

Chapter 3

Selecting, Controlling, and Reviewing Objects

Learning Objectives

After completing this chapter, you will be able to:

- *Use direct selection tools*
- *Use different types of windows for selecting objects*
- *Save selected objects*
- *Analyze object properties*
- *Link databases to objects*
- *Control visibility of objects*
- *Control the appearance of model*
- *Control object attributes*
- *Use Measure and Redline tools*
- *Add tags and comments*
- *Use links*
- *Use the Appearance Profiler window*

INTRODUCTION

In the previous chapter, you learned to use various navigation tools in a project. In this chapter, you will learn various methods and tools to select, control, and review objects. In Navisworks, there are several types of tools which are used for selecting objects in a model. After selecting objects, you can control their transformation and appearance. You can also use various measuring tools to measure distances, angle, and area. Using the **Link** tool, you can attach any file or geometry to the model. All these tools and methods are discussed in detail in this chapter. Various methods for selecting objects are discussed next.

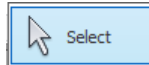
OBJECT SELECTION METHODS

In order to work on an object or a group of objects, you need to select them. In Navisworks, you can do so by using the Direct Selection method. You can also select an object or group of objects by using the **Selection Tree** window and the **Find Items** window. Various methods for selecting objects in Navisworks are discussed next.

Direct Selection Method

In the Direct Selection method, you can select an object or group of objects directly from the Scene View by using the direct selection tools. The direct selection tools are available in the **Select & Search** panel of the **Home** tab. These tools are discussed next.

Select Tool



The **Select** tool is used to select an object(s) directly from the Scene View. To select an object, choose this tool from **Home > Select & Search > Select** drop-down, as shown in Figure 3-1. On doing so, a selection cursor will be displayed in the Scene View. Next, click on the desired object; the object will be selected and highlighted in blue color. To select more than one object at a time, press and hold the CTRL key while clicking on the objects.

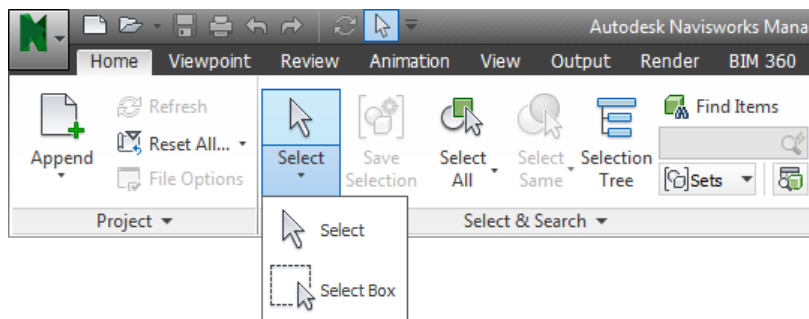


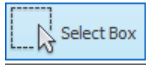
Figure 3-1 Invoking the **Select** tool



Note

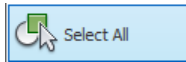
Sometimes, instead of selecting a single object, either the entire model or a particular layer will be selected in the Scene View. In this case, choose the **Last Object** option from the **Resolution** drop-down list located at **Options Editor > Interface > Selection**.

Select Box Tool



The **Select Box** tool is used to select object(s) by drawing a window in the Scene View. To select an object, invoke this tool from **Home > Select & Search > Select** drop-down, refer to Figure 3-1. On doing so, a selection cursor will be displayed in the Scene View. Next, click at a desired location in the Scene View and then drag the cursor to form a rectangle. You will notice that on dragging the cursor, a rectangle is formed in dashed lines and the objects that are completely inside it are selected.

Select All Tool



The **Select All** tool is used to select all the objects in the Scene View. To select objects, invoke this tool from **Home > Select & Search > Select All** drop-down, as shown in Figure 3-2. On doing so, all objects will be selected in the Scene View. Notice that all the selected objects will be highlighted in blue color.

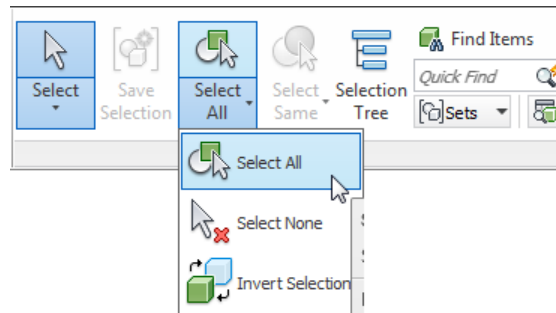
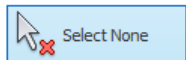


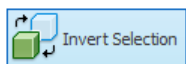
Figure 3-2 Invoking the *Select All* tool

Select None Tool



The **Select None** tool is used for deselecting the selected objects. Before using this tool, ensure that the objects are selected in the Scene View. Next, invoke this tool from **Home > Select & Search > Select All** drop-down, refer to Figure 3-2; all the selected objects will be deselected in the Scene View.

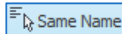
Invert Selection Tool



The **Invert Selection** tool is used for reversing the selection. To do so, first select an object in the Scene View. Next, invoke this tool from the **Home > Select & Search > Select All** drop-down, refer to Figure 3-2. On doing so, the selected objects will be deselected and the deselected objects will be selected in the Scene View.

In a project, you can also select multiple objects based on their properties, type, name, and so on. To do so, first you need to select an object in the Scene View. After selecting the object, the **Select Same** drop-down will be enabled in the **Select & Search** panel. This drop-down contains various tools that are discussed next.

Same Name Tool



The **Same Name** tool is used to select multiple objects in a model with the same name as the currently selected objects. Before invoking this tool, ensure that an object is selected in the Scene View. To select the object with the same name, choose the **Same Name** tool from **Home > Select & Search > Select Same** drop-down, as shown in Figure 3-3; the objects with the same name as the currently selected object will be selected and highlighted in blue color. For example, if you have selected a wall named as Basic Wall in the model and you want to select all the walls named as Basic Wall in the model, then use the **Same Name** tool.

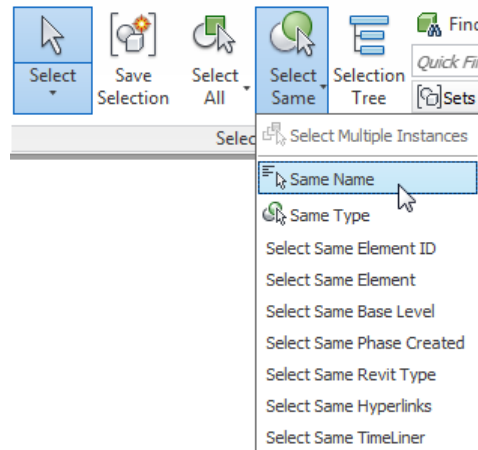
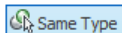


Figure 3-3 Invoking the **Same Name** tool

Same Type Tool



The **Same Type** tool is used to select objects of the same type as the currently selected object. Before invoking this tool, ensure that an object is selected in the Scene View. To select objects of the same type, choose the **Same Type** tool from **Home > Select & Search > Select Same** drop-down, refer to Figure 3-3. On doing so, the objects of the same type as the currently selected object will be selected and highlighted in blue color in the Scene View. For example, if you have selected an object of polygon geometry and you want to select all the objects with the polygon type, then you need to invoke the **Same Type** tool.

Same <Property> Tool

The **Same <Property>** tool is used to select objects having the properties such as element, element ID, and link same as the currently selected object. To select the object, choose the **Same <Property>** tool from **Home > Select & Search > Select Same** drop-down, refer to Figure 3-3. On doing so, the objects having the same properties as the current selected objects will be selected and highlighted in blue in the Scene View. For example, if you have selected an object in which glass material has been used and you want to select all the objects in which glass material is used, then you need to choose the **Select Same Material** tool.

The Selection Tree Window

In Navisworks, you can select the object(s) from the **Selection Tree** window. To use this window, choose the **Selection Tree** button from the **Select & Search** panel in the **Home** tab; the **Selection Tree** window will be displayed, as shown in Figure 3-4. Alternatively, to display the **Selection Tree** window, select the **Selection Tree** check box from the **View > Workspace > Windows** drop-down. The **Selection Tree** window is a dockable window which contains a list of objects. These objects are arranged in a hierarchy. The arrangement of objects in the hierarchy is same as the sequence of object creation of the model in the native application. When you select an object from the **Selection Tree** window, the selected object will also be selected in the Scene View and highlighted in blue color, both in the Scene View as well as in the **Selection Tree** window.

You can control the display of hierarchy in the **Selection Tree** window by selecting the required option from the drop-down list displayed at the top in the **Selection Tree** window. The options available in the drop-down list are discussed next.

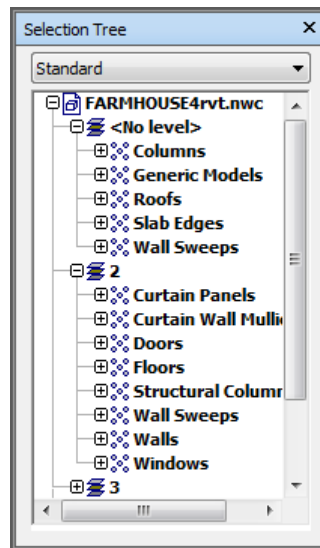


Figure 3-4 The Selection Tree window

Standard Option

In the **Selection Tree** window, select the **Standard** option from the drop-down list; the default hierarchy will be displayed which includes all the levels and parts of the model. You can arrange the displayed hierarchy in an alphabetical order. To do so, right-click on any of the items in the **Selection Tree**; a shortcut menu will be displayed. Choose **Scene > Sort** from the shortcut menu; the list will be arranged in an alphabetical order.

Compact Option

In the **Selection Tree** window, select the **Compact** option from the drop-down list; a simplified hierarchy will be displayed.

You can customize the level of details displayed on selecting the **Compact** option. To do so, choose the **Options** button in the **Application Menu**; the **Options Editor** dialog box will be displayed. Expand the **Interface** node in the left pane of the dialog box; several options will be displayed. Select the **Selection** option under the **Interface** node; various options related to the **Selection** option will be displayed in the right pane of the dialog box, as shown in Figure 3-5. In the right pane, select the required options from the **Compact Tree** drop-down list, refer to Figure 3-5. The options in the drop-down list are discussed next.

To display the model file only in the **Selection Tree** window, select the **Model** option from the drop-down list. To expand the hierarchy to layer level in the **Selection Tree** window, select the **Layers** option from the list. To expand the list to the objects level in the **Selection Tree** window, select the **Objects** option from the list.

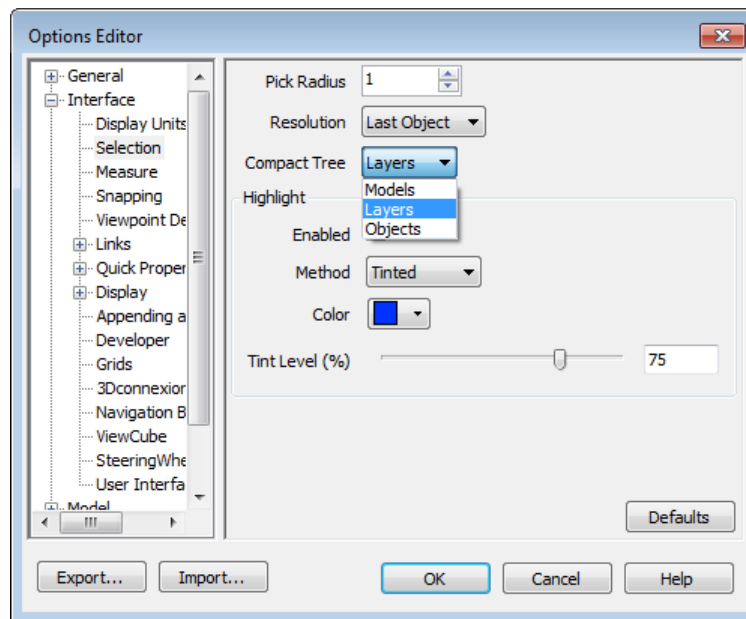


Figure 3-5 The Selection options in the Options Editor dialog box

Properties Option

In the **Selection Tree** window, select the **Properties** option from the drop-down list; a hierarchy based on the properties of items will be displayed. Now, in the **Selection Tree** window, you can select the objects based on their properties from the displayed hierarchy.

Sets Option

In the **Selection Tree** window, choose the **Sets** option from the drop-down list; all the saved selections and search sets will be displayed in a hierarchy. Note that if no sets are defined, then the **Sets** option will not be available in the drop-down list of the **Selection Tree** window. The method of saving the selections and search sets is discussed later in this chapter.

Setting Selection Resolution

In Navisworks, at times, when you select an object in the Scene View, then either the entire model or a particular layer will be selected but not the single entity. In such a case, you can customize the selection resolution. To do so, choose the **Options** button in the **Application Menu**; the **Options Editor** dialog box will be displayed. In the left pane of the **Options Editor** dialog box, expand the **Interface** node and select the **Selection** option; several options will be displayed in the right pane of the dialog box, refer to Figure 3-5. In the right pane, select the required options from the **Resolution** drop-down list. The options in this drop-down list are used to define the level of selection. These options are discussed next.

To select all objects in the current file, select the **File** option from the **Resolution** drop-down list in the right pane of the **Options Editor** dialog box. Next, click on an object in the Scene View; all objects will be selected in the Scene View. To select objects within a layer, select the **Layer** option from the drop-down list. Next, click on the required object in the Scene View; all objects of the corresponding layer will be selected. To select the first group of objects under the layer in a model, select the **First Object** option from the drop-down list. Next, click on an object in the Scene View; the object will be selected in the Scene View and the corresponding composite object will be highlighted in the **Selection Tree** window. To select the last branch of object in a model, select the **Last Object** option from the drop-down list. Next, click on the required object in a model; the object will be selected in the Scene View and the corresponding item will be highlighted in the **Selection Tree** window. By default, the **Last Object** option is selected in the **Resolution** drop-down list. Similarly, select the **Last Unique** and **Geometry** options from the **Resolution** drop-down list.

You can also access these options from the ribbon. To do so, expand the **Select & Search** panel by clicking on the down arrow. Next, select the required options from the **Selection Resolution** drop-down list.

Find Items Window

In a project, you may need to select or search an object on the basis of its property. To do so, choose the **Find Items** button from the **Select & Search** panel in the **Home** tab; the **Find Items** window will be displayed, as shown in Figure 3-6. Alternatively, to display the **Find Items** window, select the **Find Items** check box from the **View > Workspace > Windows** drop-down list. The **Find Items** window is a dockable window in which you can search for objects having common properties. These searched objects will be selected and highlighted in the Scene View and in the **Selection Tree** window.

The left pane of the **Find Items** window contains objects arranged in a hierarchy. In this pane, you can define the level of search by selecting the options from the drop-down list available at the top in the **Find Items** window. The options in this drop-down list are same as in the **Selection Tree** window. Using these options, you can control the levels of display of objects in the window.

