Chapter 1

Introduction to AutoCAD Plant 3D

Learning Objectives

After completing this chapter, you will be able to:

- *Start AutoCAD Plant 3D*
- *Work with the components of the initial screen of AutoCAD Plant 3D*
- *Work with the PROJECT MANAGER*
- *Invoke AutoCAD commands from the keyboard, menus, shortcut menus, TOOL PALETTES, and Ribbon*
- *Work with the components of dialog boxes in AutoCAD Plant 3D*

INTRODUCTION TO AutoCAD Plant 3D 2021

AutoCAD Plant 3D is a purpose-built plant design software. This software is used to design and document process plants. AutoCAD Plant 3D contains various predefined shapes of plant components. These predefined shapes, which are solid models, carry the intelligence of AutoCAD Plant 3D drawings. While installing AutoCAD Plant 3D, the standard specifications and part catalogs related to piping are also installed.

AutoCAD Plant 3D comes along with AutoCAD P&ID which is used to create piping and instrumentation drawings. AutoCAD P&ID contains various piping and instrumentation symbols. These symbols, most of which are AutoCAD blocks with attributes, carry the intelligence of AutoCAD P&ID drawings.



STARTING AutoCAD Plant 3D

When you install AutoCAD Plant 3D 2021, its icon is created and displayed on the desktop. You can launch the application by double-clicking on that icon. The interface screen of AutoCAD Plant 3D 2021 is shown in Figure 1-1.

Start Tab

In the initial interface of Plant 3D, the **Start** tab remains chosen by default, refer to Figure 1-1. This tab consists of three pages namely **CREATE**, **GET STARTED**, and **LEARN**, and contains options to access drawing template files, recently opened drawings, sheet sets, and various other learning options. These pages and their respective options are discussed next.

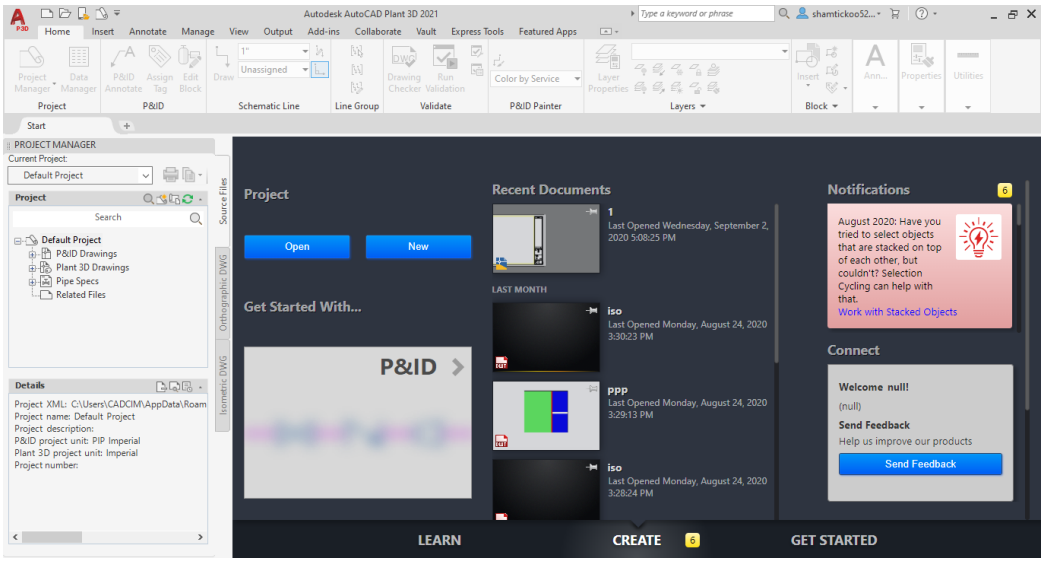

Figure 1-1 *The interface of AutoCAD Plant 3D 2021*

CREATE

This page is displayed by default whenever you launch AutoCAD Plant 3D. It contains four areas that are discussed next.

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Project

This area of the **CREATE** page contains two buttons, **Open** and **New**. You can open any existing project using the **Open** button and start a new project by using the **New** button. When you choose the **Open** button, the **Open** dialog box will be displayed. You can either specify the name of the project that you want to open in the **File Name** edit box or simply select it from the list displayed under the **Name** area.

When you choose the **New** button, the **Project Setup Wizard** will be displayed. This wizard contains six pages that guide you towards starting a new project.

Get Started With

This area contains two panes, **P&ID** and **Plant 3D**, refer to Figure 1-1. When you click on the **P&ID** pane, you will move to the **GET STARTED** page. In the **GET STARTED** page, you can choose the **Learn More** button to access the learning options related to P&ID. On choosing the **Learn More** button, you will be directed to the **AutoCAD P&ID** page where you can access the learning resources provided by Autodesk.

Similarly, you can access the learning resources related to Plant 3D by clicking on the **Plant 3D** pane and then choosing the **Learn More** button from the **GET STARTED** page.

Recent Documents

This area of the **CREATE** page lists the project files that you have recently worked on. You can access these files by simply clicking on the file name displayed in this area.

Connect

This area provides you with the options to connect with the Autodesk community. Note that you should be logged into your A360 account to access the options in this area.

GET STARTED

This page is displayed by clicking on **GET STARTED** in the **Start** tab. This page provides information about various features of AutoCAD Plant 3D, refer to Figure 1-2.

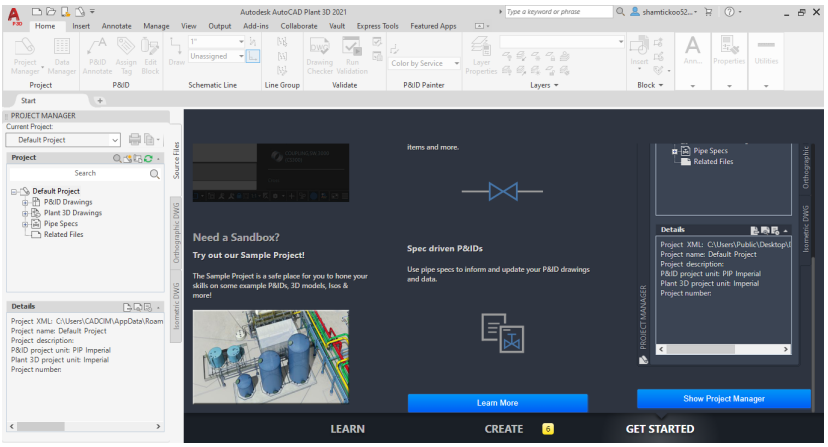

***Figure 1-2** The **GET STARTED** page selected*

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LEARN

This page is displayed by clicking on **LEARN** in the **Start** tab. It has four areas namely **What's New**, **Getting Started Videos**, **Learning Tips**, and **Online Resources**, refer to Figure 1-3. The **What's New** area lists videos that will help you to know about the key enhancements in this new release. The **Getting Started Videos** area lists videos that will help you in getting started with the software. You can also get the learning tips and other online resources by using the options under the **Learning Tips** and **Online Resources** areas.

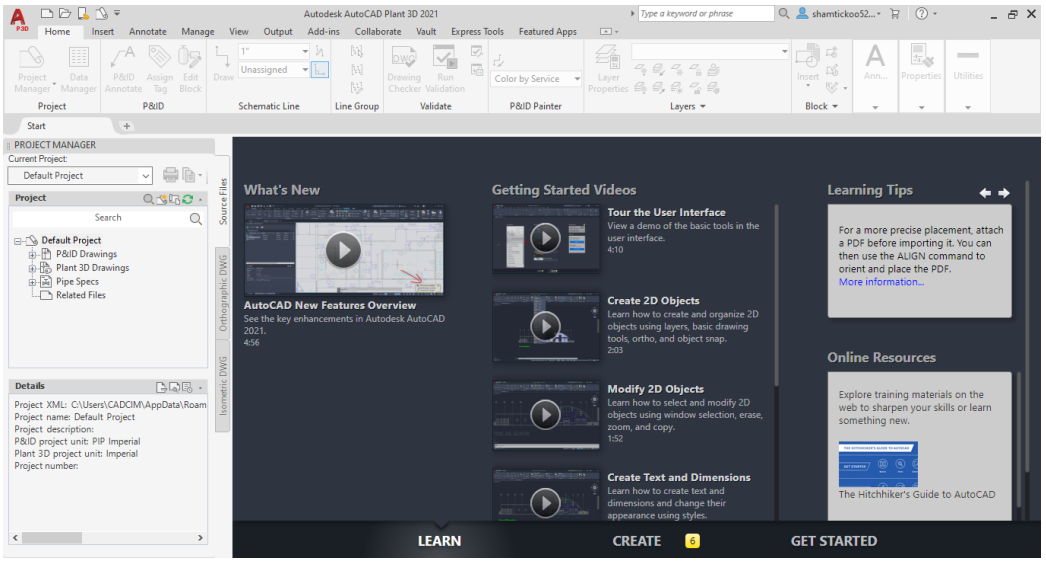

Figure 1-3 *The* ***LEARN*** *page*

WORKING ON A PROJECT

A piping design project includes the drawing and other forms of data. These data sources are inter-related in a project. The drawing data includes P&IDs, 3D models, Isometric drawings, and Orthographic drawings. The other data forms include catalogs and specs for piping, process data, and so on. Figure 1-4 shows a project flow diagram.

