

What's New in CADD5[®] 5 15.0

CADD5 15.0

DOC40175-013

Copyright © 2007 Parametric Technology Corporation. All Rights Reserved.

User and training guides and related documentation from Parametric Technology Corporation and its subsidiary companies (collectively "PTC") is subject to the copyright laws of the United States and other countries and is provided under a license agreement that restricts copying, disclosure, and use of such documentation. PTC hereby grants to the licensed software user the right to make copies in printed form of this documentation if provided on software media, but only for internal/personal use and in accordance with the license agreement under which the applicable software is licensed. Any copy made shall include the PTC copyright notice and any other proprietary notice provided by PTC. Training materials may not be copied without the express written consent of PTC. This documentation may not be disclosed, transferred, modified, or reduced to any form, including electronic media, or transmitted or made publicly available by any means without the prior written consent of PTC and no authorization is granted to make copies for such purposes.

Information described herein is furnished for general information only, is subject to change without notice, and should not be construed as a warranty or commitment by PTC. PTC assumes no responsibility or liability for any errors or inaccuracies that may appear in this document.

The software described in this document is provided under written license agreement, contains valuable trade secrets and proprietary information, and is protected by the copyright laws of the United States and other countries. It may not be copied or distributed in any form or medium, disclosed to third parties, or used in any manner not provided for in the software licenses agreement except with written prior approval from PTC.

UNAUTHORIZED USE OF SOFTWARE OR ITS DOCUMENTATION CAN RESULT IN CIVIL DAMAGES AND CRIMINAL PROSECUTION.

For Important Copyright, Trademark, Patent, and Licensing Information: For Windchill products, select About Windchill at the bottom of the product page. For InterComm products, on the Help main page, click the link for Copyright 2007. For other products, select Help > About on the main menu for the product.

UNITED STATES GOVERNMENT RESTRICTED RIGHTS LEGEND

This document and the software described herein are Commercial Computer Documentation and Software, pursuant to FAR 12.212(a)-(b) (OCT'95) or DFARS 227.7202-1(a) and 227.7202-3(a) (JUN'95), and are provided to the US Government under a limited commercial license only. For procurements predating the above clauses, use, duplication, or disclosure by the Government is subject to the restrictions set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software Clause at DFARS 252.227-7013 (OCT'88) or Commercial Computer Software-Restricted Rights at FAR 52.227-19(c)(1)-(2) (JUN'87), as applicable. 02202007

Parametric Technology Corporation, 140 Kendrick Street, Needham, MA 02494 USA

Table of Contents

Preface

Related Documents	vii
Book Conventions	viii
Window Managers and the User Interface	ix
Online User Documentation	ix
Online Command Help	x
Printing Documentation	x
Resources and Services	xi
Documentation Comments	xi

New Features and Enhancements

Usability	1-2
Explicit Single Window Rendering	1-2
New Commands	1-4
Interactive View Controls	1-4
Selection of Ambiguous Entities	1-5
Continuous Scrolling of Drawings	1-5
Spaceball Key Mapping to CADD5 Commands	1-6
User Interaction	1-6
Enhanced Entity Verification	1-6
3D Model Clipping Enhancements	1-6
Hidden Line Removal and Drawing Generation	1-9
Hidden Line Removal	1-9
Choosing Entities for Hidden Line Removal	1-9

Creating Entities after Smashing _____	1-9
Drawing Generation _____	1-9
Dual Dimension with Period and Comma _____	1-9
Automatic Generation of Label Content _____	1-10
Routed Systems _____	1-13
HVAC Enhancements _____	1-13
Duct Lines with New Cross Section Shapes _____	1-13
Modifying Duct Cross Section Orientation _____	1-16
HVAC Bends _____	1-18
Ship Electrical Enhancements _____	1-19
New Cross Section Shapes for Cableways _____	1-19
Cableway Bends with New Cross Section Shapes _____	1-21
Cableway Branches _____	1-22
Cableway Section Drawings for Transition Segments _____	1-24
Cableway Segment Report _____	1-25
New Options for Modifying Cableways _____	1-27
Piping and HVAC Enhancements _____	1-27
Consistent GETDATA Behavior in Routing Commands _____	1-27
Unique Spool Names for Pipe Lines and Duct Lines _____	1-27
New Primitive Shapes for Constructing Equipment _____	1-30
Shipbuilding Design _____	1-33
CV Hull _____	1-33
Displaying Bend Mark Lines in Stiffener Drawings and Nesting Files _____	1-33
Stiffener Drawings for Stiffeners with Double Curvature _____	1-33
Manufacturing Drawings for Flanged Plates _____	1-34
Displaying and Working with the Ship Reference System _____	1-34
Structural Modeling Enhancements _____	1-36
Copying Properties to Structural Objects _____	1-36
Creating Structural Interacting Endcuts Against Surfaces _____	1-38
Welding Fully or Partially Penetrating Plates _____	1-39
Controlling the Marking of Cutouts _____	1-39
Creating Welded Flanges for Brackets _____	1-40
Automatic Creation of Deck and Hull Joints _____	1-42
Design and User Support _____	1-46
Preserving View Render Mode Settings During Activate Model _____	1-46
Saving and Restoring Viewstates _____	1-46

Database Enhancements_____	1-47
CADD5 4X Double-precision Parts _____	1-47
General Enhancements _____	1-48
Simplified Chinese Support _____	1-48
PUT STL Command_____	1-48
PUT CGM Command _____	1-49
Creation of .gaf and .gbf Files _____	1-50
New Clash Detection and Management Options _____	1-50
Compare Part_____	1-51

Preface

What's New in CADD5 5 15.0 provides information on new functionalities and enhancements added since CADD5 5i Release 14.

Related Documents

The following documents may be helpful as you use *What's New in CADD5 5 15.0*:

- *Advanced Structural Modeling User Guide and Menu Reference*
- *Concurrent Assembly Mock-up User Guide and Menu Reference*
- *CV Hull Manufacturing Commands*
- *Design and Drafting User Guide and Menu Reference*
- *Explicit Modeling User Guide and Menu Reference*
- *Heating, Ventilation and Air Conditioning Reference*
- *Hidden Line Removal (and AEC HLR) User Guide and Menu Reference*
- *HVAC User Guide and Menu Reference*
- *Installing CADD5 5*
- *Introduction to CADD5 5*
- *Managing CADD5 5*
- *Piping User Guide and Menu Reference*
- *Rapid Prototyping Interface User Guide and Menu Reference*
- *Ship Electrical Menu and Technical Reference*

Book Conventions

The following table illustrates and explains conventions used in writing about CADD5 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 CADD5 text fields and on any command line	<code>cvaec.hd.data.param</code> <code>tar -xvf /dev/rst0</code>	Enter the text in a CADD5 text field or on any command line.
System output	<code>Binary transfer complete.</code>	Indicates system responses in the CADD5 text window or on any command line.
Variable in user input	<code>tar -cvf /dev/rst0 filename</code>	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.
CADD5 commands and modifiers	INSERT LINE TANTO	Shows CADD5 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	<i>n</i>	Supply an integer for the <i>n</i> .
Real number	<i>x</i>	Supply a real number for the <i>x</i> .
#	<code># mkdir /cdrom</code>	Indicates the root (superuser) prompt on command lines.
%	<code>% rlogin remote_system_name -l root</code>	Indicates the C shell prompt on command lines.
\$	<code>\$rlogin remote_system_name -l root</code>	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 CADD5 can change. Refer to the following table:

Look and Feel of User Interface Elements

User Interface Element	Common Desktop Environment (CDE) on Solaris and HP	Window Manager Other Than CDE on Solaris, HP, and Windows
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 CADD5 desktop or the Local Data Manager (LDM)

Please note: The LDM is valid only for standalone CADD5.

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/cadd5/data/html/htmldoc/` (UNIX)
 - Drive:\usr\apl\cadd5\data\html\htmldoc\ (Windows)
2. Click `mainmenu.html`. A list of available CADD5 documentation appears.
3. Click the book title you want to view.

From the Information Access Button on the CADD5 Desktop or LDM:

1. Start CADD5.
2. Choose Information Access, the *i* button, in the top-left corner of the CADD5 desktop or the LDM.
3. Choose DOCUMENTATION. A list of available CADD5 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)

Online Command Help

You can view the online command help directly from the CADD5 desktop in the following ways:

- From the Information Access button on the CADD5 desktop or the LDM
- From the command line

From the Information Access Button on the CADD5 Desktop or LDM:

1. Start CADD5.
2. Choose Information Access, the *i* button, in the top-left corner of the CADD5 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)

Resources and Services

For resources and services to help you with PTC (Parametric Technology Corporation) software products, see the *PTC Customer Service Guide*. It includes instructions for using the World Wide Web or fax transmissions for customer support.

Documentation Comments

PTC welcomes your suggestions and comments. You can send feedback electronically to doc-webhelp@ptc.com.

New Features and Enhancements

This document provides an overview of what is new in CADD5 15.0. This release includes a number of significant improvements in capability and usability. These enhancements and considerations are grouped and described according to the following themes.

- Usability
- Hidden Line Removal and Drawing Generation
- Routed Systems
- Shipbuilding Design
- Design and User Support
- Database Enhancements
- General Enhancements

For detailed information, refer to the product-specific online document.

Usability

Graphics-related enhancements are described in the following sections. See the *Explicit Modeling User Guide and Menu Reference* for details.

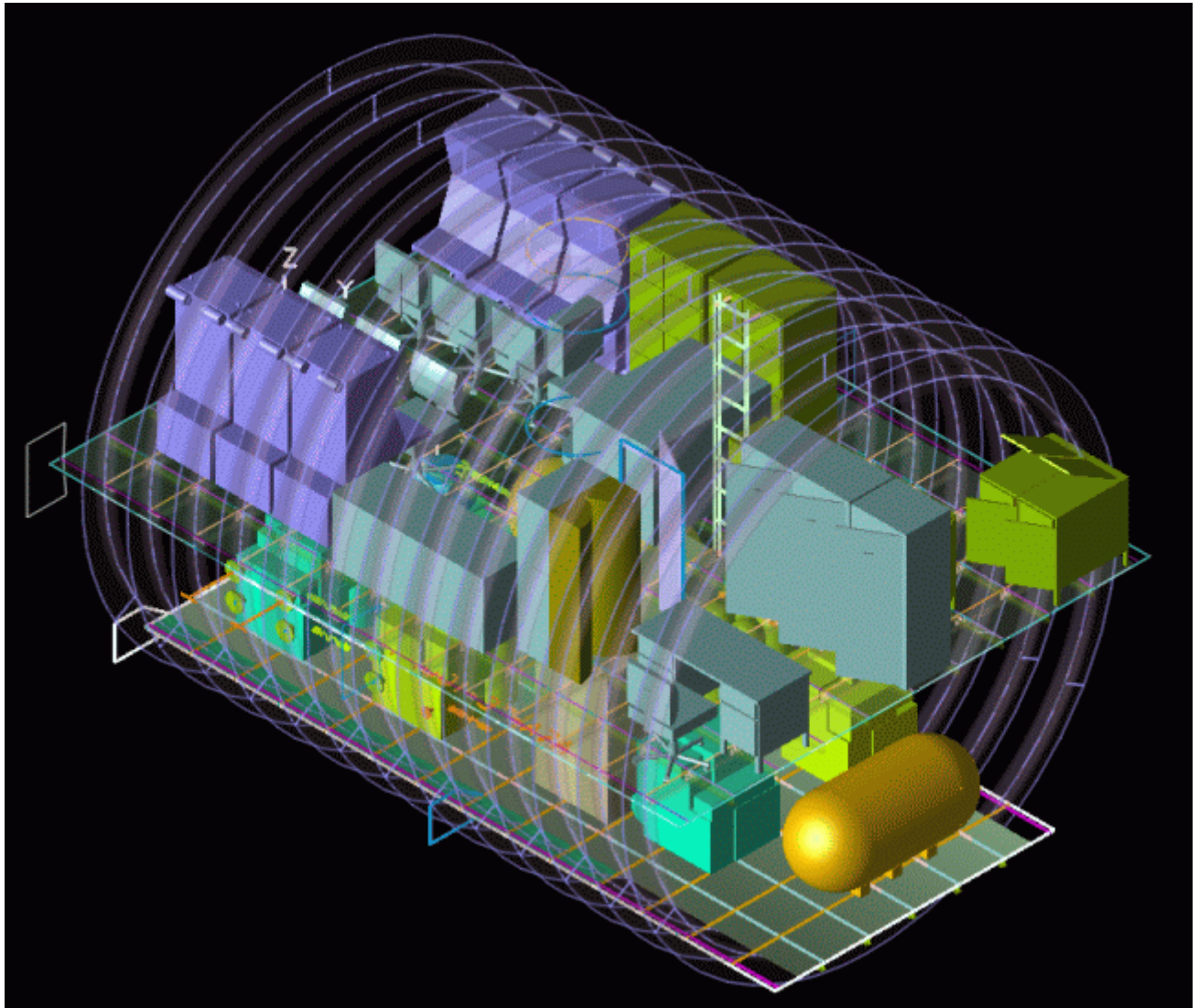
Explicit Single Window Rendering

The new Explicit Single Window Rendering (SWR) environment allows you to shade and perform graphical hidden line removal within the same window, the main graphics window. This provides a single and consistent graphics environment between the Explicit and Parametric environments.

You can apply shading or hidden line removal to all graphical entities such as surfaces, solids, and AEC and Shipbuilding application entities, within the same window as the traditional wireframe only representation of earlier releases of CADD5.

All CADD5 packages include Basic Shading which allows you to render images in shaded or HLR mode and dynamically manipulate the rendered image. For customers with the CADDShade II license, the existing functionality is enabled in the new SWR environment including interactive working and has been enhanced to include translucency and mixed mode rendering.

Figure 1-1 Example of Translucency

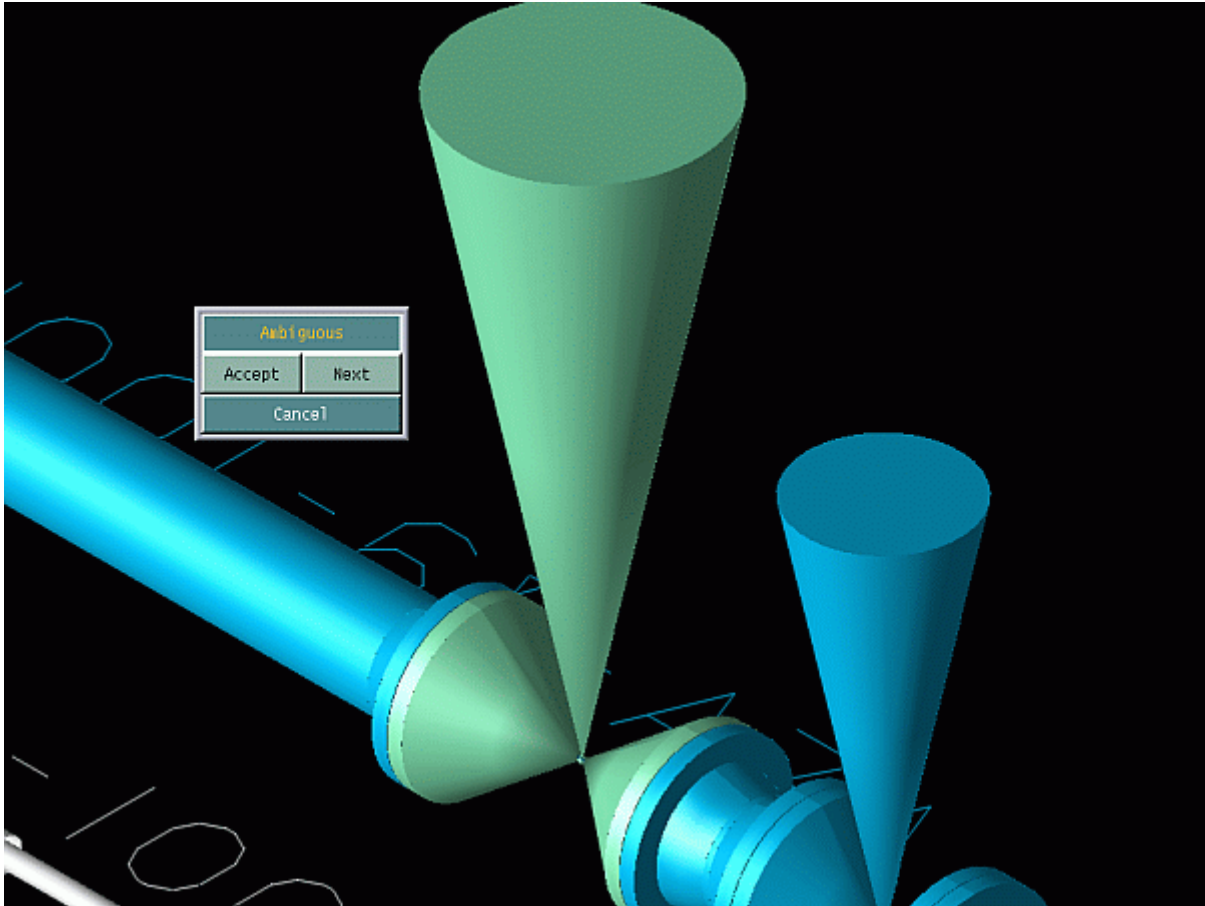


The new Explicit SWR environment is the default graphics environment for CADD5 15.0.

