the steelwork section(s) accordingly.

To modify the hanger configuration:

1. Click on the  icon. The MDS hanger configurations form opens with the appropriate filter is activated. In this case it is the first filter ().
2. Select a new configuration from the displayed filtered list, or click on another filter button and select another type of configuration.
3. For the purpose of this particular explanation, select the T3 M2 B6 configuration from the filtered list.

   The activated filter is not being changed. The application therefore tries to replace the current hanger configuration with the new configuration based on the current pipe and beam connections.

   If the new configuration has a different beam connection (for instance a double channel connection two beam connection for a double hanger), then the application prompts you to identify the beam(s) for the new connection type.
4. Click on the T3 M2 B6 hanger configuration.
5. Click **OK**. The MDS hanger configuration form closes and the hanger form is re-displayed.

   Note: The title of the form changes to reflect the new configuration.

6. Click on the icon. The Modify hanger form is displayed.

   The rod lengths are deactivated and cannot be changed because the T3 M2 B6 configuration has a fixed length welded eye rod. The bottom rod length cannot be changed either because to do so would change the total height of the hanger.

Changing the hanger type from Fixed to Variable

To change the hanger type from Fixed to Variable:

1. Click on the icon. The MDS Hangers configuration form is displayed. The form lists only variable hanger configurations. The active filter is the single-hanger filter ( ) because this is a single-hanger and the application assumes that in most cases you will modify the configuration within the same hanger category. You can change the category by clicking on a different filter icon. For the purposes of this explanation, the default filtered list is used.
2. Select the T10 M2 B6 configuration.
3. Click on OK. The MDS hanger configurations form closes and the hanger form opens. The hanger configuration changes and now contains a variable spring and a turnbuckle.
4. Click on the Modify hanger icon. The Modify hanger form is displayed and a new icon has been activated.
5. Click on the new icon. A selection form opens, listing spring sizes that are available for this specific spring type (see Figure 53).

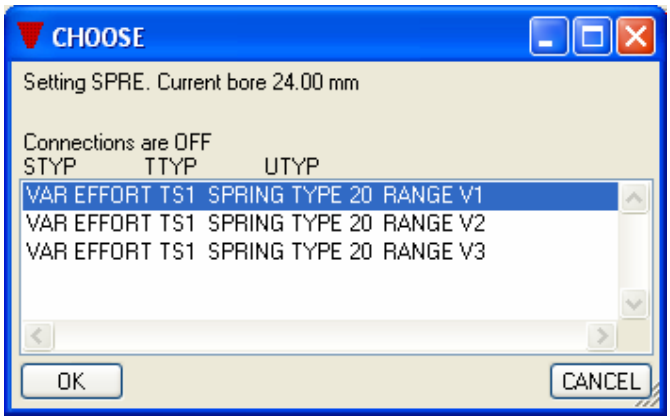


Figure 53 Spring Sizes selection form

6. Select the line for spring size 20.
7. Click **OK**.

The current spring is replaced with the new spring size. The rod lengths are updated automatically to allow appropriate space for the new spring size.

Optionally, you can now experiment with the other icons available in the hanger form. For instance, try to rotate the spring and notice that the application also rotates the beam-welding lug attached to it and the pin.

Viewing and hiding standard sheets

1. Click on the icon. The standard sheets for hangers are displayed.

2. Click on the same icon again. The standard sheets for hangers are hidden.

Viewing and hiding hanger dimensions

1. Click on the  icon. The hanger dimensions are displayed.
2. Click the same icon again. The hanger dimensions are hidden.

ADP Drawlist control

You can modify the ACP Drawlist in the Design module.

The hanger steelwork and all its associated members are added by default. You can add up to ten extra elements to associate additional steelwork that does not belong to the hanger.

Centre on hanger

Click on the  icon. The graphical view of the support being created or modified is refreshed. The view scale is not modified.

Re-connecting a hanger to a new steelwork beam

Click on the  icon. The hanger is connected to a new steelwork beam.

If necessary, the application moves the hanger to a new position, in order to satisfy the new connection point. The old fitting is deleted and a new fitting is created below the new steelwork section.

If necessary, and if the hanger contains rods, they are adjusted to maintain the correct hanger height.

If the new connection is not valid (for instance, the hanger is not vertical because the rods are too long or too short), an error message is displayed and the application restores the original hanger state.

Adding a note

Click on the  icon. You can now add a note to be displayed on the hanger drawing.

Quick reference notes about modifying hangers

- For a steelwork section that is parallel to the pipe, use the **Distance** or **Through** buttons. This is not considered as a reconnection action since the fitting only moves to the new position. It is not replaced with a new fitting.
- For double-hangers, there is one connection for each hanger. The application prompts twice for the two beams. If only one connection needs to be modified, then for the connection that you do not want to modify, identify the first beam again. The hanger is re-connected to the same beam.
- For hangers that are connected to a double-channel beam, the application prompt twice to identify each of the channels. A check is made that the two identified channel sections form a valid double-channel beam (that is: the same top level, facing each other back to back).

4.5 Creating an MDS hanger using a manufacturer's interface

To be supplied by AVEVA.

5 Branch reinforcements

5.1 Creating a branch reinforcement

To create a standard branch reinforcement:

1. Select the Branch Reinforcements icon from the tool bar, or select **Create>Branch Reinforcements…** from the main menu. The Branch Reinforcements form (Figure 54) is displayed.