Using the options available in the right pane of the **Find Items** window, you can specify the parameters for searching objects in the model. These options are discussed next.

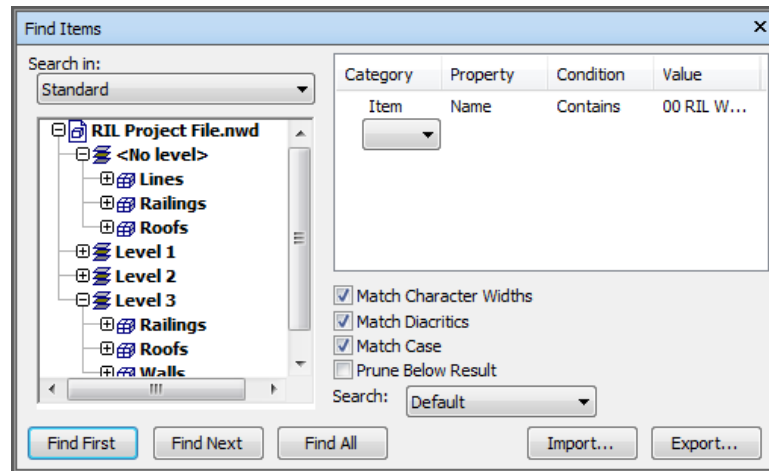


Figure 3-6 The Find Items window

Category

In the **Category** column, you can specify the category name for the object(s) to be searched. To do so, click in the **Category** column; a drop-down list will be displayed. This drop-down list contains the list of categories that are available in the model such as Item, Element, Material, and so on. You can select the required category name from the list.

Property

In the **Property** column, you can specify the property name for the object(s) to be searched. To do so, click in the **Property** column; a drop-down list will be displayed. This drop-down list contains the list of properties of the selected category. You can select the required property from the drop-down list.

Condition

In the **Condition** column, you can specify the condition operator for the objects such as =, not equals, <, >, and so on. To do so, click in the **Condition** column; a drop-down list will be displayed. You can select the required condition operator from it.

Value

In the **Value** column, you can specify the property value manually or select the required value from the drop-down list. To do so, click in the **Value** column; a drop-down list will be displayed. Select the required value from it. The values available in the drop-down list depend upon the selected category and property.

Match Case, Match Character Widths, and Match Diacritics

The **Match Case** check box is used to check the case sensitivity for the search statements. You can select the **Match Character Widths** check box to match character widths while searching. Select the **Match Diacritics** check box to match the diacritics terms while searching.

Prune Below Result

Select the **Prune Below Result** check box to stop the search when the first object is found.

Search

This drop-down list contains the following options: **Default**, **Below Selected Paths**, and **Selected Paths Only**. The **Default** option is used to search all items selected in the left pane of the window. The **Below Selected Paths** option is used to search only below the selected objects in the left pane of the window. The **Selected Paths Only** option is used to search from the objects selected in the left pane of the window.

The Find First Button

The **Find First** button is used to find the first object which will satisfy the search criteria. To find the first qualified object, choose the **Find First** button; the search results will be selected and highlighted in the Scene View as well as in the **Selection Tree** window.

The Find Next Button

The **Find Next** button is used to find the next object which will satisfy the search criteria. To find the next qualified object, choose the **Find Next** button; the search results will be selected and highlighted in the Scene View as well as in the **Selection Tree** window.

The Find All Button

The **Find All** button is used to find all objects that will satisfy the search criteria. To find all the qualifying objects, choose the **Find All** button; the search results will be selected and highlighted in the Scene View as well as in the **Selection Tree** window.


The Import Button

The **Import** button is used to import the previously saved search criteria. On choosing this button, the **Import** dialog box will be displayed. In this dialog box, browse and select the required file and then choose the **Open** button; the selected file will be imported.

The Export Button

The **Export** button is used to export the current search to an .xml file. On choosing this button, the **Export** dialog box will be displayed. In this dialog box, specify the file name and location and then choose the **Save** button; the file will be saved in the specified location.

Quick Find

 The **Quick Find** text box is used to quickly find and select objects in a model. This text box is available in the **Select & Search** panel of the **Home** tab, as shown in the Figure 3-7. To search an object, specify the related keywords in the **Quick Find** text box, and then choose the button in the text box; the objects matching the entered text will be selected and highlighted in the Scene View as well as in the **Selection Tree** window.

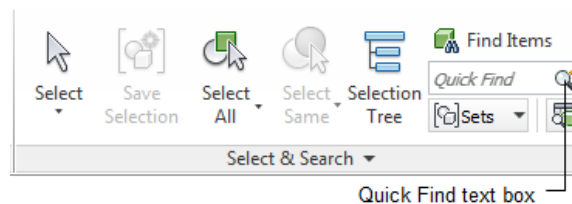


Figure 3-7 The **Quick Find** tool in the **Select & Search** panel

After selecting the required objects in a model, you can save the selection. The various methods of saving the selected objects are discussed next.

SAVING SELECTIONS

After selecting an object or a group of objects, you can save them as sets. They can be saved either by creating selection sets or by creating search sets. These two types of sets are discussed next.

Selection Sets

The selection sets are a group of objects selected either from the Scene View or from the **Selection Tree** window. To save the selected object, choose the **Save Selection** button from the **Select & Search** panel in the **Home** tab; the **Sets** window will be displayed, as shown in Figure 3-8. The selected object will be saved as a selection set in this window. Alternatively, to display the **Sets** window, choose the **Manage Sets** option from the **Home > Select & Search > Sets** drop-down. This window displays a list of all the saved selections. The buttons located at the top of the **Sets** window are discussed next.

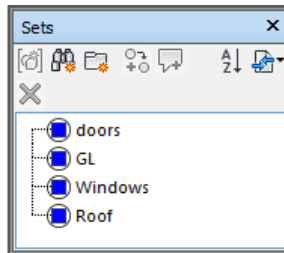






Figure 3-8 The **Sets** window


Save Selection

 The **Save Selection** button is used to save the current selection. To save the current selected object, choose the **Save Selection** button; a text box with **Selection Set** written in it will be displayed in the **Sets** window. Specify a new name in the text box and press ENTER; the selection set with the new name will be displayed in the **Sets** window. The selection sets are represented by a  symbol, refer to Figure 3-8.


Save Search

 The **Save Search** button is used to save the currently searched object. To save the currently searched object, choose the **Save Search** button; a text box with **Search Set** written in it will be displayed in the **Sets** window. Specify a new name in the text box and press ENTER; the search set with the new name will be displayed in the **Sets** window. Search sets are represented by a  symbol, refer to Figure 3-9.


New Folder

 The **New Folder** button is used to create a new folder. In the **Sets** window, you can create a new folder and group all the sets under it. To do so, choose the **New Folder** button; a folder with the text **New Folder** will be created in the **Sets** window. Specify a new name in the text box and press ENTER; the folder with the new name will be created. Next, drag and place the desired sets in this folder.

Duplicate

 The **Duplicate** button is used to create a copy of the saved items. To do so, first select the desired set in the **Sets** window and then choose the **Duplicate** button; the duplicate set will be created with the same name and content.


Add Comment

 The **Add Comment** button is used to add comments to the saved objects. To do so, select the desired set in the **Sets** window and then choose the **Add Comment** button; the **Add Comment** dialog box will be displayed. Specify a comment in the **Add Comment** area and choose the **OK** button; the comment will be added to the selected set.


Sort

 The **Sort** button is used to arrange the saved sets in an alphabetical order. To do so, choose the **Sort** button; the content in the **Sets** window will be arranged alphabetically.

Import/Export

 The **Import/Export** button is used to import and export the saved search sets. To export the saved search set, first select the desired set in the **Sets** window. Next, choose the **Import/Export** button; a drop-down list will be displayed. Select the **Export Search Sets** option from the list; the **Export** dialog box will be displayed. In this dialog box, specify the file name and location of the exported file and then choose the **Save** button; the file will be exported and saved at the specified location. Similarly, to import the search sets, select the **Import Search Sets** option from the drop-down list; the **Import** dialog box will be displayed. In this dialog box, browse and select the required file and then choose the **Open** button; the file will be imported to the **Sets** window.

Delete

 The **Delete** button is used to delete a selected set. To do so, select the set to be deleted and choose the **Delete** button; the selected set will be removed from the **Sets** window.

Search Sets

The search sets are a group of searched objects. When you run a search in the **Find Items** window, the searched objects will be selected and highlighted in blue color in the Scene View as well as in the **Selection Tree** window. Now, to save these selected objects, choose the **Save Search** button in the **Sets** window; the object will be saved as a search set, refer to Figure 3-9.

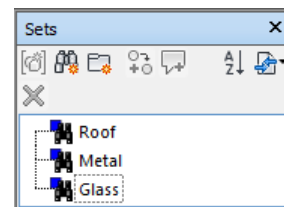



Figure 3-9 The search sets in the **Sets** window

The Selection Inspector Window

 In a project, when you select an object or a group of objects, they will be displayed in the **Selection Inspector** window along with their properties. To invoke this window, choose the **Selection Inspector** button from the **Select & Search** panel in the **Home** tab; the **Selection Inspector** window will be displayed, as shown in Figure 3-10. Alternatively, to display the **Selection Inspector** window, select the **Selection Inspector** check box from the **View > Workspace > Windows** drop-down. The **Selection Inspector** is a dockable window.

Select the object(s) from the Scene View or from the **Selection Tree** window; the selected items will be displayed in the **Selection Inspector** window, as shown in Figure 3-10. The buttons in this window are discussed next.

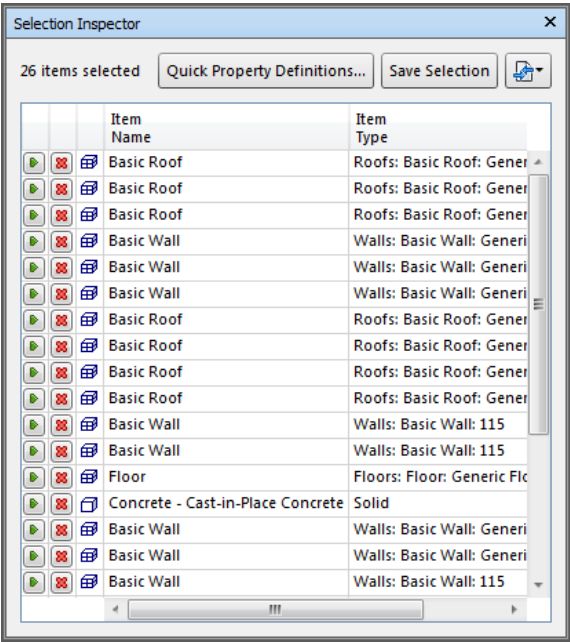




Figure 3-10 The Selection Inspector window


Show Item

 The **Show Item** button is used to view the selected object in the Scene View. On choosing this button, the selected object will be zoomed in the Scene View.


Deselect

 The **Deselect** button is used to remove an object from the **Selection Inspector** window. On choosing this button, the selected object will be removed from the **Selection Inspector** window.

Export

 The **Export** button is used to export the selected object to a csv file. To do so, click on the **Export** button; a drop-down list will be displayed. Select the **Export CSV** option from the drop-down list; the **Export to CSV** dialog box will be displayed. In this dialog box, specify the file name and location of the file to be exported and then choose the **Save** button; the selected object will be saved at the specified location.

Save Selection

 The **Save Selection** button is used to save the selected objects as a selection set. To do so, select the required object displayed in the **Selection Inspector** window. Next, choose the **Save Selection** button in the **Selection Inspector** window; the **Sets** window will be displayed and the selected object will be saved and added to the list of the **Sets** window. Specify the name of the saved object in the **Sets** window and press ENTER.

Quick Properties Definitions

Quick Property Definitions... This button is used to add desired properties to the selected objects in the **Selection Inspector** window. To do so, select the desired object from the Scene View or from the **Selection Tree** window. Next, invoke the **Selection Inspector** window. Now, choose the **Quick Properties Definitions** button from this window; the **Options Editor** dialog box will be displayed with the **Quick Properties** options in the right pane. Specify the property definitions such as category and choose the **OK** button.

OBJECT PROPERTIES

In a project, you can analyze the properties of the selected object by using the **Properties** window. You can also customize the properties of selected object in the **Properties** window. The **Properties** window is discussed next.

Properties Window

After selecting an object in the Scene View, you need to invoke the **Properties** window for analyzing the object properties. To do so, choose the **Properties** button from the **Display** panel in the **Home** tab; the **Properties** window will be displayed, as shown in Figure 3-11. Alternatively, to display the **Properties** window, select the **Properties** check box from the **View > Workspace > Windows** drop-down. The **Properties** window is a dockable window. In this window, there are separate tabs for each property of the selected object. You can use these tabs to navigate between the available property categories. You can also create the custom tabs known as User Data tabs in this window. The method of creating a User Data tab is discussed next.

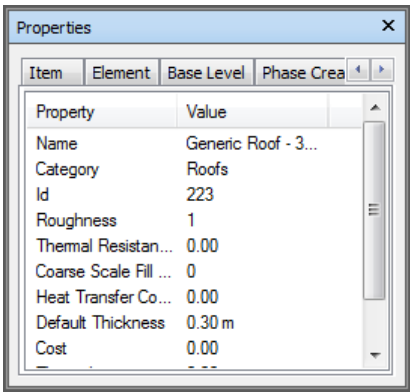


Figure 3-11 The Properties window

Creating The User Data Tab

In a project, you can also create the custom tabs in which you can define the custom property of a selected object in the Scene View. To create a custom tab, select an object from the Scene View and then right-click in the **Properties** window; a shortcut menu will be displayed, as shown in Figure 3-12. Choose the **Add New User Data Tab** option from the shortcut menu; the new **User Data** tab will be added to the **Properties** window. To rename this tab, right-click in the **Properties** window in the created **User Data** tab; a shortcut menu will be displayed. Choose the **Rename Tab** option from the menu; the **Autodesk Navisworks Manage 2015** dialog box will be displayed. Specify a new name for the tab in the **Rename Tab** text box and then choose the **OK** button; the name of the tab will be changed. You can also delete the added **User Data** tab. To do so, select and right-click on the required tab; a shortcut menu will be displayed.

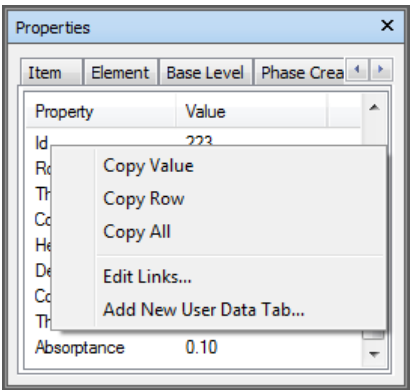


Figure 3-12 Choosing the Add New User Data Tab from the shortcut menu

Next, choose the **Delete User Data Tab** option from the shortcut menu; the selected tab will be deleted.