Selection of Ambiguous Entities

For easier selection of entities in complex assemblies, CADD5 15.0 offers a feature in the Explicit environment that aids you in accurate freehand entity selection. You can now switch selection among closely placed entities one after another and locate the entity that you want to select.

Figure 1-3 Example of Ambiguity Selection



See the section “Using Entity Selection Aids” in the *Explicit Modeling User Guide and Menu Reference* for details.

Continuous Scrolling of Drawings

You can now scroll a drawing to move the entire drawing to any side of the screen. You can scroll the drawing continuously and smoothly using the Interactive View Controls toolbar or the spaceball. This is in addition to using move-from and move-to locations to scroll a drawing.

See the section “Spaceball and Spacemouse” in the *Explicit Modeling User Guide and Menu Reference* for details.

Spaceball Key Mapping to CADD5 Commands

CADD5 5 allows you to edit the mapping of Spaceball keys to CADD5 commands. The A and B Spaceball keys are command set selection keys. You can use them along with a number key to run CADD5 commands. You can use a total of 18 commands (9 commands for the number keys in each set A and B).

See the section “The Spaceball and Spacemouse” in the *Explicit Modeling User Guide and Menu Reference* for details.

User Interaction

CADD5 now allows you to view the list of available drawings and select a drawing to open the associated part from the Activate Existing Part menu of the LDM.

See the section “Activating an Existing Part” in the *Explicit Modeling User Guide and Menu Reference* for details.

Enhanced Entity Verification

You can now display the list of properties of an entity in the Report Window in the Explicit environment. These include mass properties, and the results of both the VERIFY ENTITY and VERIFY STOBJECT (structural objects) commands.

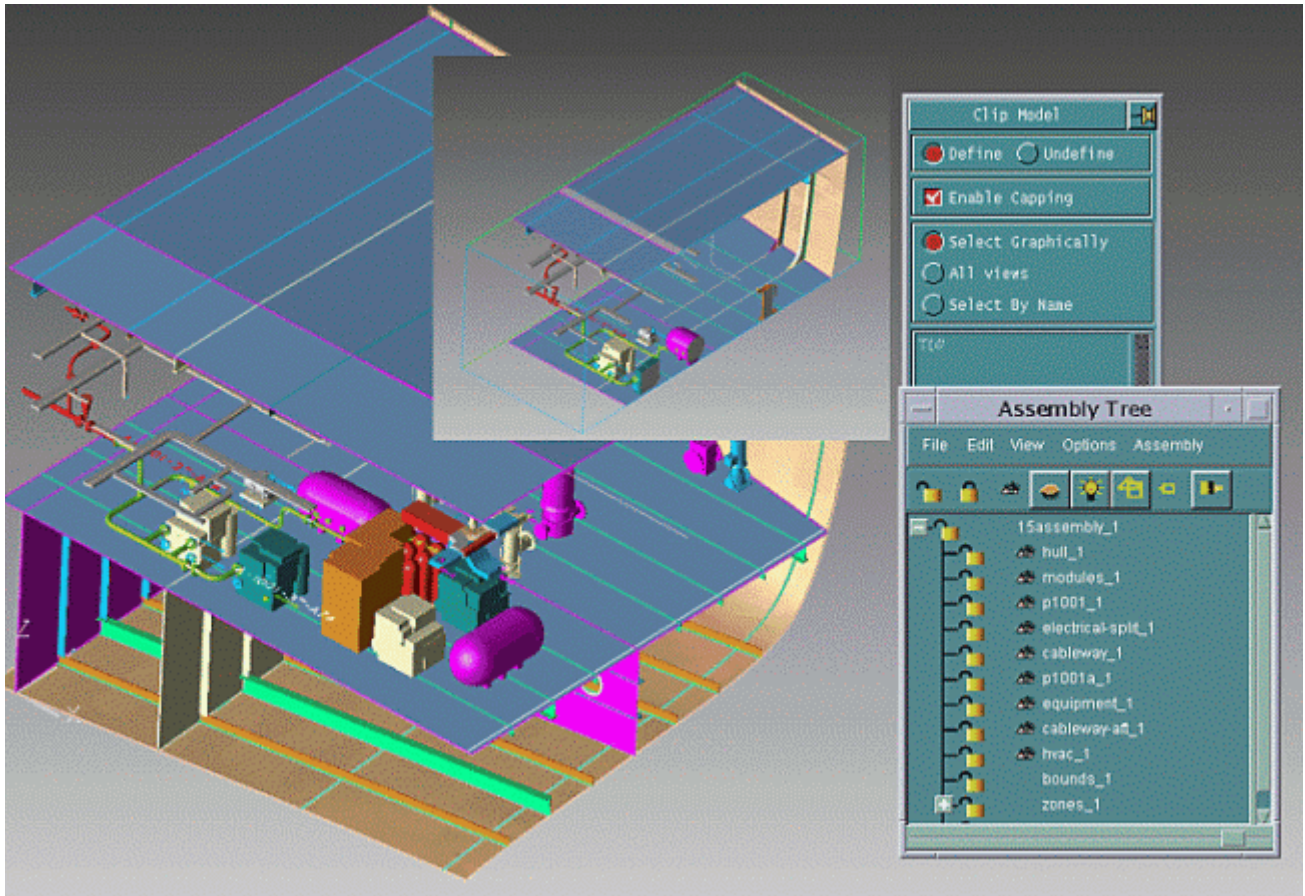
See the section “Entity Checking” in the *Explicit Modeling User Guide and Menu Reference* for details.

3D Model Clipping Enhancements

The 3D model clipping feature has now been enhanced for better usability. The view clipping functionality now stores the clip definition with the view in which it was defined. This clipping is also persistent in the CADD5 part database. This means that the clip definition remains in the database even after you quit the drawing by activating another drawing or by saving and quitting the part. When you reopen a drawing or a part, the previously defined clipping is automatically activated.

You can define different clip boxes for different views in a drawing. The model clipping visualization is also refined to display the clipped solids to appear with false surfaces or caps at the clip boundary. You can also change the color of these caps. You cannot select the capped geometry.

Figure 1-4 3D Model Clipping Visualization with Capping



You can set the color for the capping using the Shading Setup property sheet. If you set the capping color to other than default, CADD5 applies it to all clip volumes defined in the drawing. The default capping color is the same as the color of the solid to which it belongs. To view the extents of the currently defined clip box extents, use the command LIST VIEWDATA. The extents are displayed in the View Data menu and the text window.

CADD5 15.0 supports the view clipping functionality in both X11 and OGL modes.

In CAMU mode, the view clipping definition is persistent in the Adrawing in which it is defined. However, the view clipping definition is not persistent in

`MDRAW` mode and takes the definition from the last active drawing when you activate the model.

Hidden Line Removal and Drawing Generation

Enhancements in Hidden Line Removal and Drawing Generation are described in the following sections.

Hidden Line Removal

The following new functionalities are available for Hidden Line Removal (HLR).

Choosing Entities for Hidden Line Removal

The NoClip option overrides the Clip modifier of the hidden line removal command. The NoClip option removes hidden lines for those objects that were previously processed using UPDATE HLRIMAGE. Clip and NoClip are mutually exclusive.

Creating Entities after Smashing

The total number of entities that can be created after smashing has been increased along with the entity limit for a part. Double-precision CADD5 4X parts now have an entity limit of 262,144. CADD5 also allows you to select a Cplane to smash the entities onto. The layers of the respective entities are retained after smashing.

Drawing Generation

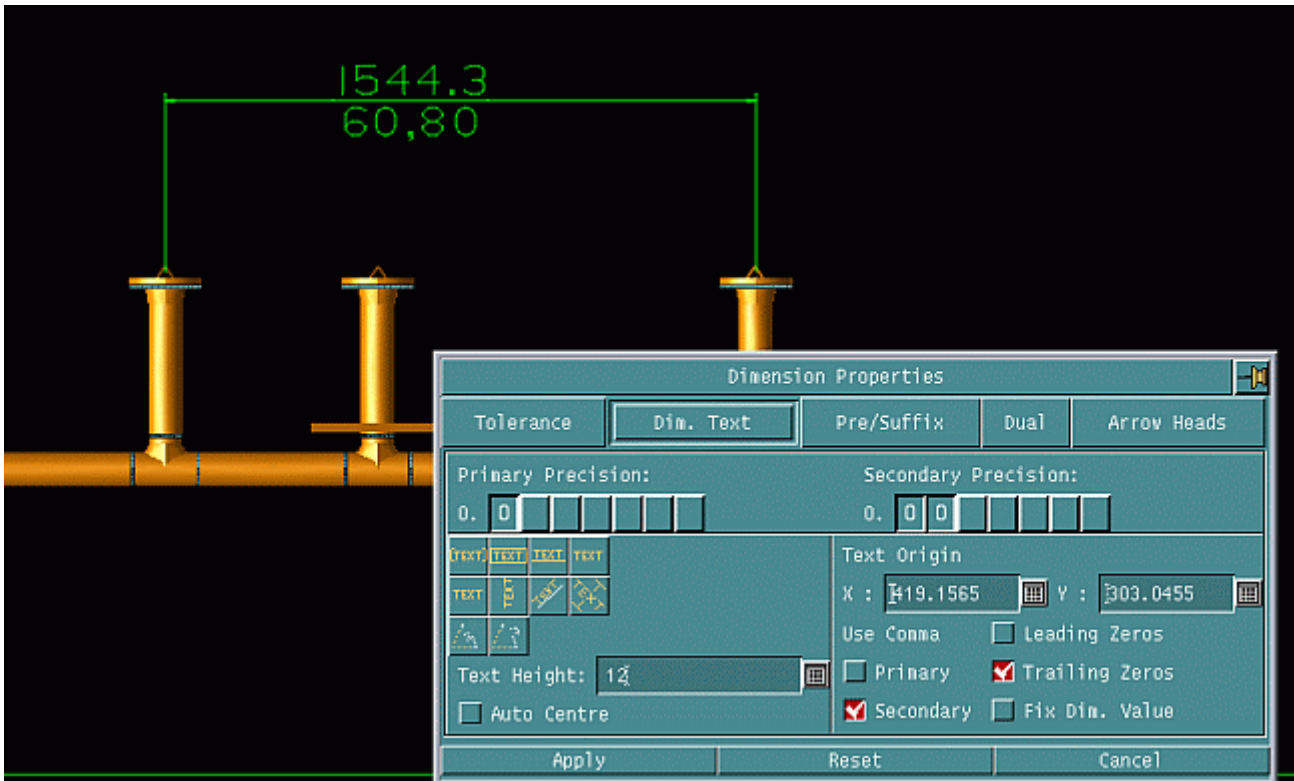
The following sections describe the enhancements in Drafting and Detailing. See the *Design and Drafting User Guide and Menu Reference* for details.

Dual Dimension with Period and Comma

For dual dimensions, you can now use a period and comma as the decimal separator in primary and secondary dimension units. You can use a period as the decimal separator for primary text and a comma as the decimal separator for secondary text or vice versa.

The Dimension Text property sheet and Change Dimension Text property sheet now include two options that you can use to specify the decimal separator, one for primary dimension text and another for secondary dimension text. Additionally, the Dimension Text tab of the Dimension Properties property sheet includes an option to select a comma as the decimal separator for primary and secondary dimension text.

Figure 1-5 Dimension Properties Property Sheet



See the sections “Dimension Text Property Sheet”, “Change Dimension Text”, and “Modifying the Dimension Text” in the *Design and Drafting User Guide and Menu Reference* for details.

Automatic Generation of Label Content

You can now automate the generation of the content of labels associated with CADDs entities. You can do this using various options on the Labeling menu shown in Figure 1-6. You can access this menu by selecting the Labeling icon on the Annotation menu.

Figure 1-6 Labeling Property Sheet

Labeling: -pipevalve5

File Annotate Add Delete Graphical

SELECTION CONTROL FORMAT

SELECTION:

Filter	Type	Value
PROPERTY	FITTYPE	10,,

CONTROL:

Label Attribute	Value
LAYER	3
ASSOCIATIVE	YES
LEADER	YES
ARROWHEAD	FILLED

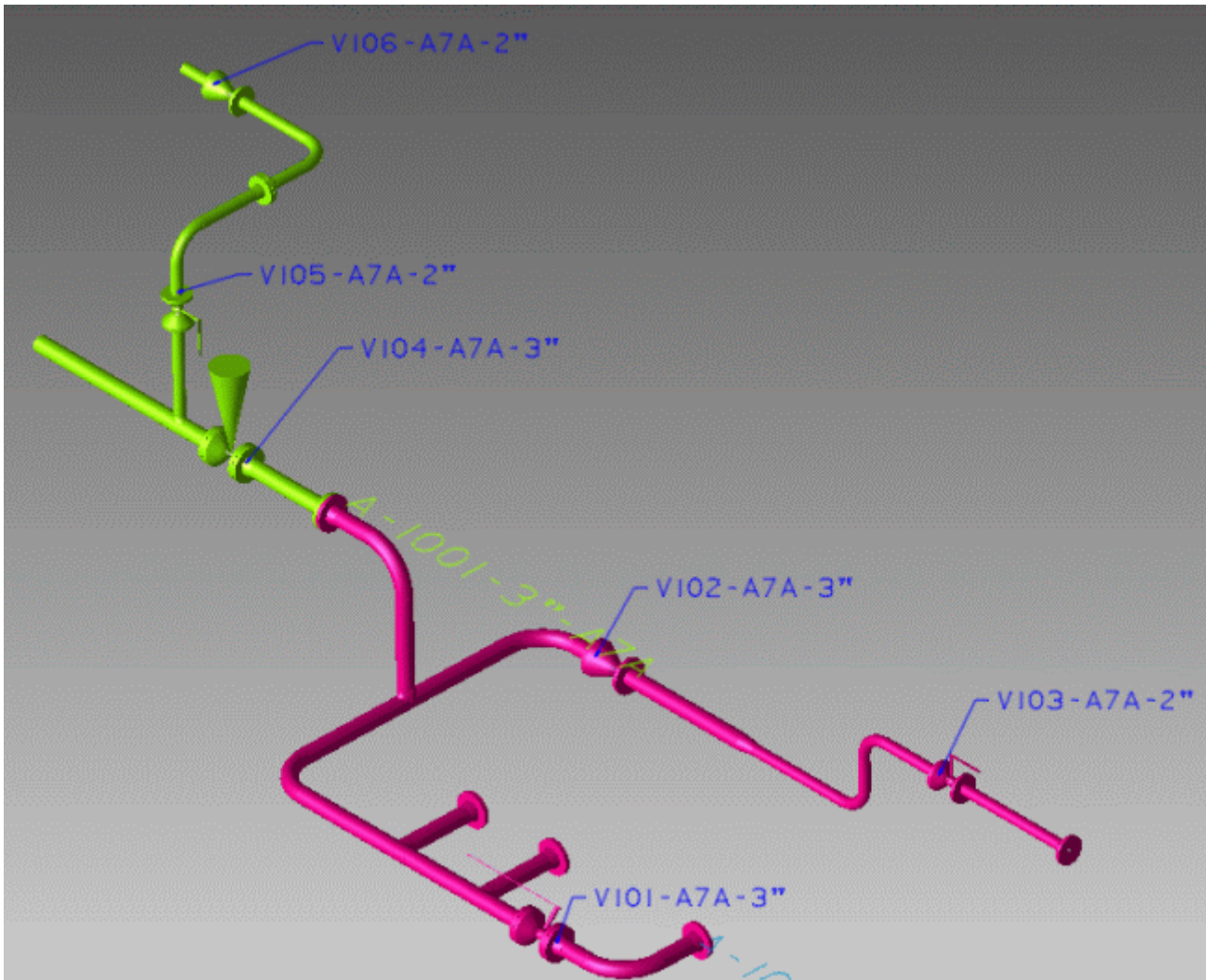
FORMAT:

Property	Annotate	Alias	Prefix	Suffix	Action	Order
MODE	N		V		CR	1
SPEC	N				/	2
MPS	N					3

The label content is generated based on a template file. The template file has three sections corresponding to the SELECTION, CONTROL, and FORMAT options in the menu. The SELECTION section defines the items to be labeled and the CONTROL section defines the look and feel of the label, while the FORMAT section defines the content of the label. The Labelling Property Sheet shows an example template definition. When annotating, only those items satisfying the selection criteria are selected and highlighted for annotation by digitizing the item followed by the required label location. The labels are automatically updated when you select the update options if the properties of the labeled entities are changed or when the template file is updated.

