VANTAGE

Multi-Discipline Supports

Framework Template Administration Guide



MDS11.6

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1 Introduction

1.1 About this guide

This manual is designed to give the administrator guidance on how to setup and configure the Framework Templates for the Multi-Discipline Supports (MDS) application. It is assumed that the administrator is an experienced user who has attended a training course and has understanding of the MDS application.

1.2 An overview of the MDS application

The MDS application allows the user to create standard supports for pipework, cable trays, and HVAC. The application is highly interactive, enabling the user to design supports with the minimum of effort. It 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 support components that can be used on the project.

The standard supports in this application, which are designed using structural sections, are template-driven. A default set of structural templates based on British Standard Steelwork Sections is supplied with the application. All of these templates may be configured to suit the needs of an office or project to adopt a relevant national standard for steelwork sections.

1.3 The Administrator's role

The administrator is responsible for initial setup of the default files associated with the MDS application (refer to the *Administration User Guide*) and setup of the structural steel sizes associated with the framework templates. The MDS application is supplied with a British Steel set of framework templates, which the administrator must modify to suit the specific requirements of the project.

1.4 MDS catalogues and specifications

The MDS application is supplied with a catalogue and specification. The range of bore and components in the catalogue are fixed and should be adequate for all projects. The catalogue supplied and associated specification '/MDS' must not be modified by the administrator or any other user.

2 Template modification rules

2.1 Special instructions

Clients may configure the MDS application Structural Design Templates to an alternative National Standard for Steelwork Sections to the British Standard supplied as default. This may be a different size from the same steelwork standard or a different size from a different standard.

Apply the following rules when replacing the default size to ensure the MDS application functions correctly:

- The origin of each template must remain in the same position when the steelwork size is modified. The example shown in this section has the origin on the back mark of the cross bar. Move the origin to align with the back when the size is changed. This ensures that the origin is placed in the correct position in relationship to the datum atta (attachment) when the framework is generated.
- DO NOT modify the position of the section starts and ends in relationship to the structure orientation.
- Use the naming convention described in Section 4.1 on page 8.
- There is a limit of twenty structural templates per support type. This limit is governed by the Pipe Support Specification '/MDS', which has eight atta entries available for each template type.
- All structural sections defined as SCTN elements in the default templates will have a numerical value set against their design parameter attribute. For example, the default value for design parameter number 1 of SCTN '/MDS/FT01-1-BAR-1' is set to '1400'. This value is the maximum allowable length for this particular SCTN. The value is checked against the actual length of a SCTN element, named ***<structurename>*-BAR-1**, and is created automatically during the creation of a Pipe Support by the MDS application. Clients may modify this attribute in their template database as part of their configuration.
- Where a template contains internal joints, it may be necessary to modify the specification reference to a handed joint when a mirror operation is performed. To do this, set the uda :MdsMirror to the spref required for a mirrored joint, when the joint is created in the template.

When a framework is created, the template is copied to the datum support (the first pipe identified will be the datum support) and then the framework is stretched and re-sized, depending on the method of creation used, i.e. Cursor, Dimensions or Clearance. Therefore the initial positioning and orientation of the sections within the structure are critical.

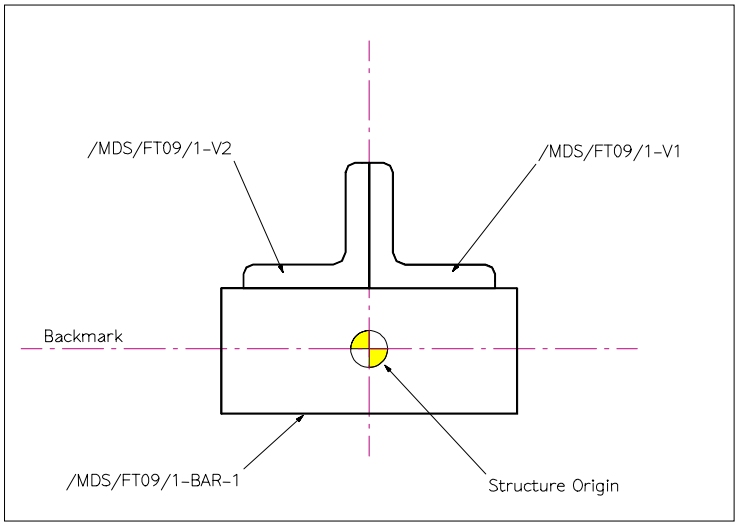
An example of replacing the default steelwork size is shown in Section 3 on page 3.