You can also add the properties to this **User Data** tab. The procedure to do so is discussed next.

Adding Properties in the User Data Tab

After creating the user data tab you can add properties to it. To do so, right-click in the **User Data** tab in the **Properties** window; a shortcut menu will be displayed, as shown in Figure 3-13. Next, hover the cursor over the **Insert New Property** option; a flyout will be displayed, refer to Figure 3-13. You can choose the property type from this flyout. On doing so, a text box will be displayed in the tab. Specify a name for the newly created property in the text box and press ENTER. Next, you need to specify a value for the added property. To do so, double-click in the **Value** column corresponding to the required property in the **User Data** tab; the **Autodesk Navisworks Manage 2015** dialog box will be displayed. Specify the required value in the **Enter Property Value** edit box and choose the **OK** button. To rename an added property, right-click on the property to be renamed; a shortcut menu will be displayed, as shown in Figure 3-14. Choose the **Rename Property** option from the menu; a text box will be displayed. Specify a new name in the text box and press ENTER.

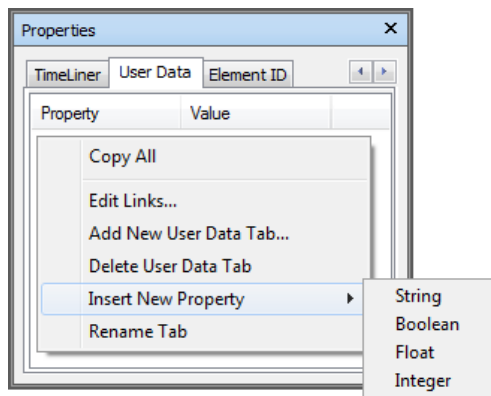


Figure 3-13 Adding custom property to the new tab

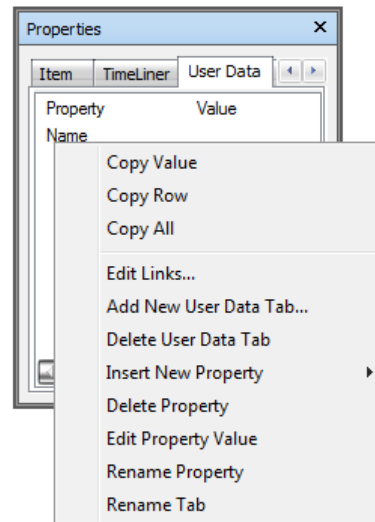


Figure 3-14 The shortcut menu

Similarly, from this menu, you can edit the property value and can also delete an added property. To edit a property value, choose the **Edit Property Value** option from the menu, refer to Figure 3-14; the **Autodesk Navisworks Manage 2015** dialog box will be displayed. Specify a new value in the **Enter Property Value** edit box and then choose the **OK** button; the value will be changed. To delete a property, choose the **Delete Property** option from the menu, refer to Figure 3-14; the property will be deleted. Similarly, you can delete the **User Data** tab by choosing the **Delete User Data Tab** option from the menu.



Note

*If you have not selected an item in the Scene View then no property will be displayed in the **Properties** window.*

You can also display the property information of an object in a tooltip style. To do so, choose the **Quick Properties** button from the **Display** panel in the **Home** tab. Next, move your cursor over the object; the property information related to the object will be displayed in a tooltip style in the Scene View. The properties to be displayed can be configured from the **Options Editor** dialog box.

LINKING EXTERNAL DATABASES TO OBJECTS



While working on a project, you may need to add some extra properties to the model object. These properties are displayed in the **Properties** window. These properties can be added by linking external databases such as an excel file to the object. The database links can be added in a single Navisworks file (locally) and can also be added globally. Whenever you will load a particular file, the link will be established when you select an object. Also, the properties of the object will be displayed in the appropriate database tab in the **Properties** window. The process of adding a database link is discussed next.

Adding Database Link Locally

You can add external databases locally by using the **File Options** dialog box. You can invoke this dialog box by choosing the **File Options** tool from the **Project** panel of the **Home** tab. In the **File Options** dialog box, choose the **Data Tools** tab. In this tab, choose the **New** button; the **New Link** dialog box will be displayed. In this dialog box, specify a name in the **Name** edit box; the **Connection** area will be activated, refer to Figure 3-15.

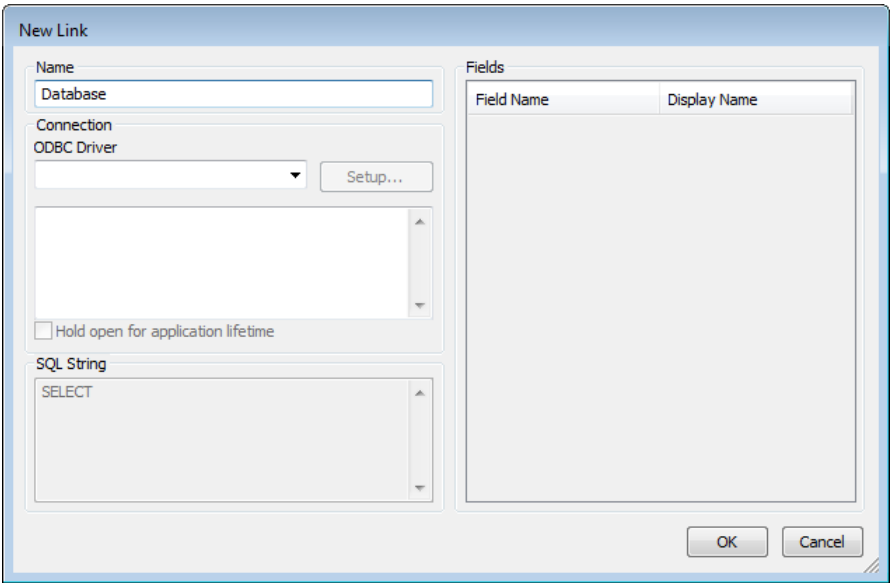


Figure 3-15 The *New Link* dialog box

Next, in the **Connection** area, select the driver connection type from the **ODBC Driver** drop-down list. For example, to link an excel file, select the **Microsoft Excel Driver** option from the list. Now choose the **Setup** button; the **ODBC Microsoft Excel Setup** dialog box will be displayed. Figure 3-16 shows the dialog box for the Microsoft Excel Driver.

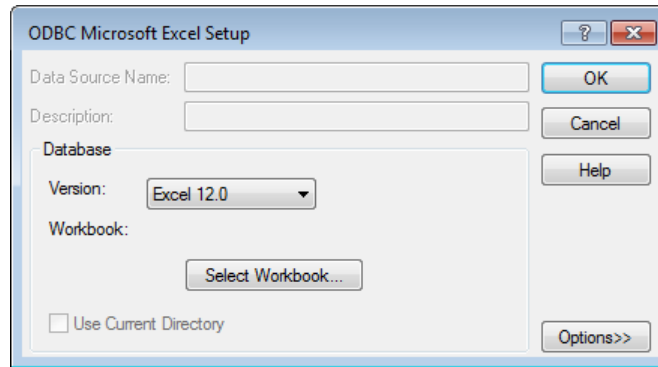


Figure 3-16 The **ODBC Microsoft Excel Setup** dialog box



Note

The name of the ODBC setup dialog box and the options displayed in it depend on the driver connection type selected from the **ODBC Driver** drop-down list. For example, if you have selected **Microsoft Access Driver** option from the drop-down list, then the displayed dialog box will be **ODBC Microsoft Access Setup**.

In this dialog box, you need to select the file to be linked and then choose the **OK** button to close the dialog box. For example, to link an excel file, select its version from the **Version** drop-down list and then choose the **Select Workbook** button; the **Select Workbook** dialog box will be displayed. In this dialog box, browse to the excel file, select it, and then choose the **OK** button. Next, choose the **OK** button to close the **ODBC Microsoft Excel Setup** dialog box. You will notice that the connection is updated in the text box in the **Connection** area of the **New Link** dialog box. Now, in the **SQL String** area of this dialog box, you need to specify the selection statement after the text **SELECT**. You can select the columns that you want to display as categories in the **Properties** window from the **Fields** area. Double-click in the **Field Name** column, enter the exact name of database column, and then press **ENTER**; the name will be automatically filled in the **Display Name** column. Similarly, specify the other column names and choose the **OK** button to close the dialog box. Now, select the check box corresponding to the links created from the **DataTools Links** area in the **File Options** dialog box, and then choose the **OK** button; the **File Options** dialog box will be closed. You can now select an object and view the created database link in the **Properties** window.

Adding Database Link Globally

To add a database link globally, choose the **DataTools** tool from the **Tools** panel of the **Home** tab; the **DataTools** dialog box will be displayed, as shown in Figure 3-17. In this dialog box, some predefined links are available in the **DataTools Links** area. You can define the new links in the same way as discussed previously. These links will be available in all sessions of Navisworks and can also be modified.

There are few buttons in the **DataTools** tab of the **File Options** dialog box which are also available in the **DataTools** dialog box. The usage of these buttons is discussed next.

To modify a database link, select the check box corresponding to that link from the **DataTools Links** area and then choose the **Edit** button; the **Edit Link** dialog box will be displayed. In this dialog box, you can make the changes as required. You can remove a link from the **DataTools Links** area by first selecting the corresponding check box and then choosing the **Delete** button. To export a database link, select the corresponding check box and then choose the **Export** button; the **Save As** dialog box will be displayed. In this dialog box, browse to the desired folder and save the file with a distinct name. Similarly, to import a database link choose the **Import** button; the **Open** dialog box will be displayed. In this dialog box, browse to the required file and choose the **Open** button; the link will be added in the **DataTools** tab of the **File Options** dialog box.

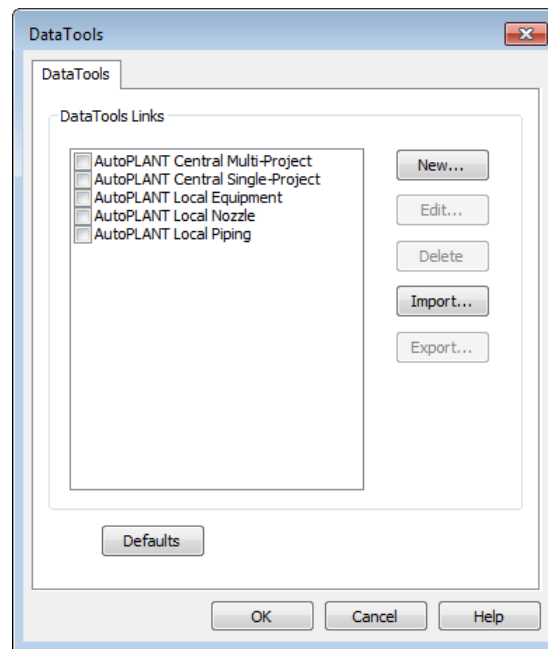


Figure 3-17 The *DataTools* dialog box

MEASURE TOOLS

In a project, you can perform several functions such as calculating distances, angle, and area. To perform these functions, you can use measure tools. Before measuring an object, you need to adjust the cursor snapping. To do so, invoke the **Options Editor** dialog box by choosing the **Options** button from the **Application Menu**. Expand the **Interface** node in the left pane of this dialog box and select the **Snapping** option; several options will be displayed in the right pane of the dialog box, as shown in Figure 3-18.

In the **Picking** area, the **Snap to Vertex** check box is selected by default. As a result, the cursor will snap to the nearest vertex while measuring distances. Select the **Snap to Edge** check box to snap the cursor to the nearest triangular edge. The **Snap to Line Vertex** check box is selected

by default. As a result, the cursor will snap to the nearest line end. To define the snapping margin, specify a value in the **Tolerance** edit box. By default, the value in the **Tolerance** edit box is **5**. In the **Rotation** area, specify the snapping angle value in the **Angle** edit box. By default, the value displayed in the **Angle** edit box is **45.00**. To define the snapping tolerance, enter the value in the **Angle Sensitivity** edit box. The default value displayed in the **Angle Sensitivity** edit box is **5.00**.

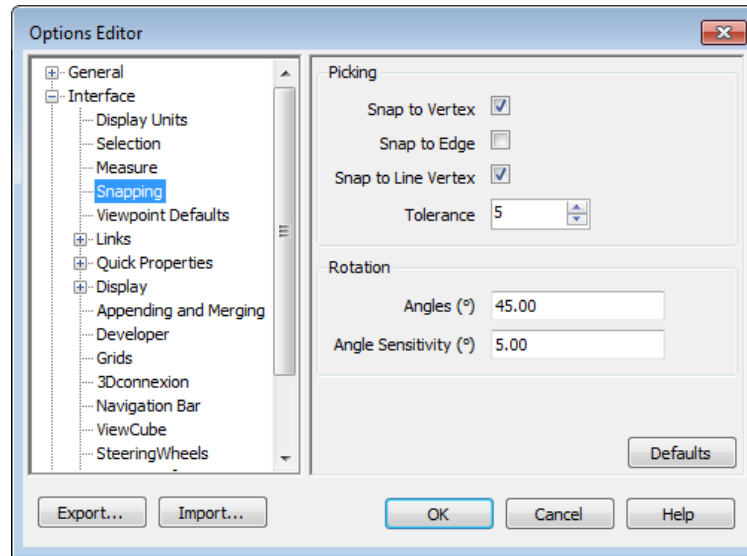


Figure 3-18 The Snapping page in the Options Editor dialog box

After defining all the parameters in the **Options Editor** dialog box, close it by choosing the **OK** button. Next, invoke the measuring tools from the **Review > Measure > Measure** drop-down. The measuring tools in this drop-down are discussed next.

Point to Point Tool



This tool is used to measure the distance between two points in a model. To do so, choose the **Point to Point** tool from the **Measure** drop-down; the measuring cursor will appear on the screen. Click on the required points between which the distance is to be measured; the measured distance will be displayed in the Scene View.

Point to Multiple Points Tool



This tool is used to measure the distance from a point to several other points in a model. To measure the distance between multiple points, choose the **Point to Multiple Points** tool from the **Measure** drop-down. Click on the start point and the first end point; the measured distance will be displayed in the Scene View. Next, click on the end points to be measured.

Point Line Tool



This tool is used to measure the total distance along the route. To measure the total distance along the route, choose the **Point Line** tool from the **Measure** drop-down.

Next, click on the start point and then click on the points along the route to be measured; the measured distance will be displayed in the Scene View.

Accumulate Tool



This tool is used to calculate the total distance between several point-to-point measurements. To do so, choose the **Accumulate** tool from the **Measure** drop-down. Then, click on the start and end points of the first distance to be measured. Next, click on the start and end points of the next distance to be measured; the sum of all point to point distances will be displayed in the Scene View.

