



**Deswik**<sup>®</sup>  
Delivering mining efficiency

# Training Tutorial



## Introduction to Deswik.CAD

Design & Solids Modeling

Underground Metals

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Buenaventura – Nov 2017

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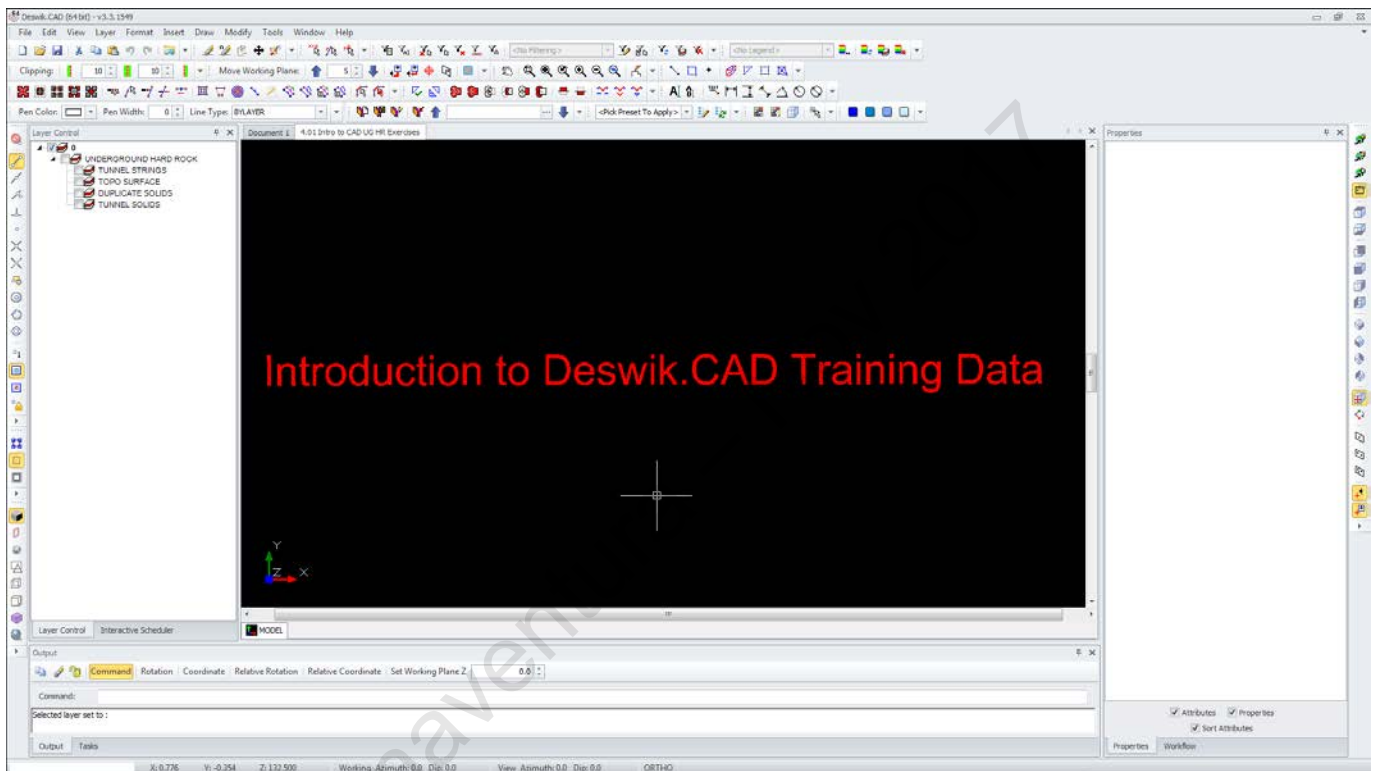
Recommended training duration: **1 DAY**

Buenaventura – Nov 2017

# 1. INTRODUCTION

This tutorial provides an introduction to the common tools and functions contained within *Deswik.CAD* in an **Underground Hard Rock** operation, however as this tutorial is an introduction to *Deswik.CAD* functionality, the learning's can be applied generally.

This tutorial is designed to be used in conjunction with the training data folder **4.01 Intro to CAD for Underground Hard Rock** containing all of the training data, software files and a completed set of CAD exercises.



*You must have Deswik.CAD software downloaded and licensed to be able to complete this tutorial. If you are attending a Deswik training course, the license will be supplied on the first day of training.*

## 2. LEARNING OBJECTIVES

This tutorial has been developed to introduce the learner to *Deswik.CAD* and familiarize them with the common tools and functionality used to navigate the *Deswik.CAD* interface effectively.


At the conclusion of this tutorial, the participant should be able to;

- Load and identify *Deswik.CAD* files
- Managing licenses
- Identify *Deswik.CAD* terminology
- Navigate the CAD display
- Configure the CAD interface
- Manage toolbars
- Dock and pin windows
- Manage navigation shortcuts, shortcut menus and hotkeys
- Manage layer control
- Identify and understand the states of layer
- Manage common dialog boxes, prompts and inputs
- Manage the properties window
- Manage attributes and attribute values
- Create and manage filters including the interactive filter
- Manage files
- Import and export data
- Selecting and modifying entities
- Manage snapping
- Manage visual styles including shaded view and animation
- Manage working planes
- Manage the viewing plane
- Create and manage legends
- Copy and move data
- Create plots (layouts) and viewports

## 3. SETUP

This tutorial is a self-paced and/or guided tutorial and is to be completed using the tools and functions contained within *Deswik.CAD*.

This introductory tutorial is a dual purpose tutorial containing a mix of reading theory and practice exercises and should be accompanied by the training data **4.01 Intro to CAD for Underground Hard Rock**

 [4.01 Intro to CAD for Underground Hard Rock](#)

## 4. REQUIRED DOCUMENTS

The documents required to complete this tutorial are;

FILE NAME	FILE TYPE
• 4.01 Intro to CAD UG HR Datasets	<i>Soft copy folder</i>
○ 4.01 Upper Stope Wireframes.dm	<i>DataMine polyline file</i>
○ 4.01 Upper Lode	<i>Vulcan solid file</i>
• 4.01 Intro to CAD UG HR Export Data	<i>Soft copy folder (Empty)</i>
• 4.01 Intro to CAD UG HR Exercises	<i>*.vdcl Deswik.CAD file</i>
• 4.01 Intro to CAD UG HR Completed	<i>*.vdcl Deswik.CAD file</i>
• 4.01 Intro to CAD UG HR Tutorial v3.3	<i>PDF Hard copy tutorial</i>

## 5. GETTING STARTED


As explained earlier, this tutorial contains a mix of reading theory and practical exercises which use a pre-prepared *Deswik.CAD* project to practice the various exercises on.

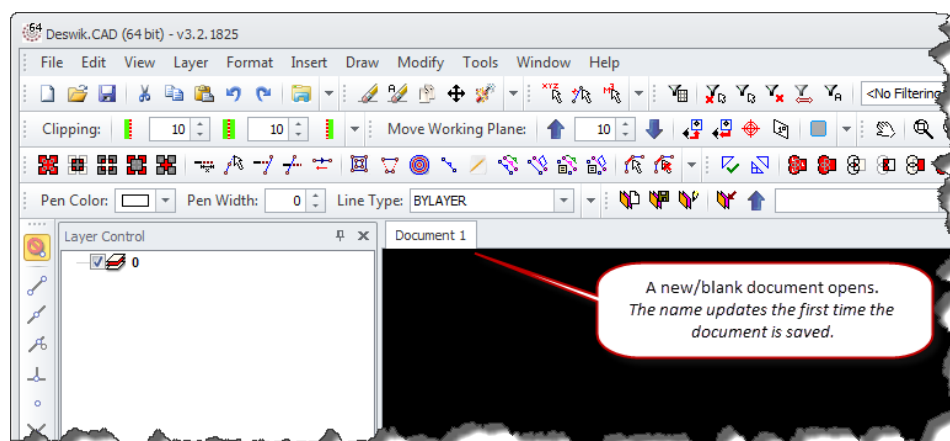
### 5.1. LOAD DESWIK.CAD DATA SET


The following steps will guide the loading of the *Deswik.CAD* project and some basic navigation tips to get started.



*Open a new/blank Deswik.CAD file;*

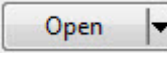
1. Open a new/blank *Deswik.CAD* document by either;
  - a. Selecting the *Deswik.CAD* icon  from the **Windows Start** menu  
or
  - b. Selecting the *Deswik.CAD* icon  from the desktop.

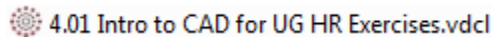



- From the Main menu run the **File | Open** command or click the  button from the **File/Edit** toolbar.



- From the presented Windows Explorer screen, open the **4.01 Intro to CAD for Underground Hard Rock** folder.

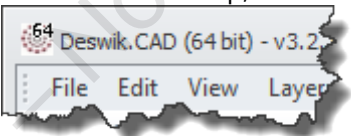
- Select the 4.01 Intro to CAD UG HR Exercises.vdcl file and click .



 *It's recommended a specific folder be created to save the Deswik.CAD files that will be created during this tutorial.*

## 5.2. IDENTIFYING CAD FILES

*Deswik.CAD* files can be identified by the *Deswik.CAD* icon and/or the *Deswik.CAD* file extension.

DESCRIPTION	DETAIL
Deswik.CAD icon	The Deswik.CAD icon is located in the top, left corner of the display. 
Deswik.CAD file extension	*.vdcl (Vector Draw Compressed Drawing).

 *There are 2 additional Deswik.CAD file extensions which are detailed later in the tutorial.*

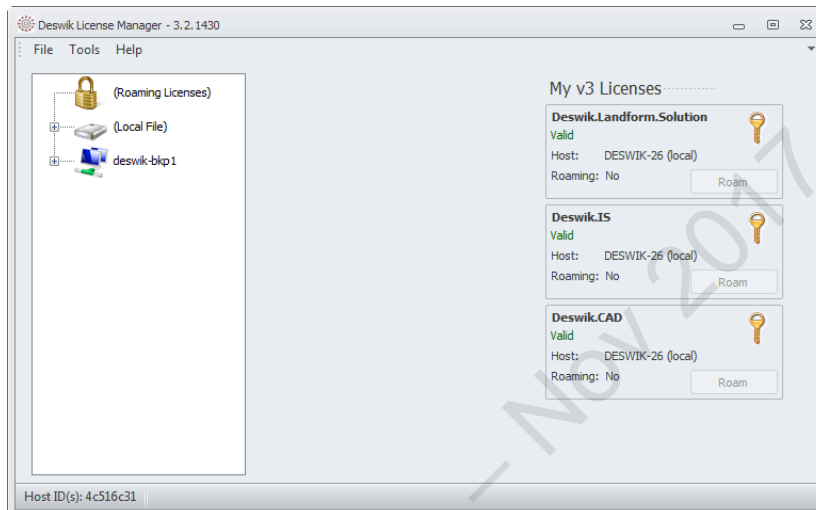
## 6. LICENSING

**Deswik Software Application** Licenses can be installed and accessed, either locally, on a client's computer or on a network server.

The **Deswik License Manager** shows all of the licenses that are available for a client's machine to use.



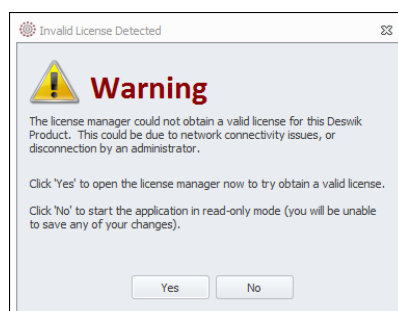
*One valid Deswik.CAD license enables the user to open one instance of Deswik.CAD, if additional (simultaneous) Deswik.CAD instances are required; a valid license is required for each of these instances. Multiple documents however can be opened in a single instance of Deswik.CAD.*



Refer to the Downloads section of the **Deswik Client Portal** <https://clientportal.deswik.com/user> which contains detailed Deswik Licensing documentation.

### 6.1. OPENING THE LICENSE MANAGER

When a valid license is not detected, *Deswik.CAD* displays the following warning message which requires the user to obtain a valid license, or the application is opened in read-only mode.

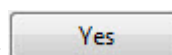


*For the purposes of this tutorial a temporary license has been provided.*



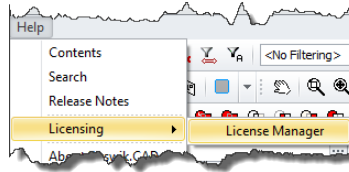
*To open the License Manager;*

1. From the **Invalid License Detected** dialog box click





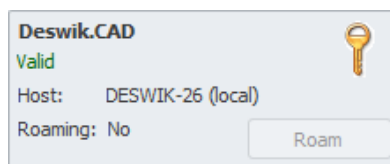
To open the **License Manager** from the Main menu at any time, run the **Help | Licensing | License Manager** command.



2. From the presented **Deswik License Manager** run the **File | Import** command.
3. From the presented Windows Explorer screen, navigate to the project location, open the **License** folder and select the **Deswik-Demo** license.



The valid *Deswik.CAD* license is displayed in the main panel of the *Deswik License Manager*.



## 6.2. NETWORK LICENSES

To access a network license from a local machine, the server that is broadcasting the license must be referenced by the **License Manager**. Once the network server has been added to the list of available license servers to check, it will be checked for a product license each time required.



*Network Licenses are automatically checked back in by the server if it detects an idle client and the idle time exceeds a timeout period (approx. 1 hour) or if a network disconnection occurs.*

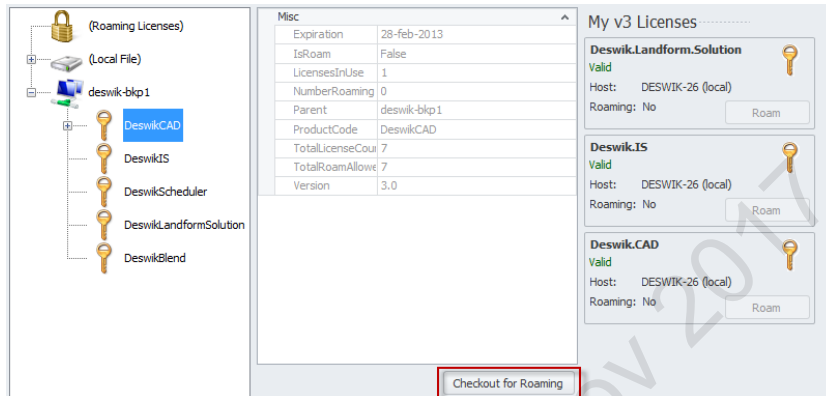
## 6.2.1. CHECKING OUT A LICENSE FOR ROAMING

Machines that do not have a license stored locally can easily roam a license from a server. A license that has been 'checked out for roaming' from a server is called a **Roaming License** i.e. if the user requires to take the computer home for the evening to work, but do not have a network connection at home, the user could roam a license from the network for 1 day.



