

Equipment and Cabletray Support User Guide and Menu Reference

CADD5® 5i Release 10.0

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Glossary

Preface

Equipment and Cabletray Support User Guide and Menu Reference gives you a quick reference for designing and manipulating equipment and cabletray support models, using the CADD5 Equipment and Cabletray Support Package. It provides a reference to the menus and property sheets on the Graphical User Interface.

Related Documents

The following documents may be helpful as you use *Equipment and Cabletray Support User Guide and Menu Reference*:

- *Pipe Support User Guide and Menu Reference*
- *Piping Specification User Guide*
- *Visualization/Preparation Reference, CADD5 5i Revision 5.0*
- *Advance Structural Modeling User Guide and Menu Reference*
- *Parametric Graphics Preparation Reference*

Book Conventions

The following table illustrates and explains conventions used in writing about CADDs applications.

Convention	Example	Explanation
Menu selections and options	List Section option, Specify Layer field	Indicates a selection you must make from a menu or property sheet or a text field that you must fill in.
User-selected graphic location	X, d ₁ or P1	Marks a location or entity selection in graphic examples.
User input in CADDs text fields and on any command line	cvaec.hd.data.param tar -xvf /dev/rst0	Enter the text in a CADDs text field or on any command line.
System output	Binary transfer complete.	Indicates system responses in the CADDs text window or on any command line.
Variable in user input	tar -cvf /dev/rst0 filename	Replace the variable with an appropriate substitute; for example, replace filename with an actual file name.
Variable in text	tagname	Indicates a variable that requires an appropriate substitute when used in a real operation; for example, replace tagname with an actual tag name.
CADDs commands and modifiers	INSERT LINE TANTO	Shows CADDs commands and modifiers as they appear in the command line interface.
Text string	"SRFGROUPA" or 'SRFGROUPA'	Shows text strings. You must enclose text string with single or double quotation marks.
Integer	n	Supply an integer for the <i>n</i> .
Real number	x	Supply a real number for the <i>x</i> .
#	# mkdir /cdrom	Indicates the root (superuser) prompt on command lines.
%	% rlogin remote_system_name -l root	Indicates the C shell prompt on command lines.
\$	\$rlogin remote_system_name -l root	Indicates the Bourne shell prompt on command lines.

Window Managers and the User Interface

According to the window manager that you use, the look and feel of the user interface in CADDSS can change. Refer to the following table:

Look and Feel of User Interface Elements

User Interface Element	Common Desktop Environment (CDE) on Solaris, HP, DEC, and IBM	Window Manager Other Than CDE on Solaris, HP, DEC, IBM, SGI, and NT
Option button	ON — Round, filled in the center OFF — Round, empty	ON — Diamond, filled OFF — Diamond, empty
Toggle key	ON — Square with a check mark OFF — Square, empty	ON — Square, filled OFF — Square, empty

Online User Documentation

Online documentation for each book is provided in HTML if the documentation CD-ROM is installed. You can view the online documentation in the following ways:

- From an HTML browser
- From the Information Access button on the CADDSS desktop or the Local Data Manager (LDM)

Please note: The LDM is valid only for standalone CADDSS.

You can also view the online documentation directly from the CD-ROM without installing it.

From an HTML Browser:

1. Navigate to the directory where the documents are installed. For example,
 - `/usr/apl/caddss/data/html/htmldoc/` (UNIX)
 - `Drive:\usr\apl\caddss\data\html\htmldoc\` (Windows NT)
2. Click `mainmenu.html`. A list of available CADDSS documentation appears.
3. Click the book title you want to view.

From the Information Access Button on the CADDSS Desktop or LDM:

1. Start CADDSS.
2. Choose Information Access, the *i* button, in the top-left corner of the CADDSS desktop or the LDM.
3. Choose DOCUMENTATION. A list of available CADDSS documentation appears.
4. Click the book title you want to view.

From the Documentation CD-ROM:

1. Mount the documentation CD-ROM.
2. Point your browser to:
CDROM_mount_point/html/doc/mainmenu.html (UNIX)
CDROM_Drive:\html\doc\mainmenu.html (Windows NT)

Online Command Help

You can view the online command help directly from the CADDs desktop in the following ways:

- From the Information Access button on the CADDs desktop or the LDM
- From the command line

From the Information Access Button on the CADDs Desktop or LDM:

1. Start CADDs.
2. Choose Information Access, the *i* button, in the top-left corner of the CADDs desktop or the LDM.
3. Choose COMMAND HELP. The Command Help property sheet opens displaying a list of verb-noun combinations of commands.

From the Command Line: Type the exclamation mark (!) to display online documentation before typing the verb-noun combination as follows:

```
#01#!INSERT LINE
```

Printing Documentation

A PDF (Portable Document Format) file is included on the CD-ROM for each online book. See the first page of each online book for the document number referenced in the PDF file name. Check with your system administrator if you need more information.

You must have Acrobat Reader installed to view and print PDF files.

The default documentation directories are:

- /usr/apl/cadds/data/html/pdf/doc_number.pdf (UNIX)
- CDROM_Drive:\usr\apl\cadds\data\html\pdf\doc_number.pdf (Windows NT)

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- Send comments electronically to `doc-webhelp@ptc.com`.
- Fill out and mail the PTC Documentation Survey located in the *PTC Customer Service Guide*.

Overview of Equipment and Cabletray Support

This is a brief introduction to CADDSS Equipment and Cabletray Support. It describes how to use various options available. CADDSS Equipment and Cabletray Support is referred to as Support in this manual and in the Graphical User Interface (GUI).

- Introduction
- Accessing Support Options
- Setup Options
- Modeling Tasks
- Reporting Options

Introduction

Support allows you to create, modify, manipulate and assemble equipment or cabletray support units. You can generate support unit models and external database and fabrication drawings for each individual equipment or cabletray support unit.

Each equipment or cabletray support unit consists of a number of support members. A support member can be either a structural axial element or plate. An axial member is created from the cross sections defined in the active section library.

A support member is represented by a local nodal figure and one of the following graphical representations:

1. In the simple wire frame mode, the support model is generated as the axial member's projection axis or plate member's boundary curve.
2. In the profile wire frame mode, the support model is generated as the axial member's projection axis and cross section profile or the plate member's boundary curve and thickness axis.
3. In the three dimensional mode, the support model is created as a set of NURB surfaces or solids.

Insertion Modes

Support has three insertion modes to insert support members into the active three dimensional model.

Standalone

In the standalone mode you can insert the support unit without any reference to existing equipment. You must provide all the required dimensional information, such as equipment support selection name and related parameters, for insertion.

Please note: Cabletray supports must be related to each other as no standalone support is provided for it.

Related to Equipment or Cabletray

By default, you can create support units that are related to the equipment or cabletrays that they support. In this mode, Support automatically checks for the offset between the equipment and its supporting member, or the offset between the cabletray and its supporting member. These calculations are based on the input data, the hull structure, the related equipment or cabletray, and the pre-defined equipment or cabletray support parameters as defined in the data files.

Automatic Insertion Mode

In the automatic insertion mode, all equipment or cabletrays in the active or viewed CADDs part or specified block are selected. Support determines the orientation and dimension of each equipment or cabletray that is not supported already, and calculates the length of the attachment axial members from the equipment or cabletray to the nearest hull structure.

Once the length is calculated, an equipment or cabletray support is inserted and related to the corresponding equipment or cabletray. The attachment axial members are trimmed automatically to the nearest hull structure based on the input endtype, and inserted without liner and with or without pad.

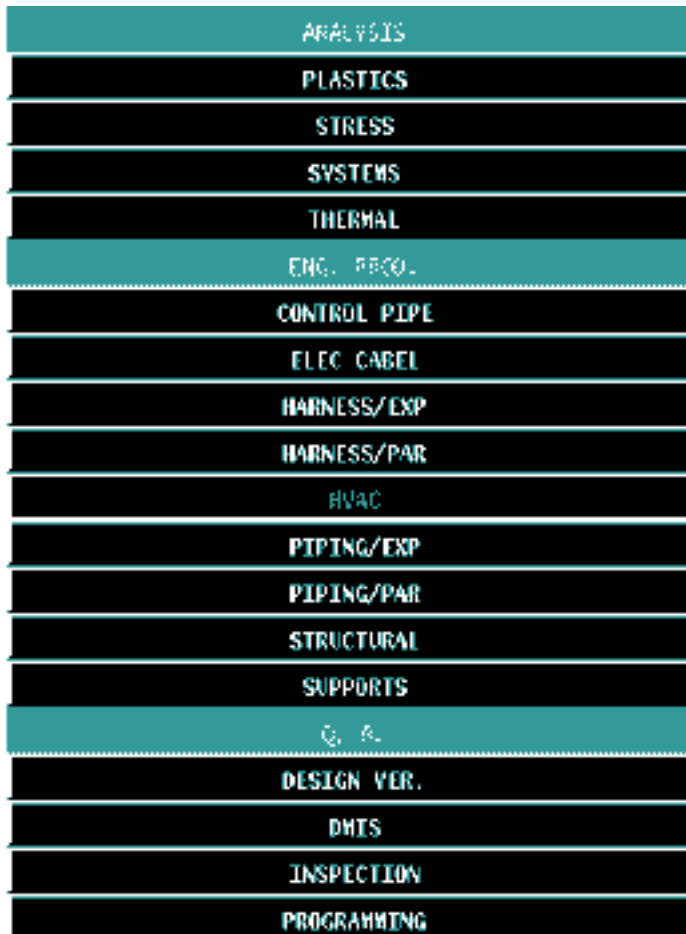
Accessing Support Options

Access the Supports options from the Explicit environment of CADD5. Enter the Supports environment either from the Local Data Manager (LDM) menu or directly from the command prompt without entering CADD5.

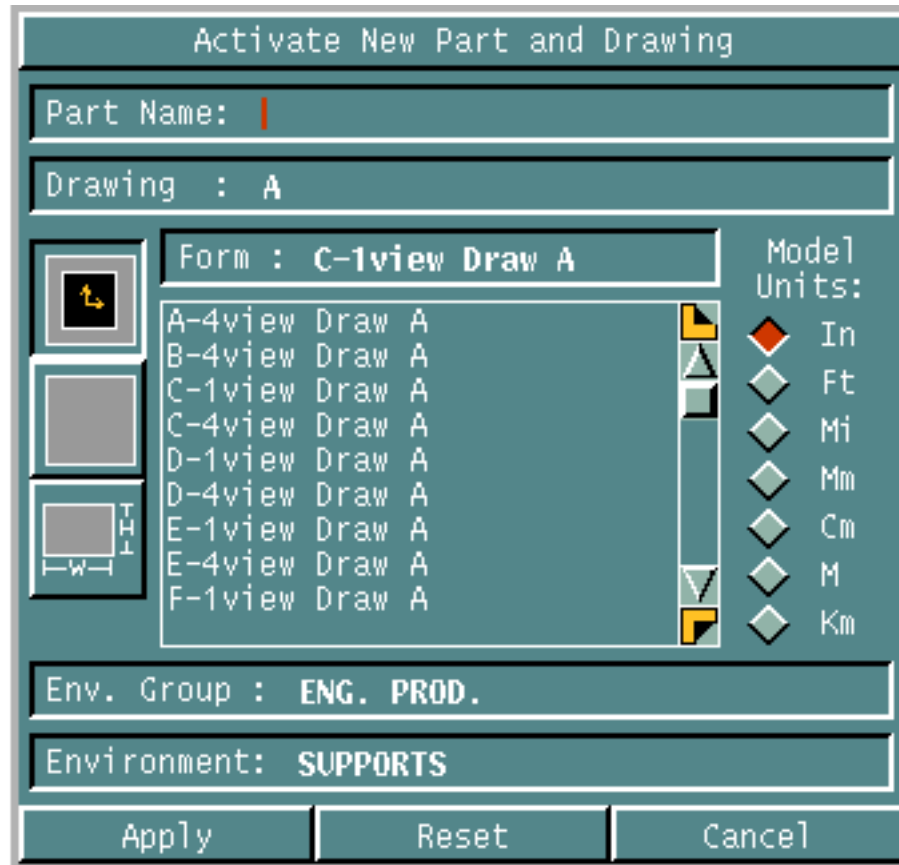
Using the Local Data Manager Menu

You can enter the Supports environment from the Local Data Manager in the following ways:

- Issue the command ENTER SUPPORTS on the command line,
or
- Click in the Env. Group field in the Activate New Part and Drawing property sheet. Choose SUPPORTS as the environment group from the pull down menu that appears.



The Env.Group field changes automatically to ENG.PROD and the environment changes to SUPPORTS.



If the part already exists, click on the part and choose SUPPORTS as the environment group. The Env.Group changes automatically to ENG.PROD and the environment changes to SUPPORTS.

Accessing Supports Options Without the LDM

Access the various Supports options without using the Local Data Manager (LDM) in the following way:

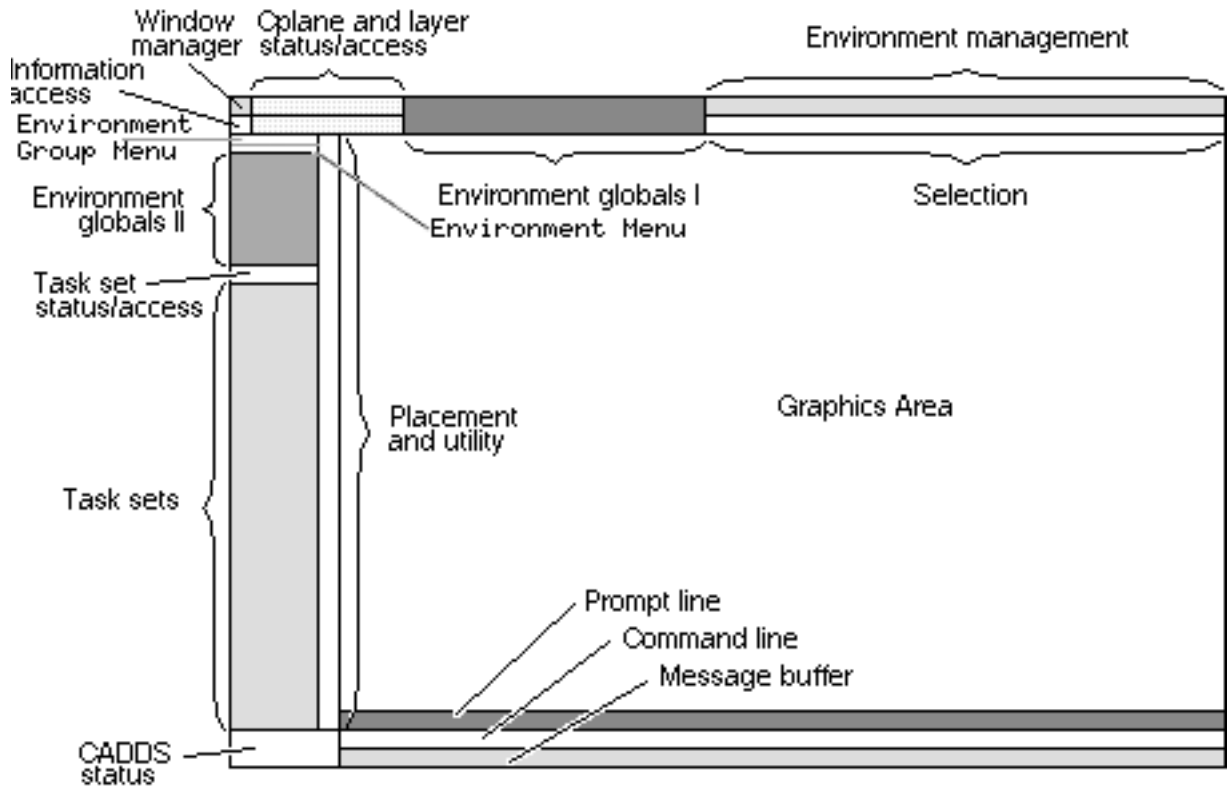
1. Invoke CADD5 directly without the LDM by issuing the following command:

```
CADD55 -EXPLICIT
```

2. Activate a new or an existing Supports model.

3. Access the various Supports options using the following menu areas:

- The Environment Management menu area on the top bar
- The Environment Access menu area on the side bar
- The Environment Globals I menu area on the top bar
- The Task Set Access menu area on the side bar



There are three types of Supports options:

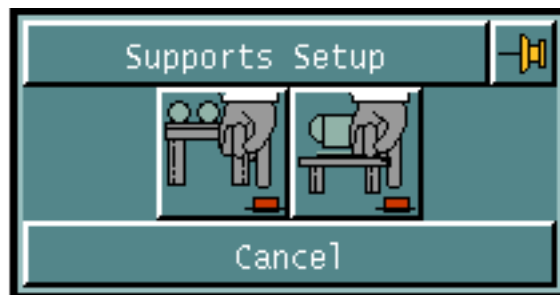
- Setup Options. For details, see “Setup Options” on page 1-7.
- Modeling Tasks. For details, see “Modeling Tasks” on page 1-8.
- Reporting Options. For details, see “Reporting Options” on page 1-14.

Setup Options

To access the Setup Options:

1. Choose Supports from the Environment Access Menu.
2. Choose Setup on the Environment Management area of top bar to display the Setup menu.
3. Choose Supports on the Setup menu to display the Supports Setup palette.

Figure 1-1 Support Setup Palette



4. Choose the required option from the Support Setup command palette.



SELECT PIPE SUPPORT PARAMETERS

Use this to set up various pipe support modeling parameters. See “Setting Up Default Pipe Support Parameters” on page 2-3.



SELECT EQUIPMENT AND CABLETRAY SUPPORT PARAMETERS

Use this to set up various equipment and cabletray modeling parameters. See “Setting Default Equipment and Cabletray Support Parameters” on page 2-5.

See Chapter 2, “Support Setup Options” for a detailed description of these options.

Modeling Tasks

To access the Modeling Tasks:

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment/Cabletray Support Task Set appears.

Figure 1-2 Equipment/Cabletray Support Task Set

EQPT SUPT		
INSERT ESUPPORT		INSERT CSUPPORT
INSERT PAD		INSERT ELINER
INSERT BOLTHOLE		SUPPORT EDITING PALETTE
DELETE ESUPPORT		DELETE PAD
DELETE LINER		DELETE BOLTHOLE
RELATE ESUPPORT		UNRELATE ESUPPORT
CONNECT ESUPPORT		DISCONNECT ESUPPORT
JOIN SUPPORT		TRIM ESUPPORT
TRANSLATE ESUPPORT		MIRROR ESUPPORT
ROTATE ESUPPORT		MARK ESUPPORT
GENERATE SULABEL		GENERATE SUBBASE
DRAW ESUPPORT		UPDATE SUPPORT

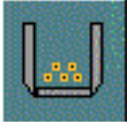
Options on the Equipment Support Task Set

The various options on the Equipment Support Task Set are:



INSERT ESUPPORT

Use this option to insert equipment support units into a 3-D CADD model. See “Inserting an Equipment Support Unit” on page 3-4.



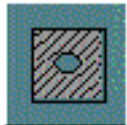
INSERT CSUPPORT

Use this to insert cabletray support units into a 3-D CADD model. See “Inserting a Cabletray Support Unit” on page 3-19.



INSERT PAD

Use this to insert a support pad at the end of an axial member. See “Inserting a Pad” on page 3-26.



INSERT ELINER

Use this to insert a liner between the equipment and its related equipment support. See “Inserting a Liner” on page 3-28.



INSERT BOLT HOLE

Use this to insert bolt holes on support members, both axial and plate members. See “Inserting a Bolt Hole” on page 3-36.



SUPPORT EDITING PALETTE

Use this to edit the support unit or support member data and attributes, or to modify existing bolt holes on the axial or plate support member. See “Editing an Equipment or Cabletray Support Unit” on page 3-41 and “Modifying a Bolt Hole” on page 3-46.



DELETE ESUPPORT

Use this to delete equipment or cabletray support units and/or support members. See “Deleting an Equipment or Cabletray Support Unit” on page 3-48.



DELETE PAD

Use this to delete support pads from the associated axial member. See “Deleting a Pad” on page 3-50.



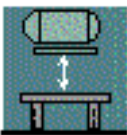
DELETE ELINER

Use this to delete liners from an equipment support. See “Deleting a Liner” on page 3-52.



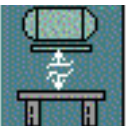
DELETING BOLT HOLE

Use this to delete bolt holes from support members. See “Deleting a Bolt Hole” on page 3-54.



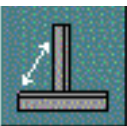
RELATE ESUPPORT

Use this to relate a support unit to the equipment that it supports or an aerial member to the cabletray that it supports. See “Relating a Support to Equipment or Axial Member to Cabletray” on page 3-56.



UNRELATE ESUPPORT

Use this to unrelate equipment or cabletray support units from the equipment or cabletray that they support. See “Unrelating a Support from Equipment or Cabletray” on page 3-59.



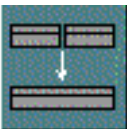
CONNECT ESUPPORT

Use this to connect support units to form a new equipment or cabletray support unit. See “Connecting an Equipment or Cabletray Support” on page 3-61.



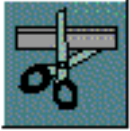
DISCONNECT ESUPPORT

Use this to disconnect support members from an equipment or cabletray support unit. See “Disconnecting an Equipment or Cabletray Support” on page 3-62.



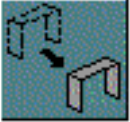
JOIN SUPPORT

Use this to join two colinear axial support members and regenerate one resultant linear support member. See “Joining a Support Axial Member” on page 3-64.



TRIM ESUPPORT

Use this to trim or stretch axial members. See “Trimming a Support Axial Member” on page 3-65.



TRANSLATE ESUPPORT

Use this to translate equipment or cabletray support units along a given translation vector. See “Translating/Copying an Equipment or Cabletray Support” on page 3-67.



MIRROR ESUPPORT

Use this to mirror equipment or cabletray support units about a given mirror plane. See “Mirroring/Copying an Equipment or Cabletray Support” on page 3-69.



ROTATE ESUPPORT

Use this to rotate equipment or cabletray support units about a given rotation axis. See “Rotating/Copying an Equipment or Cabletray Support” on page 3-71.



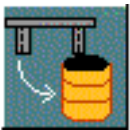
MARK SUPPORT

Use this to mark and highlight the support units in color. See “Marking/Highlighting an Equipment or Cabletray Support” on page 3-75.



GENERATE SULABEL

Use this to generate a label for related equipment or a cabletray support unit, in the specified format. See “Generating an Equipment Support Label” on page 3-77.



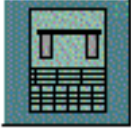
GENERATE SUDBASE

Use this to store the support unit information to the external relational database through the SQL HLI. See “Generating an Equipment or Cabletray Support Database” on page 3-85.



DRAW ESUPPORT

Use this to generate an equipment or cabletray support installation drawing. See “Generating an Equipment Support Drawing” on page 3-88.



UPDATE SUPPORT

Use this to read the support unit information from the external relational database through the SQL HLI and update the corresponding support unit model in the active part. See “Updating an Equipment or Cabletray Support from Database” on page 3-98.

See Chapter 3, “Support Modeling Tasks” for a detailed description of these options.

Reporting Options

To access the Reporting options:

1. Choose Query option on the CADD5 Environment Globals I menu to display the Reporting menu.
2. Choose Supports on the Reporting menu to display the Supports Verification command palette.

Figure 1-3 Supports Verification Palette



3. Choose an option from the Support Verification command palette.



VERIFY PIPE SUPPORT

Use this to display the Verify Support property sheet. It enables you to list the data and properties of pipe supports. For details, see *Pipe Supports User Guide and Menu Reference*, Chapter 4.



VERIFY EQUIPMENT AND CABLETRAY SUPPORT

Use this to display the Verify Equipment Supports property sheet. It enables you to verify and list selected equipment support parameters. For details, see “Verifying Equipment/Cabletray Supports” on page 4-3.



LIST PIPE SUPPORT PARAMETERS

Use this to list the default values of the pipe support parameters. It is a direct action option. For details, see *Pipe Supports User Guide and Menu Reference*, Chapter 4.



LIST EQUIPMENT/CABLETRAY SUPPORT PARAMETERS

Use this to list the default values of the equipment support parameters. This is a direct action option. For details, see “Listing Equipment/Cabletray Support Parameters” on page 4-6.

See Chapter 4, “Support Reporting Options” for a detailed description of these options.

Support Setup Options

Before starting a work session with Equipment and Cabletray Support, you need to set up the default parameter values for Supports. These default parameter values are used for creating the support units.

- Overview of Support Setup Options
- Setting Up Default Pipe Support Parameters
- Setting Default Equipment and Cabletray Support Parameters

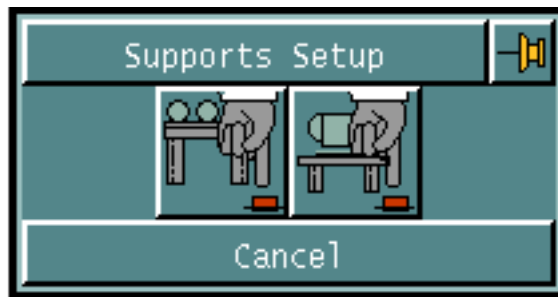
Overview of Support Setup Options

Use the Supports option from the Setup menu to set the default pipe support and equipment support modeling parameters that create Equipment Support models.

Accessing the Support Setup Palette

1. Choose Supports from the Environment Access Menu.
2. Choose Setup on the Environment Management area of top bar to display the Setup menu.
3. Choose Supports on the Setup menu to display the Supports Setup palette.

Figure 2-1 Support Setup Palette



4. Choose the required option from the Support Setup command palette. For a brief description of the options in the EQPT SUPT task set refer to “Setup Options” on page 1-7.

The detailed descriptions of these options are discussed in the following sections.

Setting Up Default Pipe Support Parameters

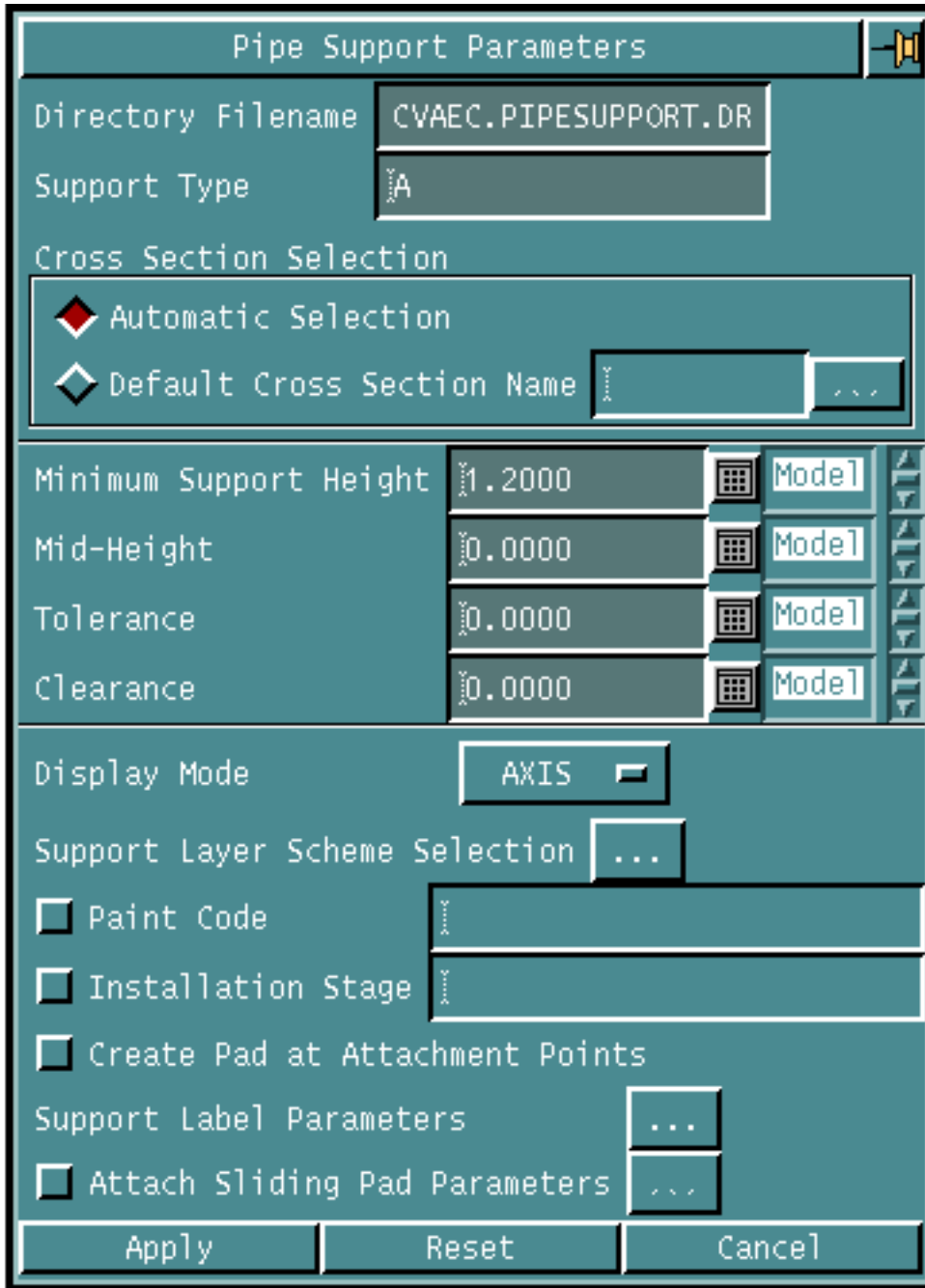


Use **SELECT PIPE SUPPORT PARAMETERS** to setup the default pipe support modeling parameters before beginning a work session with Pipe Supports. These default parameter values are used when you create pipe support units.

Using This Option

1. Choose Supports from the Environment Access Menu.
2. Choose Setup on the Environment Management area of top bar to display the Setup menu.
3. Choose Supports on the Setup menu to display the Supports Setup command palette.
4. Choose Select Pipe Support Parameters from the Supports Setup command palette. The Pipe Support Parameters property sheet appears.

Figure 2-2 Pipe Support Parameters Property Sheet



See Chapter 2, “Setting Up Pipe Support Parameters” of the *Pipe Support User Guide and Menu Reference* for details on the pipe support parameters.

Setting Default Equipment and Cabletray Support Parameters

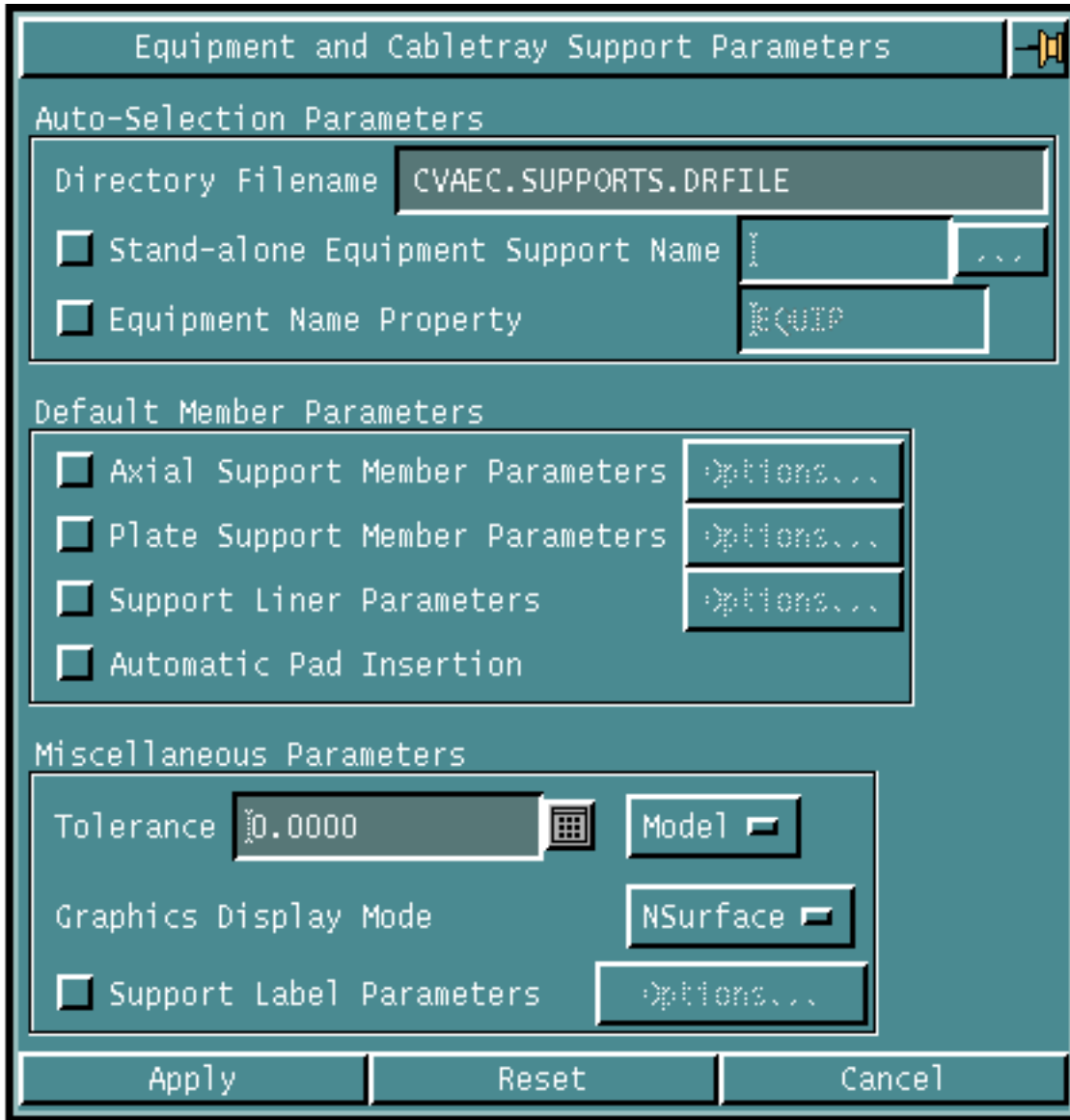


Use **SELECT EQUIPMENT AND CABLETRAY SUPPORT PARAMETERS** to set various default equipment and cabletray support modeling parameters before beginning a work session with Equipment and Cabletray Support. These default parameter values are used when you create equipment support units.

Using This Option

1. Choose Supports from the Environment Access Menu.
2. Choose Setup on the Environment Management area of top bar to display the Setup menu.
3. Choose Supports on this menu to display the Supports Setup command palette.
4. Choose Select Equipment And Cabletray Support Parameters from the Supports Setup command palette. The Equipment and Cabletray Support Parameters property sheet appears.

Figure 2-3 Equipment and Cabletray Support Parameters Property Sheet

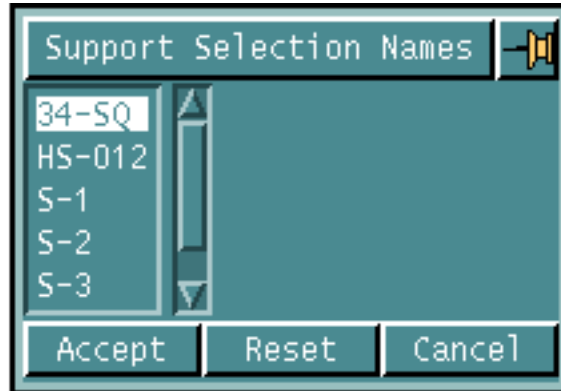


Procedure

1. Choose the auto-selection parameter options.
 - Choose Directory Filename and enter the name of the directory file to be used for equipment and cabletray support modeling. The directory file contains the names of autoselection files, which in turn contain information regarding the various equipment and cabletray support components. The default directory file is CVAEC.SUPPORTS.DRFILE.
 - Click Stand-alone Equipment Support Name and enter the default equipment support name for standalone support insertion. Click the

Stand-alone Equipment Support Name list button. The Support Selection Names scroll list appears.

Figure 2-4 Support Selection Names Scroll List



Choose the required support name from the list and click Accept.

- Click Equipment Name Property to read the equipment name from the equipment Nodal Figure. Enter the property name. The equipment name is used for the auto-selection of the equipment support name for equipment support insertion.
2. Choose any of the following default member parameter options.
- Click Axial Support Member Parameters to select the modeling parameters for axial members. Click the Options... button. The Axial Member Parameters property sheet appears. For details, see “Specifying Default Axial Support Member Parameters” on page 2-9.
 - Click Plate Support Member Parameters to specify the insertion parameters for plate members. Click the Options... button. The Plate Member Parameters property sheet appears. For details, see “Specifying Default Plate Support Member Parameters” on page 2-12.
 - Click Support Liner Parameters to specify the liner insertion default values. Click the Options... button. The Support Liner Parameters property sheet appears. For details, see “Specifying Default Support Liner Parameters” on page 2-14.
 - Choose Automatic Pad Insertion to automatically insert a pad at the equipment or cabletray support attachment points. The axial member length is adjusted for the pad thickness.

3. Choose any one of the miscellaneous parameters option.
 - Enter the default tolerance value in the Tolerance field and choose a unit from the Unit option list. This option specifies the maximum offset distance allowed between the support insertion point on the equipment and its support unit. The default distance is 0.0 model units. For details, see “Specifying Measurement Units” on page 2-16.
 - Click the Graphics Display Mode list button to specify the visual presentation of the support member. For details, see “Specifying Default Display Modes” on page 2-17.
 - Click Support Label Parameters to set up default parameters. This fixes the support label format before generating equipment support labels. Click the Options... button. The Support Label Parameters property sheet appears. For details, see “Specifying Default Support Label Parameters” on page 2-18.
4. Click Apply.

Specifying Options on the Equipment and Cabletray Support Parameters Property Sheet

Given below are the details of the options on the Equipment and Cabletray Support Parameters property sheet

Specifying Default Axial Support Member Parameters

Use the Axial Member Support Parameters option to select modeling parameters for axial members.

1. Choose Axial Support Member Parameters on the Equipment and Cabletray Support Parameters property sheet. Click the Options... button. The Axial Member Parameters property sheet appears.

Figure 2-5 Axial Member Parameters Property Sheet

The screenshot shows the 'Axial Member Parameters' dialog box. It has a title bar with the text 'Axial Member Parameters' and a red close button. The dialog is divided into several sections:

- Section Name:** A text field containing 'I' and a list button '...'.
- Material Number:** A text field containing '1' and a list button '...'.
- Priority Number:** A text field containing '10' and a list button '...'.
- Trace Curve Placement:** A dropdown menu set to 'Center'.
- Model Entity Graphics Creation Layer:** A section with two radio buttons: 'Current Layer' (selected) and 'Specify Layer'. The 'Specify Layer' option has a text field containing 'D' and a list button '...'.
- Visualization Graphics Creation Layer:** A section with two radio buttons: 'Specify Layer' (selected) and 'Increment Layer By'. The 'Specify Layer' option has a text field containing '-245' and a list button '...'. The 'Increment Layer By' option has a text field containing 'D' and a list button '...'.

At the bottom of the dialog are three buttons: 'Accept', 'Reset', and 'Cancel'.