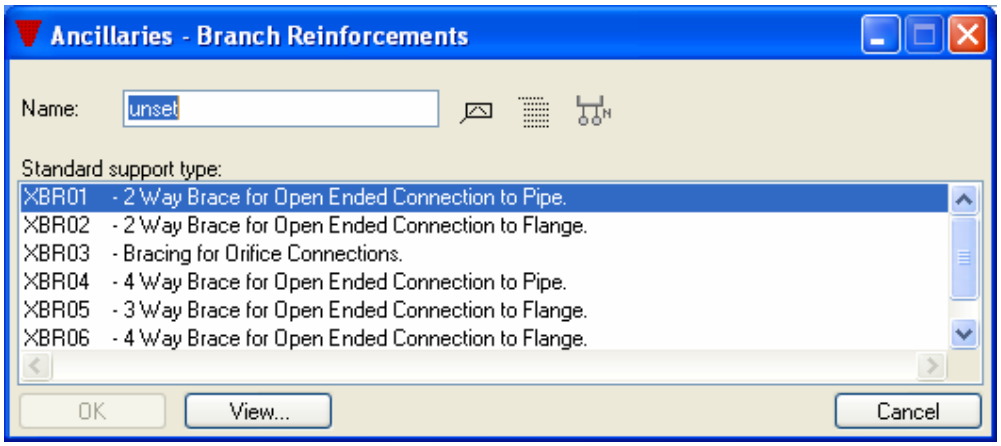


Figure 54 Branch Reinforcements form

2. Enter a name of the support to be created. You can also use the auto-naming feature by clicking on the icon. If a legal name is entered, the **OK** button on the form becomes active. Refer to the *MDS Administration User Guide* for further information.
3. Select the standard support type required.
4. Click **OK**. The support type form (Figure 55) is displayed.

Example:

This example demonstrates how to create a support type XBR04, using the name XBR04.

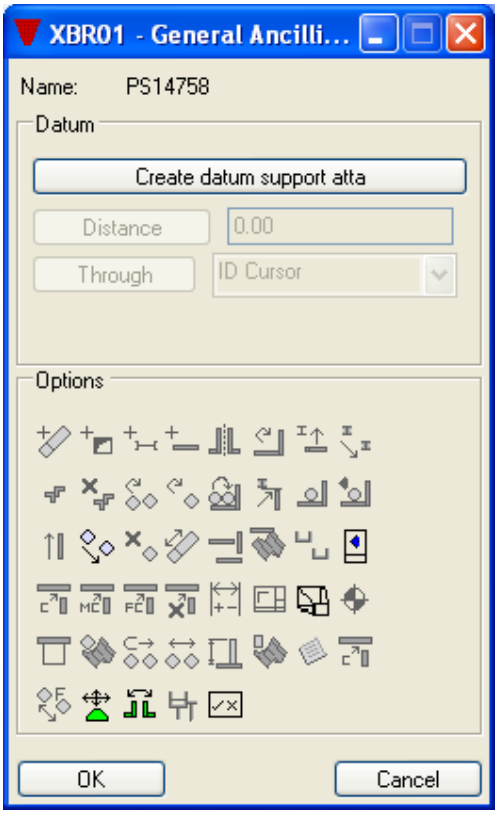


Figure 55 Example of a support type

1. Click the **Create datum support atta** button at the top of the form.

   Notice that the positioning fields are deactivated. The branch reinforcement is positioned through a series of prompted identification picks.

   For this branch reinforcement standard, a header tube is required. In this case it is one of the following:

   - Tee
   - Olet
   - Reducer
2. Select a header tube.
3. At the prompt, identify a second branch tube. This forms the vertical leg of the tube.
4. Click **OK** when you have finished the support

The application then performs a series of Integrity Checks to ensure the support is completed.

6 Preliminary supports

To create a standard preliminary support:

1. Select the preliminary support icon from the tool bar, or select **Create>Preliminary Support...** from the main menu. The Preliminary Supports form (Figure 56) is displayed.

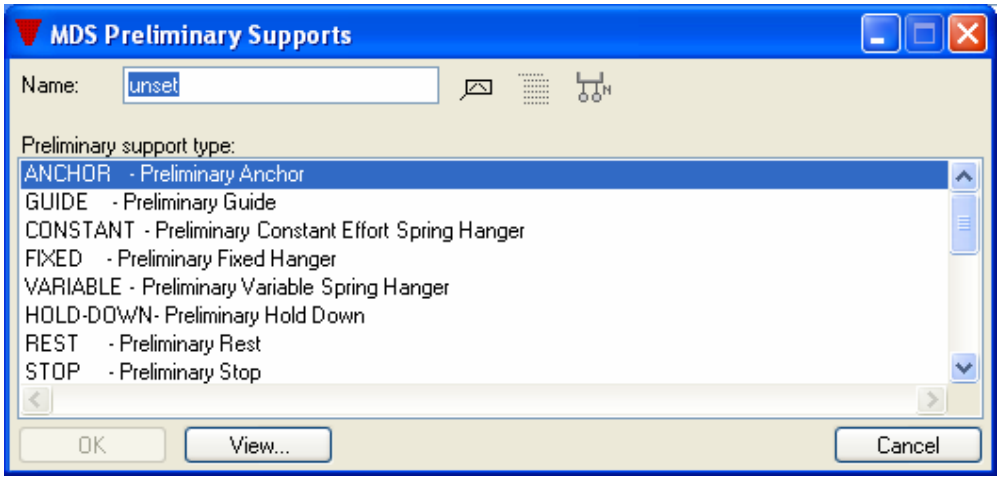


Figure 56 Preliminary Supports form

2. Enter a name for the support to be created. You can also use the auto-naming feature by clicking on the icon. If a legal name is entered, the **OK** button on the form becomes active. Refer to the *MDS Administration User Guide* for further information.
3. Select the support type required.
4. Click **OK**. The Preliminary Support creation form (Figure 57) is displayed.