Angle Tool



This tool is used to measure an angle between two points. To do so, choose the **Angle** tool from the **Measure** drop-down. Click on the start point of the first line. Next, click on the intersection point of the first and the second line. Click on the end point of the second line; the measured angle will be displayed in the Scene View.

Area Tool



This tool is used to calculate the area of a plane. To do so, choose the **Area** tool from the **Measure** drop-down. Click on the desired points to define the periphery of the area to be calculated; the calculated area will be displayed in the Scene View.

Shortest Distance Tool



This tool is used to measure the shortest distance between two objects in a model. To do so, select the required objects in the Scene View. Choose the **Shortest Distance** tool from the **Measure** panel in the **Review** tab; the shortest distance will be displayed in the Scene View.

Clear Tool



The **Clear** tool is used to delete the measurements. To do so, choose the **Clear** tool from the **Measure** panel in the **Review** tab; the measurements made will be deleted.

Convert to Redline Tool



The **Convert to Redline** tool is used for converting the measurements displayed in the Scene View into redlines. To do so, first take the measurements using any of the **Measure** tools. Next, choose the **Convert to Redlines** tool from the **Measure** panel in the **Review** tab; the measurements will be converted into redlines, and saved as a viewpoint in the **Saved Viewpoints** window. The thickness and color of these lines can be modified. To change the color of redline, select the color from the **Color** drop-down list of the **Redline** panel in the **Review** tab. To change the thickness of line, enter the thickness value in the **Thickness** edit box.

When you perform measurements in the Scene View, the measure results, start and end coordinates, and difference between the coordinates will be displayed in the edit boxes in the **Measure Tools** dockable window. To display this window, choose the **Measure Options** button from the **Measure** panel of the **Review** tab, refer to Figure 3-19.

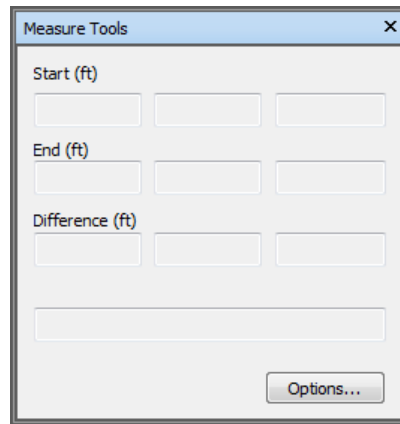


Figure 3-19 The Measure Tools dockable window

In this window, the **Start** and **End** edit boxes will display the coordinates of the start and points respectively. The **Difference** and **Distance** edit boxes in this window will display the difference of coordinates between the start and end points and the distance between them. If we calculate area and angle, the **Area** and **Angle** edit boxes will be displayed in this window.

You can also control the display of measurements in the Scene View. To do so, choose the **Options** button from the **Measure Tools** window; the **Options Editor** dialog box will be displayed. In this dialog box various measuring options are displayed in the right pane. Note that you can also access these options by expanding the **Interface** node in the **Options Editor** dialog box and then clicking on the **Measure** sub-node.

In the **Options Editor** dialog box, you can specify the thickness of measurement lines in the **Line Thickness** edit box. You can change the color of measurement lines by selecting an appropriate color from the **Color** flyout. To draw the measurement lines in 3D, select the **In 3D** check box. To clear the measurement values in the Scene View, clear the **Show measurement values in Scene View** check box, which is selected by default. The **Use centre lines** check box is also selected by default. As a result, the shortest distance measurement will snap to the centre lines of the parametric object. Additionally, the **Auto - zoom when measuring shortest distances** check box is selected by default. As a result, on calculating the shortest distance between two objects, the measured distance will zoom in automatically in the Scene View.

DIRECTION CONSTRAINTS FOR MEASUREMENTS

In a project, you can constrain the direction of measuring objects. The constraints can be applied in X, Y, and Z directions and they can also be applied in a direction parallel or perpendicular to the surface of an object. To apply directional constraints first you need to invoke any of the measuring tools from **Review > Measure > Measure** drop-down. The tools used for constraining the direction are discussed next.

X Axis Tool



The **X Axis** tool is used to constrain the measurement of an object in the X direction. To constrain the measurement along the X axis, choose the **X Axis** tool from the **Review**

> **Measure** > **Lock** drop-down. Click on the start point of the distance to be measured; the measuring line will be displayed in red color indicating that it is locked in X direction. Next, click on the end point; the distance will be displayed in the Scene View.

Y Axis Tool



The **Y Axis** tool is used to constrain the measurement of an object in the Y direction.

To constrain the measurement along the Y axis, choose the **Y Axis** tool from the **Review** > **Measure** > **Lock** drop-down. Click on the start point of the distance to be measured; the measuring line will be displayed in green color indicating that it is locked in Y direction. Next, click on the end point; the distance will be displayed in the Scene View.

Z Axis Tool



The **Z Axis** tool is used to constrain the measurement of an object in the Z direction.

To constrain the measurement along the Z axis, choose the **Z Axis** tool from **Review** > **Measure** > **Lock** drop-down. Click on the start point of the distance to be measured; the measuring line will be displayed in blue color indicating that it is locked in Z direction. Next, click on the end point; the distance will be displayed in the Scene View.

Perpendicular Tool



The **Perpendicular** tool is used to constrain the measurement of an object in a direction perpendicular to the surface of the start point. To use the perpendicular lock, choose the **Perpendicular** tool from the **Review** > **Measure** > **Lock** drop-down. Click on the start point of the distance to be measured; the measuring line will be displayed in yellow color indicating that it is locked in the perpendicular direction. Next, click on the end point; the distance will be displayed in the Scene View.

Parallel Tool



The **Parallel** tool is used to constrain the measurement of an object in a direction parallel to the surface of the start point. To use the parallel lock, choose the **Parallel** tool from the **Review** > **Measure** > **Lock** drop-down. Click on the start point of the distance to be measured; the measuring line will be displayed in magenta color indicating that it is locked in the parallel direction. Next, click on the end point; the distance will be displayed in the Scene View.

REDLINE TOOLS

In a project, you can mark up the viewpoints and clash results by adding texts and drawing revision clouds. These mark ups are added by using the redline tools. The redline tools are discussed next.

Adding Text to Redline

In a project, you can mark or annotate a saved viewpoint and clash results by adding text. To add text, choose the **Text** tool from the **Redline** panel in the **Review** tab; a pencil cursor will be displayed on the screen. Click at the required location in the Scene View; the **Autodesk Navisworks Manage 2015** dialog box will be displayed. Specify the text in the

Enter Redline Text text box and choose the **OK** button; the text will be added at the specified location. To move the text, right-click on it; a shortcut menu will be displayed. Choose the **Move** option from the menu, and click at the desired location; the text will be placed at the specified location. To edit the text, choose the **Edit** option from the shortcut menu; the **Autodesk Navisworks Manage 2015** dialog box will be displayed. Make the required changes and choose the **OK** button to apply the changes. To delete the text, choose the **Delete Redline** option from the shortcut menu.



Note

By default, the redline text is written in a single line. To write it in multiple lines, specify \P after the text from where you want to start the next line. To left align the text, leave no space between the \P and the succeeding text.

Drawing Cloud

In a project, you can mark a saved viewpoint and clash result by drawing cloud, line, ellipse, and so on. For example, to draw a cloud, first you need to choose the desired saved viewpoint. Next, choose the **Cloud** tool from the **Review > Redline > Draw** drop-down; the pencil cursor will appear in the Scene View. Now, click in the required direction to create a cloud. Similarly, you can use the other tools from the **Draw** drop-down to mark the saved viewpoints.

You can delete redline clouds and texts as per your requirement. To do so, choose the **Erase** tool from the **Redline** panel in the **Review** tab; the erase cursor will appear in the Scene View. Now, draw a box around the text or line to be deleted; the redlines will be erased.

TAGS AND COMMENTS

In Navisworks, you can tag anything in the Scene View which allows you to add comments or notes to the viewpoints. The comments added to the saved viewpoints and animations can be used for reference later. In the next section, you will learn about adding tags.

Adding Tags

In a project, you can tag anything in the Scene View. To do so, choose the **Add Tag** option from the **Tags** panel in the **Review** tab; a pencil cursor will be displayed on the screen. In the Scene View, first click on the object you want to tag and then click at the point where you want to label the tag; the **Add Comment** dialog box will be displayed. Alternatively, you can click thrice at the point where you want to create a tag. Specify the text in the **Add Comment** area. To set the tag status, select the required options from the **Status** drop-down list and choose the **OK** button. The tag will be added to that particular object, and it will be saved as a viewpoint in the **Saved Viewpoints** window. The comment which you have added in the **Add Comment** dialog box will be displayed in the **Comments** window. This window is discussed next.

The Comments Window

In a project, when you add comments to viewpoints or results, you can view them in the **Comments** window. In this window, you can add all the comments related to the model and can obtain any information quickly. The data will be displayed in a separate window rather than the Scene View. To display the window, choose the **View Comments** button from the **Comments** panel in the **Review** tab; the **Comments** window will be displayed, as shown in Figure 3-20.

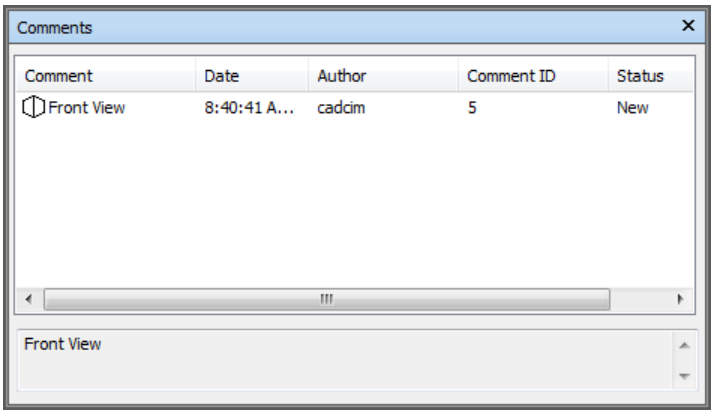


Figure 3-20 The Comments window

In the **Comments** window, you can view the information related to comments such as the author of comments, date on which comment was added, the content of comment, and so on. These informations will be displayed in different columns. You can add comments to selection and search sets, Viewpoints, Animation, Timeliner, and Clash results. The method of adding comment is discussed next.

Adding Comment

In a project, you can add comments to a selection and search set, viewpoints, clash results, animation, and so on. To add a comment to a selection/search set, select the required set from the **Sets** window. Choose the **Add Comment** button; the **Add Comment** dialog box will be displayed. Specify a comment and choose the **OK** button; the comment will be added to the set. Similarly, you can add comments to a particular viewpoint. To do so, choose the **Saved Viewpoints Dialog Launcher** button from the **Save, Load & Playback** panel in the **Viewpoint** tab; the **Saved Viewpoints** window will be displayed, as shown in Figure 3-21. Now, select the desired viewpoint and right-click on it; a shortcut menu will be displayed. Choose the **Add Comment** option from the menu; the **Add Comment** dialog box will be displayed. Enter the comment in the dialog box, assign the status from the **Status** drop-down list, and choose the **OK** button; the comment will be added to the window. Similarly, you can add comments to clash results and timeliner which will be discussed in later chapters. To view the added comments, click on the source item to which you have added the comment; the comments will be displayed in the **Comments** window.

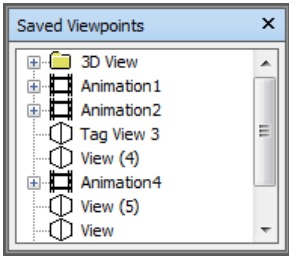


Figure 3-21 The Saved Viewpoints window

You can modify the added comments. The procedure of modifying comments is discussed next.

Modifying Comment

In a project, after adding comments, you can edit them directly in the **Comments** window. To do so, right-click on the comment in the **Comment** window; a shortcut menu will be displayed.

Choose the **Edit Comment** option from the menu; the **Edit Comment** dialog box will be displayed. Next, type the desired comment and choose the **OK** button; the comment will be edited. To delete a comment, choose the **Delete Comment** option from the shortcut menu; the comment will be deleted.

In a project, you may need to search for comments based on data, date, and source. To do so, the **Find Comments** window is used, which is discussed next.

The Find Comments Window

The **Find Comments** window is a dockable window, using the options in this window you can search for the added comments. To invoke the **Find Comments** window, choose the **Find Comments** button from the **Comments** panel in the **Review** tab; the **Find Comments** window will be displayed, as shown in Figure 3-22.

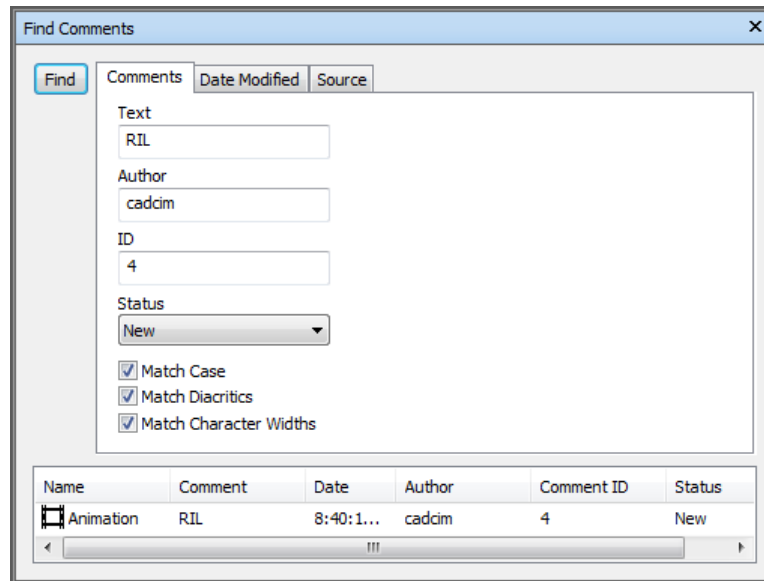


Figure 3-22 The *Find Comments* window

This window comprises of three tabs: **Comments**, **Date Modified**, and **Source**. To search for a particular **Text**, **Author**, **ID** or **Status**, choose the **Comments** tab. To search within a certain timeframe, choose the **Date Modified** tab. To search for the comments attached to the selected source, choose the **Source** tab. After specifying all the search criteria, choose the **Find** button; the results will be displayed at the bottom of the window.



You can also use the **Quick Find Comments** text box from the **Comments** panel in the **Review** tab to quickly find the comments. To do so, type the keywords in the **Quick Find Comments** edit box in the **Comments** panel of the **Review** tab. Next, choose the button next to the text box; the **Find Comments** dialog box will be displayed with a list of all comments that match the text.