The templates are saved as Comma Separated Variable (.csv) files.

Figure 1-7 Example of Labeling



Routed Systems

Enhancements in Heating, Ventilation, and Air Conditioning (HVAC), Cableway, and Piping are described in the following sections. This latest release of CADD5 includes powerful new capabilities to route duct lines, pipelines, and cableways with several new cross section shapes.

HVAC Enhancements

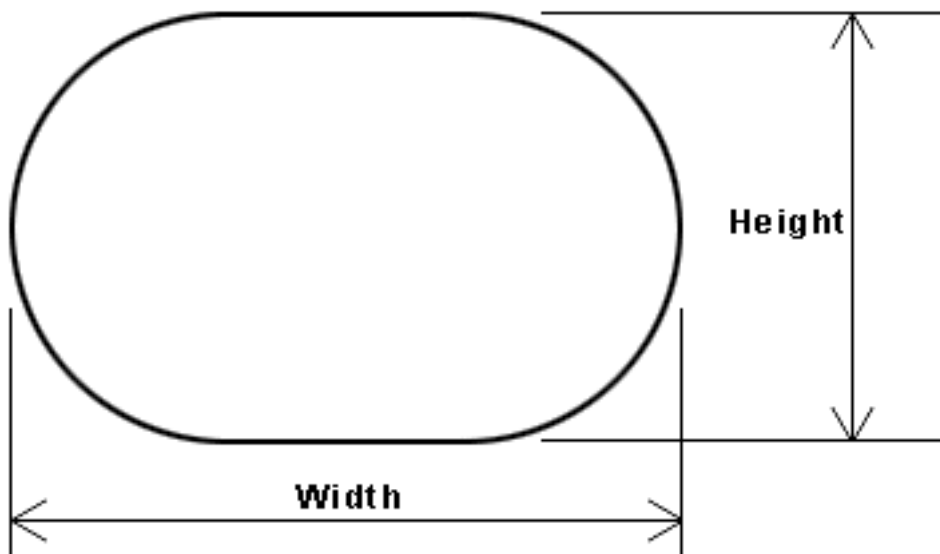
The HVAC enhancements are described in the following sections. See the *HVAC User Guide and Menu Reference* and the *Heating, Ventilation and Air Conditioning Reference* for details.

Duct Lines with New Cross Section Shapes

You can now route duct lines with flat oval, quarter circle, and rectangular cut-off cross section shapes in addition to the existing rectangular and circular shapes. The parameters associated with each shape are as follows:

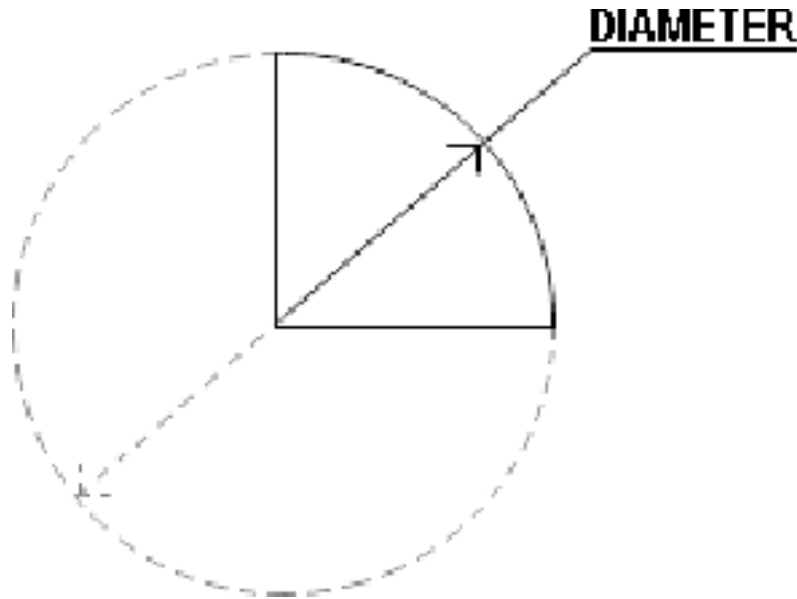
Flat Oval: A flat oval has two parameters, width and height. The width must be greater than the height. When routing a flat oval duct, you must specify the cross section size in the format, $WIDTH \times HEIGHT \times FO$. For example, specify $400 \times 200 \times FO$ for a flat oval with a width of 400 and a height of 200.

Figure 1-8 Flat Oval Shape



Quarter Circle: A quarter circle has only one parameter, the diameter. The default orientation for the quarter circle section is the top left quadrant relative to the center line of the duct along the flow direction. When routing a quarter circular duct, you must specify the cross section size in the format, `DIAMETER x QR`. For example, specify `600xQR` for a quarter circle of diameter 600.

Figure 1-9 Quarter Circle Shape



Rectangular Cut-off: A rectangular cut-off has five parameters, width, height, cut-off width, cut-off height, and the side of cut. The side of cut specifies the side of the cross section where the cut-off is applied. This side is either right or left relative to the center line of the duct along the flow direction. When routing a rectangular cut-off duct line, you must specify the duct size in the format, `WIDTH x HEIGHT x CUT-OFF WIDTH x CUT-OFF HEIGHT x SIDE OF CUT`. For example, specify `400x200x360x180x0` for a rectangular cut-off section of width 400, height 200, cut-off width 360, cut-off height 180, with the cut-off on the left side.

Figure 1-10 Rectangular Cut-off Shape with Left Cut-off

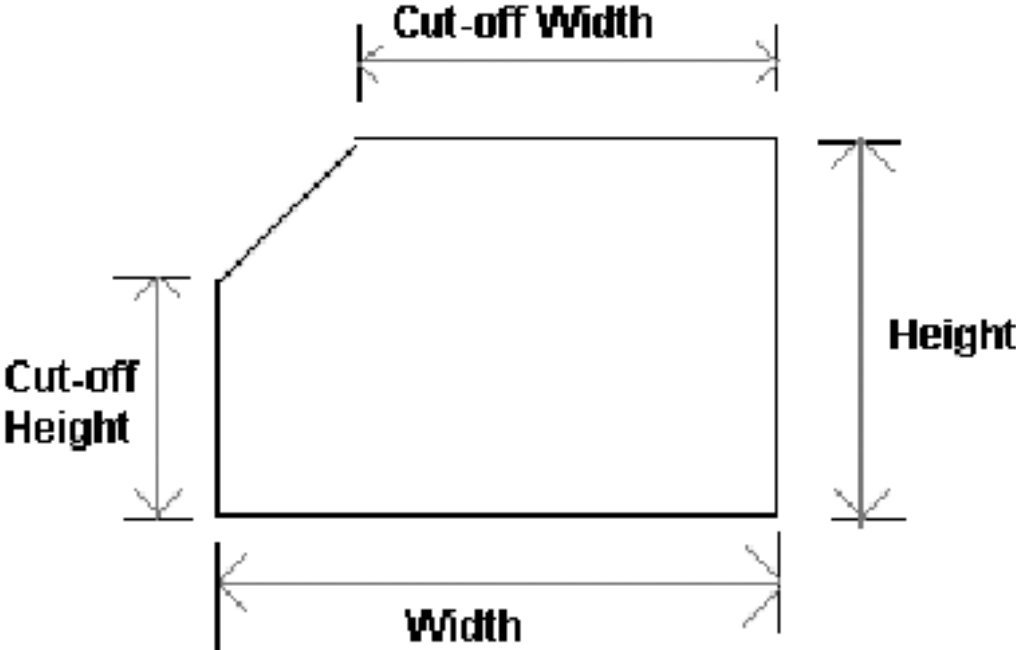
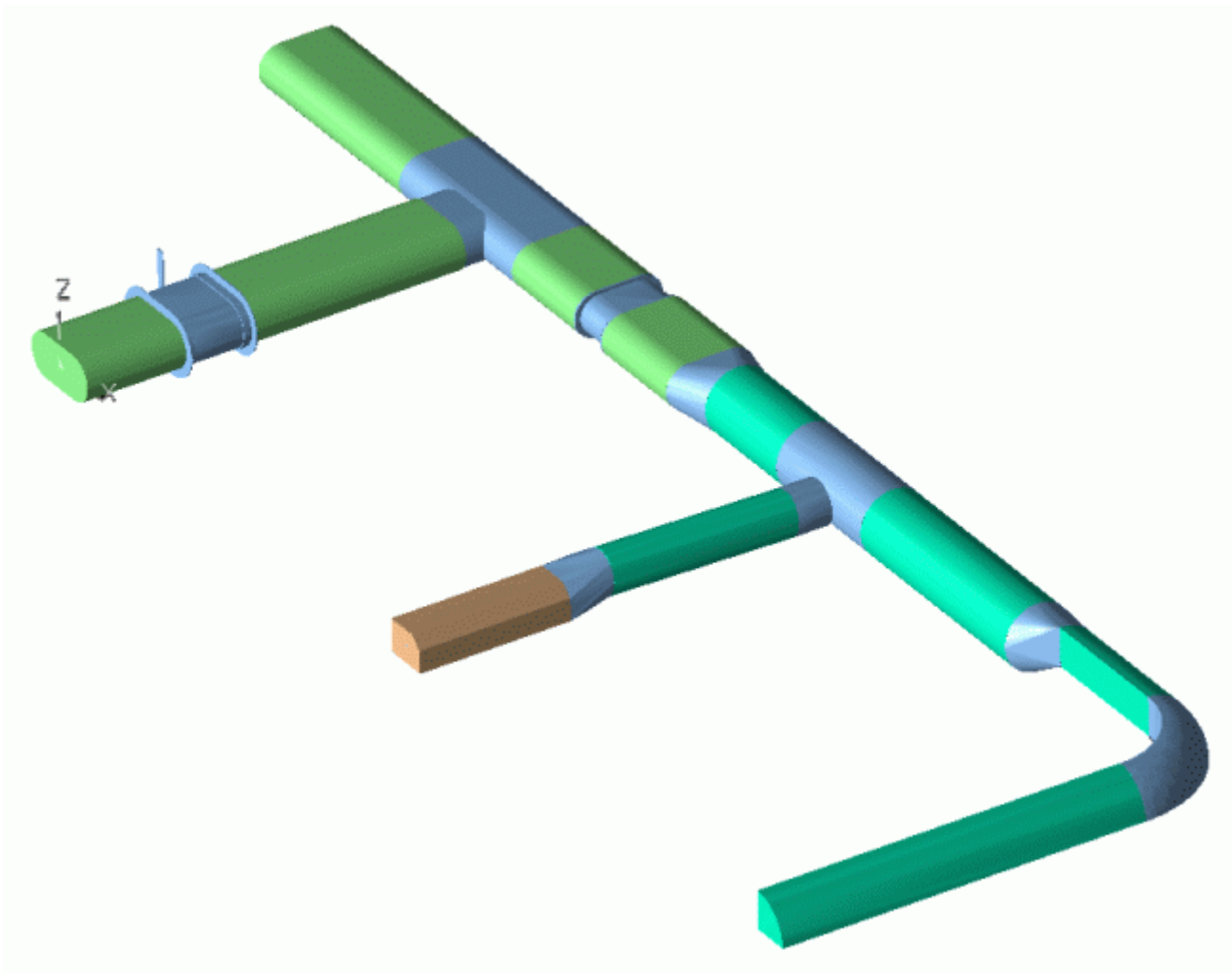


Figure 1-11 Example of Different Shapes Used in a Duct

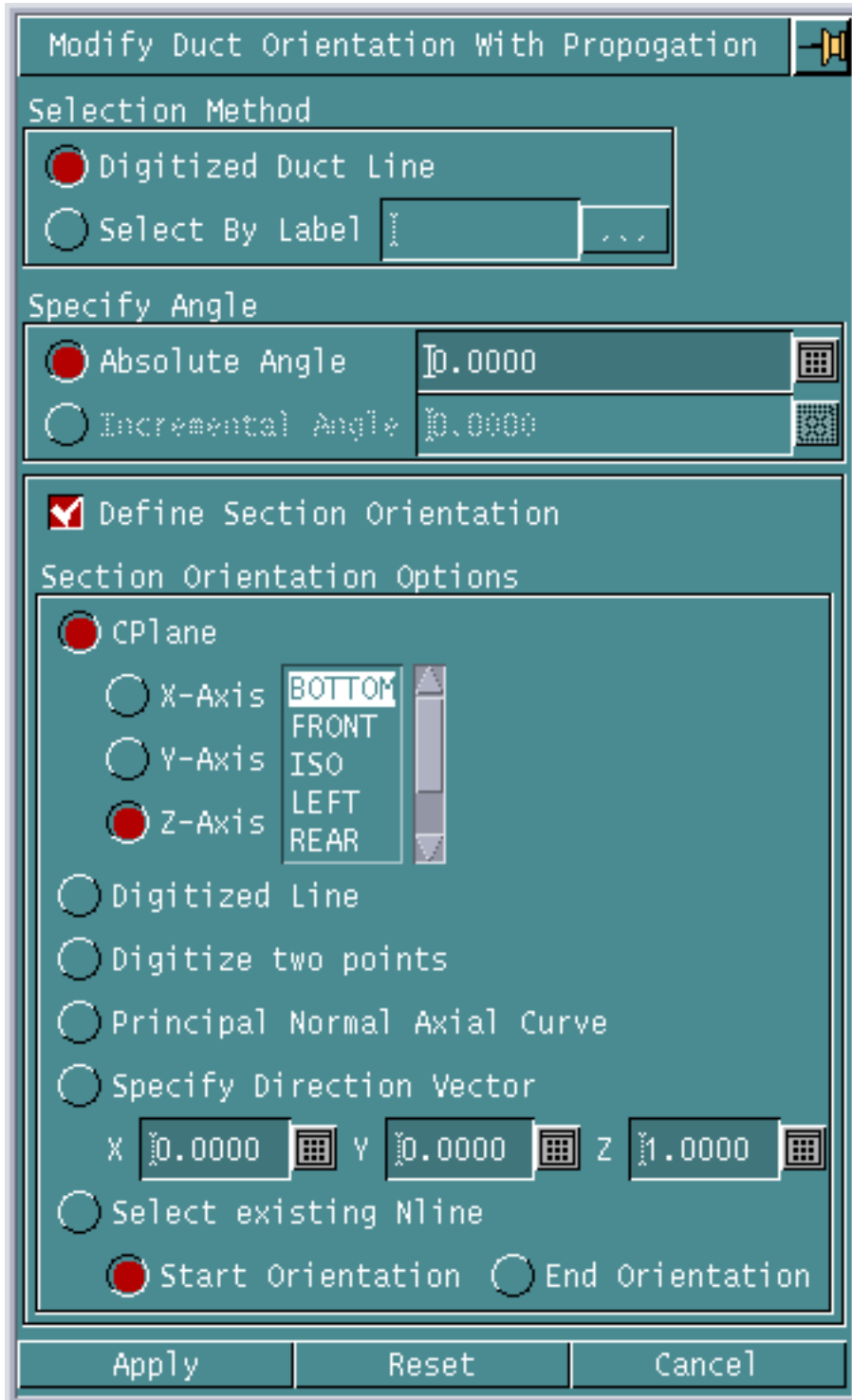


See the section “Routing Duct Lines” in the *HVAC User Guide and Menu Reference* for details.

Modifying Duct Cross Section Orientation

When modifying duct orientation, you can also now modify the cross section orientation of the duct line using the new Define Section Orientation option on the Modify Duct Orientation With Propagation property sheet.