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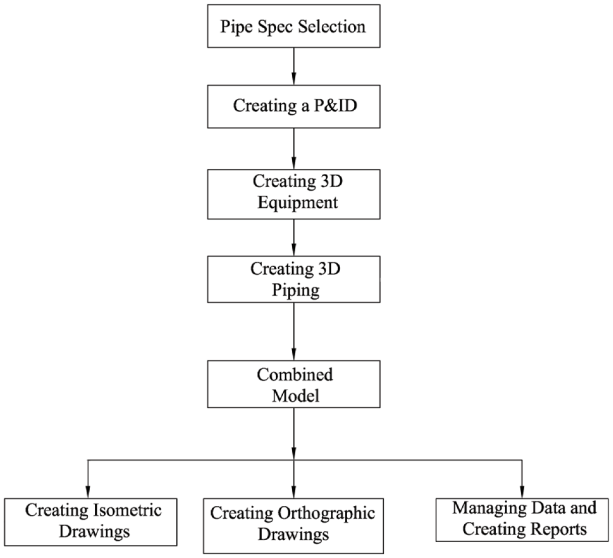

Figure 1-4 *A project flow diagram*

AutoCAD Plant 3D USER INTERFACE

The AutoCAD Plant 3D 2021 interface consists of the drawing area, command window, PROJECT MANAGER, menu bar, toolbars, Status Bar, and so on, refer to Figure 1-5. These components are discussed next.

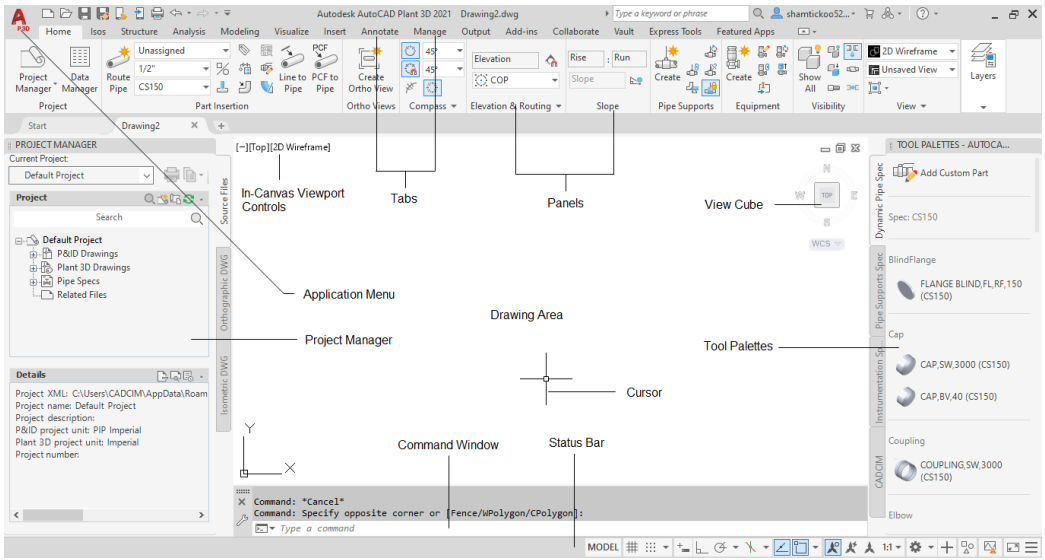

Figure 1-5 *AutoCAD Plant 3D 2021 user interface*

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Drawing Area

The drawing area covers the major portion of the screen. In this area, you can draw objects and use the commands. To draw objects, you need to define the coordinate points which can be done by using the pointing device. The position of the pointing device is represented on the screen by the cursor. The drawing area also has the standard Windows buttons such as **Close**, **Minimize**, and **Restore Down** at the top right corner. These buttons have the same functions as in other standard window.

Command Window

The command window located at the bottom of the drawing area has the command prompt where you can enter the commands. It also displays the subsequent prompt sequences and the messages. You can change the size of the window by placing the cursor on the top edge (double line bar known as the grab bar) and then dragging it. This way you can increase its size to see all the previous commands you have used.

PROJECT MANAGER

Ribbon: Project > Project Manager drop-down > Project Manager
Command: PROJECTMANAGER

PROJECT MANAGER is used to access and manage all the drawings in a project. In addition to that, you can configure project settings, and export and import data from the **PROJECT MANAGER**. Figure 1-6 shows the **PROJECT MANAGER**. When you launch AutoCAD Plant 3D for the first time, the PROJECT MANAGER is displayed on the left in the interface, refer to Figure 1-5. There are three tabs in the **PROJECT MANAGER: Source Files**, **Orthographic DWG**, and **Isometric DWG**. You can create and access the P&ID and Plant 3D drawing files using the **Source Files** tab. The other two tabs can be used to create and access the orthographic and isometric drawings.

The areas in the **PROJECT MANAGER** and the options available in them are discussed next.

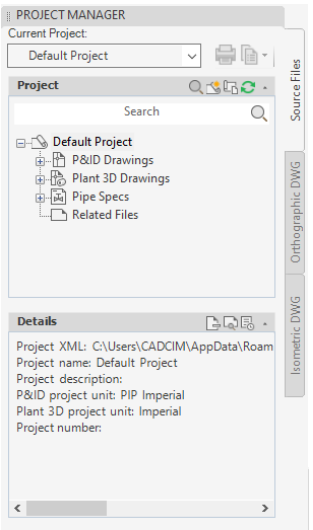

*Figure 1-6 The **PROJECT MANAGER***

Current Project Area

When you open the **PROJECT MANAGER** for the first time, the **Source Files** tab is chosen by default and the **Default Project** is displayed in this area, refer to Figure 1-6. Using the options in the drop-down list in the **Current Project** area, you can open existing projects, collaboration projects, access files from Vault, start a new project, and access the sample project. The **Publish** button in this area enables you to publish the drawing set to a DWF, DWFx, or PDF format. The **Reports** drop-down next to the **Publish** button is used for displaying a list of reports that you can run. Using the options in this drop-down, you can view, modify, import, and export data related to a project.

Project Area

All the drawing files related to a project are organized under their respective nodes in this area. For instance, if you create a project

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with the name CADCIM, a node named CADCIM will be created as a project node along with four sub-nodes: **P&ID Drawings**, **Plant 3D Drawings**, **Pipe Specs**, and **Related Files**. These sub-nodes contain respective project files. For example, any P&ID file related to the CADCIM project will be displayed under the **P&ID Drawings** sub-node of the CADCIM node in the **Project** area. The piping specifications which are being used in the project will be displayed under the **Pipe Specs** sub-node of the CADCIM node.

The toolbar available in this area contains four buttons which are discussed next.

Hide/Show search box
This toggle button is used to show or hide a search box below the **Project Area**. This search box can be used to search a drawing in the project. To search a drawing, type its name in the search box to display the results under the linked node.

New Drawing
When you choose this button, the **New DWG** dialog box will be displayed. Using this dialog box, you can create a new drawing and add it to the project tree.

Copy Drawing to Project
When you choose this button, the **Select Drawings to Copy to Project** dialog box will be displayed. Using this dialog box, you can select one or more files to copy in the project.

Refresh DWG Status
This button enables you to know if any of the drawings or the files in the project are being edited by the other user.

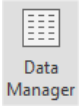
Details Area

This area lists all the information related to the project such as project path, project name and its description.

The data used in a project is arranged in folders that are created while creating a project. For example, if you create a project with the name CADCIM, a folder named CADCIM will be created as the project folder. Also, a series of the sub-folders will be created in the project folder that contains data related to the project, refer to Figure 1-7.