COMPARING MODELS

While working on a project, sometimes you may need to find the differences between two elements in a model. Alternatively, you may need to compare two models of different versions. In Navisworks, you can find out the differences or compare two models by using the **Compare** tool. To compare two elements in a model, first select the required elements using the CTRL key. Next, choose the **Compare** tool from the **Home > Tools** panel; the **Compare** dialog box will be displayed, as shown in Figure 3-23. To compare two different versions of the same model, first load the first file that you want to compare. Next, append the second file and then select both the files in the **Selection Tree** window using the CTRL key. Next, invoke the **Compare** tool; the **Compare** dialog box will be displayed. The options in this dialog box are discussed next.

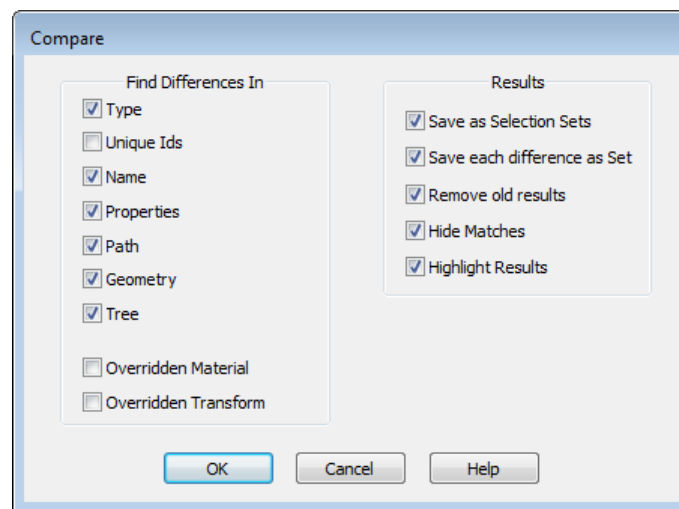


Figure 3-23 The *Compare* dialog box

Find Differences In

In the **Find Differences In** area of the dialog box, select the check boxes corresponding to the categories in which you want to find the differences. For example, to find differences in the geometry of two model elements, select the **Geometry** check box. If you have made any changes in the model appearance or made any transformation in the model, then you need to select the **Overridden Material** and **Overridden Transformation** check boxes to compare the elements with material and location overrides.

Results

In the **Results** area, there are various options that allow you to specify how you want to display the comparison results. The options in this area are discussed next.

Save as Selection Sets

Select this check box to save the comparison results of matched and unmatched objects as a separate selection set in the **Sets** window. The comments related to the comparison result of the matched and unmatched objects will be available in the **Comments** window.

Save each difference as Set

Select this check box to save the differences that are found while comparing the elements as a selection set. The selection set will also contain comments related to the comparison results. You can view these comments in the **Comments** window.

Remove old results

Select this check box to delete the results of old comparison from the **Sets** window.

Hide Matches

Select this check box to hide the matching objects after the comparison finishes. This will allow you to view the differences clearly.

Highlight Results

Select this check box to highlight all the objects having the differences in different color overrides.

After the comparison finishes, the results will be displayed in the Scene View. The matched and the unmatched items, and the differences in the items will be displayed in different color codes. The matching elements will be highlighted in white color. The elements with differences will be highlighted in red color. Items found in the first element but not in the second element will be highlighted in yellow, and the one found in the second element but not in the first element will be highlighted in cyan.

CONTROLLING THE VISIBILITY OF OBJECTS

In a project, you may need to control the visibility of some objects in the Scene View. In Navisworks, you have several options to control the visibility of objects in the model. You can hide and display an object or a group of objects in the model. To hide an object in the model, first select the desired object in the model. Next, choose the **Hide** button from the **Visibility** panel in the **Home** tab; the selected object will be hidden. Notice that the hidden object will appear gray in the **Selection Tree** window. To display the hidden object(s), choose the **Hide** button again. To hide all the unselected objects in the model, select the object which you want to display and then choose the **Hide Unselected** button from the **Visibility** panel in the **Home** tab; the unselected objects will be hidden. To display all the hidden objects, choose **Unhide All** from the **Unhide All** drop-down, refer to Figure 3-24. To make the object visible during navigation, regardless of the performance setting, select the item in the **Selection Tree** window. Next, choose the **Require** button from the **Visibility** panel; the required objects will appear red in the **Selection Tree** window. To make all the objects unrequired, select the **Unrequire All** option from the drop-down list in the **Visibility** panel, refer to Figure 3-24.

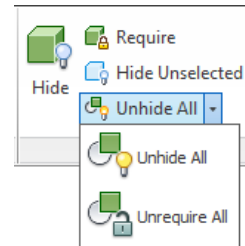
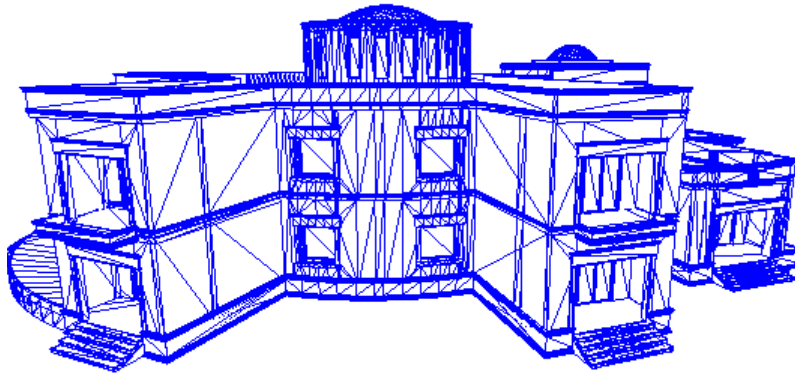


Figure 3-24 The *Unhide All* drop-down

CONTROLLING THE APPEARANCE OF THE MODEL IN THE SCENE VIEW

You can control the appearance of a model in the Scene View. To control the display of your model in the Scene View, use the tools available in the **Render Style** panel of the **Viewpoint** tab. There are four render modes available to control the delivery of items in the **Scene View**. To apply these modes, click on the **Mode** option in the **Render Style** panel of the **Viewpoint** tab; a drop-down list will be displayed. Select any of the four options from the drop-down list. Select the **Full Render** option to render the model with smooth shading including the materials used. Select the **Shaded** mode to deliver the model with smooth shading but without textures. Select the **Wireframe** mode to deliver the model in wireframe. Select the **Hidden Line** mode to deliver the model in wireframe but in this case only outline edges will be displayed, as shown in Figure 3-25.



*Figure 3-25 The Wireframe view of the model on using the **Hidden Line** mode*

In Navisworks, the 3D scene illumination can be controlled by making it brighter or lighter by using four lighting modes available in the **Lighting** mode drop-down list. To use these options, click on the **Lighting** option in the **Render Style** panel of the **Viewpoint** tab; a drop-down list will be displayed. You can select any of the following four options: **Full Lights**, **Scene Lights**, **Head Light**, and **No Lights**.

You can also change the background color and its effect to be used in the Scene View as per your choice. To configure the background effect, invoke the **Background** tool from the **Scene View** panel in the **View** tab; the **Background Settings** dialog box will be displayed, as shown in Figure 3-26.

Select the type of background effect from the **Mode** drop-down list, and then choose the color from the **Color** drop-down list. Select the **Plain** mode to fill the background of the scene with the selected color. Select the **Graduated** mode to fill the background of the scene with two colors. Select the **Horizon** mode to split the scene across the horizontal plane which gives the effect of sky and ground.

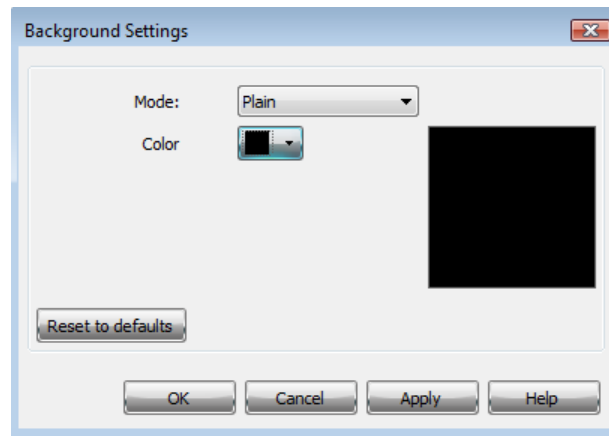


Figure 3-26 The Background Settings dialog box

CONTROLLING OBJECT ATTRIBUTES

In a project, you can control the object transformation and its appearance. All these changes are displayed in the Scene View. You can alter the object's position, size, and rotation using the visual manipulation tools (Gizmos). You can also make these changes numerically. The method of controlling object attributes using these tools will be discussed individually.

Controlling Object Attributes using Gizmo

You can move, rotate, and resize the objects using gizmo. To move an object to the required position in the Scene View, select the required object; you will notice that the **Item Tools** contextual tab appears in the ribbon. This tab contains all the transformation tools which are also called gizmos. These gizmos are discussed next.

Move Gizmo

The **Move** gizmo is used to adjust the position of the selected object. To do so, choose the **Move** tool from the **Transform** panel in the **Item Tools** contextual tab; the **Move** gizmo will be displayed in the Scene View, as shown in Figure 3-27. To move the selected object in the X, Y, and Z direction, place the mouse over the gizmo; the cursor will change into a hand symbol. Next, place the mouse over the required axis; the axis will be highlighted, and then drag it in the required direction. You can also change the position of the gizmo in the Scene View. To do so, press and hold the CTRL key. Place the cursor on the centre ball of the gizmo. Next, drag the gizmo and place it at the desired location.

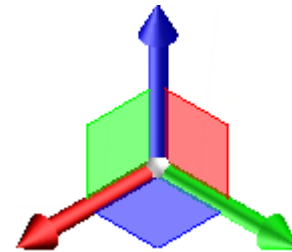


Figure 3-27 The Move gizmo



Tip: You can also move an object by specifying exact values. To do so, select the object and right-click to display a shortcut menu. Next, choose the **Override Item > Override Transform** option from the menu; the **Override Transform** dialog box will be displayed. Specify the coordinates value in the dialog box and choose the **OK** button; the selected object will be moved to the specified location.

Rotate Gizmo

The **Rotate** gizmo is used to rotate a selected object with gizmo. To do so, choose the **Rotate** tool from the **Transform** panel in the **Item Tools** contextual tab; the **Rotate** gizmo will be displayed in the Scene View, as shown in the Figure 3-28. Now, adjust the center point of rotation. The method of adjusting the center point is same as the method for adjusting the **Move** gizmo. Place the mouse over one of the curves in the middle, refer to Figure 3-24 and drag the mouse to rotate the selected object.



Figure 3-28 The **Rotate** gizmo

Scale Gizmo

The **Scale** gizmo is used to resize the selected object. To do so, choose the **Scale** tool from the **Transform** panel in the **Item Tools** contextual tab; the **Scale** gizmo will be displayed in the Scene View, as shown in Figure 3-29. Now, to resize the object along a single axis, drag any of the three axes. To resize the object across two axes, drag the colored triangles in the middle of the two axes. To resize the object across all the three axes at the same time, use the ball in the center of the gizmo.



Figure 3-29 The **Scale** gizmo

Controlling Object Attributes Numerically

You can also move, rotate, and scale the selected objects numerically. To do so, first invoke any of the gizmos, and then click on the down arrow in the **Transform** panel; various edit boxes such as **Position**, **Rotation**, **Scale**, and **Transformation Centre** will be displayed. Now, specify the values in the required edit boxes.

You can also change the appearance such as color and transparency of the selected objects. To change the color, click on the **Color** drop-down in the **Appearance** panel of the **Item Tools** tab; a list of colors will be displayed. Select the desired color; the color of the object will be changed. To adjust the transparency, drag the **Transparency** slider in the **Appearance** panel of the **Item Tools** tab.

LINKS

Navisworks uses several sources of links such as the links converted from CAD files, links added by the users, and links which are automatically generated by the program, like viewpoint links. To display these, choose the **Links** button from the **Display** panel in the **Home** tab; all links will be displayed as icons in the Scene View.

Types of Links

There are two types of links: Standard and User Defined. Standard links are hyperlink, label, viewpoints, and clash detection. User Defined links are those in which a user can create different categories other than the standard ones. You can control the display of both the links. To control the display of the Standard links, choose the **Options** button from the **Application Menu**; the **Options Editor** dialog box will be displayed. Expand the **Interface** node in the left pane of the dialog box. Next, expand the **Links** sub node and select **Standard Categories**, as shown in Figure 3-30.

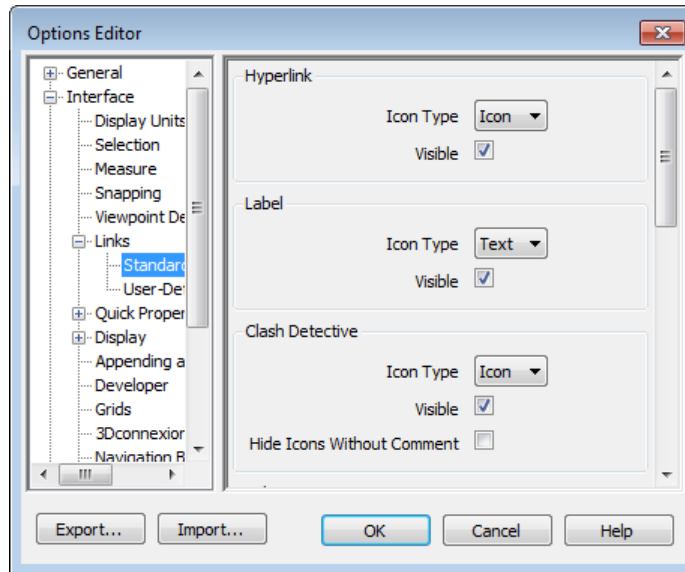


Figure 3-30 The Standard Categories option selected in the Options Editor dialog box

In the right pane of the dialog box, select the corresponding **Visible** check box to display the links and to hide them clear the check box. To change the appearance of links, select the required option from the **Icon Type** drop-down list for the corresponding link category, and choose the **OK** button to close the dialog box.

Similarly, to control the display of user defined links, select the **User Defined Categories** option from the **Links** sub node under the **Interface** node; several options will be displayed in the right pane of the dialog box. In this pane, select the **Visible** check box to display the corresponding links and clear the check box to hide them. To change the appearance of links, select the required option from the **Icon Type** drop-down list. Next, choose the **OK** button to close the dialog box. Note that the user defined options will not be available if you have not added the user defined categories. You can also search for links by using the **Find Items** window.

Customizing Appearance of Links in the Scene View

To avoid the confusion arising due to the large number of links displayed in the Scene View, you can customize the appearance of links displayed in the Scene View by using options in the

Options Editor dialog box. To do so, expand the **Links** sub node under the **Interface** node in the left pane of the **Options Editor** dialog box, as shown in Figure 3-31; several options will be displayed in the right pane of the dialog box. Specify the value in the **Max Icons** edit box to control the display of icons in the Scene View. Select the **Hide Colliding Icons** check box to hide any overlapping link icon in the Scene View. To specify the distance between camera and the drawn links, enter the value in the **Cull Radius** edit box.