Figure 1-12 Modify Duct Orientation With Propagation Property Sheet

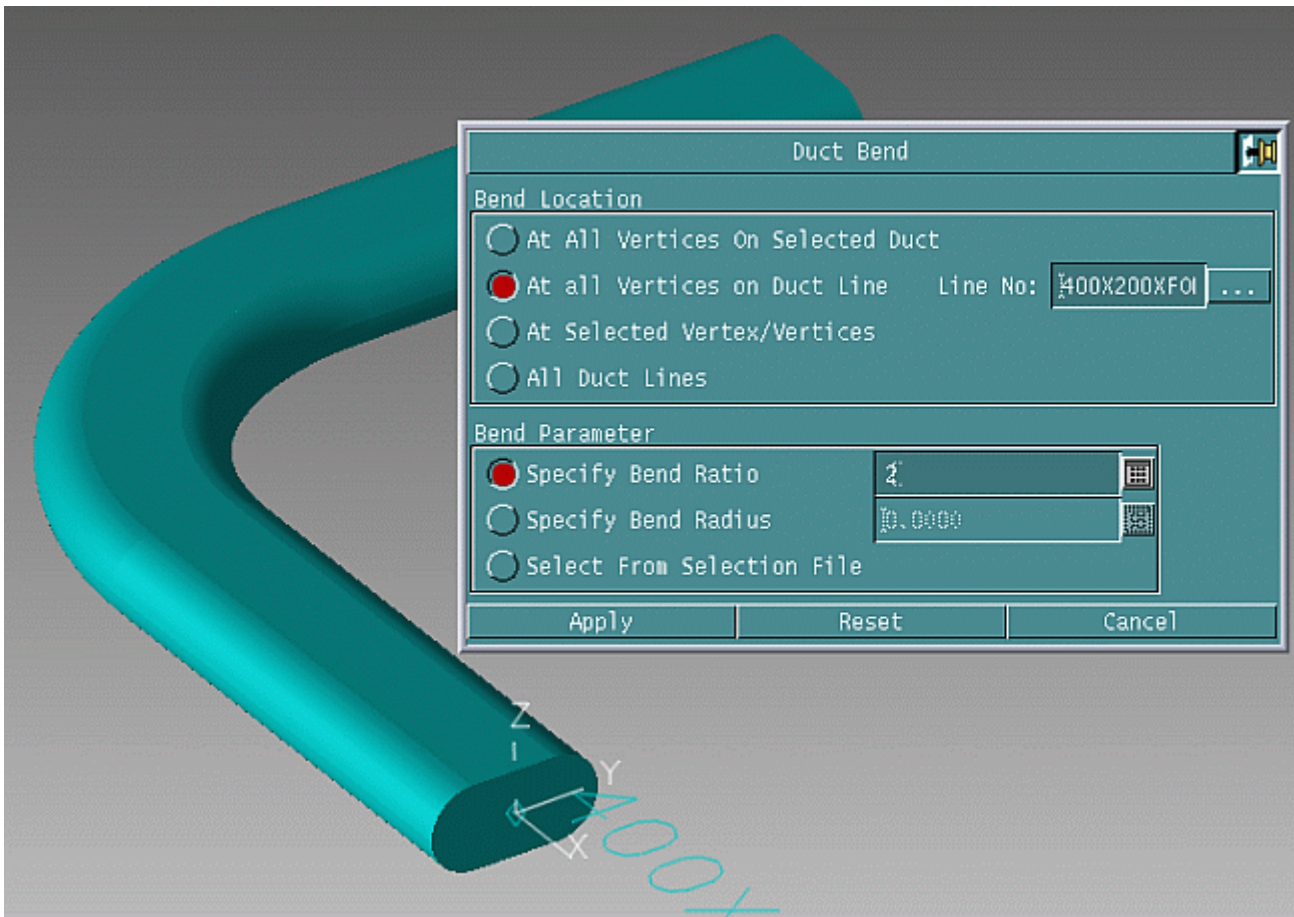


See the section “Modifying Duct Orientation” in the *HVAC User Guide and Menu Reference* for details.

HVAC Bends

You can now insert a bend into an HVAC duct as an alternative to an elbow. You can insert bends based on a bend ratio, bend radius, or from a selection file using the Duct Bend property sheet. You can also delete bends from the duct line.

Figure 1-13 Duct Bend Property Sheet



Ship Electrical Enhancements

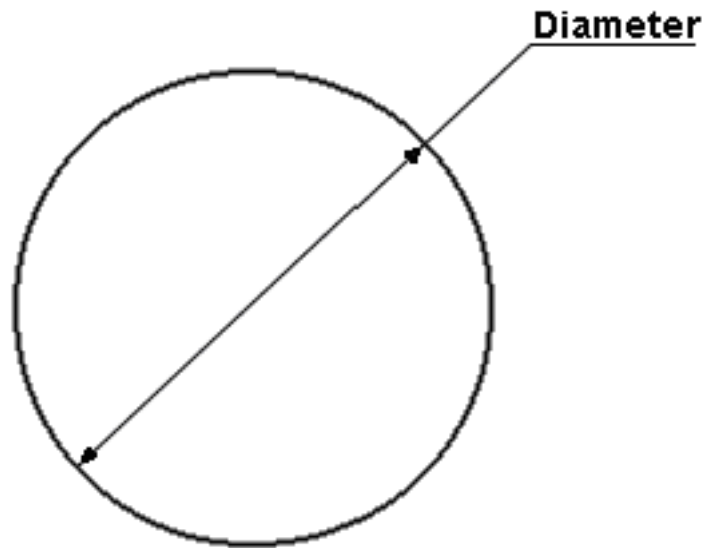
Ship Electrical enhancements are described in the following sections. See the *Ship Electrical Menu and Technical Reference* for details.

New Cross Section Shapes for Cableways

You can now route cableways with circular, rectangular cut-off, and trapezoidal cross section shapes in addition to the existing rectangular shape. The parameters associated with each shape are as follows:

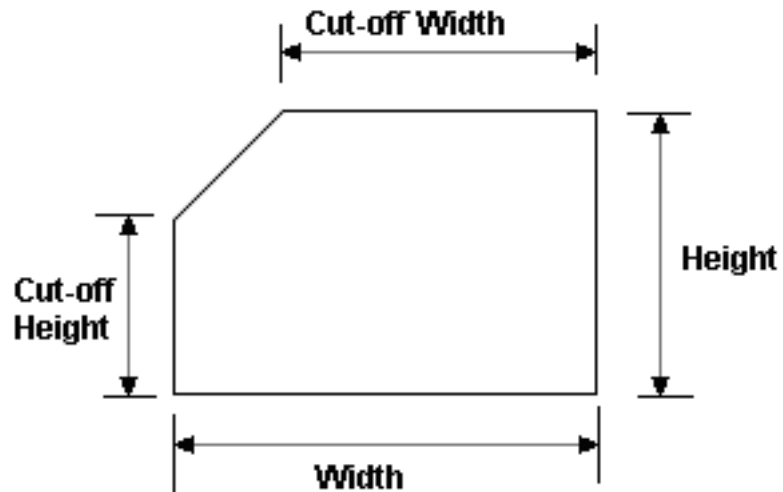
Circle: A circle has only one parameter, the diameter.

Figure 1-14 Circular Shape



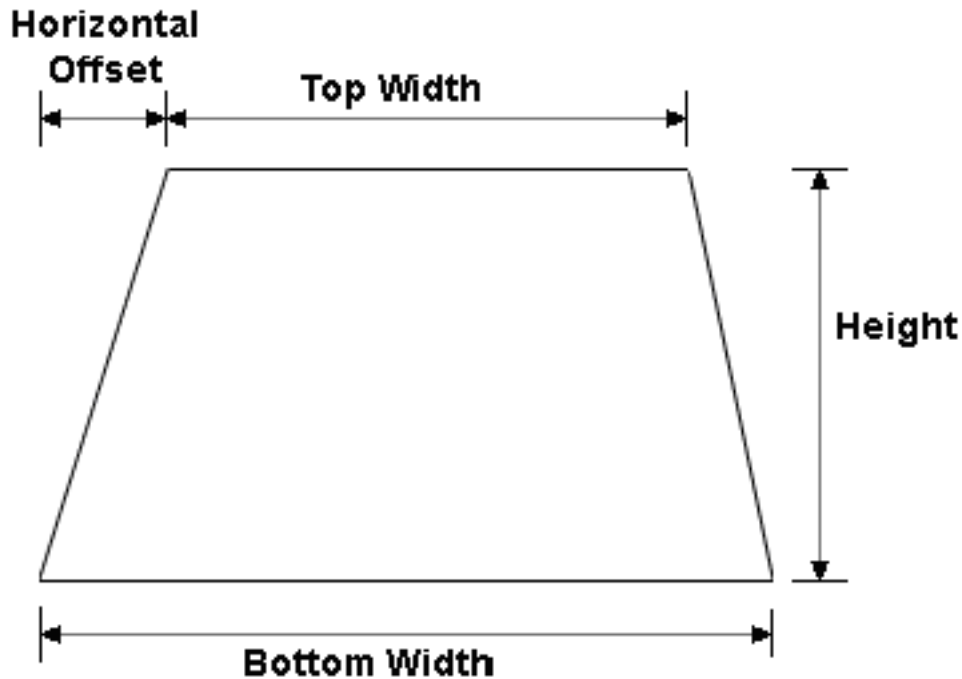
Rectangular Cut-off: A rectangular cut-off has five parameters: width, height, cut-off width, cut-off height, and the side of cut. The side of cut specifies the side of the cross section where the cut-off is applied. This side is either right or left relative to the center line of the cableway along the flow direction.

Figure 1-15 Rectangular Cut-off Shape with Left Cut-off



Trapezoid: A trapezoid has four parameters: bottom width, top width, height, and, the horizontal offset distance between the bottom and top faces of the trapezoid.

Figure 1-16 Trapezoidal Shape



See the section “Specifying Routing Cableway Options” in the *Ship Electrical Menu and Technical Reference* for details.

Cableway Bends with New Cross Section Shapes

You can now insert cableway bends with new cross section shapes by specifying the bend ratio as specified in the following table:

Table 1-1 Formulae to Calculate Bend Ratio for Different Cross Section Shapes

Cross Section Shape	Formula for Bend Ratio
Rectangle	BEND RADIUS / WIDTH
Circle	BEND RADIUS / DIAMETER
Trapezium	BEND RADIUS / (TOP WIDTH or BOTTOM WIDTH, whichever is greater)
Rectangular Cut-off	BEND RADIUS / WIDTH

See the section “Inserting Cableway Bends” in the *Ship Electrical and Menu Reference* for details.

Cableway Branches



You can now insert up to 27 cableway branches from a selected cableway node and maintain the connectivity and continuity of the cableway network. You can also add, delete, or modify the branches after they are inserted. The new INSERT OR MODIFY CABLEWAY BRANCH option on the Modeling task set opens the Cableway Branch palette. This palette allows you to insert new cableway branches or modify existing branches using an intuitive interactive Java menu. This menu enables you to create and edit branches, and see the results graphically within the menu before submitting the required results to the command.

Figure 1-17 Cableway Branch Palette

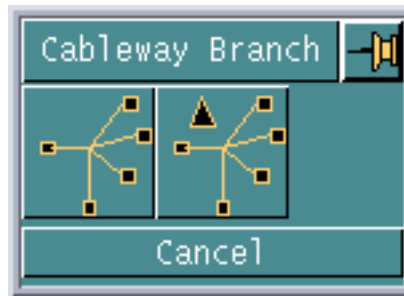


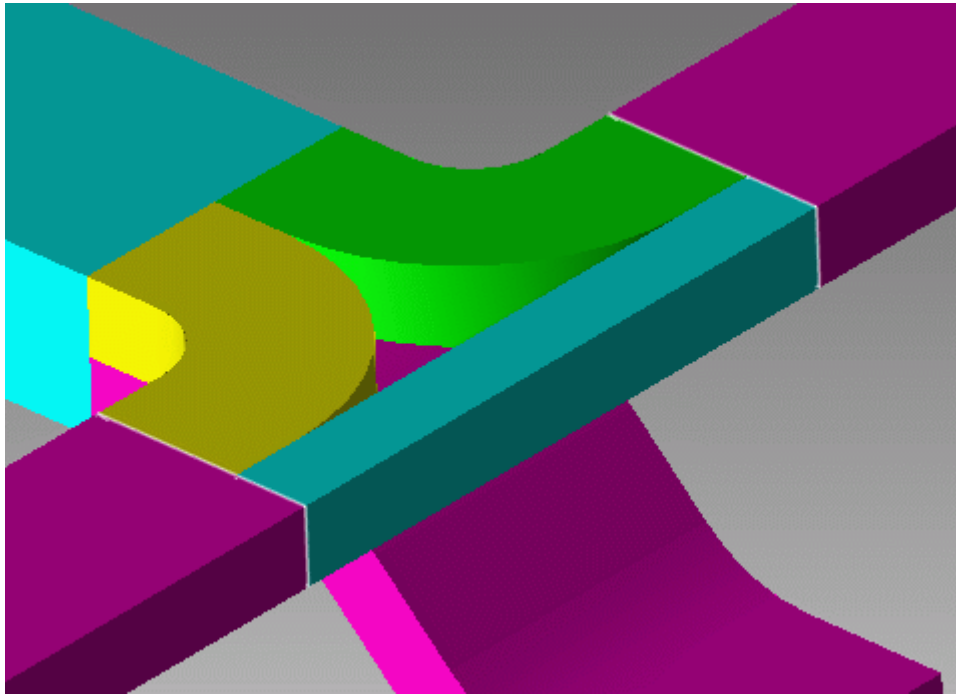
Figure 1-18 Split Cableway Property Sheet

Split Cableway

Interact: NO YES

Sl.No	X OffSet	Y OffSet	Justification	C/s Type	P1	P2	P3	P4	P5	Add Row
Parent	0.0	0.0	CENTER	RECT	0.4	0.2	0.0	0.0	0	
1	0.0	-0.05	CENTER	RECT	0.4	0.1	0.0	0.0	0	
2	.1	0.05	CENTER	TRAP	0.2	0.1	.1	0.05	0	<input type="button" value="Add"/> <input type="button" value="Delete"/>

Figure 1-19 Example of Cableway branch

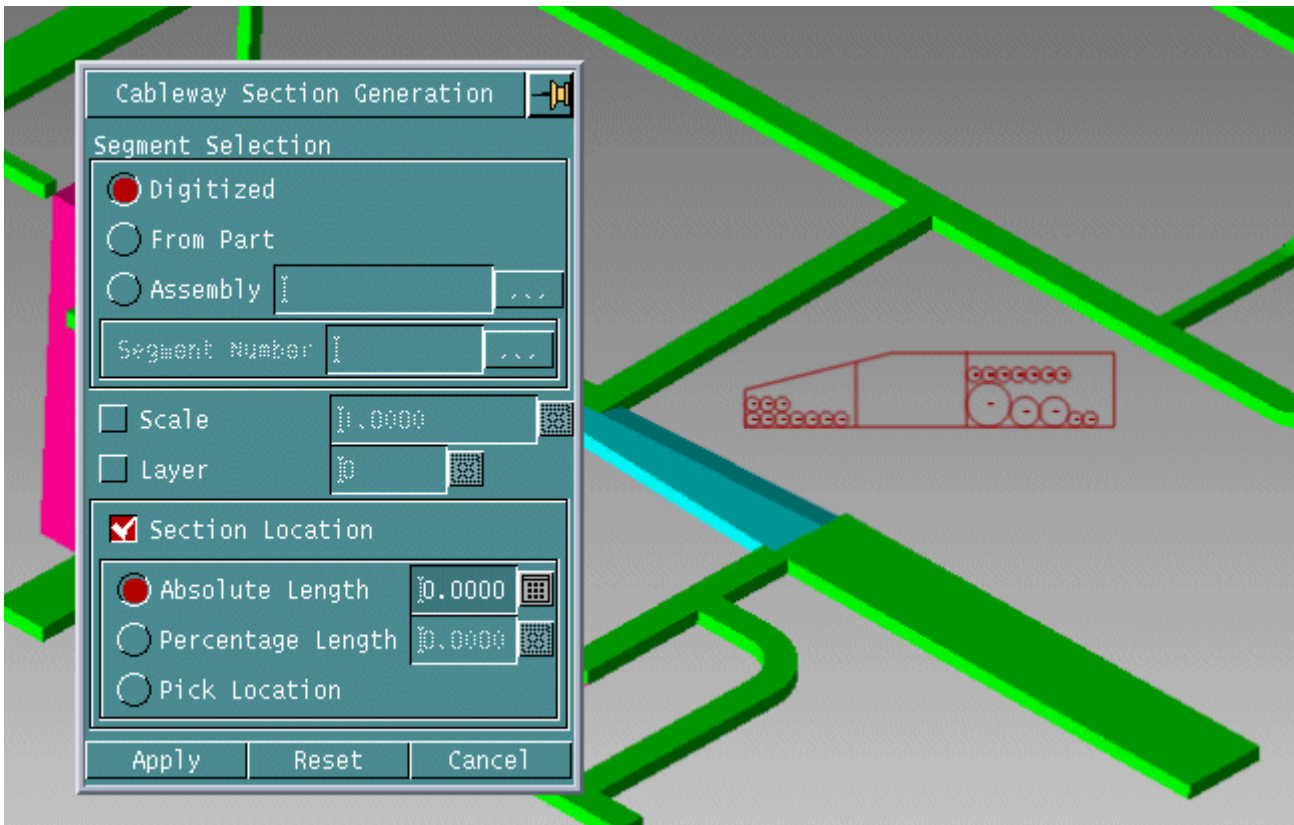


See the section “Inserting or Modifying Cableway Branches” in the *Ship Electrical Menu and Technical Reference* for details.