DATA MANAGER

Ribbon: Project > Data Manager
Command: DATAMANAGER



When you create a P&ID or a Plant 3D model, each and every part of the drawing is assigned with some properties. These properties can be accessed through the **DATA MANAGER**. Using the **DATA MANAGER**, you can view, import, export, and create reports from the project data. Choose the **Data Manager** button from the **Project** panel to display the **DATA MANAGER**. Figure 1-8 shows a partial view of the **DATA MANAGER**.

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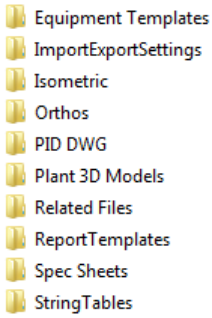

Figure 1-7 Sub-folders of the project folder

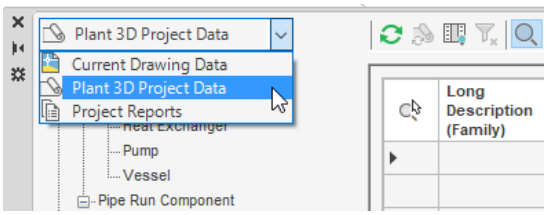

*Figure 1-8 Partial view of the **DATA MANAGER***

Navigation Bar

The Navigation Bar is displayed in the drawing area and contains various navigation tools which are grouped together, refer to Figure 1-9. You can toggle on/off the visibility of this bar by using the **Navigation Bar** toggle button available in the **Viewport Tools** palette of the **View** tab of the **Ribbon**. These tools are discussed next.

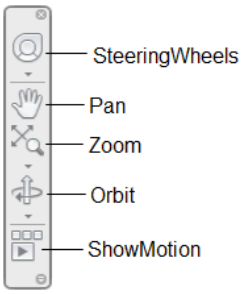

*Figure 1-9 The tools in the **Navigation Bar***

SteeringWheels

The SteeringWheels allow you to access different 2D and 3D navigation tools. SteeringWheels are divided into different sections known as wedges. Each wedge on a wheel represents a single navigation tool. You can pan, zoom, or rewind the current view of a scene in different ways using the SteeringWheels.

Pan Tool

This tool allows you to adjust the viewpoint of a drawing. To adjust the viewpoint, choose this tool, press and hold the left mouse button, and then drag it in the drawing area. You can exit this command by pressing ESC.

Zoom Tools

The zoom tools are used to adjust the view of the drawing on the screen without affecting the actual size of the object.

Orbit Tools

The orbit tools are used to rotate the view in the 3D space.

ShowMotion Tool

This tool is used to capture different views in a sequence and animate them when required.

ViewCube

ViewCube is available at the top right corner of the drawing area and is used to switch between the standard and isometric views or roll back to the current view.

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In-canvas Viewport Controls

In-canvas Viewport Controls are available at the top left corner of the drawing screen. They enable you to change the view, the visual style, as well as the viewport.

Status Bar

The bar displayed at the bottom of the screen is called Status Bar. It contains useful information and buttons, refer to Figure 1-10, which makes it easy to change the status of some of the AutoCAD functions. You can toggle between the on and off states of most of these functions by clicking on them.

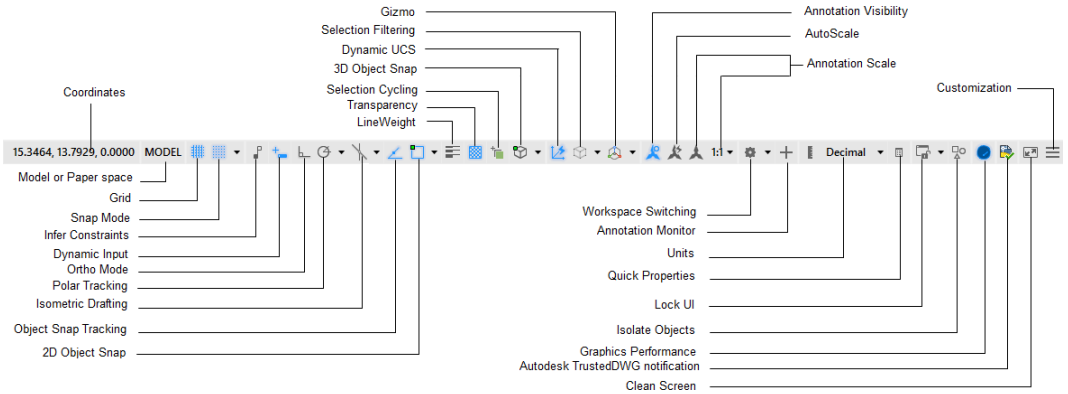

Figure 1-10 *The Status Bar*

Tray Settings

You can control the display of icons and notifications in the tray at the right end of the Status Bar by making appropriate settings in the **Tray Settings** dialog box. To invoke the **Tray Settings** dialog box, enter **TRAYSETTINGS** in the command prompt and press ENTER. The **Tray Settings** dialog box is shown in Figure 1-11.

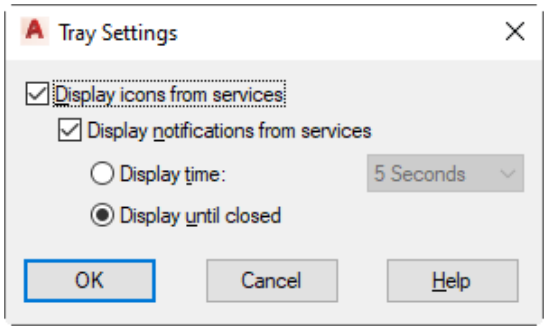

Figure 1-11 *The **Tray Settings** dialog box*

Clean Screen

The **Clean Screen** button is available at the lower right corner of the screen. This button, when chosen, displays an expanded view of the drawing area by hiding all the toolbars except the command window, Status Bar, and menu bar. The expanded view of the drawing area can also

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be displayed by choosing **View > Clean Screen** from the menu bar or by using the CTRL+0 keys. You can choose the **Clean Screen** button again to restore the previous display state.

Customization

You can hide the display of some of the buttons in the Status Bar. To do so, click on the **Customization** button available at the lower right corner of the screen; a menu will be displayed. In this menu, clear the check mark next to the names of the buttons you need to hide.

Plot/Publish Details Report Available



This icon is displayed when some plotting or publishing activity is performed in the background. When you click on this icon, the **Plot and Publish Details** dialog box, which provides the details about the plotting and publishing activities, will be displayed. You can copy this report to the clipboard by choosing the **Copy to Clipboard** button from the dialog box.

Manage Xrefs



The **Manage Xrefs** icon is displayed whenever an external reference drawing is attached to the selected drawing. This icon displays an alert message whenever the external referenced drawing needs to be reloaded. To find detailed information regarding the status of each Xref in the drawing and the relation between various Xrefs, click on the **Manage Xrefs** icon; the **EXTERNAL REFERENCES** palette will be displayed.

PROPERTIES Palette

The **PROPERTIES** palette is used to set the current properties and to change the general properties of the selected objects. The **PROPERTIES** palette is displayed on right-clicking on an object and then choosing the **Properties** option from the shortcut menu displayed. If you right-click on the **PROPERTIES** palette, a shortcut menu will be displayed. You can choose **Allow Docking** from this menu to dock or hide the palette.

In AutoCAD Plant 3D, the **PROPERTIES** palette displays an additional section for the properties specific to the selected object, refer to Figure 1-12. For example, if you select a Plant 3D object, the **Plant 3D** section will be displayed in the **PROPERTIES** palette with the 3D properties of the object. The list of properties displayed varies depending on the object selected. For example, if you select pipe support, the dimensions of the selected geometry will be displayed in the **Part Geometry** section, refer to Figure 1-13. In this section, you can edit the geometry of the selected pipe support. Similarly, if you select a valve from a Plant 3D model, properties of the valve will be displayed. You can change the valve actuator using the **PROPERTIES** palette.