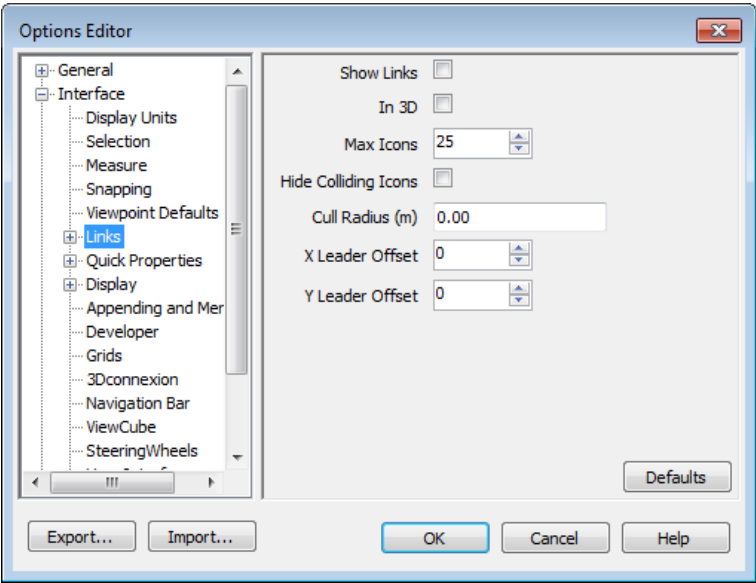


Figure 3-31 The **Links** options in the **Options Editor** dialog box

Sometimes links can be hidden in the Scene View. To avoid this, select the **In 3D** check box; the links will float in front of their attachment points. To show the leader lines, specify the distance in the **X Leader Offset** and **Y Leader Offset** edit boxes; links will be displayed with the leader lines pointing to the attached items.

Adding Links

The links can be appended from various data sources such as spreadsheets, webpages, audio and video files. You can attach multiple links to a single object. To add a link to an object, select the desired object in the model; the **Item Tools** contextual tab will be displayed in the ribbon. Choose the **Add Link** tool from the **Links** panel in the **Item Tools** tab; the **Add Link** dialog will be displayed, as shown in Figure 3-32. Alternatively, right-click on the selected object; a shortcut menu will be displayed. Choose the **Links** option from the shortcut menu; a flyout will be displayed. Choose the **Add Link** option; the **Add Link** dialog box will be displayed. Specify a desired name for the link in the **Name** edit box. To specify the file to be linked, choose the **Browse** button displayed to the right of the **Link to file or URL** edit

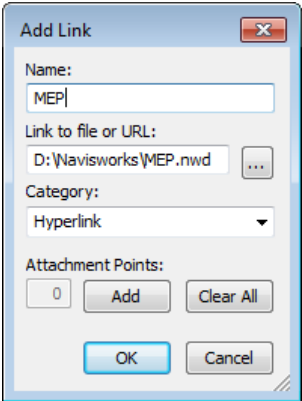


Figure 3-32 The **Add Link** dialog box

box; the **Choose Link** dialog box will be displayed. Browse to the folder location and select the required file. Next, choose the **Open** button from the **Choose Link** dialog box; the path of the selected file will be displayed in the **Link to file or URL** edit box. Choose the link category from the **Category** drop-down list. To attach the link to a specified point on the selected item, choose the **Add** button under the **Attachment Points** area; a pick cursor will be displayed in the Scene View. Click on the required location on the selected object in the Scene View. Next, choose the **OK** button; the dialog box is closed and a link will be added. The link icon will be displayed at the specified location in the Scene View. To delete the attached points, choose the **Clear All** button in the **Attachment Points** area and then choose the **OK** button. You can add several links to an object by repeating the above mentioned steps.

Managing Links

In Navisworks, you can edit, reset, and delete all the links except those which are automatically generated such as links which points to the clash results, viewpoints, TimeLiner tasks, and so on. To edit a link, right-click on the required link; a shortcut menu will be displayed. Choose the **Edit Link** option from the menu; the **Edit Links** dialog box will be displayed, as shown in Figure 3-33.

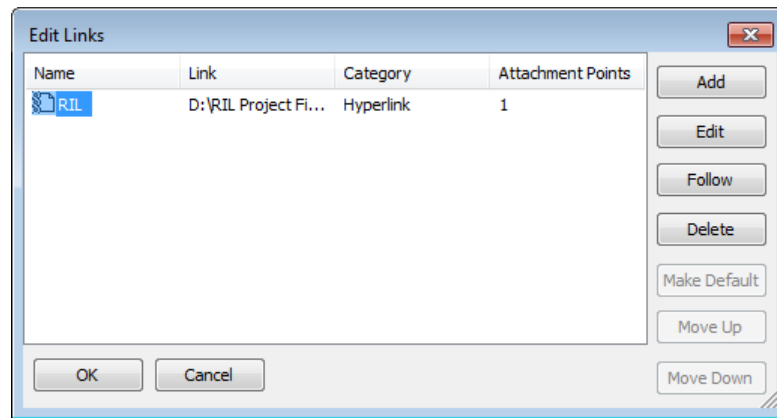


Figure 3-33 The **Edit Links** dialog box

Now in the dialog box, select the link that you want to edit and choose the **Edit** button; the **Edit Link** dialog box will be displayed, as shown in Figure 3-34. Enter the link details in the **Name**, **Link to file or URL**, and **Category** edit boxes. Next, specify the desired **Attachment Points** to change the location of links in the Scene View, and choose the **OK** button to close the dialog box.

Similarly, to delete a link, select the required link from the **Edit Links** dialog box, refer to Figure 3-34. Choose the **Delete** button and then the **OK** button; the link will be deleted. To reset all links for an object, select the required object. Next, choose the **Reset**

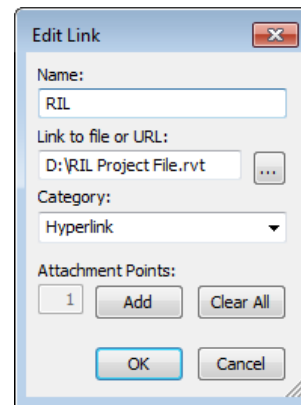


Figure 3-34 The **Edit Link** dialog box

Links tool from the **Links** panel in the **Item Tools** contextual tab; all links will be readjusted to their original state. Similarly, you can reset all links in the Scene View to their original state. To do so, select the **Links** option from the **Reset All** drop-down list in the **Project** panel of the **Home** tab; all links will be readjusted.



Tip: You can also display the **Edit Links** dialog box by choosing the **Edit Links** tool from the **Links** panel of the **Item Tools** tab, refer to Figure 3-29.

THE APPEARANCE PROFILER WINDOW

In a project, you can customize the appearance of a model by defining the custom display settings based on the property data or selection/search sets, using the **Appearance Profiler** window. The **Appearance Profiler** window is a dockable window. You can use this window to differentiate between the objects by color coding them and adding transparency in the model. To invoke the **Appearance Profiler** window, choose the **Appearance Profiler** button from the **Tools** panel in the **Home** tab; the **Appearance Profiler** window will be displayed, as shown in Figure 3-35. Alternatively, to display the **Appearance Profiler** window, select the **Appearance Profiler** check box from the **View > Workspace > Windows** drop-down. The **Appearance Profiler** window is divided in three areas: **Selector**, **Selector** list, and **Appearance**. These areas are discussed next.

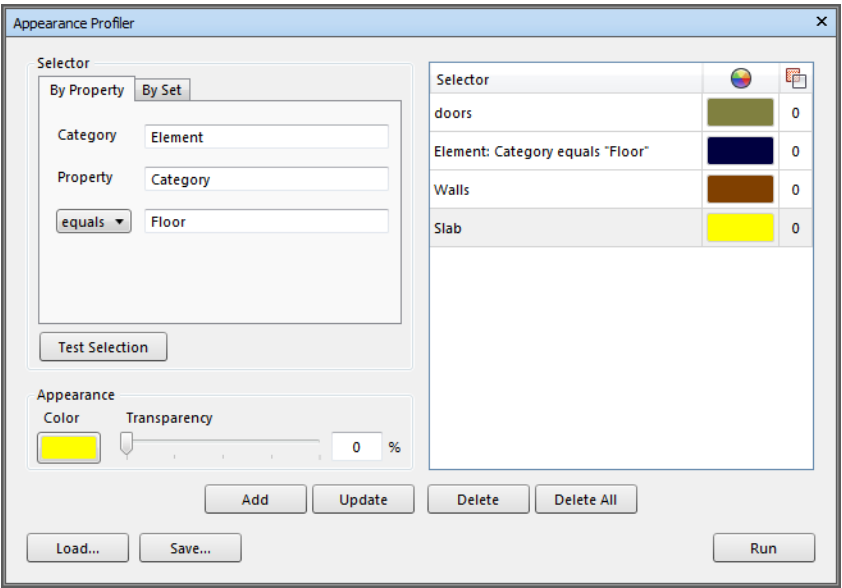


Figure 3-35 The *Appearance Profiler* window

Selector Area

The left pane of the **Appearance Profiler** window is the **Selector** area. In this area, there are two tabs: **By Property** and **By Set**. In the **By Property** tab, you can define the search criteria based on property. In the **By Set** tab, you can define the search criteria based on selection and search sets. The **Test Selection** button is used for checking the defined search criteria. On choosing this button, the objects satisfying the search criteria will be selected in the model in the Scene View.

To define the selector by the property data, choose the **By Property** tab from the **Appearance Profiler** window. Enter the property category and property type in the **Category** and **Property** edit boxes. Select the appropriate condition operator from the **equals/does not equals** drop-down list. After defining the search criteria, choose the **Test Selection** button; all objects meeting the search criteria will be selected in the Scene View.

Similarly, you can define the selector by using the selection/search set. To do so, first ensure that a search/selection set is defined in the project. Next, choose the **By Set** tab in the **Selector** area. Then select the set from the list. Next, choose the **Test Selection** button; all objects meeting the search criteria will be selected in the Scene View.

After defining the selector using any of the above discussed methods, you can configure its appearance in the **Appearance** area which is discussed next.

Appearance Area

The **Appearance** area is located at the right corner in the **Appearance Profiler** window. In this area, you can configure the appearance of the defined selector. The **Color** button in this area is used for selecting colors. On choosing this button, a **Color** palette will be displayed. Select the desired color from it and choose the **OK** button; the **Color** palette will be closed and the color will be selected. Specify the transparency level value in the **Transparency** edit box. After specifying the color and transparency, choose the **Add** button; the selector will be added in the **Selector** list area. Next, choose the **Run** button; the objects in the model will be color coded with the new color.

If you make any changes in the added selector, then choose the **Update** button for saving those changes. To remove a selector from the list, choose the **Delete** button. The **Delete All** button is used to clear the **Selector** list. The **Load** button is used to open an existing appearance profile. On choosing this button, the **Open** dialog box will be displayed. In the dialog box, browse to the desired file, and choose the **Open** button; the file will be loaded in the **Appearance Profiler** window. The **Save** button is used for saving the current appearance profile. On choosing this button, the **Save As** dialog box will be displayed. Specify the name for the file in the **File name** edit box. Choose the file type from the **Save as type** drop-down list, and choose the **Save** button; the file will be saved as a data file (.DAT file type).

Selector List Area

The right pane of the **Appearance Profiler** window is the **Selector** list. This area contains the list of all added selectors.

TUTORIALS

General instructions for downloading tutorial files:

1. Download the *c03_tutorial* zip file for the tutorial from <http://www.cadcim.com>. The path of the file is as follows: *Textbook > Civil/GIS > Navisworks > Exploring Autodesk Navisworks 2015*.
2. Now, save and extract the downloaded folder at the following location:
C:\Navisworks_2015



Note

*The default unit system used in the tutorials is metric. To change the units to imperial, select the required units from **Options Editor > Interface > Display Units**.*

Tutorial 1

Taking Measurements

In this tutorial, you will open the file *c03_navisworks_2015_tut1*. Next, calculate the distance between mullions in the door by using various measuring tools such as the **Point to Point** tool, the **Point Line** tool, and the **Accumulate** tool.

(Expected time: 30min)

The following steps are required to complete this tutorial:

- a. Open the file *c03_navisworks_2015_tut1*.
- b. Display the saved views.
- c. Measure distances using the **Point to Point** tool.
- d. Measure distances using the **Point Line** tool.
- e. Measure distances using the **Accumulate** tool.
- f. Save the project.

Opening the File

In this section, you will open the file in Navisworks.

1. Choose the **Open** button from the Quick Access Toolbar; the **Open** dialog box is displayed.
2. In this dialog box, browse to the following location:
C:\Navisworks_2015\c03_tutorial.
3. Select **Navisworks File Set (*.nwf)** from the **Files of type** drop-down list.
4. Select the file *c03_navisworks_2015_tut1* from the displayed list of files; the file name appears in the **File name** edit box.
5. Choose the **Open** button from the dialog box; the model is displayed in the Scene View, as shown in Figure 3-36.

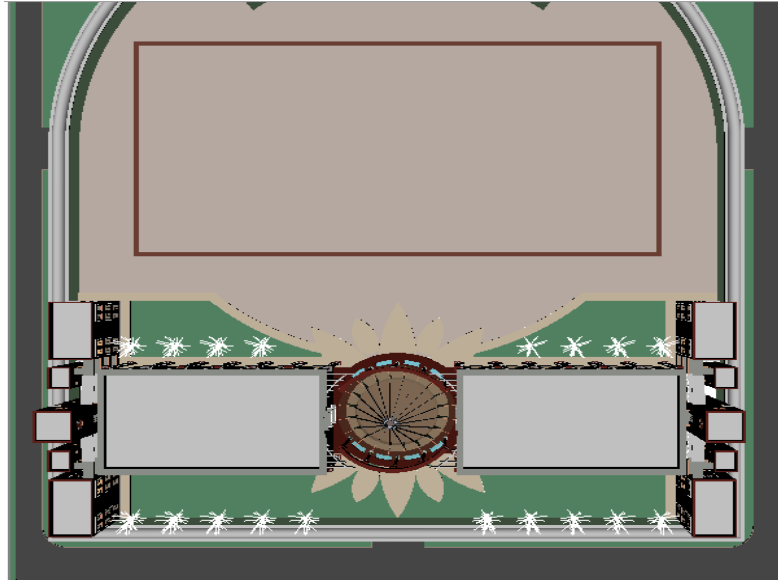


Figure 3-36 Model opened in Navisworks

Displaying the Saved Views

In this section, you will display the saved views by using the **Saved Viewpoints** window.

1. Choose the **Saved Viewpoints Dialog Launcher** button from the **Save, Load & Playback** panel of the **Viewpoint** tab; the **Saved Viewpoints** window is displayed, as shown in Figure 3-37.