This form contains all of the available 18 preliminary supports, according to the MDS Application default file DES-SUPP-DEFS, which is located in the project default directory. Any support names and descriptions can be modified in this file. Refer to the *MDS Administration User Guide* for further information.

Example:

This example demonstrates how to create a support type ANCHOR using the name PR-A.

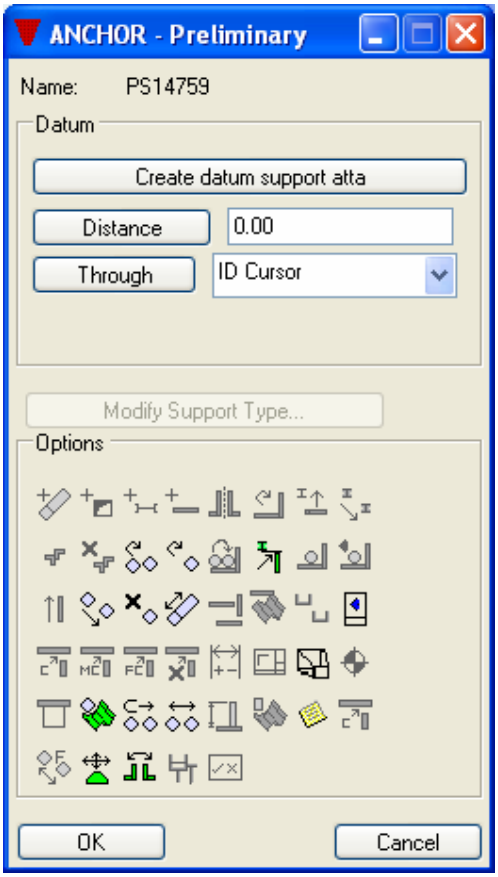


Figure 57 Preliminary Support creation form

1. Select the **Create datum support atta** button at the top of the form.
2. When prompted by Identify tube of pipe, make a suitable selection.
3. Position the preliminary support atta in the pipe. Do this in one of these ways:
   - Use the **Distance** button with a distance value in the text field
   - Use any of the available options available with the **Through** button
4. Click **OK** when you have finished the support.

   A graphical **X** identifies the preliminary support position.

7 Welding application

The Weld application provides welds for:

- Ancillaries (for example u-bolts and clips)
- Sections
- Joints

Welds for ancillaries and joints are created in the MDS catalogue project by the project administrator. Most of the framework welds for sections and joints are also created in this way. However, some welds are not part of the template and must be created by you during support creation.

The creation/modification/deletion of welds is explained in the following sections.

7.1 Creating a weld on a framework or special

To create a weld:

1. Select the Create Weld icon from the MDS Framework or Special Framework form. The Framework Weld Selection form (Figure 58) is displayed.

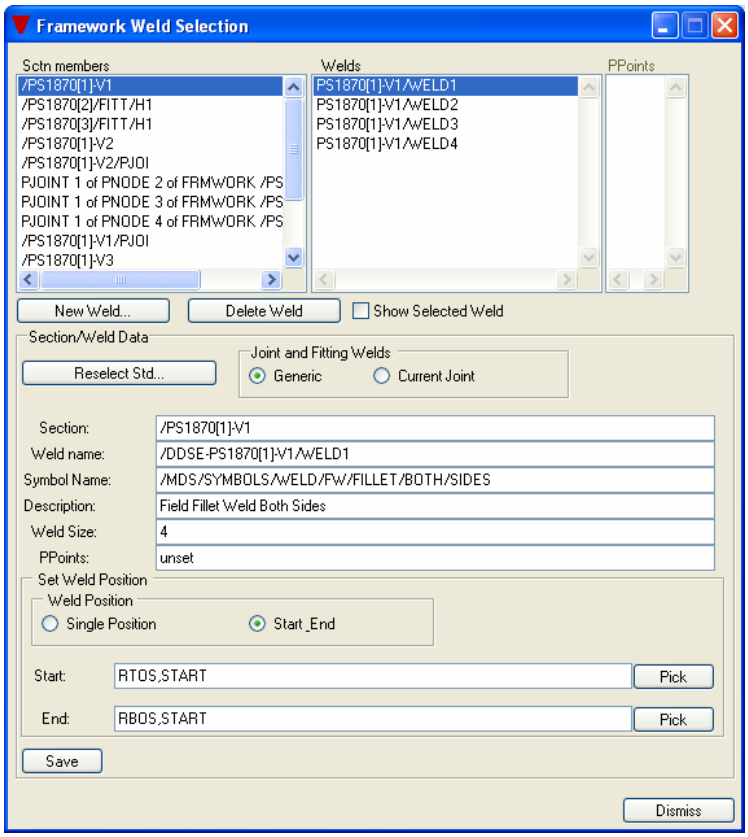


Figure 58 Framework weld selection form

All Welds created or modified are stored in a TMPL at the STRU level of the support in your database. They are displayed together with all relevant welding information in the weld list, such as shown in Table 3.