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Plant 3D	
Class	Tank
Tag	
Tag	TK-106
General	
Short Description	
Long Description (Size)	Tank
Long Description (Fa...	
Compatible Standard	
Manufacturer	
Item Code	
Design Std	
Design Pressure Factor	
Weight	
Weight Unit	
Flange Thickness	1.12
Content Iso Symbol D...	
Status	New
Number	106
Area	
Nozzles	
Tag	N-1
Size	8"x10"
Pressure Class	150
Short Description	Nozzle, flanged

Figure 1-12 *The additional section displayed for a Plant 3D object*

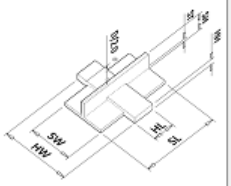
Part Properties	
Part Data	
Material	
Material Code	
Pressure Class	
Part Geometry	
Preview	
Dimensions	
D	10 15/16"
SL	1'-4 15/16"
SW	9 3/8"
ST	3/4"
SH	6 9/16"
HL	4 11/16"
HW	1'-3 1/16"
HH	0"
Length	

Figure 1-13 *The dimensions of the pipe support displayed in the* ***PROPERTIES*** *palette*

DIFFERENT WORKSPACES IN AutoCAD PLANT 3D

A workspace is defined as a customized arrangement of **Ribbon**, toolbars, menus, and window palettes in the AutoCAD environment. In AutoCAD Plant 3D, there are different workspaces to create a P&ID and Plant 3D model. Some of them are 3D Piping, P&ID PIP, P&ID ISO, P&ID ISA, P&ID DIN, and P&ID JIS-ISO.

You will notice that there are different workspaces for creating a P&ID. These workspaces are based on different standards. When you invoke a P&ID workspace of a particular standard, the tool palette will display the symbols related to that standard.

You can select any of the predefined workspaces from the **Workspace** drop-down list available in the title bar located next to the **Quick Access Toolbar**, refer to Figure 1-14. This drop-down list does not appear by default in the title bar. To make this drop-down list available, click on the down arrow in the title bar, a flyout will be displayed. Next, choose the **Workspace** option from the flyout displayed. You can also set the workspace from the flyout displayed on choosing the **Workspace Switching** button in the Status Bar, refer to Figure 1-15.

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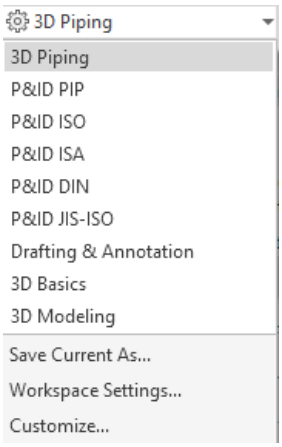

Figure 1-14 *The predefined workspaces*

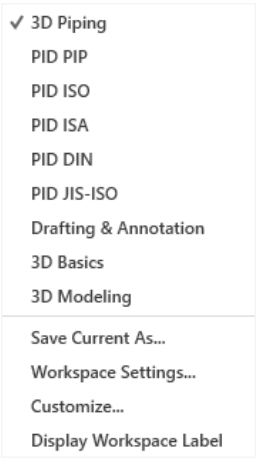

Figure 1-15 *The flyout displayed on choosing the* ***Workspace Switching*** *button*

GRIPS

Grips provide a convenient and quick means of editing objects. Grips are displayed on the key points of an object when the object is selected. There are different grips available in AutoCAD Plant 3D. The following table shows the grip symbols, their names, and their usage.

Grip Symbol	Grip Name	Usage
	Continuation grip	It is used to start or continue routing a pipe.
	Substitution grip	It is used to substitute a component.
	Add Nozzle grip	You can add a nozzle to an equipment using this grip.
	Elevation grip	You can change the elevation of a pipe using this grip.
	Edit nozzle grip	It is used to modify a nozzle.
	Rotation grip	It is used to rotate a valve or fitting.
	Flip grip	It is used to flip a valve or a fitting.

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	Connection grip	It is displayed when a schematic line is connected to a component or an equipment.
	Stretch grip	It is displayed at the midpoint of a schematic line. You can move the schematic line using this grip.
	Endline grip	It is used to increase or decrease the length of a schematic line.
	Flip grip (in P&ID)	It is used to change the direction of the schematic line.
	Gap grip	It is displayed when a gap is added on the schematic line. You can increase or decrease the gap using this grip.

INVOKING COMMANDS IN AutoCAD Plant 3D

When you are in the drawing area, you need to invoke AutoCAD Plant 3D commands to perform any operation. For example, to draw a line, first you need to invoke the **LINE** command and then define the start point and the endpoint of the line. Similarly, if you want to erase objects, you must invoke the **ERASE** command and then select the objects for erasing. In AutoCAD Plant 3D, you can invoke the commands using different methods which are discussed next.

Invoking Commands Using Command Prompt

You can invoke any AutoCAD Plant 3D command using the keyboard by typing the command name at the command prompt and then pressing the ENTER key. As you type the first letter of a command, AutoCAD Plant 3D displays all available commands starting with the letter typed. You can also use the **Dynamic Input** button to directly enter the command in the **Pointer Input** box. The **Pointer Input** box is a small box displayed on the right of the cursor, as shown in Figure 1-16. However, if the cursor is currently placed on any toolbar or menu bar, or if the **Dynamic Input** is turned off, the command can be entered only through the command prompt. The following example shows how to invoke the **LINE** command using the keyboard:

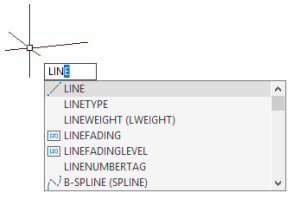

Figure 1-16 *The* ***Pointer Input*** *box displayed when the* ***Dynamic Input*** *is on*

Command: **LINE** or **L** Enter (L is command alias)

Invoking Commands Using Ribbon

In AutoCAD Plant 3D, you can also invoke a tool from the **Ribbon**. In the **Ribbon**, the tools for creating pipes, equipment, supports, and the other Plant 3D components are available in different panels instead of being spread out in the entire drawing area in different toolbars and menus, refer to Figure 1-17.

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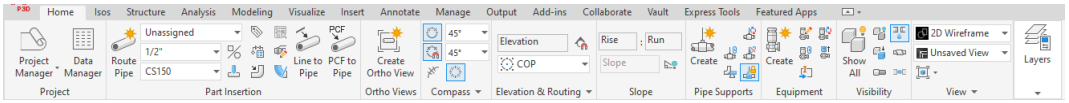

*Figure 1-17 The **Ribbon** for the **3D Piping** workspace*

In AutoCAD Plant 3D, there are different tabs and panels for performing different tasks such as creating a P&ID, isometric drawings, orthographic drawing, and so on. These are discussed next.

Home Tab of the P&ID Workspace

The **Home** tab of the P&ID workspace contains tools that are used to create a P&ID. The **Home** tab of **P&ID** workspace is shown in Figure 1-18.

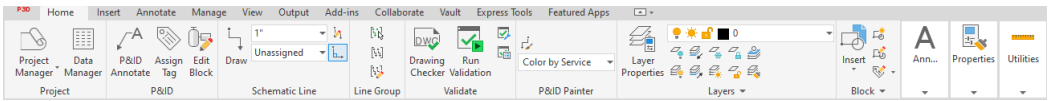

*Figure 1-18 The **Home** tab of the **P&ID** workspace*

Home Tab of the 3D Piping Workspace

This is one of the most important tabs provided in the 3D Piping workspace. This tab provides all the tools which are used to create 3D pipings, equipments, and pipe supports. The **Home** tab of the **3D Piping** workspace is shown in Figure 1-19.

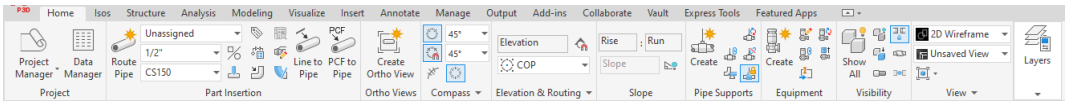

*Figure 1-19 The **Home** tab of the **3D Piping** workspace*

Isos Tab

The tools in the **Isos** tab are used to generate isometric drawings. The **Isos** tab is shown in Figure 1-20.

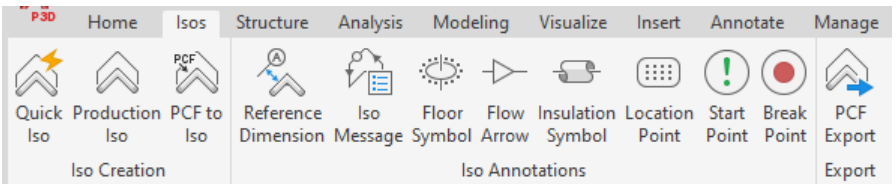

*Figure 1-20 The **Isos** tab*

Structure Tab

The tools in the **Structure** tab are used to create and modify structures. The **Structure** tab is shown in Figure 1-21.