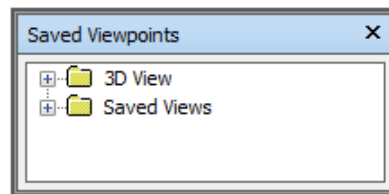


Figure 3-37 The Saved Viewpoints window

2. In the **Saved Viewpoints** window, click on the + icon corresponding to the **Saved Views** viewpoint folder; the folder is expanded, as shown in Figure 3-38.

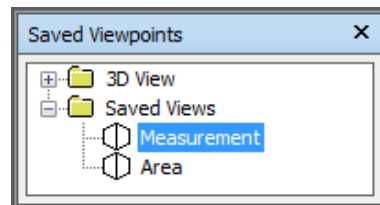


Figure 3-38 Expanded view of the Saved Views folder

3. Select the **Measurement** option from the **Saved Views** folder, refer to Figure 3-38; the view is displayed in the Scene View, as shown in Figure 3-39. Close the **Saved Viewpoints** window.

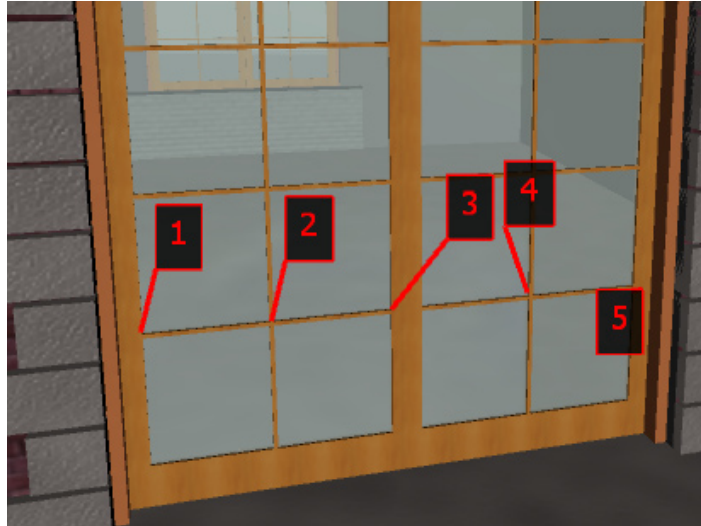


Figure 3-39 The Measurement view in the Scene View

Measuring Distances Using the Point to Point Tool

In this section, you will measure distances using the **Point to Point** tool.

1. Invoke the **Point to Point** tool from **Review > Measure > Measure** drop-down; the cursor appears on the screen.
2. Move and place the cursor at point 1 and click when the snap to vertex cursor appears, as shown in Figure 3-40.

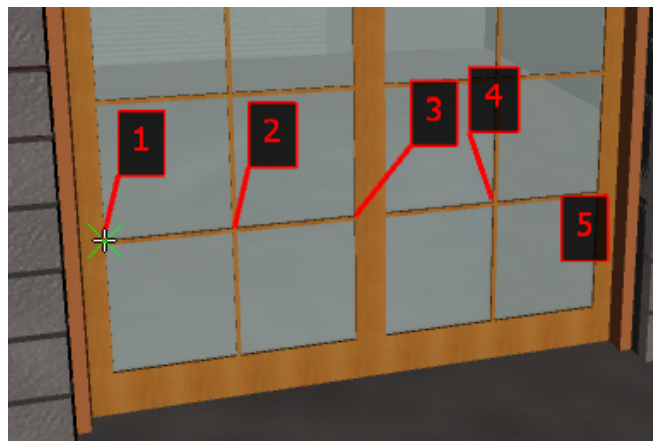


Figure 3-40 The cursor placed at point 1

- Next, place the cursor on point **2** and click when the snap to vertex cursor appears; the calculated distance is displayed in the Scene View, as shown in Figure 3-41.



Figure 3-41 Distance calculated between point 1 and 2

Measuring Distances Using the Point Line Tool

In this section, you will measure distances using the **Point Line** tool.

- Invoke the **Point Line** tool from the **Review > Measure > Measure** drop-down; the cursor appears on the screen and the previously calculated distance disappears.
- Place the cursor on point **1** and click when the snap to vertex cursor appears, as shown in Figure 3-42.

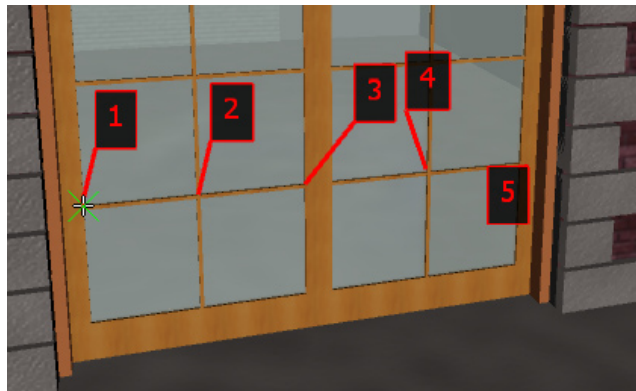


Figure 3-42 The cursor placed at point 1

- Next, place the cursor on point **2** and click when the snap to vertex cursor appears; the calculated distance is displayed in the Scene View, as shown in Figure 3-43.



Figure 3-43 Distance calculated between point 1 and 2

4. Repeat the procedure followed in steps 1 to 3 to calculate the total distance between 1 and 5; the calculated distance is displayed in the Scene View, as shown in Figure 3-44.

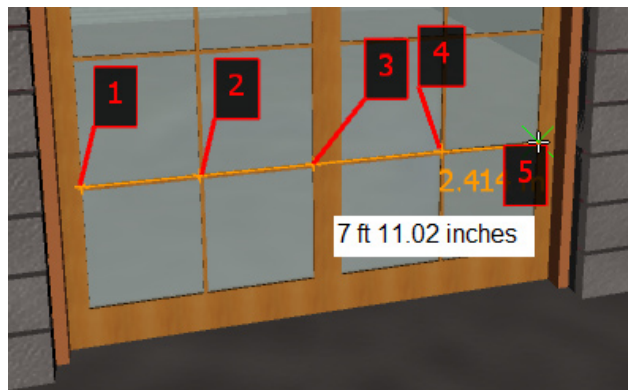


Figure 3-44 The total distance calculated between point 1 and 5

Measuring Distances Using the Accumulate Tool

In this section, you will measure distances using the **Accumulate** tool.

1. Invoke the **Accumulate** tool from **Review > Measure > Measure** drop-down; the cursor appears on the screen and the previously calculated distance disappears.
2. Place the cursor on point 1 and click when the snap to vertex cursor appears, as shown in Figure 3-45.



Figure 3-45 The cursor placed at point 1

3. Next, place the cursor on point 2 and click when the snap to vertex cursor appears; the calculated distance is displayed in the Scene View, as shown in Figure 3-46.



Figure 3-46 Distance calculated between point 1 and 2

4. Again, click on the point 2 and then click on point 3; the calculated distance is displayed in the Scene View, as shown in Figure 3-47.

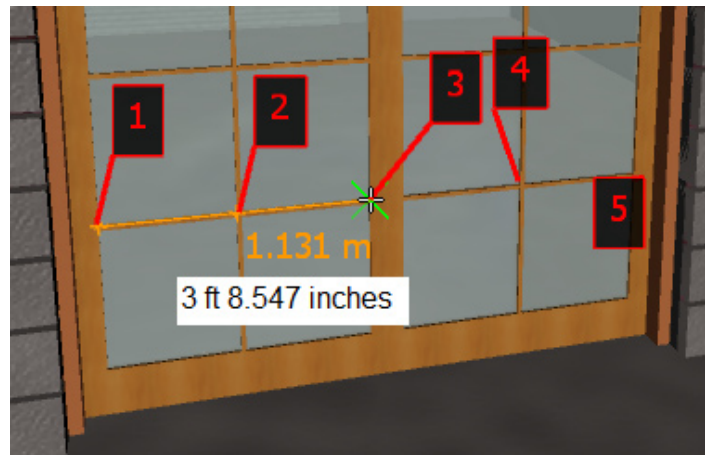


Figure 3-47 Distance calculated between point 1 and 3

5. Repeat the procedure followed in step 3 and calculate the distance between point 1 and 4 and point 1 and 5, refer to Figure 3-48 and Figure 3-49.

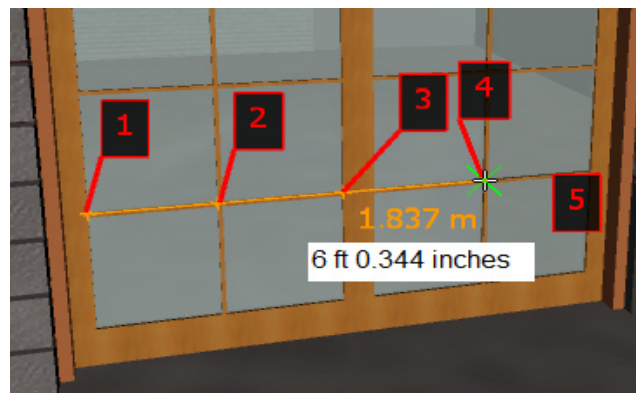


Figure 3-48 Distance calculated between point 1 and 4

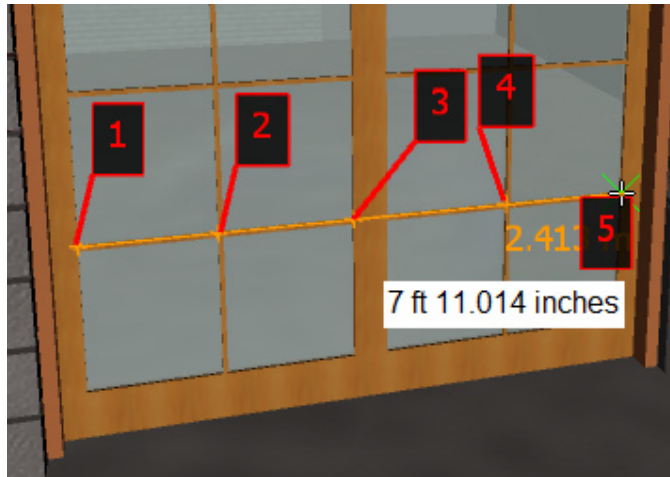


Figure 3-49 Distance calculated between point 1 and 5



Note

To save the dimensions, choose the **Convert to Redline** tool from the **Measure** panel in the **Review** tab; the view will be saved in the **Saved Viewpoints** window.

Saving the Project

In this section, you will save the project.

1. Choose **Save As** from the Application Menu; the **Save As** dialog box is displayed.
2. Browse to *Navisworks_2015* folder and enter **c03_navisworks_2015_tut01** in the **File name** edit box. Next, select the **Navisworks File Set (*.nwf)** file format from the **Save as type** drop-down list and then choose the **Save** button; the project is saved.

Tutorial 2

Creating Tags and Calculating Area

In this tutorial, you will open the file *c03_navisworks_2015_tut2*. Next, you will add tags to four corners of the roof and calculate the area of roof using the **Add Tag** and **Area** tools.

(Expected time: 45min)

The following steps are required to complete this tutorial:

- a. Open the file *c03_navisworks_2015_tut2*.
- b. Display the saved views.
- c. Add tags.
- d. Calculate area.
- e. Add text.
- f. Save the project.

Opening the File

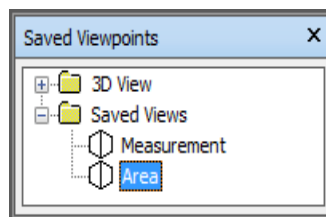
In this section, you will open the file in Navisworks.

1. Choose the **Open** button from the Quick Access Toolbar; the **Open** dialog box is displayed.
2. In this dialog box, browse to the following location:
C:\Navisworks_2015\c03_tutorial.
3. Select **Navisworks File Set (*.nwf)** from the **Files of type** drop-down list.
4. Select the file *c03_navisworks_2015_tut2* from the displayed list of files; the file name appears in the **File name** edit box.
5. Choose the **Open** button from the dialog box; the model is displayed in the Scene View, refer to Figure 3-36 (same as Tutorial 1).

Displaying the Saved Views

In this section, you will display the saved views by using the **Saved Viewpoints** window.

1. Choose the **Saved Viewpoints Dialog Launcher** button from the **Save, Load & Playback** panel of the **Viewpoint** tab; the **Saved Viewpoints** window is displayed, refer to Figure 3-37.
2. In the **Saved Viewpoints** window, click on the **+** icon corresponding to **Saved Views** viewpoint folder; the folder expands, refer to Figure 3-38.
3. Select the **Area** option from the **Saved Views** folder, as shown in Figure 3-50; the view is displayed in the Scene View, as shown in Figure 3-51. Now, close the **Saved Viewpoints** window.



*Figure 3-50 Expanded view of the **Saved Views** folder*

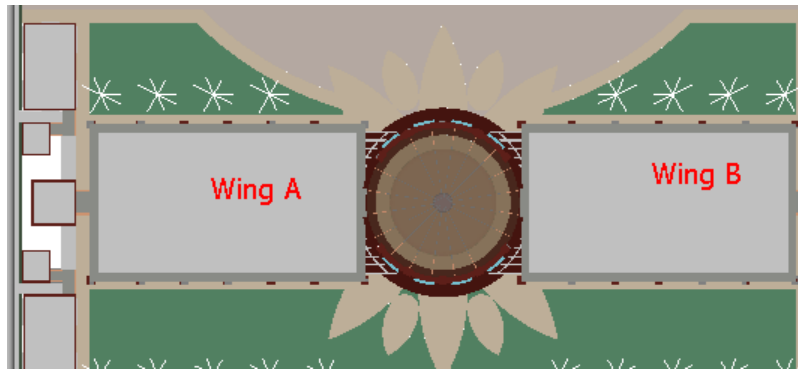


Figure 3-51 The Area view in the Scene View

Adding Tags

In this section, you will add tags to the four corners of the roof using the **Add Tag** tool.

1. Choose the **Add Tag** tool from the **Tags** panel in the **Review** tab; the shape of the cursor is changed to pencil.
2. Place the cursor at the corner of **Wing A**, as shown in Figure 3-52.
3. Double-click on the specified location; the tag 6 is created and the **Add Comment** dialog box is displayed.
4. In the dialog box, add the comment **Corner point 1** in the text box and choose the **OK** button; the dialog box is closed and the tag is created, as shown in Figure 3-53.