2. Click the Section Name to specify the default cross section name for axial member insertion. Enter the default cross section name in the field or click the Section Name list button to display the Section Names Scroll List, see Figure 2-4. Choose the required default cross section for the axial member insertion and click Accept.
3. Enter the default plate member material number in the Material Number field. A material description is defined in the materials file. The default material number is 1.

4. Enter the plate member priority number in the Priority Number field. The default number is 10.
5. Click the Trace Curve Placement option list button to specify the location of the cross section with reference to the projection axis or trace curve. The Trace Curve Placement option list appears.

Figure 2-6 Trace Curve Placement Option List



- Choose Center to place the trace curve at the center of the cross section. This is the default.
OR
- Choose Top to place the trace curve at the top of the cross section. The top portion is the largest positive y value of the section.
OR
- Choose Bottom to place the trace curve at the bottom of the cross section. The bottom portion is the largest negative y value of the section.
OR
- Choose Left to place the trace curve at the centre left of the cross section. The left portion is the largest negative x value of the section.
OR
- Choose Right to place the trace curve at the centre right of the cross section. The right portion is the largest positive x value of the section.
OR
- Choose Top Left to place the trace curve at the top left corner of the cross section.
OR

- Choose Top Right to place the trace curve at the top right corner of the cross section.
OR
 - Choose Bottom Left to place the trace curve at the bottom left corner of the cross section.
OR
 - Choose Bottom Right to place the trace curve at the bottom right corner of the cross section.
6. Choose one of the following model entity graphics creation layer options.
- Click Current Layer to specify that the model entities, like Nodal Figure and projection axis, are to be created on the currently active layer. This is the default.
OR
 - Choose Specify Layer to specify that the model entities are to be created on the specified layer. Enter the default creation layer number in the field.
7. Choose one of the following Visualization Graphics Creation Layer options.
- Click Specify Layer to specify the layer on which the visualization graphics entities are to be created. Enter the default creation layer number in the field.
OR
 - Click Increment Layer By to specify a new increment value such that the visualization graphics entities are to be created on layer $L+n$, where L is the layer on which the model entities reside and n is the specified increment value. By default, the visualization graphics entities are created 10 layers away from the model entities, in the positive direction.
8. Click Accept.

Specifying Default Plate Support Member Parameters

Use the Plate Support Member Parameters option to specify the insertion parameters for plate members.

1. Choose Plate Support Member Parameters on the Equipment and Cabletray Support Parameters property sheet. Click the Options... button. The Plate Member Parameters property sheet appears.

Figure 2-7 Plate Member Parameters Property Sheet

Plate Member Parameters

Thickness 0.0000 Model

Material Number 1

Priority Number 10

Plate Boundary Curve Placement Center

Model Entity Graphics Creation Layer

◆ Current Layer

◇ Specify Layer 0

Visualization Graphics Creation Layer

◆ Specify Layer -245

◇ Increment Layer By 0

Accept Reset Cancel

2. Enter the thickness of the plate in the Thickness field. Choose a unit from the Unit option list. The default is 1.0 units. For details, see “Specifying Measurement Units” on page 2-16.
3. Enter the default plate member material number in the Material Number field. A material description is defined in the materials file. The default material number is 1.
4. Enter the plate member priority number in the Priority Number field. The default number is 10.

5. Click the Plate Boundary Curve Placement option list button to define the of the plate boundary placement. The Plate Boundary Curve Placement option list appears.

Figure 2-8 Plate Boundary Curve Placement Option List



- Choose Center to place the boundary curve defining the perimeter at the center of the plate. This is the default.
OR
 - Choose Top to place the boundary curve on the top face of the plate. The bottom face is on the negative side of global Z-axis.
OR
 - Choose Bottom to place the boundary curve on the bottom face of the plate. The top face is on the positive side of global Z-axis.
6. Choose one of the following model entity graphics creation layer options.
 - Choose Current Layer to specify that the model entities, like Nodal Figure and boundary curve, are to be created on the currently active layer. This is the default.
 - Choose the Specify Layer to specify that the model entities are to be created on the specified layer. Enter the default creation layer number in the field.
 7. Choose one of the following visualization graphics creation layer options.
 - Choose the Specify Layer to specify the layer on which the visualization graphics entities are to be created. Enter the default creation layer number in the field.
 - Click the Increment Layer By to specify a new increment value such that the visualization graphics entities are to be created on layer $L+n$, where L is the layer on which the model entities reside and n is the specified increment value. By default the visualization graphics entities are created 10 layers away from the model entities in the positive direction.
 8. Click Accept.

Specifying Default Support Liner Parameters

Use the Support Liner Parameters option to specify the liner insertion default values.

1. Choose Support Liner Parameters on the Equipment and Cabletray Support Parameters property sheet. Click the Options... button. The Support Liner Parameters property sheet appears.

Figure 2-9 Support Liner Parameters Property Sheet

Support Liner Parameters

Liner Default Dimension

Height 0.0500 Model

Width 0.0500 Model

Thickness 0.1500 Model

Height Adjustment 0.0500 Model

Specify Bolt Hole Offset From Liner's Origin

Along Local X-axis 0.0000 Model

Along Local Y-axis 0.0000 Model

Specify Hatch Line Parameters

Angle 45.0000

Spacing 0.1000 Model

Accept Reset Cancel

2. Choose any of the following liner default dimension options.

- Enter the default height of the liner to be inserted in the Height field. This liner is attached to the axial or plate member of the equipment support unit. The height is the dimension of the liner along its local Y-axis. Click the Unit option list button to specify the measurement unit. For details, see “Specifying Measurement Units” on page 2-16. The default height is 50 mm.
- Enter the default width of the liner to be inserted in the Width field. This liner is attached to the axial or plate member of the equipment support unit. The width is the dimension of the liner along its local X axis. Click the Unit option list button to specify the measurement unit. For details, see “Specifying Measurement Units” on page 2-16. The default width is 50 mm.
- Enter the default thickness of the liner to be inserted in the Thickness field. Click the Unit option list button to specify the measurement unit. For details, see “Specifying Measurement Units” on page 2-16. The default thickness is 15mm.
- Click the Height Adjustment to specify the trimming or adjustment value for adjusting the dimension of the liner that is to be attached to the axial member of the equipment support. Enter an adjustment value. Click the Unit option list button to specify the measurement unit. For details, see “Specifying Measurement Units” on page 2-16. The default height is 50 mm. Deselect this option to indicate that no trimming value is used to compute the dimension of the liner, the specified height and width are used instead.

This option is only applicable to a liner which is being attached to axial member, and the dimension of the liner (either height or width, whichever is aligned with the width of the member section) is the member section width minus the specified trimming value.

3. Choose Specify Bolt Hole Offset From Liner’s Origin to specify that the bolt hole is to be located on the liner with the specified offset distance from the center of the liner.

- Enter the offset distance in the Along Local X-Axis field to specify the offset distance of the bolt hole from the center of the liner plate along its local X-axis direction. Click the Unit option list button to choose the measurement unit. For details, see “Specifying Measurement Units” on page 2-16. The default distance is 0.0.
- Enter the offset distance in the Along Local Y-Axis field to specify the offset distance of the bolt hole from the center of the liner plate along its local Y-axis direction. Click the Unit option list button to choose the measurement unit. For details, see “Specifying Measurement Units” on page 2-16. The default distance is 0.0.

4. Choose Specify Hatch Line Parameters to insert a cross hatch model entity, that is, bound by the boundary curve of the liner. Deselect this option to indicate that no cross hatch line to be created.
 - Enter an angle in degrees in the Angle field to specify the angle of cross hatch lines to be created. The default angle is 45 degrees.
 - Enter the spacing in the Spacing field to specify the spacing of the cross hatch lines to be created. The default spacing is 0.1 units. See “Specifying Measurement Units” on page 2-16.

Specifying Measurement Units

Use the Unit option list to specify the measurement units for various parameters.

1. Click Unit option list button. The Measurement Units option list appears.

Figure 2-10 Measurement Units Option List



2. Choose one of the measurement unit options displayed.
 - Choose Model for model unit in the active part. This is the default.
OR
 - Choose IN for inches.
OR
 - Choose FT for feet.
OR
 - Choose MI for miles.
OR

- Choose MM for millimeters.
OR
- Choose CM for centimeters.
OR
- Choose M for meters.
OR
- Choose KM for kilometers.

Specifying Default Display Modes

Use the Graphics Display Mode option list to specify the visual presentation of the support member.

1. Click Graphics Display Mode option list button on the Equipment and Cabletray Support Parameters property sheet. The Graphics Display option list appears.

Figure 2-11 Graphics Display Mode Option List



- Choose Simple to display the support member as a local Nfigure and simple wire frame graphical entities. That is, the projection axis is generated for axial member and the boundary curve is generated for the plate member.
OR
- Choose Profile to display the support member as a local Nfigure with profile wire frame graphical entities. That is, the projection axis and cross section profile is generated for axial member and the boundary curve and thickness axis is generated for the plate member.
OR
- Choose NSurface to display the support member as a local Nfigure and 3-D representation with minimum number of NURB surface entities.
OR
- Choose Solid to displays the support member as a local Nfigure and 3-D representation like solids.

Specifying Default Support Label Parameters

Use the Support Label Parameters option to set the default parameters for the support label generation.

- 1. Choose Support Label Parameters on the Equipment and Cabletray Support Parameters. Click the Options... button. The Support Label Parameters property sheet appears.**

Figure 2-12 Support Label Parameters Property Sheet



The dialog box is titled "Support Label Parameters" and contains several sections for configuring support parameters. It includes checkboxes for generating mnemonic fields for cabletray and equipment support, radio buttons for selecting supported types or specified text, and a section for configuring a label number field with input boxes for width, starting number, and step size, along with a dropdown for number ordering. At the bottom, there is a "Label Text Box" dropdown and three buttons: "Accept", "Reset", and "Cancel".

Support Label Parameters

Generate Mnemonic1 Field For Cabletray Support

Use Supported Cabletray Type

Use Specified Text: JPB

Generate Mnemonic1 Field For Equipment Support

Use Supported Equipment Type

Use Specified Text: EQ

Label Number Field

Field Width: 3

Starting Number: 1

Step Size: 1

Number Ordering Along: X-Axis, Ascending

Generate Mnemonic2 Field

Use Stage Name Property

Use Block Name Where Support Resides

Use Specified Text: I

Label Text Box: None

Accept Reset Cancel

2. Choose Generate Mnemonic1 Field For Cabletray Support to create the cabletray support label with a MNEMONIC1 field. Deselect this option if cabletray support label is to be created with no MNEMONIC1 field.
 - Click Use Supported Cabletray Type to specify that the cabletray support label is created using the cabletray type name in the MNEMONIC1 field of the label. This is the default.
 - Click Use Specified Text to specify a text string for the MNEMONIC1 field of the cabletray support label. Enter a text string in the field.
3. Choose Generate Mnemonic1 Field for Equipment Support to specify that the equipment support label is created with a MNEMONIC1 field. Deselect this option if equipment support label is to be created with no MNEMONIC1.
 - Click Use Supported Equipment Type to specify that the equipment support label is created using the equipment type name in the MNEMONIC1 field of the label. This is the default.
 - Click Use Specified Text to specify a text string for the MNEMONIC1 field of the equipment support label. Enter the text string in the field.
4. Specify any of the following label number field options.
 - Enter the width or the number of digits in the Field Width field to specify the width of the support label. The default width is 3 digits.
 - Enter Starting Number to specify the starting number (that is used as the label number) to generate the label for the selected support units. If the specified starting number is -1, then always use the most recently used label number for a given MNEMONIC1 and MNEMONIC2 being stored in the active part.
 - Enter Step Size to specify the incremental step size for generating the support label. For each selected support unit, the support label is created with the label number $N+n$, where N is the most recently used label number for a given MNEMONIC1 and MNEMONIC2 being stored in the active part or the specified starting label number and n is the incremental step size. The default is 1.
 - Choose an option from the Number Ordering Along option list, see Figure 2-13, to specify the global axis for generating the label number. This number is generated based on the support unit's location along the specified axis. the default is to generate the number along the X-Axis. The other options are Y-Axis and Z-Axis.

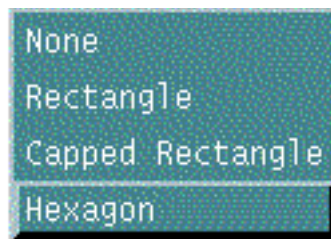
This option also specifies the order to generate the label number, in either ascending or descending order, based on the support unit's location along the X-, Y- or Z-axis. The options are ascending and descending. The default order is ascending.

Figure 2-13 Number Ordering Along Option List



5. Choose any one of the following Generate Mnemonic2 Field options.
 - Choose Use Stage Name Property to indicate that the installation stage name of the support is used in the support label MNEMONIC2 field. This is the default. If the stage name cannot be determined, no label is created.
 - Choose Use Block Name Where Support Resides to indicate that the name of the block, where the support exists, is used in the support label MNEMONIC2 field. If the block name is not determined for the support, no label is created.
 - Choose Use Specified Text and specify the text string for the support label MNEMONIC2 field.
6. Choose an option from the Label Text Box option list to specify that a text box is to be created around the support label text. By default, no label is created.

Figure 2-14 Label Text Box Option List



- Choose None if you do not want to create a text box around the support label text. This is the default.
- Choose Rectangle if you want the box to be rectangle.
- Choose Capped Rectangle if you want the box to be a capped rectangle with rounded ends.
- Choose Hexagon if you want a hexagon around the label text.

Support Modeling Tasks

This chapter describes Support Modeling tasks. These tasks include creating, editing, modifying and deleting equipment support units.

- Overview
- Inserting an Equipment Support Unit
- Inserting a Cabletray Support Unit
- Inserting a Pad
- Inserting a Liner
- Inserting a Bolt Hole
- Support Editing Palette
- Editing an Equipment or Cabletray Support Unit
- Modifying a Bolt Hole
- Deleting an Equipment or Cabletray Support Unit
- Deleting a Pad
- Deleting a Liner
- Deleting a Bolt Hole
- Relating a Support to Equipment or Axial Member to Cabletray
- Unrelating a Support from Equipment or Cabletray
- Connecting an Equipment or Cabletray Support
- Disconnecting an Equipment or Cabletray Support
- Joining a Support Axial Member
- Trimming a Support Axial Member
- Translating/Copying an Equipment or Cabletray Support
- Mirroring/Copying an Equipment or Cabletray Support

- Rotating/Copying an Equipment or Cabletray Support
- Marking/Highlighting an Equipment or Cabletray Support
- Generating an Equipment Support Label
- Generating an Equipment or Cabletray Support Database
- Generating an Equipment Support Drawing
- Updating an Equipment or Cabletray Support from Database

Overview

Choose the Supports option from the Environment Access menu and then choose the Eqpt Supt Task Set. Each task is either a direct action or it displays a command palette, a property sheet or a menu.

Use the Equipment Support Task Set to produce an equipment support model. You can create, edit and display Equipment Support models.

To create Equipment Support models, use the default equipment support parameters and properties set in the Setup Options. For details, see “Setting Default Equipment and Cabletray Support Parameters” on page 2-5.

Accessing the Equipment/Cabletray Support Task Set

To access the EQPT SUPT Task Set options:

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment/Cabletray Support Task Set appears. For a brief description of the options in the EQPT SUPT task set refer to “Modeling Tasks” on page 1-8.

The detailed descriptions of these options are discussed in the following sections.

Inserting an Equipment Support Unit



Use INSERT ESUPPORT to insert equipment support units, based on pre-defined support types and cross sections, into a 3-D CADD model. An equipment support member can be either an axial element or plate. The equipment name, the support insertion location, and orientation can be read from the equipment. Each equipment support type is defined in the corresponding definition file.

Please note: For each of the selected equipment in the active and viewed parts, the equipment must be a standalone and should not be supported by any support unit. That is, an equipment can only be supported by one support unit. However, an equipment support can support more than one equipment.

This option reads the name from the selected equipment, uses it to process the various equipment support autoselection files, and determines the definition file and parameters used for insertion.

For each axial attachment member, you can determine the member attachment point in one of the following modes:

- Automatic Insertion Mode

In this mode, the attachment point is automatically determined in the following manner. You must select either the All Equipments from Active/Viewed Parts option or the Equipments in Specified Blocks option. The nearest reference structure onto which the axial member can be attached to is found and the equipment support unit is attached to it. For details, see the All Equipments from Active/Viewed Parts or Equipments in Specified Blocks option on page 3-8.

- Interactive Insertion Mode

In this mode, you explicitly select the actual attachment point. The selected points trim or stretch the attachment axial member for creation. The selected reference structural determines the actual attachment point if you use the End Type List. For details, see the End Type List option on page 3-9.

An equipment support can be inserted as either standalone or related to an existing every bolt hole on the equipment must have a corresponding bolt hole on the support unit. This must have the same location and orientation as the bolt hole on the related equipment.

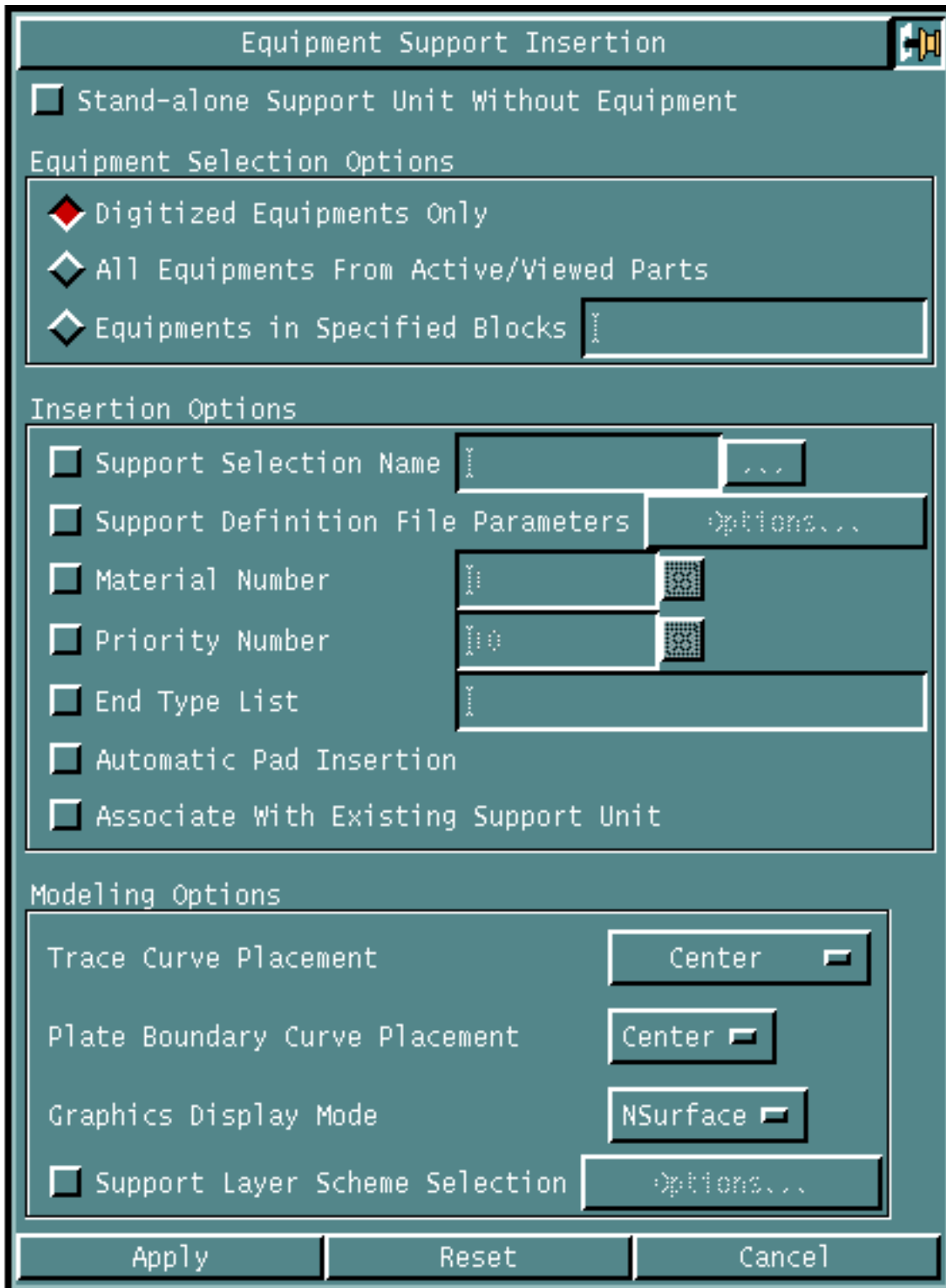
The nearest support members are found by dropping the origin of the equipment bolt hole along its own local Z-axis onto each of the support members. Such an intersection must be found on any of the support members. If a bolt hole exists on the support member at an intersection point with the same orientation, it is related to the corresponding bolt hole on the equipment. If such a bolt hole does not exist on the support member, it is inserted and related to the corresponding bolt hole on the equipment.

Please note: If you select the All Equipments from Active/Viewed Parts option or the Equipments in Specified Blocks option, then all the stand-alone equipments in active/viewed CADDs parts are selected and processed as described above.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment/Cabletray Support Task Set appears.
3. Choose the Insert Esupport option from the Eqpt Supt Task Set. The Equipment Support Insertion property sheet appears.

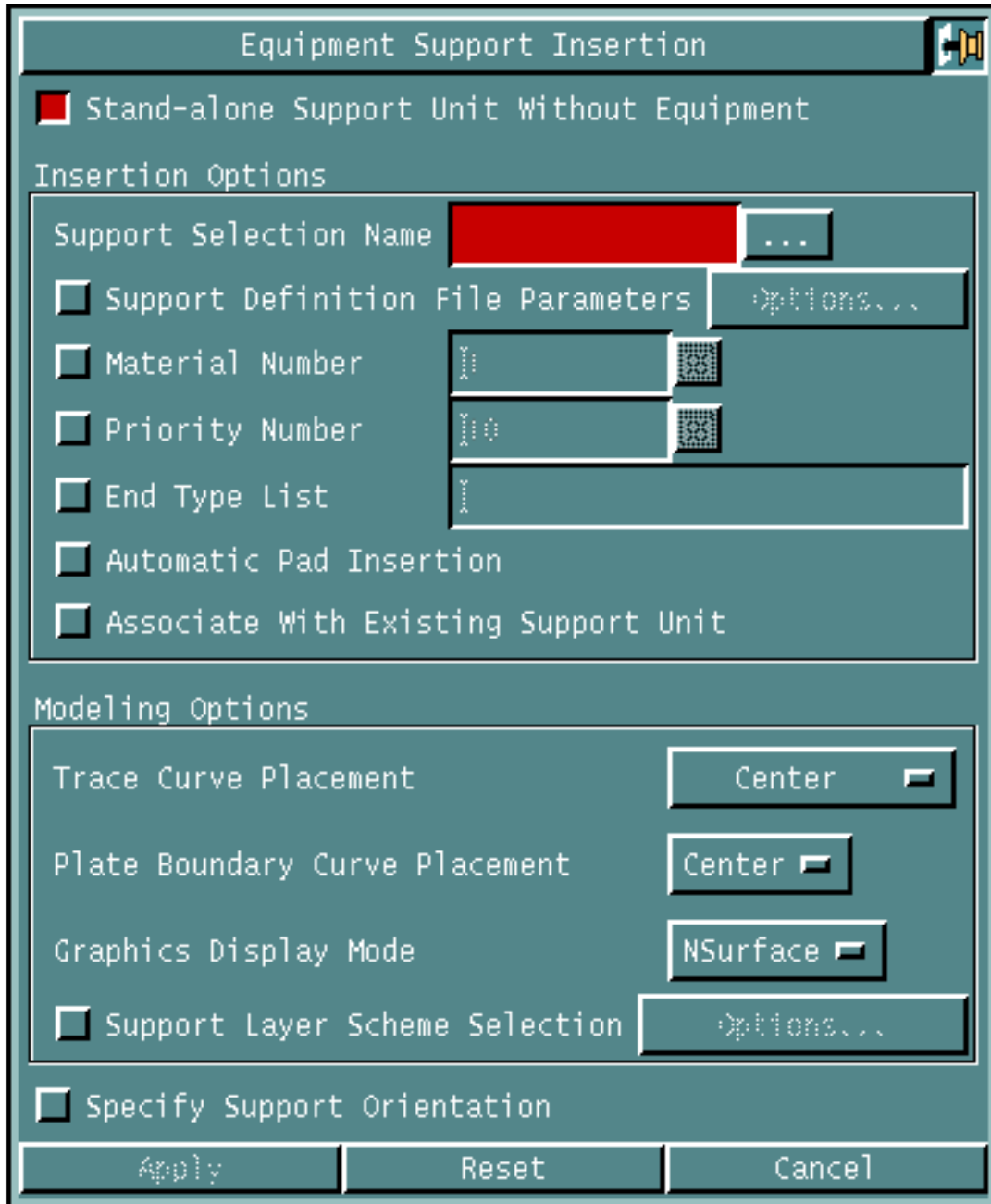
Figure 3-1 Equipment Support Insertion Property Sheet



Procedure

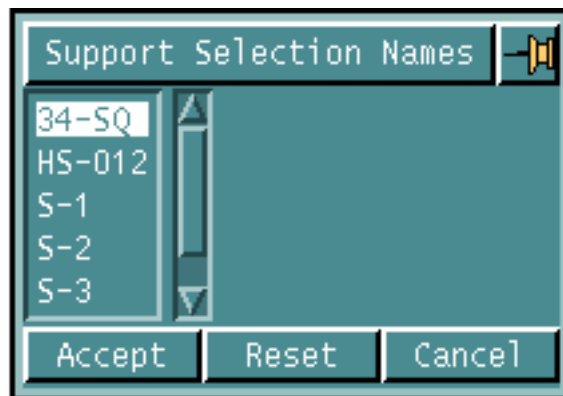
1. Choose Stand-alone Support Unit Without Equipment to create a support unit that does not support any equipment at present. When you choose this option the property sheet changes as shown below. If you have chosen this option, proceed to Step 3.

Figure 3-2 Equipment Support Insertion Property Sheet Without Equipment



2. If you have not chosen the Stand-alone Support Unit Without Equipment, then click one of the following equipment selection options.
 - Click Digitized Equipment Only to insert equipment support units to selected equipment units.OR
 - Click All Equipments from Active/Viewed Parts to insert equipment support units to all equipments from active or viewed parts.OR
 - Click Equipments in Specified Blocks to insert equipment support units to all equipments from specified blocks.
3. Choose the following insertion options.
 - Choose Support Selection Name and click the list button. A list of support selection names appears.

Figure 3-3 Support Selection Names List



Choose the required Support name from the list and click Accept.

- Choose Definition File Parameters to specify the float point and section name parameters, as required by the equipment support definition file for insertion. Click the Options... button to display the Support Definition File Parameters property sheet. For details, see “Specifying Select Parameters” on page 3-10.
- Choose the Material Number to specify the structural material number for the support member. The default material is 1. To use the default material number as specified in the Setup options, deselect this option. For details, see “Specifying Default Axial Support Member Parameters” on page 2-9 and “Specifying Default Plate Support Member Parameters” on page 2-12.

- Choose the Priority Number and enter the structural priority number. The default is 10. You can change the default using the Setup options. For details, see “Specifying Default Axial Support Member Parameters” on page 2-9 and “Specifying Default Plate Support Member Parameters” on page 2-12.
 - Choose End Type List and enter the end type to specify the attachment endtype names. These determine how the attachment members of the equipment support should attach to the corresponding reference structures.

The end type attachment is valid only if the member can properly stand on the appropriate surface of the reference structure with sufficient welding space. If valid, the support member is created and attached to the selected reference structure.

There must be a one to one correspondence between the endtype name and equipment support attachment point. The number of selected reference structures cannot be less than the number of attachment points required, otherwise an error message is displayed.
 - Choose Automatic Pad Insertion to insert the pad at the attachment point of all the equipment support axial members. The default is as set in the Setup option. For details, see “Setting Default Equipment and Cabletray Support Parameters” on page 2-5.
 - Choose Associate with Existing Support Unit to automatically connect the inserted support unit to an existing support unit.
4. Specify the required modeling options.
- Click the Trace Curve Placement option list button to specify the location of the section with respect to the trace curve. By default, the section origin is located on the center. For details, see “Specifying Trace Curve Placement” on page 3-12.
 - Click the Plate Boundary Curve Placement to define the placement of the plate with respect to the boundary curve. By default, the boundary curve is placed at the center of the plate. For details, see “Specifying Plate Boundary Curve Placement” on page 3-13.
 - Click the Graphics Display Mode option list button to specify the visual presentation of the equipment support. The Graphics Display Mode option list appears. Choose a visual presentation option to update the equipment support unit. For details, see “Specifying Graphics Display Mode” on page 3-14.
 - Choose Support Layer Scheme Selection to specify the layer on which the equipment support axial member's projection axis, or plate member boundary curve and Nfigure graphics are created. Click the Options... button to display the Support Layer Scheme property sheet. For details, see “Specifying Support Layer” on page 3-15.

5. If you have selected Stand-alone Support Unit Without Equipment, see Figure 3-2, you can choose Specify Support Orientation to specify the orientation of the equipment support.
6. Click Apply.

If you have selected Specify Support Orientation to specify the orientation of the equipment support, then Equipment Support Orientation Property Sheet appears. For details, see “Specifying Equipment Support Orientation” on page 3-16.

Specifying Options on the Equipment Support Insertion Property Sheet

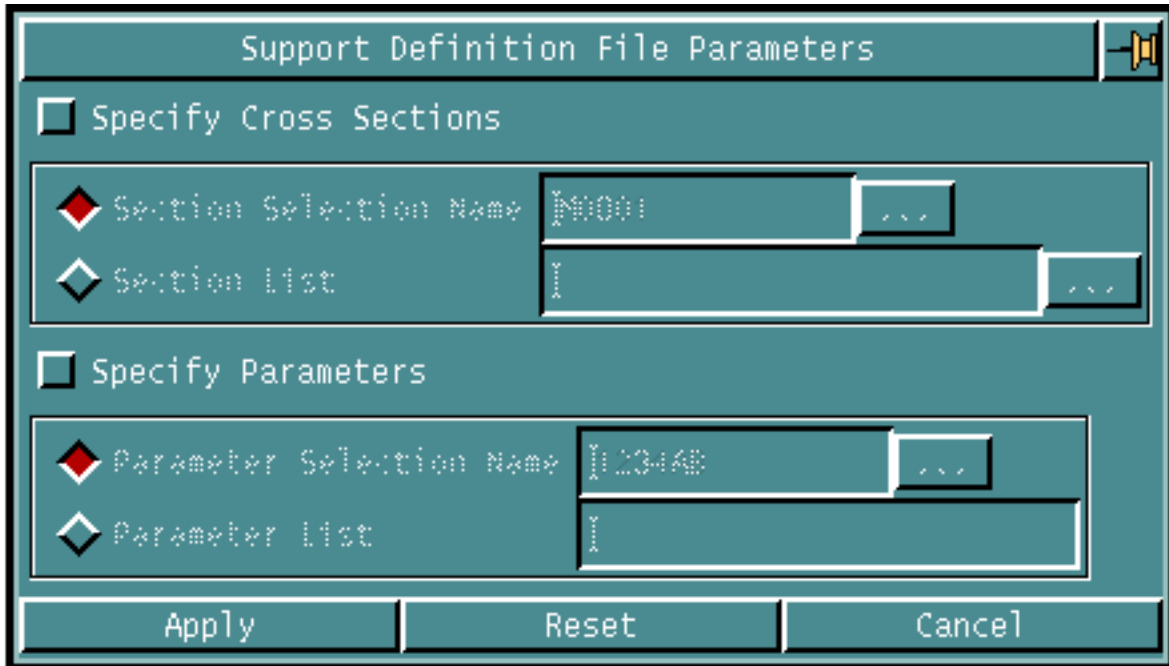
Given below are the details of the options on the Equipment Support Insertion property sheet.

Specifying Select Parameters

Use the Support Definition File Parameters to specify the float point parameters, as required by the equipment support definition file for insertion.

1. Choose Support Definition File Parameters on the Equipment Support Insertion property sheet.
2. Click Apply. The Support Definition File Parameters property sheet appears.

Figure 3-4 Support Definition File Parameters Property Sheet



3. Choose Specify Cross Section to indicate the section names to be used along with the equipment support definition file for insertion.
 - Click Section Selection Name to specify the section selection name. These section names come from the Equipment Support Section Parameter Autoselection File.
Click the options button. The Section Selection Name List appears. Choose the section name and click Accept.
OR
 - Click Section List to specify the list of section names you can use, along with the equipment support definition file for insertion.
Click the options button. The Section Names List appears. Choose the section list and click Accept.
4. Choose Specify Parameters to indicate the section name parameters to be used along with the equipment support definition file for insertion.
 - Click Parameter Selection Name to specify parameter selection names from the Equipment Support Specification file.
Click the options button. The Parameters Selection Names List appears. Choose the parameter name and click Accept.
For stand-alone cases, the default equipment support selection name can be set using the Setup Option. For details, see Setting Default Equipment Support Name on page 2-6.

OR

- Click Parameter List to specify the list of parameter names from the Equipment Support Specification file.

Click the options button. The Parameters Names List appears. Choose the parameter name and click Accept.

5. Click Apply.

Specifying Trace Curve Placement

Use the Trace Curve Placement option list button to specify the location of the section with respect to the trace curve.

1. Click the Trace Curve Placement option list button on the Equipment Support Insertion property sheet. The Trace Curve Placement option list appears.

Figure 3-5 Trace Curve Placement Option List



- Choose Center to place the trace curve at the center of the cross section. This is the default.

OR

- Choose Top to place the trace curve at the top of the cross section. The top portion is the largest positive y value of the section.

OR

- Choose Bottom to place the trace curve at the bottom of the cross section. The bottom portion is the largest negative y value of the section.

OR

- Choose Left to place the trace curve at the centre left of the cross section. The left portion is the largest negative x value of the section.
OR
- Choose Right to place the trace curve at the centre right of the cross section. The right portion is the largest positive x value of the section.
OR
- Choose Top Left to place the trace curve at the top left corner of the cross section.
OR
- Choose Top Right to place the trace curve at the top right corner of the cross section.
OR
- Choose Bottom Left to place the trace curve at the bottom left corner of the cross section.
OR
- Choose Bottom Right to place the trace curve at the bottom right corner of the cross section.

Specifying Plate Boundary Curve Placement

Use the Plate Boundary Curve Placement option list button to define the placement of the plate boundary.

1. Click the Plate Boundary Curve Placement option list button on the Equipment Support Insertion property sheet. The Plate Boundary Curve option list appears.

Figure 3-6 Plate Boundary Curve Placement Option List



- Choose Center to place the boundary curve defining the perimeter at the center of the plate. This is the default.
OR
- Choose Top to place the boundary curve on the top face of the plate. The bottom face is on the negative side of global Z-axis.

OR

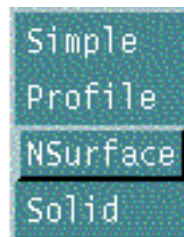
- Choose Bottom to place the boundary curve on the bottom face of the plate. The top face is on the positive side of global Z-axis.

Specifying Graphics Display Mode

Use the Graphics Display Mode option list button to specify the visual presentation of the support unit.

1. Choose the Graphics Display Mode option list button on the Equipment Support Insertion property sheet. The Graphics Display Mode option list appears.

Figure 3-7 Graphics Display Mode Option List



- Choose Simple to display the support member as a local Nfigure with simple wire frame graphical entities. The projection axis is generated for the axial member and the boundary curve is generated for the plate member.

OR

- Choose Profile to display the support member as a local Nfigure with profile wire frame graphical entities. The projection axis and cross section profile is generated for axial member and the boundary curve and thickness axis is generated for the plate member.

OR

- Choose NSurface to display the support member as a local Nfigure with 3-D representation with minimum number of NURB entities. If necessary, NURB surfaces are also included.

OR

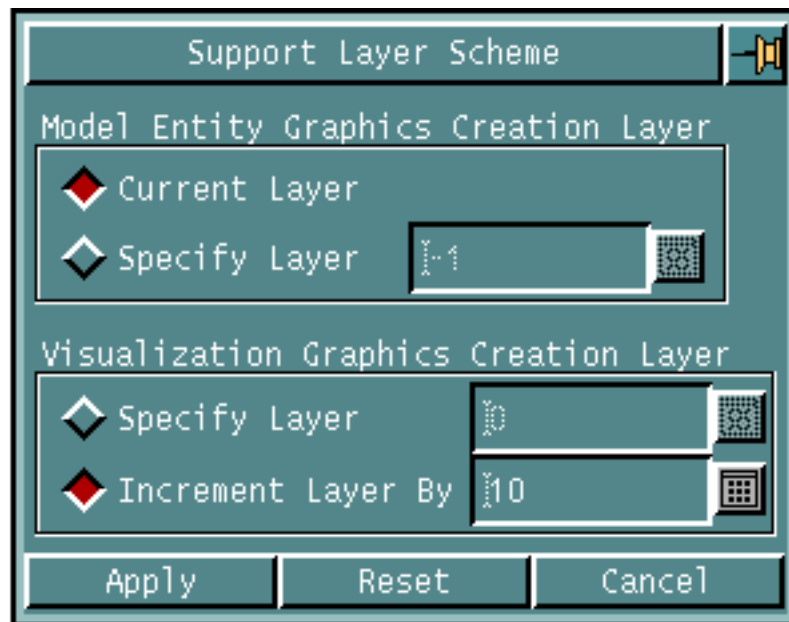
- Choose Solid to display the support member as a local Nfigure with 3-D representation as shown for solids.

Specifying Support Layer

Use the Support Layer Scheme Selection option to specify the layer on which the system creates model entity or visualization graphics.

1. Choose the Support Layer Scheme Selection on the Equipment Support Insertion property sheet. Click the Options... button. The Support Layer Scheme property sheet appears.

Figure 3-8 Support Layer Scheme Property Sheet



2. To specify the layer, click one of the following model entity graphics creation layer options.
 - Click Current Layer to create the equipment support member section with 3-D graphics on a current layer.OR
 - Click Specify Layer to create the equipment support member section with 3-D graphics on a specified layer. Enter the layer number in the field. The valid layer numbers are those of any CADDs layer, between 0 and 254.
3. Select one of the following visualization graphics creation layer options.
 - Click Specify Layer to create the equipment support member section with 3-D graphic on the specified layer. Enter the layer number in the field.OR

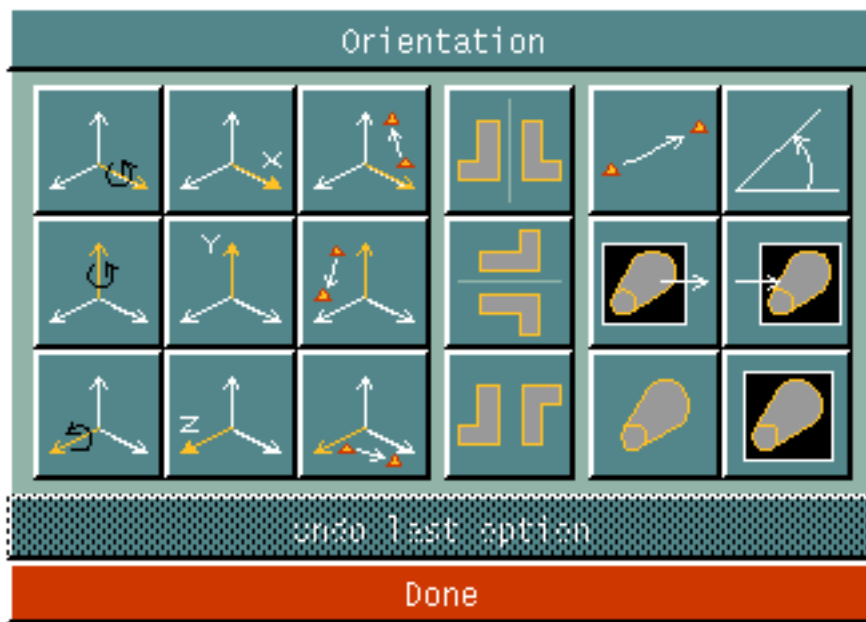
- Click Increment Layer By to create the equipment support member section with 3-D graphic on the layer L+n, where L is the layer of the axial members projection axis, or plate member's boundary curve and Nfigure. The default is 10.
4. Click Apply.