Cableway Section Drawings for Transition Segments

Transition cableway segments have different cross section dimensions at the leading and trailing ends with a smooth transition between the ends. For such segments, you can now generate the section drawing using the cross section dimensions at any point along the length of the segment using the Selection Location option on the Cableway Section Generation property sheet in one of the following ways:

Figure 1-20 Cableway Section Generation Property Sheet



- Specify the distance of the point from the leading end of the cableway segment using the Absolute Length option.
- Specify the percentage of the distance of the point from the leading end with respect to the length of the cableway segment using the Percentage Length option.
- Graphically select the point by using the Pick Location option.

If you do not specify the point, the section drawing uses the dimensions of the smallest cross section of the segment.

See the section “Generating Cableway Sections” in the *Ship Electrical Menu and Technical Reference* for details.

Cableway Segment Report

Using the new Cableway Segment Report option on the Cable Reporting property sheet, you can report the cross section dimensions of all the segments in a cableway or the cableway segments with selected cross section shapes.

You can also use the new Report Transition option to report the cross section dimensions at the leading and trailing ends of each cableway segment.

Figure 1-21 Cable Reporting Property Sheet

Cable Reporting

Connect To RDBMS

Username Password
Project Name
Assembly

Report Selection

Electrical Device Report
 Cable Schedule Report
 Cable Signal Report
 Cable Path Report
 Cableway Node Report
 Cableway Segment Report Report Transition
 Rectangular Rectangular CutOff
 Trapezoidal Circular
 Cableway Near Nodes Report
 Cable Support Report

Output Selection

Text File

Apply Reset Cancel

See the section “Generating Reports” in the *Ship Electrical Menu and Technical Reference* for details.

New Options for Modifying Cableways

When modifying cableways, you can now perform the following additional actions by using the new options on the Cableway Modification property sheet:

- Swap the cross section widths and heights at both ends of a rectangular cableway segment using the Choose Swap Dimensions of Both End option.
- Swap the cross section width and height at the upstream end of a rectangular cableway segment using the Swap Start Point Dimension option.
- Swap the cross section width and height at the downstream end of a rectangular cableway segment using the Swap End Point Dimension option.
- Swap the cross section dimensions of the upstream and downstream ends of the segment using the Swap Between Start and End Size option.
- Modify the cross section size and type of the cableway segment using the Cross Section option.
- Modify the cross section rotation angle of a cableway segment at the start and end points using the Rotation Angle 1 and Rotation Angle 2 options, respectively.

See the section “Modifying Cableways” in the *Ship Electrical Menu and Technical Reference* for details.

Piping and HVAC Enhancements

Piping and HVAC enhancements are described in the following sections. See the *Piping User Guide and Menu Reference*, *Piping Reference*, *HVAC User Guide and Menu Reference*, and *Heating, Ventilation and Air Conditioning Reference* for details.

Consistent GETDATA Behavior in Routing Commands

CADDS 5 15.0 onward, when routing a pipe line or duct line, the getdata location modifiers such END, ORG, POI, and VERT are retained after each selection and need not be entered again unless you change the modifier.

Unique Spool Names for Pipe Lines and Duct Lines

You can now generate pipe or duct line spools with unique spool names across entire pipe or duct networks and synchronize them with the Oracle database by using the Unique and Connect options together on the Pipe Line Spool Generation / Reconstruction property sheet or the Duct Line Spool Generation /

Reconstruction property sheet, respectively. You can also reconstruct (delete spools) from the networks and synchronize them with the Oracle database.

This new functionality ensures that if a pipe or duct line is split across several parts, spool names are unique. This is achieved by searching the Oracle database for the next available spool number and then spooling and writing to the database simultaneously. Reconstructing spools deletes them from the database to ensure synchronization.

Figure 1-22 Pipe Line Spool Generation / Reconstruction Property Sheet

The image shows a software dialog box titled "Pipe Line Spool Generation / Reconstruction". It contains several sections of controls:

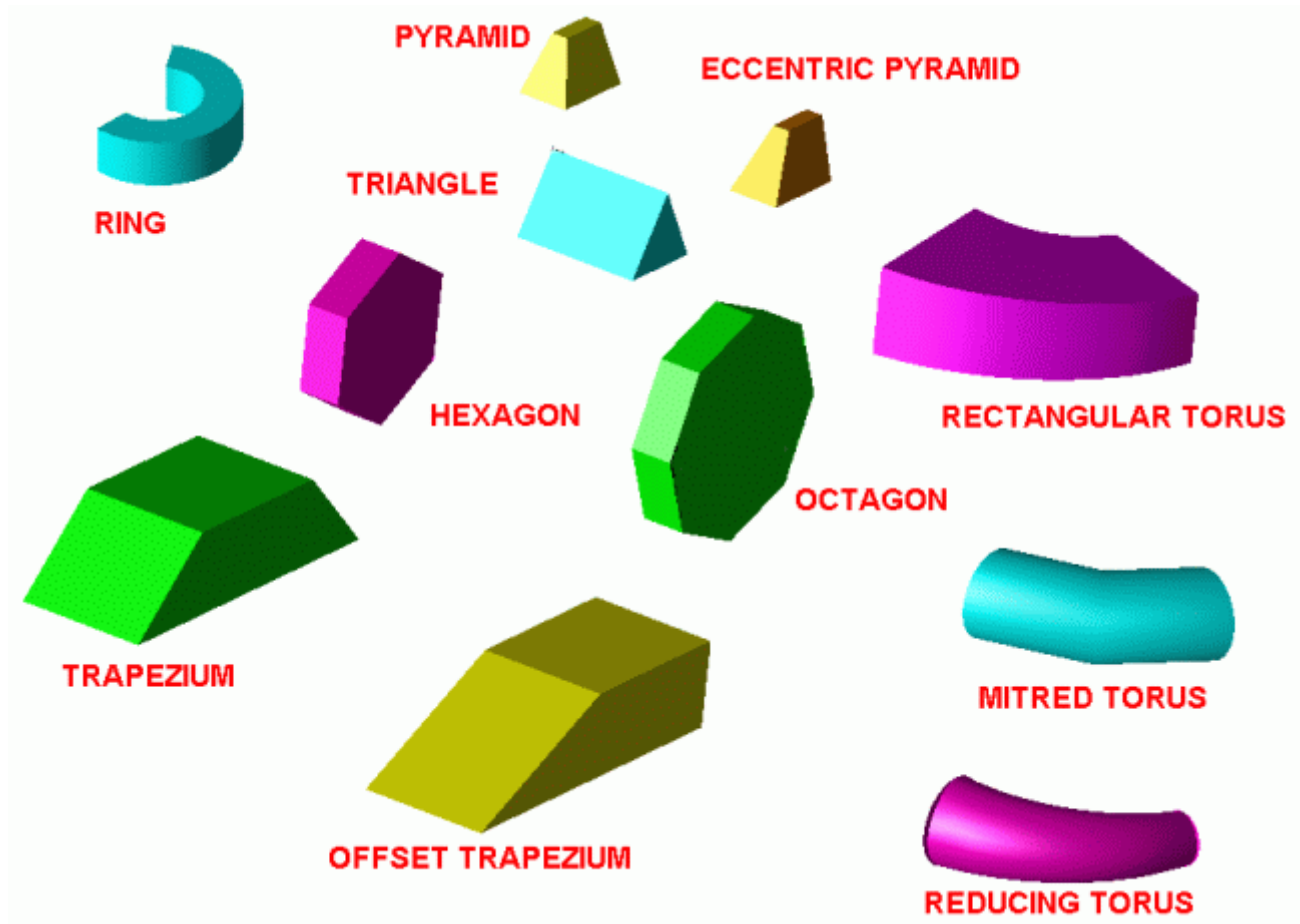
- Pipe Line Selection Method:** Three radio buttons: "Digitized Pipe Lines" (selected), "All Pipe Lines in Active Part", and "Specified Line Numbers" (with an input field and "...").
- Generation/Reconstruction Options:** A radio button for "Pipe Line Spool Generation" (selected) with a "Fitting At Spool Point" checkbox and "Options ..." button. Below it is a "Fitting Inclusion" dropdown set to "Include". A radio button for "Pipe Line Reconstruction" has two checkboxes: "Partial From Spool" and "To Spool", each with an input field and "...".
- Interactive Spool Generation:** A checkbox that is unchecked.
- Create Pipe Line Spool Label Legend:** A checked checkbox.
- Text Properties:** Two input fields for "Text Height" and "Text Width", both set to "0.1560".
- Spool Naming:** A checked checkbox for "Unique Spool Name" with a dropdown set to "Connect...".
- Spool Parameters:** "Start Spool Number" (input: "SPOOL#1"), "Increment Value" (input: "1"), "Label/Legend Creation Layer" (checkbox unchecked, input: "D"), "Maximum Spool Length" (checkbox unchecked, input: "236.2205"), "Maximum Bend Number" (checkbox unchecked, input: "4"), and "Bend Collision Plane Checking" (checkbox unchecked).
- Buttons:** "Apply", "Reset", and "Cancel" at the bottom.

See the following sections for details:

- “Generating or Reconstructing Pipe Line Spools” in the *Piping User Guide and Menu Reference*
- “Generating or Reconstructing Duct Line Spools” in the *HVAC User Guide and Menu Reference*

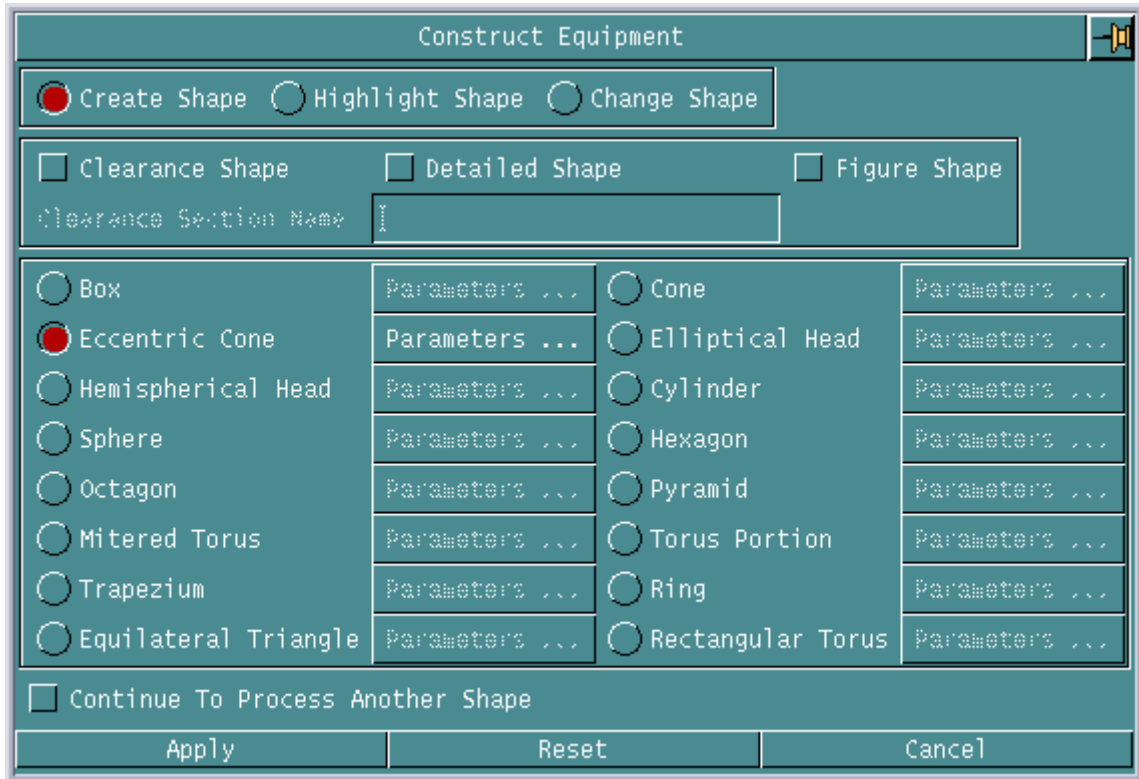
New Primitive Shapes for Constructing Equipment

You can now generate equipment with the following new primitive shapes:



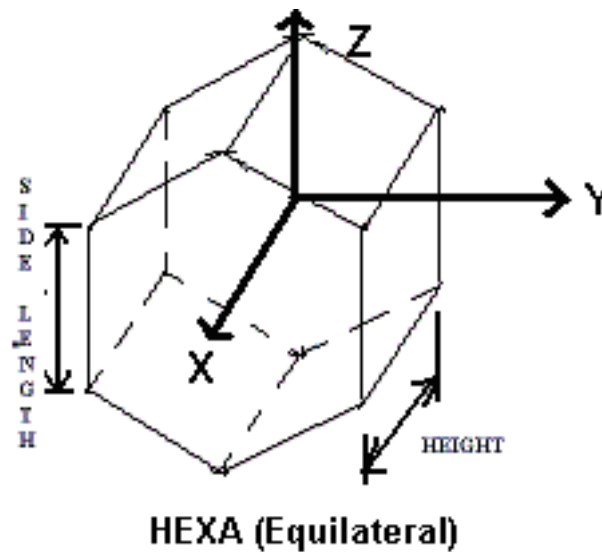
You can create these shapes by selecting the relevant options on the Construct Equipment property sheet. These new shapes are also supported as Clearance shapes.

Figure 1-23 Construct Equipment Property Sheet



For example, you can create the following shape by selecting the Hexagon option on the Construct Equipment property sheet:

Figure 1-24 Hexagon Shape



See the following sections for details:

- “Constructing Equipment” in the *Piping User Guide and Menu Reference*
- “Constructing Equipment” in the *HVAC User Guide and Menu Reference*

Shipbuilding Design

Enhancements in CV Hull and Structural Modeling are described in the following sections.

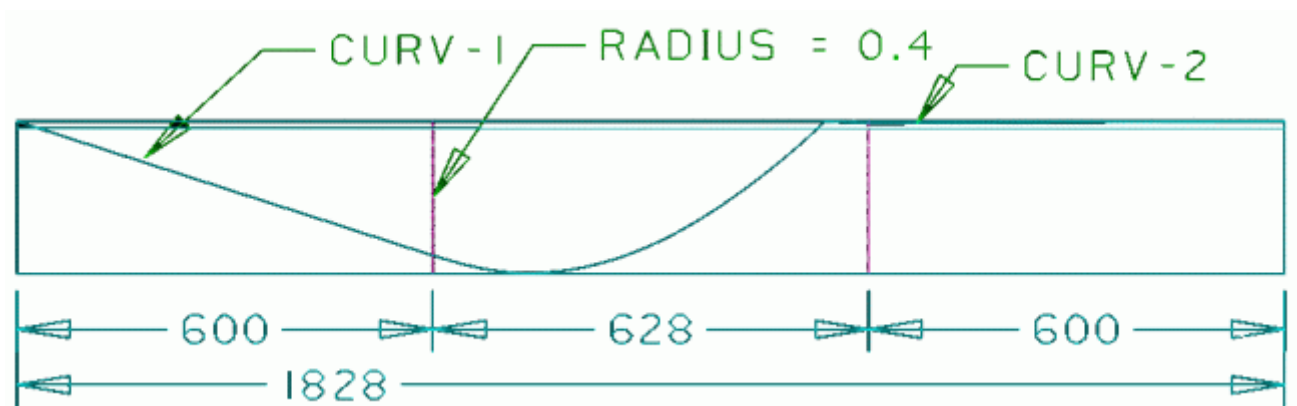
CV Hull

Enhancements in CV Hull are described in the following sections. For more information, refer to the *CV Hull Manufacturing Commands*.

Displaying Bend Mark Lines in Stiffener Drawings and Nesting Files

You can now show bend mark lines for stiffeners in the stiffener drawings or nesting files for a stiffener fabricated from a plate. The bend mark lines are marked at the start and end of each bend in the stiffener. The value of the bend radius is shown as a label with a leader line pointing to the bend line.