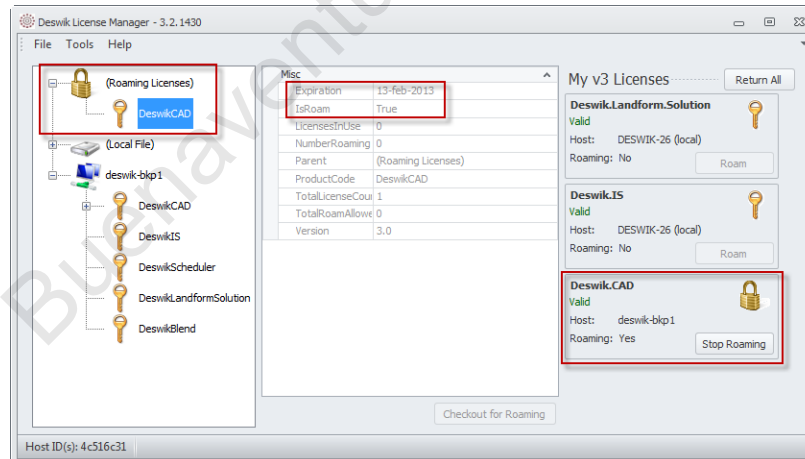
To roam a license from a server; select the desired product from the list of server licenses and click

**Checkout for Roaming**



## 6.2.2. CHECKING IN A ROAMING LICENSE

When a license has been checked out for roaming the license appears under **Roaming Licenses** in the **License Manager**.



To check in/return a roaming license; click **Stop Roaming** to return an individual roamed license, or click **Return All** to return one or more roamed licenses.



Roamed Licenses that have not been checked in/returned by the user are automatically checked back in and returned to the pool of available licenses after midnight on the date of the roamed license **Expiration**.

## 7. TERMINOLOGY

*Deswik.CAD* contains different types of entities for the purpose of modeling, creating, designing and modifying various shapes.

The table below describes some of the more common entity types used in *Deswik.CAD*;

ENTITY	DESCRIPTION	AKA
Polyline	A <b>Polyline</b> is a connected series of line segments.	<ul style="list-style-type: none"> <li>• Strings</li> <li>• Multi-Line Segment</li> </ul>
Polygon	A <b>Polygon</b> is a Polyline which has been closed.	<ul style="list-style-type: none"> <li>• Closed Polyline</li> </ul>
Polyface	A <b>Polyface</b> is a group of line segments which are either open or closed.	<ul style="list-style-type: none"> <li>• Triangulation</li> <li>• DTM</li> <li>• Mesh</li> <li>• Wireframe</li> </ul>
Surface	A <b>Surface</b> is an open Polyface.	<ul style="list-style-type: none"> <li>• DTM</li> <li>• Open Polyface</li> </ul>
Solid	A <b>Solid</b> is a closed Polyface.	<ul style="list-style-type: none"> <li>• Mesh</li> <li>• Triangulation</li> <li>• Wireframe</li> </ul>



### CHAPTERS REVIEW

Before proceeding to the next chapter; review the subjects below and confirm the particular skills have been acquired. The acquired skills and knowledge should include;

SKILLS & KNOWLEDGE	CHAPTER REFERENCE
Load a <i>Deswik.CAD</i> *.vdcl file using two methods.	<a href="#">Load Deswik.CAD Data Set</a>
Identify a <i>Deswik.CAD</i> project or file.	<a href="#">Identifying CAD Files</a>
Install a temporary license.	<a href="#">Opening the License Manager</a>
Check in and check out roaming licenses from a server.	<a href="#">Checking Out a License for Roaming</a>



*The theories covered in these topics can now be applied to similar processes.*

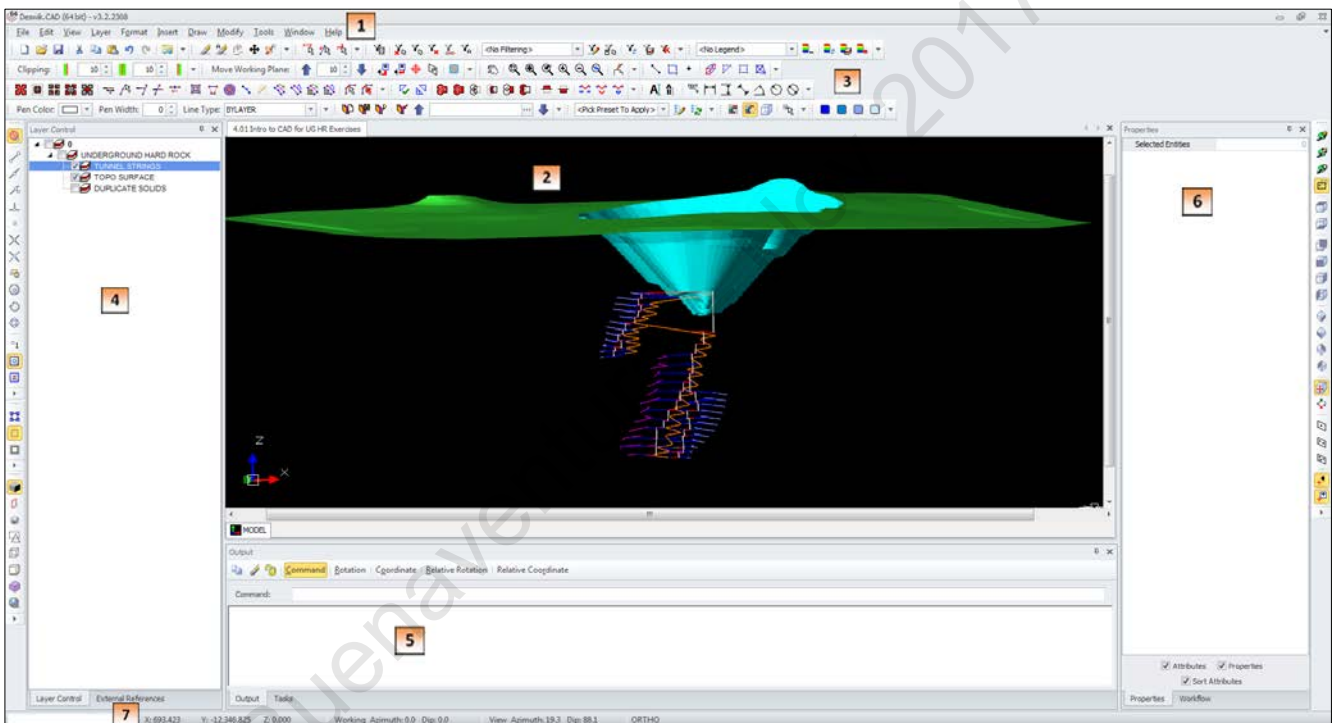
## 8. DESWIK CAD DISPLAY

The main platform contains seven main areas which house some of the more common functions contained in *Deswik.CAD*. The functionality has been grouped together to allow for ease of use and improved navigation and the various areas can be configured to the users preferred layout.

To get started with *Deswik.CAD*, it will help to get familiar with the general layout of the application.

The main application has seven main sections;

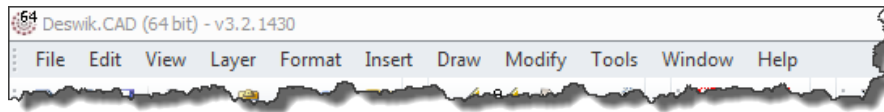
- |                               |                        |                            |
|-------------------------------|------------------------|----------------------------|
| <b>1</b> Main menu            | <b>2</b> Model Space   | <b>3</b> Toolbars          |
| <b>4</b> Layer Control window | <b>5</b> Output window | <b>6</b> Properties window |
| <b>7</b> Status bar           |                        |                            |




*For this tutorial and while learning the product, it is highly recommended that **all** toolbars, windows and menus remain in their default locations.*

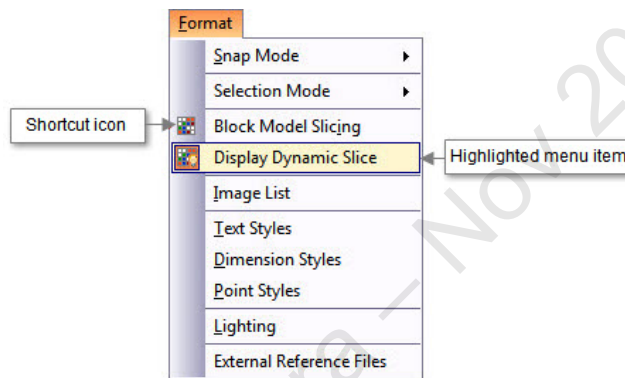
## 8.1. MAIN MENU

The *Deswik.CAD* Main menu contains all the commands available to the user to work within *Deswik.CAD*.



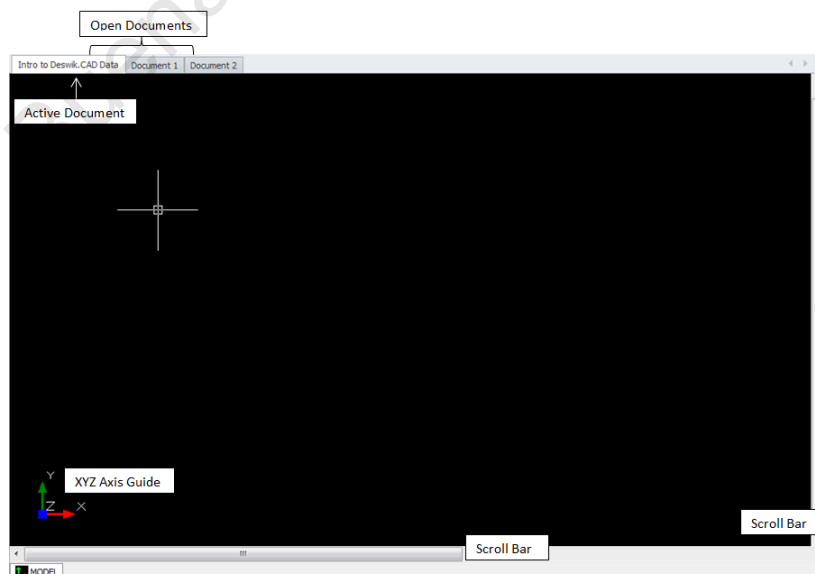
When a **Main menu** command is selected, a drop-down menu of multiple commands and sub-menus is displayed. If a menu option has an associated shortcut icon, it will be displayed to the left of the menu item.

 *Hover the cursor over a command in the drop-down menu to highlight the command and click to select.*




## 8.2. MODEL SPACE

Graphical entities are displayed and edited within the Model Space.





The cursor displays as crosshairs  within the Model Space, unless Deswik.CAD is processing a command such as File | Save. In this case the cursor displays as an arrow within the Model Space and no other functions can be processed until the active command has processed, at which time the cursor returns to the crosshairs.

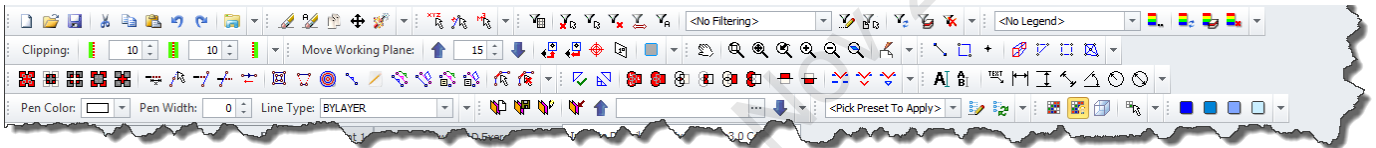


The user can easily work within multiple projects in Deswik.CAD simultaneously. Document names are displayed on tabs along the top left of the **Model Space**. Click on a tab to make it the active document. The active document is always highlighted (the color will depend on the **View | Look and Feel** style selected), and the tab for the active document will be displayed 'in front' of the other tabs.

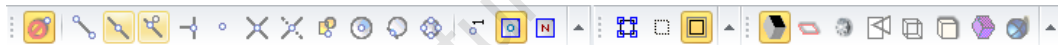
### 8.3. TOOLBARS

Toolbars provide shortcuts to many Main menu commands. The majority of toolbars are located at the top of the screen with additional toolbars down the left and right sides of the screen.

#### Main Toolbars



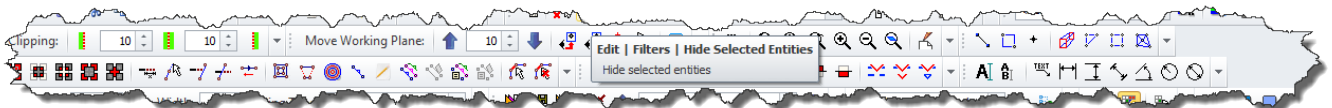
#### Left Side Toolbars



#### Right Side Toolbars



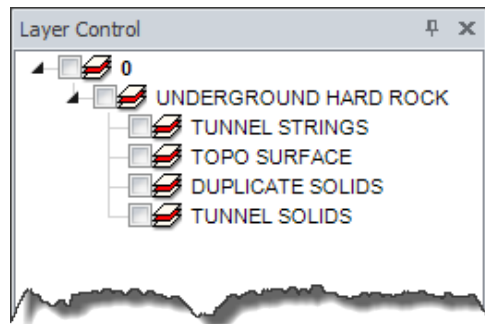
In default mode, hovering the cursor over any of the buttons on a toolbar will display pop-up text (called screen tips), which provides the button's associated command and a short explanation of what the command does. Clicking on any toolbar button will run the associated Main menu command.




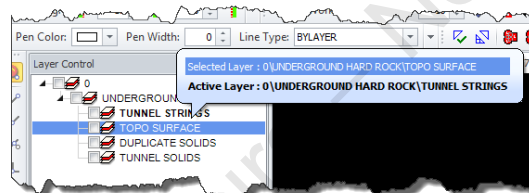
Refer to [Configuring the CAD Interface](#) for further information on toolbar options.

## 8.4. LAYER CONTROL WINDOW

All layers created within a project are displayed in the **Layer Control** window. Layers allow the user to quickly change the visibility of the data by selecting  or clearing  the checkboxes to the left of the layer names.