Specifying Equipment Support Orientation

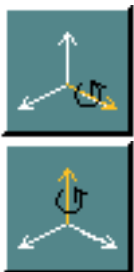
Use the Specify Support Orientation option to specify the equipment support orientation.

1. Choose Specify Support Orientation on the Equipment Support Insertion property sheet and click Apply. The Orientation property sheet appears.

Figure 3-9 Orientation Property Sheet



2. Choose one of the following options on the Orientation property sheet to specify the orientation of the inserted equipment support.



Rotates the inserted equipment support by the specified angle about the X-axis.

Rotates the inserted equipment support by the specified angle about the Y-axis.



Rotates the inserted equipment support by the specified angle about the Z-axis.



Points the equipment support local X-axis of the inserted figure in the specified direction.



Points the equipment support local Y-axis of the inserted figure in the specified direction.



Points the equipment support local Z-axis of the inserted figure in the specified direction.



Points the equipment support local X-axis of the inserted figure along a specified vector.



Points the equipment support local Y-axis of the inserted figure along a specified vector.



Points the equipment support local Z-axis of the inserted figure along a specified vector.



Mirrors the inserted equipment support about the model X-axis.



Mirrors the inserted equipment support about the model Y-axis.



Mirrors the inserted equipment support about both the model X- and Y-axis.



Allows you to specify a vector about which the inserted equipment support is to be rotated.



Allows you to specify the angle of rotation of the equipment support about a vector.

The following two options specify the change in the view of the inserted equipment support and must be used together.



Specifies the initial view of the equipment support.



Specifies the changed view of the equipment support.



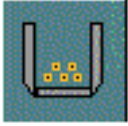
Specifies that the rotation of the inserted equipment support is about the model space axis.



Specifies that the rotation of the inserted equipment support is about the construction space (or CPL) axis.

3. Click Done to orient the inserted equipment support as specified.

Inserting a Cabletray Support Unit



Use INSERT CSUPPORT to insert cabletray support units into a 3-D CADDs model. Based on the selected cabletray, the system determines the appropriate number of axial members and cross section names and creates the members as one support unit. You cannot insert stand-alone cabletray supports.

A cabletray is a Nodal Figure entity which should be located at the beginning of the cabletray, at the bottom center position. At the beginning or end of a cabletray piece, there is a keepout area where you cannot create support members.

For each of the selected cabletrays in the active and viewed parts, the cabletray must be a standalone and should not be supported by any support unit.

The Cabletray Support Specification File defines the parameters for the support member insertion.

Each member is a single segment linear axial member and must be inserted parallel to the local Z-axis of the selected cabletray.

The member attachment point can be determined by one of the following modes:

- Automatic Insertion Mode

In this mode, the attachment point is automatically determined in the following manner. You select either the All Cabletrays from Active/Viewed Parts option or the Cabletrays in Specified Blocks option. The nearest reference structure onto which the axial member can be attached to is found and the cabletray support unit is attached to it. See All Cabletrays from Active/Viewed Parts. See page 3-22, for details.

Please note: If you select the All Cabletrays from Active/Viewed Parts option or the Cabletrays in Specified Blocks option, then all the stand-alone cabletrays in active/viewed CADDs parts are selected and processed as described above.

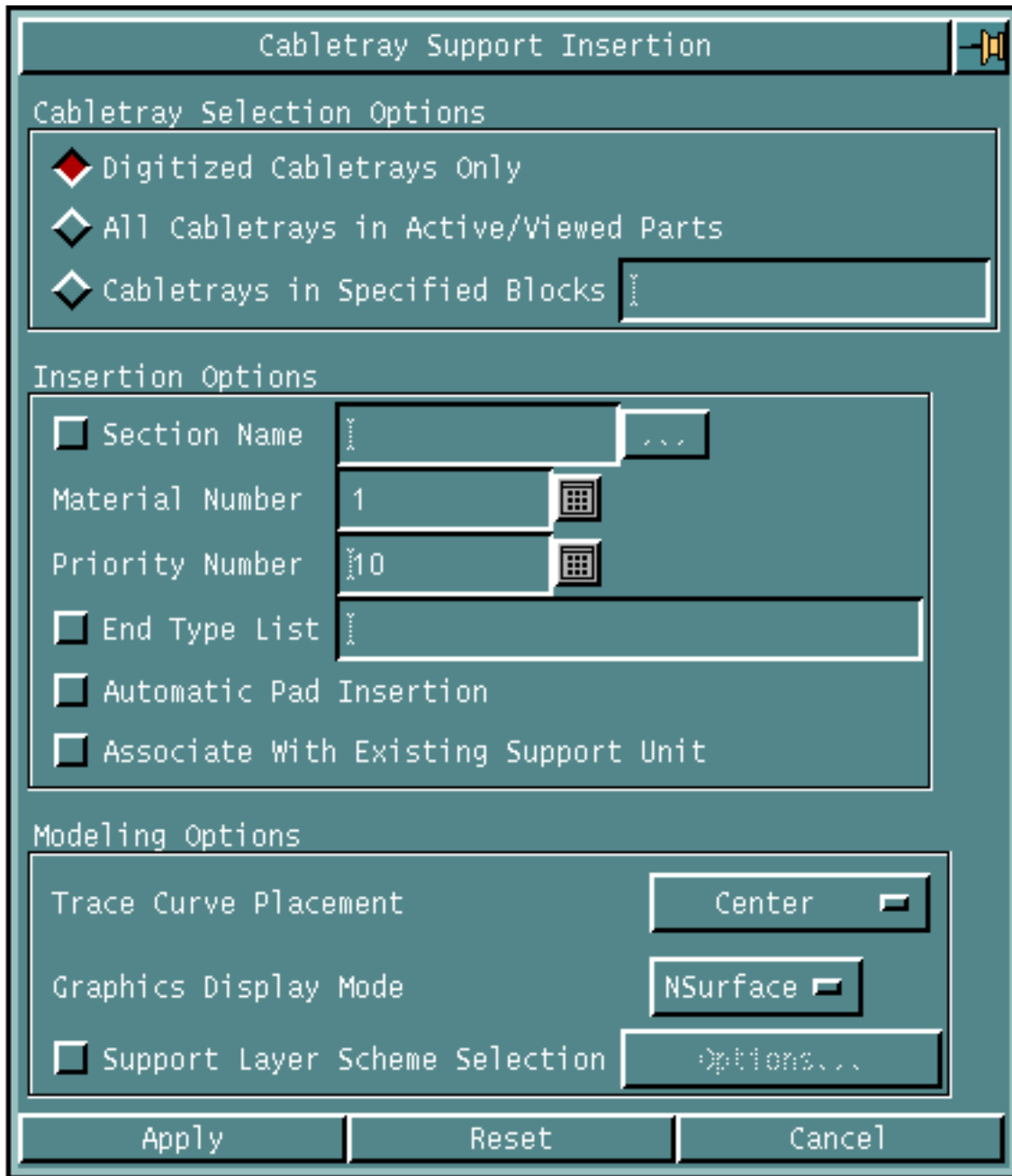
- Interactive Insertion Mode

In this mode, you explicitly select the actual attachment points. The selected points trim or stretch the attachment axial member for creation. The selected reference structural determines the actual attachment point if you use the End Type List option. For details, see the End Type List option on page 3-23.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose Insert Csupport from the Eqpt Supt Task Set. The Cabletray Support Insertion property sheet appears.

Figure 3-10 Cabletray Support Insertion Property Sheet



Procedure

1. Select one of the following cabletray selection options.
 - Click Digitized Cabletrays Only to insert cabletray support units onto the selected cabletrays.

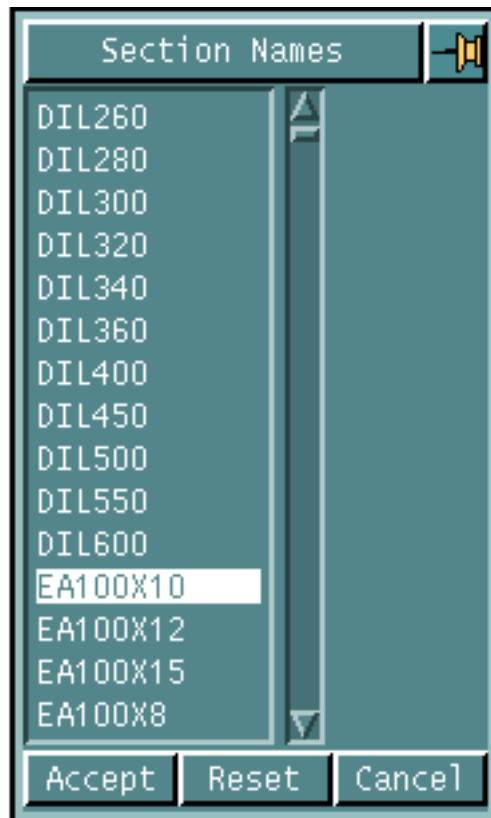
OR

 - Click All Cabletrays from Active/Viewed Parts to insert cabletray support units onto all cabletrays from active or viewed parts.

OR

 - Click Cabletrays in Specified Blocks to insert cabletray support units onto all cabletrays from specified blocks. Enter the blocks names in the field. Each block name should be separated by comma.
2. Choose the following insertion options.
 - Choose Section Name and click the list button. A list of section names appears.

Figure 3-11 Section Names List



Choose the required section name from the list and click Accept.

- Enter the Material Number to specify the material number for the support member. The default material is 1. You can change the default using the Setup options. For details, see “Specifying Default Axial Support Member Parameters” on page 2-9.
- Enter the Priority Number to specify the structural priority number. The default is 10. You can change the default using the Setup options. For details, see “Specifying Default Axial Support Member Parameters” on page 2-9.
- Choose End Type List and enter the end type to specify the attachment endtype names to determine how the attachment members of the cabletray support should attach to the corresponding reference structures.

The end type attachment is valid only if the member can properly stand on the appropriate surface of the reference structure with sufficient welding space. If valid, the support member is created and attached to the selected reference structure.

There must be a one to one correspondence between the end type name and equipment support attachment point. The number of selected reference structures cannot be less than the number of attachment points required, otherwise an error message is displayed.

- Choose Automatic Pad Insertion to insert the pad at the attachment point of all the cabletray support axial members. The pad name, shape, and size is defined in the Pad Autoselection File. The default for this is specified in the Setup option. See “Automatic Insertion Mode” on page 3-4.
 - Choose Associate with Existing Support Unit to automatically connect the inserted support unit to an existing support unit.
3. Choose the required modeling options.
 - Click the Trace Curve Placement list button to indicate the location of the section with respect to the trace curve. By default, the section origin is located on the center. For details, see “Specifying Trace Curve Placement” on page 3-12.
 - Click the Graphics Display Mode to specify the visual presentation of the equipment support. For details, see “Specifying Graphics Display Mode” on page 3-14.
 - Choose Support Layer Scheme Selection to specify the layer on which the equipment support axial member's projection axis, or plate member boundary curve and Nfigure graphics are created. For details, see “Specifying Support Layer” on page 3-24.
 4. Click Apply.

5. Select the cabletrays for support insertion.
 - If Digitized Cabletrays Only is chosen, select the cabletray units for cabletray support insertion.

Specifying the Option on the Cabletray Support Insertion Property Sheet

Given below are the details of the Support Layer Scheme option on the Cabletray Support Insertion property sheet.

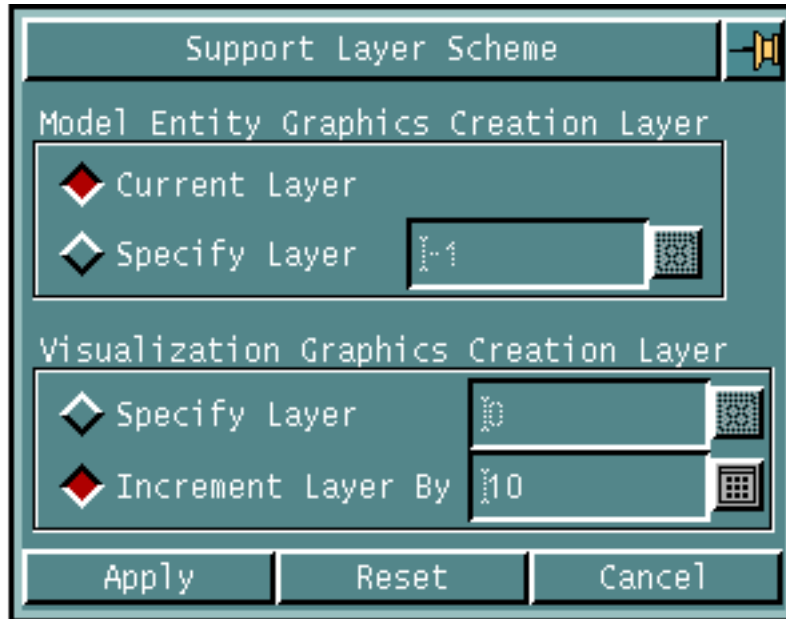
Specifying Support Layer

Use the Support Layer Scheme Selection option to specify the creation layer for the model entity or visualization graphics.

1. Choose Support Layer Scheme Selection options button on the Cabletray Support Insertion property sheet.

The Support Layer Scheme property sheet appears.

Figure 3-12 Support Layer Scheme Property Sheet



2. Select one of the following model entity graphics creation layer options.
 - Click Current Layer to create the cabletray support member section with 3-D graphics on the current layer.
OR
 - Click Specify Layer to create the cabletray support member section with 3-D graphics on the specified layer. Enter the layer number in the field. The valid layer numbers are those of any CADD layer, between 0 and 254.
3. Select one of the following visualization graphics creation layer options.
 - Click Specify Layer to create the cabletray support member section with 3-D graphic on the specified layer. Enter the layer number.
OR
 - Click Increment Layer By to create the cabletray support member section with 3-D graphic on layer $L+n$, where L is the layer of the axial member's projection axis, or the plate member's boundary curve and N figure. The default is 10.
4. Click Apply.

Inserting a Pad



Use the INSERT PAD option to insert a support pad at the end of an axial member.

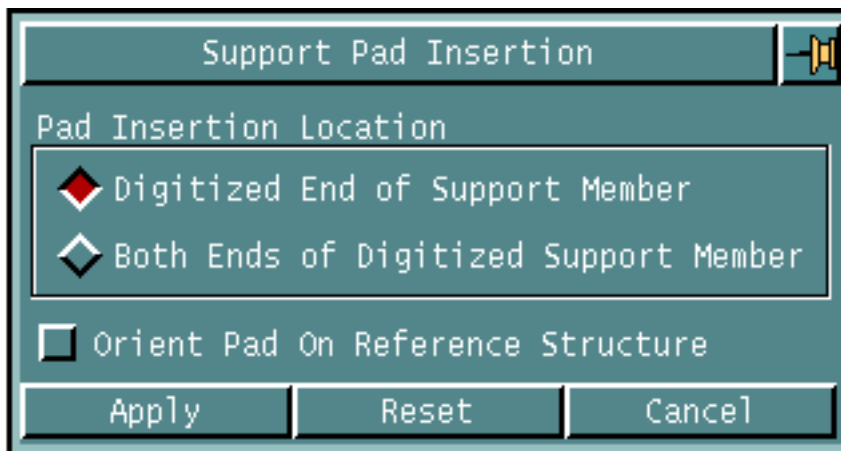
A pad is a small planar plate that is used to separate the axial member from the reference structure it stands on. The pad is inserted as a structural membrane stobject with a pre-defined cross section, defined in the internal or external section library in the active part. Based on the axial member cross section that you have selected, the system reads the pad name, shape (cross section), and thickness from the Pad Auto-selection File. The pad is inserted perpendicularly to the member at the end point which is nearest to the point that you have selected on the axial member. The axial member is trimmed automatically by the thickness of the pad such that the total length of the axial member plus pad's thickness remains the same.

Optionally, you can specify an existing reference structure to orient the pad the system inserts. The pad lies on the surface of the reference structure where the member stands.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose the Insert Pad option from the Eqpt Supt Task Set. The Pad Insertion property sheet appears.

Figure 3-13 Support Pad Insertion Property Sheet



Procedure

1. Specify one of the following pad insertion location options.
 - Click Digitized End of Support Member to insert a support pad at the selected end of the support member.

OR

 - Click Both Ends of Digitized Support Member to insert support pads at both ends of the selected support member.
2. Click Orient Pad On Reference Structure to specify that you are using an existing reference structure to orient the pad. The default is to insert the pad perpendicular to the axial member. Deselect this option to enable the default.
3. Click Apply.
4. Select the end of the support member or the support member for pad insertion as follows:
 - If Digitized End of Support Member is chosen, select the required end of the support member, which is nearer to the selected point.

OR

 - If Both Ends of Digitized Support Member is chosen, select the required support member.
5. If Orient Pad On Reference Structure is chosen, first select the axial member and the location indicating the end of the member where the pad is to be inserted. Then select the reference structure that orients the pad.

The pad is inserted, oriented, and positioned such that it lies on the surface of the reference structure on which the member stands.

Inserting a Liner



Use INSERT ELINER to insert a liner between the bolt hole of an equipment and its supporting member, which can be either an axial element or a plate.

A liner is a small rectangular plate with a bolt hole. It fits between the equipment and its support unit. The liner bolt hole must align with the bolt hole on the equipment and its supporting member. The equipment support is appropriately translated by the liner's thickness, away from the equipment and along the thickness direction (local Z-axis) of the liner.

Please note: The bolt hole on the equipment and the corresponding related bolt hole on the equipment support must be aligned.

The bolt hole on the liner must be positioned at the same location as its corresponding bolt hole on the equipment support member. Also, the thickness direction (local Z-axis of the liner) of the bolt hole must align with the bolt hole on the member.

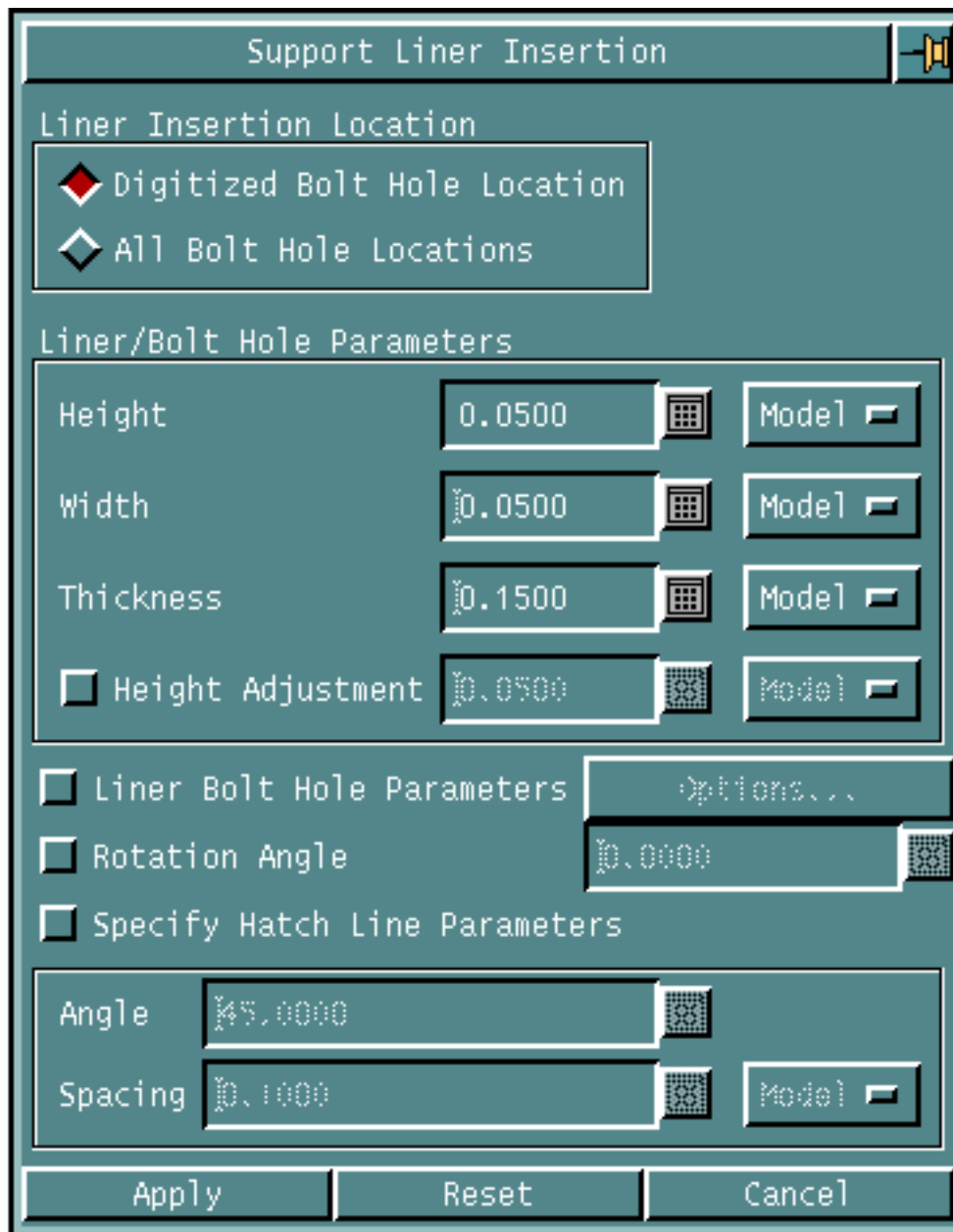
If the liner is attached to an axial member, its local X-axis is parallel to the axial member's projection axis. Otherwise, the local X-axis of the liner is aligned with the X-, Y-, and Z-axis of the related equipment in that order. The liner is created with the same graphical representation as the related equipment support.

If there is an existing liner on the selected bolt hole, the liner is inserted between the existing liner and the supported equipment.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose Insert Eliner from the Eqpt Supt Task Set. The Support Liner Insertion property sheet appears.

Figure 3-14 Support Liner Insertion Property Sheet



The image shows a software dialog box titled "Support Liner Insertion". It contains several sections for configuring the insertion of a support liner. The "Liner Insertion Location" section has two radio buttons: "Digitized Bolt Hole Location" (selected) and "All Bolt Hole Locations". The "Liner/Bolt Hole Parameters" section includes input fields for Height (0.0500), Width (0.0500), Thickness (0.1500), and Height Adjustment (0.0500), each with a "Model" button. Below this are checkboxes for "Liner Bolt Hole Parameters" (with an "Options..." button), "Rotation Angle" (0.0000), and "Specify Hatch Line Parameters". The "Specify Hatch Line Parameters" section has input fields for Angle (45.0000) and Spacing (0.1000), with a "Model" button. At the bottom are "Apply", "Reset", and "Cancel" buttons.

Section	Parameter	Value	Control
Liner Insertion Location	Digitized Bolt Hole Location	<input checked="" type="radio"/>	Radio Button
	All Bolt Hole Locations	<input type="radio"/>	Radio Button
Liner/Bolt Hole Parameters	Height	0.0500	Text Field, Model Button
	Width	0.0500	Text Field, Model Button
	Thickness	0.1500	Text Field, Model Button
	Height Adjustment	0.0500	Text Field, Model Button
Liner/Bolt Hole Parameters (Options)	Liner Bolt Hole Parameters	<input type="checkbox"/>	Checkbox, Options... Button
	Rotation Angle	0.0000	Text Field
	Specify Hatch Line Parameters	<input type="checkbox"/>	Checkbox
Specify Hatch Line Parameters	Angle	45.0000	Text Field
	Spacing	0.1000	Text Field, Model Button
Buttons	Apply	Apply	Button
Buttons	Reset	Reset	Button
Buttons	Cancel	Cancel	Button

Procedure

1. Specify one of the following liner insertion location options.
 - Click Digitized Bolt Hole Location to insert a liner between the selected bolt hole of an equipment and its supporting member.

OR
 - Click All Bolt Hole Locations to insert liners between all the bolt holes of an equipment and its supporting members.
2. Specify the following liner/bolt hole parameter options.
 - Enter a Height value to specify the height of the liner that is inserted. Height is the dimension of the liner along its local Y-axis. Click the options list button to specify the measurement unit. For details, see “Specifying Measurement Units” on page 3-34.

The default height is set in the Setup Options. For details, see “Specifying Default Support Liner Parameters” on page 2-14.
 - Enter a Width value to specify the width of the liner that is inserted. Width is the dimension of the liner along its local X-axis. Click the options list button to specify the measurement unit.

The default thickness is set in the Setup Options. See “Specifying Default Support Liner Parameters” on page 2-14.
 - Enter a Thickness value in the field, to specify the thickness of the liner that is inserted. Click the options list button to specify the measurement unit.

The default thickness is set in the Setup Options. For details, see “Specifying Default Support Liner Parameters” on page 2-14.
 - Click the Height Adjustment option and enter the trimming or adjustment value. This value adjusts the dimension of the liner to be attached to the axial member of the equipment support. This option is applicable only to liner which is being attached to axial member. The dimension of this liner (that is, either height or width, whichever is aligned with the width of the member section) is the member section width minus the specified trimming value. Deselect this option to indicate that no trimming value is used to compute the dimension of the liner, the specified height and width are used instead.

The default trimming value is as set in the Setup Options. You can change the default using the Setup Options. For details, see “Specifying Default Support Liner Parameters” on page 2-14.
3. Choose Liner Bolt Hole Parameters to specify the parameters of the bolt hole that is created. Clicking Options... displays the Liner Bolt Hole property sheet. For details, see “Specifying Liner Bolt Hole Parameters” on page 3-32.

4. Choose Rotation Angle to specify the angle (in degrees) to rotate the liner about the center of the bolt hole. The rotation takes place in the counter-clockwise direction, with the rotation axis parallel to the local Z-axis of the liner.

If the liner is attached to an axial member, then by default its local X-axis is parallel to the axial member's projection axis. Otherwise, the local X-axis of the liner is aligned with the X-, Y-, and Z-axis of the related equipment, in that order.

5. Click Specify Hatch Line Parameters to indicate that the liner is cross hatched. That means a crosshatch model entity bounded by the liner's boundary curve is inserted.
 - Enter Angle in degrees of the cross hatch lines that are created. The default angle is 45 degrees. You can change the default using the Setup Options. “Specifying Default Support Liner Parameters” on page 2-14.
 - Enter Spacing of the cross hatch lines that are created. Choose the measurement unit from the Unit option list button. The default spacing is 0.1 units. You can change the default using the Setup Options. For details, see “Specifying Default Support Liner Parameters” on page 2-14.
6. Click Apply.
7. Select the bolt holes or the equipment units as follows:
 - If Digitized Bolt Hole Location is chosen, select the bolt hole to insert a liner between the selected bolt hole of an equipment and its supporting member.

OR
 - If All Bolt Hole Locations is chosen, select the equipment to insert liners between all the bolt holes of the selected equipment and its supporting members.

Specifying Options on the Support Liner Insertion Property Sheet

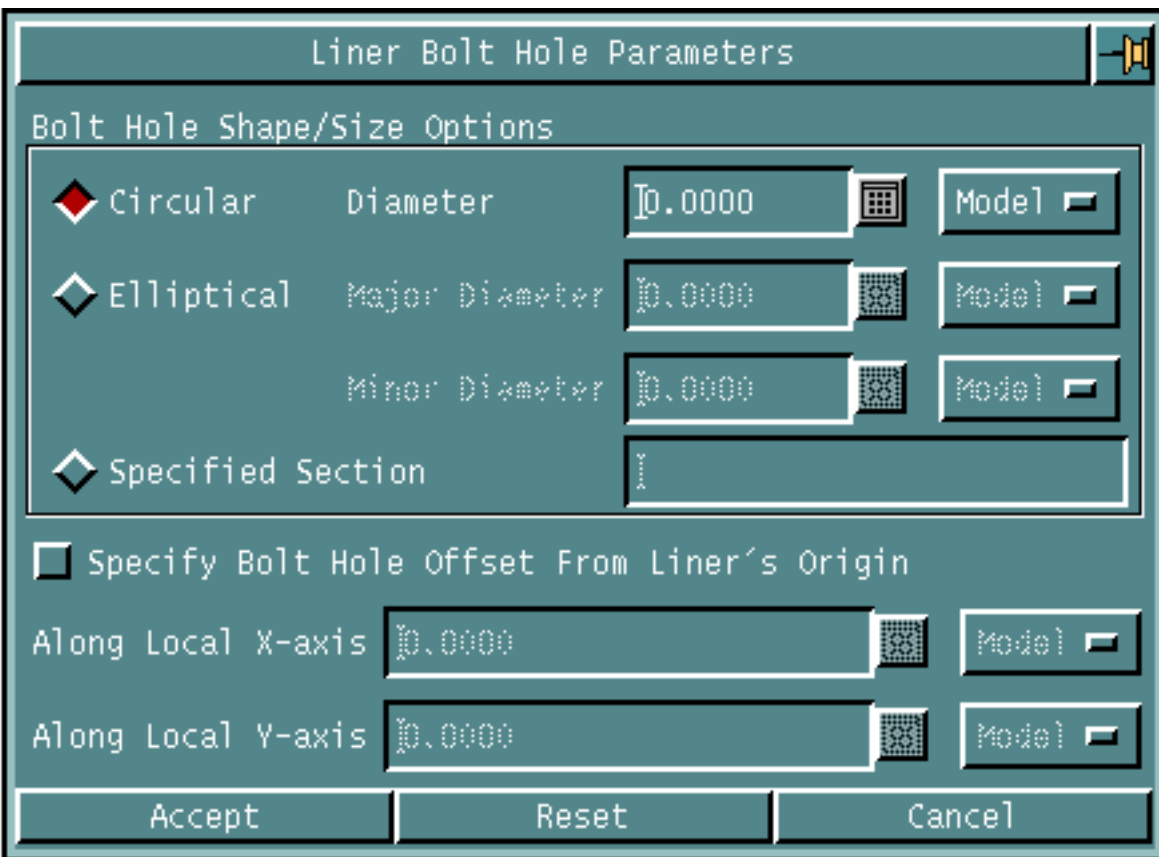
Given below are the details of the options on the Liner Insertion property sheet.

Specifying Liner Bolt Hole Parameters

Use the Liner Bolt Hole Parameter option to specify the parameters of the bolt holes that are created on the liner.

1. Choose the Liner Bolt Hole Parameter option on the Support Liner Insertion Property Sheet and click the Options... button. The Liner Bolt Hole Parameters property sheet appears.

Figure 3-15 Liner Bolt Hole Parameters Property Sheet



2. Select one of the following bolt hole shape and size options.
 - Click Circular to insert a round bolt hole on the liner. The bolt hole is created as a void structural plate cutout.

Enter the Diameter of the bolt hole that is inserted. Choose the measurement unit from the Unit option list button. For details, see "Specifying Measurement Units" on page 3-34.

By default, the bolt hole is of the same size and shape as the bolt hole on the equipment support member.

OR

- Click Elliptical to insert an elliptical bolt hole on the liner. The bolt hole is created as a void structural plate cutout.

Enter Major Diameter the dimension along the major (or local X) axis of the elliptical bolt hole that is inserted. Choose the measurement unit from the Unit option list button.

Enter Minor Diameter of the minor (or local X) axis of the elliptical bolt hole that is inserted. Choose the measurement unit from the Unit option list button.

By default, the bolt hole is of the same size and shape as the bolt hole on the equipment support member.

- Click Specified Section to specify the cross section name on which to insert the bolt hole. The bolt hole is created as a void axial element cutout
By default, the bolt hole is of the same size and shape as the bolt hole on the equipment support member.

Please note: The specified section name must be defined in the internal or external cross section library.

3. Choose Specify Bolt Hole Offset From Liner's Origin to specify the bolt hole's offset distance from the center of the liner plate.
 - Enter Along Local X-axis to specify the bolt hole's offset distance from the center of the liner plate along its local X-axis direction. Choose the measurement unit from the Unit option list button. For details, see “Specifying Measurement Units” on page 3-34. The default distance is 0.0. You can change the default using the Setup Options. For details, see “Specifying Default Support Liner Parameters” on page 2-14.
 - Enter Along Local Y-axis to specify the bolt hole's offset distance from the center of the liner plate along its local Y-axis direction. Choose the measurement unit from the Unit option list button. For details, see “Specifying Measurement Units” on page 3-34. The default distance is 0.0. You can change the default using the Setup Options. For details, see “Specifying Default Support Liner Parameters” on page 2-14.
4. Click Accept.

Specifying Measurement Units

Use the Unit option list button to specify the measurement units for various parameters.

1. Click the Unit option list button. The Unit option list appears.

Figure 3-16 Unit Option List



2. Choose one of the measurement unit options displayed.
 - Choose Model for model unit in the active part.
OR
 - Choose IN for inches.
OR
 - Choose FT for feet.
OR
 - Choose MI for mile.
OR
 - Choose MM for millimeters.
OR
 - Choose CM for centimeters.
OR

- Choose M for meters.
- OR
- Choose KM for kilometers.

Inserting a Bolt Hole



Use INSERT BOLT HOLE to insert bolt holes on the selected axial or plate member. You can insert the bolt hole as a void structural axial element cutout using pre-defined cross sections. The cross section name must be defined in the internal or external section library of the active part.

Alternatively, a bolt hole can be inserted with the primitive shape, round or elliptical, as a void structural plate cutout by using the appropriate modifiers to specify the dimensional parameters. The inserted bolt hole must be located on the selected member and must cut through it completely.

- Inserting a bolt hole on a plate member

In this case, the location you have selected is projected to the nearest point on the plate, planar or curved, and the bolt hole is oriented normal to the plate at the insertion point. Use existing CADD commands to define and select a CPL. To facilitate the selection of the insertion location, use explicit location selections. The local X-axis of the bolt hole is aligned with the X-, Y-, and Z-axis of the active CPL in that order.

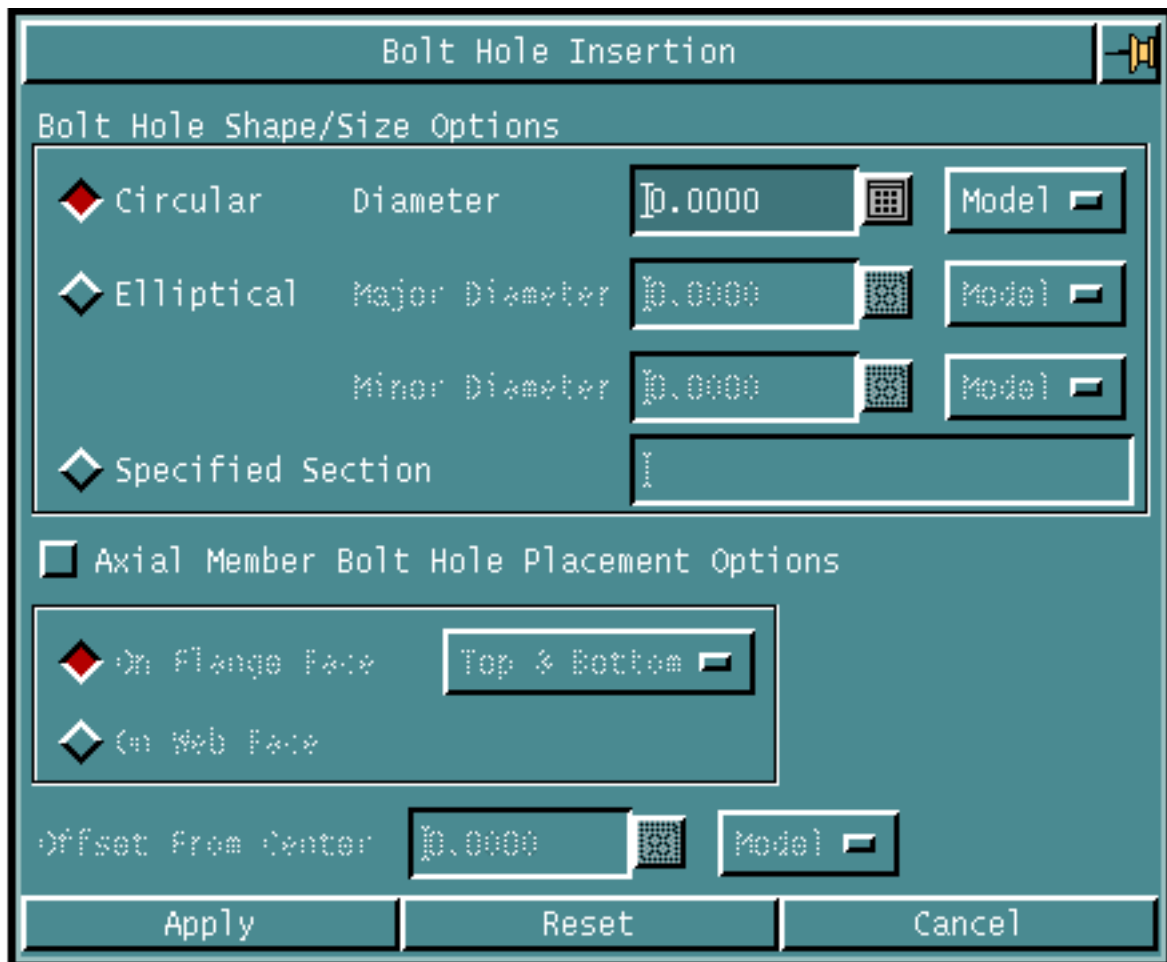
- Inserting a bolt hole on an axial member

In this case, the location you have selected, on the axial member projection axis determines the plane (perpendicular to the projection axis at that point) in which the hole origin is located. Then the system evaluates the face along the local X-axis or Y-axis (flange or web) of the cross section and creates the hole on the face that is nearest to the selected point. The exact location of the bolt hole on the axial member is determined through a combination of your input and the use of the On Flange Face or the On Web Face and the Offset From Centre options. By default, the bolt hole is located on the insertion plane, at the center of the flange and web face of the member. The local X-axis of the bolt hole is aligned with the projection axis or trace curve of the axial member.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose the Insert Bolt Hole option from the Eqpt Supt Task Set. The Bolt Hole Insertion property sheet appears.