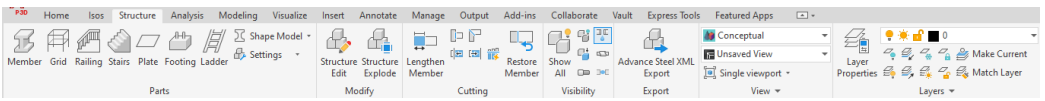

*Figure 1-21 The **Structure** tab*

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Ortho View Tab

The tools in the **Ortho View** tab are used to annotate and dimension a view. Also, you can create adjacent views and locate the view components in a 3D Model. The **Ortho View** tab is shown in Figure 1-22. Note that the **Ortho View** tab will be displayed only when you create orthographic drawings. The method of creating orthographic drawings will be discussed in later chapters.

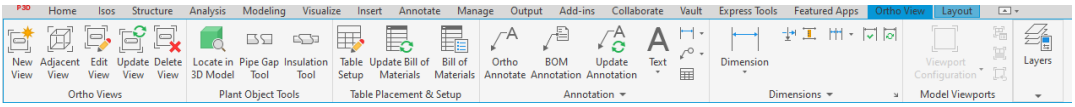

Figure 1-22 *The* ***Ortho View*** *tab*

Ortho Editor Tab

The tools in the **Ortho Editor** tab are used to create orthographic views. The **Ortho Editor** tab is shown in Figure 1-23. You will learn more about **Ortho Editor** tab in later chapters.

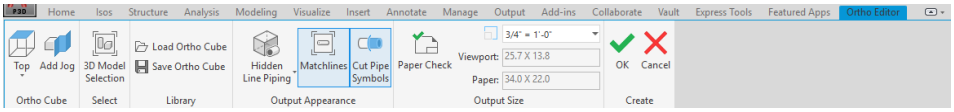

Figure 1-23 *The* ***Ortho Editor*** *tab*

TOOL PALETTES

AutoCAD Plant 3D has provided different tool palettes as an easy and convenient way of placing symbols and 3D parts in the current drawing. The **TOOL PALETTES** display items based on the workspace in which you are currently working. The **TOOL PALETTES** in different workspaces are discussed next.

TOOL PALETTES in P&ID PIP Workspace

The **TOOL PALETTE - P&ID PIP** contains various tabs such as **Lines**, **Equipment**, **Valves** and so on, refer to Figure 1-24. The symbols in each tab are grouped into different areas. You can also create more custom symbols and add them to the **TOOL PALETTES**. You can change the Tool Palette by choosing the **Properties** button and then selecting the required Tool Palette from the flyout displayed.

TOOL PALETTES in 3D Piping Workspace

In the **3D Piping** workspace, the **TOOL PALETTES** contains three tabs: **Dynamic Pipe Spec**, **Pipe Supports Spec**, and **Instrumentation Spec**, refer to Figure 1-25. The **Dynamic Pipe Spec** tab contains the piping components from the selected specification. You can add more components to the **Dynamic Pipe Spec** tab by invoking the **Spec Viewer**. You will learn more about the **Spec Viewer** in the later chapters. In addition, you can add a customized part to the Tool Palettes. Also, you can change the components displayed in this tab by selecting a different specification. The **Pipe Supports Spec** tab contains pipe supports. In this tab, you can dynamically select a support and place it in the 3D model. The **Instrumentation Spec** tab contains various measuring instruments which can be installed on the pipings as per the requirement.

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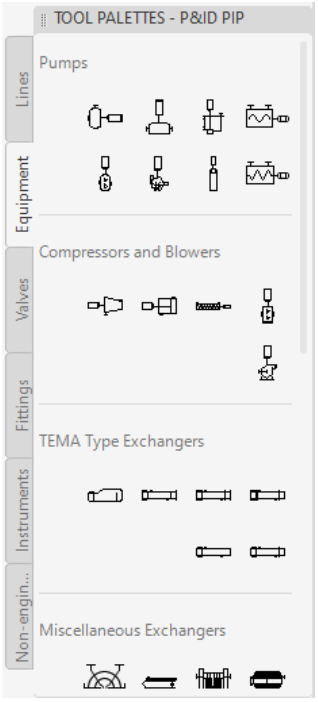

Figure 1-24 *P&ID Tool Palettes*

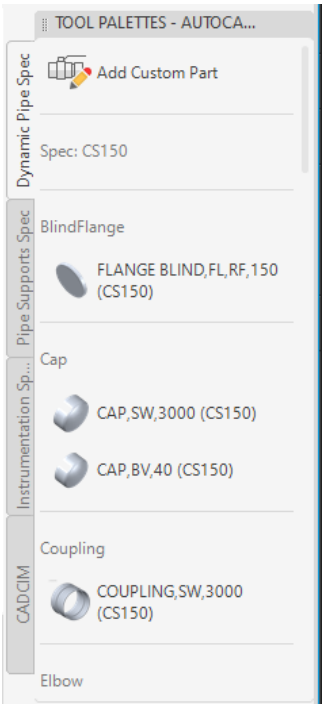

Figure 1-25 *3D Piping Tool Palettes*

Application Menu

The **Application Menu** is available at the top left corner of the AutoCAD Plant 3D window. It contains some of the tools that are available in the **Standard** toolbar. Click on the **Application Menu** to display the tools, as shown in Figure 1-26.

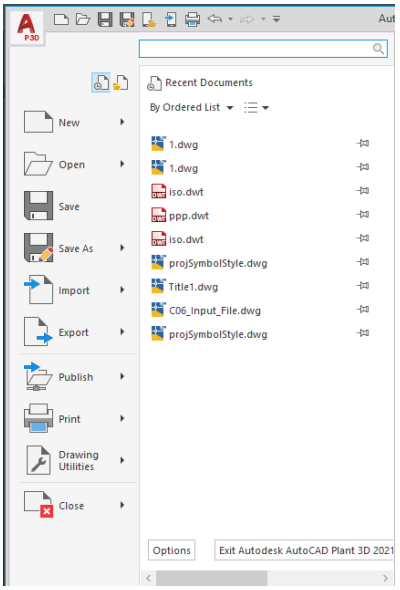

Figure 1-26 *The Application Menu*

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You can search a command using the search field on the top of the **Application Menu**. To search a tool, enter the complete or partial name of the command in the search field; the possible tool list will be displayed. If you click on a tool from the list, the corresponding command will get activated. By default, the **Recent Documents** button is chosen in the **Application Menu**. Therefore, the recently opened drawings will be listed. If you have opened multiple drawing files, choose the **Open Documents** button; the documents that are opened will be listed in the **Application Menu**. To set the preferences of the file, choose the **Options** button available at the bottom of the **Application Menu**. To exit AutoCAD Plant 3D, choose the **Exit Autodesk AutoCAD Plant 3D 2021** button next to the **Options** button.

Menu Bar

You can also invoke commands from the Menu bar. Menu bar is not displayed by default in AutoCAD Plant 3D. To display the Menu bar, click on the down arrow in the **Quick Access Toolbar**; a flyout will be displayed. Choose the **Show Menu Bar** option from it; the Menu bar will be displayed. As you move the cursor over the Menu bar, different titles get highlighted. You can click on the desired item to display a menu. Now, you can invoke a command by left-clicking on it in the menu. An arrow displayed on the right side of some of the menu items indicates that they have a cascading menu. The cascading menu provides various options to execute the same AutoCAD Plant 3D command.

Shortcut Menu

AutoCAD Plant 3D provides shortcut menus to invoke the recently used tools easily. These shortcut menus are context-specific which means that the tools available in them are dependent on the place/object for which they are displayed. A shortcut menu is invoked by right-clicking in the drawing area. It generally contains an option to select the previously invoked tool again apart from the commonly used tools, refer to Figure 1-27.

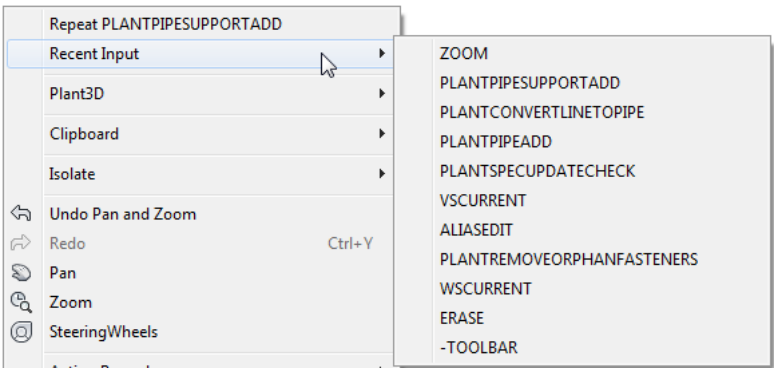

Figure 1-27 *Partial view of the shortcut menu with the recently used commands*

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If you right-click in the drawing area while a command is active, a shortcut menu with the options of that particular command will be displayed. Figure 1-28 shows the shortcut menu displayed on right-clicking when the **Route Pipe** tool is active.