 To display Layer tool tips, hover the cursor over any layer in the Layer Control window, further Description can be added to the tool tip by right-clicking the layer and selecting Properties from the shortcut menu.



 Refer to [Layer Control](#) for further, detailed information on **Layer Control** window options.

## 8.5. OUTPUT WINDOW

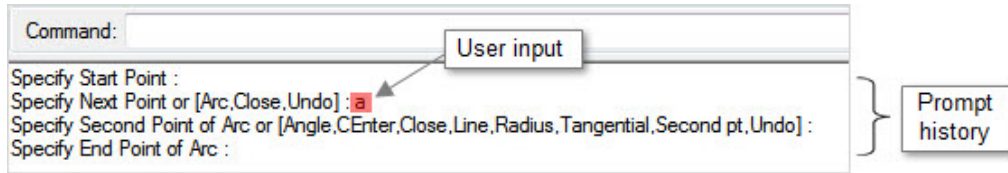
The **Output** window defaults to the **Command** tab view which displays a **Command** field for user inputs and a window displaying a history of command prompts and user inputs.

Additional information including XYZ coordinates, Azimuth, Dip and Distances are contained within the **Rotation**, **Coordinate**, **Relative Rotation** and **Relative Coordinate** tabs. These fields can be locked to assist with picking precise points in the Model Space.





When running a command, if a prompt is closed in error or it is simply no longer visible, and the user is able to refer to the Output window for the previous prompt.

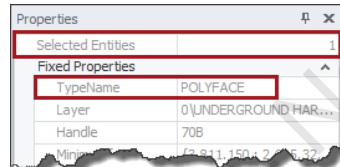


## 8.6. PROPERTIES WINDOW

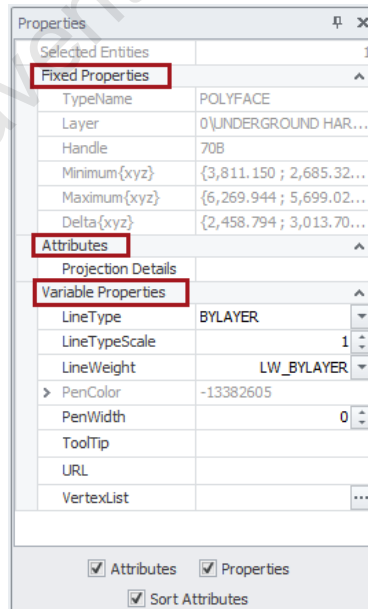
All entities in a *Deswik.CAD* project have properties associated with them. These properties are displayed within the **Properties** window when an entity is selected in the Model Space.



When entities are selected in the Model Space, always check the Properties window to ensure the correct number and type of entities are selected. The Properties window remains blank if there are no entities selected.



The Properties window is divided into 3 sections: **Fixed Properties**, **Attributes** and **Variable Properties**.



Refer to [Properties Window](#) for further, detailed information on Properties and Attributes.

## 8.7. STATUS BAR



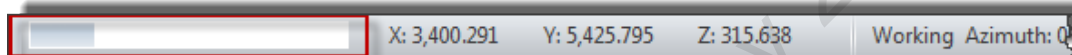
The Status bar is located at the bottom of the screen and provides real-time information regarding entities in the Model Space. Move the cursor, or as it changes the view within the Model Space, the Status bar will provide the user with X, Y and Z coordinates, Working Azimuth and Dip, and View Azimuth and Dip.



When ORTHO (Orthogonal Drawing Mode) is enabled/toggled on **ORTHO** it forces digitizing to be performed at 90 degree angles. Click to toggle off **ORTHO** so digitizing can be at any angle.

### 8.7.1. PROGRESS BAR

The Status Bar also contains a Progress Bar which provides the current status of the current command.



When Deswik.CAD is processing a command the cursor also displays as an arrow within the Model Space and no other functions can be processed until the Progress Bar has completed and the cursor returns to the crosshairs.



### CHAPTERS REVIEW

Before proceeding to the next chapter; review the subjects below and confirm the particular skills have been acquired. The acquired skills and knowledge should include;

SKILLS & KNOWLEDGE	CHAPTER REFERENCE
Understand the Deswik.CAD interface is comprised of 7 main areas.	<a href="#">Deswik CAD Display</a>
Identify that there is one or more projects open at a time.	<a href="#">Model Space</a>
Locate the last command in the model space.	<a href="#">Output window</a>
Display tool tips for toolbars.	<a href="#">Toolbars</a>
Apply the orthogonal drawing mode.	<a href="#">Status Bar</a>



The theories covered in these topics can now be applied to similar processes.

## 9. CONFIGURING THE CAD INTERFACE

Certain areas of the *Deswik.CAD* interface can be configured to suit the users or the system requirements i.e. general settings, toolbars and dock windows.

### 9.1. GENERAL SETTINGS

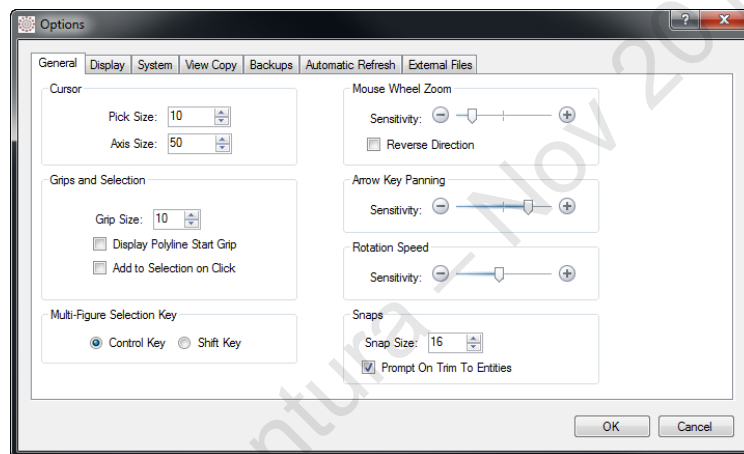
Default settings in *Deswik.CAD* such as display, system and backup options can be modified to suit the user's preferences.



To modify settings run the **Tools** | **Options** command from the Main menu.



The presented **Options** dialog box defaults to the **General** tab view where general settings can be modified i.e. Cursor Size, Rotation Speed and Multi-Figure Selection Key.



Most of the remaining default Options do not require modification, or in the case of Backups are detailed later in this tutorial.

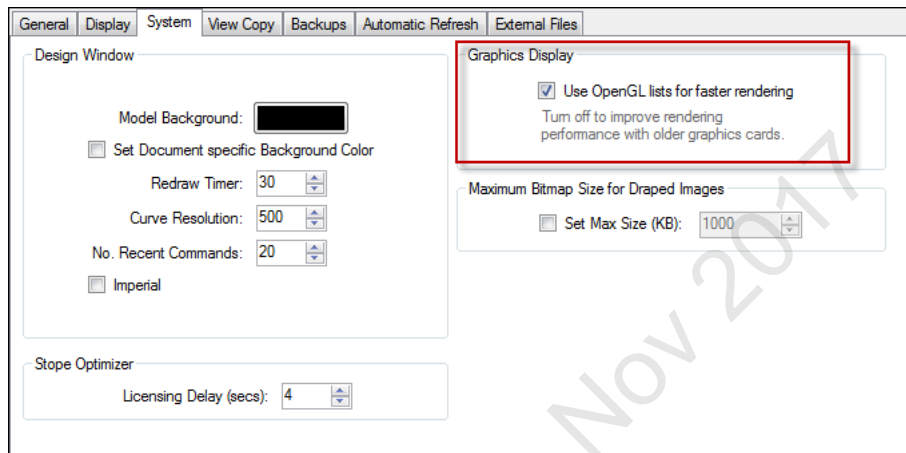
### 9.1.1. GRAPHICS DISPLAY SETTINGS

*Deswik.CAD* uses OpenGL lists for faster rendering, however if the user has an older graphics card in your computer that cannot support the use of OpenGL lists, this may cause your computer to crash. This setting can also be modified via the **Tools | Options** command.



To modify graphic display settings;

1. From the **Options** dialog box click the **System** tab.
2. From the Graphics Display section clear the  Use OpenGL lists for faster rendering checkbox.



3. Click 

### 9.2. TOOLBAR SETUP

Toolbars can be customized to suit the user's requirements. By default, most *Deswik.CAD* toolbars are 'pinned' in one section under the Main menu, with the exception of several toolbars; **Snap Mode, Grips, Visual Styles, Rotate, 3D Views and View Planes**. These toolbars are 'pinned' vertically to the left and right of the *Deswik.CAD* main screen.



You can 'un-pin' any toolbar from its default, 'pinned' position and move it to a new location or leave it as a 'floating' toolbar.

---

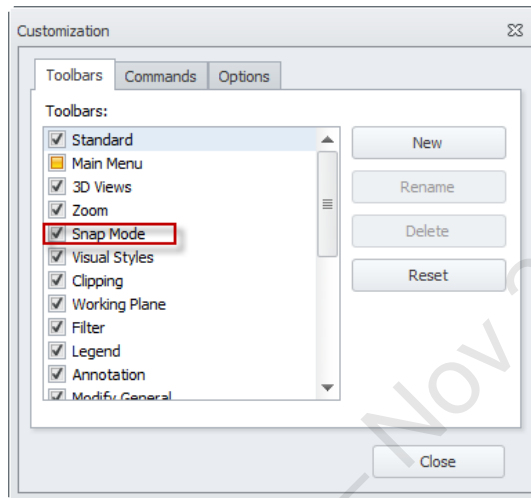
### 9.2.1. ADD OR REMOVE A TOOLBAR SHORTCUT

The toolbar shortcuts can be added or removed as desired to provide control on what is available and is not available in the toolbars.



To add a toolbar shortcut;

1. **Right-click** on a 'pinned' toolbar and select **Customize** from the shortcut menu.
2. From the **Customization** dialog box, select the **Toolbars** tab.
3. Select the required toolbar checkbox



4. Click 



To remove a toolbar shortcut, clear the required toolbar checkbox  from the **Customization** dialog box.


---

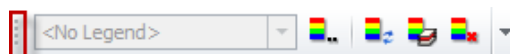
### 9.2.2. MOVE A TOOLBAR

Toolbars can be relocated to new locations on the *Deswik.CAD* platform.



To move a toolbar;

1. Hover the cursor to the left of the toolbar to be moved.
2. Wait until the cursor changes to cross arrows 
3. Click and drag the toolbar to a new location.



4. To 'pin' the toolbar to its new location, drag the toolbar to the new location and drop it.



Toolbars and menus can be reset to their default locations by running the **View | Reset Menus to Defaults** command from the Main menu and restarting *Deswik.CAD*.

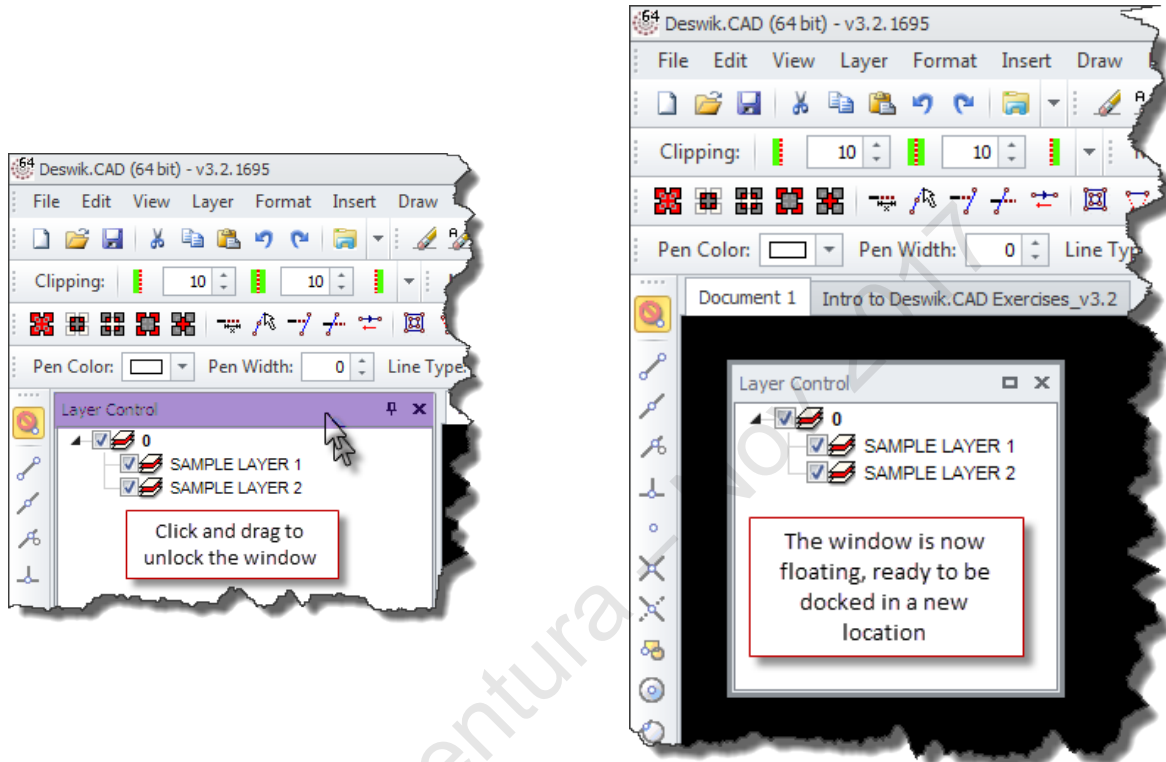


For this tutorial, please leave or reset all toolbars, windows and menus to their default locations.

### 9.3. DOCK WINDOWS


The **Layer Control**, **Properties** and **Output** windows are all known as **dock windows**. By default, these windows are docked on the left, right and bottom of the *Deswik.CAD* main screen.

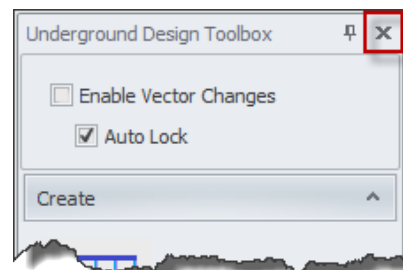
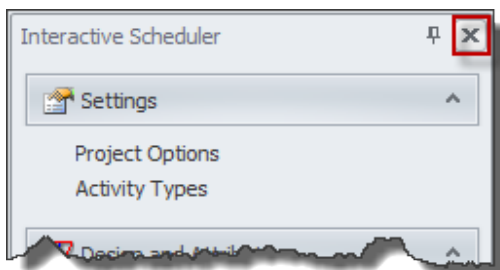
Control panels for plugins in *Deswik.CAD* (e.g. **Dump Scheduler**, **Interactive Scheduler**) are displayed as dock windows as well. All of these windows can be moved to a new location, or hidden from view at your discretion.