Figure 3-17 Bolt Hole Insertion Property Sheet



Procedure

1. Select one of the following bolt hole shape and size options.
 - Click Circular to insert a round bolt hole on the support member. The bolt hole is created as a void structural plate cutout.
Enter the Diameter of the bolt hole that is inserted. Choose the measurement unit from the Unit option list button. For details, see “Specifying Measurement Units” on page 3-34.
OR
 - Click Elliptical to insert an elliptical bolt hole on the support member. The bolt hole is created as a void structural plate cutout.
Enter the Major Diameter, the dimension along the major (or local X) axis of the elliptical bolt hole that is inserted. Choose the measurement unit from the Unit option list button.

Enter the Minor Diameter, the dimension along the minor (or local X) axis of the elliptical bolt hole to be inserted. Choose the measurement unit from the Unit option list button.

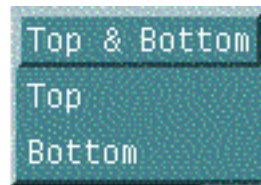
- Click Specified Section to insert a bolt hole with the specified shape and size on the support member. The bolt hole is created as a void structural axial element cutout. Enter the section name in the field.

Please note: The specified section name must be defined in the internal or external cross section library.

2. Choose Axial Member Bolt Hole Placement Options to specify the position of the bolt hole on the axial support member.
 - Click On Flange Face to insert the bolt hole on the flange of the selected axial member. The bolt hole is inserted parallel to the local Y-axis of the member cross section. This is the default.

Click the On Flange Face option list button. The On Flange Face option list appears.

Figure 3-18 On Flange Face Option List.



Choose Top & Bottom to insert bolt hole on both the top and bottom flange of the axial member.

OR

Choose Top to insert bolt hole on the top flange of the axial member.

OR

Choose Bottom to insert bolt hole on the bottom flange of the axial member.

By default, the bolt hole is created on the insertion plane, at the center of the flange.

- Click On Web Face to insert the bolt hole on the web of the selected axial member. That is, the bolt hole is inserted parallel to the local X-axis of the member cross section. By default, the bolt hole is created on the insertion plane, at the center of the web.

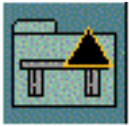
- Enter Offset from Center value. This is the offset distance from the center of the flange or web of the selected axial member to position the bolt hole on the flange or web. Click the Unit option list button to specify the measurement unit. For details, see “Specifying Measurement Units” on page 3-34.

If the offset distance is positive, the bolt hole origin location is offset toward the positive direction of the axial member cross section local coordinates system along either the flange or web direction, depending on which one is selected. If it is negative, the bolt hole origin location is offset toward the negative direction of the cross section local coordinates system along either the flange or web direction, depending on which one is selected.

The default distance is 0.0. That is, the bolt hole is positioned at the center of the flange or web.

3. Click Apply.

Support Editing Palette

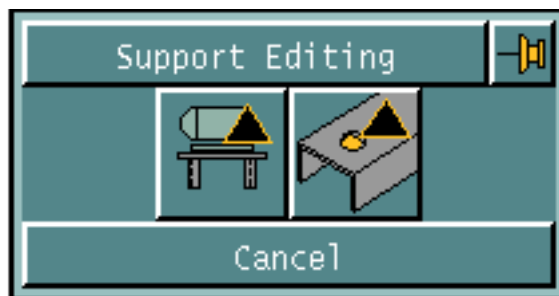


Use the SUPPORT EDIT PALETTE to change a support unit or support member data and attributes or to modify the existing bolt holes on the axial or plate support member.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose Support Edit Palette from the Eqpt Supt Task Set. The Support Editing palette appears.

Figure 3-19 Support Editing Palette



4. Choose one of the following:



EDIT ESUPPORT

Use this option to change a support unit or support member data and attributes. See “Editing an Equipment or Cabletray Support Unit” on page 3-41.



MODIFY BOLT HOLE

Use this option to modify the existing bolt holes on the axial or plate support member. See “Modifying a Bolt Hole” on page 3-46.

Editing an Equipment or Cabletray Support Unit

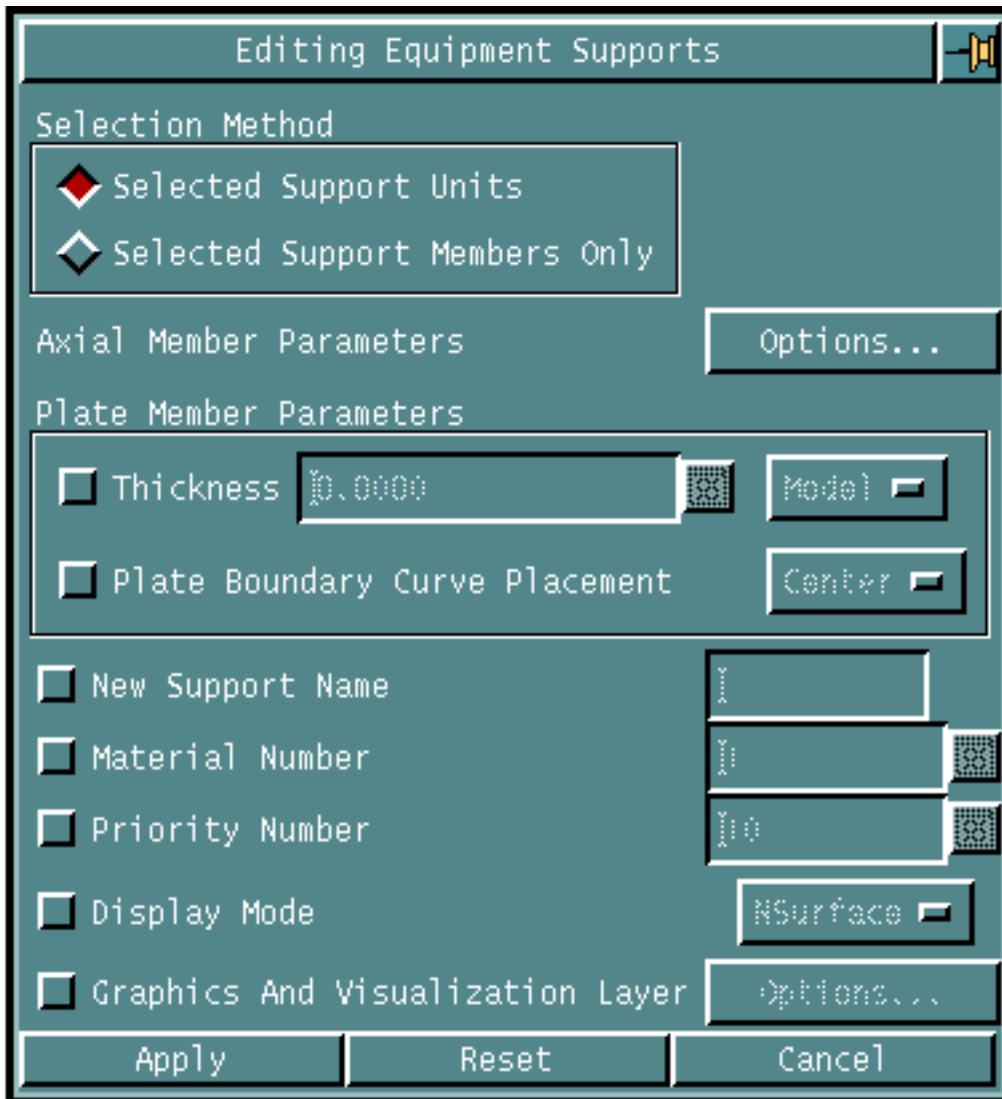


Use the EDIT ESUPPORT from the Support Editing command palette to change a support unit or support member data and attributes. You can change the cross section, display option, layer, material type, priority number, relative position of axial member's projection axis or plate member's boundary curve.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose Support Edit Palette from the Eqpt Supt Task Set. The Support Editing palette appears.
4. Click the Edit Esupport option on the Edit Support Palette. The Editing Equipment Support Property Sheet appears.

Figure 3-20 Editing Equipment Support property sheet



Procedure

1. Specify a selection method for selecting supports.
 - Click Selected Support Units to edit the selected support units only.
 - OR
 - Click Selected Support Members Only to edit the selected support members only from the associated support unit.
2. Choose Axial Member Parameters by clicking the Options... button. The Editing Axial Support Member Parameters property sheet appears. For details, see "Specifying Axial Member Parameters" on page 3-44.

3. Specify the Plate Member Parameters by using the following options.
 - Choose Thickness to edit the plate thickness. Enter the thickness in the field. Choose the measurement unit from the Unit option list.
 - Click the Plate Boundary Curve Placement to define the placement of the plate boundary. By default, the boundary is placed at the center of the plate. For details, see “Specifying Plate Boundary Curve Placement” on page 3-13.
4. Choose New Support Name to specify a name for the selected support unit.
5. Choose Material Number and enter the desired structural material number to be used for the support member. The default is 1.
6. Choose Priority Number and enter the desired structural priority number to be used for the support member. The default is 10.
7. Click the Graphics Display Mode to edit the visual presentation of the equipment support. Click the Graphics Display Mode option list button and choose a visual presentation option to update the support members. For details, see “Specifying Graphics Display Mode” on page 3-14.
8. Choose Graphics And Visualization Layer to edit the layer for the model and graphics entities of the selected equipment or cabletray support members. Click the Options... button to display the Support Layer Scheme property sheet. For details, see “Specifying Support Layer” on page 3-15.
9. Click Apply.
10. Select the support units to be modified.
 - If Selected Support Units is chosen, select the support unit.OR
 - If Selected Support Members Only is chosen, select the support members from the support unit.

Specifying the Option on the Editing Equipment Supports Property Sheet

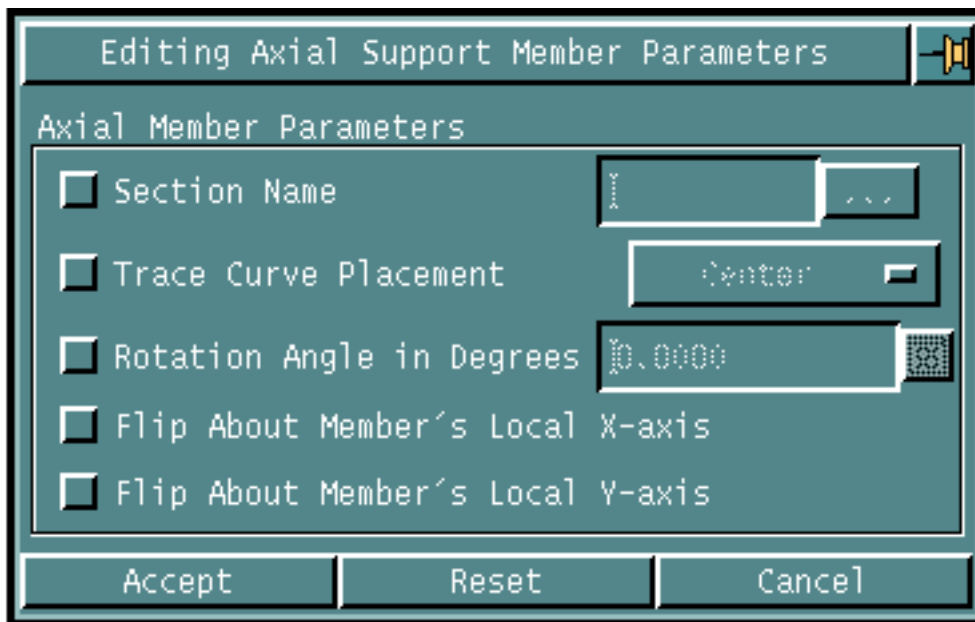
Given below are the details of the Axial Member Parameters option on the Editing Equipment Support Insertion property sheet.

Specifying Axial Member Parameters

Use the Axial Member Parameters option to specify the attributes of the selected plate members to be updated.

1. Click the Axial Member Parameter Options... button on the Editing Equipment Supports property sheet. The Editing Axial Support Member Parameters property sheet appears.

Figure 3-21 Editing Axial Support Member Parameters Property Sheet



2. To edit the axial member parameters:
 - Choose Section Name to edit the section name of the selected axial members. Click the list button. A list of section names appears. Choose a section name from the list and click Accept. The selected axial members are updated with the section name.

Please note: The section must exist in the internal or external section library.

- Choose Trace Curve Placement to edit the location of the section with respect to the trace curve. Click the Options List button to display the list. Choose an option to update the selected axial members. For details, see “Specifying Trace Curve Placement” on page 3-12.
- Choose Rotation Angle in Degrees and enter the rotation angle to rotate the axial member cross section about its geometric center by the specified degrees. The rotation takes place in the clockwise direction.

- Choose Flip About Member's Local X-axis to mirror the axial member cross section about its local x-axis. For example, an axial member with a T-shaped cross section is inverted by this option.
 - Choose Flip About Member's Local Y-axis to mirror the axial member section about its local y-axis. For example, an axial member with a Channel cross section having the outer ends of the top and bottom flanges pointing to the right, is reversed such that the flange ends point to the left.
3. Click Accept.

Modifying a Bolt Hole

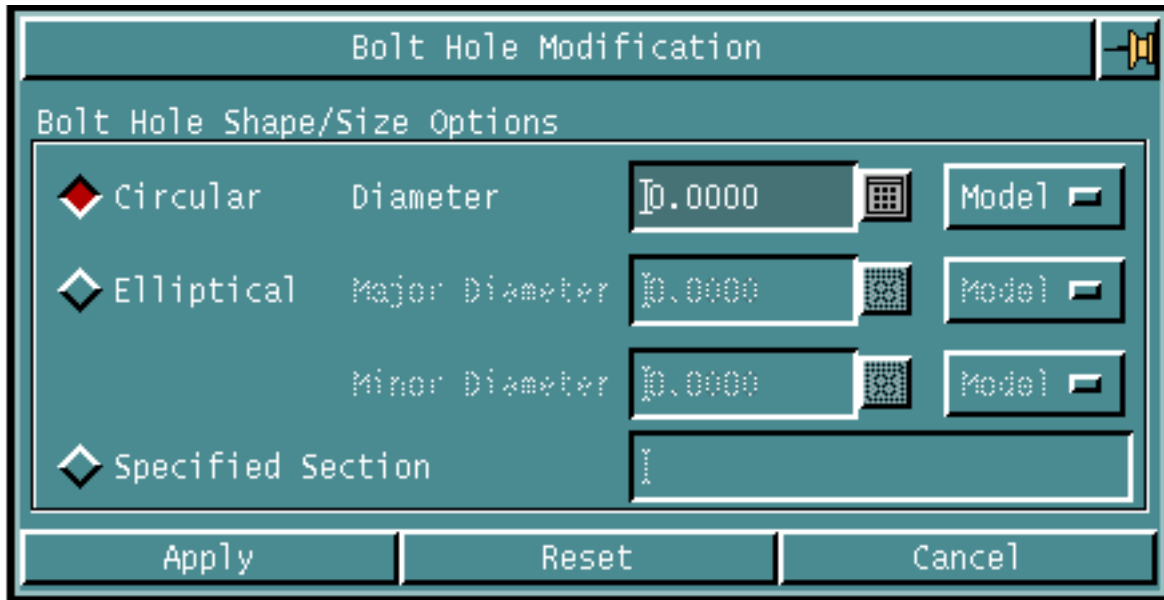


Use MODIFY BOLT HOLE from the Support Editing command palette to modify the existing bolt holes on the axial or plate support member. The bolt hole is a cutout on the support member and should have the same graphical representation as the support member.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose Support Edit Palette from the Eqpt Supt Task Set. The Support Editing command palette appears.
4. Click the Modify Bolt Hole option. The Bolt Hole Modification property sheet appears.

Figure 3-22 Bolt Hole Modification Property Sheet



Procedure

1. Specify bolt hole shape and size using the following options.

- Click **Circular** to regenerate the selected bolt hole as a void round structural plate cutout.

Enter the Diameter of the bolt hole to be regenerated. Click the Unit option list button and choose a measurement unit.

OR

- Click **Elliptical** to regenerate the selected bolt hole as a void elliptical structural plate cutout.

Enter Major Diameter the dimension of the major (or local X) axis of the elliptical bolt hole you are updating. Click the Unit option list and choose a measurement unit.

Enter Minor Diameter the dimension of the minor (or local X) axis of the elliptical bolt hole you are updating. Click the Unit option list and choose a measurement unit.

- Click **Specified Section** to regenerate the selected bolt hole as a void structural axial element cutout. Enter a cross section name to update the bolt hole

Please note: The specified section name must be defined in the internal or external cross section library.

2. Click Apply.

3. Select the bolt holes to be modified.

Deleting an Equipment or Cabletray Support Unit



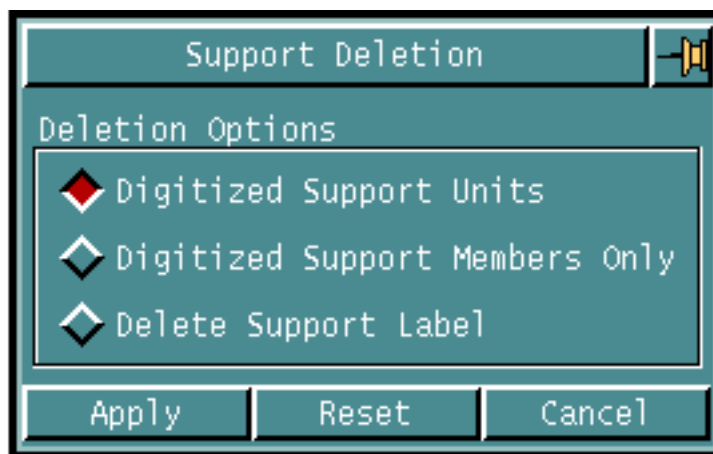
Use DELETE ESUPPORT to delete the selected support unit and/or its support members. The default is to delete the entire support unit. To select the support unit, it is sufficient to select any of the support members.

Please note: Any structural objects associated with the support member, like pad, liner and bolt hole, are deleted together with the support member.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose the Delete Esupport option from the Eqpt Supt Task Set. The Support Deletion property sheet appears.

Figure 3-23 Support Deletion Property Sheet



Procedure

1. You can selectively delete supports in one of the following ways.
 - Click Digitized Support Units to delete selected support units only.

OR

 - Click Digitized Support Members Only to delete selected support members only from the associated support unit.
 - Click Delete Support Label to delete labels only from the selected support units.
2. Click Apply.
3. Select the support units, the support members or the support units whose labels are to be deleted.
 - If Digitized Support Units is chosen, select the support units to be deleted.

OR

 - If Digitized Support Members Only is chosen, select the support members from the support unit.

OR

 - If Delete Support Label is chosen, select the support units whose labels are to be deleted.

Deleting a Pad

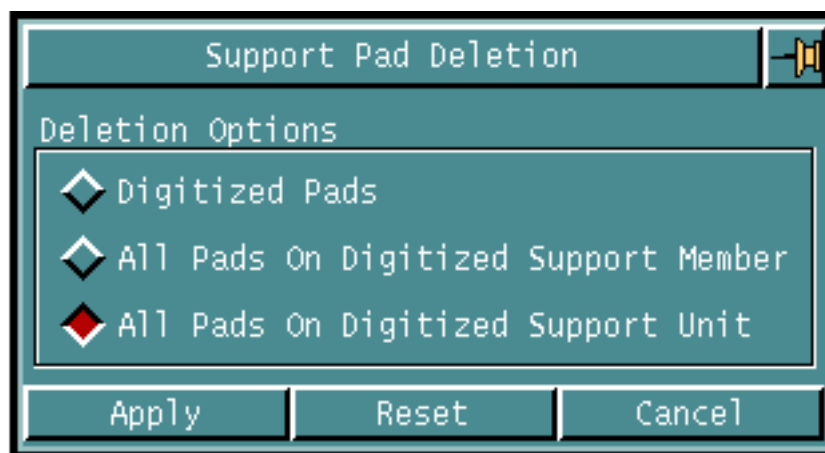


Use DELETE PAD to delete pads from the axial attachment member. The axial attachment member is stretched by the thickness of the pad such that the overall length of the axial member plus pad remains the same after deletion of the pad.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose the Delete Pad option from the Eqpt Supt Task Set. The Support Pad Deletion property sheet appears.

Figure 3-24 Support Pad Deletion Property Sheet



Procedure

1. You can selectively delete pads in one of the following ways.
 - Click Digitized Pads to delete selected pads only.
OR
 - Click All Pads On Digitized Support Member to delete all pads attached to the selected support members.
OR
 - Click All Pads On Digitized Support Unit to delete all pads attached to the axial members of the selected support unit.

2. Click Apply.
3. Select the pads, the support members or the support units whose pads are to be deleted.
 - If Digitized Pads is chosen, select the pads to be deleted.
OR
 - If All Pads On Digitized Support Member is chosen, select the support members whose pads are to be deleted.
OR
 - If All Pads On Digitized Support Unit is chosen, select the support units whose pads are to be deleted.

Deleting a Liner



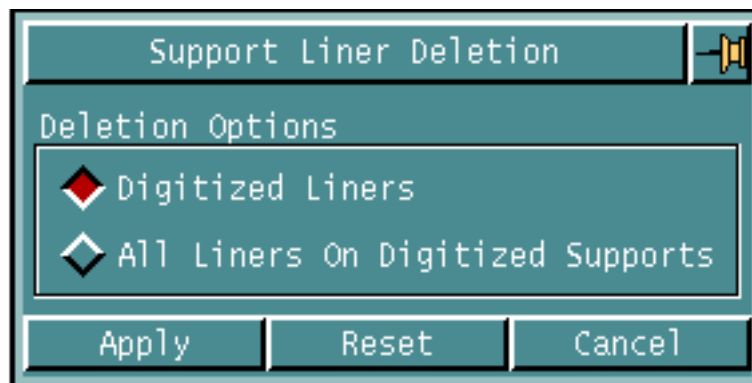
Use DELETE ELINER to delete liners from the associated equipment support unit. If deleting the liners on a support unit results in a gap is between the support and the related equipment, the equipment support is translated by the liner thickness, toward the equipment along the depth (local Z-axis) of the liner.

Please note: You can delete liners only from the associated equipment support.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose the Delete Eliner option from the Eqpt Supt Task Set. The Support Liner Deletion property sheet appears.

Figure 3-25 Support Liner Deletion Property Sheet



Procedure

1. You can selectively delete liners in one of the following ways.
 - Click Digitized Liners to delete selected liners only from the equipment support unit.OR
 - Click All Liners On Digitized Supports to delete all liners from the selected equipment support units only.
2. Click Apply.

3. Select the liners or the equipment support units whose liners are to be deleted.
 - If Digitized Liners is chosen, select the liners to be deleted.
- OR
- If All Liners On Digitized Supports is chosen, select the equipment support units whose liners are to be deleted.

Deleting a Bolt Hole

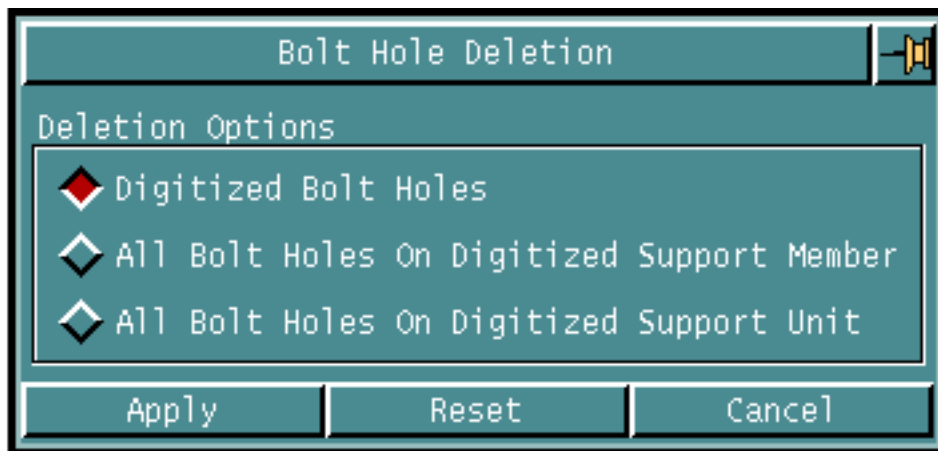


Use DELETE BOLT HOLE to delete bolt holes from support members.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose the Delete Bolt Hole option from the Eqpt Supt Task Set. The Bolt Hole Deletion property sheet appears.

Figure 3-26 Bolt Hole Deletion Property Sheet

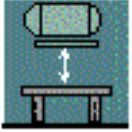


Procedure

1. You can selectively delete bolt holes in one of the following ways.
 - Click Digitized Bolt Holes to delete selected bolt holes only from the associated support members.
OR
 - Click All Bolt Holes On Digitized Support Member to delete all bolt holes from the selected equipment support members only.
OR
 - Click All Bolt Holes On Digitized Support Unit to delete all bolt holes from the selected equipment support unit only.
2. Click Apply.

3. Select the bolt holes, the support members or the support units whose bolt holes are to be deleted.
 - If Digitized Bolt Holes is chosen, select the bolt holes to be deleted.
OR
 - If All Bolt Holes On Digitized Support Member is chosen, select the support members whose bolt holes are to be deleted.
OR
 - If All Bolt Holes On Digitized Support Unit is chosen, select the support units whose bolt holes are to be deleted.

Relating a Support to Equipment or Axial Member to Cabletray



Use RELATE ESUPPORT to relate an existing support unit to the cabletray or equipment that is to be supported. The support unit can be adjusted in a limited manner to effectively support the related cabletray or equipment, but the basic structure and geometry of the support unit is preserved.

When relating to an equipment, it should not be supported by more than one support unit, but more than one equipment can be related to the same support unit. The selected support unit is translated to the bottom of the selected equipment such that it will support the equipment properly. However, if the selected support is supporting the existing equipment, the equipment support is not moved.

Each bolt hole Text Node (TNode) found on the selected equipment, is projected downward along the local Z-axis direction of the selected equipment to locate the corresponding bolt hole on the selected support unit. If no such bolt hole is found on the support unit, a bolt hole is inserted on the nearest projected point on the support unit. Once this bolt hole is located or created, the entire support unit is pushed toward the selected equipment, from the bolt hole on the support unit to the associated bolt hole Tnode on the selected equipment.

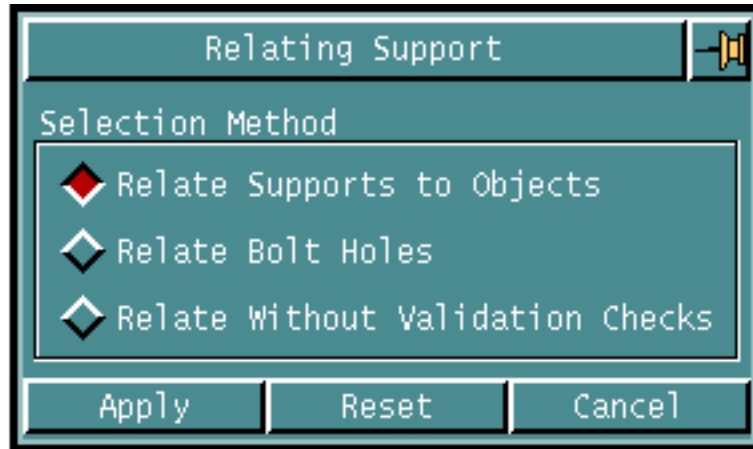
Please note: Each bolt hole Tnode on the equipment must be associated with any bolt hole on the supporting equipment support, or a bolt hole is automatically inserted on the equipment.

When relating to a cabletray, the axial member you select is translated and fitted to the side of the cabletray such that it supports the cabletray effectively. The selected axial member must be standalone and must not be connected to any other support unit.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose the Relate Esupport option from the Eqpt Supt Task Set. The Relating Supports property sheet appears.

Figure 3-27 Relating Support Property Sheet



Procedure

1. You can relate supports in one of the following ways.

- Click Relate Supports to Objects to relate an existing support unit to the supported cabletray or equipment.

OR

- Click Relate Bolt Holes to relate the selected bolt holes to the selected equipment. If the selected equipment is not being supported, the support unit on which the selected bolt holes reside, is related to the equipment logically with no validity check. In this case, all the selected bolt holes must be on the same equipment support unit.

Please note: If the equipment is related to a support unit, all the associated bolt holes must belong to the same equipment support.

OR

- Click Relate Without Validation Checks to relate the selected support unit to the selected equipment without validity check. There is no check on the bolt hole Tnode on the selected equipment, and the selected support unit is simply related to the selected equipment, without any transformation. The default is that each bolt hole Tnode found on the selected equipment is mapped to an associated bolt hole on the selected support unit.

Please note: You can only relate a support unit to an equipment without a validity check.

2. Click Apply.

3. Select the support units or members to be related.

- If you have clicked Relate Supports to Objects, first select the object to be supported, that is, a cabletray or an equipment. Next, select the support unit to support the selected object.

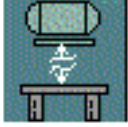
OR

- If you have clicked Relate Bolt Holes, first select the equipment to be supported. Next, select one or more bolt holes of the support unit to support the selected equipment.

OR

- If you have clicked Relate Without Validation Checks, first select the equipment to be supported. Next, select the support unit to support the selected equipment.

Unrelating a Support from Equipment or Cabletray

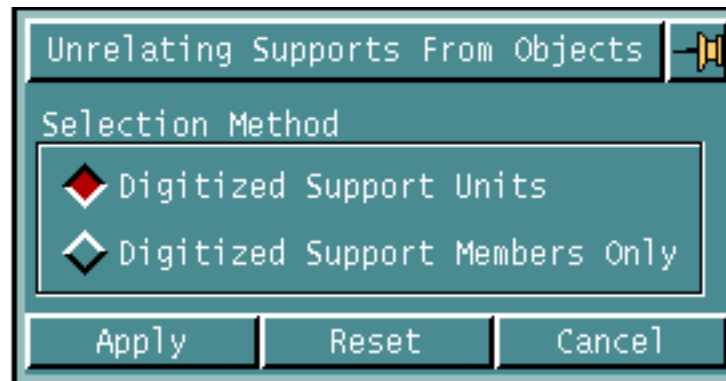


Use UNRELATE ESUPPORT to unrelate support units or individual support members from the supported cabletray or equipment. The resulting support unit becomes a standalone support unit.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose the Unrelate Esupport option from the Eqpt Supt Task Set. The Unrelating Supports property sheet appears.

Figure 3-28 Unrelating Supports from Objects Property Sheet



Procedure

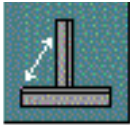
1. You can unrelate supports in one of the following ways.
 - Click Digitized Support Units to unrelate selected support units from their corresponding supported objects, cabletray or equipment.OR
 - Click Digitized Support Members Only to unrelate selected individual support members only from its supported object, cabletray or equipment.The default is to unrelate all support members in a support unit from their related object.

- 2.** Click Apply.
- 3.** Select the support units or members to be unrelated.
 - If Digitized Support Units is chosen, select the support units to be unrelated from their supported objects.

OR

 - If Digitized Support Members Only is chosen, select the support members to be unrelated from the supported object.

Connecting an Equipment or Cabletray Support



Use CONNECT ESUPPORT to connect support units to form a new support unit. If the support units you are connecting are related to an equipment or a cabletray, this relationship is preserved. The new support unit becomes a single unit comprised of the sum total of all the members.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose the Connect Esupport option from the Eqpt Supt Task Set. The Connecting Supports property sheet appears.

Figure 3-29 Connecting Supports Property Sheet



Procedure

1. Click New Support Name to name the resultant support unit. Enter the support name in the field. The default is the existing name of the parent support unit.
2. Click Apply.
3. Select the parent support unit first, and then the child support units. The child support units are connected to the parent and form a new support unit.

Disconnecting an Equipment or Cabletray Support

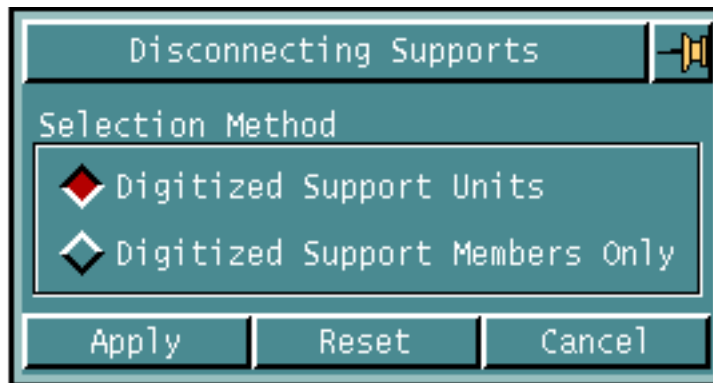


Use DISCONNECT ESUPPORT to disconnect a support unit. Each of the disconnected support members become separate support unit.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose the Disconnect Esupport option from the Eqpt Supt Task Set. The Disconnecting Supports property sheet appears.

Figure 3-30 Disconnecting Supports Property Sheet

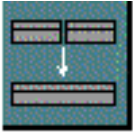


Procedure

1. You can disconnect supports in one of the following ways.
 - Click Digitized Support Units to disconnect the selected support units.OR
 - Click Digitized Support Members Only to disconnect the selected support members only from the associated support unit.
2. Click Apply.

- 3.** Select the support units or members to be disconnected.
 - If Digitized Support Units is chosen, select the support units to be disconnected. Each support member becomes a support unit itself.
OR
 - If Digitized Support Members Only is chosen, select the support members to be disconnected from the associated support units.

Joining a Support Axial Member



Use **JOIN SUPPORT** to merge and join selected linear axial support members into one.

The selected support members must meet the following conditions. They must:

- be both single segment linear structural axial elements
- be colinear
- have the corresponding trimmed or stretched segment meeting end to end
- have the same cross section and orientation

If the two selected support members belong to different support units, the second support unit is merged into the first and results in one single support unit.

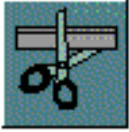
Using This Option

1. Choose **Supports** from the **Environment Access** menu.
2. Choose **Eqpt Supt** from the **Task Set Access** menu. The **Equipment Support Task Set** appears.
3. Choose the **Join Support** option from the **Eqpt Supt Task Set**. This is a direct action option and hence no property sheet is displayed.

Procedure

Select the members you want to join. The first selected member is stretched to the far end of the second member and the second member is deleted.

Trimming a Support Axial Member

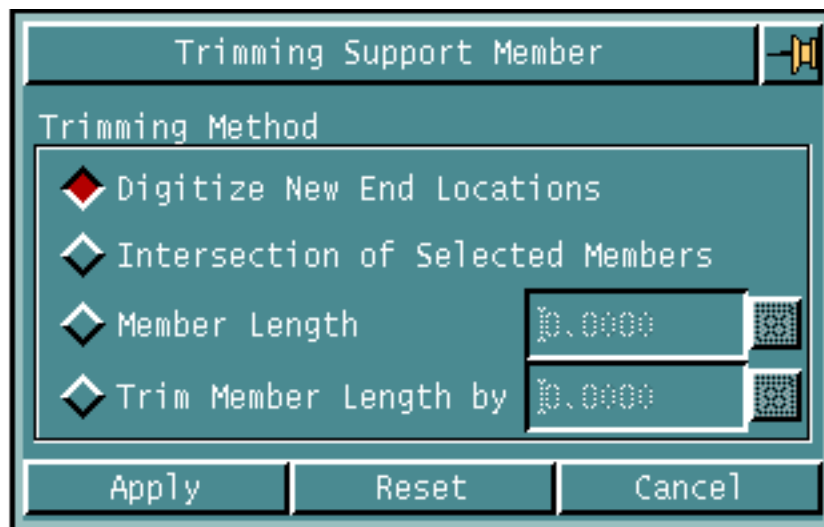


Use TRIM ESUPPORT to trim axial members to the specified length. The length is either up to the intersection point with the other axial members or the point you select. The support member is trimmed from the selected end which is nearer to the specified location on the member. You can either be lengthen or shorten the member. Do not trim an axial member such that the related bolt hole, liner, cabletray or equipment no longer supports the member properly. A related bolt hole is one that is associated to a corresponding bolt hole on the supported equipment.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose the Trim Esupport option from the Eqpt Supt Task Set. The Trimming Support Member property sheet appears.

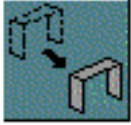
Figure 3-31 Trimming Support Member Property Sheet



Procedure

- 1. Choose one of the following trimming method options.**
 - Click Digitized New End Locations to trim the support member at the location specified on the support member.
OR
 - Click Insertion of Selected Members to trim the selected support member at its intersection point with another selected support member.
OR
 - Click Member Length to trim the selected support member length by the specified incremental length value. Enter the incremental length value in the corresponding field. A positive value shortens the member length, while a negative value lengthens the member by the specified value.
OR
 - Click Trim Member Length By to trim the selected support member length by the specified length value.
- 2. Click Apply.**
- 3. Select the support units to be trimmed.**

Translating/Copying an Equipment or Cabletray Support

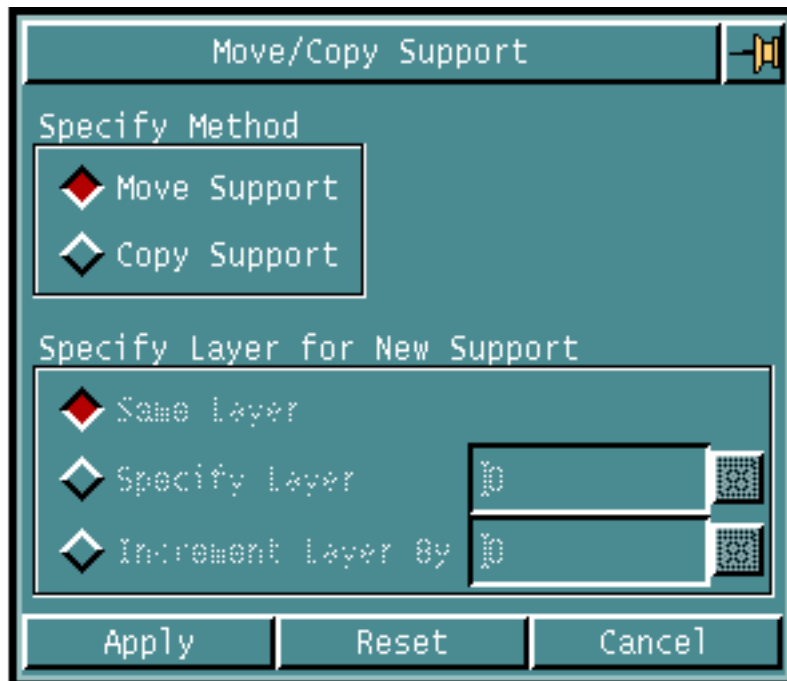


Use TRANSLATE ESUPPORT to translate structural support units from one location to another along a specified translation vector.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose the Translate Esupport option from the Eqpt Supt Task Set. The Move/Copy property sheet appears.

Figure 3-32 Move/Copy Property Sheet



Procedure

1. You can specify the method of translation.

- Click Move Support to translate the structural support unit from one location to another along a specified translation vector.

OR

- Click Copy Support to copy the selected equipment support unit to the location specified by the translation vector. Select more than two locations for the translation vector. Multiple copies are created at the subsequent selected locations. The newly created support units are standalone.