You can also right-click on the command window to display the shortcut menu. This menu displays the input setting options and also some of the Windows options such as **Copy** and **Paste**, refer to Figure 1-29. The commands and their prompt entries are displayed in the History window (previous command lines not visible) and can be selected, copied, and pasted in the command line using the shortcut menu. As you press the up arrow key, the previously entered commands are displayed in the command window. Once the desired command is displayed at the command prompt, you can execute it by simply pressing the ENTER key.

You can also copy and edit any previously invoked command by locating it in the History window and then selecting the lines. After selecting the desired command lines from the History window, right-click to display a shortcut menu. Choose **Copy** from the menu and then paste the selected lines at the end of the command line.

You can right-click on the coordinate display area of the Status Bar to display the shortcut menu. This menu contains the options to modify the display of coordinates, as shown in Figure 1-30. You can also right-click on any of the toolbars to display the shortcut menu from where you can choose any toolbar to be displayed.

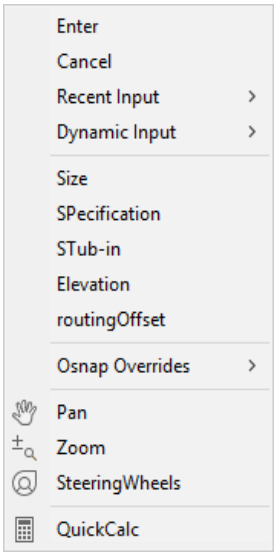

Figure 1-28 *Shortcut menu displayed on right-clicking when the* ***Route Pipe*** *tool is active*

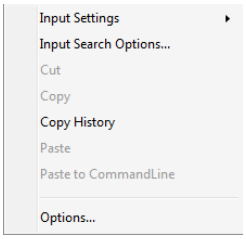

Figure 1-29 *Shortcut menu displayed by right-clicking on command window*



Figure 1-30 *Shortcut menu displayed by right-clicking on coordinate display area*

AutoCAD Plant 3D DIALOG BOXES

On invoking certain commands in AutoCAD Plant 3D, the related dialog boxes are displayed. When you choose an item in the Menu bar which displays three dots along with its name [**...**], a dialog box is displayed. For example, when **Options...** option is chosen from the **Tools** menu, the **Options** dialog box is displayed. A dialog box contains a number of components like the dialog label, radio buttons, text or edit boxes, check boxes, slider, image boxes, and command buttons. Some of the components in a dialog box are shown in Figure 1-31.

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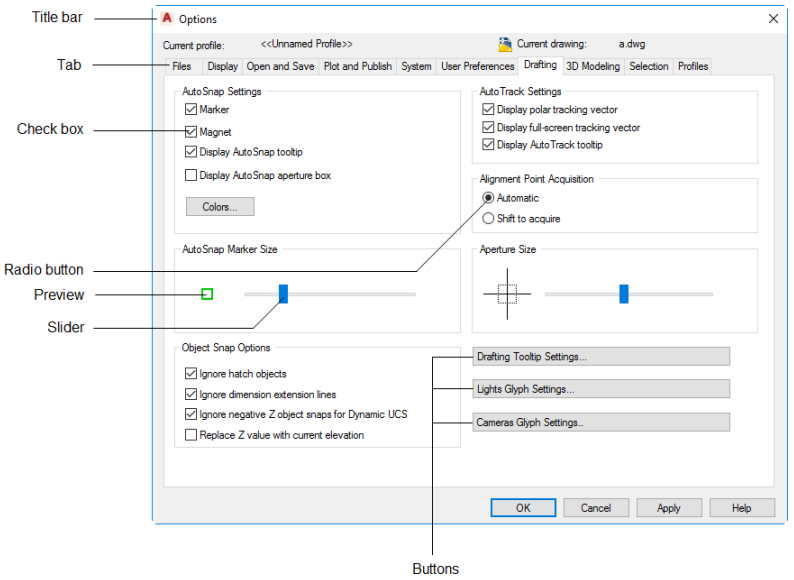

Figure 1-31 *Components of a dialog box*

The title bar displays the name of the dialog box. The tabs have different sections that contain various groups of related options under them. The check boxes are toggle options for making a particular option available or unavailable. When you click on an option which has a down arrow attached to its icon and a list of options is displayed, then it is termed as drop-down list. You can select options using the radio buttons. Note that only one button can be selected at a time from a section. The text box is an area where you can enter a text such as a file name. It is also called an edit box, because you can make any change to the text entered. In some dialog boxes, you will find the [...] button, which displays another related dialog box. There are certain buttons such as the **OK**, **Cancel**, and **Help** buttons that are also displayed at the bottom of the dialog box. The button with a dark border is the default button.

CREATING BACKUP FILES

If the drawing file already exists and you use **Save** or **Save As** tool to update the current drawing, AutoCAD Plant 3D creates a backup file. AutoCAD Plant 3D takes the previous copy of the drawing and changes it from the file type *.dwg* to *.bak*, and the updated drawing is saved as a drawing file with the *.dwg* extension. For example, if the name of the drawing is *myproj.dwg*, AutoCAD Plant 3D will change it to *myproj.bak* and save the current drawing as *myproj.dwg*.

Converting Auto-saved and Backup Files into AutoCAD Format

Sometimes, you may need to convert the auto-saved and backup files to AutoCAD format. To change the backup file into an AutoCAD format, open the folder in which you have saved the backup or the auto-saved drawing. Now, choose **Options** from the **View** tab; the **Folder Options** dialog box will be displayed. In this dialog box, choose the **View** tab and uncheck the **Hide extensions for known file types** check box under the **Advanced settings** area. Next, choose the **OK** button to exit the dialog box. Rename the auto-saved drawing or the backup file with a different name and also change the extension of the drawing from *.sv$* or *.bak* to *.dwg*. After you rename the drawing, you will notice that the icon of the auto-saved drawing or the backup file is replaced

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by the AutoCAD icon. This indicates that the auto-saved drawing or the backup file is converted to an AutoCAD Plant 3D drawing.

Using the Drawing Recovery Manager to Recover Files

The files that are saved automatically can also be retrieved by using the **DRAWING RECOVERY MANAGER**. You can open the **DRAWING RECOVERY MANAGER** by choosing **Drawing Utilities > Open the Drawing Recovery Manager** from the **Application Menu** or by entering **DRAWINGRECOVERY** at the command prompt.

If the automatic save operation is performed on a drawing and the system crashes accidentally, then next time when you run AutoCAD Plant 3D, the **Drawing Recovery** message box will be displayed, as shown in Figure 1-32. The message box informs you that the program unexpectedly crashed and you can open the most relevant backup file created by AutoCAD Plant 3D. Choose the **Close** button from the **Drawing Recovery** message box; the **DRAWING RECOVERY MANAGER** is displayed on the left in the drawing area, as shown in Figure 1-33.

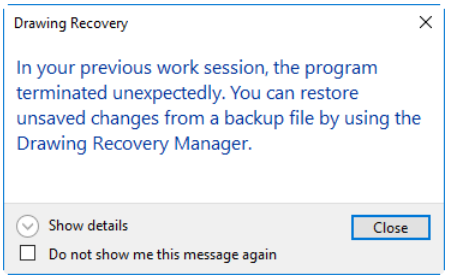

*Figure 1-32 The **Drawing Recovery** message box*

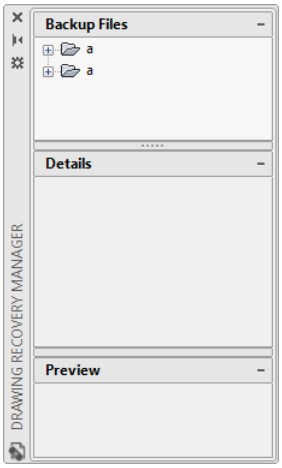

*Figure 1-33 The **DRAWING RECOVERY MANAGER***

The **Backup Files** rollout lists the original files, the backup files, and the automatically saved files. Select a file; its preview will be displayed in the **Preview** rollout. Also, the information corresponding to the selected file will be displayed in the **Details** rollout. To open a backup file, double-click on its name in the **Backup Files** rollout. Alternatively, right-click on the file name and then choose **Open** from the shortcut menu. It is recommended that you save the backup file at the desired location before you start working on it.