If any dock windows, such as the *Interactive Scheduler* or *Underground Design Toolbox* are loaded when you opened the *Deswik.CAD* project, they are not required for this tutorial and therefore can be closed.

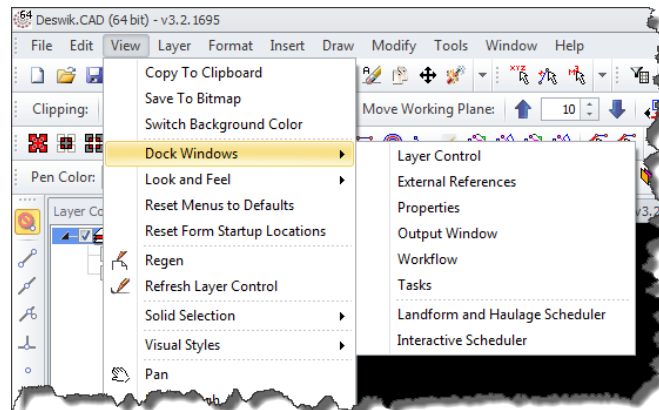


To close dock windows click  at the top right corner of the dock window to be closed.





To reveal a dock window that has been closed; run the View | Dock Windows command and select the required dock window, which will be displayed in its last docked location.

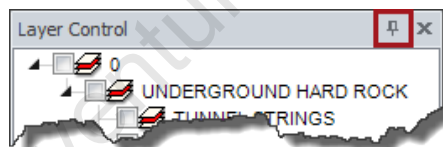


### 9.3.1. UNPINNING DOCK WINDOWS

Dock windows can be 'unpinned' when they are no longer required, giving the user more room to view entities in the Model Space.



To 'unpin' a dock window click the pin icon (currently in the 'pinned' position) from the title bar of the **dock window** to be 'unpinned'.



Deswik.CAD will hide the window, creating a tab (with the name of the window) in the corner where that window was displayed. Hover over the tab, the window will be displayed. The moment the cursor is moved away from that window, it will disappear again.

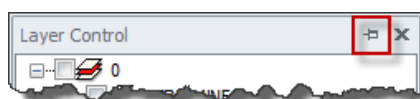
### 9.3.2. PINNING DOCK WINDOWS

Dock windows can be 'pinned' as required to different locations on the Deswik.CAD platform.



To 'pin' a dock window;

1. Hover the cursor over an 'unpinned' window tab to display the window.
2. Click the pin icon (currently in the 'unpinned' position).





Deswik.CAD will 'pin' the window in the same position that the window was displayed.



For this tutorial and while learning the product, it is recommended that all Dock Windows remain in their default locations.



## CHAPTER REVIEW

Before proceeding to the next chapter; review the subjects below and confirm the particular skills have been acquired. The acquired skills and knowledge should include;

SKILLS & KNOWLEDGE	CHAPTER REFERENCE
Adjust the defaults settings for Deswik.CAD to suit the user.	<a href="#">General Settings</a>
Adjust graphics display to suit the graphics card.	<a href="#">Graphics Display Settings</a>
Unpin, add and or remove a toolbar.	<a href="#">Toolbar Setup</a>
Relocate a docked window in Deswik.CAD.	<a href="#">Dock Windows</a>
Reveal a dock window that has been closed.	<a href="#">Dock Windows</a>





The theories covered in these topics can now be applied to similar processes.

## 10. SHORTCUTS

There are several shortcuts available which assist in the navigation and operation of *Deswik.CAD*.

### 10.1. NAVIGATION SHORTCUTS

The table below provides a list of some of the more basic navigation shortcuts within *Deswik.CAD*.

FUNCTION	DETAIL	INSTRUCTIONS
Rotation	Use the Rotation feature to orbit the view in the Model Space.	<ul style="list-style-type: none"><li>• Hold the &lt;<b>Shift</b>&gt; key down and &lt;<b>Left mouse</b>&gt; click.</li><li>• Click the  button in the Top Right section of the screen.</li></ul>
Zoom	Use the Zoom feature to zoom the view in and out in the Model Space.	<ul style="list-style-type: none"><li>• Use the <b>Scroll Wheel</b> on the mouse.</li></ul>
Zoom All	Use the Zoom All feature to quickly align the view to include all current visible entities in the Model Space.	<ul style="list-style-type: none"><li>• Click the  button in the Top Middle section of the screen.</li><li>• Hotkey: <b>Z + A</b></li></ul>
Pan	Use the Pan feature to quickly drag the view of current visible entities in the Model Space.	<ul style="list-style-type: none"><li>• Click and hold down the <b>Scroll Wheel</b> and drag the mouse to the desired view.</li><li>• Use the keyboard <b>Arrow Keys</b> to pan the Model Space.</li></ul>


### 10.2. HOTKEYS


The **Hotkeys** listed below are used to control some common functions within *Deswik.CAD*.

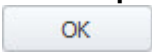
KEY	DETAIL
Esc (escape)	<ul style="list-style-type: none"><li>• Hit the &lt;<b>Esc</b>&gt; key to clear the current running feature or command.</li></ul>
Ctrl (control)	<ul style="list-style-type: none"><li>• Hit the &lt;<b>Ctrl</b>&gt; key to let the user select multiple entities in the one selection command.</li></ul>
Spacebar	<ul style="list-style-type: none"><li>• Hit the &lt;<b>Spacebar</b>&gt; key to rerun the most recent command performed.</li></ul>
Tab	<ul style="list-style-type: none"><li>• Hit the &lt;<b>Tab</b>&gt; key to quickly move between selections in certain <i>Deswik.CAD</i> windows.</li></ul>

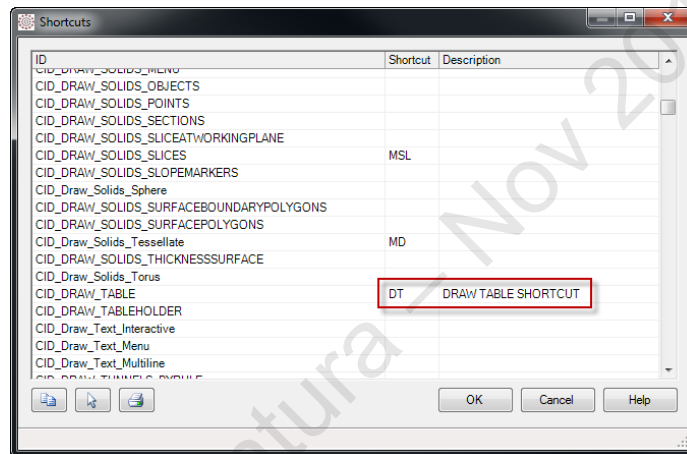
### 10.2.1. CREATING HOTKEYS

Users can create and edit keyboard shortcuts that are associated with Main menu commands in *Deswik.CAD*.

 *Shortcuts must be unique and impossible to confuse with another command i.e. if there is already an existing shortcut 'AA', you cannot create a new shortcut 'AAA', or 'A' as it would make the other shortcut commands redundant and unusable.*

 *To create a hotkey;*

1. From the Main menu, run the **Tools | Shortcuts** command.
2. From the presented **Shortcuts** dialog box select the command **ID** and enter a unique **Shortcut**.
3. Enter a **Description** (optional).
4. Click  to save the shortcut and close the dialog box.




### 10.3. SHORTCUT MENUS

*Deswik.CAD* offers several different **shortcut menus** when you right-click: the shortcut menu that is displayed and the commands/options offered will differ depending on where the cursor is when a right-click is engaged.

There are 4 different **shortcut menus** depending on where in the project you right-click;

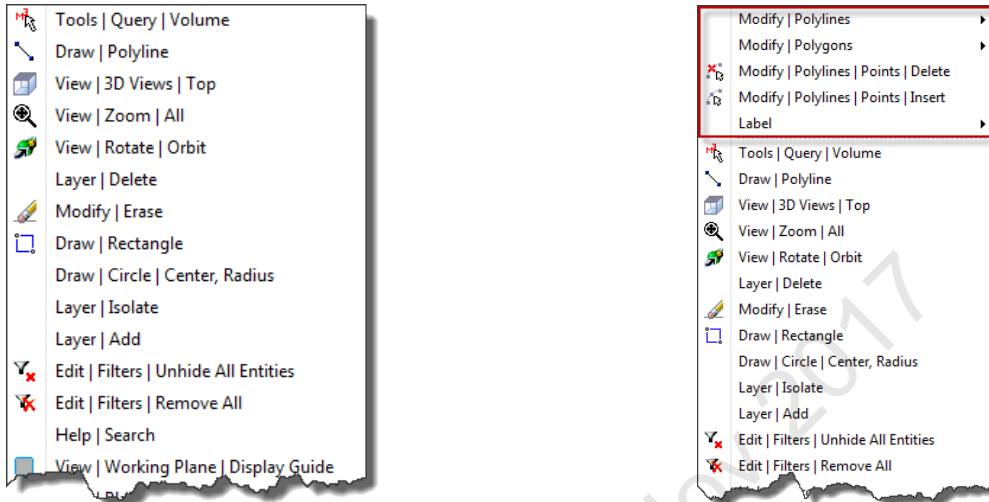
- Model Space
- Model Space (with entities selected in the Model Space)
- Layer Control window
- Layer Control window (with the cursor over a specific layer)

 *The Model Space shortcut menu varies, depending on whether any entities are selected in the Model Space.*

### 10.3.1. MODEL SPACE

When no entities are selected in the **Model Space**, the shortcut menu displays an historical list of commands recently executed i.e. breadcrumbs.

When an entity is selected in the **Model Space**, the shortcut menu has additional commands which are specific to the type of entity selected.



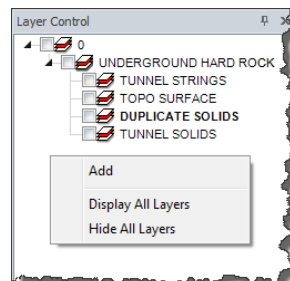
### 10.3.2. LAYER CONTROL

The **Layer Control** shortcut menus assist in the quick modification of layers and/or the selection of data within a layer.

There are 2 shortcut menus available to assist in the quick modification of layers and/or the selection of data within a layer:



From the Layer Control window, **right-click** when the cursor is not over a layer name and the following shortcut menu displays:

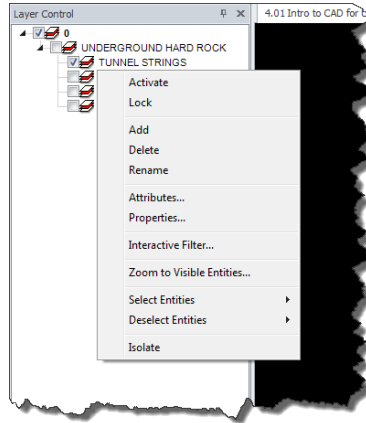




This shortcut menu relates to the Layer Control window, not a specific layer.



From the Layer Control window, **right-click** when the cursor is over a layer name and the following shortcut menu is displays:



This shortcut menu relates to the currently selected layer only.

### 10.3.3. REFRESH LAYER CONTROL

The **View | Refresh Layer Control** command updates all layers in the Layer Control window, ensuring that all layers are represented, and regenerates the drawing in the Model Space using the source data.



### CHAPTER REVIEW

Before proceeding to the next chapter; review the subjects below and confirm the particular skills have been acquired. The acquired skills and knowledge should include;

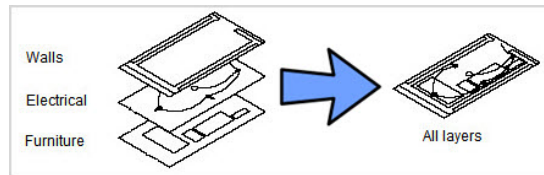
SKILLS & KNOWLEDGE	CHAPTER REFERENCE
Use shortcuts to zoom, rotate and pan.	<a href="#">Navigation Shortcuts</a>
Create and use hot keys.	<a href="#">Hotkeys</a>
Initiate shortcut menus at various locations in <i>Deswik.CAD</i> .	<a href="#">Shortcut Menu</a>



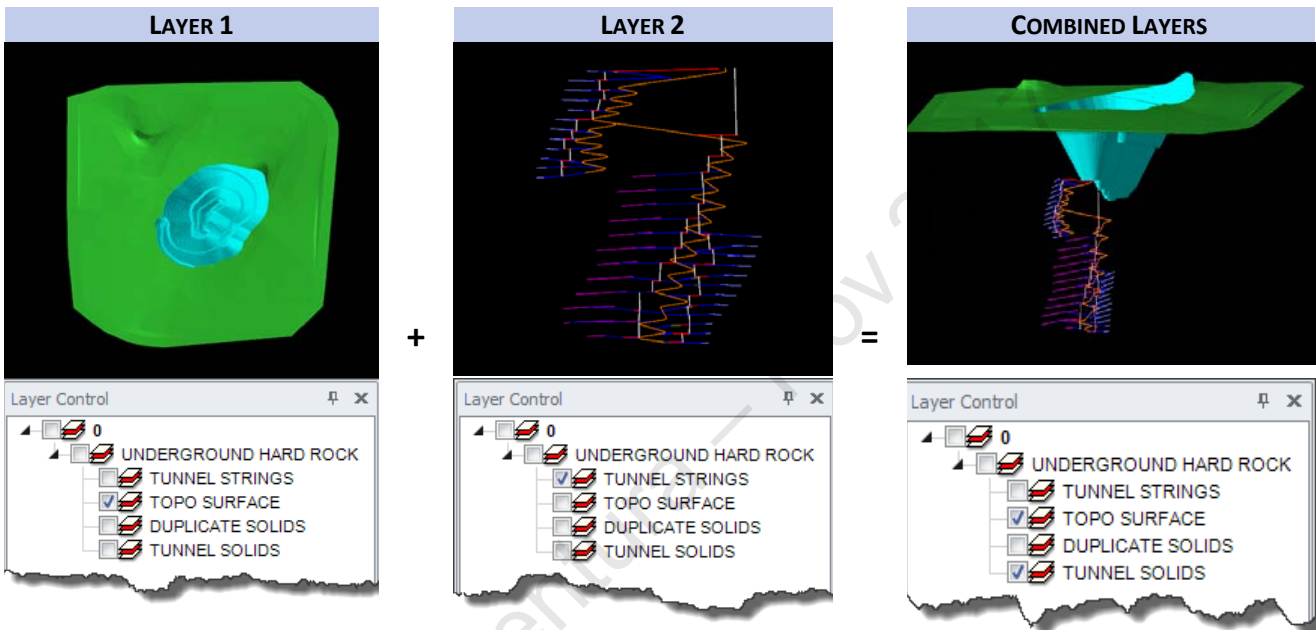
The theories covered in these topics can now be applied to similar processes.