Figure 1-25 Example of Displaying Bend Mark Lines



You must set appropriate values for the `SHOW-BENCHMARK-LINE`, `BENCHMARK-LINE-FONT`, and `BENCHMARK-LINE` variables in the `nestparams` file to show or hide the bend mark lines.

Stiffener Drawings for Stiffeners with Double Curvature

You can now display bend line markings in stiffener drawings for stiffeners with a double curvature, that is, stiffeners twisted in both the flange and web planes.

Manufacturing Drawings for Flanged Plates

You can now generate cutout profiles in manufacturing drawings and nesting files for cutouts made on the folded flange of the plate as well as those made in the plate itself.

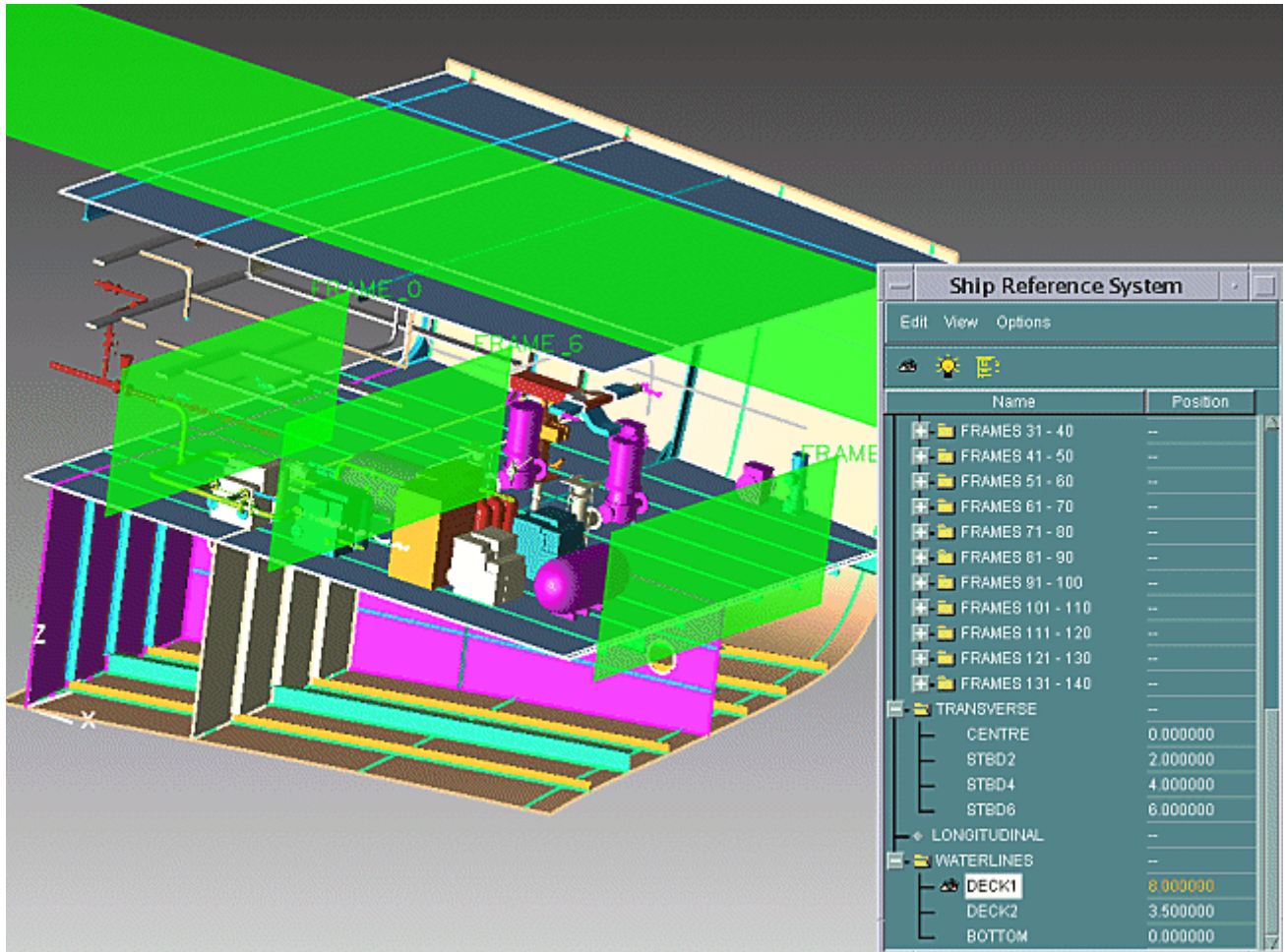
You can also display appropriate labels in the plate drawing to show the orientation of the flanges with respect to the plate. The label names must be set for the `FLANGE-UP-CODE` and `FLANGE-DOWN-CODE` variables in the `nestparams` file.

Displaying and Working with the Ship Reference System

CV Hull now enables you to display the Ship Reference System within a part or an assembly graphically, and in a tree format. In the tree format, you can easily view the ship reference system by selecting multiple references or a range of references to perform specific actions on the displayed ship parameters.

The following figure shows a sample tree form of the Ship Reference System:

Figure 1-26 Ship Reference System



A DTM modifier has been added to the GETDATA functionality to enable selection of references and perpendicular offsets from them. After a DTM has been selected all coordinates entered are relative to the Ship Reference System independent of the active CPL. Entering the CPL modifier will set input back relative to the selected CPL. Ship References may only be selected after the input of the DTM modifier. This new advanced functionality enables shipbuilders to route pipes, cableways, and HVAC networks to a more familiar reference system.

Structural Modeling Enhancements

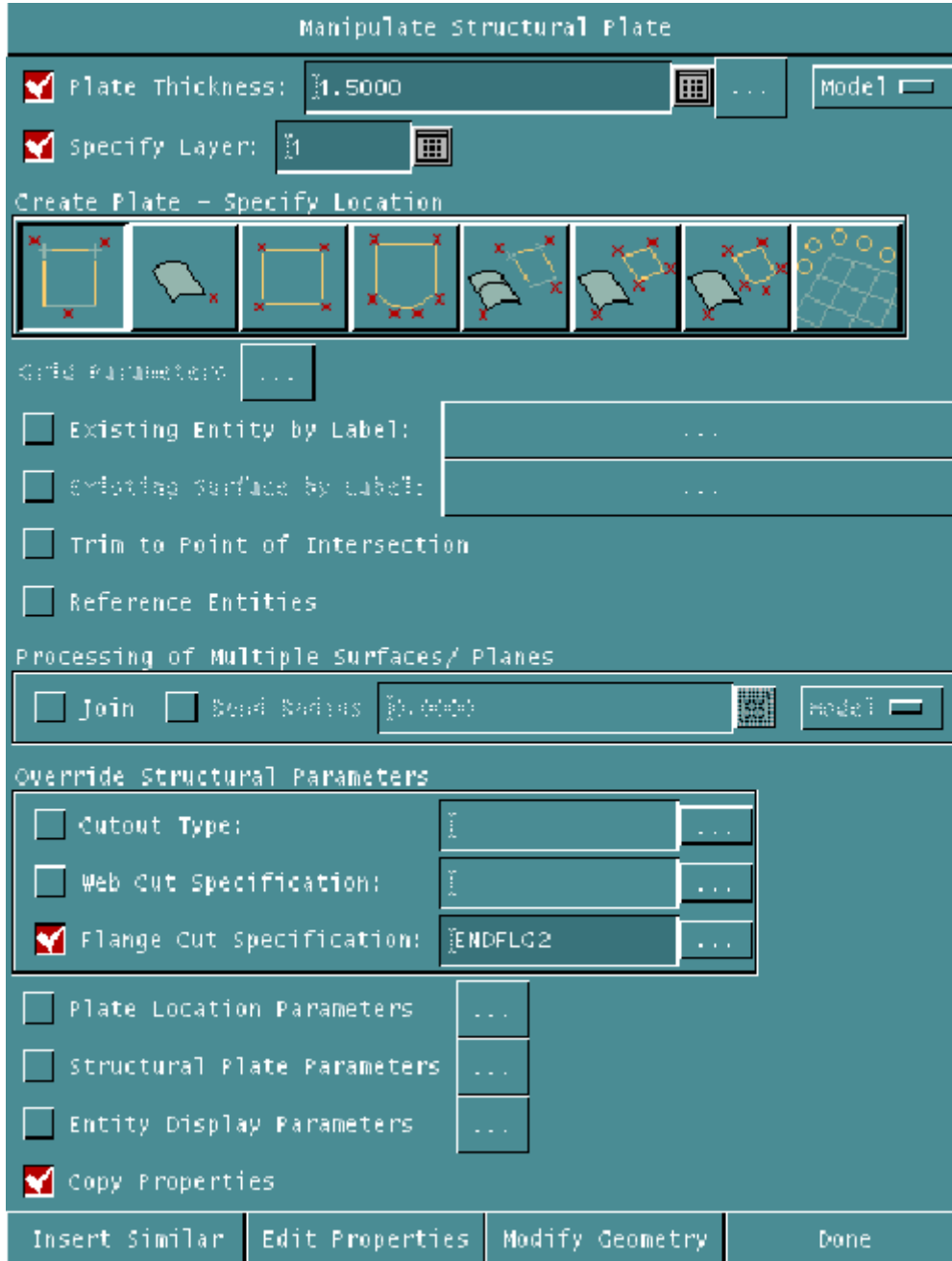
Enhancements in Structural Modeling are described in the following sections. See the *Advanced Structural Modeling User Guide and Menu Reference* for details.

Copying Properties to Structural Objects

A new Copy Properties capability is added to the manipulating, rotating, moving, and mirroring structural objects functionality. All relevant menus also include an option to support this functionality. When you choose this option, all user-defined properties attached to the selected structural objects are copied to the newly created ones.

The following figure shows the Copy Properties option on the Manipulating Structural Plates property sheet:

Figure 1-27 Manipulate Structural Plate Property Sheet

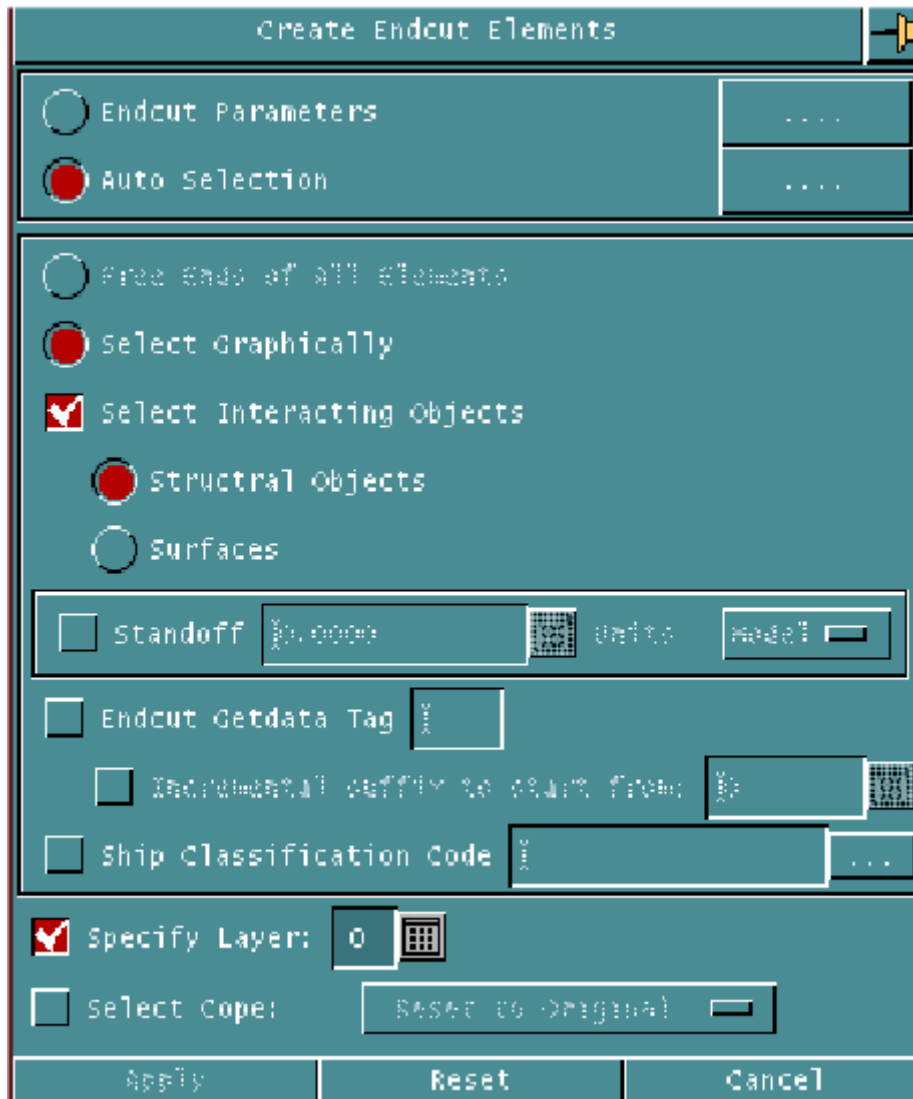


Creating Structural Interacting Endcuts Against Surfaces

You can now create an endcut by selecting the intersecting structural object or surface in addition to the STElement to be cut. If you create an endcut against a surface, the endcut maintains a relationship with the interacting surface as well as the SObject on which the endcut is created. If you modify the SObject, the endcut is also modified. However, if you modify the interacting surface, the endcut is modified only if you run the UPDATE STPART command.

You must select the Select Interacting Objects option in the Create Endcut Elements property sheet as shown in the following figure to select either the structural element to be cut or to the intersecting structural object or surface.

Figure 1-28 Create Endcut Elements Property Sheet



Welding Fully or Partially Penetrating Plates

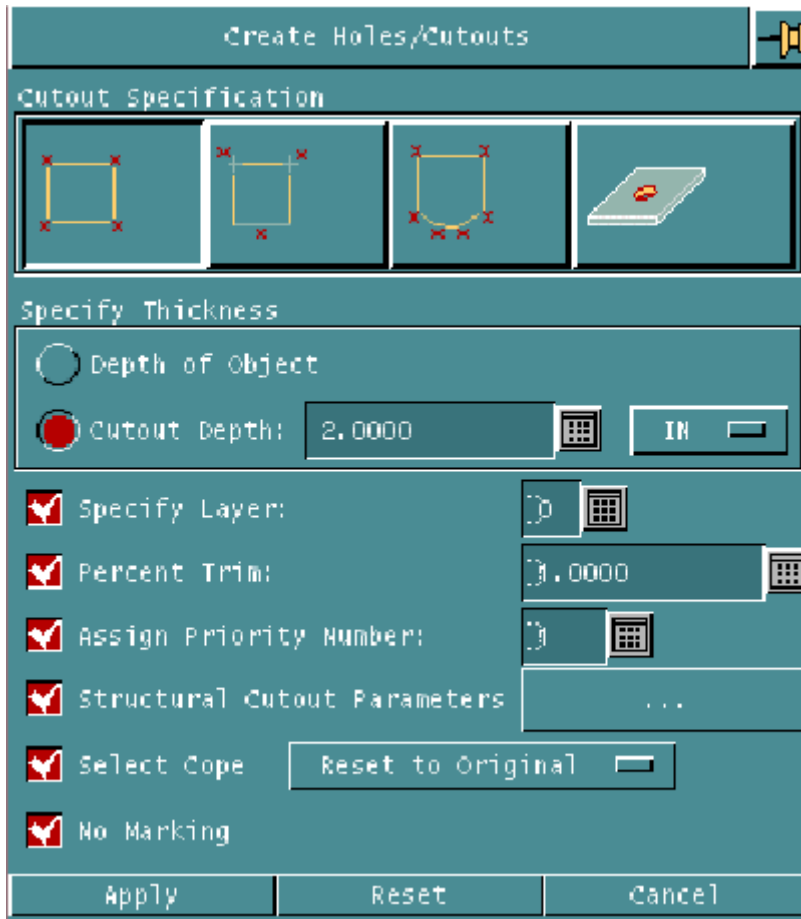
You can now weld together plates that partially penetrate another plate or are totally enclosed within another plate's boundary. In the latter case, you must create a cutout completely within a parent plate's boundaries and close this hole with a plate that has the same shape as the cutout. The two plates can have different thicknesses.

Controlling the Marking of Cutouts

You can now control the marking of cutouts in the manufacturing plate drawing and the nesting file by using the NOMARK property. With this property, you can exclude cutouts from the plate drawing or nesting file by setting the `PLATE_CUTOUT_MARK` variable in the `nestparams` file to 1. The default setting for this variable is 0 in which case all the cutouts are included in the drawing.