CLOSING A DRAWING

You can use the **CLOSE** command to close the current drawing file without actually quitting AutoCAD Plant 3D. If you choose **Close > Current Drawing** from the **Application Menu** or enter **CLOSE** at the command prompt, the current drawing file will be closed. If multiple drawing files are opened, choose **Close > All Drawings** from the **Application Menu**. If you have not saved the drawing after making the last changes to it and you invoke the **CLOSE** command, AutoCAD Plant 3D displays a message box that allows you to save the drawing before closing.

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This dialog box gives you an option to discard the current drawing or the changes made to it. It also gives you an option to cancel the command. After closing the drawing, you are still in AutoCAD Plant 3D from where you can open a new or an already saved drawing file. You can also use the close button (**X**) corresponding to the drawing area to close the drawing.

Note

You can close a drawing even if a command is active.

OPENING A PROJECT DRAWING

You can open an existing drawing file that has been saved previously in a project. The drawings are located under the **P&ID Drawings** and **Plant 3D Drawings** nodes in the **PROJECT MANAGER**. To open a drawing, expand the respective drawings node and right-click to display a shortcut menu. Next, choose the **Open** option from the shortcut menu, refer to Figure 1-34; the drawing will open. Alternatively, double-click on the drawing in the **PROJECT MANAGER** to open it.

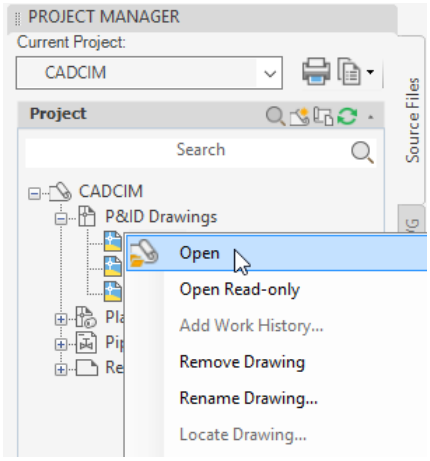

Figure 1-34** Opening a drawing from the **PROJECT MANAGER

To view a drawing without altering it, you must choose the **Open Read-Only** option from the shortcut menu. In other words, choosing the read-only option protects the drawing file from being changed. AutoCAD Plant 3D does not prevent you from editing the drawing. But if you try to save the opened drawing with the original file name, AutoCAD Plant 3D warns you that the drawing file is write-protected. However, you can save the edited drawing to a file with a different file name using the **SAVEAS** command. This way you can preserve your drawing.

OPENING A DRAWING THAT IS NOT IN THE PROJECT

Application Menu: Open > Drawing **Quick Access Toolbar:** Open
Menu Bar: File > Open **Command:** OPEN

You can open a drawing file that does not exist in the currently opened project using the **Select File** dialog box. This dialog box is discussed next.

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Opening an Existing Drawing Using the Select File Dialog Box

If you are already in the drawing editor and you want to open a drawing file, choose the **Open** tool from the **Quick Access Toolbar**; the **Select File** dialog box will be displayed. Alternatively, invoke the **OPEN** command to display the **Select File** dialog box by using the command prompt, as shown in Figure 1-35. You can select the drawing to be opened using this dialog box. This dialog box is similar to the standard dialog boxes. You can choose the file you want to open from the folder in which it is stored. You can access the required folder by using the **Look in** drop-down list. You can then select the name of the drawing from the list box or you can enter the name of the drawing file you want to open in the **File name** edit box. After selecting the drawing file, you can choose the **Open** button to open the file.

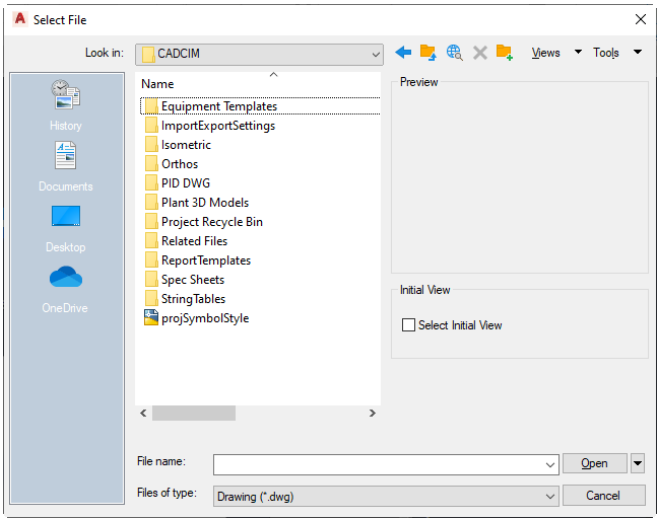

Figure 1-35 *The* ***Select File*** *dialog box*

When you select a file name, the preview of the selected drawing file is displayed in the **Preview** box. If you are not sure about the file name of a particular drawing but know the contents, you can still select the file and look for that drawing in the **Preview** box. You can also change the file type by selecting it in the **Files of type** drop-down list. Apart from the .dwg files, you can open the .dwt (template) files, .dws files or the .dxf files. The **Open** button also has a drop-down list, as shown in Figure 1-36. You can choose any of the methods given in this list for opening the file.

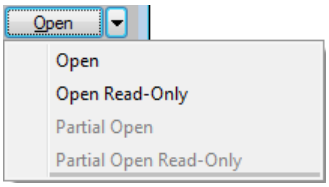

Figure 1-36 *The* ***Open*** *drop-down list*

Note that you cannot make any changes to the drawing file that is not in the current project. If you do so, the **Alert** message box will be displayed, as shown in Figure 1-37. This message box warns you that the object can only be inserted into a project drawing, and if you want to add this drawing to the current project, choose the **Yes** button; the message box will be closed and the drawing will be added to the currently opened project.

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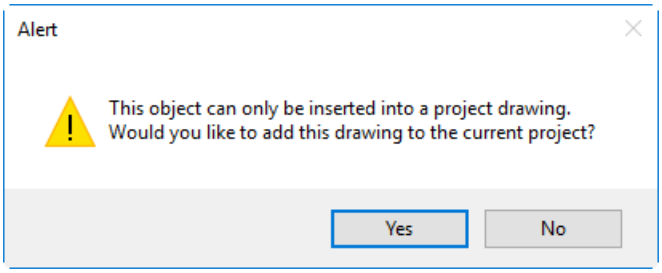

Figure 1-37 *The **Alert** message box*

Alternatively, to add files to the current drawing, right-click on the **P&ID Drawings** or **Plant 3D Drawings** node and choose the **Copy Drawing to Project** option from the shortcut menu displayed, refer to Figure 1-38; the **Select Drawings to Copy to Project** dialog box will be displayed, refer to Figure 1-39. Browse to the file location and double-click on the drawing file to be added to the project; the drawing file will be added to the current project.

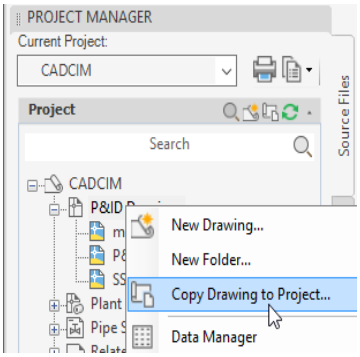

Figure 1-38 *Copying a drawing to project*

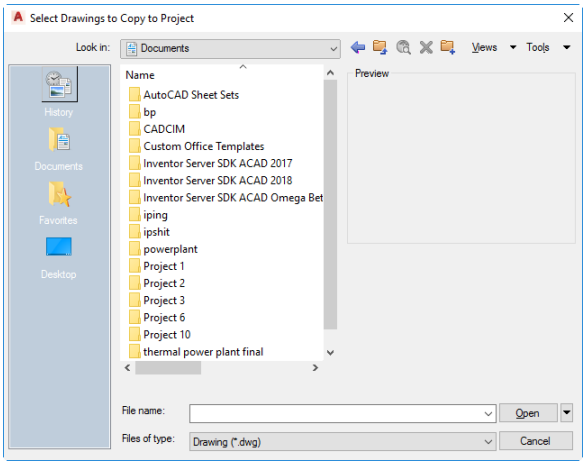

Figure 1-39 *The **Select Drawings to Copy to Project** dialog box*

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QUITTING AutoCAD Plant 3D

You can exit the AutoCAD Plant 3D program by using the **EXIT** or **QUIT** command. Even if a command is active, you can choose **Exit Autodesk AutoCAD Plant 3D 2021** from the **Application Menu** to close the AutoCAD Plant 3D program. In case the drawing has not been saved, it allows you to first save the work through a dialog box. Note that if you choose **No** in this dialog box, all the changes made in the current file till the last save will be lost. You can also use the **Close** button (**X**) of the main AutoCAD Plant 3D window (present in the title bar) to end the AutoCAD Plant 3D session.