## 11. LAYER CONTROL

An individual layer in *Deswik.CAD* is the equivalent of an overlay used in paper-based drafting. In drafting, multiple overlays might look something like this;



In *Deswik.CAD*, entities contained on multiple layers might look something like this;



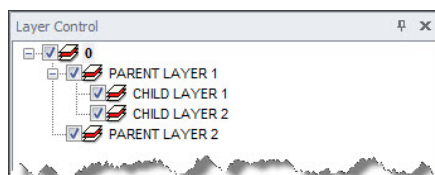
Layers are the primary organizational tool in *Deswik.CAD* and can be used to;

- Group information by function i.e. keep entities with a similar purpose on the same layer
- Enforce line type, color and other standards
- Organize data/entities to make it easier to manage the information in your document



*In Deswik.CAD a layer can have entities of any type on them. Entities can also have Attributes applied to them by layer. This topic is covered in greater detail later in the tutorial.*

*Deswik.CAD* uses a hierarchical layer structure, or layer tree to organize layers, meaning the layer tree is comprised of 'parent' layers and 'child' layers.



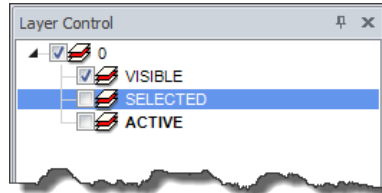
*The layer tree or structure is displayed within the **Layer Control** window.*

## 11.1. STATES OF A LAYER

A layer has 3 possible states; **Visible**, **Selected** and **Active**.



*The state of a layer is a critical concept in Deswik.CAD, understanding how and why to set or change a layer's state will assist the user to ensure that data is written, saved or processed to the correct layer.*



*There is an exception here; a layer that is not **Visible**, **Selected** or **Active** is still a layer, a hidden layer!*

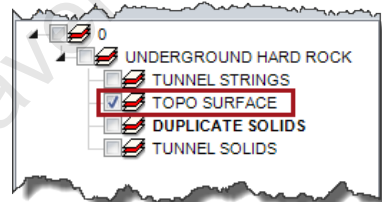
### 11.1.1. VISIBLE LAYER


Entities on a **Visible** layer are displayed in the Model Space, unless a Filter has been applied, and can be selected and modified. There can be an unlimited number of Visible layers at the same time.



*To make a layer visible;*

1. From the **Layer Control** window, select the checkbox  to the left of the layer name to make the layer **Visible**.



2. From the Main menu, run the **View | Zoom | All** command, or click  to align the view and include all current visible entities in the Model Space.
3. Clear the checkbox  to the left of the layer name to hide the layer. Entities on a hidden layer are not visible in the Model Space.



*Holding the <Ctrl> key and selecting a 'parent' layer checkbox  will change the visibility of a 'parent' layer as well as all of its 'child' layers to the matching state.*

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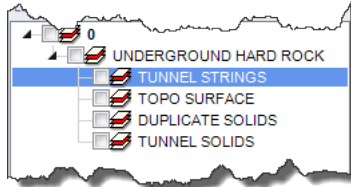
### 11.1.2. SELECTED LAYER

Certain functionality such as **Filters** and **Legends** apply to **Selected** layers and many commands provide the user with the option of writing the output to a **Selected** layer instead of an active layer. There can only be 1 **Selected** layer at a time.



To make a layer selected;

1. From the **Layer Control** window, **single-click** on the layer name to make the layer **Selected**.



The background of the **Selected** layer name turns blue in the **Layer Control** window.

2. To deselect a layer, click in the white background below all of the other layers in the **Layer Control** window or select another layer.

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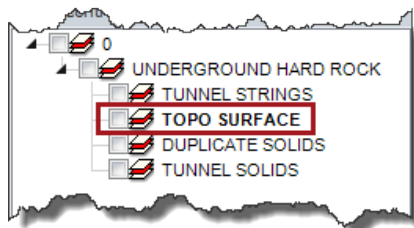
### 11.1.3. ACTIVE LAYER

All new entities are created on the **Active** layer and for many commands; the default option is for *Deswik.CAD* to write the results to the **Active** layer. There can only be one **Active** layer at a time.



To make a layer active;

1. From the **Layer Control** window, **double-click** on the layer name to make the layer **Active**.



The **Active** layer is indicated in **BOLD** typeface in the Layer Control window.

2. To deactivate a layer, the user must activate another layer.



Selecting Activate from a layer shortcut menu will also activate a layer.

### 11.1.4. THREE STATES OF A LAYER SUMMARY


The **States of a Layer** concept is a critical concept in *Deswik.CAD*, the following table summarizes the features of each of the 3 states;

LAYER STATE	DETAIL
<b>Visible</b>	<ul style="list-style-type: none"><li>• Layer Control window – checkbox <input checked="" type="checkbox"/> is selected</li><li>• Entities are visible in the Model Space</li><li>• Unlimited number of visible layers.</li></ul>
<b>Selected</b>	<ul style="list-style-type: none"><li>• Layer Control window – background of selected layer name is blue</li><li>• Some functionality i.e. Filters and Legends apply to a selected layer</li><li>• Many commands provide option of writing output to a selected layer</li><li>• Maximum number of selected layers is 1.</li></ul>
<b>Active</b>	<ul style="list-style-type: none"><li>• Layer Control window – active layer name is bold</li><li>• New entities are created on an active layer</li><li>• Outputs, by default are written to an active layer</li><li>• Maximum number of active layers is 1.</li></ul>

## 11.2. LAYER MODIFICATION


In complex projects, it is a good idea to carefully structure the data using layers so that it can be easily found later. Layers also allow the user to quickly change the visibility of the data grouped under them.

The **Layer** menu, accessed via the Main menu, contains all the tools required to manage the layout and properties of the layers setup in *Deswik.CAD*.

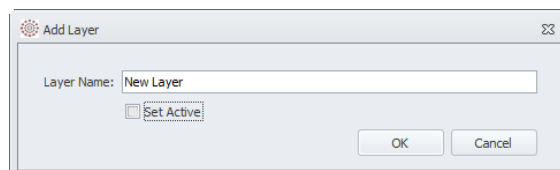
 *The majority of commands contained in the Layer menu can be accessed by right-clicking on the actual Layer in the Layer Control window. This will ensure the Layer command running is being applied to the desired Layer.*

### 11.2.1. ADDING A LAYER

In this exercise, we will add a new layer, as a child layer to the **0\UNDERGROUND HARD ROCK** layer.

 *To add a new layer;*

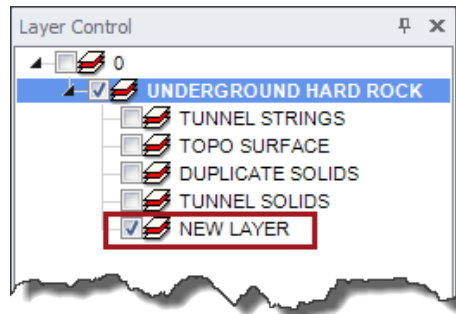
1. Isolate the **0\Underground Hard Rock** layer and make it visible, selected and active.
2. **Right-click** on the layer and select Add from the shortcut menu.
3. In the presented Add Layer dialog box, input **New Layer** in the Layer Name field.
4. Clear the  Set Active checkbox.



5. Click 



The layer is created in the Layer Control window as a child layer of the Selected layer (**Underground Hard Rock**).



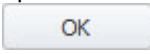
Before adding a layer, first decide where to place the new layer in the layer tree, as the new layer will automatically be created as a 'child' of the layer that is currently **Selected**. Therefore, select the appropriate layer first. If no layer is **Selected** when the **Layer | Add** command is run, the new layer will be created at the top level of the layer tree.

### 11.2.2. RENAMING A LAYER

In this exercise, we will rename the New Layer, created in the previous exercise.



To rename a layer;

1. **Right-click** on the newly created layer and select Rename from the shortcut menu.
2. In the presented Rename Layer dialog box, change the Layer Name to Renamed.
3. Click 



The layer name is changed from **NEW LAYER** to **RENAMED**.

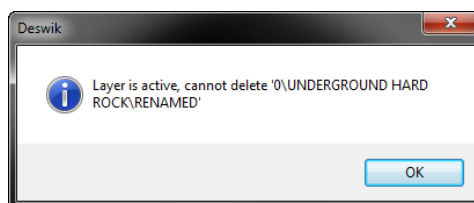
### 11.2.3. DELETING A LAYER

In this exercise, we will delete the **RENAMED** layer and assess the impact of trying to delete an **Active** layer.

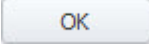


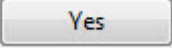
To delete a layer;

1. Activate the **0\UNDERGROUND HARD ROCK\RENAMED** layer.
2. **Right-click** on the RENAMED layer and select Delete from the shortcut menu.





Deswik.CAD will not delete an Active layer, click  to close the dialog box.

3. Ensure the **RENAMED** layer is not active by making another layer active.
4. **Right-click** on the **RENAMED** layer and select **Delete** from the shortcut menu.
5. Click  to delete the layer.



## CHAPTER REVIEW

Before proceeding to the next chapter; review the subjects below and confirm the particular skills have been acquired. The acquired skills and knowledge should include;

SKILLS & KNOWLEDGE	CHAPTER REFERENCE
Understand the three states of a layer.	<a href="#">States of a Layer</a>
Add, delete and rename layers.	<a href="#">Layer Modification</a>



*The theories covered in these topics can now be applied to similar processes.*

## 12. COMMON DIALOG BOXES

*Deswik.CAD* uses a selection of dialog boxes, shortcut menus and on screen prompts to process information.

Many commands in *Deswik.CAD* require the user to specify what entities and/or layers are required for the command.

*Deswik.CAD* uses 2 main dialog boxes to determine this information;

- Select Entities dialog box
- Layer Selection dialog box

### 12.1. SELECT ENTITIES DIALOG BOX

The option selected from the **Select Entities** dialog box dictates the entities *Deswik.CAD* uses to run a command.



*For Deswik.CAD to use the correct entities to run a command, the correct entities must be chosen!*

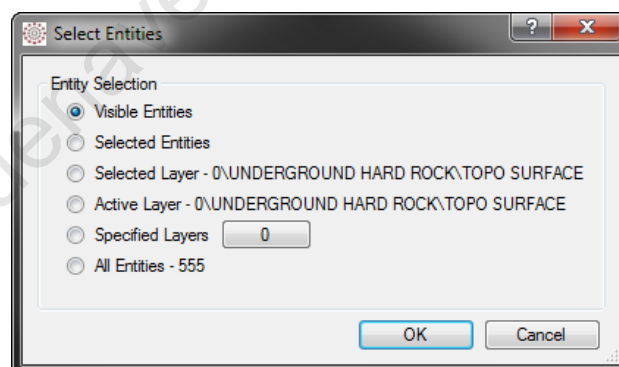


*To demonstrate the Select Entities dialog box;*

1. Isolate the **0\UNDERGROUND HARD ROCK\TOPO SURFACE** layer and make it visible, selected and active.
2. From the Main menu run the **Tools | Query | Volume and Surface Area** command or click  from the toolbar.



*Further information on the Query commands is covered later in the tutorial.*


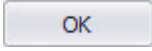


3. Click 



*The Select Entities dialog box may change depending on the command selected, current entity selected in the Model Space (if any) and the current layer setup.*

The following table details the options available in the **Select Entities** dialog box;

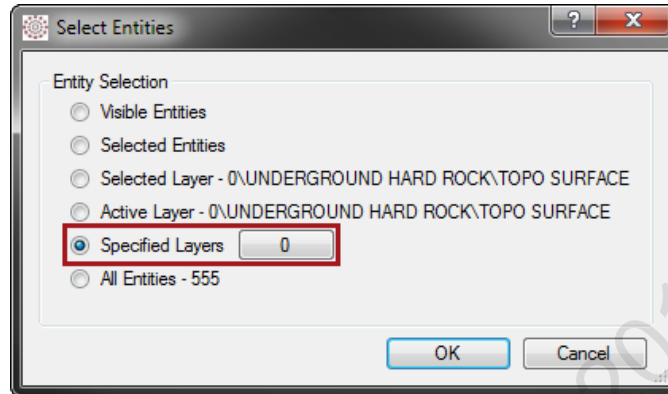
FIELD	DESCRIPTION
<b>Visible Entities</b>	Select all visible entities in the Model Space.
<b>Selected Entities</b>	Select all entities already selected in the Model Space.  <i>If Selected Entities is chosen, but there are 0 entities currently selected in the Model Space, the user will be prompted to select entities once <b>OK</b> is selected. Right-click when you have made your selection to run the command.</i>
<b>Selected Layer</b>	Select all entities on the Selected layer.
<b>Active Layer</b>	Select all entities on the Active layer.
<b>Specified Layers</b>	Select all entities on a specific layer. To select a specific layer or multiple layers, click the  button to the right of <b>Specified Layers</b> .
<b>All Entities</b>	Select all entities on all layers in the project.

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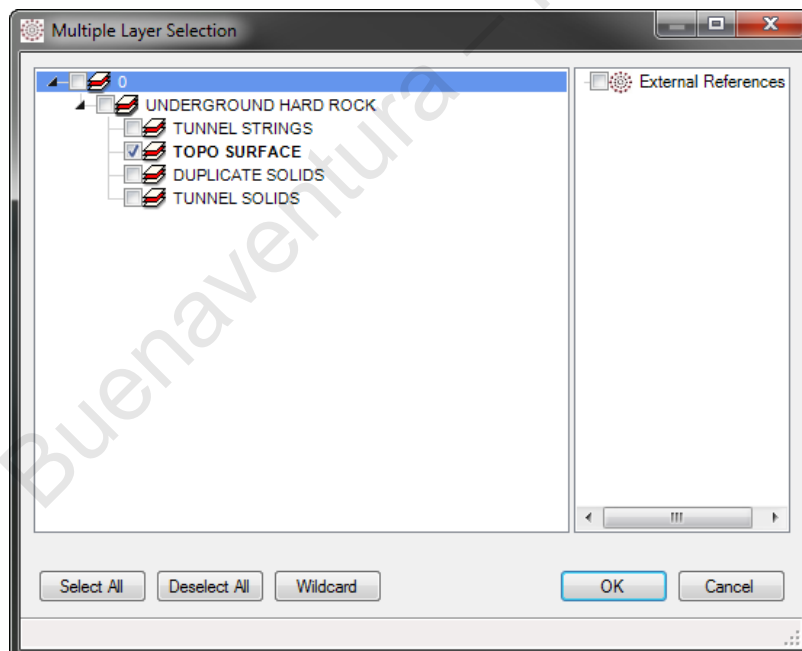
## 12.2. LAYER SELECTION DIALOG BOX

The layer selected from the **Layer Selection** dialog box dictates the input or output layer *Deswik.CAD* uses to run a command.