A new option, No Marking, is provided with property sheets related to creating and editing structural cutouts. The following figure shows the No Marking option on the Create Holes/Cutouts property sheet:

Figure 1-29 Create Holes/Cutouts Property Sheet



Creating Welded Flanges for Brackets

You can insert a welded flange for a bracket along a straight edge and within the boundary of the bracket. The welded flange must be a flat bar in the form of DEPTH x FWDT, where DEPTH must be more than FWDT. This welded flange is inserted as a child SObject of the selected bracket. You can also add endcuts and setback parameters to the bar.

A new option Welded Flange Section is added to the Create Structural Flange property sheet to support this functionality. You must click the list adjacent to the Welded Flange Section option and select a flat bar section from the section library to insert the welded flange as follows:

Figure 1-30 Create Structural Flange Property Sheet

Create Structural Flange

Folded Flange Width: 0.0000 Model

Welded Flange Section: FB100X ...

Flange Offset: 0.0000 Model

Setback Parameters

Start: 0.0000 Model

End: 0.0000 Model

Endcut Specification

Endcut Specification - First End

First End Cut Specification: T-W120T1: ...

Endcut Specification - Second End

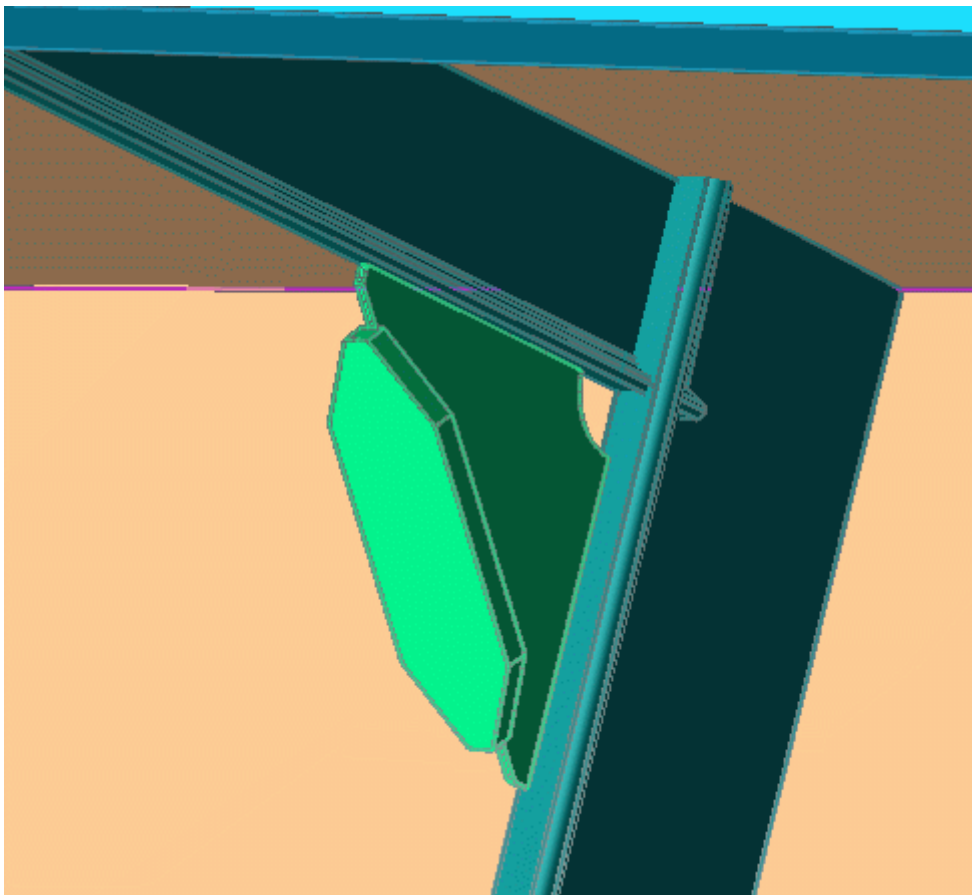
No Second End Specification

Same Specification as First End

Second End Cut Specification: ...

Accept Reset Cancel

This results in a welded flange inserted in the selected bracket similar to the following figure:



Automatic Creation of Deck and Hull Joints

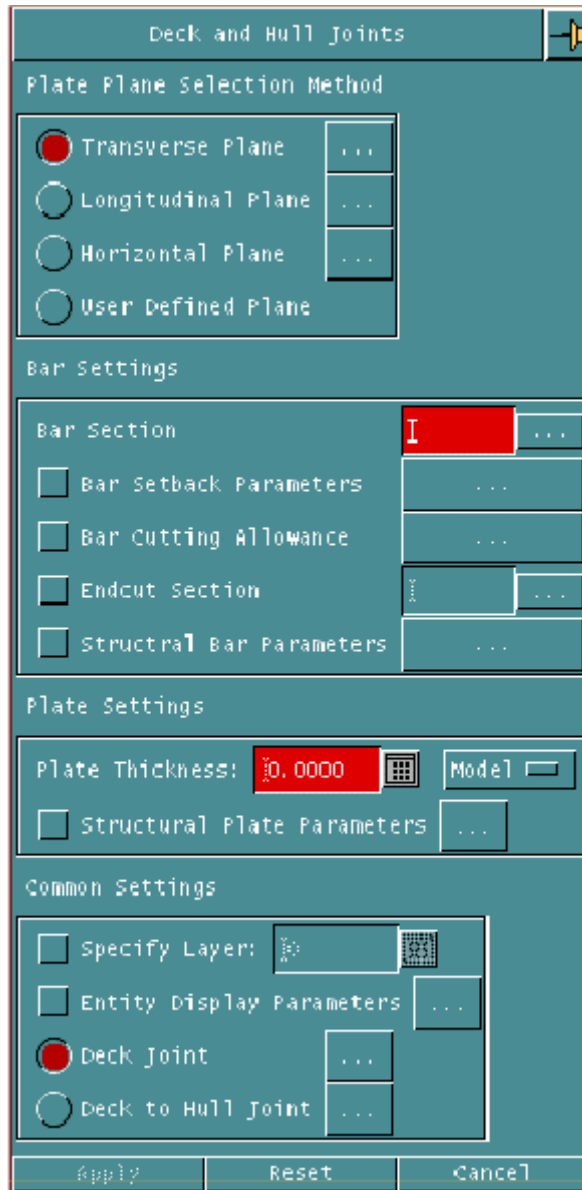
You can now automate the creation of commonly used joint types using a plate and flat bar combination as follows:

- Joint between two stiffeners on a deck
- Joint between a deck stiffener and stiffener on the hull or a bulkhead
- Joint between a deck stiffener, the hull, or bulkhead and another deck

You can select parameters to define these joints depending upon the joint type being created. Plate thickness and flat bar are common to all joints while depth of plate from the deck or hull and various joining radii depend upon the joint being created.

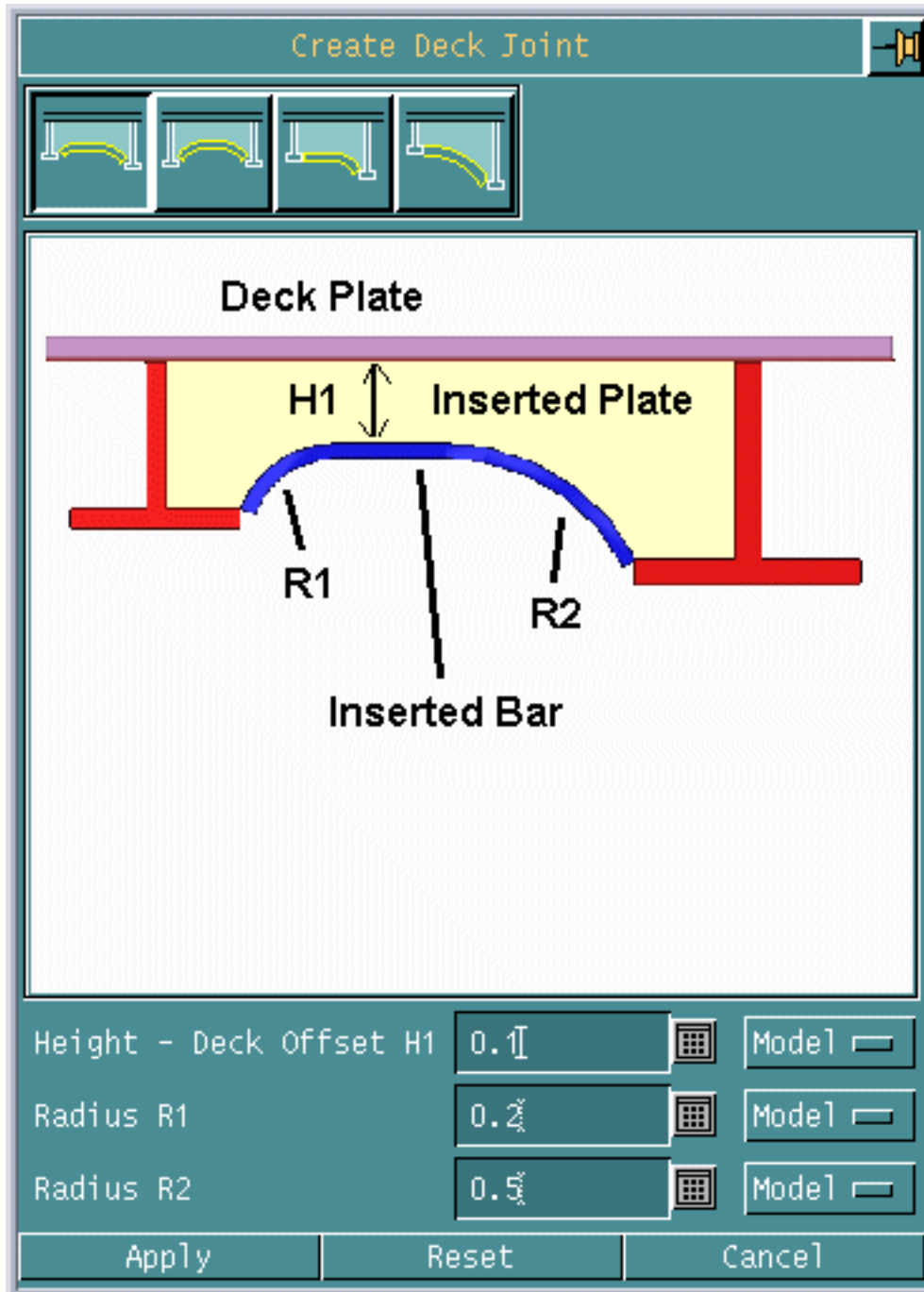
You can access the Deck and Hull Joints property sheet shown in the following figure from the Create Element menu. Use the Deck Joint and the Deck to Hull Joint options to create the required joint between the selected structural objects.

Figure 1-31 Deck and Hull Joints Property Sheet

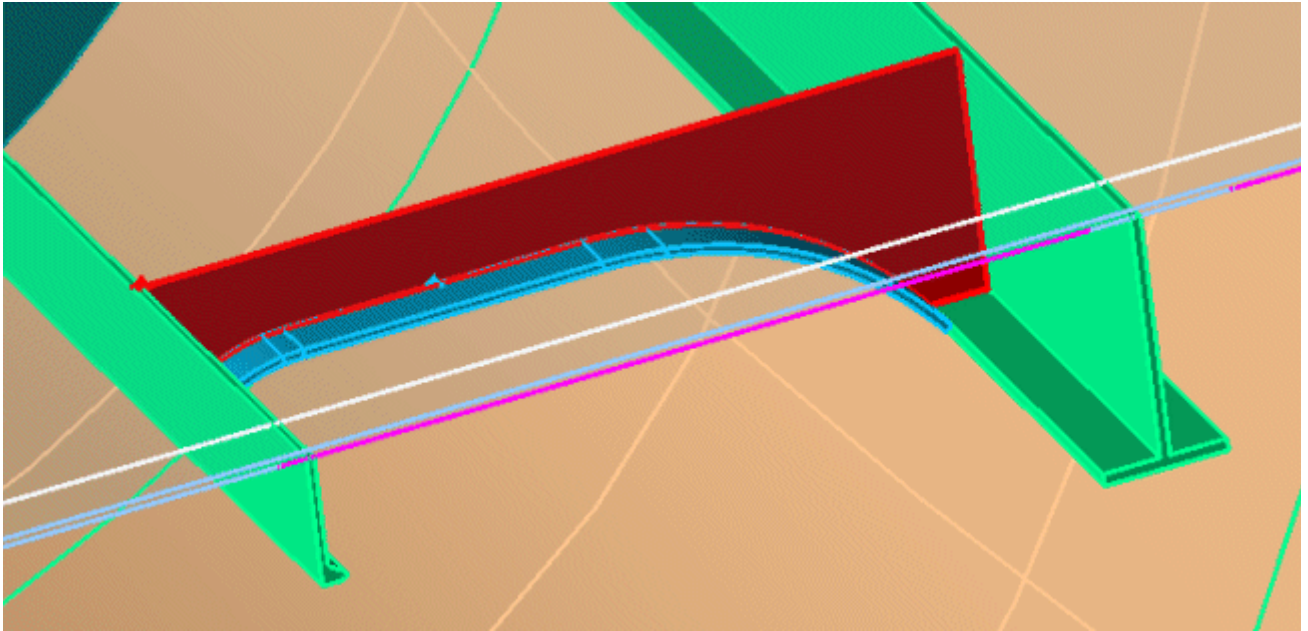


The following example shows the property sheet for defining a joint between two different sized stiffeners on a deck. The variables required for this joint are the offset of the bar from the deck plate surface (H1), the radius at the first stiffener selection (R1), and the radius at the second stiffener selection (R2).

Figure 1-32 Create Deck Joint Property Sheet



This results in a structural joint similar to the following figure:



Design and User Support

Enhancements in Design and User Support are described in the following sections. See the *Concurrent Assembly Mock-up User Guide* for details.

Preserving View Render Mode Settings During Activate Model

While activating a model, CAMU now preserves additional view render mode settings such as the view and spin center settings for mouse or spaceball-based dynamic view manipulation, and the dual-point clip model settings for a view.

See the section “Moving Between Models and Adrawings” in the *Concurrent Assembly Mock-Up User Guide and Menu Reference* for details.

Saving and Restoring Viewstates

You can now save the viewstates of an assembly to the active part and restore them from the active part or the default Adrawing directory by clicking the Save/Restore Viewstates option on the Adrawing menu. If a part has viewstate files from multiple assemblies, you must select the relevant viewstate file.

The viewstate file (.vsf) now stores the component instance name in addition to the CAMU ID. This enables EPD.Connect to work with viewstates.

See the section "Saving and Restoring Viewstates" in the *Concurrent Assembly Mock-up User Guide and Menu Reference* for details.

Database Enhancements

Database-related enhancements are described in the following sections.

CADDS 4X Double-precision Parts

CADDS 5 15.0 onward, CADDS 4X double-precision parts have an entity limit of 262,144, similar to the entity limit of CADDS 5 design parts.

See *Managing CADDS 5* for more information.

General Enhancements

The following sections describe general enhancements.

Simplified Chinese Support

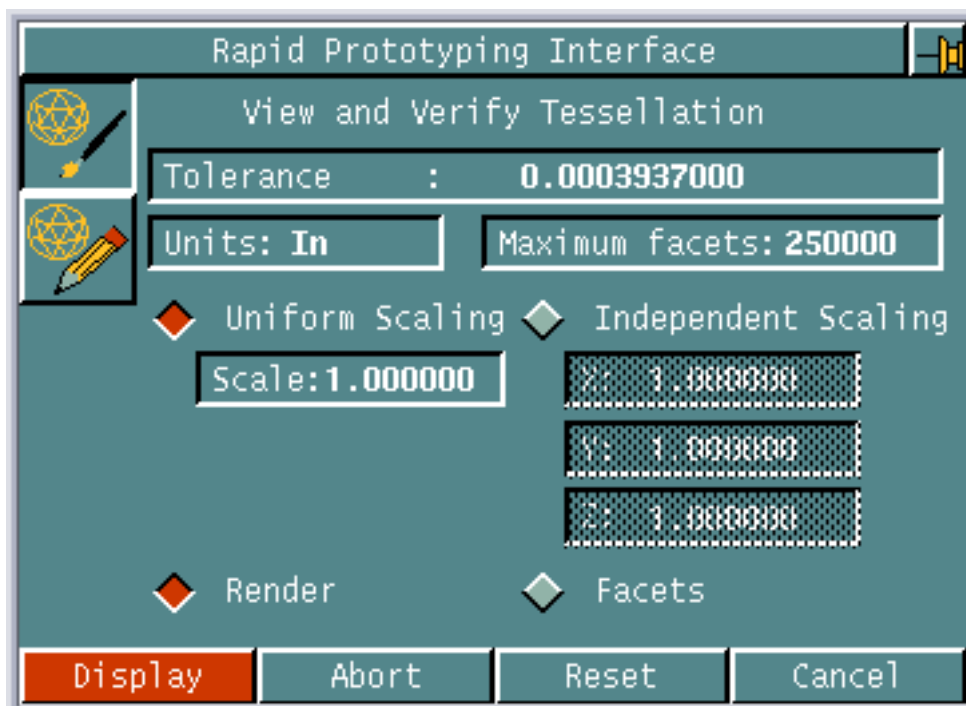
CADDS 5 is now available in Simplified Chinese.