Please note: Only standalone supports are translated if the Copy option is not selected.

2. Choose one of the following options to specify layers for a new support.

- Click Same Layer to translate and copy the support on the same layer as the original support.

OR

- Click Specify Layer to translate and copy the support on the layer specified in the corresponding field.

OR

- Click Increment Layer By to translate and copy the support on the layer $L+n$, where L is the layer of the original support and n is the incremental value specified in the corresponding field.

3. Click Apply.

4. Select the support units to be translated and then select more than two locations for the translation vector.

Mirroring/Copying an Equipment or Cabletray Support

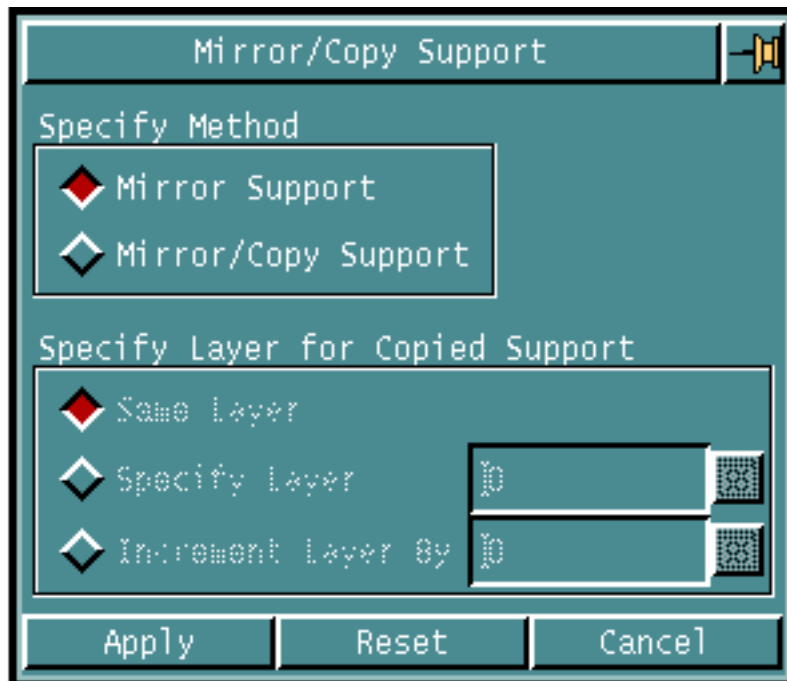


Use MIRROR ESUPPORT to mirror support units about a mirror plane. You can also use this option to create new support units at the mirrored location.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose the Mirror Esupport option from the Eqpt Supt Task Set. The Mirror/Copy Support property sheet appears.

Figure 3-33 Mirror/Copy Property Sheet



Procedure

1. You can specify the method for mirroring.
 - Click Mirror Support to mirror support units about the mirror plane that you define.

OR

 - Click Mirror/Copy Support to create a copy of the existing support unit at the mirror location. The newly created support is standalone.

Please note: If you do not use the Mirror/Copy option only stand-alone supports are mirrored.

2. If you have clicked Mirror Support, define the mirror plane. There are two ways to define a mirror plane:
 - By selecting two points.

In this case, the mirror plane is defined to be normal (perpendicular) to the active CPL through a line connecting these two points. Select the two points to define the mirror plane.

Please note: You should not select one CPL and then identify another view with a different CPL. This may result in the loss of model graphic precision.

OR

- By selecting three points to define the plane.

Use explicit coordinates to select the desired points. You define the mirror plane by these three points. Use the three point technique only if you want to select a plane other than the active CPL.
3. Choose one of the following options to specify a layer for the copied support.
 - Click Same Layer to mirror and copy the support on the same layer as the original support.

OR

 - Click Specify Layer to mirror and copy the support onto the layer you specify in the corresponding field.

OR

 - Click Increment Layer By to mirror and copy the support onto the layer $L+n$, where L is the layer of the original support and n is the incremental value you specify in the corresponding field.
4. Click Apply.
5. Select the support units to be mirrored and then define the mirror plane. You can use either two or three points to define the mirror plane as specified above.

Rotating/Copying an Equipment or Cabletray Support



Use ROTATE ESUPPORT to rotate support units about a specified point or line. It has two forms:

- **Explicit**

In this case, you explicitly specify the axis and angles of rotation by using the orientation options. The rotation is around multiple axes which are parallel to either the X-axis, Y-axis or Z-axis of the active construction plane.

- **Implicit**

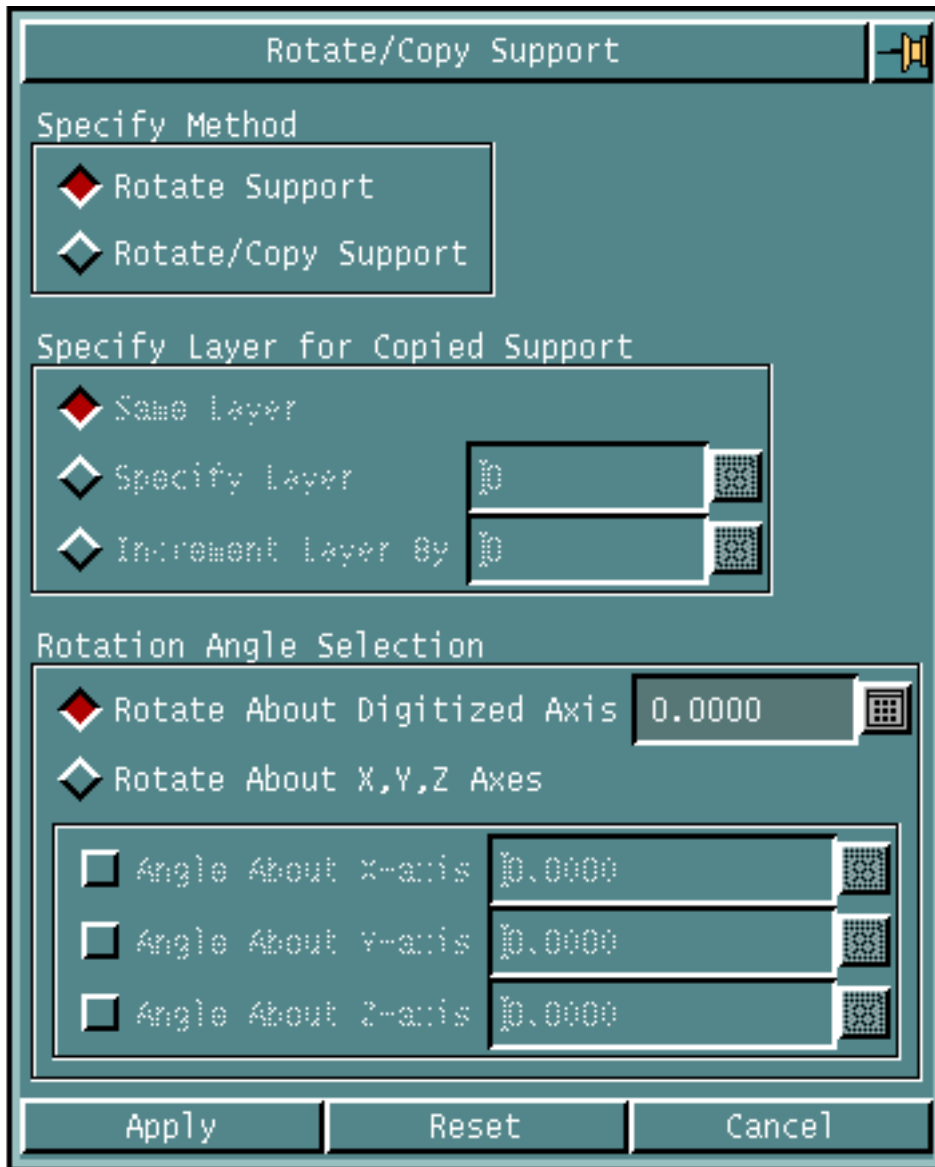
In this case, you must select three points to define the axis and the rotation origin. First select the center or origin of the rotation. Next, select two points to define the start and end points of the rotation axis. If the rotation origin and rotation axis are not in the same place the rotation is about an imaginary axis, parallel to the identified rotation axis, and passing through the rotation origin, with the specified angles of rotation. The rotation is around a single arbitrary axis in 3-D space.

You can use the Rotate/Copy option with either form to create a copy of the existing support units at the resultant location. The newly created support units are standalone.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose the Rotate Esupport option from the Eqpt Supt Task Set. The Rotate/Copy Support property sheet appears.

Figure 3-34 Rotate/Copy Support Property Sheet



Procedure

1. Specify the method of rotation.

- Click Rotate Support to rotate the support unit about a specified point line.
OR
- Click Rotate/Copy Support to rotate and copy the support unit to the location specified by the rotation data. The newly created support is standalone.

Please note: If you do not use the Rotate/Copy option only stand-alone supports are rotated.

2. If Rotate/Copy Support is selected, choose one of the following options to specify the creation layer for the copied support.
 - Click Same Layer to rotate and copy the support to the same layer as the original support.
OR
 - Click Specify Layer to rotate and copy the support onto the layer specified. Enter the layer number in the corresponding field.
OR
 - Click Increment Layer By to rotate and copy the support to the layer $L+n$, where L is the layer of the original support and n is the incremental value you specify in the corresponding field.
3. Specify one of the following rotation angle selection options.
 - Click Angle About Digitized Axis to rotate the support unit about a single arbitrary axis in 3-D space, through an angle of specified degrees. Enter the rotation angle in degrees in the corresponding field. The angle is measured counterclockwise.
OR
 - Click Rotate About X, Y, Z Axes to rotate the support unit about multiple axes which are parallel to the X-, Y-, or Z-axis of the active construction plane.
4. If Rotate About X, Y, Z Axes is chosen, enter the rotation angle about the corresponding axis as follows.
 - Click Angle About X-Axis to rotate the support unit, in the YZ plane, through an angle of specified degrees. Enter the rotation angle in degrees in the field. The angle is measured counterclockwise.
OR
 - Click Angle About Y-Axis to rotate the support unit, in the XZ plane, through an angle of specified degrees. Enter the value of the angle in degrees in the field. The angle is measured counterclockwise.
OR
 - Click Angle About Z-Axis to rotate the support unit, in the XY plane, through an angle of specified degrees. Enter the value of the angle in degrees in the field. The angle is measured counterclockwise.
5. Click Apply.

- 6.** Select the support units to be rotated and the rotation axis as follows:
 - If Rotate About X, Y, Z Axes is chosen, select the support units to be rotated.
- OR
- If Rotate About Digitized Axis is chosen, select the support units to be rotated and then select three locations to define the origin and direction vector of the rotation axis. The first location is the origin of the rotation axis, the second and third locations define the direction vector parallel to the rotation axis.

Marking/Highlighting an Equipment or Cabletray Support



Use MARK SUPPORT to highlight the selected support units in a color of your choice.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose Mark Esupport from the Eqpt Supt Task Set. The Highlighting Supports property sheet appears.

Figure 3-35 Highlighting Supports Property Sheet



Procedure

1. Specify the method to select the support units to be highlighted.
 - Click Digitized Supports Only to highlight the selected support unit.
 - OR
 - Click All Supports in Active/Viewed Part to highlight all the support units in the active or viewed parts.
 - OR
 - Click All Stand-alone Supports in Active/Viewed Parts to highlight all the stand-alone support units in the active or viewed parts.
2. Specify one of the following highlighting options.
 - Click Mark With Selected Color to highlight the selected support unit in a specified color. Click the Color option list button to display a color list. The colors in the list are RED, GREEN, and BLUE. Choose the color from the list to highlight the selected support units. Red is the default.
 - Click Clear Marking to reset the visual display of the selected support unit to its original state.
3. Click Apply.
4. If Digitized Supports Only is chosen, select the support units to be highlighted.

Generating an Equipment Support Label



Use GENERATE SULABEL to automatically generates a support label for each selected related structural support unit in the active CADDSS part.

Please note: Standalone support units are ignored. Also, a support unit having an existing label is not processed.

Each support label consists of the following three fields:

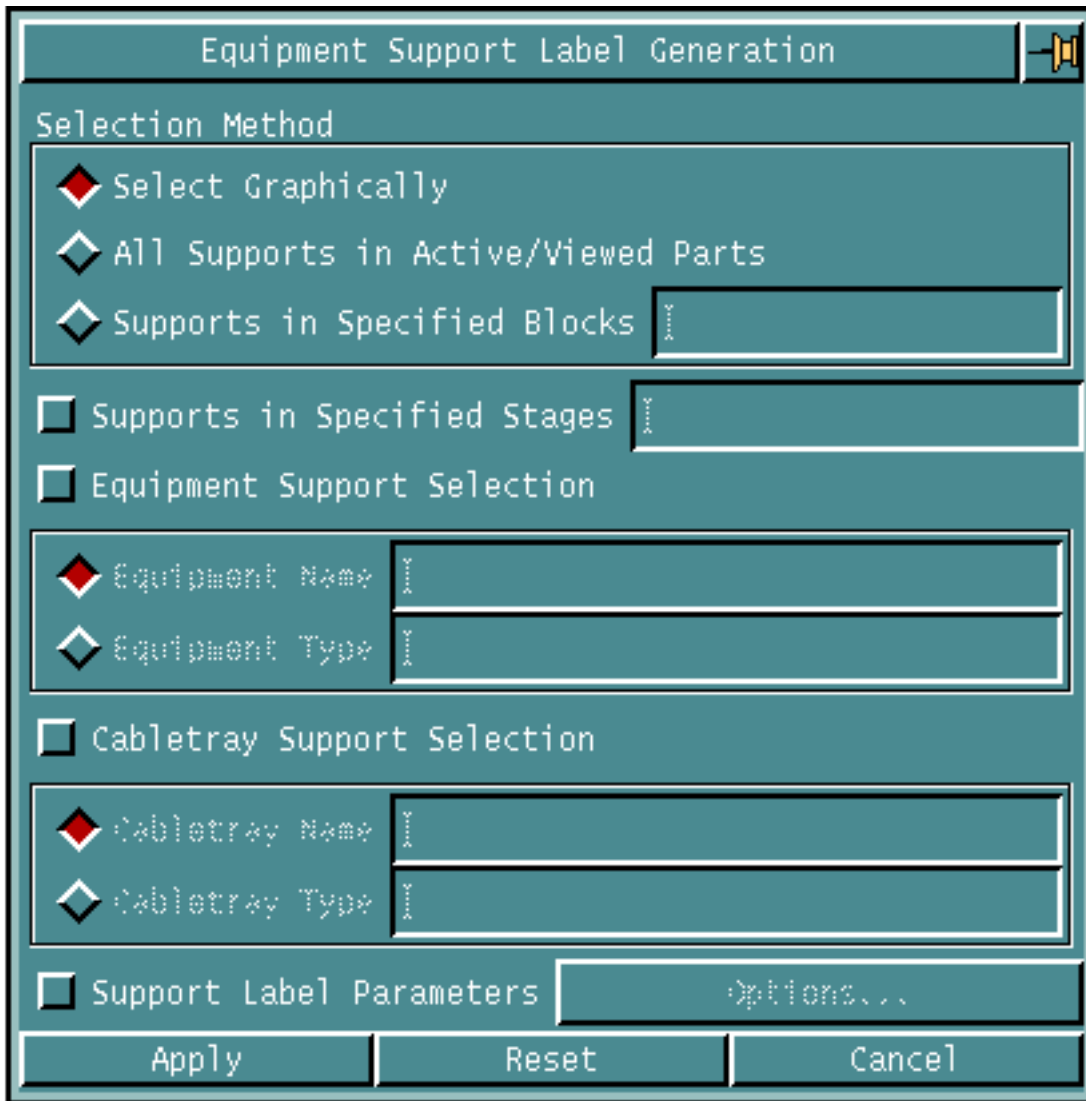
- MNEMONIC1
- MNEMONIC2
- NUMBER

The format of the support label can be defined in the structural support directory file. The support label is inserted as a model Nodal Text entity, related to the support unit Nodal Figure entity.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose Generate Sulabel from the Eqpt Supt Task Set. The Equipment support Label Generation property sheet appears.

Figure 3-36 Equipment Support Label Generation Property Sheet



The dialog box is titled "Equipment Support Label Generation" and features a standard Windows-style title bar with a maximize button. It is organized into several sections:

- Selection Method:** Contains three radio buttons. "Select Graphically" is selected. The other two are "All Supports in Active/Viewed Parts" and "Supports in Specified Blocks" (with an adjacent empty text field).
- Supports in Specified Stages:** A checkbox that is unchecked, with an adjacent empty text field.
- Equipment Support Selection:** A checkbox that is unchecked.
- Equipment Name and Type:** Two radio buttons. "Equipment Name" is selected. Both have adjacent empty text fields.
- Cabletray Support Selection:** A checkbox that is unchecked.
- Cabletray Name and Type:** Two radio buttons. "Cabletray Name" is selected. Both have adjacent empty text fields.
- Support Label Parameters:** A checkbox that is unchecked, with an "Options..." button to its right.

At the bottom, there are three buttons: "Apply", "Reset", and "Cancel".

Procedure

1. Specify the method to select the support units for label generation.
 - Click Select Graphically to select the support units for label insertion.
OR
 - Click All Supports in Active/Viewed Parts to select all the support units in the active part for label insertion.
OR
 - Click Supports in Specified Blocks to select only those support units located in the specified blocks for label insertion. Enter the name of the blocks in the field. You can specify multiple blocks, and each block name should be separated by a comma.
2. Choose Supports in Specified Stages to select only those support units having the specified stage name, in the active part, for label insertion. Enter the stage names in the field. You can specify multiple stages, and each stage name should be separated by a comma.
3. Choose one of the following equipment support selection options to label only the specified equipment supports, in the active part.
 - Click Equipment Name to label only the supports related to equipments with the specified name in the active part. Enter the equipment name in the field.
 - Click Equipment Type to label only the supports related to equipments with the specified name in the active part. Enter the equipment type in the field
4. Choose one of the following cabletray support selection options to label only the specified cabletray supports, in the active part.
 - Click Cabletray Name to label only the supports related to cabletrays with the specified name in the active part. Enter the cabletray name in the field.
 - Click Cabletray Type to label only the supports related to cabletrays with the specified name in the active part. Enter the cabletray type in the field
5. Choose Support Label Parameters to specify the label parameters. Click the corresponding Options... button to display the Support Label Parameter property sheet. For details, see “Specifying Support Label Parameters” on page 3-80.
6. Click Apply.
7. If Select Graphically is chosen, select the support units to be labeled in the active part.

Specifying the Option on the Equipment Support Label Generation Property Sheet

Given below are the details of the Support Label Parameters Options button on the Equipment Support Label Generation property sheet.

Specifying Support Label Parameters

Use Support Label Parameters option button to specify the label parameters.

1. Click Support Label Parameters and click on the Options... button on the Equipment Support Label Generation property sheet. The Support Label Parameters property sheet appears.

Figure 3-37 Support Label Parameters Property Sheet



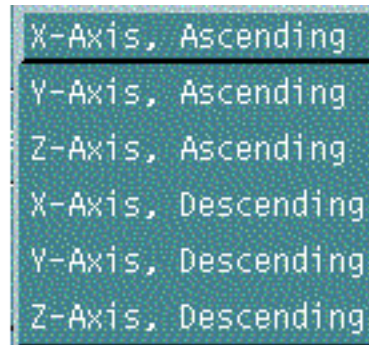
The dialog box is titled "Support Label Parameters" and features a standard Windows-style title bar with a maximize button. It is organized into several sections:

- Generate Mnemonic1 Field For Cabletray Support:** A checkbox is present but unchecked. Below it, a group box contains two radio buttons: "Use Supported Cabletray Type" (selected) and "Use Specified Text" (unselected). The "Use Specified Text" option is followed by a text input field containing "FB".
- Generate Mnemonic1 Field For Equipment Support:** A checkbox is present but unchecked. Below it, a group box contains two radio buttons: "Use Supported Equipment Type" (selected) and "Use Specified Text" (unselected). The "Use Specified Text" option is followed by a text input field containing "EQ".
- Label Number Field:** This section contains four controls:
 - "Field Width": A text input field with "3" and a spinner icon to its right.
 - "Starting Number": A text input field with "1" and a spinner icon to its right.
 - "Step Size": A text input field with "1" and a spinner icon to its right.
 - "Number Ordering Along": A dropdown menu currently showing "X-Axis, Ascending".
- Generate Mnemonic2 Field:** A checkbox is present but unchecked. Below it, a group box contains three radio buttons: "Use Stage Name Property" (selected), "Use Block Name Where Support Resides" (unselected), and "Use Specified Text" (unselected). The "Use Specified Text" option is followed by an empty text input field.
- Label Text Box:** A dropdown menu currently showing "None".
- Buttons:** At the bottom, there are three buttons: "Accept", "Reset", and "Cancel".

1. Choose Generate Mnemonic1 Field For Cabletray Support to create the support label with a MNEMONIC1 field. The default MNEMONIC1 text is as set in the Setup Options. For details, see “Specifying Default Support Label Parameters” on page 2-18.
 - Click Use Supported Cabletray Type to use the cabletray type name in the MNEMONIC1 field of the label to be created for the cabletray supports.
 - Click Use Specified Text to specify the text string for the MNEMONIC1 field of the cabletray support label. Enter the text string in the field.
2. Choose Generate Mnemonic1 Field for Equipment Support to create the equipment support label with a MNEMONIC1 field. The default MNEMONIC1 text is as set in the Setup Options. For details, see “Specifying Default Support Label Parameters” on page 2-18.
 - Click Use Supported Equipment Type to use the equipment type name in the MNEMONIC1 field of the label to be created for a equipment supports.
 - Click Use Specified Text to specify the text string for the MNEMONIC1 field of the equipment support label. Enter the text string in the field.
3. Specify the following label field number options. You can change the defaults of the following options using the Setup options. For details, see “Specifying Default Support Label Parameters” on page 2-18.
 - Enter Field Width to specify the width or the number of digits in the number field of the support label.
 - Enter Starting Number to specify the starting number to be used as the label number in generating the label for the selected support units. If the specified starting number is -1, use the recently specified label number for a given MNEMONIC1 and MNEMONIC2 stored in the active part.
 - Enter Step Size to specify the incremental step size n is used to generate support label. For each selected support unit, the support label is created with the label number $N+n$, where N is the most recently used label number for a given MNEMONIC1 and MNEMONIC2 being stored in the active part or the specified starting label number.

4. Click the Number Ordering Along option button to specify the global axis to generate the label number. The Number Ordering Along option list appears.

Figure 3-38 Number Ordering Along Option List



The number is generated based on the support unit’s location along the specified axis. The default is to generate the number along the X-Axis. The other options you can select are Y-Axis and Z-Axis.

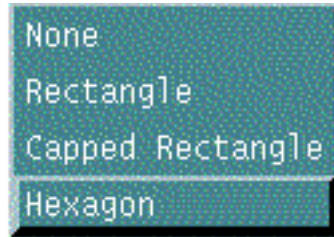
This option also specifies the order to generate the label number, in either ascending or descending order, based on the support unit’s location along the specified X-, Y- or Z-axis. The default order is Ascending. The other options you can select are ascending and descending.

You can change the default using the Setup Options. For details, see “Specifying Default Support Label Parameters” on page 2-18.

5. Choose Generate Mnemonic2 Field to create the support label with a MNEMONIC2 field. The default is the text string specified in the Setup Options. You can change the default using the Setup options. For details, see “Specifying Default Support Label Parameters” on page 2-18.
 - Click Use Stage Name Property to specify that the installation stage name is used in the MNEMONIC2 field of the support label. The installation stage name is stored by the SUSTAGE property of the selected support units. If you select this option, but the selected support unit does not have the SUSTAGE property, then no label is generated.
OR
 - Click Use Block Name where Support Resides to indicate that the name of the block where the support is located is used in the MNEMONIC2 field of the support label. If you do not define the block, the support label is created with no MNEMONIC2 field.
OR
 - Click Use Specified Text to specify the text string for the MNEMONIC2 field of the support label. Enter the MNEMONIC2 text string in the field.

6. Click the Label Text Box option list button to display the list of support label text boxes. The Label Text Box option list appears.

Figure 3-39 Label Text Box Option List



Choose one of the displayed options to specify the text box to be created around the support label.

- Choose None if you do not want to create a text box around the support label text.
- Choose Rectangle if you want the box to be rectangle.
- Choose Capped Rectangle if you want the box to be a capped rectangle with rounded ends.
- Choose Hexagon if you want a hexagon around the label text.

The default is as set in the Setup Options. You can change the default using the Setup Options. For details, see “Specifying Default Support Label Parameters” on page 2-18.

7. Click Accept.

Generating an Equipment or Cabletray Support Database



Use `GENERATE SUDBASE` to extract support unit attributes information from the active and viewed CADDs part and store it in an external RDBMS database. Use the SQL query utilities to process and format this support information outside of CADDs. You can use the RDBMS reporting utilities to generate the bill of materials or various reports required for the support unit fabrication and installation process.

Please note: The `DRAW ESUPPORT` option reads from the external support database to automate the generation of support installation drawings.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose Generate Sudbase from the Eqpt Supt Task Set. The Equipment Support External Database Generation property sheet appears.

Figure 3-40 Equipment Support External Database Generation Property Sheet

The screenshot shows a dialog box titled "Equipment Support External Database Generation". It contains several sections: "External Database Login" with "User Name" and "Password" text boxes; "Project Name" with a text box; "Revision Code" with a checkbox and a text box; "Selection Method" with four radio button options: "Select Graphically" (selected), "All Supports in Active/Viewed Parts", "Supports in Specified Blocks" (with a text box), and "Supports in Specified Stages" (with a text box); and "Overwrite Support External Database" with a checkbox. At the bottom are "Apply", "Reset", and "Cancel" buttons.

Procedure

1. Enter the following user information to connect to the external RDBMS. These options are mandatory.
 - Enter the RDBMS login user name in the User Name field.
 - Enter the RDBMS login user password in the Password field.
2. Enter the project name in the Project Name field to identify the external RDBMS database files. This option is mandatory. If a project name is not entered, then an error message is displayed and the process terminates.
3. Choose Revision Code and enter the revision number of the selected support units in the field. The revision number is only stored as an integer attribute for the support units in the external database table and not for revision control as in EDMControl.

4. Specify one of the following selection method options to select the support units.
 - Click Select Graphically to select the support units whose information is stored in the external RDBMS database.
OR
 - Click All Supports in Active/Viewed Parts to select all the support units in the active and viewed parts whose information is stored in the external RDBMS database.
OR
 - Click Supports in Specified Blocks to select only those support units, in the active and viewed parts, that are located in the specified blocks. The information of the selected supports is stored in the external RDBMS database. Enter the name of the blocks in the field. You can specify multiple blocks, and each block name should be separated by a comma.
 - Choose Supports in Specified Stages to select only those support units, in the active and viewed parts, that have the specified stage name, and the information of the selected supports is stored in the external RDBMS database. You can specify multiple stages, and each stage name should be separated by a comma.
5. Choose Overwrite Support External Database to specify that the external RDBMS database will be overwritten if a support unit with the same label already exists. The default is not to overwrite.
6. Click Apply.
7. If Select Graphically is chosen, select the support units from the active and viewed parts. The support information is stored in the external RDBMS database.

Generating an Equipment Support Drawing



Use `DRAW ESUPPORT` to automatically create fabrication drawings of selected equipment and cabletray supports in the active part.

For each of the selected support units, all the information needed to generate a support fabrication drawing is read from the external RDBMS database. The fabrication drawing is created in the next available drawing form in the active drawing. The dimension and text entities are created according to the current default parameters in the active part. Use the `SELECT DIMENSION` and `SELECT TEXT` command to select the appropriate parameters prior to the `DRAW ESUPPORT` command.

Please note: Only one support unit can be drawn in one drawing form.

Even though only one fabrication drawing can be created per support unit, there can be more than one fabrication drawing form in the form part. All support objects, dimension, and label entities should be created clear from each other. Any overlapping between objects and entities should be avoided whenever possible. In order to avoid overlap, you should not create any duplicated or unnecessary dimension or label entities in the drawing.

No graphics are generated for the standard support units, only the attributes and/or parameters of the standard support units are displayed on the corresponding drawing form. The standard supports are those defined in the Standard Support Autoselection File.

This option processes the non-standard support first with the selected form part and drawing. Standard supports which are required to be processed with the same form part and drawing as defined in the Standard Support Autoselection File, are processed together as a group.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose Draw Esupport from the Eqpt Supt Task Set. The Equipment Support Drawing Generation property sheet appears.

Figure 3-41 Equipment Support Drawing Generation Property Sheet

The screenshot shows a dialog box titled "Equipment Support Drawing Generation". It contains several sections for user input and configuration:

- External Database Login:** Fields for "User Name" and "Password", both currently redacted with black boxes.
- Project Name:** A text field, currently redacted.
- Drawing Name:** A text field, currently redacted.
- Save with Starting Suffix:** An unchecked checkbox.
- Name of Form Part:** A text field, currently redacted.
- Drawing Name in Form Part:** A text field, currently redacted.
- Selection Method:** A group box containing four radio button options:
 - All Supports in Specified Project
 - Supports in Specified Blocks (with an adjacent empty text field)
 - Supports in Specified Stages (with an adjacent empty text field)
 - Label Based Selection (with an adjacent "Options..." button)
- Support Drawing Parameters:** An unchecked checkbox with an adjacent "Options..." button.
- Support Drawing Output:** An unchecked checkbox with an adjacent "Options..." button.
- Process Drawings Continuously Without Break:** An unchecked checkbox.

At the bottom of the dialog are three buttons: "Apply", "Reset", and "Cancel".

Procedure

1. Enter the following user information to connect to the external RDBMS database. These options are mandatory.
 - Enter a RDBMS login user name in the User Name field.
 - Enter a RDBMS login user password in the Password field.

2. Enter a project name in the Project Name field to identify the external RDBMS database files. This option is mandatory. If you do not enter a project name, then an error message is displayed and the process terminates.
3. Enter a name in the Drawing Name field. This specifies the name of the drawing to be activated, with the specified form part and drawing, for support drawing generation. This option is mandatory and there is no default drawing.

If all the forms in the active drawing are filled up and there are more support units to be processed, all the model entities and the active drawings are deleted and a drawing with the same name is activated with the given form part and drawing. This process is repeated until all selected supports are drawn. By default, the drawing is activated with the specified name, therefore no suffix is added to the drawing name. The active part contains the last processed drawing.

Please note: Any existing drawing with the same name is deleted.

4. Choose Save With Starting Suffix and enter the starting suffix number to name the created drawings with a suffix. The starting suffix number along with the specified drawing name is used to determine the names of the drawings to be activated in the active part. The default starting suffix number is 1.

If all the forms in the active drawing are filled up and there are more support units to be processed, the current suffix number n is incremented by one and appended to the specified drawing name to form a new name drawing name $n+1$. The active drawing is kept in the active part while another drawing with the new name is activated, with the specified form part and drawing, to process the remaining selected support units.

For example, if the drawing name drawing name is “DWG” and the starting suffix number n is 1, then the drawings are created and named as “DWG1”, “DWG2”, “DWG3”,...etc.

5. Enter a form part name in the Name of Form Part field. This specifies the form part to activate the drawing for support drawing generation. This option is mandatory and there is no default form part name.
6. Enter a drawing name in the Drawing Name in Form Part field. This specifies the associated drawing in the form part specified in the Name of Form Part field. The drawing information like drawing size and graphics is taken from the specified form part drawing and the drawing for support drawing generation is activated. This option is mandatory and there is no default drawing.
7. Specify one of the following selection method options.
 - Click All Supports in Specified Project to select all the supports of a specified project from the external RDBMS database for drawing generation.

Please note: If there are more support units to be processed than the number of drawing forms available in the active drawing, the command terminates when all the drawing forms in the active drawing are filled.

OR

- Click Supports in Specified Blocks to select only those support units of the specified project, that are located in the specified blocks for drawing generation. Enter the name of the blocks in the field. You can specify multiple blocks, and each block name should be separated by a comma.
- Choose Supports in Specified Stages to select only those support units of the specified project that have the specified stage name from the external RDBMS database for drawing generation. You can specify multiple stages, and each stage name should be separated by a comma.

This option cannot be chosen along with the All Supports in Specified Project option.

8. Choose Label Based Selection to use support labels to select the supports from the external RDBMS database. Click the Options... button. The Label Based Support Selection property sheet appears. For details, see “Specifying Label Based Selection” on page 3-92.
9. Choose Support Drawing Parameters to specify the drawing parameter options. Click the Options... button. The Support Drawing Parameters property sheet appears. For details, see “Specifying Support Drawing Parameters” on page 3-93.
10. Choose Support Drawing Output to specify the output destinations and other hardcopy options. Click the Options... button. The Support Drawing Output Options property sheet appears. For details, see “Specifying Support Drawing Output Destinations” on page 3-95.
11. Choose Process Drawings Continuously Without Break to indicate all the selected supports are processed continuously with no break, if there are more selected supports than the number of drawing forms in the active drawing of the form part.

If you choose this option, then once all the drawing forms in the active drawing are filled up, the graphics data in the active drawing is sent to the printer or plotter device or stored in the specified diskfile as needed. The active drawing is deleted. A new drawing is activated from the same form part drawing, and the remaining selected supports are processed. Once all the drawing forms in the active drawing are filled up, by default this option prompts you to type `ok` before activating the next drawing and continue the processing of the remaining selected supports.

12. Click Apply.

Specifying Options on the Equipment Support Drawing Generation Property Sheet

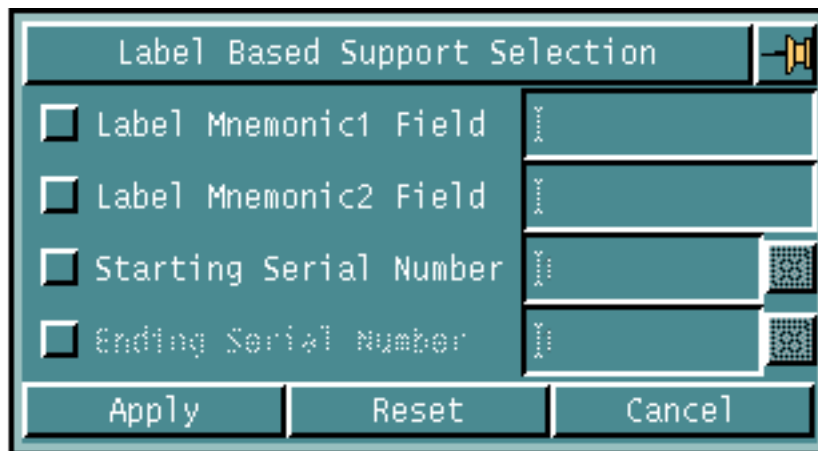
Given below are the details of the options on the Equipment Support Insertion property sheet

Specifying Label Based Selection

Use the Label Based Selection option to specify the label based selection options.

1. Choose Label Based Selection on the Equipment Support Drawing Generation property sheet. Click the Options... button. The Label Based Support Selection property sheet appears.

Figure 3-42 Label Based Support Selection Property Sheet



2. Choose Label Mnemonic1 Field to select only those supports whose label Mnemonic1 field matches the specified text string from the external RDBMS database. Enter the mnemonic1 text string in the field.
3. Choose Label Mnemonic2 Field to select only those supports whose label Mnemonic2 field matches the specified text string from the external RDBMS database. Enter the mnemonic2 text string in the field.
4. Choose Starting Serial Number to specify the label number to select and read the support unit from the external RDBMS database for drawing generation. Enter the starting serial number in the field. If you do not choose the Ending Serial Number option, only the supports whose label numbers match the specified number are selected from the external RDBMS database. If you choose the Ending Serial Number option, the specified number is the starting number of the range for support selection
5. Choose Ending Serial Number to specify the ending label number of a range to select the support units from the external RDBMS database for drawing

generation. Only those supports whose label number is greater than or equal to the starting number and less than or equal to the specified ending number is selected from the external RDBMS database.

For example, if the Starting Serial Number entered is 10 and the Ending Serial Number entered is 20, then only those supports whose label numbers are between 10 and 20 inclusively are selected for the drawing generation.

6. Click Apply.

Specifying Support Drawing Parameters

Use the Support Drawing Parameters option to specify the drawing parameter options.

1. Choose Support Drawing Parameters on the Equipment Support Drawing Generation property sheet. Click the Options... button. The Support Drawing Parameters property sheet appears.

Figure 3-43 Support Drawing Parameter Property Sheet

Support Drawing Parameters

Drawing Scale 0.0000

Clearance Space Around Support Graphics

Distance 0.0000 Draw

Ratio 0.2000

HLR Dash Line Parameters

Dash Length 0.2500

Dash Spacing 0.2500

Layer Selection

Layer of Model Entities 0

Layer of Draw Entities 0

Accept Reset Cancel

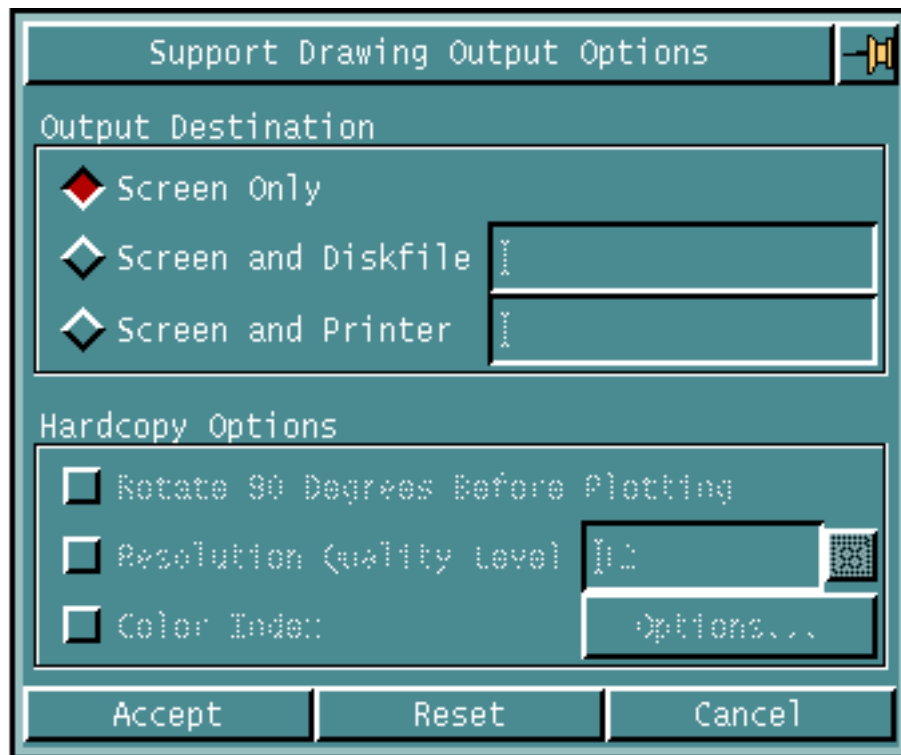
2. Choose Drawing Scale to specify the scaling factor to define the views on the support drawing. Enter the scaling factor in the field. If you choose this option, the view scale is not calculated automatically. The default is to calculate the view scale automatic such that all created views fit in the graphic area of the drawing form.
3. Choose the clearance space around support graphics options.
 - Choose Distance to specify the absolute minimum clearance distance to calculate the scaling factor to display the support unit and its related dimension entities in the detail drawings or views. Enter the absolute minimum clearance distance in the field. Click the Unit option list button. Choose the appropriate measurement unit for the specified clearance distance.OR
 - Choose Ratio to calculate the scaling factor to display the support unit and its related dimension entities in the detail drawings or views. Enter the minimum clearance space, as a percentage of either the horizontal or vertical extent of the support detail drawing whichever is smaller, in the field. The default is 0.2 or 20%. That is, the minimum total clearance space between the support objects and the detail drawing boundary is 20% of either the horizontal or vertical extent of the support detail drawing, or 10% of the detail drawing extent from each side of the detail drawing boundary.
4. Choose HLR Dash Line Parameters to display hidden lines as dashed lines. Enter the dash line font parameters, dash length and inter-spacing.
 - Enter the dash length in absolute drawing units in the Dash Length field. The default is 0.25 drawing units.
 - Enter the inter-dash spacing in absolute drawing units in the Dash Spacing field. The default dash spacing is 0.25 drawing units.
5. Specify the layer selection options.
 - Choose Layer of Model Entities to specify the layer on which the Model entities, like the support unit, related pipe lines, and clamp holes are created. Enter the layer number in the field. The default is the active layer.
 - Choose Layer of Draw Entities to specify the layer on which the Drawing or Drafting entities, like label, dimension, and text entities are created. Enter the layer number in the field. The default is the active layer.
6. Click Accept.