- By selecting a specified layer in the **Layer Selection** dialog box, the user can select all the entities on that layer to be used as inputs with the command:



- Some commands will require the user to select a layer to write the new information to, once the command is run.
- The **Layer Selection** dialog box lets the user control where the new information is output.

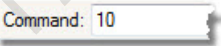



## 12.3. PROMPTS AND INPUTS

As commands are executed in *Deswik.CAD*, prompts for information (e.g. insertion points, angles) are displayed in semi-transparent pop-up text boxes to the bottom right of the screen. These pop-ups usually remain there until the action is performed, or until the user ends the action.



The table below outlines the common fields, outputs and commands used to complete *Deswik.CAD* prompts;


FIELD	DESCRIPTION
<b>Command field</b>	Typed input first displays in the Command field. 
<b>Output window</b>	Input data from the Command field is moved to the Output window after the user hits the <b>&lt;Enter&gt;</b> key.
<b>Optional prompts</b>	Whenever a prompt provides options in square brackets <b>[]</b> , these are optional prompts i.e. for the prompt <b>Specify Next Point</b> , the user is able to type 'a' for <b>[A]rc</b> , 'c' for <b>[C]lose</b> or 'u' for <b>[U]ndo</b> .  <i>Input is not case sensitive i.e. 'a' and 'A' are the same to Deswik.CAD.</i>
<b>Right-click</b>	<b>Right-click</b> to finalize the command.
<b>&lt;Esc&gt;</b>	Hit the <b>&lt;Esc&gt;</b> key to terminate input and abort a command at any time.

### 12.3.1. FOLLOW THE PROMPTS

In this exercise, we will create a simple entity to demonstrate the use of prompts and inputs.

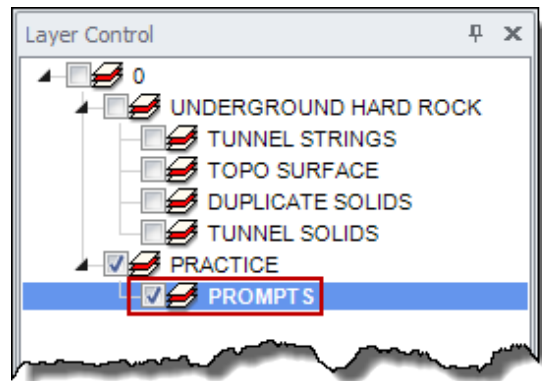
 *To follow the prompts and draw a box;*

1. Add a new 'parent' layer and name it: **0\PRACTICE**

 *The **0\PRACTICE** layer will be used to save various 'child' layers as exercises in the tutorial are completed.*

2. Add a new 'child' layer and name it: **0\PRACTICE\PROMPTS**

- Isolate the new layer and make it visible, selected and active.



- Run the **Draw | Solids | Objects | Box** command.
- PROMPT: Insertion Point
- INPUT: Click in the appropriate location in the Model Space to indicate the Insertion Point.
- PROMPT: Length
- INPUT: Enter '**150**' as the desired length of the box and hit **<Enter>**.



*As the user types, the number will appear in the Command field. When the user hits **<Enter>**, the number will move down to the Output window, becoming a part of the prompt and input history.*

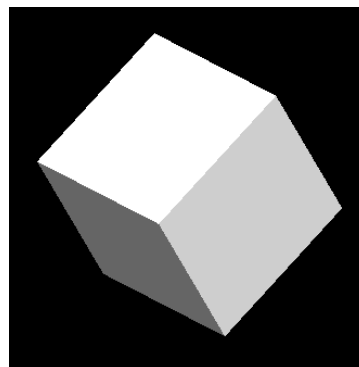
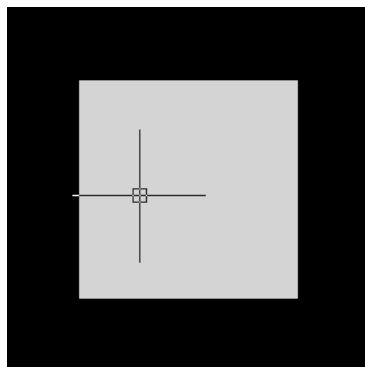
- PROMPT: **Width**
- INPUT: Enter '**150**' and hit **<Enter>**.
- PROMPT: **Height**
- INPUT: Enter '**150**' and hit **<Enter>**.
- PROMPT: **Rotation**
- INPUT: *Deswik.CAD* will provide a 'leader' line from the original insertion point to your cursor to assist you visually if you wish to click in the Model Space to manually select a Rotation Angle, or enter a **Rotation Angle** and hit **<Enter>**.



*Deswik.CAD draws a solid box (cube), often used to represent a Dump Overflow area.*





*Use the rotation and zoom commands to view the solid from different perspectives in the Model Space.*



## 12.4. LEFT MOUSE CLICK AND RIGHT MOUSE CLICK

As demonstrated in the preceding chapters of the tutorial, left and right clicking within *Deswik.CAD* can govern the outcome of a command or function.

The following table details some of the more common uses and outcomes of left and right clicking;

COMMAND/FUNCTION	OUTCOME
<b>Shortcut Menus (all)</b>	<ul style="list-style-type: none"> <li>• <b>Left-click</b> to select from a Shortcut Menu.</li> <li>• <b>Right-click</b> to display a Shortcut Menu.</li> </ul>
<b>Model Space</b>	<ul style="list-style-type: none"> <li>• <b>Left-click</b> to select Entities.</li> <li>• <b>Right-click</b> to display the Shortcut Menu.</li> </ul> <p> <i>An extended menu is displayed if an entity is selected in the Model Space.</i></p>
<b>Command Prompts i.e. Draw Polyline</b>	<ul style="list-style-type: none"> <li>• <b>Left-click</b> to select Start Point or Next Point.</li> <li>• <b>Right-click</b> to complete command.</li> </ul>
<b>Layer Control window</b>	<ul style="list-style-type: none"> <li>• <b>Left-click</b> to make a layer selected or to select a checkbox <input checked="" type="checkbox"/> and make a layer visible.</li> <li>• <b>Right-click</b> to display the Shortcut Menu.</li> </ul> <p> <i>An extended menu is displayed if the cursor is over a layer in the Layer Control window.</i></p>



### CHAPTER REVIEW

Before proceeding to the next chapter; review the subjects below and confirm the particular skills have been acquired. The acquired skills and knowledge should include;

SKILLS & KNOWLEDGE	CHAPTER REFERENCE
Use the select entities option successfully whilst running a command.	<a href="#">Select Entities Dialog Box</a>
Follow the prompts during a command.	<a href="#">Prompts and Inputs</a>
Demonstrate using left and right clicks to initiate the appropriate response.	<a href="#">Left Mouse Click and Right Mouse Click</a>



*The theories covered in these topics can now be applied to similar processes.*

## 13. PROPERTIES WINDOW

As stated earlier, **Fixed Properties**, **Variable Properties** and **Attributes** are displayed within the **Properties** window when an entity or entities are selected in the Model Space.



Information regarding [Attributes](#) is covered in the next chapter of the tutorial.

### 13.1. FIXED PROPERTIES

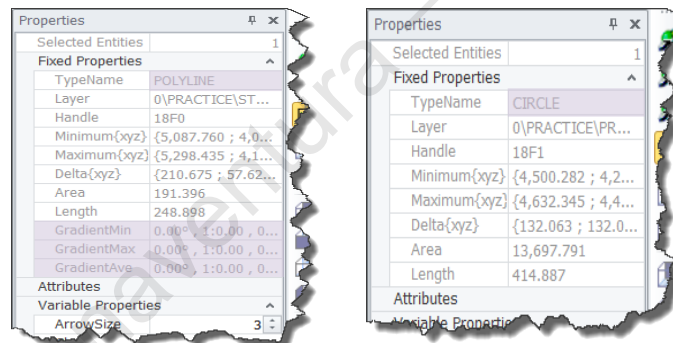
An entity's **Fixed Properties** cannot be changed; these properties are managed by *Deswik.CAD*.

When an entity is selected in the **Model Space**, the **Fixed Properties** of that entity are automatically displayed in the **Properties** window. Fixed Properties, by default, are greyed out as they are properties that *cannot* be changed. They are assigned and managed by *Deswik.CAD* when an entity is created, imported, edited, etc.

The different **Fixed Properties** that are displayed are dependent on the type of entity selected in the Model Space. Although there are many types of Fixed Properties, only those Fixed Properties that apply to the selected entity will display.



The Fixed Properties displayed differ for different entities i.e. Polyline entities have Gradient (Min, Max and Ave) properties; circle entities do not because a circle has no gradient.




#### 13.1.1. POLYLINE START POINTS

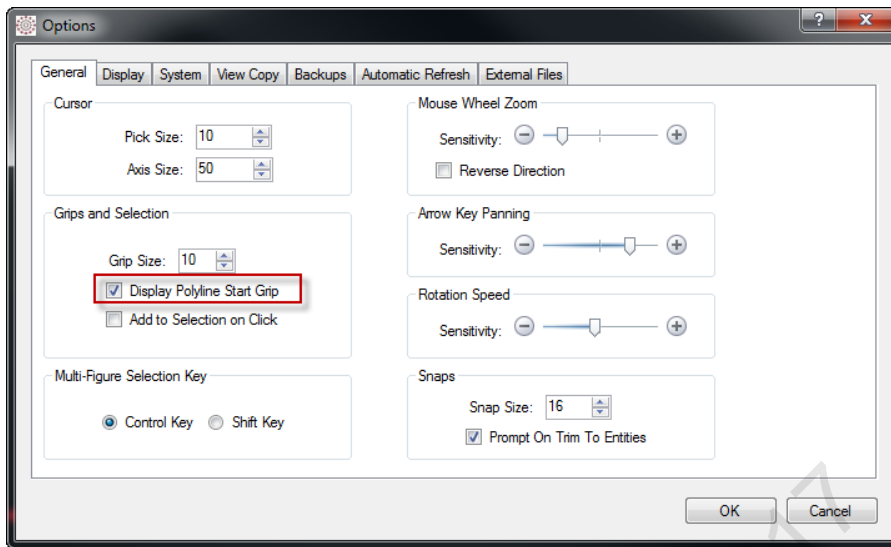
In this exercise, we will draw a simple polyline and identify the Start (and end) point.

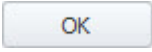


To identify polyline start point;

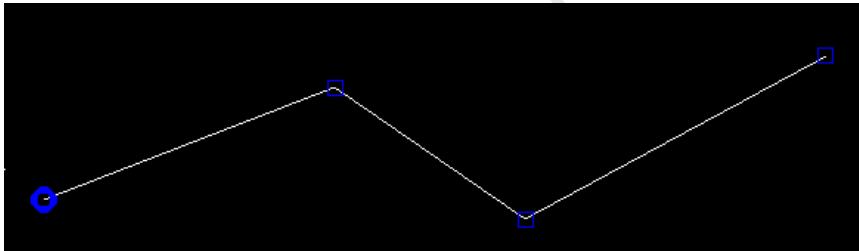
1. Add a new layer and name it: **0\PRACTICE\START POINT**
2. Isolate the new layer and make it visible, selected and active.
3. Run the **Draw | Polyline** command or click  from the toolbar.
4. Follow the prompts to draw a simple polyline and right-click to complete the command.
5. From the Main menu run the **Tools | Options** command.

6. From the presented Options dialog box, select the  Display Polyline Start Grip checkbox.

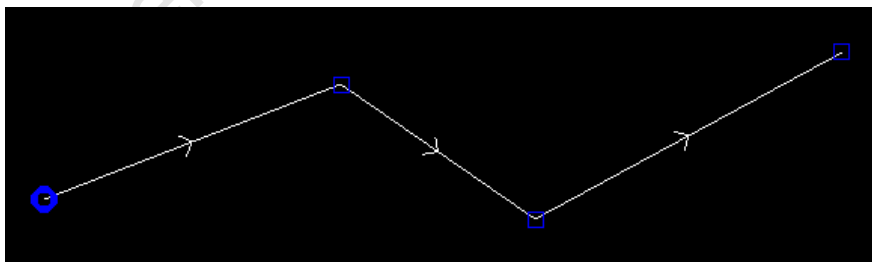


7. Click  to close the **Options** dialog box.  
8. From the Model Space, click on the polyline to select it.

- Review the polyline in the Model Space, the Start Point Grip displays as a **bold** grip.



-  *Directional Arrows can also be displayed; **Properties window** | **Variable Attributes** | **Show Direction Arrows**.*



## 13.2. VARIABLE PROPERTIES

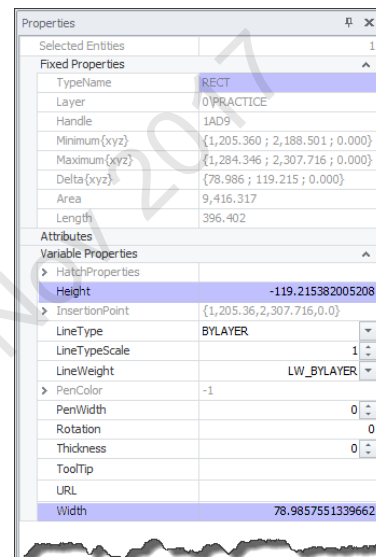
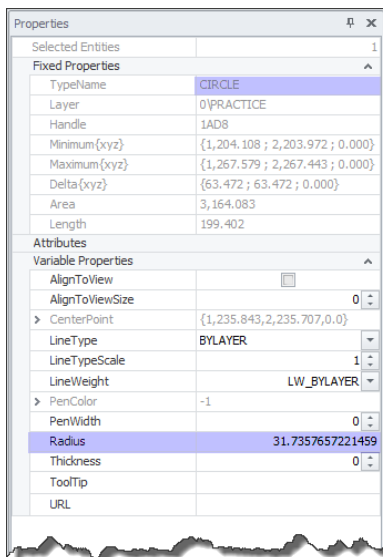
**Variable Properties** are those properties that the user *can* change.

When an entity is selected in the Model Space, the Variable Properties of that entity are automatically displayed in the Properties window.