Section:	The name of the section with which the Weld is associated.
Weld name:	The name of the weld as stored in the TMPL in your database.
Symbol Name:	The name of the symbol as used in Draft on the MDS drawing.
Description:	Text to describe the weld type.
Weld Size:	The size of the weld that is output on the MDS drawing.

Table 3 Example of a Weld list

2. Click on **New Weld**. The Select Standard Weld form (Figure 59) is displayed.

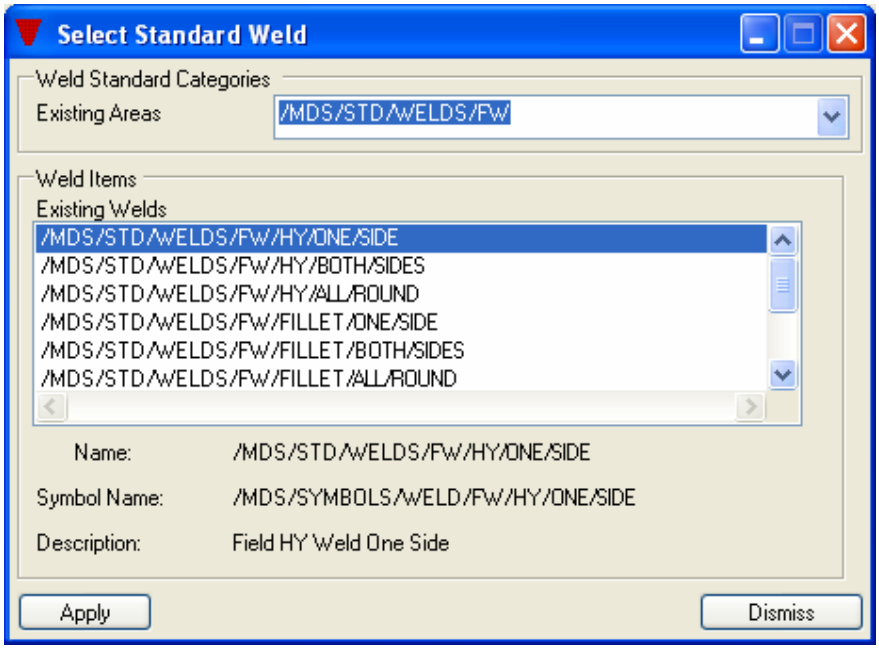


Figure 59 Select Standard Weld form

Standard welds provide a method of selecting the weld symbol for use in draft on the MDS drawing.

3. Select the Weld.
4. Click **Apply**.

   Nothing happens in the database at this point. Information is passed from the Standard Welds form into the Framework Weld form.

5. Click on **Save** on the Framework Weld selection form (Figure 58). The selection is written to the database.

7.2 Positioning welds on a framework or special pick

Note: A weld must be positioned before saving.

There are two methods of positioning welds using weld position buttons on the Framework Weld Selection form (Figure 58). They are:

- Single Position
- Start & End

To position a weld:

1. Select either **Single Position** or **Start & End** radio button.
2. Select **Pick** on the Framework Weld Selection form (Figure 58). In either case, the Set Weld Position form is displayed. Welds can be made on either a single Pline or on Pline Intersections.

Single Pline

For single position welds, the Set Weld Position form is as shown in Figure 60.

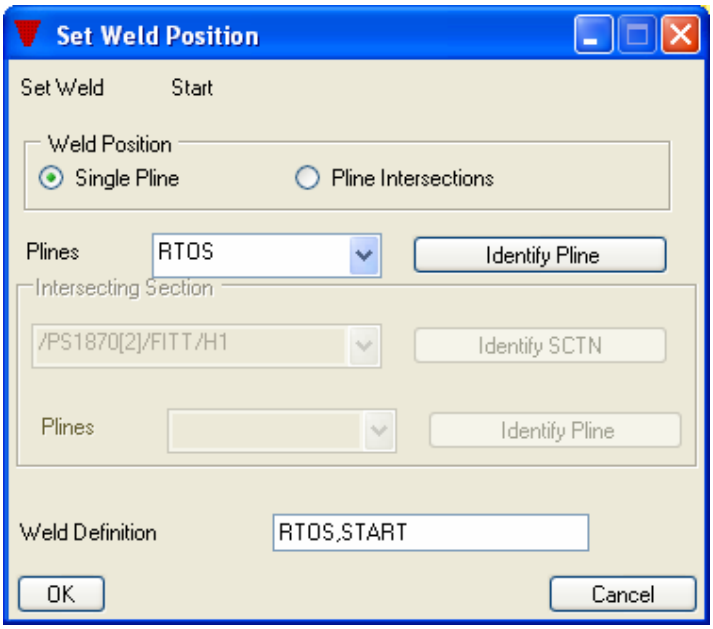


Figure 60 Set Weld Position form (single Pline)

On the Set Weld Position form:

1. Select the **Single Pline** radio button.
2. Click the **Identify Pline** button.
3. From the drop-down menu, select the Pline that requires the weld.

   The selected Pline, and start or end (as appropriate), appear in the Weld Definition text field.