Specifying Support Drawing Output Destinations

Use the Support Drawing Output options to specify the output destinations and other hardcopy options.

1. Choose Support Drawing Output options button on the Equipment Support Drawing Generation property sheet. Click the Options... button. The Support Drawing Output Options property sheet appears.

Figure 3-44 Support Drawing Output Options Property Sheet



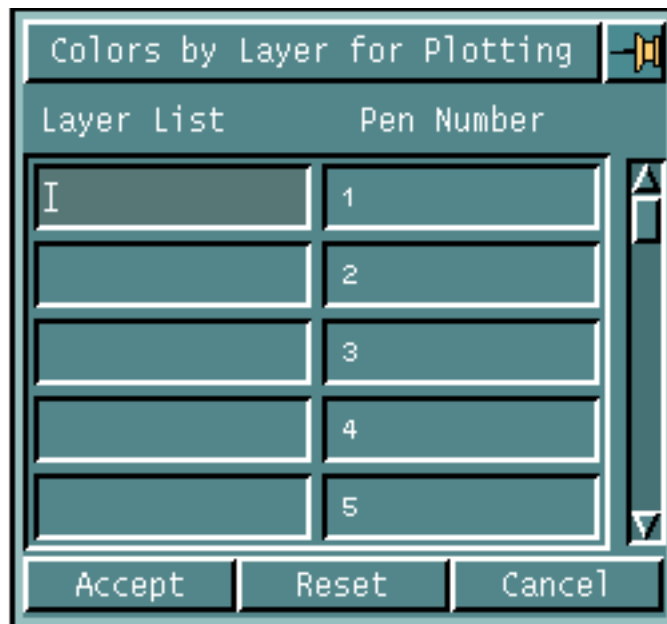
2. Specify one of the following output destination options.
 - Click Screen Only to specify that the support drawings are displayed on the screen only.
 - Click Screen and Diskfile to specify that the graphics data in active drawing is output in CGM format to a file on disk. Enter the name of the diskfile in the field. The system creates this file is created in the user's create directory unless you specify an explicit path name in the file name. If you choose the Process Drawing Continuously Without Break option, the label of the first support being drawn in the current drawing is appended to the specified diskfile name. That is, the diskfile is created as diskfile.support label in order to spool the active drawing to different diskfiles continuously. A maximum limit for a filename is 20 characters. If the diskfile exists, you are prompted for confirmation before overwriting the existing diskfile.

- Click Screen and Printer to specify that the graphics data in the active drawing is sent to a printer or plotter device. Enter the logical device name of the printer or plotter in the field.
3. Specify one of the following hardcopy options.
- Click Rotate 90 Degrees Before Plotting to rotate the drawing by 90 degrees before plotting.
 - Choose Resolution Quality Level and enter an integer value to specify the relative resolution for stroking arcs and circles. Acceptable integer values are 8-24, with 8 representing the coarsest resolution and 24 the finest. The default value is 12.
 - Choose Color Index to specify the layer number and assign the color index to be used for plotting. All entities on the specified layers are plotted in the assigned color, whose color number is as defined on the plotter. On pen plotter, the color index number corresponds to the pen number. Click the Options... button. The Colors by Layer for Plotting property sheet appears.

Specifying Layer Color Assignment for Plotting

Use the Color Index option to specify the destinations and other hardcopy options.

1. Choose Color Index on the Support Drawing Output Options property sheet. Click the Options... button. The Colors by Layer for Plotting property sheet appears.



- 2.** Enter a layer number in the field under the Layer List column. Next, enter a color number, for plotting the entities on the specified layer, in the field under the Pen Number column. Repeat this process on the subsequent rows until the layer-color number assignment is done.
- 3.** Click Accept.

Updating an Equipment or Cabletray Support from Database

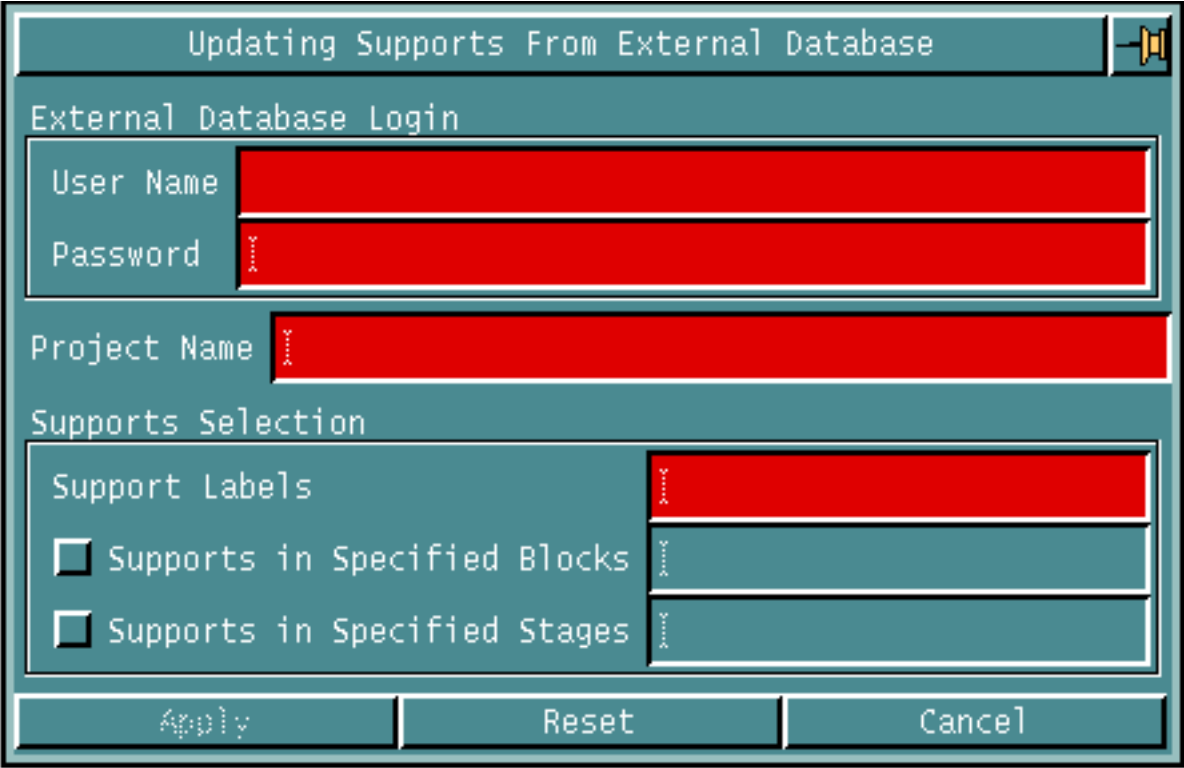


Use UPDATE SUPPORT to extract information of the selected support units from the external RDBMS database and update the corresponding support units in the active part.

Using This Option

1. Choose Supports from the Environment Access menu.
2. Choose Eqpt Supt from the Task Set Access menu. The Equipment Support Task Set appears.
3. Choose Update Support from the Eqpt Supt Task Set. The Updating Supports From External Database property sheet appears.

Figure 3-45 Updating Supports From External Database Property Sheet



Procedure

1. Enter the following user information to connect to the external RDBMS. These options are mandatory.
 - Enter the RDBMS login user name in the User Name field.
 - Enter the RDBMS login user password in the Password field.
2. Enter the project name in the Project Name field to specify the external RDBMS database files. This option is mandatory. If a project name is not entered, then an error message is displayed and the process terminates.
3. Choose the following support selection options.
 - Enter the labels of support units to be selected in the external RDBMS database, in the Support Labels field. The information of the selected support units are read from the external RDBMS database and the corresponding support units are updated in the active part. Multiple labels can be specified and each label should be separated by a comma. This option is mandatory.
 - Choose Supports in Specified Blocks to select only those support units that are located in the specified blocks. The information of the selected supports is read from the external RDBMS database and the corresponding support units are updated in the active part. You can specify multiple blocks, and each block name should be separated by a comma.
 - Choose Supports in Specified Stages to select only those support units that have the specified stage name and the information of the selected supports is read from in the external RDBMS database and the corresponding support units are updated in the active part. You can specify multiple stages, and each stage name should be separated by a comma.

Please note: Either the Supports in Specified Blocks or Supports in Specified Stages option must be selected to identify the support units to be read from the external RDBMS database.

4. Click Apply.

Support Reporting Options

This chapter describes the Equipment and Cabletray Support Reporting options. These options generate reports on the equipment and cabletray support parameters and properties, or the support modeling parameters.

- Overview of Equipment and Cabletray Support Reporting
- Verifying Equipment/Cabletray Supports
- Listing Equipment/Cabletray Support Parameters

Overview of Equipment and Cabletray Support Reporting

Use the options in the Supports Verification command palette to report the parameters and attributes of the selected equipment or cabletray support units, or list the default value of the equipment or cabletray support modeling parameters.

Accessing the Support Verification Palette

1. Choose Query option on the CADDs Environment Globals I menu to display the Reporting menu.
2. Choose Supports on the Reporting menu to display the Supports Verification command palette.

Figure 4-1 Support Verification Palette



3. Choose an option from the Support Verification command palette. For a brief description of the options in the Supports Verification Command Palette refer to “Reporting Options” on page 1-14.

The detailed descriptions of the following Equipment Support Options are discussed in the next sections.

- VERIFY EQUIPMENT/CABLETRAY SUPPORT
- LIST EQUIPMENT/CABLETRAY SUPPORT PARAMETERS

See *Pipe Supports User Guide and Menu Reference*, Chapter 4 for details of the following Pipe Support Options.

- VERIFY PIPE SUPPORT
- LIST PIPE SUPPORT PARAMETERS

Verifying Equipment/Cabletray Supports



Use Verify Equipment/Cabletray Supports to verify and list selected equipment and cabletray support parameters. Using this option you can either list the parameters and properties of all or selected members of an equipment or cabletray support unit.

The list contains the following data and properties.

Related Object Attributes and Parameters

- Type of related object, cabletray or equipment
- Related object name
- Related object MIPTR (Master Index Pointer)
- Related object anchor location

Support Units Attributes and Parameters

- Support label
- Support unit selection name
- Block name where the support unit resides
- Support unit stage name
- Support unit paint code
- Support unit total weight
- Support unit total volume
- Support unit total surface area
- Support unit centroid
- Support unit anchor locations (parent Nodal Figure location)

Support Member Attributes and Parameters

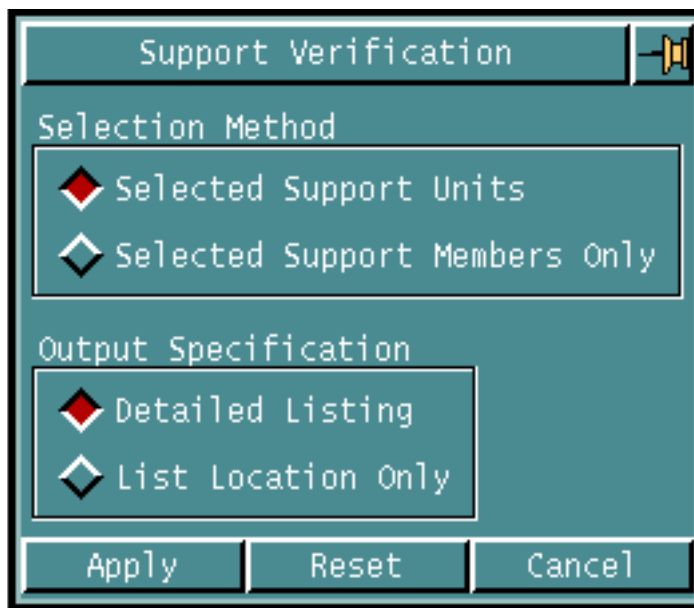
- Support member MIPTR (Master Index Pointer)
- Support member type, Axial, Liner, Pad or Plate
- Support member layer number
- Support member material number
- Support member origin (Nodal Figure location)

- Support member length (axial member only)
- Support member cross section name (axial member only)
- Support member plate thickness (plate only)
- Bolt hole type, size and location
- Pad name
- Liner dimension and location

Using This Option

1. Choose Query option on the CADD5 Environment Globals I menu to display the Reporting menu.
2. Choose Supports on the Reporting menu to display the Supports Verification palette.
3. Choose Verify Equipment/Cabletray Supports from the Support Verification palette. The Support Verification property sheet appears.

Figure 4-2 Support Verification Property Sheet



Procedure

- 1.** Choose any of the Selection Method options:
 - a.** Choose Selected Support Units to verify all the members of the selected support units. This is the default.
 - b.** Choose Selected Support Members Only to verify the selected support members.
- 2.** Choose any of the Output Specification options:
 - a.** Choose Detailed Listing to list all parameters and attributes of the selected equipment or cabletray support units or members. This is the default.
 - b.** Choose List Location Only to list only the attachment location points of the equipment or cabletray support units or members.
- 3.** Click Apply.
- 4.** Select the support units or members to be reported.

Listing Equipment/Cabletray Support Parameters



Use the List Equipment/Cabletray Support Parameters option to list the default values of the equipment and cabletray support modeling parameters. This is a direct action option. The following default values and data files are listed. You can set or modify these default values using the “Setting Up Default Pipe Support Parameters” on page 2-3.

- Default directory file name
- Stand-alone equipment support name
- Support member type, axial, plate or liner
- Support pad name
- Tolerance
- Default display mode
- Label parameters

Using This Option

1. Choose Query option on the CADDs Environment Globals I menu to display the Reporting menu.
2. Choose Supports on the Reporting menu to display the Support Verification command palette.
3. Choose List Equipment/Cabletray Support Parameters List from the Support Verification command palette. The default value of the equipment and cabletray support modeling parameters are listed.

Equipment Support Types

This appendix contains some sample drawings of equipment support types.

- Equipment Support Types

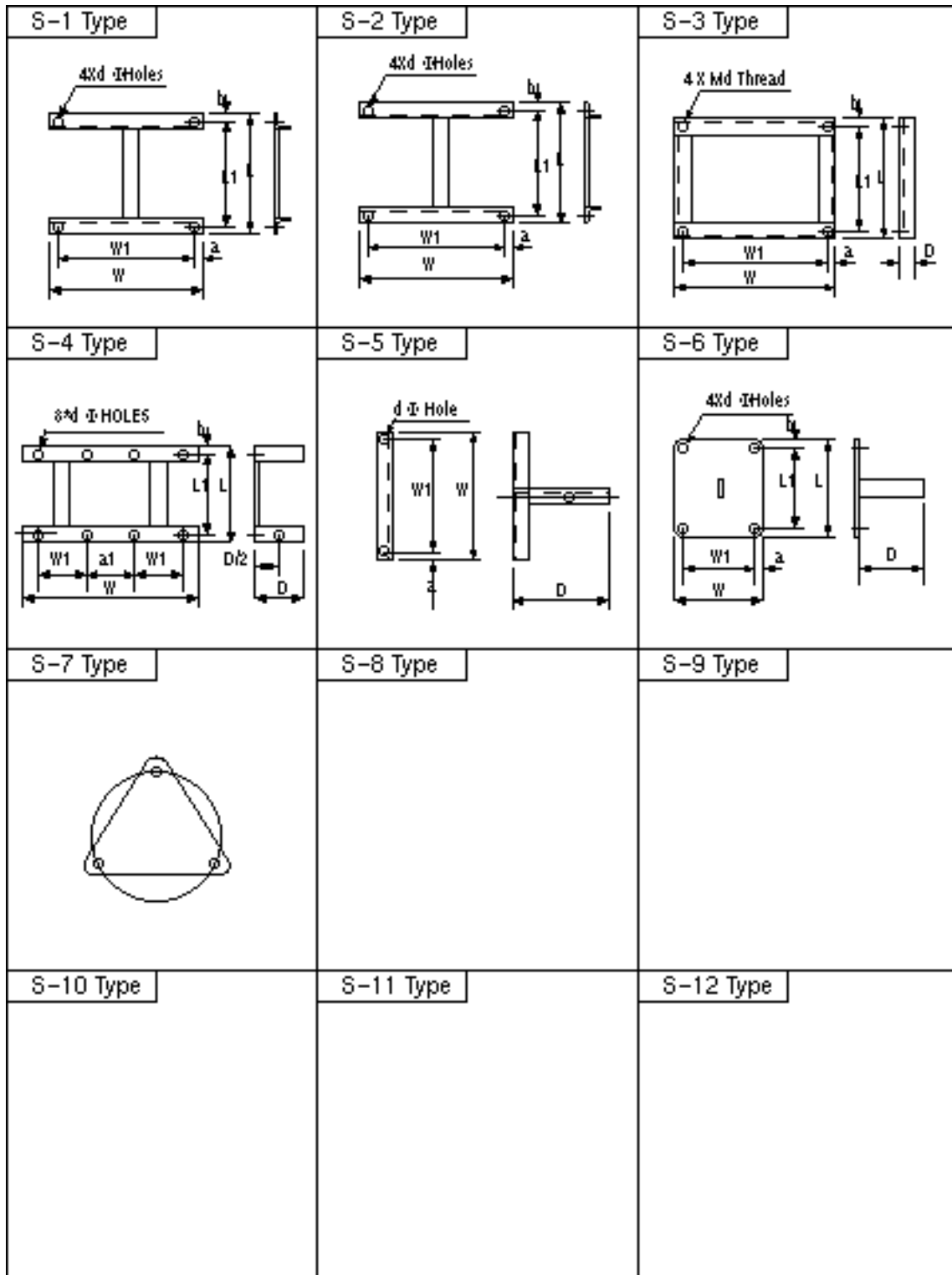
Equipment Support Types

An equipment support is a support unit which is used to carry the load of the supported equipment and that transmits loads from the equipment to the attached building or structure.

You can choose equipment support type using the INSERT ESUPPORT command. In the standalone insertion, to insert equipment support with a related equipment, the equipment support type is determined by the equipment as specified in the auto-selection file.

Shown in Figure A-1 are the sample drawings of some equipment supports. You have to prepare the definition files to be used by the INSERT ESUPPORT command. See the figure given below.

Figure A-1 Equipment Support Types



Equipment and Cabletray Support Library Preparation

This appendix describes how to prepare the equipment and cabletray library part.

For details on equipment library part preparation in general, please refer to the *CADDS Piping Specification User Guide*.

- Using INSERT ESUPPORT
- Equipment Library Part Preparation
- Cabletray Support Library Part Preparation

Using INSERT ESUPPORT

Use INSERT ESUPPORT to create an equipment support. In the case of inserting equipment support to be related to an equipment, the selected equipment must contain the equipment name, so that through the auto-selection file the corresponding equipment support can be determined. The equipment can also contain optional bolt hole information. In the case of inserting equipment support as a standalone, you must specify the equipment support name.

The 'INFO' item with the entry as 'EQUIPMENT' in the support directory file specifies the Equipment Support Autoselection File for select corresponding equipment support name from Equipment Support Specification File. The Section Parameter Autoselection File, Parameter Autoselection File and Equipment Support Definition File are also used for equipment support creation.

Please note: In case of inserting equipment support to be related to an equipment, it is an error if no equipment name can be determined from the equipment.

Equipment Bolt Hole

You can define bolt holes on an equipment. A bolt hole is a Text Node (Tnode) entity which has the property BOLTHOLE or SECTNAME properties. The SECTNAME property indicates the cross section name that determines the size and shape of the bolt hole. Such cross section must exist in the cross section library and it is used to create the corresponding bolt hole on the supporting member. If the BOLTHOLE property on the bolt hole Tnode has exactly one positive floating point number, it is a circular bolt hole and the number is the diameter. If the BOLTHOLE property on the bolt hole Tnode has exactly two positive floating point numbers, it is an elliptical bolt hole and the numbers are the major and minor diameters respectively. If the BOLTHOLE property on the bolt hole Tnode takes on a non-positive value, then the SECTNAME property is used to define the size and shape of the bolt hole. The location of the bolt hole should be read from the Tnode entity.

When an equipment support is to be inserted and related to an existing equipment, each bolt hole on the equipment is projected onto the support member. If there is an existing bolt hole on the support member at the same location of the equipment bolt hole, it should be related to the corresponding bolt hole on the equipment. If no such bolt hole is found, create one such bolthole on the support member, as a void structural cutout on the support member, using the cross section name or diameter parameter(s) as defined on the equipment bolt hole Tnode(s).

In preparing the equipment library part, use the INSERT TNODE command to insert Tnode entity as a surrogate of a bolt hole, in the equipment library part. If cross section is desired to define the size and shape of the bolt hole, then use the INSERT PROPERTY command to attach the SECTNAME property to the bolt hole Tnode. If you want a circular bolt hole, use the INSERT PROPERTY command to attach the BOLTHOLE property with the diameter as its value to the bolt hole Tnode. If you want an elliptical bolt hole, use the INSERT PROPERTY command to attach the BOLTHOLE property with the major and minor diameter as its values to the bolt hole Tnode.

Equipment Support Insertion Location and Orientation

The initial origin of equipment support, when inserted, is determined as follows:

1. In case of inserting equipment support to be related to equipment, the origin of the equipment support is determined by the equipment nfigure origin.
2. In case of stand alone insertion, the origin of the equipment support is determined by user selection.

The relative offset vector and orientation from the initial origin of the equipment support can be defined in the Support_Statement in the equipment support definition file. The Support_Statement takes on the form shown below:

```
Support_Statement: NAME support name ORIGIN origin location ROTATE  
AX degrees AY degrees AZ degrees
```

where,

support name is the name of the support unit

origin location is the relative offset location from the initial origin.

degrees is the rotation angle along the corresponding axis of the supported equipment that determines the orientation of the support unit.

The origin of the inserted equipment support is determined by initial origin combined with relative offset defined in the equipment support definition file.

For orientation of the inserted equipment support, the above AX, AY, AZ rotation in the equipment support definition file is combined with

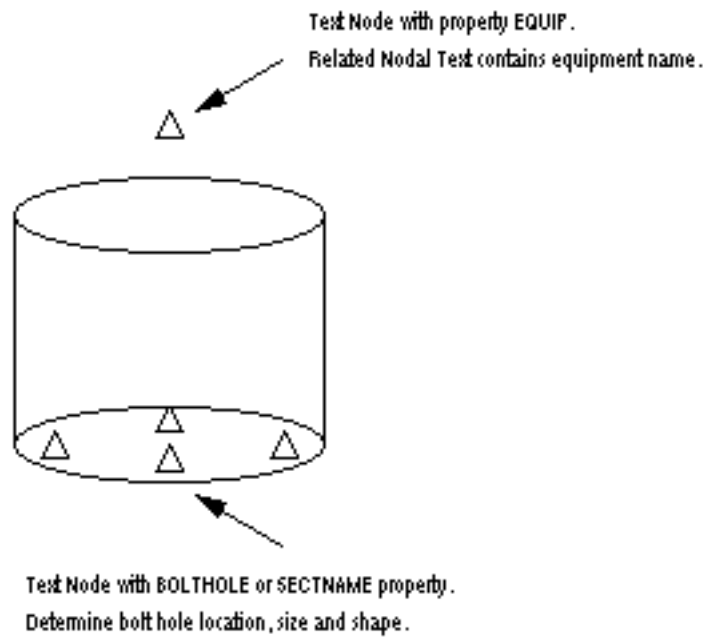
1. In the case of inserting equipment support to be related to equipment, the equipment nfigure orientation
2. In the case of stand alone insertion, the orientation modifiers.

Equipment Library Part Preparation

Use the following procedure to prepare Equipment library parts:

1. Use CADD commands to create the graphic entities, as required, in the equipment library part. For details, please see *CADD Parametric Graphics Preparation Reference*.
2. Use the INSERT PPROPERTY command to insert the required part properties to the equipment library part. An equipment should have a FITTYPE property with a value of 200.
3. Create the equipment name as a Nodal Text entity related to a Text Node entity which has the property EQUIP. Alternatively, insert the equipment name as a part property SNAME in the equipment library part described in Appendix A above.
4. Use the INSERT TNODE command to insert Tnode entity at the appropriate location that indicates the bolt hole's origin, if you want a bolt hole in the equipment. Depending on the desired size and shape of the bolt hole, use the INSERT PROPERTY command to attach the BOLTHOLE or SECTNAME property to the bolt hole Tnode. For details, see "Equipment Bolt Hole" on page B-2.
5. Use the CONSTRUCT NFIGURE, CONSTRUCT EQUIPMENT or PREPARE NFIGURE command to prepare the equipment library part as a Nodal Figure, see Figure B-1. For details in equipment preparation, see *CADD Parametric Graphics Preparation Reference*.

Figure B-1 Equipment Nodal Figure Part



Cabletray Support Library Part Preparation

Use the `INSERT CSUPPORT` command to select and create the cabletray support. The selected cabletray must contain information like the cabletray selection name, origin and orientation. A cabletray is a Nodal Figure(Nfig) entity. For details on the cabletray support insertion rule, see Appendix-C "Cabletray Support Specification File" on page C-27.

Use the `INSERT CSUPPORT` command to read the cabletray selection name from the selected cabletray Nodal Figure. This name is used as the selection name to look up the various attributes in the Cabletray Specification File, see Appendix-C "Cabletray Specification File" on page C-25, for cabletray support insertion.

The command first looks on the cabletray Nodal Figure, for the `CABLETRAY` property. The property value is read as the cabletray selection name. The origin and orientation of the cabletray Nodal Figure is read from the entity and is used as such for the cabletray support insertion. It is an error if the cabletray selection name cannot be determined. You can use the `INSERT PPROPERTY` command to insert the `CABLETRAY` property to the cabletray figure library part. For details on figure library part preparation in general, see the *CADD S Piping Specification User Guide*.

Support Autoselection Files

This appendix contains a list of directory, auto-selection and parameter file formats used in Equipment and Cabletray Support.

- Equipment Support Insertion
- Support Directory File
- Equipment Support Autoselection File
- Equipment Support Specification File
- Equipment Support Parameter Autoselection File
- Equipment Support Section Parameter Autoselection File
- Equipment Support Definition File
- Cabletray Support Insertion
- Cabletray Specification File
- Cabletray Support Specification File
- Cabletray Support Cross Section Autoselection File
- Pad Autoselection File
- Support Attachment Endtype Autoselection File
- Standard Support Drawing Autoselection File
- Block Definition File

Equipment Support Insertion

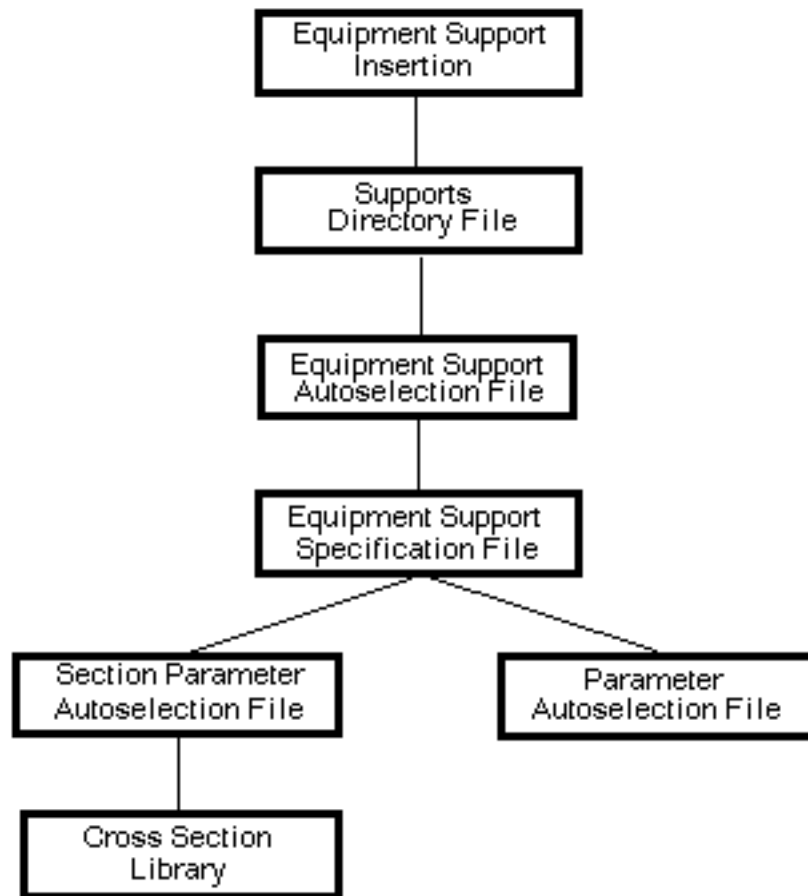
The selected equipment should contain information like the equipment name, support insertion and orientation, and bolt hole information (optional) in order to enable the INSERT ESUPPORT command to select and create the equipment support.

The INSERT ESUPPORT command reads the equipment name from the selected equipment nodal figure. This name is used as the selection name to determine the definition file for equipment support for insertion. The command first looks for a Text Node on the equipment with the EQUIP property and the equipment name is read from the related nodal text (Ntext) entity, if it exists.

If the equipment name can not be determined in this way, the software then searches for the selection name (SNAME) part property on the equipment Nodal Figure. This property value is read as the equipment name. It is an error if no equipment name can be determined. You can use the INSERT PPROPERTY command to insert the SNAME property to the equipment library part.

Equipment support insertion is based on the attributes of the existing equipment and the various equipment support autoselection files. These files are described in the subsequent sections. The relationship of the various autoselection files to be used in the INSERT ESUPPORT command is shown.

Figure C-1 Autoselection Files for Equipment Support Insertion



Support Directory File

This file specifies the path and name of various autoselection and specification files for equipment and cabletray support modeling. The system default directory file is `/usr/apl/cadds/data/cvaec/supports/drfile`. Use the `SELECT SUPARAMETERS` command to change the default.

The first line in the file defines the format for the support label. For example, `MNEMONIC1-NUMBER-MNEMONIC2` means the support label will have mnemonic 1 field first, followed by number and mnemonic 2 field, all separated by a “-”.

A sample of the Support Directory File is shown below.

```
MNEMONIC1-NUMBER-MNEMONIC2
INFO DIRY &
*****
*2345678901234567890123456789012345678901234567890123456789012345
789012
*
* Filename:  cvaec.supports.drfile
*
* Purpose:  Defines supports label format and directory path and
*           filename for autoselection files.
*
* Description:
* INFO      keyword to identify autoselection or specification
*           filename.
* CABLETRAY cabletray specification file
* CSSPEC    cabletray support specification file
* ENDTYPE   structural attachment endtype autoselection file
* EQUIPMENT equipment support autoselection file
* ESSPEC    equipment support specification file
* PAD       structural pad auto-selection file
* PARAMETER equipment support parameter autoselection file, used
*           with equipment support definition file
* SECPARAM  equipment support section parameter autoselection
*           file, used with equipment support definition file
* DIRY      autoselection directory or filename
*
*2345678901234567890123456789012345678901234567890123456789012345
6789012
*****
BLOCK      CVAEC.SUPPORTS.BLOCK
CABLETRAY  CVAEC.SUPPORTS.CABLETRAY
CSUPPORT   CVAEC.SUPPORTS.CSUPPORT
CSUPTSEC   CVAEC.SUPPORTS.CSSECTION
ENDTYPE    CVAEC.SUPPORTS.ENDTYPE
EQUIPMENT  CVAEC.SUPPORTS.EQUIPMENT
ESUPPORT   CVAEC.SUPPORTS.ESUPPORT
```


ESUPTPARAM	CVAEC . SUPPORTS . PARAMETER
ESUPTSEC	CVAEC . SUPPORTS . SECPARAM
DRAWING	CVAEC . SUPPORTS . DRAWING

Equipment Support Autoselection File

The equipment type and its default equipment support selection name (as defined in the Equipment Support Specification File later on) should be stored together with a unique equipment name in the Equipment Support Autoselection File. When you insert equipment support to be related to equipment, the equipment name must be defined in the auto selection file.

This auto selection file must be defined in the support directory file with the selection name EQUIPMENT.

Given the equipment name the following information is read from this file: the equipment type and the equipment support selection name. The three fields in this file are described below.

NAME (Text)

This specifies the name of the equipment as read from the equipment Nodal Figure, either from a Text Node with the EQUIP property, or from the SNAME property.

TYPE (Text)

This specifies the type name of the equipment determined in this file. This type name can be used for equipment or cabletray support selection as in GENERATE SULABEL CABLETRAY/EQUIPMENT TYPE. It can also be used in the mnemonic1 field of the support label.

SNAME (Text)

This specifies the equipment support selection name. This selection name refers to the definition file name, the related floating point parameter selection name and the section parameter selection name in the Equipment Support Specification File for the equipment support insertion.

A sample of the Equipment Support Autoselection File is shown below.

Table C-1 Equipment Support Autoselection File Sample

```
NAME TYPE SNAME &
*****
*2345678901234567890123456789012345678901234567890123456789012345
6789012
*
* Filename: cvaec.supports.equipment
*
* Purpose: Defines the equipment type and support selection name
*          for a given equipment.
*
* Description:
```

```
* NAME  equipment name.  
* TYPE  equipment type.  
* SNAME equipment support selection name.  
*  
*2345678901234567890123456789012345678901234567890123456789012345  
6789012  
*****  
BALLAST-PP L   S-2  
BALLAST1   L   BALLAST1  
CONTROL    S   CONTROL  
DEGONG     S   DFGONG  
MAST       S   MAST  
SEATCHLT   S   SEARCHLE
```

Equipment Support Specification File

This file is used by the INSERT ESUPPORT command to get the equipment support definition file name from equipment support name. This file should be sorted.

This auto selection file must be defined in support directory file with selection name ESUPPORT.

You must determine the definition file, the appropriate parameter selection name (where the list of parameters are defined in the Equipment Support Parameter Autoselection File) and the section parameter selection name (where the list of section names are defined in the Equipment Support Section parameter Autoselection File) to be used for the support insertion for each equipment support.

The definition filename, parameter selection name and section parameter selection name is stored under a unique equipment support selection name in the Equipment Support Specification File. The four fields in this file are described below.

SNAME (Text)

This specifies the equipment support selection name.

PNAME (Text)

This specifies the equipment support definition file.

PRMSNAME (Text)

This specifies the equipment support parameter selection name. This selection name reads the required floating point parameters from the equipment support parameter autoselection file

SECSNAME (Text)

This specifies the equipment support section parameter selection name. This selection name reads the cross section names from the equipment support section parameter autoselection file.

A sample of the Equipment Support Specification File is shown below.

Table C-2 Equipment Support Specification File Sample

```
SNAME DNAME PRMSNAME SECSNAME &  
*****  
*234567890123456789012345678901234567890123456789012345  
6789012  
*  
* Filename: cvaec.supports.specification
```

*
* Purpose: For a given equipment support selection name, the
* equipment support definition file name, the parameter
* selection name and the section parameter selection name
* are defined in this file.
*

* Description:

* SNAME equipment support selection name
* DNAME equipment support definition filename
* PRMSNAME floating point parameter selection name
* SECSNAME section name parameter selection name
*

*234567890123456789012345678901234567890123456789012345
6789012

BALLAST1	CVAEC.SUPPORTS.PROC.BALLAST1	A002	M0002
CONTROL	CVAEC.SUPPORTS.PROC.CONTROL	A002	M0002
DFGONG	CVAEC.SUPPORTS.PROC.DFGONG	A002	M0002
DFGONG	CVAEC.SUPPORTS.PROC.DFGONG	A002	M0002
S-2	CVAEC.SUPPORTS.PROC.S-2	A002	M0002
SEARCHLT	CVAEC.SUPPORTS.PROC.SEARCHLT	A002	M0002

Equipment Support Parameter Autoselection File

This file is used by the INSERT ESUPPORT command to pick up the floating point parameters used in equipment support definition file. This file should be sorted.

This auto selection file must be defined in the support directory file with selection name ESUPTPARAM.

You must determine a list of floating point parameters to be used with the corresponding equipment support definition file. The list of parameters refers to the variables T1, T2,...,Tn as defined in the definition file. These parameters are used to scale or position various support members for equipment support insertion. Each list should be stored under a unique selection name in the Equipment Support Parameter Autoselection File.

The equipment support parameter selection name refers to the list of parameters to be used with the definition file for equipment support insertion. The two fields in this file are described below.

SNAME (Text)

This specifies the equipment support parameter selection name.

PARAMS (Real)

This specifies a list of floating point parameters to be used for equipment support insertion. Each parameter should be separated by a comma. The list of parameters is used with the equipment support definition file for the equipment support insertion, with first double value in the list to replace T1 in equipment definition file, second in the list to replace T2, and so on.

A sample of the Equipment Support Parameter Autoselection File is shown below.

Table C-3 Equipment Support Parameter Autoselection File Sample

```
SNAME PARAMS &
*****
*2345678901234567890123456789012345678901234567890123456789012345
6789012
*
* Filename: cvaec.supports.parameter
*
* Purpose: Provides parameters for use in the equipment support
*          definition file.
*
* Description:
* SNAME    parameter selection name.
* PARAMS   list of parameters.
```

```
*  
*2345678901234567890123456789012345678901234567890123456789012345  
6789012  
*****  
1234AB 23.3, 32.00, 43.44, 55.27, 34.3, 12.23, 100.44  
A001 12,33, 34.00, 32.11, 43.34, 55.99, 22.22, 99.55  
A002 0.0, 2.1, 34.00, 32.11, 43.34, 55.99, 22.22, 99.55  
AABBCC 23.3, 32.00, 43.44, 55.27, 34.3, 12.23, 100.44
```

Equipment Support Section Parameter Autoselection File

This file is used by the INSERT ESUPPORT command to pick up the cross section parameters used in equipment support definition file to insert equipment support. This file needs to be sorted.