3 Framework setup

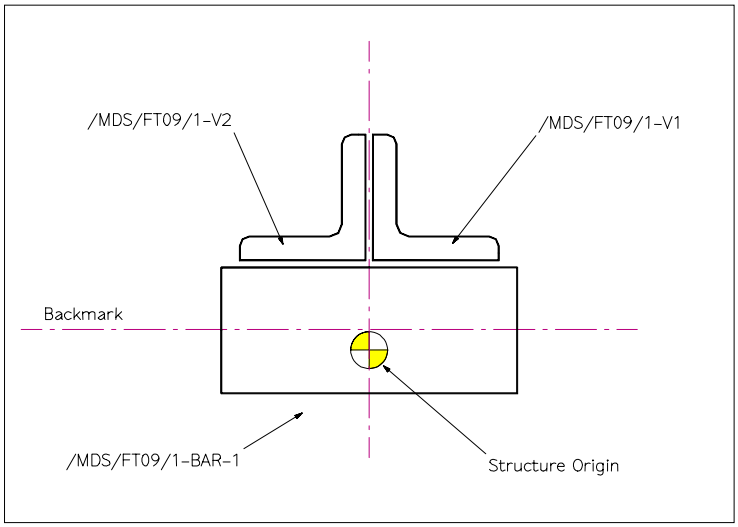
3.1 Replacing the default steelwork section size

The MDS application is supplied with a default set of frameworks based on British Steelwork standards. The project can modify the steelwork sizes and the following example explains how the administrator makes the alternatives available. In the example, support types FT09 option 1, which uses 60x60x8 angle British Steel Standard is changed to 2x2x3/8 AISC Standard.

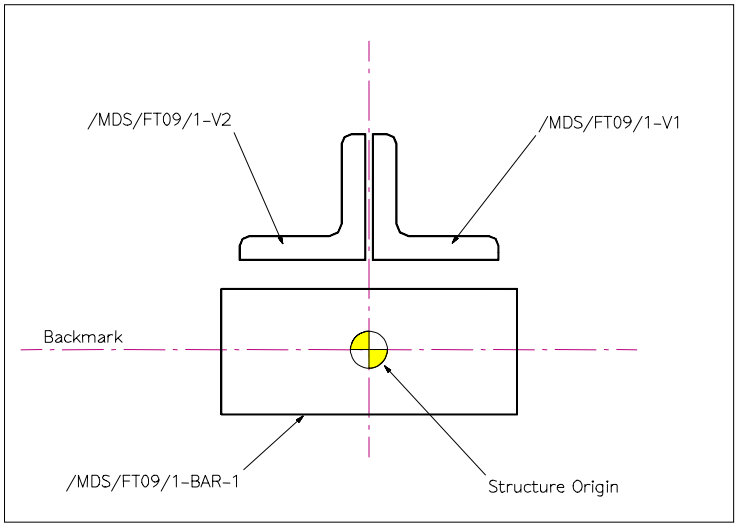
1. Enter the application with write access to the project MDS framework template database.
2. Enter the Design module and load the applicationware.
3. Navigate to the FT09 template structure /MDS/FT09/1. This is the first available size for the FT09 standard, by default, of four available.
4. Unlock the structure.
5. Set the limits of the structure and add it to the drawlist and look down. The following view should be displayed on the screen. Additional text and symbols have been added for clarification.