   In this particular case, RTOS is the name of the selected Pline and START is the position of

the selected section.

If you want to define a weld at an intersection, go to 'Pline Intersections' below.

Pline Intersections

On the Set Weld Position form (see Figure 60):

1. Select the **Pline Intersections** radio button. The available intersecting sections are populated in the list and the Set Weld Position form appears as shown in Figure 61.

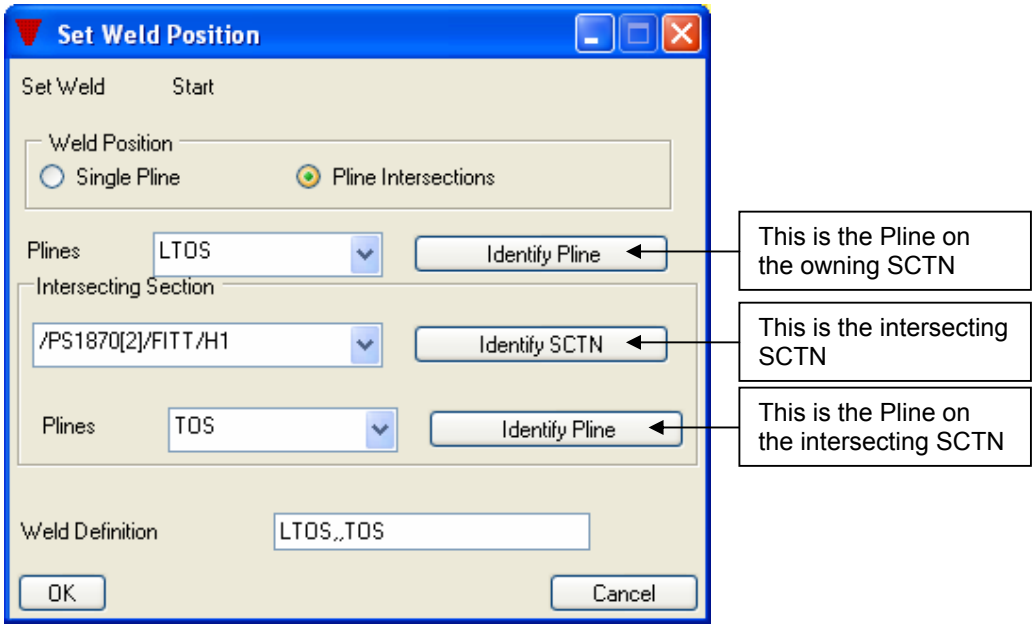


Figure 61 Set Weld Position form (Pline Intersections)

2. Click on the upper **Identify Pline** button and select the first (owning) Pline that requires the weld.
3. Click on **Identify SCTN** button and select the section containing the intersecting Pline.
4. Click on the lower **Identify Pline** button and select the intersecting Pline.

8 Isometric material list control

You can exclude selected items from the Isometric Material List. For example:

- Individual ancillaries (including the DATUM atta)
- Ancillaries on other branches belonging to the support
- The support frame itself

To access the Isometric Material List Control facility:

1. Click on the Isometric Control icon from any of the support forms. The Isometric Material List Control form (Figure 62) is displayed.

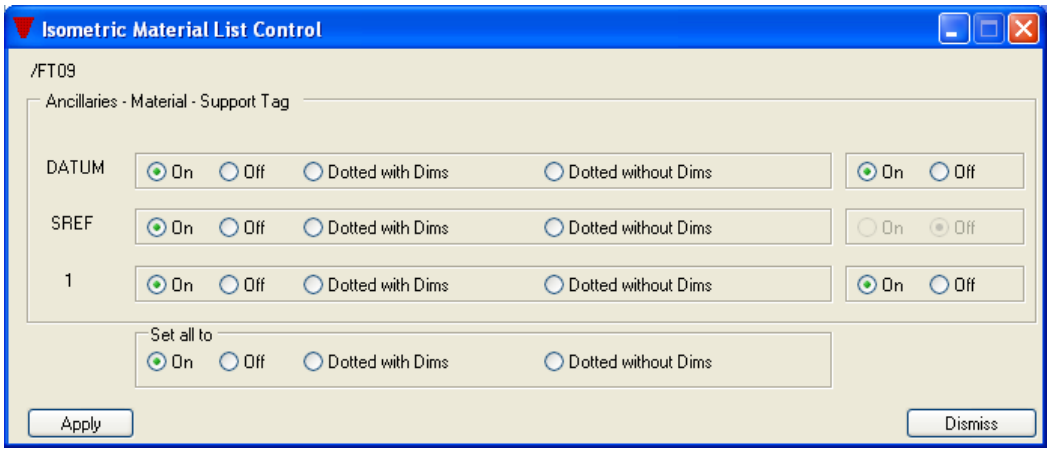


Figure 62 Isometric Material List Control form

2. Set the Ancillaries to **On** or **Off** as required.

   Note: You can also exclude the support frame from a piping branch Isometric Material List by setting the **SREF** ancillary to **Off**.

3. Optionally, you can exclude ancillaries or the support frame and either draw them dotted and dimensioned, or draw them dotted and non-dimensioned.

9 Data access control

In previous releases, the method of controlling data access was handled by the teams owning the database mechanisms. At release 11.6 this still applies, but new access control features allow you to specify in additional detail what operations a user can carry out on elements in the database. This is known as Data Access Control (DAC).