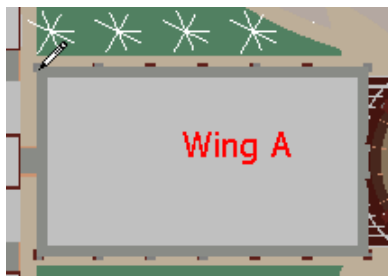


Figure 3-52 Placing the Tag cursor



Figure 3-53 Tag 1 created at the corner

5. Repeat the procedure followed in steps 1 to 4 and add tags on both the wings, as shown in Figure 3-54.

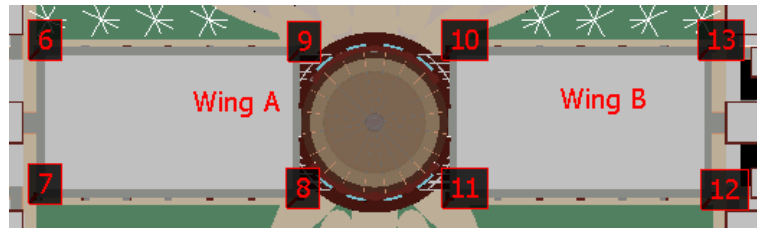


Figure 3-54 Tags created on both the wings



Note

Enter the comment as **Corner point 2**, **Corner point 3**, and so on in the **Add Comment** dialog box.

Calculating Area

In this section, you will calculate area of both the roofs.

1. Choose the **Area** tool from **Review > Measure > Measure** drop-down.
2. Place the cursor on the corner **6** in **Wing A** and click when the snap to vertex cursor appears.
3. Similarly, click on the corners **7**, **8**, and **9**; the calculated area is displayed in the Scene View, as shown in Figure 3-55.

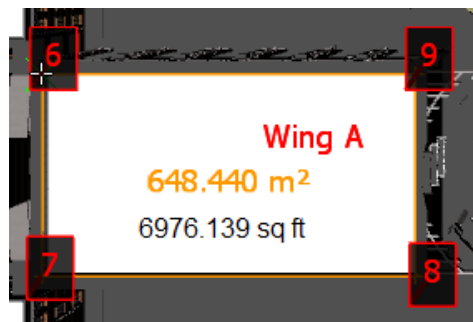


Figure 3-55 Area of roof Wing A



Note

Right-click to change the location of cursor while measuring the area.

4. Similarly, click on the four corners **10**, **11**, **12**, and **13**; the calculated area is displayed and which is almost equal to the area of **Wing A**.

Saving the Project

In this section, you will save the project.

1. To save the project with the current view, choose **Save As** from the Application Menu; the **Save As** dialog box is displayed.
2. Browse to *Navisworks_2015* folder and enter **c03_navisworks_2015_tut02** in the **File name** edit box. Next, select **Navisworks File Set (*.nwf)** file format from the **Save as type** drop-down list, and choose the **Save** button; the project is saved.

Tutorial 3 Finding Items and Saving as Search Sets

In this tutorial, you will open the file *c03_navisworks_2015_tut3* and then find items based on their types and properties. After finding items, you will save them as search sets.

(Expected time: 20min)

The following steps are required to complete this tutorial:

- a. Open the file *c03_navisworks_2015_tut3*.
- b. Display the **Find Items** and **Sets** windows.
- c. Specify the search criteria to find the items and save them as search set.
- d. Save the project.

Opening the File

In this section, you will open the file in Navisworks.

1. Choose the **Open** button from the Quick Access Toolbar; the **Open** dialog box is displayed.
2. In this dialog box, browse to the following location:
C:\Navisworks_2015\c03_tutorial.
3. Select **Navisworks File Set (*.nwf)** from the **Files of type** drop-down list.
4. Select the file *c03_navisworks_2015_tut3* from the displayed list of files; the file name appears in the **File name** edit box.
5. Choose the **Open** button from the dialog box; the model is displayed in the Scene View.

Displaying the Dockable Windows

In this section, you will invoke the **Find Items** and **Sets** windows and dock them on the left side of the interface.

1. Choose the **Find Items** tool from **Home > Select & Search** panel; the **Find Items** window is displayed.

2. Place the cursor on the title bar of the window and double-click; the window is docked at the left side of the interface.
3. Choose the **Manage Sets** option from **Home > Select & Search > Sets** drop-down list; the **Sets** window is displayed.
4. Place the cursor on the Title Bar in the **Sets** window, press and hold the left mouse button and drag the **Sets** window and over the Title Bar of the **Properties** window; the two windows are grouped together, refer to Figure 3-56.

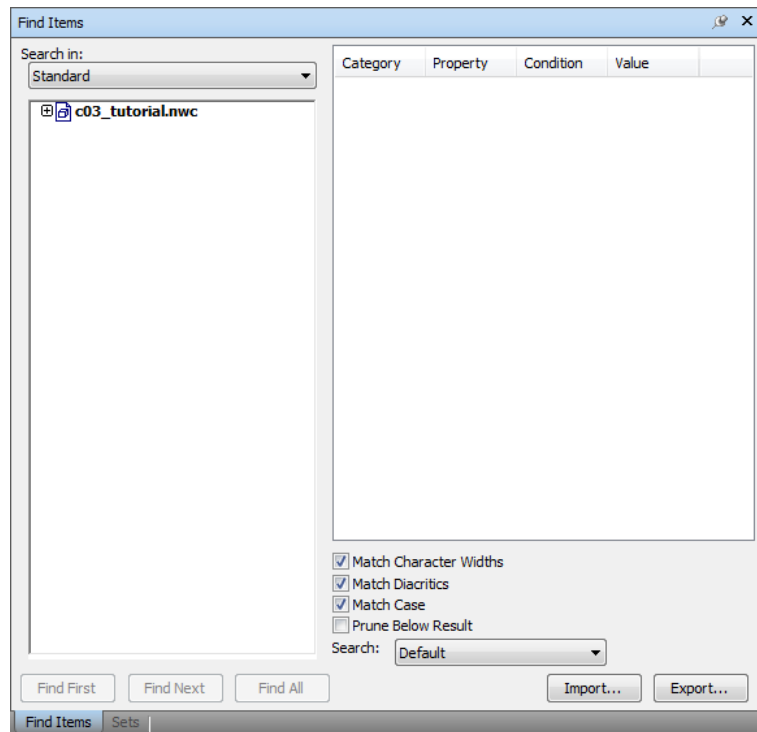
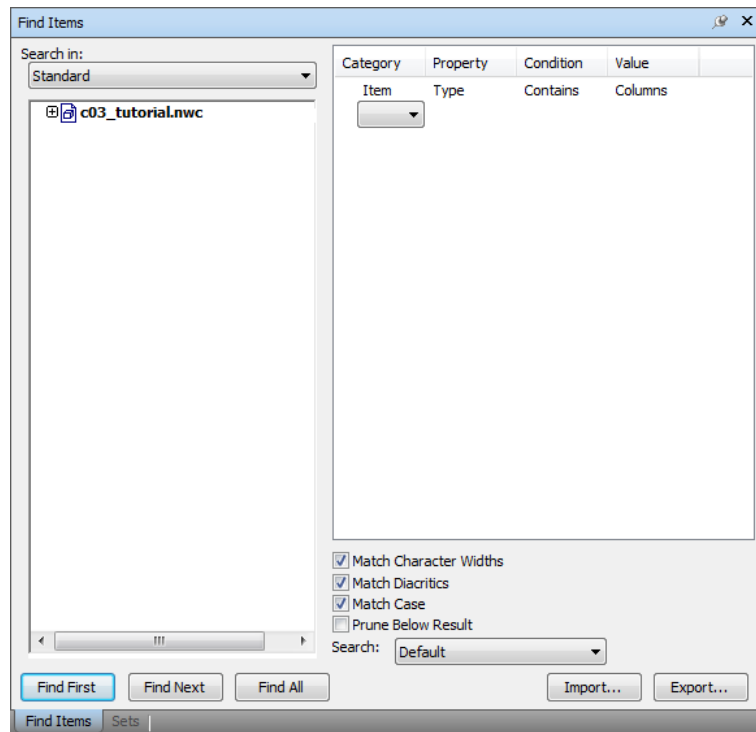


Figure 3-56 Two windows grouped together

Finding Items and Saving Items

In this section, you will specify the search criteria to find the items and then save them as search sets.

1. In the **Find Items** window, click in the **Category** column; a drop-down list is displayed. Select **Item** from the drop-down list. Similarly, select **Type**, **Contains**, and **Columns** from the **Property**, **Condition**, and **Value** columns, respectively, refer to Figure 3-57.



*Figure 3-57 Partial view of the **Find Items** window*

2. Choose the **Find All** button; the columns are selected and highlighted in the Scene View.
3. Choose the **Hide Unselected** tool from **Home > Visibility** panel; all the selected columns are displayed, refer to Figure 3-58.

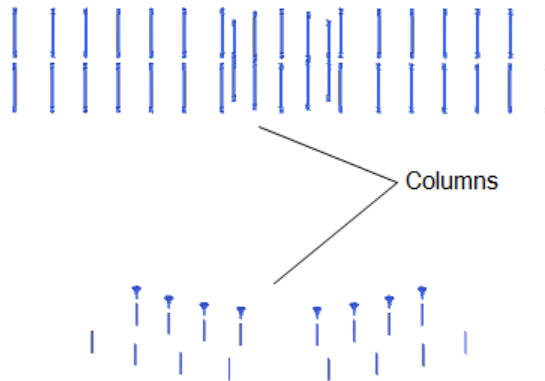
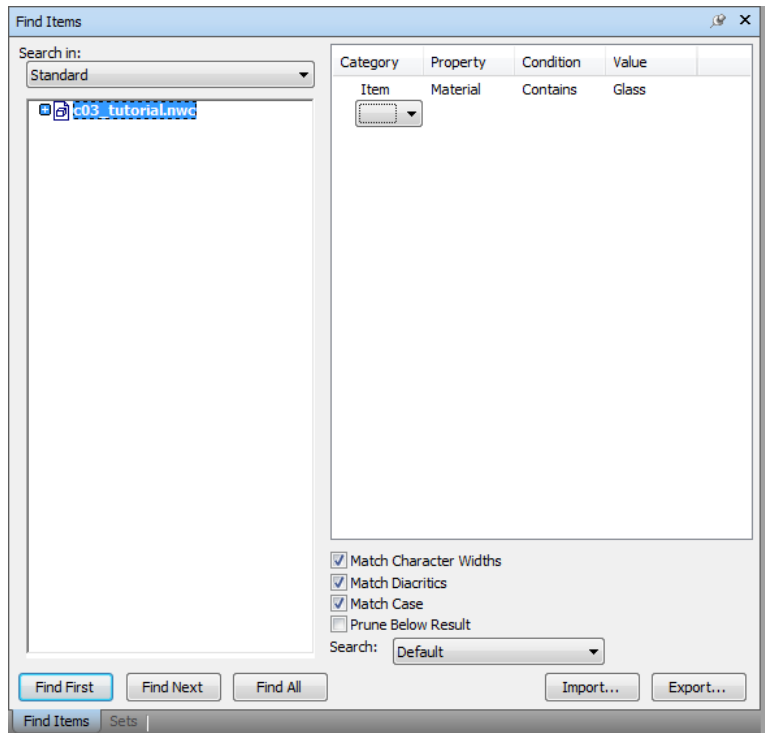


Figure 3-58 Columns displayed in Scene View

4. Choose the **Unhide All** tool from **Home > Visibility** panel; the whole model will be displayed.
5. Choose the **Sets** tab in the grouped window; the **Sets** window is displayed. Choose the **Save Search** button; a search set is created. Right-click on the created search set; a shortcut menu is displayed. Choose the **Rename** option from the menu and name the search set as **Columns**.
5. Choose the **Find Items** tab to display the **Find Items** window. Specify another search criteria, as shown in Figure 3-59.



*Figure 3-59 Partial view of the **Find Items** window*

6. Choose the **Find All** button; objects that have the glass material assigned are highlighted in the Scene View.
7. Repeat the procedure followed in step 6 and save the selected objects as search set with the name **Glass**.

Saving the Project

In this section, you will save the project.

1. To save the project with the current view, choose **Save As** from the Application Menu; the **Save As** dialog box is displayed.

2. Browse to *Navisworks_2015* folder and enter *c03_navisworks_2015_tut03* in the **File name** edit box. Next, select **Navisworks File Set (*.nwf)** file format from the **Save as type** drop-down list and then choose the **Save** button; the project is saved.

Self-Evaluation Test

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

1. The **Selection Tree** is invoked from the _____ panel of the **Home** tab.
2. **Selection Inspector** contains a list of all the _____ objects.
3. The _____ option is used to reverse the selection.
4. The properties of an item in the model can be analyzed using the _____ window.
5. The _____ gizmo is used to move the selected item.
6. The **Select** tool is used to select a particular item in a model. (T/F)
7. The **Quick Find** tool is used to analyze the properties of an item in the model. (T/F)
8. In the **Properties** window, you cannot add a custom property to a selected item. (T/F)
9. You can invoke the transformation gizmo from the **Animation** tab. (T/F)
10. The **Accumulate** option is used to calculate the area. (T/F)

Review Questions

Answer the following questions:

1. Which of the following tabs is part of the **Selection Tree** window?

a) Standard	b) Compact
c) Properties	d) All of these
2. Which of the following tools is not a selection tool?

a) Same Name	b) Same Type
c) Same Timeliner	d) Require

3. Which of the following tools is used to control the visibility of objects in the model?
 - a) **Append**
 - b) **Merge**
 - c) **Find Items**
 - d) None of these
4. Which of the following tools is not a transformation tool?
 - a) **Rotate**
 - b) **Scale**
 - c) **Move**
 - d) **Text**
5. Which of the following tools is not used as the **Measure** tool?
 - a) **Point to Point**
 - b) **Area**
 - c) **Add Tag**
 - d) **Angle**
6. The **Measure** tools are invoked from the **Item Tools** tab. (T/F)
7. The **Point to Multiple Points** tool is used to calculate the total distance between multiple points. (T/F)
8. The **Add Link** tool is used to customize the appearance of a model. (T/F)
9. The **Sets** window contains only a list of saved viewpoints. (T/F)
10. The **Convert to Redlines** tool is used to convert measurements to redlines. (T/F)

EXERCISE

Exercise 1

Measuring Height

Download the *c03_navisworks_2015_ex1* file from <http://www.cadcim.com>. The path of the file is as follows: *Textbooks > Civil/GIS > Navisworks > Exploring Autodesk Navisworks 2015*. Open the file and then calculate the height of the stairs above the ground. Create tags across the four corners of the wall and calculate area of the wall. Figure 3-60 shows the Residence Building.

(Expected time : 30min)

The following steps are required to complete the exercise:

1. Open the file *c03_navisworks_2015_ex1*.
2. Display the saved views.
3. Calculate distance between point 1 and 2 using the **Perpendicular Lock** tool.
4. Create tags at the corners of the wall.
5. Calculate area of the wall.
6. Save the project.
7. Name of the file to be saved is *c03_navisworks_2015_ex01*.



Figure 3-60 The Residence Building

Answers to Self-Evaluation Test

1. Select & Search, 2. selected, 3. Invert Selection, 4. Properties, 5. Move, 6. T, 7. F, 8. F, 9. F, 10. F.