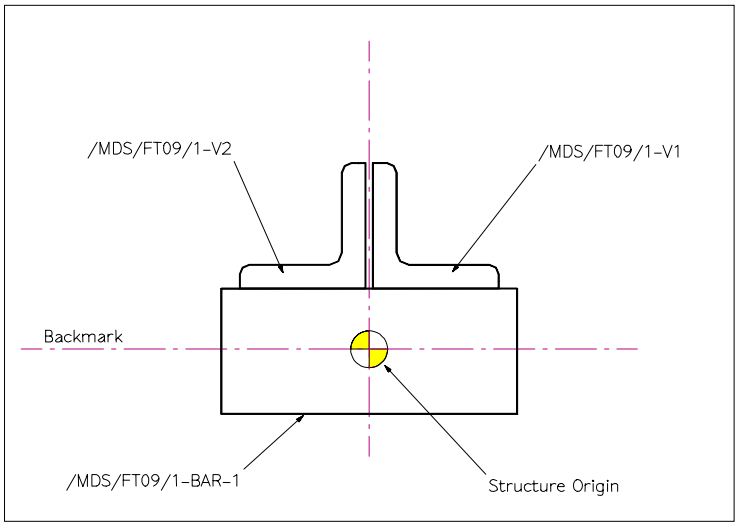
6. Enter the Beams & Columns Steelwork application and select **Modify>Section>Specification**. Navigate to each section in turn and set the spref to /AISC-SPEC/L2x2x3/8thk. After this has been completed the following view should be displayed on the screen.



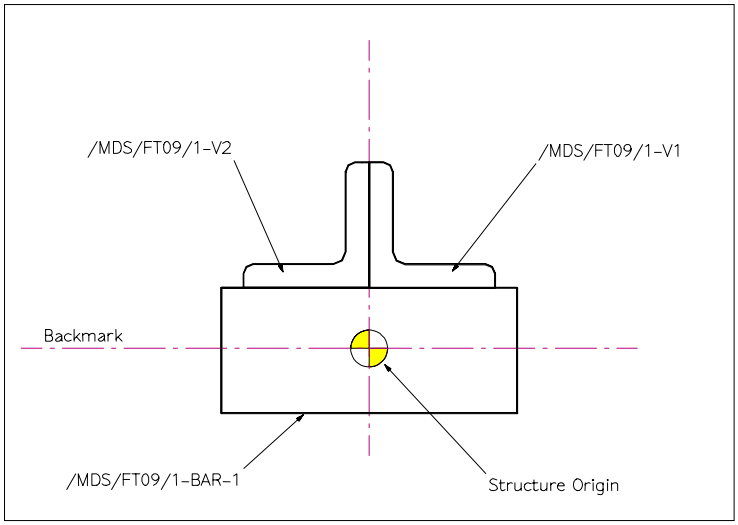
7. Note that the sections now have gaps between each other and the back mark of the cross member /MDS/FT09/1-BAR-1 has moved off the origin of the structure. Move the cross bar so that the back mark returns to the structure origin.
8. Navigate to the cross bar /MDS/FT09/1-BAR-1 and slide the section so that the back mark returns to the structure origin. After this has been completed, the following view should be displayed on the screen.



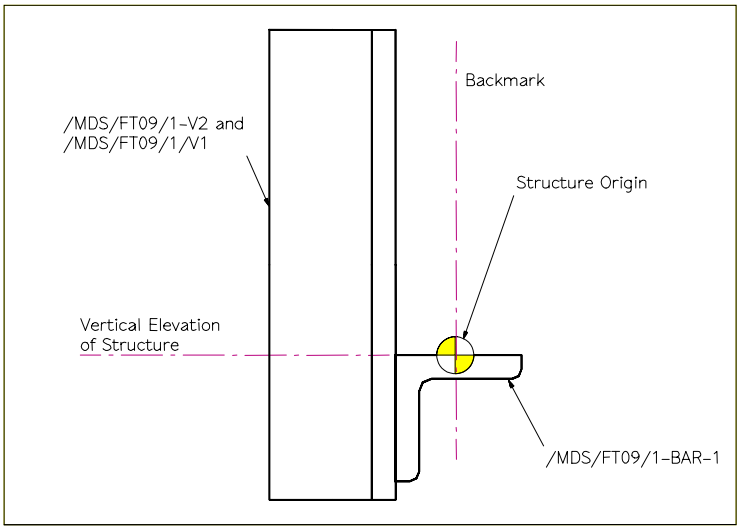
9. Slide the two remaining vertical members so that they are flush with the cross member. Navigate to each vertical member in turn and type ‘MOVE S CLEAR 0 INF SCTN 1’. Section 1 in this case being the cross bar. After this has been completed, the following view should be displayed on the screen.



10. Slide the two vertical members and make them flush with each other and the intersection point the origin of the structure. Navigate to vertical member /MDS/FT09/1-V1 and type the following two lines ‘PIN 1 AT STRU’ and ‘MOVE W CLEAR 0 INF PIN 1’. Navigate to the second vertical member /MDS/FT09/1-V2 and type the following two lines ‘MOVE E CLEAR 0 INF PIN 1’ and ‘PIN 1 OFF’. After this has been completed, the following view should be displayed on the screen.