Note: To use DAC it must be switched on for the project, otherwise only the teams owning database controls will apply.

With DAC switched on, all general users are prevented from carrying out any operation on any part of the database unless they have specifically been given the necessary access rights. DAC uses the following new administration database elements:

- **Role** defines the type of operations a user can carry out. For example, creating, modifying and deleting elements. Roles are defined as a collection of permissible operations (Perops).
- **Scope** defines the part of the database in which a user can work.
- **Access Control Rights (ACRs)** are a combination of a role and a scope. Users can, and usually will, have several ACRs, allowing them to carry out specified operations on specified parts of the database.

9.1 Application entry

When you enter the application you are presented with a list of zones where you can create structure elements. If no such zones can be found the application does not start and an error message is displayed.

9.2 Create mode

When you select a pipe to create an ancillary, the application first checks if it can claim the branch. If it cannot claim the branch, then an error message is displayed. A check is made at branch level because another user can modify the branch while it is being supported. This can compromise the integrity of the model because you may move the branch leg that is being supported.

If you can claim the element, then a further check is made to see if you have sufficient access rights to create an atta. If you do not have sufficient access rights, then an error message is displayed.

In create mode you may decide to create the connections to structural steel. A check is made to determine whether or not you can:

- Claim the steelwork
- Create SNOD elements

If you can do neither of these, then the Create, Modify, Force Connect, and Delete icons are deactivated.

If you can create a support, you are allowed to modify or delete the same components that have been created and to modify or delete additional components (for instance: elbow, reducer, bend).

9.3 Additional requirements for MDS with DACS

In the creation of dummy branches and trunnions you may be required to create and set attributes of other piping components. These are:

Create

Branches	For the creation of dummy legs/trunnions.
Tees	For the creation of dummy legs/trunnions to straight pipe.
Cross	For the creation of dummy legs/trunnions to straight pipe.

Modify

Elbow	ARR, LEA, CREF, ORI.
Reducers	CREF.
Tees	All attributes for tees.
Cross	All attributes for crosses.

10 Application data sheets

The MDS application is supplied with a series of support data sheets. These are used as the default set of support configurations. The default files supplied with the application reflect the dimensions and properties specified in these data sheets.

The dimensions and properties can be changed from their default values for specific office or project environments. Refer to the *MDS Administration User Guide* for more information.

Note: The support data sheets MUST NOT be considered to be the master office or project support standard. The office or project must still use their own support standards and configure the default files to suit their own requirements. These are described in the *MDS Standard Supports* document.

11 MDS Wizard

The MDS Wizard helps you to quickly identify pipes, structural sections, and equipment.

1. Select **Utilities>MDS Wizard…** from the main menu or click on the Wizard icon on the main tool bar. The MDS Wizard form (Figure 63) is displayed.

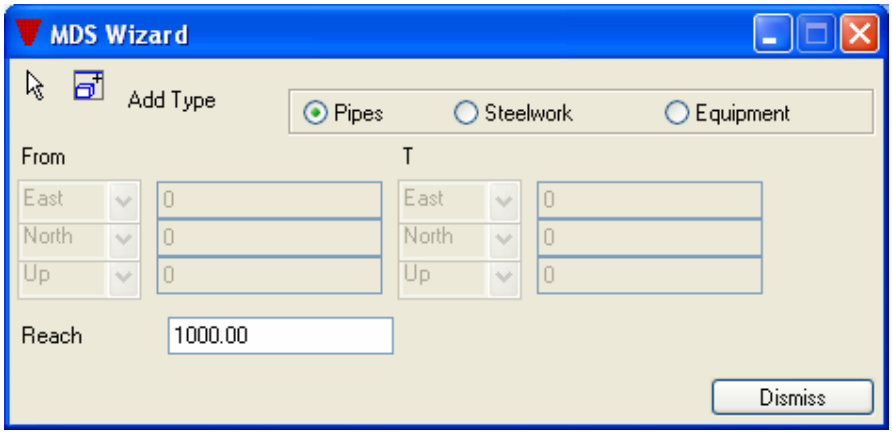


Figure 63 MDS Wizard form

2. Select an **Add Type** option to determine the type to be searched for and added to the graphical view. The following mutually exclusive toggle types are available:
   - Pipes
   - Steelwork
   - Equipment
3. Click on the **Cursor** icon and identify an element to use as the datum of a volume. This is called the Reach Box. A graphical representation is added, identifying the volume to be used.
4. Enter a value in the **Reach** field. Modify this value to make the reach box smaller or larger.
5. Click on the Drawlist icon . The application searches within the reach distance from the element and adds all the selected types found to the Drawlist.

12 MDS reports

12.1 Basic report

To create a basic Report:

1. Click on the Report icon from the tool bar or select **Utilities>MDS Reports...** from the main menu. The MDS Reports Menu form (Figure 64) is displayed.