AutoCAD Plant 3D HELP

Titlebar: ? > Help **Shortcut Key:** F1 **Command:** HELP or ?

You can get online help and documentation on the working of AutoCAD Plant 3D 2021 commands from the **Help** menu in the InfoCenter located on the right in the title bar, refer to Figure 1-40. You can also access the **Help** menu by pressing the F1 function key. Some important options in the **Help** menu are discussed next.

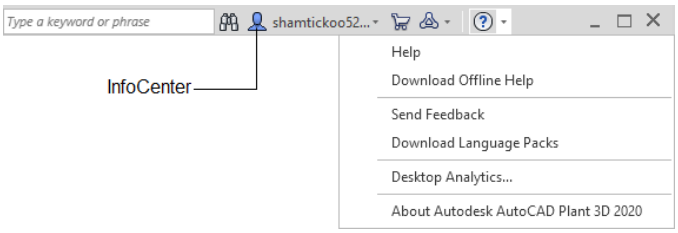

Figure 1-40 *The **Help** menu in the **InfoCenter***

Figure 1-41 shows the **Autodesk AutoCAD Plant 3D 2021 - Help** page after choosing the **Help** button from the InfoCenter bar.

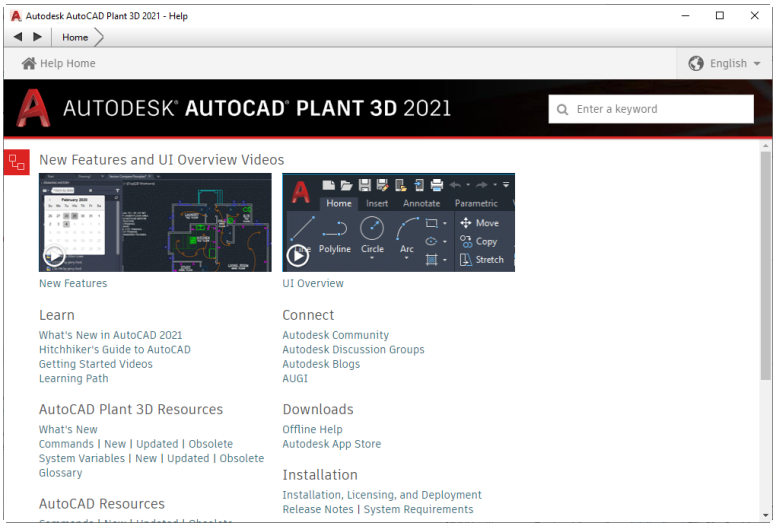

Figure 1-41 *The **Autodesk AutoCAD Plant 3D 2021 - Help** page*

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Customer Involvement Program

This option is used to share your software and system configuration information with Autodesk. The collected information is used by Autodesk for the improvement of Autodesk software.

About Autodesk AutoCAD Plant 3D 2021

This option gives you information about the release, serial number, licensed to, and also the legal description about AutoCAD Plant 3D.

Autodesk App Store

Autodesk App Store helps you to download various applications of AutoCAD, get connected to the AutoCAD network, share information and designs, and so on. On choosing the **Autodesk App Store** button from the title bar, the **AUTODESK APP STORE** page will open in the default browser, as shown in Figure 1-42.

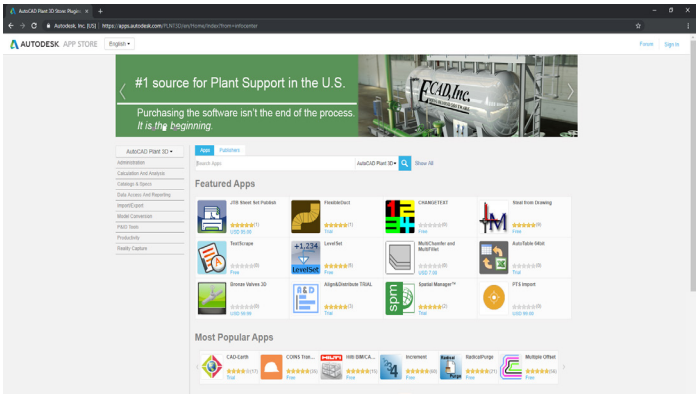

***Figure 1-42** The **AUTODESK APP STORE** page*

You can download various Autodesk apps such as PlantDataManager, Rename Project, and so on from this page. Some of them are free of cost. You can also publish your own Autodesk products for other users of Autodesk products.

Also, you can download applications for software other than AutoCAD family such as Autodesk Alias, Revit, Simulation, and so on. You can also search for the applications by entering the name of the app in the **Search Apps** text box.

ADDITIONAL HELP RESOURCES

- You can get help for a command while working in AutoCAD Plant 3D by pressing the F1 key. If you press the F1 key when a command is active, the **HELP** window containing information about that command will be displayed. After using the help, you can exit the window and continue with the current project.

- You can get help about a dialog box by choosing the **Help** button from that dialog box.

- Autodesk provides several resources that can be used to get assistance on Plant 3D tools and functions. These resources can be accessed by visiting the following links:

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a. Autodesk community forum website *https://forums.autodesk.com/*
b. AutoCAD Plant 3D Technical Assistance website *https://knowledge.autodesk.com/support/autocad-plant-3d#?sort=score*

- You can also get help by contacting the author, Prof. Sham Tickoo, at *stickoo@pnw.edu* and *tickoo525@gmail.com*.

- You can download AutoCAD Plant 3D drawings, programs, and special topics by registering yourself at the website by visiting: *https://cadcim.com/Registration.aspx*

Self-Evaluation Test

Answer the following questions and then compare them to those given at the end of this chapter:

1. The items in the _____ tab in the **TOOL PALETTES** contain the piping components from the selected specification.

2. The _____ grip is used to modify a nozzle.

3. If you want to work on a drawing without altering the original drawing, you must select the _____ option.

4. The _____ is used to start or continue routing a pipe.

5. The_____ palette displays an additional section for the properties specific to the selected item.

6. You can use the _____ command to close the current drawing file without actually quitting AutoCAD Plant 3D.

7. You can press F3 key to invoke the **AutoCAD** text window which displays the previously used commands and prompts. (T/F)

8. If you do not have an internet connection, you cannot access the Help files. (T/F)

9. You can close a drawing in AutoCAD Plant 3D 2021 even if a command is active. (T/F)

10. If the current drawing is unnamed and you save the drawing for the first time, you will be prompted to specify the file name in the **Save Drawing As** dialog box. (T/F)

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Review Questions

Answer the following questions:

1. Which of the following combination of keys should be pressed to turn on or off the display of the **TOOL PALETTES** window?

   (a) CTRL+3 (b) CTRL+0
   (c) CTRL+5 (d) CTRL+2

2. Which of the following commands is used to exit the AutoCAD Plant 3D program?

   (a) **QUIT** (b) **END**
   (c) **CLOSE** (d) None of these

3. Which of the following commands is invoked when you choose the **Save** option from the **File** menu or choose the **Save** tool in the **Quick Access Toolbar**?

   (a) **SAVE** (b) **LSAVE**
   (c) **QSAVE** (d) **SAVEAS**

4. By default, the angles are positive if measured in the _____ direction.

5. You can get help for a command while working in AutoCAD Plant 3D by pressing the _____ key.

6. The shortcut menu invoked by right-clicking in the command window displays the most recently used commands and some of the commonly used options such as **Copy**, **Paste**, and so on. (T/F)

7. Flip grip is used to flip a valve or a fitting. (T/F)

8. The **TOOL PALETTES** display items based on the workspace in which you are currently working. (T/F)

9. You cannot make any changes in the drawing file which is not in the current project. (T/F)

10. The file name that you enter to save a drawing in the **Save Drawing As** dialog box can be 255 characters long but cannot contain spaces and punctuation marks. (T/F)

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Answers to Self-Evaluation Test

1. **Dynamic Pipe Spec**, **2**. **Edit Nozzle**, **3**. **Open Read-only**, **4**. Continuation grip, **5**. **PROPERTIES**, **6**. **CLOSE**, **7**. F, **8**. T, **9**. T, **10**. T

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