11. Look east to make sure the cross bar has not moved in the vertical direction. The face of the section must be flush with the origin of the structure, as shown below. If this is the case, the modification of the template is complete and it can be used on the project to create a framework using AISC steelwork.


Backmark
/MDS/FT09/1-V2 and
/MDS/FT09/1/V1
Structure Origin
Vertical Elevation
of Structure
/MDS/FT09/1-BAR-1

3.2 Modifying the design template's minimum/maximum lengths

All structural sections defined in the Design Template Database have their design parameter set to the maximum usable length. The MDS application issues a warning to the user when the Support Integrity Checker is actioned at the end of each creation or modification process. This check is only a warning and the user is allowed to complete the support. The warning indicates to the user that either the support is stressed or the steelwork size needs increasing.

It is also possible to define a minimum length by setting design parameter 2. For example, if the design parameters of a section are set to 1000 100, the maximum length is 1000 and the minimum length is 100.

3.3 Creating template internal joints

Create template internal joints using standard PDMS structural connections. If a joint needs to be 'handed' for mirrored frameworks, use the uda :MdsMirror at the catalogue join element to store the joint reference.

3.4 Modifying the appearance of joints and fittings on the MDS ADP drawing

If you do not want a template joint or fitting to appear on the MDS ADP drawing, set the SJOI or FITT function attribute to DUMMY. Joints and fittings are then ignored on the drawing material list and are not tagged in the graphical views. Use this attribute when a joint, which has no physical properties, is used to cut-out a section.

4 Naming conventions

4.1 Framework naming conventions

Ensure each framework conforms to the following naming conventions. This enables the MDS application to navigate to the appropriate element and customise the application for both the Design and Draft stages of support production. Failure to apply these naming conventions may cause the applications to fail to produce supports.

Type	Name format	Example
SITE	/MDS/TEMPLATES	N/A
ZONE(S)	/MDS/FRAMES/{frameworktype}	/MDS/FRAMES/FT09
STRU	/MDS/{frameworktype}/{option}	/MDS/FT09/1
FRMW	/MDS/{frameworktype}/{option}-FRMW1	/MDS/FT09/1-FRMW1
SCTN	CROSSBAR	
	/MDS/{frameworktype}/{option}-BAR-1	/MDS/FT09/1-BAR-1
	VERTICAL MEMBERS (if needed)	
	/MDS/{frameworktype}/{option}-V1 or V2	/MDS/FT09/1-V1
	SUBS	
	/MDS/{frameworktype}/{option}-SUBS1	/MDS/FT01/1-SUBS1
	SNODS	
	/MDS/{frameworktype}/{option}-V1/S1 or /V2/S1	/MDS/FT09/1-V1/S1
	SJOI	
	/MDS/{frameworktype}/{option}-V1/S1/IJOINT1	/MDS/FT09/1-V1/S1/IJOINT1

There are two zones for each of these framework types: FT03, FT04, FT14, FT15, FT18, and FT19. Each one is supplied with the suffix -HORI or -VERT e.g. /MDS/FRAMES/FT03-HORI.

The suffix allows the orientation of members within the structure to be different when used with vertical or horizontal lines.

5 Available templates

5.1 Extending the number of steelwork framework types available

The supplied set of templates contain, typically, four options for each framework. To extend this number, create extra structures using the naming convention in Section 4.1 on page 8. To reduce the number of framework types, delete unwanted structures from the design template database. The supplied specification will handle up to twenty options per framework type.

6 Template options

6.1 Availability of cross bars

Each standard has the ability to add up to a maximum of six cross bars. In some circumstances the office or project standard may not want a particular standard to allow cross bar creation. Control this by setting the :Mdsbars attribute at the template zone level. Use a ‘true’ setting to allow cross bar creation and ‘false’ to prevent it.

6.2 Creation of standard in the horizontal or vertical plane

Some standards allow the creation of a support in the horizontal or vertical plane. In some circumstances the office or project standard may not allow both. Control this by setting the :MdsHV attribute at the template zone level.