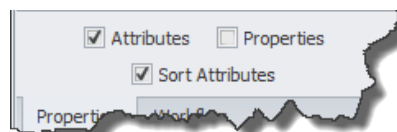
The different Variable Properties that are displayed are dependent on the type of entity selected in the Model Space. Although there are many **Variable Properties**, only those Variable Properties that apply to the selected entity will display.



*The Variable Properties displayed differ for different entities i.e. Circle entities have a Radius property, which would not be displayed for entities such as a rectangle, which has Height and Width properties.*



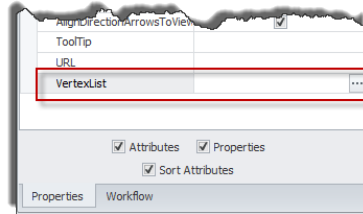
Variable Properties can be hidden from view by clearing the  **Properties** checkbox at the bottom of the Properties window.



### 13.2.1. VERTEX LIST


Single entities such as a Polyline can be edited via the **Vertex List**, which is displayed at the bottom of the **Properties** window.

**i** The **Vertex List** field is not visible for entity types such as circles, ellipses, rectangles, etc.

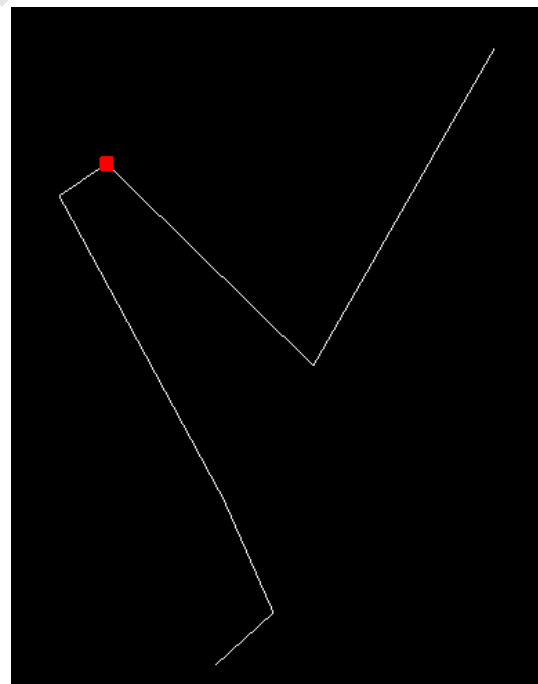
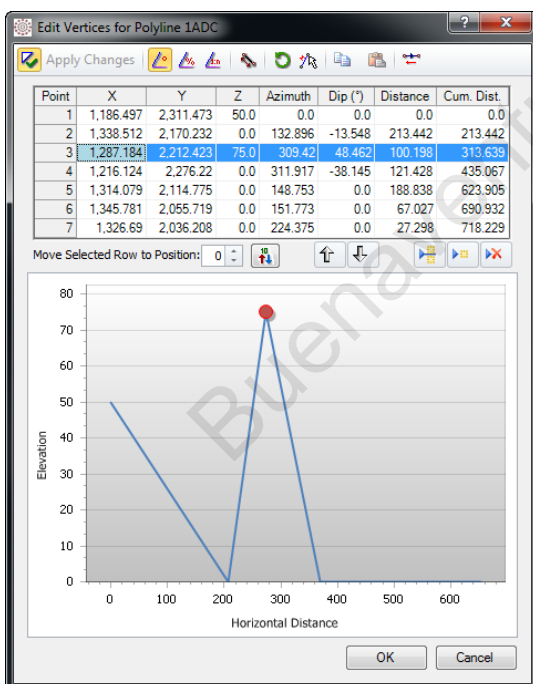


**📄** The Vertex List window that displays depends on the entity type selected from the Model Space.

**🎓** To edit a Polyline;

1. Click the  icon from the **VertexList** field.
2. From the Edit Vertices for Polyline dialog box select one of the Points.

**✓** The Point selected from the grid is indicated by a **red** dot in the graph and a **red** grip in the Model Space.



3. Fields in the **Point** grid can be modified by clicking the required field and entering a new value.

**i** As changes are made in the grid, the row(s) containing the change(s) made will be highlighted in **blue**.



## CHAPTER REVIEW

Before proceeding to the next chapter; review the subjects below and confirm the particular skills have been acquired. The acquired skills and knowledge should include;

SKILLS & KNOWLEDGE	CHAPTER REFERENCE
Locate fixed properties of an entity.	<a href="#">Fixed Properties</a>
Modify the polyline start points.	<a href="#">Polyline Start Points</a>
Adjust a variable property on an entity.	<a href="#">Variable Properties</a>
Locate and edit the vertex list of a polyline.	<a href="#">Vertex List</a>




*The theories covered in these topics can now be applied to similar processes.*

Buenaventura – Nov 2017

## 14. ATTRIBUTES

Attributes are custom data which can be applied to a layer and the dataset on that layer and are one of the most important concepts in *Deswik.CAD*.


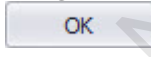
*Deswik.CAD* allows an unlimited number of Attributes to be applied to a layer. All entities on the same layer share the same Attributes: however their Attribute *values* can, and usually will differ.

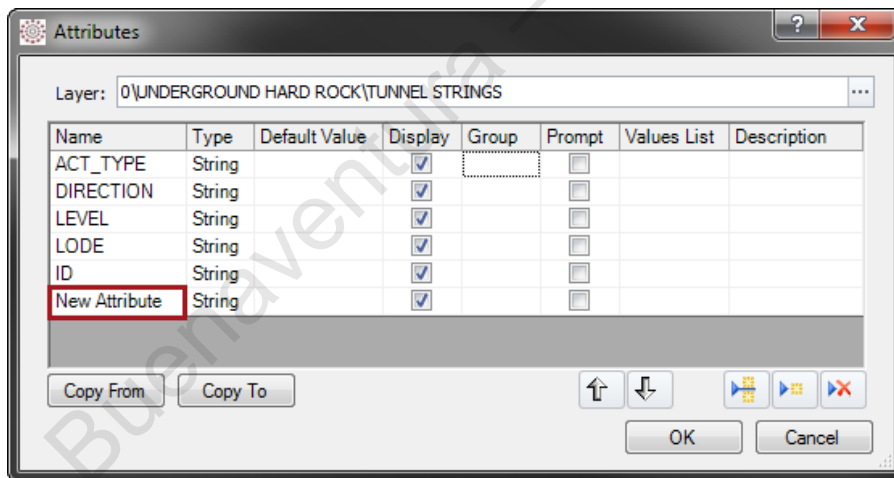
 *It is critical the Attributes in the project are set up correctly and consistently to ensure the user gets the maximum potential out of various tools and commands in Deswik.CAD.*


One of the most powerful uses of Attributes is filtering, to visually isolate entities in the Model Space quickly and easily. *Deswik.CAD* can also create detailed reports, including specific Attributes as a field within a report.

 Information regarding [Filters](#) is covered later in the tutorial.

 To add an Attribute to entities on a layer;


1. **Right-click** the required layer and select Attributes from the shortcut menu.
2. Click  to add a new row in the Attribute dialog box.
3. Input a Name for the new attribute and click 



 All entities on the selected layer will now have this new Attribute assigned to them. Attributes can also be modified or deleted via the Attribute dialog box.

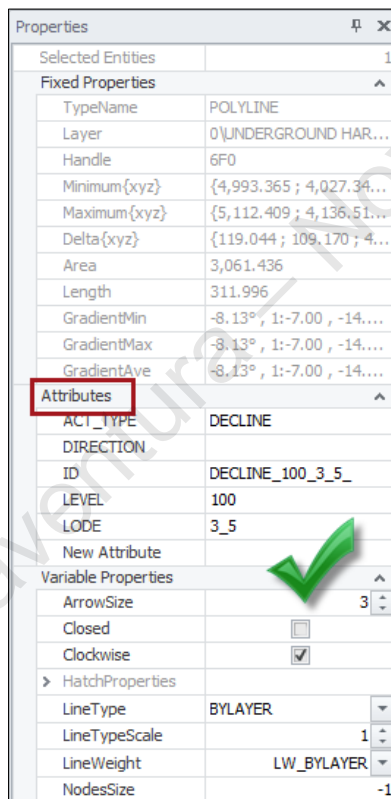
## 14.1. ATTRIBUTE VALUES

When an Attribute is added to the layer, the default value of that Attribute (if any) is assigned to all existing entities on the layer. It is then necessary to assign values to these Attributes. Attribute values can be strings (comprised of text and/or numbers) or they can be strictly numeric values, useful for calculations.

 *Without values assigned, Attributes serve no purpose!*

Values can be assigned to individual Attributes, by entering in the specific value in the field next to the Attribute, in the Properties window. Values can also be assigned to multiple entities in the Model Space, by filtering the required Attributes with the Interactive Filter.

The Properties window below, displays the Attributes and Values for a single entity selected in the Model Space:




Properties	
Selected Entities	1
<b>Fixed Properties</b>	
TypeName	POLYLINE
Layer	0\UNDERGROUND HAR...
Handle	6F0
Minimum{xyz}	{4,993.365 ; 4,027.34...
Maximum{xyz}	{5,112.409 ; 4,136.51...
Delta{xyz}	{119.044 ; 109,170 ; 4...
Area	3,061.436
Length	311.996
GradientMin	-8.13° , 1:-7.00 , -14...
GradientMax	-8.13° , 1:-7.00 , -14...
GradientAve	-8.13° , 1:-7.00 , -14...
<b>Attributes</b>	
ACT_TYPE	DECLINE
DIRECTION	
ID	DECLINE_100_3_5_
LEVEL	100
LODE	3_5
New Attribute	
<b>Variable Properties</b>	
ArrowSize	3
Closed	<input type="checkbox"/>
Clockwise	<input checked="" type="checkbox"/>
<b>HatchProperties</b>	
LineType	BYLAYER
LineTypeScale	1
LineWeight	LW_BYLAYER
NodesSize	-1

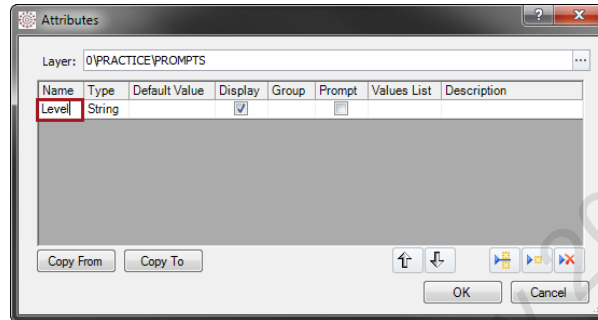
### 14.1.1. ADDING ATTRIBUTES AND ASSIGNING VALUES

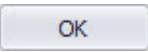
In this exercise, we will add an Attribute to a layer and assign a Value to the entity on the layer.

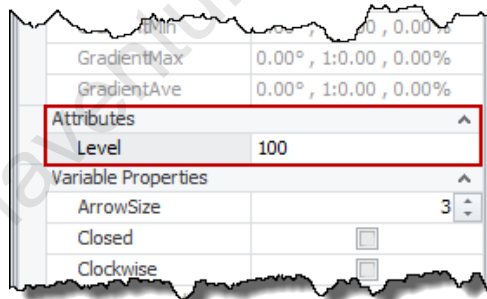


To add attributes and assign values;

1. Isolate the **0\PRACTICE\PROMPTS** layer and make it visible, selected and active.
2. **Right-click** on the layer and select Attributes from the shortcut menu.
3. From the presented Attributes dialog box, click  to add a new row.
4. In the Name column, input 'Level' to assign all the entities on this layer an Attribute of Level.



5. Click .
6. Select the entity in the Model Space and refer to the **Attributes** section in the **Properties** window. The **'Level' Attribute** has been added to the Properties window.
7. Input **'100'** in the value field next to **Level**.




Attribute Values can also be deleted and modified from the Properties window.

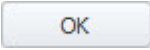



Hit **<Esc>** to ensure there are no entities selected in the Model Space.

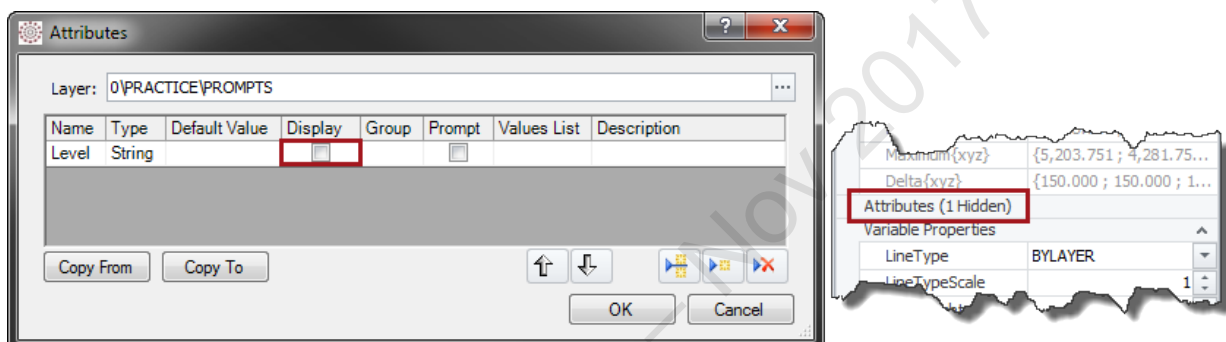
## 14.2. DISPLAY / HIDE ATTRIBUTES

Attributes are set to display in the Properties window by default, however Attributes can be hidden, which may be useful when working on large and/or complex projects.

 To hide an Attribute;


1. **Right-click** the required layer and select Attributes from the shortcut menu.
2. From the Display column of the Attributes dialog box, clear the  required Attribute checkbox and click 

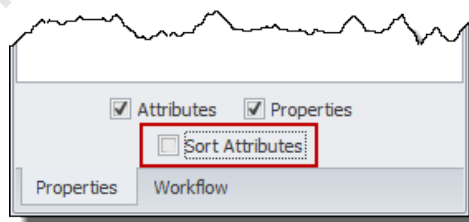
 The hidden attribute no longer displays in the Properties window and the total number of hidden attributes is displayed in the Properties window.




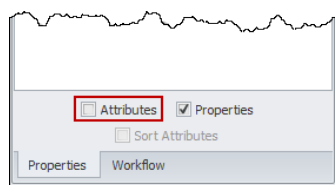
### 14.2.1. SORTING ATTRIBUTES

Attributes, by default are displayed in the Properties window in alphabetical order.

 To sort Attributes in the same order as they display in the Attributes dialog box, clear the  **Sort Attributes** checkbox at the bottom of the Properties window.