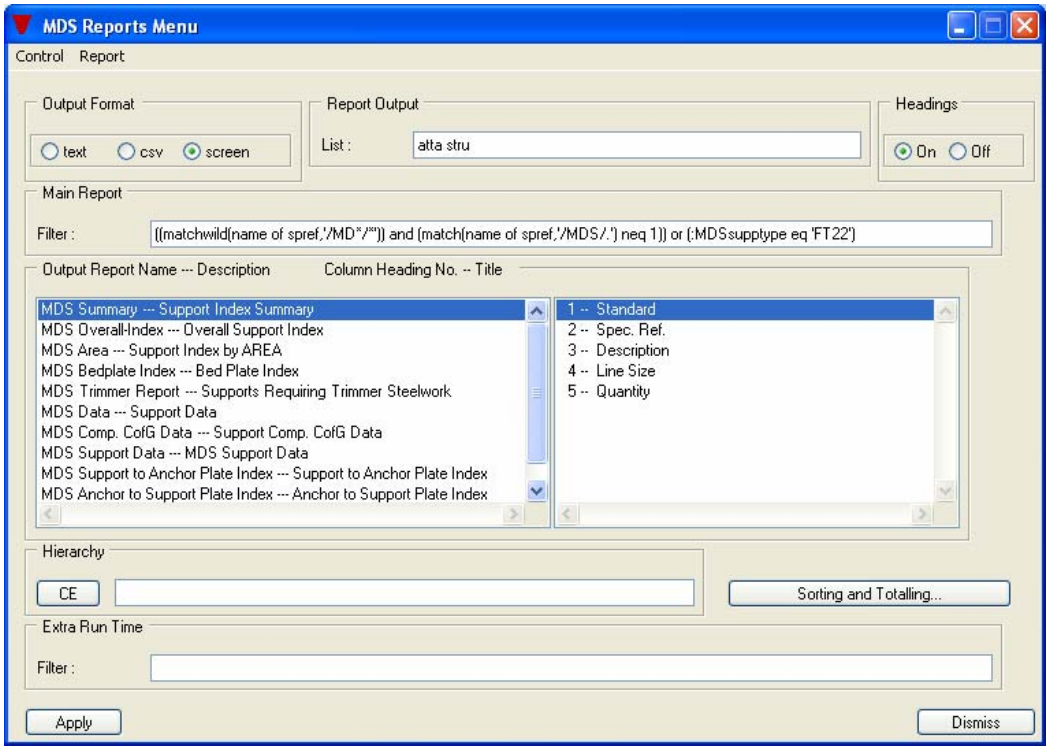


Figure 64 MDS Reports Menu form

2. Select an applicable report.
3. Click on the **Apply** button. A default report on the whole of the current MDB is created.
4. At the prompt confirm acceptance. The report is displayed.
5. Optionally, click on the **CE** button. A report is created for the currently selected element in the members list.
6. Optionally, click on the text or csv buttons in the **Output Format** box. This changes the output mode format of the report accordingly and writes the report to a file in the %MDSREPORTS% environment path.

12.2 Extended report

Extended reports can contain:

- Extra run time filter expressions
- Customised report headings
- Sorting, totalling, and sub-totalling

12.2.1 Extra run-time filter expressions

Extra run time filters are used to make the report more selective.

Type a valid filter definition as an expression in the Filter text field.

12.2.2 Customised report headings

To create customised report headings:

1. Select **Report>User Defined** from the menu on the top of the MDS Reports form. The MDS Report Headings form (Figure 65) is displayed.
2. Click either the **On** or **Off** buttons in the Headings field in the MDS Reports Menu (Figure 64) to activate or suppress report headings. When set to Off, the default report headings are restored.