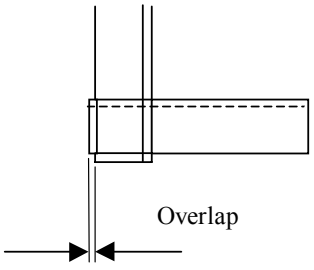
:MdsHV	Description
BOTH	Allows creation in the horizontal and vertical plane
HORI	Allows creation in the horizontal plane only
VERT	Allows creation on the vertical plane only

6.3 Maximum section lengths

At each section within the template, design parameter 1 is set to the maximum length allowed. The support integrity checker monitors this value against the actual length and issues a message to the user when the support has been completed. If the :MdsCheck attribute is set to true, the user is not allowed to complete the support without making the section length less than the maximum allowed. If the :MdsCheck attribute is set to false, a warning is issued and the support is completed.

6.4 Cross bar overlap override

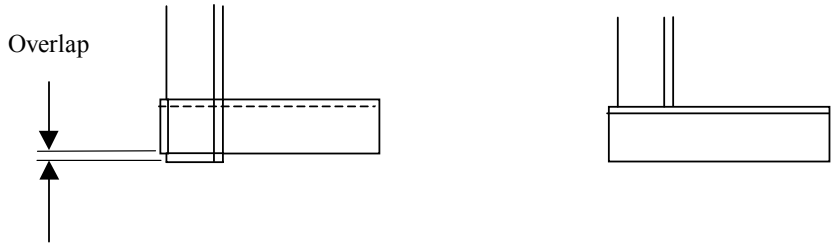
When a support is created, it uses the application overlap default, obtained from the application default form, to overlap the steelwork for welding. This can be overridden on each individual cross bar by setting the :MdsOlap attribute at the SCTN element. If the uda :MdsOlap is set to OVERLAP, the application uses the setting in the uda :MdsOnum as the overlap value required.



6.5 Vertical section overlap

The vertical SCTN is extended past the cross bar by the application overlap value, as shown below left, in order to weld the SCTNs together. In some circumstances the vertical member may need to be flush with the top of the cross bar. To achieve this, set the uda :MdsOlap value at the vertical SCTN to OVERLAP and the uda :MdsOnum value to -100 (if the cross bar depth is 100).

The example, below left, is the standard/default configuration with the :MdsOlap unset <default>. The example, below right, assumes a common template SCTN size of 100x100x8 angle. The vertical SCTN uda :MdsOlap value is set to OVERLAP and the :MdsOnum value is set to -100, (the depth of the cross bar being 100)



6.6 Maximum allowable bore sizes

Each MDS framework has the functionality to control the minimum and maximum pipe bore allowed for the template. This is achieved by setting the :MdsMaxBore and :MdsMinBore uda. For example, if the first template for FT09 is 60x06x8 angle and you set the :MdsMaxBore to 100 and the :MdsMinBore to 50, the user will not be allowed to add a pipe to the support which is less than 50 or greater than 100.

The MDS framework can also be configured to set the minimum and maximum pipe bores using the dimensional values. This is achieved by setting the :MdsRange uda. For example, if the uda is set to ‘1,0,610,80’, it means that dimension 1 can be between 0 and 610 with a maximum bore of 80. If it is set to ‘(1/2/3),0,610,80\(1/2),0,305,80\3,0,305,80’, it means that dimension 1, 2, and 3 has a maximum length of 610 up to 80 bore, dimension 1 and 2 has a maximum length of 305 up to 80 bore, and dimension 3 has a maximum length of 305 up to 80 bore. The largest bore will be used in the check when more that one bore exists on a framework.

7 Project special templates

7.1 Philosophy

MDS project special templates allow users to create an MDS special support with some SCTN members, very quickly, and if necessary to complete the design of the MDS support in the standard PDMS Beams & Columns application.

Users who have write access to the project special discipline zones owned by the site /MDS/SPECIALS can create their own MDS Project Special structural templates.

The origin of an MDS support structure is always at the P9 of the DATUM atta of the current MDS support being created. The copied members of a project special template are positioned relative to the MDS support structure origin position.

7.2 Storage areas

We recommend that MDS project special templates zones are stored in a site named /MDS/SPECIALS.

Three zones are required to store the project special structure templates. Name them as follows to enable the MDS application to recognise the appropriate discipline templates:

/MDS/SPECIALS/PIPE, the PIPING template zone.