This auto selection file must be defined in the support directory file with selection name ESUPTSEC.

This selection name refers to the list of cross section names to be used with the definition file for equipment support insertion. Each section name must be defined in the active cross section library. This list of section names refer to the variables S1, S2,...,Sn as defined in the definition file.

Each section name in the list should be used for the axial member creation, if any, as specified in the definition file. The two fields in this file are described below.

SNAME (Text)

This specifies the equipment support cross section parameter selection name.

PARAMS (Text)

This specifies the list of cross section names to be used for equipment support insertion. Each cross section name should be separated by a comma and must be defined in the active section library.

A sample of the Equipment Support Section Parameter Autoselection File is shown below.

```
SNAME PARAMS &
*****
*2345678901234567890123456789012345678901234567890123456789012345
6789012
*
* Filename: cvaec.supports.secparam
*
* Purpose: Contains equipment support cross section names for the
*          support definition file. The cross section name will be
*          used for the structural element as defined in the
*          support definition file. The cross section must be
*          defined in the active cross section library.
*
* Description:
* SNAME cross section parameter selection name
* PARAMS list of cross section names, separated by comma
*
```



```
*234567890123456789012345678901234567890123456789012345  
6789012  
*****  
M0001    X100X11 , C130X17 , H200X10X10  
M0002    L40X5 , L90X10 , h200X10X10  
M00123   L100X10X10 , L120X10  
M32001   L100X10X10 , L120X10
```

Cross Section Library

A section library is a set of entity sub-records or a text file that stores the parameters or the shape of the section profiles. There are two types of section libraries, internal and external. Both internal or external cross section library can be used for axial member insertion.

For further details see Appendix A, Section Libraries, of the *CADD5 Advance Structural Modeling User Guide and Menu Reference*.

Equipment Support Definition File

This file is a text file consisting of statements that define the geometry and attributes of a support unit. A statement may contain sub-statements. The basic elements that make up a statement or a sub-statement are key words and expressions defined in this section.

This file, along with a list of floating point parameters and cross section names can be used for equipment support insertion. For each equipment support, you must prepare a definition file which defines the various geometry and attributes of the equipment support to be created. An equipment support is a collection of structural objects or members.

Notations Used in Equipment Support Definition File

The notations used in the Equipment Support Definition File are as shown in the table below.

Table C-4 Notations

Symbol	Description
	OR
Key words	are in capital characters
[]	indicates that enclosed item(s) is/are optional.
;	statements always finish with ;.
recursion	an item appears in both left and right side of a definition.

Equipment Support Definition File Syntax

The following is the list of keywords that the INSERT ESUPPORT command can recognize in the Equipment Support Definition File and their usage. If the Unit_statement is not used, the model unit of the active part is used.

Statement:

```
[ Unit_Statement ]
```

Support_Statement:

```
{ Stelement_Statement | Stplate_Statement | Curve_Statement |  
Bolthole_Statement | Property_Statement }*
```

Comments:

Anything not starting with any of the keywords from above mentioned statements is treated as comments.

Support Model Unit Statement

This statement indicates the model unit to be used to insert the support unit. There should be only one support unit statement if it exists in each support definition file.

Unit_Statement:

```
UNIT = IN | FT | MI | MM | CM | M | KM
```

Support Definition Statement

This statement specifies the name and origin of the support unit. There should be exactly one support definition statement in each support definition file.

Support_Statement:

```
NAME Support_Name Origin_Statement Rotation_Statement;  
Support_Name:Text_Expression
```

Structural Element Member Statement

This statement defines the structural element type member of the support unit.

Stelement_Statement:

```
STELEMENT [Stiffener_ID] Stiffener_Definition;  
Stiffener_ID:Integer_Expression (must be the order number of this  
element among STELEMENT/STPLATE defined in the procedure file,  
starting from 1, cutouts defined using STPLATE keyword are  
excluded).  
Stiffener_Definition:Point_Statement  
Section_Statement  
[ Centerline_Statement ]  
[ Priority_Statement ]  
[ Anchor_Statement ]
```

Structural Plate Member Statement

This statement defines the structural plate type member of the support unit.

Stplate_Statement:

```
STPLATE [ Plate_ID ] Plate_Definition;  
Plate_ID:Integer_Expression (must be the order number of this  
plate among STELEMENT/STPLATE defined in the procedure file,  
starting from 1, cutouts defined using STPLATE keyword are  
excluded).
```

```
Plate_Definition:Boundary_Statement  
[ Orientation_Statement ]  
[ Origin_Statement ]  
[ Thickness_Statement ]  
[ Placement_Statement ]  
[ Priority_Statement ]  
[ Cutout_Statement ]  
Orientation_Statement:Xform_Space | Rotation_Statement  
Xform_Space:UDIR 3D_Vector VDIR 3D_Vector WDIR 3D_Vector
```

Rotation_Statement:

```
ROTATE [ AX Rotation_Degree ] [ AY Rotation_Degree ] [ AZ  
Rotation_Degree ]  
3D_Vector:3D_Point  
Rotation_Degree:Double_Expression
```

Curve Definition Statement

This statement defines the 2D curve to be used for the support member definition.

Curve_statement:

```
CURVE Curve_Name 2D_Curve;  
Curve_Name:Text_Expression
```

Support Property Statement

This statement specifies the property to be attached to the support unit during insertion.

Property_Statement:

```
PROPERTY { Property_Definition }*  
Property_Definition: Property_Name Property_Type Property_Value  
Property_Name:Text_Expression  
Property_Type:INTEGER | DOUBLE | TEXT  
Property_Value:Double_Expression | Integer_Expression |  
Text_Expression
```

Bolt Hole Statement

Bolthole_Statement:

```
BOLTHOLE Parent_Object_ID Bolthole_Definition Bolthole_Position  
Bolthole_Definition Circle_Definition | Ellipse_Definition |  
Section_Definition  
Bolthole_Position{ [Orientation_Statement] Origin_Statement }*
```

Stiffener Cross Section Statement

Section_Statement:

```
Section_Definition Section_Orientation  
Section_Definition: SECTION Section_Name  
Section_Name:Text_Expression  
Section_Orientation: Flange_Direction Web_Direction  
Web_Direction:WEBDIR 3D_Vector  
Flange_Direction:FLANGEDIR 3D_Vector
```

Stiffener Definition Curve Position Statement

Centerline_Statement:

```
CENTERLINE Horizontal_Justification Vertical_Justification
```

Stiffener Support Member Anchor Statement

Anchor_Statement:

```
ANCHOR Anchor_Definition  
Anchor_Definition:[ START | END | BOTH ]
```

Plate Boundary Statement

Boundary_Statement:

```
BOUNDARY Curve_Name | BOUNDARY 2D_Curve
```

Plate Thickness Statement

Thickness_Statement:

```
THICKNESS Plate_Thickness  
Plate_Thickness:Double_Expression
```

Plate Boundary Curve Placement Statement

Placement_Statement:

PLACEMENT Vertical_Justification

Cutout Statement

Cutout_Statement:

CUTOUT Parent_Object_ID
Parent_Object_ID:[Plate_ID | Stiffener_ID]
Specified or not in the parent element/plate definition,
Parent_Object_ID should be the order number of the element/plate
(exclude cutout which also uses STPLATE keyword) defined in the
procedure file, starting from 1. This Parent_Object_ID is only for
referencing cutout/bolthole belonging to which object, if the ID
given is wrong, it is ignored. The parent objects statements must
be defined prior to Parent_Object_ID is used to reference to that
object.

Structural Object Priority Number Statement

Priority_Statement:

PRIORITY Priority_Number
Priority_Number:Integer_Expression

2D Curve Definition

2D_Curve:

{ 2D_Point | 2D_Curve , 2D_Point | 2D_Curve , Arc_Definition }* |
Circle_Definition | Ellipse_Definition
Arc_Definition:RADIUS Arc_Radius [CCW] Arc_Endpoint
Circle_Definition:CIRCLE Circle_Radius
Ellipse_Definition:ELLIPSE Major_Radius Minor_Radius
Arc_Radius: Double_Expression
Circle_Radius:Double_Expression
Major_Radius:Double_Expression
Minor_Radius:Double_Expression
Arc_Endpoint:2D_Point

Origin Statement

Origin_Statement:

```
ORIGIN 3D_Point
```

3D Point List Statement

Point_Statement:

```
POINT 3D_Point { , 3D_Point }*
```

2D Point Definition

2D_Point:

```
X Double_Expression Y Double_Expression
```

3D Point Definition

3D_Point:

```
X Double_Expression Y Double_Expression Z Double_Expression
```

Horizontal Justification Statement

Horizontal_Justification:

```
LEFT | RIGHT | CENTER
```

Vertical Justification Statement

Vertical_Justification:

```
TOP | BOTTOM | CENTER
```

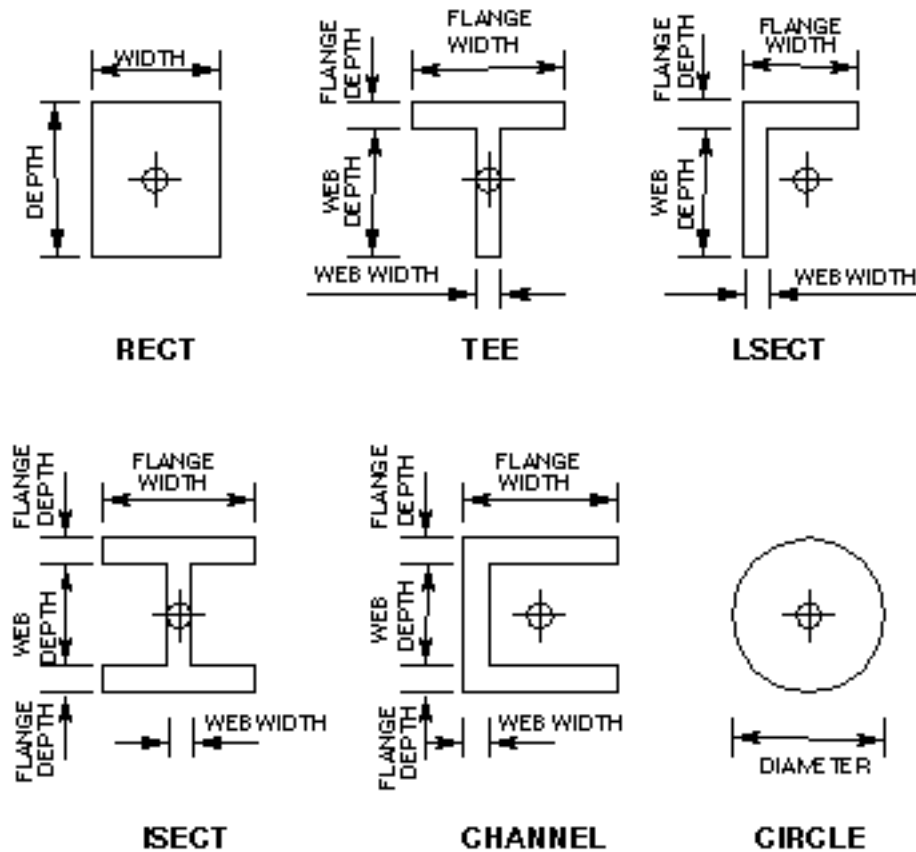
Expression Statements

Given below are the expression statements and their descriptions.

Table C-5 Expression Statements

Statement	Description
Double_Expression	double value Integer_Expression Double_Variable Unary_Operator (Double_Expression) (Double_Expression) Binary_operator (Double_Expression)
Integer_Expression	integer value
Text_Expression	Text_variable Text_string
Double_variable	double variable recognized as Tn, such as T1, T2,... etc.
Text_variable	string variable recognized as Sn, such as S1, S3,... etc. Used for cross section.
Text_string	{ character}*
Unary_operator	+ -
Binary_operator	Operators such as +, -, *, / and functions such as SIN, COS, TAN, SQRT can be used in definition file. Special functions DEPTH, WIDTH, FTHICK and WTHICK are provided, their argument is cross section name and they return depth, width, flange thickness and web thickness of the given cross section name respectively. For details, see the figure Cross Section Dimensional Parameters below.

Figure C-2 Cross Section Dimensional Parameters



A sample definition file for the equipment support insertion is shown in the table given below. The parameters used in this example are $T1 = 0.0$, $T2 = 2.1$. The section parameters $S1$ and $S2$ have the cross section names that are used to create the axial members, and such sections must be defined in the selected cross section library.

Table C-6 Equipment Support Definition File Sample

```
SEATNAME t8109 ORIGIN x1.05y3.15zT1;

STELEMENT SECTION S1
  POINTS X(1.0-(2.5-1.5))+T1YT2ZT1-WIDTH(S1), xT1yT2z-3.0
  LOCALCPL x-1.0yT1zT1,xT1y-1.0zT1 CENTERLINE LEFT TOP PRIORITY
  15;

STELEMENT SECTION S2
  POINTS xT2yT2zT1-FTHICK(L40X5), xT2yT2z-3.0
  LOCALCPL x-1.0yT1zT1,xT1y-1.0zT1 CENTERLINE RIGHT TOP PRIORITY
  15;

STELEMENT SECTION S1
  POINTS xT2y4.2zT1-WTHICK(S2), xT2y4.2z-3.0
```

```
LOCALCPL x-1.0yT1zT1,xT1y-1.0zT1 CENTERLINE LEFT BOTTOM PRIORITY
15;

STELEMENT SECTION S2
POINTS xT1y4.2zT1-DEPTH(L40X5), xT1y4.2z-3.0
LOCALCPL x-1.0yT1zT1,xT1y-1.0zT1 CENTERLINE RIGHT BOTTOM
PRIORITY 15;

STPLATE BOUNDARY x0.0y2.1, x2.1y2.1,
RADIUS 1.485 CCW x2.1y4.2, x0.0y4.2, x0.0y2.1
PLACEMENT BOTTOM THICKNESS 0.2 priority 5;

STPLATE BOUNDARY x1.05y2.1,
RADIUS 1.05 CCW x2.1y3.15, RADIUS 1.05 CCW x1.05y4.2,
RADIUS 1.05 CCW x0.0y3.15, RADIUS 1.05 CCW x1.05y2.1
PLANE x1.0yT1zT1,xT1y1.0zT1,xT1yT1z1.0,xT1yT1z1.5
PLACEMENT BOTTOM THICKNESS 0.2 priority 5;

STPLATE BOUNDARY curve1
PLANE x1.0yT1zT1,xT1y1.0zT1,xT1yT1z1.0,xT1yT1z3.0
PLACEMENT BOTTOM THICKNESS 0.2 priority 5;

STPLATE BOUNDARY x1.05y2.6,
RADIUS 0.55 CCW x1.6y3.15, RADIUS 0.55 CCW x1.05y3.65,
RADIUS 0.55 CCW x0.5y3.15, RADIUS 0.55 CCW x1.05y2.6
PLANE x1.0yT1zT1,xT1y1.0zT1,xT1yT1z1.0,xT1yT1z3.0
PLACEMENT BOTTOM priority 5 CUTOUT 7;

CURVE curve1 xT1yT2, xT2yT2*COS(1.1*5.0-5.5)/SIN(PI/2.0),
xT2y4.2*1.0, xT1y4.2,xT1yT2;
```

Cabletray Support Insertion

A cabletray support, as shown in in the figure given below, consists of a collection of linear single segment axial members and each member is inserted parallel to the local Z-axis of the related cabletray. The member insertion rule is defined in the specification file as described in the subsequent sections.

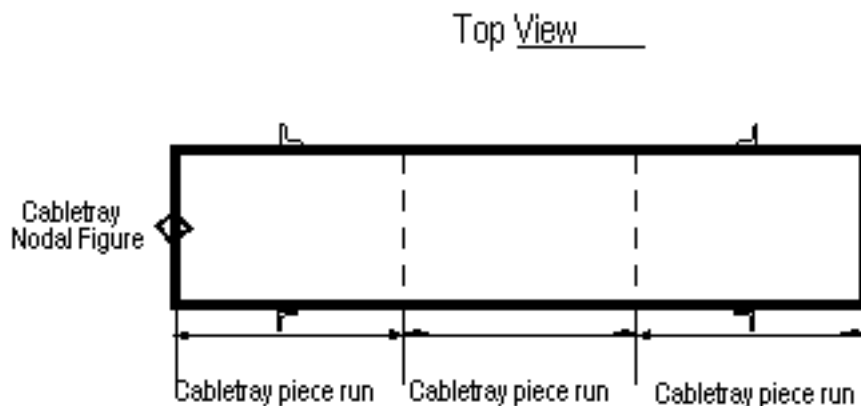
A cabletray support consists of a number of subsets of axial members. A subset should consist of either one or two members, and the member(s) within a subset should be attached to the same cabletray piece.

In order to enable the INSERT CSUPPORT command to select and create the cabletray support, the selected cabletray should contain information like the cabletray selection name, origin and orientation.

The INSERT CSUPPORT command reads the cabletray selection name from the selected cabletray Nodal Figure. This selection name refers to various attributes in the Cabletray Specification File for cabletray support insertion. The command looks for the CABLETRAY property on the cabletray Nodal Figure, and the property value is taken as the cabletray selection name.

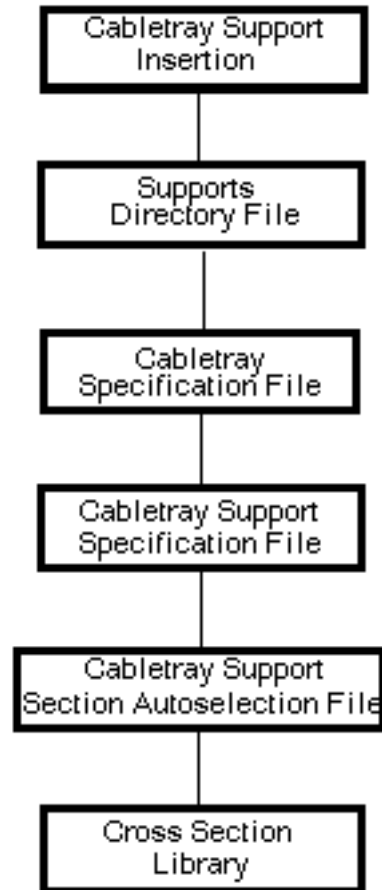
The origin and orientation of the cabletray Nodal Figure is read from the entity itself and used for the cabletray support insertion. It is an error if the cabletray selection name cannot be determined. You can use the INSERT PPROPERTY command to insert the CABLETRAY property to the cabletray figure library part.

Figure C-3 A Cabletray Support with a Cabletray



The relationship of the various autoselection files to be used in the INSERT CSUPPORT command is shown below.

Figure C-4 Autoselection Files for Cabletray Support Insertion



Cabletray Specification File

This file is used by the INSERT CSUPPORT command to insert cabletray support. Cabletray is represented, by default, by a rectangular cross section. Each cabletray assembly consists of a collection of logical or manufacturable cabletray pieces. These pieces are connected together end to end, one after another along the cable passageway. There are two types of cabletray pieces, straight and bend.

The name of this file should be defined in the directory file and the selection name CABLETRAY refers to the filename. This file should be sorted.

Given the cabletray name, its attributes and parameters like, the cabletray type, number of tiers, width, height, and the cabletray piece selection names, can be referred from this file. The four fields in this file are described below.

NAME (Text)

This specifies the cabletray name.

TYPE (Text)

This specifies the cabletray type name.

LEVEL (Integer)

This specifies the number of levels or tiers.

PIECE (Real)

This specifies the list of cabletray piece selection names.

XOFF (Real)

This specifies the origin of cabletray from nfigure, local x offset

YOFF (Real)

This specifies the origin of cabletray from nfigure, local y offset

ZOFF (Real)

This specifies the origin of cabletray from nfigure, local zoffset

NUMBER (Integer)

This specifies the number of members in the cabletray support

A sample of the Cabletray Specification File is shown below.

Table C-7 Cabletray Specification File Sample

```

UNITS = MM
NAME TYPE LEVEL XOFF YOFF ZOFF NUMBER PIECE &
*****
*234567890123456789012345678901234567890123456789012345
6789012345
*
* Filename: cvaec.supports.cabletray
* Purpose: This file defines the cabletray name, type, number of
* tiers, width and height and the list of cabletray
* pieces. For simplicity, a cabletray has the shape of a
* rectangular box and it can also have bends. Each
* cabletray consists of a collection of cabletray pieces
* and they are connected one after another along the
cable
* passageway. There are two types of cabletray pieces,
* straight and bend.
*
* Description:
* NAME cabletray name
* TYPE cabletray type
* LEVEL number of levels/tiers
* XOFF origin of cabletray from nfigure, local x offset
* YOFF origin of cabletray from nfigure, local y offset
* ZOFF origin of cabletray from nfigure, local z offset
* NUMBER number of members in the cabletray support
* PIECE list of cabletray pieces

*234567890123456789012345678901234567890123456789012345
6789012345
*****
LA-5D L 1 0.0 0.0 0.0 4 S1A1,S1,S1,S1,S1,S1B1
LA-5E L 1 0.0 0.0 0.0 6 S1A1,S1,S1,S1B1,S1,S1,S1C1
LAR-5 L 1 0.0 0.0 0.0 5 B1SE,B1LD,B1L,B1SF
LAR-5X3 L 1 0.0 0.0 0.0 5 B1SE,B1L,B1L,B1LD,S1A1
LAR-5X6 L 1 0.0 0.0 0.0 5 B1S,B1L,B1L,B1LD,S1,S1A1
LAR-5Y6 L 1 0.0 0.0 0.0 7 S1A1,S1B1,B1LD,B1L,B1L,B1SE
LB-3F L 2 0.0 0.0 0.0 6 S2A1,S2,S2,S2B1,S2B2,S2,S2,S2C1
LB-5E L 2 0.0 0.0 0.0 6 S2A1,S2,S2,S2B1,S2,S2,S2C1
LBR-5X6 L 2 0.0 0.0 0.0 5 B2SE,B2L,B2L,B2LD,S2,S2A1
LBR-5Y6 L 2 0.0 0.0 0.0 5 S2A1,S2,B2LD,B2L,B2L,B2SE
LC-5E L 2 0.0 0.0 0.0 6 S2A1,S2,S2,S2B1,S2,S2,S2C1
RLA-5E L 1 0.0 0.0 0.0 6 S1A1,S1,S1,S1B1,S1,S1,S1C1
SLA-5 L 1 0.0 0.0 0.0 2 SLA0

```

Cabletray Support Specification File

This file is used by the INSERT CSUPPORT command to insert cabletray support. Each cabletray consists of a collection of logical cabletray pieces. These pieces are connected together end to end, one after another along the cable passageway. There are two types of cabletray pieces, straight and bend. The cabletray piece is the basic unit for the support member insert rule.

The name of this file is defined in the directory file and the selection name CSSPEC refers to the filename. This file should be sorted.

This file defines the rules for cabletray support member insertion onto a given cabletray piece. Given the cabletray piece selection name, the various parameters in this file are used to determine how the support member should be created, oriented and fitted to the side of the cabletray piece. The description of each field in this file is given below.

SNAME (Text)

This specifies the cabletray piece selection name. The cabletray piece is the logical unit that defines the cabletray support member insertion rule.

GROUP (Text)

This specifies the cabletray piece group name. If there are more than one cabletray pieces (or member insertion rule) in the same cabletray that can be used to insert a set of members (a subset of the entire cabletray support) to the related cabletray, then the cabletray pieces should have the same group name. But only one cabletray piece should be used for the member insertion, one that has the highest PRIORITY number and allow the members to support the cabletray effectively.

PRIORITY (Integer)

This specifies the cabletray piece priority number for a cabletray piece of the same cabletray with the same group name. If the priority number is greater than 0, then the cabletray piece which has a higher priority should be considered first by the INSERT CSUPPORT command and the corresponding member insertion rule as defined in TYPE should be used to fit and create the set of members to the cabletray. The number 1 has the highest priority. If the priority number is equal to 0, then the cabletray piece is used by the RELATE SUPPORT command and the group name is ignored.

TYPE (Text)

This specifies the cabletray support member insertion type name. There are five pre-defined insertion types and they are described below:

- Type B indicates that one support member is to be inserted and oriented to the center bottom of the cabletray piece.
- Type L indicates that one support member is to be inserted along the left side of the cabletray piece, looking from the start point along its run from above.
- Type R indicates that one support member to be inserted along the right side of the cabletray piece, looking from the start point along its run from above.
- Type S indicates that two support members are to be inserted, one along the left side and one along the right side of the cabletray piece symmetrically.
- Type T indicates that one support member to be inserted along the center top of the cabletray piece.

DEPTH (Real)

This specifies the cabletray support depth, relative to cabletray. It is the offset distance from the cabletray Nodal Figure's origin, along its local Z-axis, which indicates the bottom of the cabletray support and would be used to trim the individual member.

RADIUS (Real)

This specifies the inner bend radius of a curved cabletray piece. If the bend radius is equal to 0, then the cabletray piece is linear or straight. If it is positive, the bend is clockwise looking from the top of the cabletray (or from the positive local Z-axis of the cabletray). If it is negative, the bend is counterclockwise.

WIDTH (Real)

This specifies the cabletray width.

HEIGHT (Real)

This is the cabletray height.

RUN (Real)

This specifies the run of the cabletray piece. For linear piece, it is the length. For bend piece, it is the bending angle in degrees.

START (Real)

This specifies the start point of the allowable insertion range of the support member along the run of the cabletray piece. For linear pieces, it is the offset distance from the beginning of the piece. For curved pieces, it is the offset angle in degrees from the beginning of the piece.

END (Real)

This specifies the end point of the allowable insertion range of the support member along the run of the cabletray piece. For linear pieces, it is the offset distance from the beginning of the piece while for curved pieces it is the offset angle in degrees from the beginning of the piece.

POINT (Real)

This specifies the default member insertion point along the run of the cabletray piece. For linear pieces, it is the offset distance from the beginning of the piece while for curved pieces it is the offset angle in degrees from the beginning of the piece.

ORIENT (Text)

This specifies the cabletray support member section orientation. There are twelve pre-defined section orientations which align the flange (local X) or web (local Y) of the cross section with the local X (tangent to the run) or local Y (perpendicular to the run) of the cabletray piece.

A sample of the Cabletray Support Specification File is shown below.

Table C-8 Cabletray Support Specification File Sample

```

UNITS=MM
NAME  GROUP PRIORITY TYPE DEPTH RADIUS WIDTH HEIGHT RUN  START END
POINT ORIENT  &
*****
*2345678901234567890123456789012345678901234567890123456789012345
6789012
* Filename:cvaec.supports.csupport
* Purpose: This file defines the rules for cabletray support member
*         creation on its cabletray piece. A cabletray consists
*         of a collection of cabletray piece and are connected one
*         after another along the cable passage pathway. There are
*         two types of cabletray piece, liner or bend. Cabletray
*         support can only have linear axial member(s). Each
*         axial member is inserted parallel to the local Z-axis
*         of the related cabletray and positioned along the run
*         of the cabletray piece. If there are more than one
*         possible location for member insertion, the
*         alternatives should be grouped and prioritized.
* Description:
* SNAME    Cabletray piece selection name.

```

* GROUP Cabletray piece group name. Cabletray pieces have the
* same group name belong to the same group. Only one from
* the same group will be used for member insertion, the
* one with highest priority. in the same group for member
* creation based on the PRIORITY number.
* PRIORITY Cabletray piece priority number, for piece of the same
* cabletray and group.
* > 0 priority number for INSERT CSUPPORT, 1 has the highest
* priority
* = 0 only for RELATE SUPPORT
* TYPE Cabletray support member insertion type name.
* = B 1 member to the bottom
* L1 member to the left, reading from the top
* S2 members, 1 to left and 1 to right symmetrically
* R1 member to the right
* T1 member to the top
* DEPTH axial member starting Z depth.Offset along the local
* Z-axis of cabletray
* RADIUS inner radius of bending cabletray piece.
* > 0 clockwise looking from the cabletray's top
* < 0 counterclockwise looking from the cabletray's top
* = 0 linear cabletray piece
*WIDTH cabletray width, along its local Y-axis.
*HEIGHT cabletray height, along its local Z-axis
*RUN run of the cabletray piece.
* length of the linear piece or angle in degrees for bend
* piece
*START start point of member insertion space along the run of
* cabletray piece.
* offset distance from beginning of linear piece or
* point of member insertion space along the run of
* cabletray piece.
* offset distance from beginning of linear piece or
* offset angle in degrees from beginning of bend piece
* POINT default member insertion point along the run of
* cabletray piece.
* offset distance from beginning of linear piece or
* ORIENT axial member section orientation.
* =F section local +X points at piece local +X (its run)
* -F section local -X points at piece local +X (its run)
* W section local +Y points at piece local +X (its run)
* -W section local -Y points at piece local +X (its run)
* FW section local +X points at piece local +X (its run)
* section local +Y points at piece local +Y
* F-W section local +X points at piece local +X (its run)
* section local -Y points at piece local +Y
* -FW section local -X points at piece local +X (its run)
* section local +Y points at piece local +Y
* -F-W section local -X points at piece local +X (its run)
* section local -Y points at piece local +Y
* WF section local +Y points at piece local +X (its run)
* section local +X points at piece local +Y
* W-F section local +Y points at piece local +X (its run)
* section local -X points at piece local +Y

```

* -WF section local -Y points at piece local +X (its run)
* section local +X points at piece local +Y
* -W-F section local -Y points at piece local +X (its run)
* section local -X points at piece local +Y
* For type L, S and R, section orientation should be F,
* -F, W or -W is sufficient.
* For type B and T, both the section local X and Y should be
* specified to avoid ambiguity.
*
*2345678901234567890123456789012345678901234567890123456789012345
6789012
*****
B1L   - 0 L 0 650 718 113 22.5 0 22 6 F
B1LD  D 1 L 0 650 718 113 22.5 0 22 6 F
B1SE  E 1 S 0 650 718 113 22.5 0 22 6 F
B1SF  F 1 S 0 650 718 113 22.5 0 22 6 F
B2L   - 0 L 0 650 718 228 22.5 0 22 6 F
B2LD  D 1 L 0 650 718 228 22.5 0 22 6 F
B2SE  E 1 S 0 650 718 228 22.5 0 22 6 F
B2SF  F 1 S 0 650 718 228 22.5 0 22 6 F
S1    - 0 S 0 0 718 113 300 30 270 150 F
S1A1  A 1 S 0 0 718 113 300 30 270 150 F
S1B1  B 1 S 0 0 718 113 300 30 270 150 F
S1B2  B 2 S 0 0 718 113 300 30 270 150 F
S1C1  C 1 S 0 0 718 113 300 30 270 150 F
S2    - 0 S 0 0 718 228 300 30 270 150 F
S2A1  A 1 S 0 0 718 228 300 30 270 150 F
S2B1  B 1 S 0 0 718 228 300 30 270 150 F
S2B2  B 2 S 0 0 718 228 300 30 270 150 F
S2C1  C 1 S 0 0 718 228 300 30 270 150 F
SLA0  SLA 1 S 0 0 718 113 0 0 0 0 F

```

Cabletray Support Cross Section Autoselection File

The INSERT CSUPPORT command uses the Cabletray Support Cross Section Autoselection File for cabletray support insertion. The cabletray name and the length of the support member are inputs to this selection file. The appropriate cross section to be used for the member insertion is read from the third field (SECTION).

This file must be defined in support directory file with selection name CSUPTSEC. This file should be sorted.

The cross section name selection is based on the first data line where the length of the axial member is shorter than or equal to the value of the LENGTH field. This implies that lines with the same cabletray name (NAME field) must be sorted in order of increasing length. The description of the file format is as follows.

NAME (Text)

This specifies the cabletray name.

LENGTH (Real)

This specifies the axial member maximum length.

SECTION (Real)

This specifies the support member cross section name.

A sample of the Cabletray Support Cross Section Autoselection File is shown below.

Table C-9 Cabletray Support Cross Section Autoselection File Sample

```
UNITS=MM
NAME LENGTH SECTION &
*****
*2345678901234567890123456789012345678901234567890123456789012345
6789012
* Filename: cvaec.supports.seccsupport
* Purpose: This file defines the cross section to be used for
*          the cabletray support axial member. For the given
*          cabletray, if the axial member length is shorter than
*          or equal to the value in the second column of the first
*          line found, the section name in the third column should
*          be used for the member insertion.
* Description:
* NAME      cabletray name
* LENGTH    axial member maximum length
* SECTION    member section name to be used
```

```
*2345678901234567890123456789012345678901234567890123456789012345
6789012
*****
LA-5D      300      DIL60
LA-5D      20000    EA120X12
LA-5E      300      DIL60
LA-5E      20000    EA120X12
LAR-5      300      DIL60
LAR-5      20000    EA120X12
LAR-5X3    300      DIL60
LAR-5X3    20000    EA120X12
LAR-5X6    300      DIL60
LAR-5X6    20000    EA120X12
LAR-5Y6    300      DIL60
LAR-5Y6    20000    EA120X12
LB-5E      300      DIL60
LB-5E      20000    EA120X12
LBR-5X6    300      DIL60
LBR-5X6    20000    EA120X12
LBR-5Y6    300      DIL60
LBR-5Y6    20000    EA120X12
LC-5E      300      DIL60
LC-5E      20000    EA120X12
RLA-5E     300      DIL60
RLA-5E     20000    EA120X12
SLA-5      300      DIL60
SLA-5      20000    EA120X12
```

Cross Section Library

A section library is a set of entity sub-records or a text file that stores the parameters or the shape of the section profiles. There are two types of section libraries, internal and external. This is the internal or external cross section library to be used for axial member insertion.

For further details see Appendix A, Section Libraries, of the *CADDS Advance Structural Modeling User Guide and Menu Reference*.

Pad Autoselection File

The creation of the support pad depends on the selection of the PAD and NOPAD modifier in the INSERT CSUPPORT and INSERT ESUPPORT command and the INSERT PAD command itself. If neither of these modifiers is selected, it depends on the selection of the PAD and NOPAD modifier in the SELECT SUPARAMETERS command. The default is NOPAD. The selection of the support pad depends on the associated support member's cross section and the pad profile name, thickness and weight are to be read from the Support Pad Auto-selection Table, CVAEC.SUPPORTS.PAD. The pad attributes read are used to create the support pad as a small plate and have it attached to the related support member.

Support Pad Auto-selection Table

For each structural support member cross section type, this table defines the support pad type name, cross section name to be used to create pad profile, thickness and weight of the pad.

For more details see the table shown below.

Table C-10 Support Pad Auto-selection Table

```

UNITS=MM
SECTION          PAD PROFILE THICKNESS WEIGHT
*****
*
* Filename       : CVAEC.SUPPORTS.PAD
* Purpose        : Support pad auto-selection file
* Usage          : Given the support member's cross section, return
the
*                support pad name and its definition parameters.
* Description    : Data field/column Description
*                SNAME          selection name, structure cross
section name
*                PAD            pad name
*                PROFILE        pad profile, or section name
*                THICKNESS      pad thickness
*                WEIGHT         pad weight
* Restriction   : (1) Line 1 must be the unit card.
*                (2) Line 2 must be the file format header card.
*                (3) Sorted by the column 1, SNAME.
*                (4) cross section can contain 12 characters
maximum,
*                SMS limitation.
*
*2345678901234567890123456789012345678901234567890123456789012345
678901234567890
*NAME           PAD            PROFILE          THICKNESS WEIGHT
  
```

```
*****
*****
```

C100X50X5	PAD-C100X50X5	C100X50X5	10	1.0
C125X65X6	PAD-C125X65X6	C125X65X6	10	1.0
C150X75X6.5	PAD-C150X75X6.5	C150X75X6.5	10	1.0
C150X75X9	PAD-C150X75X9	C150X75X9	10	1.0
C180X75X7	PAD-C180X75X7	C180X75X7	10	1.0
C200X90X7.5	PAD-C200X90X7.5	C200X90X7.5	10	1.0
C200X90X8	PAD-C200X90X8	C200X90X8	10	1.0
C250X90X11	PAD-C250X90X11	C250X90X11	10	1.0
C250X90X9	PAD-C250X90X9	C250X90X9	10	1.0
C300X90X10	PAD-C300X90X10	C300X90X10	10	1.0
C300X90X12	PAD-C300X90X12	C300X90X12	10	1.0
C300X90X9	PAD-C300X90X9	C300X90X9	10	1.0
C380X100X10	PAD-C380X100X10	C380X100X10	10	1.0
C75X40X5	PAD-C75X40X5	C75X40X5	10	1.0
F25X6	PAD-F25X6	F25X6	10	1.0
F38X4.5	PAD-F38X4.5	F38X4.5	10	1.0
F38X6	PAD-F38X6	F38X6	10	1.0
F50X4.5	PAD-F50X4.5	F50X4.5	10	1.0
F50X6	PAD-F50X6	F50X6	10	1.0
F65X16	PAD-F65X16	F65X16	10	1.0
F65X9	PAD-F65X9	F65X9	10	1.0
F75X6	PAD-F75X6	F75X6	10	1.0
H100X100X6	PAD-H100X100X6	H100X100X6	10	1.0
H100X50X5	PAD-H100X50X5	H100X50X5	10	1.0
H125X125X6.5	PAD-H125X125X6.5	H125X125X6.5	10	1.0
H125X60X6	PAD-H125X60X6	H125X60X6	10	1.0
H150X100X6	PAD-H150X100X6	H150X100X6	10	1.0
H150X150X7	PAD-H150X150X7	H150X150X7	10	1.0
H150X75X5	PAD-H150X75X5	H150X75X5	10	1.0
H175X175X7.5	PAD-H175X175X7.5	H175X175X7.5	10	1.0
H175X90X5	PAD-H175X90X5	H175X90X5	10	1.0
H200X100X4.5	PAD-H200X100X4.5	H200X100X4.5	10	1.0
H200X100X5.5	PAD-H200X100X5.5	H200X100X5.5	10	1.0
H200X150X6	PAD-H200X150X6	H200X150X6	10	1.0
H200X200X8	PAD-H200X200X8	H200X200X8	10	1.0
H250X125X5	PAD-H250X125X5	H250X125X5	10	1.0
H250X125X6	PAD-H250X125X6	H250X125X6	10	1.0
H250X175X7	PAD-H250X175X7	H250X175X7	10	1.0
H250X250X9	PAD-H250X250X9	H250X250X9	10	1.0
L100X10	PAD-L100X10	L100X10	10	1.0
L130X12	PAD-L130X12	L130X12	10	1.0
L130X15	PAD-L130X15	L130X15	10	1.0
L150X12	PAD-L150X12	L150X12	10	1.0
L150X15	PAD-L150X15	L150X15	10	1.0
L40X5	PAD-L40X5	L40X5	10	1.0
L50X5	PAD-L50X5	L50X5	10	1.0
L50X6	PAD-L50X6	L50X6	10	1.0
L65X6	PAD-L65X6	L65X6	10	1.0
L65X8	PAD-L65X8	L65X8	10	1.0
L75X6	PAD-L75X6	L75X6	10	1.0
L75X9	PAD-L75X9	L75X9	10	1.0
L90X10	PAD-L90X10	L90X10	10	1.0

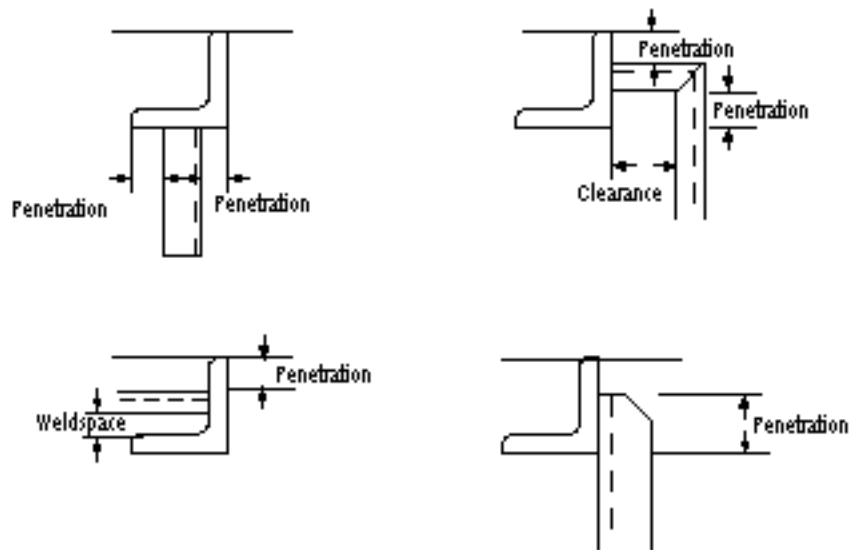
Support Autoselection Files
Pad Autoselection File

L90X13	PAD-L90X13	L90X13	10	1.0
P100	PAD-P100	P100	10	1.0
P125	PAD-P125	P125	10	1.0
P150	PAD-P150	P150	10	1.0
P200	PAD-P200	P200	10	1.0
P25	PAD-P25	P25	10	1.0
P32	PAD-P32	P32	10	1.0
P40	PAD-P40	P40	10	1.0
P50	PAD-P50	P50	10	1.0
P65	PAD-P65	P65	10	1.0
P80	PAD-P80	P80	10	1.0

Support Attachment Endtype Autoselection File

This file is used by the INSERT CSUPPORT and INSERT ESUPPORT commands to insert axial support member. See the figure given below.