See *Installing CADDS 5* for information on enabling Simplified Chinese font support in CADDS. Additionally, see the *Design and Drafting User Guide and Menu Reference* for instructions about creating multibyte characters.

PUT STL Command

The DISPLAY modifier of the PUT STL command now displays the rendered or faceted image directly in the main graphics window. Ending the command using the DISPLAY modifier and a semicolon (;) displays the rendered or faceted image in the current graphics window. Ending the command with a <CR> restores the original model display. Additionally, the RENDER and FACETS options are now available in the Rapid Prototyping Interface property sheet in the Explicit environment similar to the Parametric environment.

Figure 1-33 Rapid Prototyping Interface Property Sheet



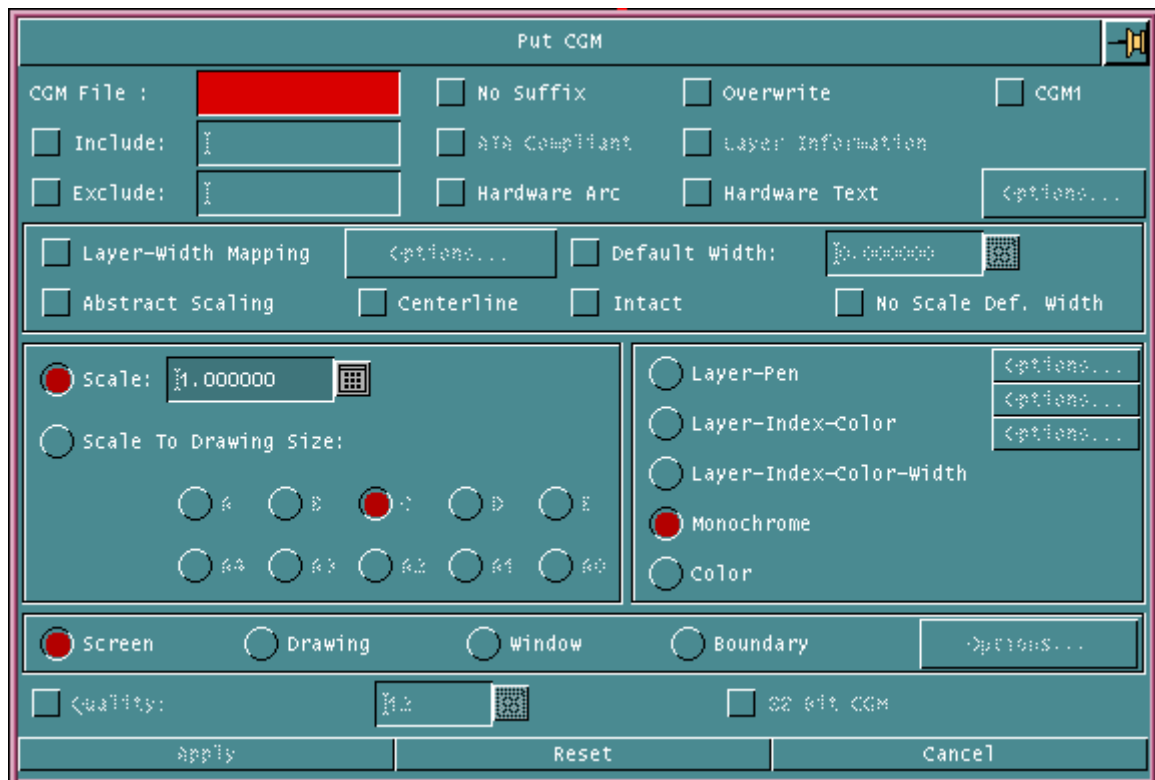
The USEDISPLAY modifier of the PUT STL command is now retired.

See the *Rapid Prototyping Interface User Guide and Menu Reference* and the online help for PUT STL for details.

PUT CGM Command

In the Explicit environment, the PUT CGM command now creates a file in the CGM3 format, by default. You can save this file and use it to plot the drawing on plotter devices. A CGM1 option has been added to the Put CGM property sheet. You can use the CGM1 option to create a file in the CGM1 format and send to the PTC plotter drivers to plot the drawing.

Figure 1-34 Put CGM Property Sheet



See the *Explicit Modeling User Guide and Menu Reference* and the online help for PLOT DRAWING and PUT CGM for details.

Creation of .gaf and .gbf Files

You no longer need to use the `cadds2pvs` utility to create `.gaf` and `.gbf` files. To create these files automatically when saving the part, you must set the `CV_FILE_PVS` environment variable in the `.caddsrc-local` file.

For example,

```
setenv CV_FILE_PVS "<modifiers> name.gaf"
```

When you save a part after creating a drawing and shading it, CADD5 automatically creates the `.gaf` or `.gbf` file, depending on the modifiers you have included in the value of the `CV_FILE_PVS` environment variable in the `.caddsrc-local` file.

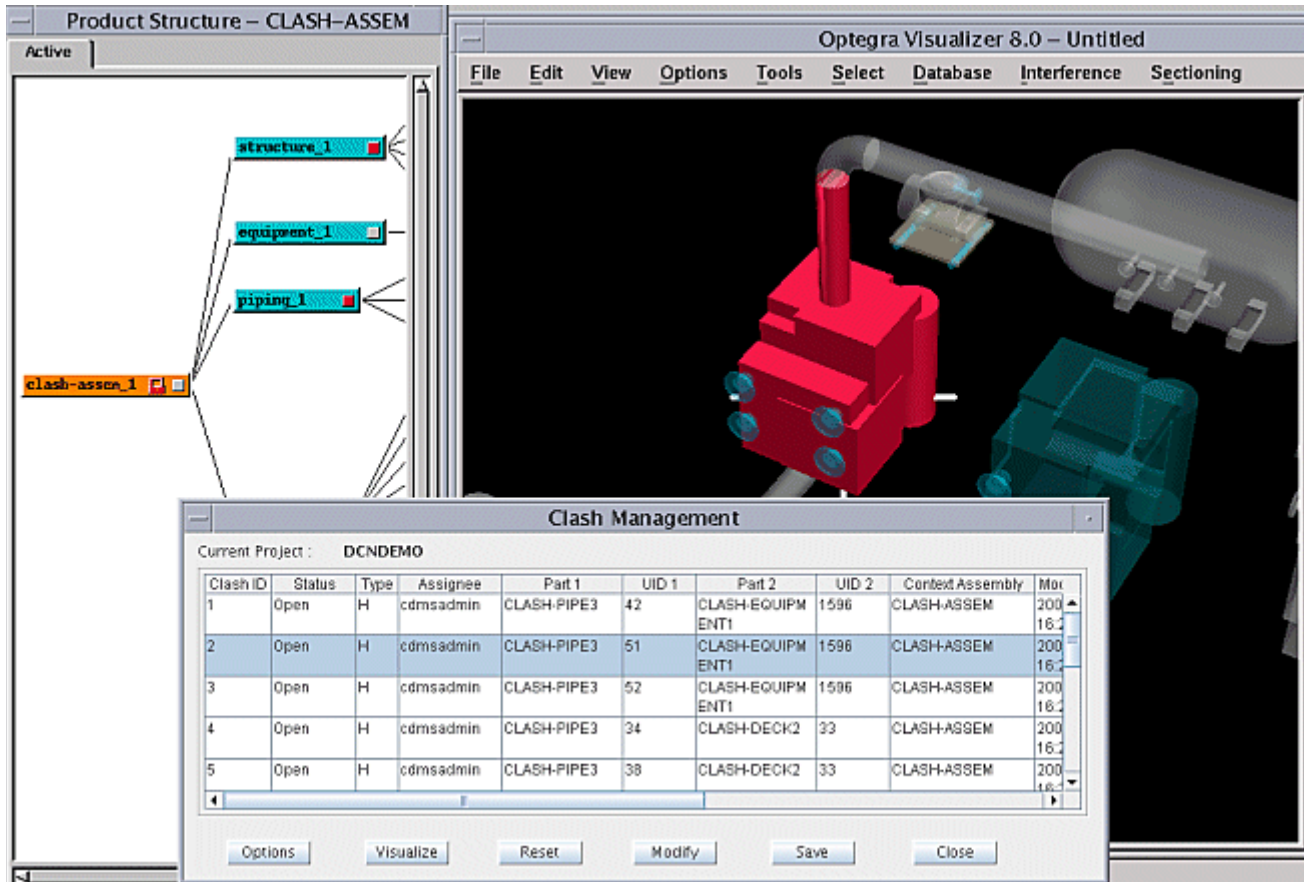
New Clash Detection and Management Options

The Clash Detection and Management (CDM) application options, new for this release of CADD5 and Optegra, enable you to detect, review, manage, and resolve clashes at business object (items) level. You can use this application to check for local clashes within an active CADD5 design session. This application checks clashes within your active working part and if required the part against the local assembly and against the contents of the complete master product structure. You can also perform global clashes on the master product structure from within CADD5 5 or EPD.Connect and manage these clashes during a project life-cycle. You can view the clashes in either CADD5 5 or EPD.Visualizer and uniquely manage and resolve these clashes.

This application option is available in both CADD5 and Optegra EPD.Connect. In CADD5 5 you can access this application option from the **UTILITY > CLASH DETECTION MGMT** on the CADD5 top menu bar. In EPD.Connect, you can access this application option from **Tools > Clash Detection Mgmt** on the EPD.Connect menu bar as shown.

CDM may also be used outside of CADD5 and EPD.Connect with restricted functionality.

Figure 1-35 Clash Management



The CDM application and its documentation, the *Clash Detection and Management (CDM) User Guide and Menu Reference*, are planned to be available with the M010 Release of both CADD5 and Optegra 15.0.

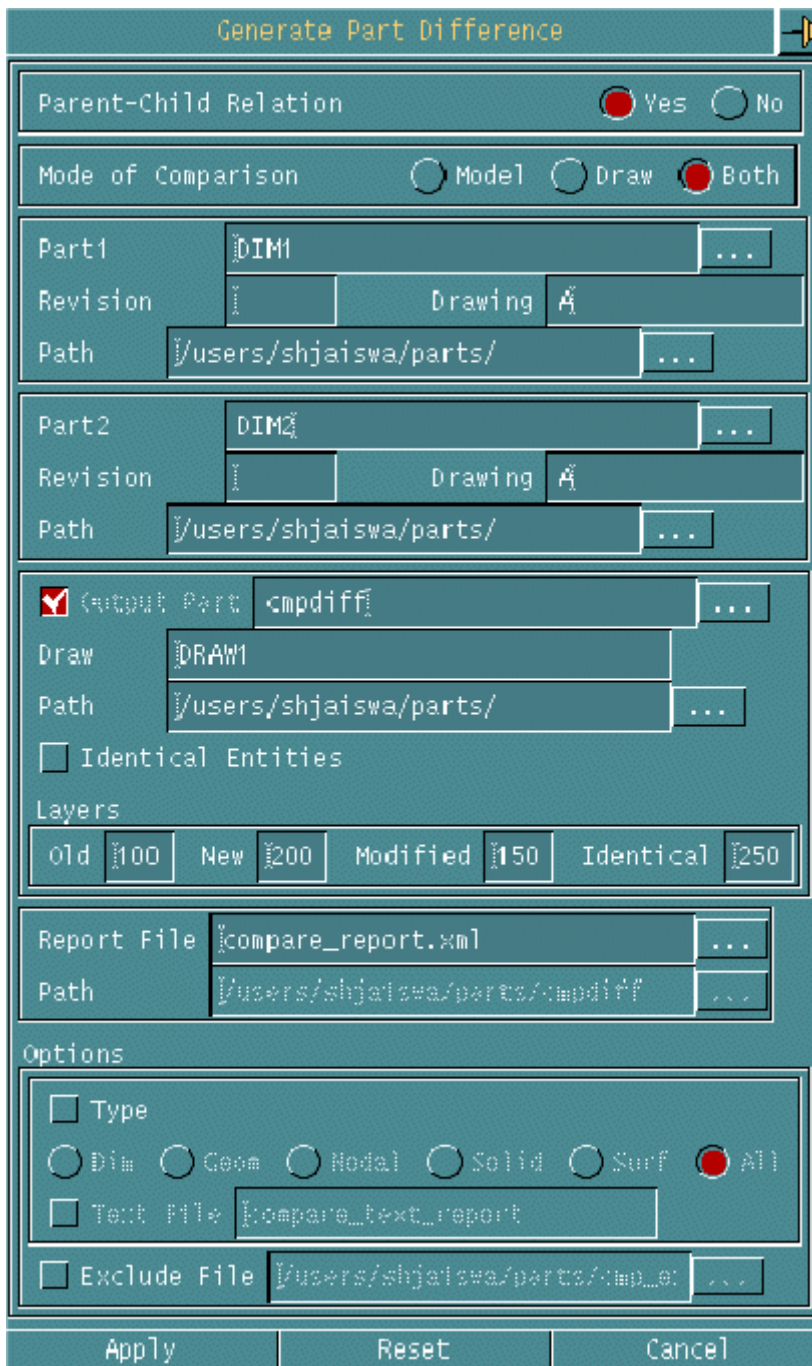
Compare Part

The Compare Part functionality has now been enhanced to generate an XML report file in addition to the output CADD5 part. The XML file lists the differences between the two compared parts and is displayed in a tree format where entities are grouped by their differences.

You can now generate a report of modified entities for a parent-child based comparison and a report of entities that differ by layer for a geometry-based comparison. You can also generate a text file containing the list of property names that are to be excluded during a parent-child based comparison.

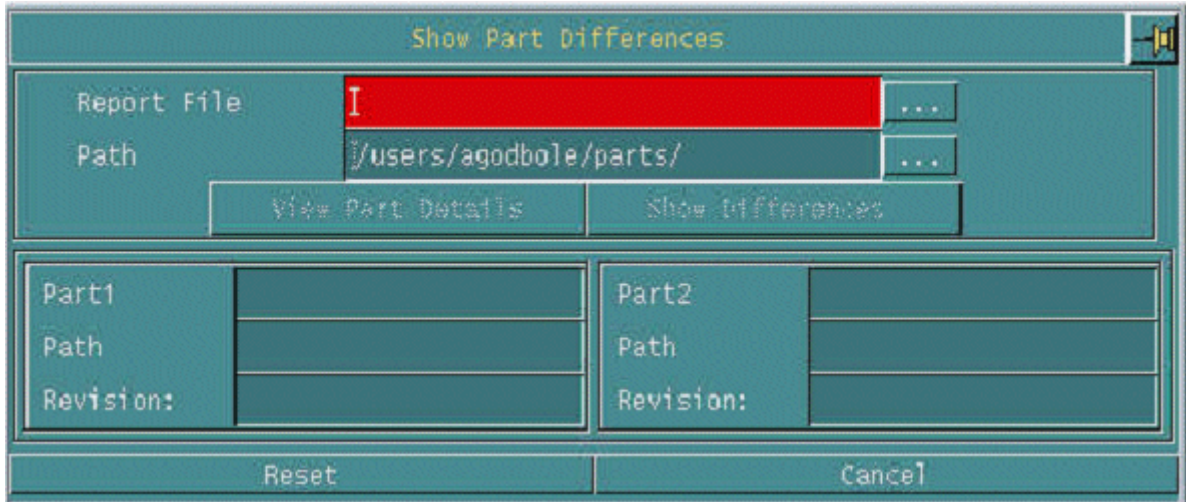
The new Generate Part Difference property sheet enables you to generate the differences in the two parts and write them to an output CADDs part and an XML file. When you write the differences to an output part, new, deleted, modified, and identical entities are created in this part on layers you specify or default layers based on the type of difference.

Figure 1-36 Generate Part Difference Property Sheet



The new Show Part Differences property sheet enables you to view the differences that are written to the XML file.

Figure 1-37 Show Part Differences Property Sheet



See the section “Comparing CADDs Parts” in the *Explicit Modeling User Guide and Menu Reference* for details.