/MDS/SPECIALS/HVAC, the HVAC template zone.

/MDS/SPECIALS/TRAY, the Cable Tray template zone.

In the MDS Design application, if a discipline zone exists, e.g. /MDS/SPECIALS/PIPE, the STRU elements are displayed in the **Select Project Special** form. Otherwise the user is informed that the zone /MDS/SPECIALS/PIPE does not exist, and the Copy Project Special operation is aborted. If the zone exists but there are no STRU elements, an empty list is displayed in the form.

7.3 Filter settings at a piping or tray project special template

The uda :MdsHv setting at the STRU element of the project special template is the only filtering mechanism available. It can be set to HORI, VERT, or BOTH. The settings are self explanatory and are relative to the orientation of the current pipe or tray being supported by the MDS special support.

The list of piping and cable tray project special templates displayed, and available to the user, is the same list as the STRU members that currently exist in the appropriate discipline template zone. It is filtered according to the settings of the uda :MdsHv at the structural template, and the orientation of the pipe or tray being supported.

The selected structural template is copied into the MDS special support being created without any modifications to the design of its members. None of the attributes at the project special STRU template or any of its members are used by the MDS application for either of these

disciplines. They are not required and should not be set.

The project special templates members in the piping and cable tray disciplines are copied exactly into the MDS special support and positioned relative to the MDS special support origin currently being created. There is no automatic modification of the positions and length of the template members when they are copied into the MDS support.

7.4 Filter and build settings at an HVAC project special template

7.4.1 HVAC structure template

The list of HVAC templates, for the HVAC STRT element to be supported, is filtered on the settings of two udas. They are :MdsHv (described in section 7.3 on page 12) and :MdsRange and are both attributes of the STRU template.

The second filter control, :MdsRange, is implemented for HVAC templates only. It controls whether insulation exists on the HVAC STRT element being supported. The settings are shown in the table below:

Setting	Action
0	Restrict the STRU template to support only HVAC STRT elements that are uninsulated.
1	Restrict the STRU template to support only HVAC STRT elements that are insulated.
2, any other value, or left unset	Allow the STRU template to support HVAC STRT elements that are either uninsulated or insulated.

Having set the udas at the STRU templates, consider also :MdsCheck. Set this uda at the time the template is selected and/or built from the list displayed in the Select Project Special form. The options are shown in the table below:

Setting	Action
true	Include the insulation thickness of the HVAC STRT element in the design and build calculations of the STRU template members copied to the current MDS HVAC Special Support.
false (default setting)	Exclude the insulation thickness of the HVAC STRT element in the design and build calculations of the STRU template members copied to the current MDS HVAC Special Support

7.4.2 HVAC Structure Template Members

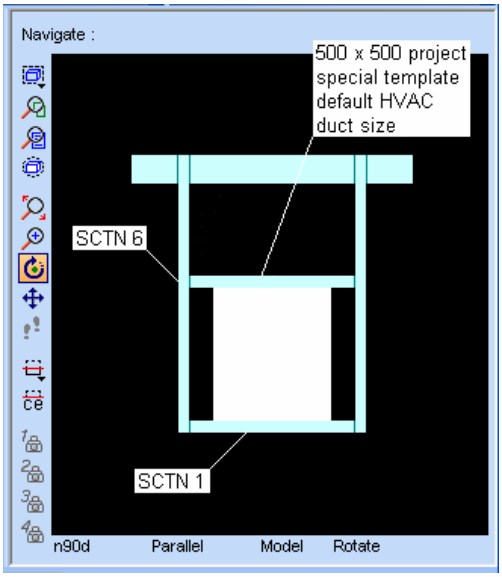
The positions and lengths of HVAC STRU template members are automatic modified by the settings of two udas, :MdsConfigA and :MdsConfigB, i.e. the types SCTN, SUBS, EXTR and VERT.

Each of the MDS HVAC Project Special Support templates is built on a base HVAC STRT duct size of 500mm wide x 500mm high (Figure 1) and is modified by the udas mentioned above. The build action takes place when either the template is selected or the OK button is clicked and is controlled by the Build toggle setting on the form.