Figure C-5 Support Axial Member Attachment Endtype



The attachment endtype defines how the axial member is to be attached to the selected reference structure such that it stands on the reference structure effectively. The description of the file format is as follows.

ENDTYPE (Text)

This specifies the attachment endtype selection name.

SECTION (Integer)

This specifies the cross section type of the reference structure. = 5 Equal Angle, 6 Angle, 7 Tee, 10 Rectangle (Flat Bar).

ATTACH (Text)

This specifies the attachment type. = **NORMAL** axial member stands perpendicular to the attachment surface of reference structure, = **PARALLEL** axial member sticks parallel to the attachment surface of reference structure. The attachment surface is defined by **LOCATION** and **FACE** below.

LOCATION (Text)

This specifies the attachment location on the reference structure. = FLANGE axial member attached to the flange of the reference structure, = WEB axial member attached to the web, = "-" not applicable

FACE (Text)

This specifies the attachment surface on the reference structure. = IN axial member attached to the inside surface of the reference structure, = OUT axial member attached to the outside surface, = "-" not applicable. Only applicable for angle and channel.

PENETRATE (Real)

This specifies the minimum penetration distance of the attachment support member from the edge of the attachment surface.

WELDSPACE (Real)

This specifies the minimum welding space between attachment support member and the structural element.

CLEARANCE (Real)

This specifies the minimum clearance distance between non-attachment support members and the structural element.

A sample of the Support Attachment Endtype Autoselection File is shown below.

Table C-11 Support Attachment Endtype Autoselection File Sample

```
UNITS=MM
*ENDTYPE SECTION ATTACH LOCATION FACE PENETRATE WELDSPACE
CLEARANCE
*****
*2345678901234567890123456789012345678901234567890123456789012345
678901234567890
*
* Filename: CVAEC.SUPPORTS.ENDTYPE
*
* Purpose: Define axial support member attachment endtype to
*          existing reference structure. The attachment endtype
*          defines the orientation and position on the reference
*          structure.
*
* Description:
* ENDTYPE attachment endtype name
* SECTION cross section type
*          =5 equal angle, 6 angle, 7 tee, 10 rectangle (flat bar)
* ATTACH attachment type
*          = NORMAL, normal to selected surface
*          PARALLEL, parallel to selected surface
* LOCATION attachment location on cross section
```

```

*   = FLANGE, connect to flange
*   WEB,      connect to web
*   "-",     not applicable
* FACE       surface flag
*   = IN,     inner surface of the cross section
*   OUT,     outer surface of the cross section
*   "-",     not applicable
* PENETRATE  minimum penetration distance. The attachment point
*            should be located on the attachment surface, away
*            from the surface's edge at this distance.
*   = "-",   not applicable
* WELDSPACE  welding clearance space between attachment member
*            and the rest of the stiffener.
*   = "-",   not applicable
* CLEARANCE  minimum clearance distance between support unit and
*            stiffener.
* The support unit (other than the attachment member itself)
* should be clear from the stiffener at such distance.
*   = "-",   not applicable
*

```

```

*234567890123456789012345678901234567890123456789012345
678901234567890

```

```

*****
ENDTYPE SECTION ATTACH LOCATION FACE PENETRATE WELDSPACE CLEARANCE
F          6     NORMAL  FLANGE  -      15         -         -
F          7     NORMAL  FLANGE  -      15         -         -
WHI        6     NORMAL  WEB     IN      15        75        25
WQ         6     NORMAL  WEB     OUT     25        25       100
WQ         7     NORMAL  WEB     -       15        75        25
WQI        6     NORMAL  WEB     IN      15        75        25
WQI        7     NORMAL  WEB     IN      15        75        25
WV         6     PARALLEL WEB     OUT     60         -         -
WV        10     PARALLEL WEB     -       60         -         -

```

Standard Support Drawing Autoselection File

This file is used by the DRAW ESUPPORT command to identify the standard supports and the corresponding form part and drawing to be used to display the attributes and parameters of a standard support unit. The DRAW ESUPPORT command does not draw a standard support in the graphic area of a drawing form. Only the corresponding attributes and parameters of the support unit are displayed as Ntext entities in the drawing form.

The description of the file format is as follows.

NAME (Text)

This specifies the standard equipment or cabletray support name.

FORM (Text)

This specifies the form part to be used to process and display the parameters of the standard support.

DRAWING (Text)

This specifies the drawing name of the form part to be used to generate the drawing of the standard support.

A sample of the Standard Support Drawing Autoselection File is shown below.

Table C-12 Standard Support Drawing Autoselection File Sample

```
NAME FORM DRAWING &
*****
*234567890123456789012345678901234567890123456789012345678901234
56789012345
*
* Filename: cvaec.supports.drawing
* Purpose: This file defines the form part and its drawing to be
*          used for standard equipment and
*          cabletray support processing.
* Given the support name, match the name as defined in
* the NAME field here and extract the corresponding
* form part and drawing name.
*
* Description:
* NAME (Text)      Standard equipment or cabletray support name
* FORM (Text)     Form part to be used to process and display the
*                 parameters of the standard support
* DRAWING (Text)  Form part drawing name
*
*234567890123456789012345678901234567890123456789012345678901234
56789012345
*****
MAST                      CVAEC.SUPPORTS.FORM.STANDARD-A4      1
```

Block Definition File

In the equipment and cabletray support package, several commands such as INSERT ESUPPORT, INSERT CSUPPORT, GENERATE SUDBASE, etc., optionally use block list to perform operations on the objects reside in the given block list.

The Block Definition File is an ASCII file. In the block definition file, a primitive block uses two points to define a cuboid, or multiple definitions to define a list of cuboid. On top of primitive block, a block can have combination of cuboid(s) and nested block(s).

The keyword BLOCK in the block definition file starts a block definition, followed by ':' and a block name. The keyword EXTENT starts the cuboid definition, followed by ':' and six real values representing two sets of XYZ coordinates, separated by space. The keyword SUBBLOCK start the definition for nested blocks, followed by ':' and sub-block names, separated by space.

A sample block definition file is given below.

```
*****
* FILENAME      : cvaec.support.block
* TYPE          : Block definition file
* PURPOSE      : File defining extents for rectangular blocks.
*
* Syntax:
*
* BLOCK:<block name>
* EXTENT:<x1><y1><z1><x2><y2><z2>
* SUBBLOCK:<block name><block name>...
*
* DESCRIPTION:
*
* BLOCK      block name definition
* EXTENT     extent definition, the diagonal points of a rectangular
*           box
* SUBBLOCK  list of sub-blocks defined in the same file
*
* All lines start with a asterisk are comments.
* Block name must be unique in the same definition file.
* All data should be separated by space.
* The definition of a block is terminated by the next "BLOCK"
* statement.
* There can be more than one "EXTENT" statement in a block
* definition.
* There can be more than one "SUBBLOCK" statement in a block
* definition.
*
* Note: Overlap between blocks and subblocks will not be checked.
```

```
*****  
BLOCK:B1  
EXTENT:  -1000.0  -1000.0  -1000.0  100.0  100.0  100.0  
*  
BLOCK:B2  
EXTENT:      1.0    1.0    0.0    2.0    2.0    1.0  
*  
BLOCK:B3  
EXTENT:      2.0    2.0    0.0    3.0    3.0    1.0  
*  
BLOCK:B4  
EXTENT:      3.0    3.0    0.0    4.0    4.0    1.0  
*  
BLOCK:B5  
SUBBLOCK:B1 B2  
*  
BLOCK:B6  
EXTENT:      0.0    1.0    0.0    1.0    2.0    1.0  
EXTENT:      1.0    0.0    0.0    2.0    1.0    1.0  
SUBBLOCK:B3 B4  
SUBBLOCK:B5
```

Support External RDBMS Database

This appendix describes the relational database format of the equipment and cabletray support tables in the external RDBMS database. In this version of CADDs, Oracle is the supported RDBMS database.

The GENERATE SUDBASE command reads the various parameters and attributes of the existing cabletray and equipment supports in the active and viewed CADDs parts and writes them to the external RDBMS database outside CADDs. The read and write access to the RDBMS is done via the existing SQL HLI interface. Once the attributes of a support unit is written to RDBMS database, you should use the report generation tools available in the RDBMS to prepare the reports or bill of material outside CADDs.

- Cabletray and Equipment Support Relational Database Format

Cabletray and Equipment Support Relational Database Format

The cabletray and equipment support attributes are represented and stored in a number of pre-defined relational database tables as shown in the table below.

In the following descriptions for Equipment Support tables, those tables with its name postfixed by project indicates that each project will have this table. While those without the postfix are global tables used by all projects.

Table D-1 Pre-defined Database Tables List

Table Name	Description
SUPT_LINK_project Table	Contains application key and internal identifiers.
SUPT_UNIT_project Table	Contains support unit attributes.
SUPT_MEMBER_project Table	Contains support member attributes.
SUPT_CUTOUT_project Table	Contains cutout attributes.
SUPT_AXIAL_project Table	Contains axial object parameters.
SUPT_PLATE_project Table	Contains plate object parameters.
SUPT_PAD_project Table	Contains support pad parameters and attributes.
SUPT_ENDCUT_project Table	Contains axial member endcut attributes.
SUPT_BOLTHOLE_project Table	Contains bolt hole parameters and attributes.
SUPT_EQUIPMENT_project Table	Contains related equipment attributes.
SUPT_CABLETRAY_project Table	Contains related cabletray attributes.
SUPT_CURVE_project Table	Contains Nspline parameters.
SUPT_CURVE_POINT_project Table	Contains Nspline control points and parameters.
SUPT_PROPERTY_project Table	Contains user specified properties and values.
SUPT_USER_PROPERTY_TBL Table	Contains the name of user specified properties.
APPL_PART_TBL Table	Contains part name and part ID.
APPL_MDF_TBL Table	Contains descriptive text for various objects.

The format of each of these tables is described below.

SUPT_LINK_project Table

This table contains support identifiers and provides links between a support unit identifier and its representing entity (support parent nfig). A support unit is identified by its label and stage/block in commands such as GENERATE SUDBASE, DRAW ESUPPORT, UPDATE SUPPORT, etc. However, in the RDBMS tables, a support unit is represented by an object id (automatically generated by system). This table links the two representations for the support

units. For each project defined by user, there is a link table. The table format is as shown below.

Table D-2 SUPT_LINK_project Table Format

Field Name	Data type	Description
SUPT_PROJECT	NOT NULL VARCHAR(30)	Project name
SUPT_STAGE	VARCHAR(30)	Stage name
SUPT_BLOCK	VARCHAR(30)	Block name
SUPT_LABEL	NOT NULL VARCHAR(30)	Support label
SUPT_PARTID	NOT NULL NUMBER	Part name
SUPT_UID	NOT NULL NUMBER	Entity UID
SUPT_OBJID	NOT NULL NUMBER	Object ID number

SUPT_UNIT_project Table

This table stores information for support unit as described in the table below. You can use SUPT_OBJID as a search key to access this table.

Table D-3 SUPT_UNIT_project Table Format

Field Name	Data type	Description
SUPT_OBJID	NOT NULL NUMBER	Support object/unit ID
SUPT_NAME	VARCHAR[30]	Support name
SUPT_REVISION	NUMBER	Revision number
SUPT_QUANTITY	NUMBER	Support unit quantity count
SUPT_WEIGHT	NUMBER	Support unit weight
SUPT_PAINT	VARCHAR[30]	Paint code name
SUPT_X	NUMBER	Support unit location
SUPT_Y	NUMBER	Support unit location
SUPT_Z	NUMBER	Support unit location
SUPT_UDIR_X	NUMBER	Support unit local U vector
SUPT_UIDR_Y	NUMBER	Support unit local U vector
SUPT_UDIR_Z	NUMBER	Support unit local U vector
SUPT_VDIR_X	NUMBER	Support unit local V vector
SUPT_VDIR_Y	NUMBER	Support unit local V vector
SUPT_VDIR_Z	NUMBER	Support unit local U vector
SUPT_FRAME	VARCHAR[30]	Frame name where support unit resides
SUPT_LONGITUDE	VARCHAR[30]	Longitude name where support unit resides

Table D-3 SUPT_UNIT_project Table Format

Field Name	Data type	Description
SUPT_DECK	VARCHAR[30]	Deck name where support unit resides

SUPT_MEMBER_project Table

This table stores the common information for support member, both axial and plate, as described in the table below. For axial member, the axial object specific information is stored in the SUPT_AXIAL_project table. For plate member, the plate object specific information is stored in the SUPT_PLATE_project table. You can use either SUPT_OBJID or SUPT_MEMBER_UID as a search key to access this table.

Table D-4 SUPT_MEMBER_project Table Format

Field Name	Data type	Description
SUPT_OBJID	NOT NULL NUMBER	Support object/unit ID
SUPT_MEMBER_UID	NOT NULL NUMBER	Member UID
SUPT_MEMBER_TYPE	NUMBER	Member type, = 1 axial, 2 plate.
SUPT_MEMBER_WEIGHT	NUMBER	Member weight
SUPT_MEMBER_MATERIAL	NUMBER	Material number

SUPT_CUTOUT_project Table

This table stores the cutout information as described in the table below. For axial cutout, the axial object specific information is stored in the SUPT_AXIAL_project table. For plate cutout, the plate object specific information is stored in the SUPT_PLATE_project table. You can use SUPT_OBJID, SUPT_MEMBER_UID and SUPT_CUTOUT_UID together as search key to access this table.

Table D-5 SUPT_CUTOUT_project Table Format

Field Name	Data type	Description
SUPT_OBJID	NOT NULL NUMBER	Support object/unit ID
SUPT_MEMBER_UID	NOT NULL NUMBER	Parent member UID
SUPT_CUTOUT_UID	NOT NULL NUMBER	Cutout UID
SUPT_CUTOUT_TYPE	NUMBER	Cutout type, = 1 axial, 2 plate

SUPT_AXIAL_project Table

This table stores the information for axial structural object, as described in the table below. You can use either SUPT_OBJID or SUPT_AXIAL_UID as a search key to access this table.

Table D-6 SUPT_AXIAL_project Table Format

Field Name	Data type	Description
SUPT_OBJID	NOT NULL NUMBER	Support object/unit ID
SUPT_AXIAL_UID	NOT NULL NUMBER	Axial object UID
SUPT_SECTION	VARCHAR[30]	Cross section name
SUPT_FLANGE_X	NUMBER	Flange direction (local X)
SUPT_FLANGE_Y	NUMBER	Flange direction (local X)
SUPT_FLANGE_Z	NUMBER	Flange direction (local X)
SUPT_WEB_X	NUMBER	Web direction (local Y)
SUPT_WEB_Y	NUMBER	Web direction (local Y)
SUPT_WEB_Z	NUMBER	Web direction (local Y)
SUPT_HJUST	NUMBER	Trace curve horizontal justification, = 0 Center, -1 Left, 1 Right
SUPT_VJUST	NUMBER	Trace curve vertical justification, = 0 Center, -1 Bottom, 1 Top
SUPT_LENGTH	NUMBER	Axial object length
CURVE_UID	NUMBER	Trace curve UID
CURVE_PID	NUMBER	Trace curve part ID

SUPT_PLATE_project Table

This table stores the information for plate structural object, as described in the table below. You can use either SUPT_OBJID or SUPT_PLATE_UID as a search key to access this table.

Table D-7 SUPT_PLATE_project Table Format

Field Name	Data type	Description
SUPT_OBJID	NOT NULL NUMBER	Support object/unit ID
SUPT_PLATE_UID	NOT NULL NUMBER	Plate object UID
SUPT_THICKNESS	NUMBER	Plate thickness
SUPT_THICKNESS_X	NUMBER	Thickness direction
SUPT_THICKNESS_Y	NUMBER	Thickness direction
SUPT_THICKNESS_Z	NUMBER	Thickness direction
SUPT_PLACEMENT	NUMBER	Plate placement, = 0 Center, -1 Bottom, 1 Top
CURVE_UID	NUMBER	Boundary curve UID

Table D-7 SUPT_PLATE_project Table Format

Field Name	Data type	Description
CURVE_PID	NUMBER	Boundary curve part ID

SUPT_PAD_project Table

This table stores the information for support pad, as described in the table below. You can use either SUPT_OBJID, SUPT_MEMBER_UID or SUPT_PAD_UID as a search key to access this table.

Table D-8 SUPT_PAD_project Table Format

Field Name	Data type	Description
SUPT_OBJID	NOT NULL NUMBER	Support object/unit ID
SUPT_MEMBER_UID	NOT NULL NUMBER	Axial member UID
SUPT_PAD_UID	NOT NULL NUMBER	Pad UID
SUPT_PAD	VARCHAR[30]	Pad name
SUPT_LOCATION	NUMBER	Pad location, = 1 first, 2 second end of member
SUPT_THICKNESS_X	NUMBER	Thickness direction
SUPT_THICKNESS_Y	NUMBER	Thickness direction
SUPT_THICKNESS_Z	NUMBER	Thickness direction

SUPT_ENDCUT_project Table

This table stores the information for axial member endcut, as described in the table below. You can use either SUPT_OBJID or SUPT_MEMBER_UID as a search key to access this table.

Table D-9 SUPT_ENDCUT_project Table Format

Field Name	Data type	Description
SUPT_OBJID	NOT NULL NUMBER	Support object/unit ID
SUPT_MEMBER_UID	NOT NULL NUMBER	Axial member UID
SUPT_ENDCUT1	VARCHAR[30]	Endcut name at start point
SUPT_ENDCUT2	VARCHAR[30]	Endcut name at end point

SUPT_BOLTHOLE_project Table

This table stores the information for bolt hole as described in the table below. You can use SUPT_OBJID, SUPT_MEMBER_UID and SUPT_BOLTHOLE_UID together as a search key to access this table.

If both SUPT_DIAMETER1 and SUPT_DIAMETER2 are NULL, the bolt hole should be defined by the cross section (SUPT_SECTION). If only SUPT_DIAMETER1 is not NULL, it is a circular bolt hole. If both SUPT_DIAMETER1 and SUPT_DIAMETER2 are not NULL, it is an elliptical bolt hole.

Table D-10 SUPT_BOLTHOLE_project Table

Field Name	Data type	Description
SUPT_OBJID	NOT NULL NUMBER	Support object/unit ID
SUPT_MEMBER_UID	NOT NULL NUMBER	Support member UID
SUPT_BOLTHOLE_UID	NOT NULL NUMBER	Bolt hole UID
SUPT_DIAMETER1	NUMBER	Bolt hole diameter (local X)
SUPT_DIAMETER2	NUMBER	Elliptical diameter (local y)
SUPT_SECTION	VARCHAR[30]	Bolt hole section name
SUPT_BOLTHOLE_X	NUMBER	Bolt hole location
SUPT_BOLTHOLE_Y	NUMBER	Bolt hole location
SUPT_BOLTHOLE_Z	NUMBER	Bolt hole location
SUPT_FLANGE_X	NUMBER	Flange direction (local X)
SUPT_FLANGE_Y	NUMBER	Flange direction (local X)
SUPT_FLANGE_Z	NUMBER	Flange direction (local X)
SUPT_WEB_X	NUMBER	Web direction (local Y)
SUPT_WEB_Y	NUMBER	Web direction (local Y)
SUPT_WEB_Z	NUMBER	Web direction (local Y)

SUPT_EQUIPMENT_project Table

This table stores information for related equipment as described in the table below. You can use SUPT_OBJID, SUPT_EQUIPMENT_PID and SUPT_EQUIPMENT_UID together as a search key to access this table.

Table D-11 SUPT_EQUIPMENT_project Table Format

Field Name	Data type	Description
SUPT_OBJID	NOT NULL NUMBER	Support object/unit ID
SUPT_EQUIPMENT_PID	NOT NULL NUMBER	Equipment Part ID
SUPT_EQUIPMENT_UID	NOT NULL NUMBER	Equipment UID
SUPT_EQUIPMENT_NAME	VARCHAR[30]	Equipment name
SUPT_EQUIPMENT_X	NUMBER	Equipment location
SUPT_EQUIPMENT_Y	NUMBER	Equipment location
SUPT_EQUIPMENT_Z	NUMBER	Equipment location

SUPT_CABLETRAY_project Table

This table stores information for related cabletray as described in the table below. You can use SUPT_OBJID, SUPT_CABLETRAY_PID and SUPT_CABLETRAY_UID together as a search key to access this table.

Table D-12 SUPT_CABLETRAY_project Table Format

Field Name	Data type	Description
SUPT_OBJID	NOT NULL NUMBER	Support object/unit ID
SUPT_CABLETRAY_PID	NOT NULL NUMBER	Cabletray Part ID
SUPT_CABLETRAY_UID	NOT NULL NUMBER	Cabletray UID
SUPT_CABLETRAY_NAME	VARCHAR[30]	Cabletray name
SUPT_CABLETRAY_X	NUMBER	Cabletray location
SUPT_CABLETRAY_Y	NUMBER	Cabletray location
SUPT_CABLETRAY_Z	NUMBER	Cabletray location

SUPT_CURVE_project Table

This table stores information for an nspline entity as described in the table below. You can use the CURVE_UID and CURVE_PID as a search key to access this table.

Table D-13 SUPT_CURVE_project Table Format

Field Name	Data type	Description
CURVE_UID	NOT NULL NUMBER	Nspline UID
CURVE_PID	NOT NULL NUMBER	Part ID
CURVE_ORDER	NUMBER	Nspline order or degree
CURVE_NUM_POINT	NUMBER	Number of control points
CURVE_DOMAIN_BOUND1	NUMBER	Parametric extent, starting trim bound
CURVE_DOMAIN_BOUND2	NUMBER	Parametric extent, end trim bound
CURVE_EXTRAP_MODE1	NUMBER	Starting point trap mode
CURVE_EXTRAP_MODE2	NUMBER	End point trap mode

SUPT_CURVE_POINT_project Table

This table stores information for the control points of an Nspline as described in the table below. You can use the CURVE_UID, CURVE_PID and CURVE_POINT_SEQ as a search key to access this table.

Table D-14 SUPT_CURVE_POINT_project Table Format

Field Name	Data type	Description
CURVE_UID	NOT NULL NUMBER	Nspline UID
CURVE_PID	NOT NULL NUMBER	Part ID
CURVE_POINT_SEQ	NOT NULL NUMBER	Point sequence number, = 1, 2, 3,...
CURVE_KNOT	NUMBER	Degree knot
CURVE_X	NUMBER	Point location, along X-axis
CURVE_Y	NUMBER	Point location, along Y-axis
CURVE_Z	NUMBER	Point location, along Z-axis
CURVE_WEIGHT	NUMBER	Point weight

SUPT_PROPERTY_project Table

This table contains CADDs properties and their corresponding values for a support unit. The GENERATE SUDBASE command extracts the properties from the selected support unit(s), of the same project, in a CADDs model and inserts the responding records in this table. An arbitrary set of properties can be stored into this table. To determine the properties to be stored in this table, the GENERATE SUDBASE command reads the list of desired properties from the table SUPT_USER_PROPERTY_TBL. You can use the primary key OBJECT_ID to access this table. The table format is as shown in the table below.

Table D-15 SUPT_PROPERTY_project Table Format

Field Name	Data type	Description
OBJECT_ID	NOT NULL NUMBER	Object ID
PROP_NAME	NOT NULL VARCHAR(10)	Property name
PROP_VALUE	VARCHAR(30)	Property value

SUPT_USER_PROPERTY_TBL

This table contains the list of CADDs properties to be stored in the external support database, along with the pre-defined set of support data. The GENERATE SUDBASE command reads this table, determines the list of properties to be extracted from the support unit, and then store the properties to the SUPT_PROPERTY_project table.

You must provide the list of desired CADDs properties, one property per record, and insert the records into this table using the RDBMS utility. This table has read-only permissions for any CADDs command like GENERATE SUDBASE. If this table does not exist or there is no record found in this table, no data is written to the SUPT_PROPERTY_project table. If the character “*” is found in a record, all properties found on the selected support unit parent nodal figure are stored in the SUPT_PROPERTY_project table. The table format is as shown in the table below.

Table D-16 SUPT_USER_PROPERTY_TBL Format

Field Name	Data type	Description
PROP_NAME	NOT NULL VARCHAR(10)	Property name

APPL_PART_TBL Table

This table is used internally by GENERATE SUDBASE to temporarily register a part name with a part ID number. The part ID number is used in the various tables (for example, the support link table “SUPT_LINK_project”. If you do not use EDMInfo, the part ID assigned by GENERATE SUDBASE command can be used as such.

If you wish to use EDMInfo to access the support property table (that is, SUPT_PROPERTY_project), use the LINK ADBMS command along with the available script to update the part ID in the support link table. The script updates SUPT_PARTID in the SUPT_LINK_project table. Once the part ID is updated in the support link table, the EDMInfo commands like DUMP/ANNOTATE/MARK AENTITY are able to access the support property table.

There is only one support part table for all the projects. The table format is as shown in the table below.

Table D-17 APL_PART_TBL Table Format

Field Name	Data type	Description
APPL_PARTNAME	NOT NULL VARCHAR(74)	Part name
APPL_PARTID	NOT NULL NUMBER	Part ID number

APPL_MDF_TBL Table

The MDF (Material Description File) table contains the selection name and the description text for support components, such as member cross section and pad. The selection name (SNAME) is the primary key and must be unique. Use the RDBMS utility to prepare the database outside CADD5. The data defined in this table is Read-Only to the DRAW ESUPPORT command. The data format of this table is as shown in the table below.

Table D-18 APPL_MDF_TBL Table Format

Field Name	Data type	Description
SNAME	NOT NULL VARCHAR[30]	Selection Name
DESCRIPTION	VARCHAR[30]	Description Text

DRAW ESUPPORT Form Part Preparation

This appendix describes the procedure to prepare the form part used by the DRAW ESUPPORT command. Use DRAW ESUPPORT to generate support drawings. You must activate the appropriate form part and drawing. For details, see the complete description of the DRAW ESUPPORT command.

- Support Drawing Form
- Preparing a Support Form Part
- Drawing Form and Drawing Form Tnode
- Drawing Form Tnode Location and Text Parameters
- Drawing Form Tnode Property Values
- Defining a Drawing Form
- Drawing Form Graphic Display Area
- Drawing Form Tnode for Text Data

Preparing a Support Form Part

The DRAW ESUPPORT command reads the Text Node entities in the active drawing and generates the appropriate graphic or textual data at the current location of each of the Text Node, accordingly to the properties being attached to it.

Given below are some pointers to prepare a support form part for the DRAW ESUPPORT command:

- Use the INSERT TNODE command to insert the Tnode entities at the appropriate location in the active drawing. See “Drawing Form Tnode Location and Text Parameters” on page E-5 for details on how to position Tnode entities.
- Use the INSERT PROPERTY command to attach the appropriate properties to the Tnode entities. See “Drawing Form and Drawing Form Tnode” on page E-4 for the list of supported properties and values that should be attached to the Tnode entities.
- Create Tnode entities as Draw mode entities only.
- Use the SELECT MODE DRAW command prior to the Tnode insertion.
- Use other basic CADD commands to create any graphics, as desired, in the active drawing.
- Save the form part so that the DRAW ESUPPORT command can later use it.

Drawing Form and Drawing Form Tnode

A drawing form is a logical rectangular area in the drawing of a form part. Only one support drawing can be generated in a drawing form. The graphical and textual data of a support unit should be created and drawn inside a drawing form. There can be more than one drawing forms in a drawing.

A drawing form graphic display area is a logical rectangular area inside a drawing form, and the graphical data of a support unit is drawn inside this area. Only one graphic display area can be defined in a drawing form.

Each Tnode entity which has DWGOBJATTR property is a drawing form Tnode and it determines the layout of a drawing form. The value of the DWGOBJATTR property indicates the attribute or characteristic of the drawing form Tnode. If there are more than one instance of the drawing form Tnode which has the same attribute in the same drawing form or drawing, the corresponding drawing form Tnode entities should also have the DWGOBJIDX property and take on different values. The value of the DWGOBJIDX property indicates the index or sequence number of the data instance in the drawing form or drawing.

Drawing Form Tnode Location and Text Parameters

The location of the drawing form Text Node(Tnode) entity can be used to do the following:

- Define the rectangular boundary of a drawing form
- Define the rectangular boundary of the graphic display area of a drawing form
- Indicate the location for textual data creation

The drawing form Tnode entities that reside inside the rectangular boundary of a drawing form determine the characteristics and layout of the drawing form.

Please note: More than one drawing form can exist in the drawing of a form part, but there can be only one graphic display area in a drawing form.

To define a drawing form, two drawing form Tnode entities should be located at the diagonal corners of the required rectangular area. All the other drawing form Tnode entities that are related to this drawing form must be located inside its defined boundary.

A drawing form can have a rectangular graphic display area. To define a graphic display area, two drawing form Tnode entities should be located at the diagonal corners of the required rectangular area inside the drawing form. The graphical data of a support unit is generated and drawn in this graphic display area.

For textual data display, the drawing form Tnode entities should be positioned at the appropriate locations inside a drawing form. This way, the appropriate data is extracted from the support unit, and a Nodal text(Ntext) entity is created and attached to the corresponding drawing form Tnode. The location and text parameters of the drawing form Tnode is used to insert the Ntext entity and display the appropriate textual data of a support unit in a drawing form.

The DRAW ESUPPORT command processes each drawing form Tnode, extracts the appropriate data, graphical or textual, from the selected support unit based on the properties being attached on the drawing form Tnode, and displays such data at the appropriate location in the drawing form.

Please note: Only one support unit can be drawn in one drawing form.

Drawing Form Tnode Property Values

Given below is the list of the properties and the valid values that can be attached to the drawing form Tnode entities in the form part.

The DWGOBJATTR (integer) property indicates the drawing form Tnode attributes as shown below.

Table E-1 Drawing Form TNode Attributes

Integer	Description
=1	drawing form boundary (rectangle diagonal corner)
2	drawing form graphic area boundary (rectangle diagonal corner)
3	project/external database name
4	revision number
1001	fabrication process/drawing name
1002	stage name
1003	support label
1004	support unit quantity count
1005	support unit weight
1006	code name of paint to be used on support unit
1007	support unit location, along X-axis
1008	support unit location, along Y-axis
1009	support unit location, along Z-axis
1010	frame number/name (along X-axis) where support unit stands
1011	longitudinal number/name (along Y-axis) where support unit stands
1012	deck number/name (along Z-axis) where support unit stands
1013	name of block where support unit stands
1014	name of zone where support unit stands
1015	support object total quantity count, member or pad. This is the multiple of support unit quantity count and the support object count in a support unit.
1101	support object type, member or pad.
1102	support object item number, member or pad.
1103	support object description, member or pad, to be read from the MDF table. For axial member, the section name will be used to read from the MDF table. For pad, the pad name will be used to read from the MDF table.
1104	support axial member cross section name
1105	support material number
1106	support axial member length
1107	material description

Table E-1 Drawing Form TNode Attributes

Integer	Description
1123	cabletray name
1132	equipment name
1133	bolt hole name/label

The DWGOBJIDX (integer) index number identifies multiple instances of drawing form Tnode with the same attribute in the same drawing form or drawing.

Defining a Drawing Form

To define a drawing form, 2 drawing form Tnode entities which have the property DWGOBJATTR with value 1, is located at the diagonal corners of the desired rectangular area. All the related drawing form Tnodes must be inside the drawing form boundary.

More than one drawing form can be contained in the same drawing of a CADDSS form part. The property DWGOBJIDX used to identify one drawing form from the other, takes an integer value starting from 1. The two Tnode entities which define the installation drawing form boundary (DWGOBJATTR property with a value of 1) should have the property DWGOBJIDX with the same value.

For example, if there are two drawing forms in the active drawing of a support form part. There should be four Tnodes which have the property DWGOBJATTR with value 1. Two of them have the property DWGOBJIDX with value 1 and their locations define the boundary for the first drawing form. The other two have the property DWGOBJIDX with value 2 and their locations define the boundary for the second drawing form.

Drawing Form Graphic Display Area

If the graphics display of the selected support unit is desired in a drawing form, the drawing form should have a rectangular graphic display area. To define a graphic display area, 2 drawing form Tnode entities having the property DWGOBJATTR with a value 2 should be located at the diagonal corners of the desired rectangular area inside the drawing form. The graphical data of a support unit is generated and drawn in this graphic display area.

If the graphic display area is defined in a drawing form, the DRAW ESUPPORT command inserts the support unit as model entities. Additional view is oriented, scaled, positioned, clipped and created such that the support unit is seen properly in the view created. Depending on the geometry of the support unit, more than one view can be created for a support unit in a drawing form in order to show the overall structure of the support model clearly. All the views created do not overlap each other and they should reside completely inside the graphic display area. For each view created in the graphic display area, the DRAW ESUPPORT command performs HLR on the support model and the appropriate dimension and text entities are inserted in draw mode to provide the drafting details.

Although there can be user-defined views in the drawing of a form part, this is not recommended. As the DRAW ESUPPORT command inserts the support unit as model entities in the form part, multiple image of the support unit may be displayed in the user-defined views.

Drawing Form Tnode for Text Data

To display the text data of a support unit in the drawing form, the drawing form Tnode entities should be inserted at the appropriate location inside the drawing form, and the property DWGOBJATTR should be attached with the appropriate value.

In the DRAW ESUPPORT command, text data is created as Nodal text (Ntext) entities and they are attached to the appropriate drawing form Tnodes in the drawing form. The appropriate text parameters should also be attached to the drawing form Text Node(Tnode) entities. The parameters used for the Ntext insertion are determined as follows:

- Using the text parameters in the associated Tnode entity, if they exist.
- Using the default parameters as selected in the SELECT TEXT command.

DRAW ESUPPORT command checks all the Tnode entities in the drawing form with property DWGOBJATTR, creates corresponding Ntext according to Tnode property DWGOBJATTR value and attaches the Ntext to the Tnode. For example, if a Tnode is found having property DWGOBJATTR with value 3, then a Ntext is created with its text value and project name and is attached to the Tnode.

If there are multiple instances of drawing form Tnodes with the same attribute in the same drawing form, the property DWGOBJIDX is used to provide the index or sequence number for the Ntext insertion. The DRAW ESUPPORT command reads the corresponding data instances from the support unit, creates the Ntext entities and attaches them to the appropriate Tnode entities.

Glossary

Cabletray

A device that is used to support and carry the weight of the cable as it is being routed from one connection point to another.

Cabletray Support

A support unit that supports and carries the load of a cabletray. A cabletray support transmits the load from the cabletray to the attached building or structure.

Equipment Support

A support unit that carries the load of the supported equipment. An equipment support transmits the load from the equipment to the attached building or structure.

External Database

The External Database is the structural support external relational database (RDBMS) generated by the GENERATE SUBBASE command.

Liner

A small planar plate that lies between the equipment and the equipment support member. It is a rectangular plate with one bolt hole on it. The location of the bolt hole should match the bolt hole on the equipment and the equipment support member.

Nodal Figure

A CADD5 local nodal figure that contains the equipment and cabletray support member graphics and related attributes. Nodal figure is a basic

CADDS entity is extensively used for AEC objects and not only for equipment and cabletray support. For example, even the equipment and cabletray consists of nodal figures.

Nspline

An Nspline is a curve composed of one or more segments. It has three characteristics: degree, polygon points, and knot vectors. The degree of an Nspline is determined by the polynomials that define it. A polygon point controls the shape of an Nspline. Knot vectors are lists of parameter values that correspond to points on the Nspline where one polynomial ends and another begins.

NURB

NURB is an Non-Uniform Rational B-spline.

NURBS

NURBS is an Non-Uniform Rational B-spline Surface.

Pad

A small planar plate which lies between the attachment axial member of a support unit and the reference structure on which the support unit is being erected on.

RDBMS

A relational database management system for storing information external to the CADDS database, such as Oracle, and interfaced from CADDS via the SQL High Level Interface.

Section Library

A means of storing section shape information used by Advance Structural Modeling (ASM) and SMS. It is either stored internally in the CADDS part database or in an external ASCII text file.

Solid

A solid is a collection of geometric entities and non-graphic relational information. The geometric entities, such as curves and surfaces, describe the shape of the solid. The non-graphic topological entities describe the relationship between the geometrical entities.

Standard Section

A standard section is one that is defined by its basic parameters of height, width, flange thickness, web thickness, or by a user defined shape.

Support Label

A support label is a nodal text entity related to the support unit. The label consists of 3 data fields MNEMONIC1, MNEMONIC2 and NUMBER. Its format is defined in the structural support directory file. The mnemonic fields, MNEMONIC1 and MNEMONIC2, are used for general purpose user-defined text data in a support label. The NUMBER field is used to store a sequential number generated automatically by the GENERATE SULABEL command.

Support Member

A support member is a structural axial element or plate entity represented by a nodal figure associated with related model graphics and attributes. An axial support member attributes include cross section name, material, trace curve position,...etc. A plate support member attributes include thickness, material, boundary curve position,...etc.

Support Unit

A support unit is a collection of one or more support members related to each other and constituting a single logical unit. The support unit itself does not have any graphical representation. Its attributes include support selection name, installation stage and paint code. Cabletray

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