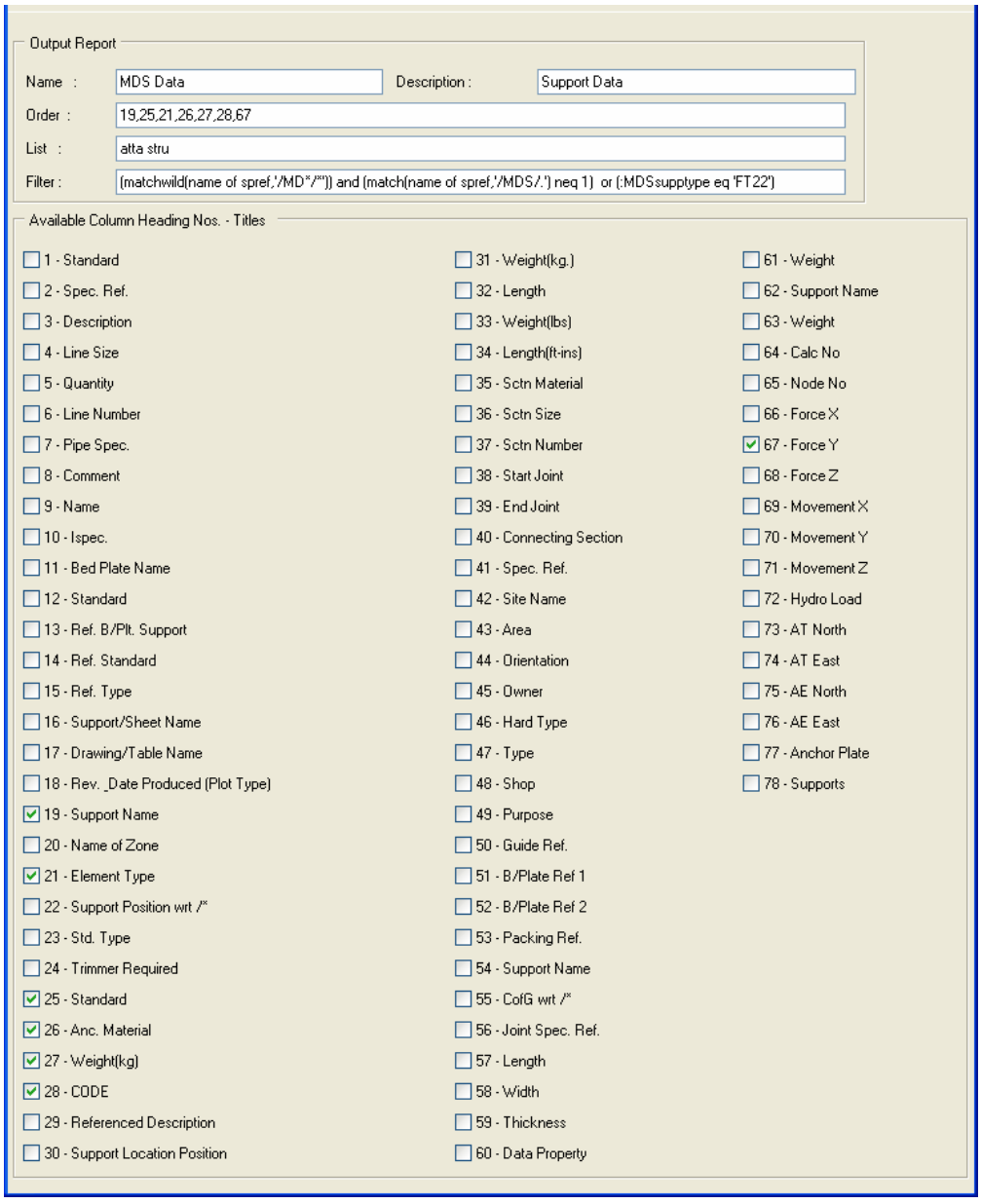


Figure 65 MDS Report Headings

3. Select alternative headings by activating the appropriate checkboxes. If headings are changed, then the report must be saved before closing.
4. Select **Control>Save as Default Report**.
5. The saved report is automatically shown in the output report names selection list (Figure 64) when the form is dismissed. The modified report is optionally available to other users.
6. Select **Control>Reload Default Reports**.

Sorting, totalling and sub-totalling

Sorting, totalling, and sub-totalling report options can be:

- Predefined by the administrator
- Overridden by the designer

To configure Sorting, totalling and sub-totalling:

1. Click on the **Sorting and Totalling** button in the MDS Reports menu form (Figure 64). The MDS Sorting and Totalling form (Figure 66) is displayed.

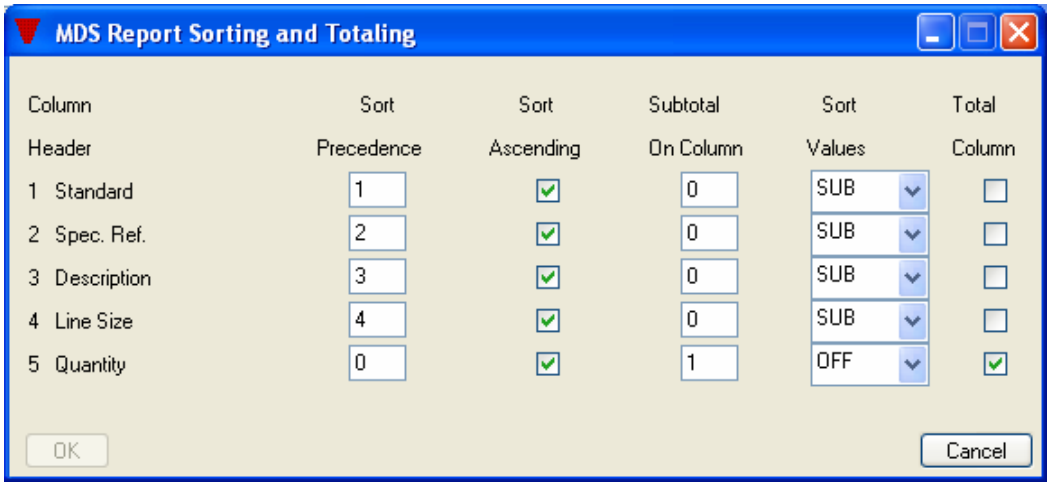


Figure 66 MDS Sorting and Totalling form

Settings for each column heading in a given report can be defined. If any of the following fields are modified, then the **OK** button becomes active.

The options are:

a. Sort Precedence:

Set	Effect
0	No sorting required.
1 to n	Sort highest priority to lowest priority.

b. Sort Ascending (applicable only when sort priority is active):

Set	Effect
Checked	Sort ascending.
Unchecked	Sort descending.

c. Subtotal On Column (applicable only when sort priority is active):

Set	Effect
0	No subtotalling.
1 or n	Provides a subtotal of the referenced column number if any value in that column changes.

d. Sort Values:

Set	Effect
ON	Values are always output.
OFF	Values are never output unless a subtotal for this column is output.
SUB	Values are output if a subtotal for any column is output.
FIRST	Values are output for the first occurrence of a group of common values in a sorted column.

e. Total Column:

Set	Effect
Checked	Total for the selected column is output at the bottom of the report.
Unchecked	Total for that column is not output at the bottom of the report.

2. Click on **OK**. The form content is checked for validity:

   If no inconsistencies are found, then the criteria of the form are accepted.

   If inconsistencies are found, then a detailed report is generated and a prompt to correct the errors is issued.

End of document