Example

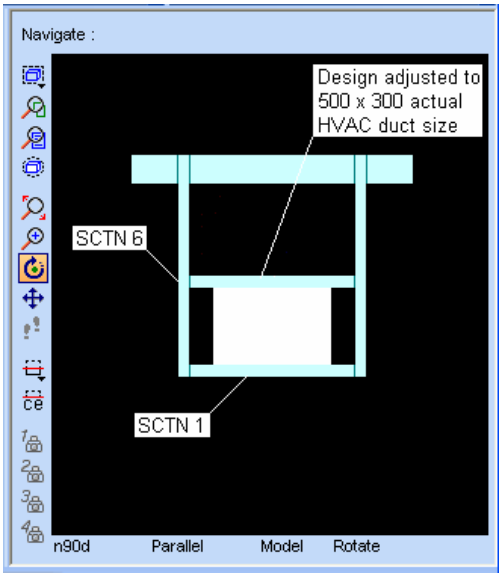
The STRU /MDS/SPECIALS/HVAC/1 contains an FRMW with seven SCTN members. The uda settings for SCTNS 1 and 6 only are shown below and provide the template shown in Figure 2:

SCTN 1 = /MDS/SPECIALS/HVAC/1-BAR-1
:MDSConfigA false,,,\true,0.5\true,0.5
:MDSConfigB unset
SCTN 6 = /MDS/SPECIALS/HVAC/1-V1
:MDSConfigA true,W,0.5,WIDTH\,\true,1
:MDSConfigB unset



MDS Project Special Structural Template /MDS/SPECIAL/HVAC/1 configured to suit the DEFAULT 500mm wide x 500mm high HVAC ducting size.

Figure 1 Default size (500mm)



MDS Project Special Support copied from the template /MDS/SPECIALS/HVAC/1 and automatically adjusted to suit the actual 500mm wide x 300mm high HVAC ducting size.

Figure 2 Automatic adjustment to 300mm

Now let us consider the uda settings for SCTN 1 = /MDS/SPECIALS/HVAC/1-BAR-1 and interpret what they mean.

:MDSConfigA false,,,\true,0.5\true,0.5

<see below> 1 2 3

The values in this attribute are delimited into three values by the backslash '\' character and further delimited by the comma ',' character.

1. false,,, [a,b,c,d]

   a) false = Element will NOT be repositioned

   b) <blank> = a) above is 'false', so not applicable

c) <blank> = a) above is ‘false’, so not applicable

d) <blank> = a) above is ‘false’, so not applicable

2. true,0.5 [a,b]

a) true = Element POSS (SCTN start position) needs to be repositioned

b) 0.5 = ½ (half) the difference between the default size of the HVAC duct (500mm) and the actual size of the HVAC duct (500mm)

3. true,0.5 [a,b]

a) true = Element POSE (SCTN end position) needs to be repositioned

b) 0.5 = ½ (half) the difference between the default size of the HVAC duct (500mm) and the actual size of the HVAC duct (300mm)

:MDSConfigB unset

No action will be taken as the uda value is unset.

This uda can only be set with values of a similar type to those attributed to :MDSConfigA when the element needs to be moved in more than one direction.

Now let us consider the uda settings for SCTN 6 = /MDS/SPECIALS/HVAC/1-V1 and interpret what they mean.

:MDSConfigA true,W,0.5,WIDTH\ ,\true,1

<see below> 4 5 6

4. true,W,0.5,WIDTH [a,b,c,d]

a) true = Element will be repositioned

b) W = The direction in which the element will be moved

c) 0.5 = Move the element 0.5 x WIDTH <value in d) below> difference between the ACTUAL width and the DEFAULT width of the HVAC STRT

d) WIDTH = WIDTH or HEIGHT of HVAC STRT element to be considered in c) above

5. , [a,b]

a) <blank> = not applicable

b) <blank> = not applicable

6. true,1 [a,b]

a) true = Element POSE (SCTN end position) needs to be repositioned

b) 1 = 1 x difference between the default size of the HVAC duct (500mm) and the actual size of the HVAC duct (300mm)

:MDSConfigB unset

No action will be taken as the uda value is unset.

This uda can only be set with values of a similar type to those attributed to :MDSConfigA when the element needs to be moved in more than one direction.

Note: At this release the udas :MDSConfigA and :MDSConfigB are only considered when copying an MDS HVAC Project Special Template.

End of document