 To hide all the Attributes and Attribute Values, in the Properties window clear the  **Attributes** checkbox at the bottom of the Properties window.



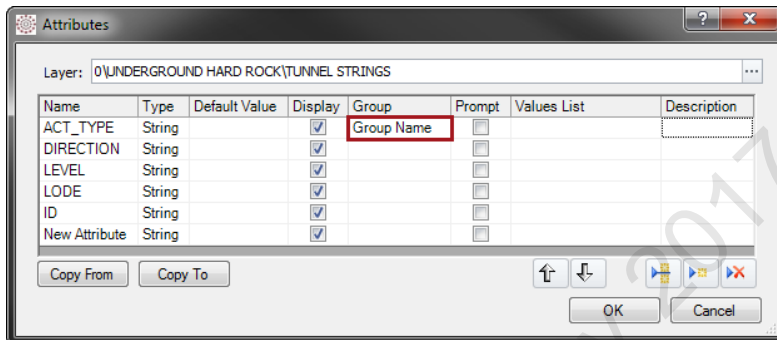
### 14.3. GROUP ATTRIBUTES

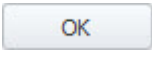
Attributes can be organized into groups (optional) which may assist when there are many Attributes on a layer.



To group attributes;

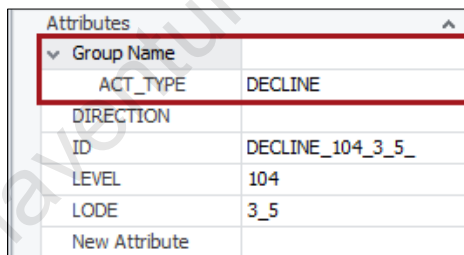
1. **Right click** on the **0/UNDERGROUND HARD ROCK/TUNNEL STRINGS** Layer and select Attributes.
2. From the Attributes dialog box enter a Group name/s for the required Attributes, similar to the following;



3. Click  and select an entity in the models space.
4. Check the properties window.



The attributes that are in a Group will display in the Properties window in their respective Groups.



#### CHAPTER REVIEW

Before proceeding to the next chapters; review the subjects below and confirm the particular skills have been acquired. These skills and knowledge should include;

SKILLS & KNOWLEDGE	CHAPTER REFERENCE
Add an attribute to a layer and assign a value.	<a href="#">Attribute Values</a>
Display and hide attributes.	<a href="#">Display / Hide Attributes</a>
Identify attribute groups in the Properties window.	<a href="#">Group Attributes</a>



The theories covered in these topics can now be applied to similar processes.


## 15. FILTERS

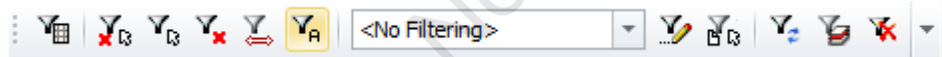
**Filtering** is a powerful concept that allows the user to temporarily hide and display entities that meet specific selection criteria based on their Attributes and Properties.

When a **Filter** is applied to a layer and entities on that layer do not meet the selection criteria, they are hidden from view. These **Filters** are termed 'hard' **Filters** as they remain associated with the layer until removed. Entity visibility on that layer will be governed by this **Filter**, even if the Layer visibility is turned off, then on again.

Entities can also be hidden or made visible independent of these 'hard' **Filters** using commands such as **Hide Selected Entities**. These 'soft' **Filters** provide a temporary means of changing what entities are visible on the screen at any point in time. As soon as the Layer Visibility is turned off and on again, all entities on the layer that were 'soft' **Filtered** become visible again.









Filters can also be used to temporarily change the visibility of certain entities prior to running a command. When the command is run, only the **Filtered** entities will be altered or used in the command.




 All Filter commands can be accessed via the Main menu – Edit | Filters – or by the Filters shortcut toolbar.



### 15.1. ENTITY FILTERS


The various Filter commands in *Deswik.CAD* are summarized below;


SYMBOL	COMMAND	DETAIL
	<b>Edit   Filters   Interactive Filter</b>	<i>Refer to</i>
	<b>Edit   Filters   Isolate Selected Entities</b>	<i>Display only the selected entities.</i>
	<b>Edit   Filters   Hide Selected Entities</b>	<i>Hide the selected entities.</i>
	<b>Edit   Filters   Unhide All Entities</b>	<i>Remove all 'soft' Filters.</i>
	<b>Edit   Filters   Invert Visibility</b>	<i>Invert the visibility of all entities on visible layers.</i>
	<b>Edit   Filters   Isolate by Attribute</b>	<i>Display all entities with attributes common to the selected entities.</i>
	<b>Edit   Filters   Edit</b>	<i>Create and edit Filters.</i>
	<b>Edit   Filters   Create From Selected Entities</b>	<i>Automatically generate a Filter based on selected entities.</i>

	<b>Edit   Filters   Refresh</b>	Reapply the Filters assigned to layers and refresh the graphics.
	<b>Edit   Filters   Apply to Layers</b>	Manage which Filters are applied to the layers.
	<b>Edit   Filters   Remove All</b>	Remove all Filters from all layers and unhide all entities on all visible layers in the active project.


### 15.1.1. ISOLATE ENTITIES AND INVERT VISIBILITY

In this exercise, we will isolate several entities in the Model Space and then invert the visibility so the selected entities are hidden.

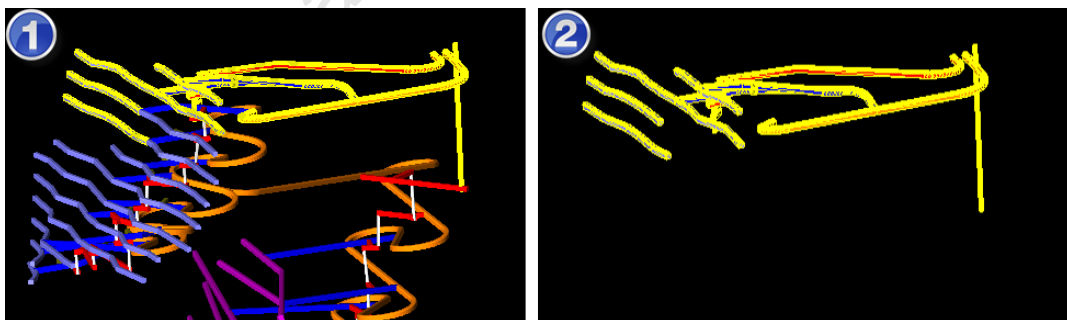
 To isolate and invert entity visibility;


1. Isolate the **0\UNDERGROUND HARD ROCK\TUNNEL SOLIDS** layer and make it visible, selected and active.
2. Run the **Edit | Filters | Remove All** command or click the  button.

 It is recommended that prior to running any Filter commands: start by running the **Remove All** command to ensure no Filters are currently running in the background.

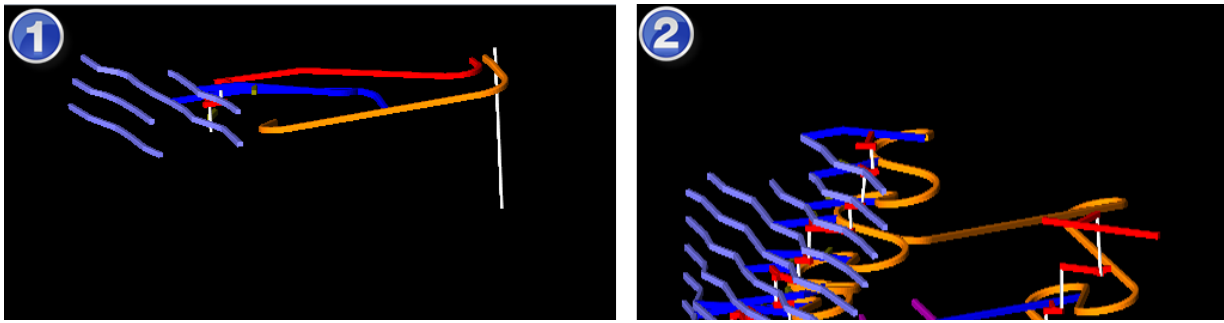
3. Run the **Edit | Filters | Isolate Selected Entities** command or click the  button.
4. Follow the prompt and select mining solid entities to isolate, like in the picture below:

 Hold **<Ctrl>** down to select multiple entities and right-click to finish selecting.




 Only the selected entities are displayed in the Model Space.

5. Run the **Edit | Filters | Invert Visibility** command or click the  button.




- This will reverse the filter, making the isolated visible entities hidden and the hidden entities visible.

6. Run the **Edit | Filters | Remove All** command or click the  button to turn off the **Filter** and restore the other entities in the Model Space.

## 15.2. FILTER CREATION

The **Edit | Filters | Edit** command allows the user to manually create a **Filter** so it can be used with other tools within *Deswik.CAD* to quickly filter out specific entities when required.

Once a **Filter** is created, it is saved globally in the project and can be applied to any layer i.e. the list of available **Filters** is the same for every layer.

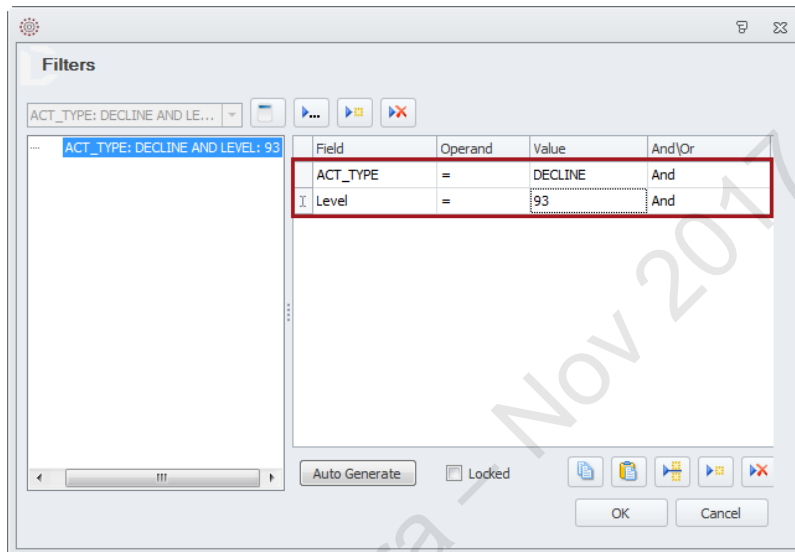
-  When a **Filter** is applied, it is applied only to the **Selected** layer and the entities it contains. It is **not** applied to every layer in the project.

### 15.2.1. FILTER LOGIC

To create an effective **Filter** in *Deswik.CAD* the following logic should be adhered to:


- The **Filter** is based on the **Attribute** selected (**Field**)
- An **Operand** (=, > etc...) must be selected from the drop-down list
- An **Attribute Value** must be entered
- When the **Filter** contains more than 1 row, **And/Or** must be selected (defaults to **And**)



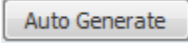
 The following example is a simple Filter based on Activity Types and Levels.

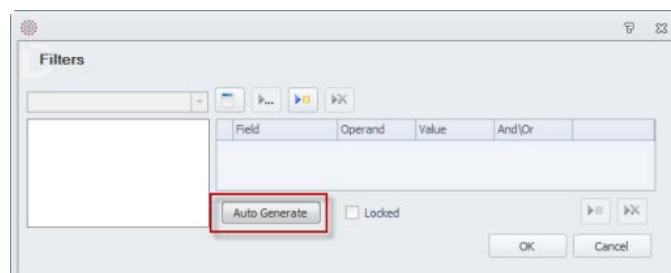




### 15.2.2. CREATING A FILTER

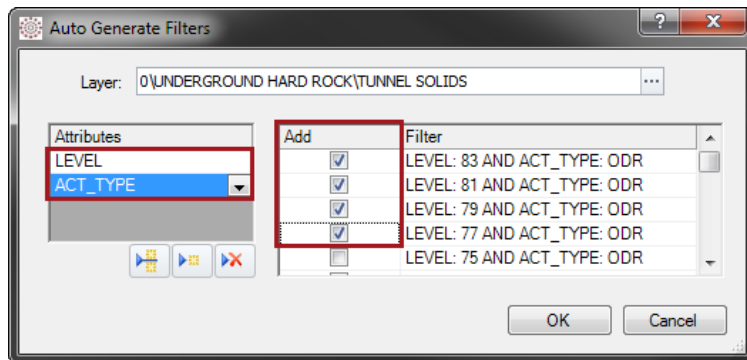
In this exercise, we will use the Auto Generate function to create the Filter outlined above.


 To auto generate a Filter;

1. Isolate the **0\UNDERGROUND HARD ROCK\TUNNEL SOLIDS** layer and make it visible, selected and active.
2. Run the **Edit | Filters | Remove All** command or click the  button.
3. Run the **Edit | Filters | Edit** command or click the  button.
4. From the presented Filters dialog box, click the  button.

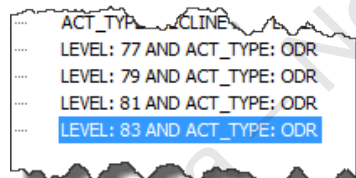


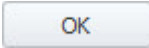
- From the presented **Auto Generate Filters** dialog box, click  to add an **Attribute**.
- Select **LEVEL** from the **Attributes** drop-down list.
- Click  to add another **Attribute** and select **ACT\_TYPE** from the drop-down list.

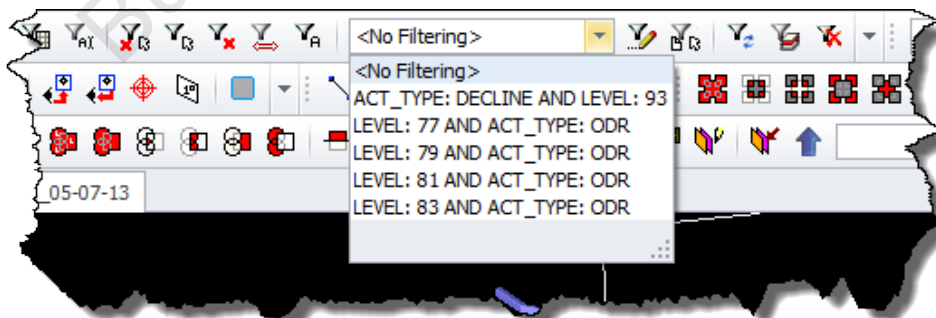


 All the possible unique values for the selected Attributes are displayed in the grid.

- Select the  **LEVEL: 83 AND ACT\_TYPE: ODR** checkbox and click .

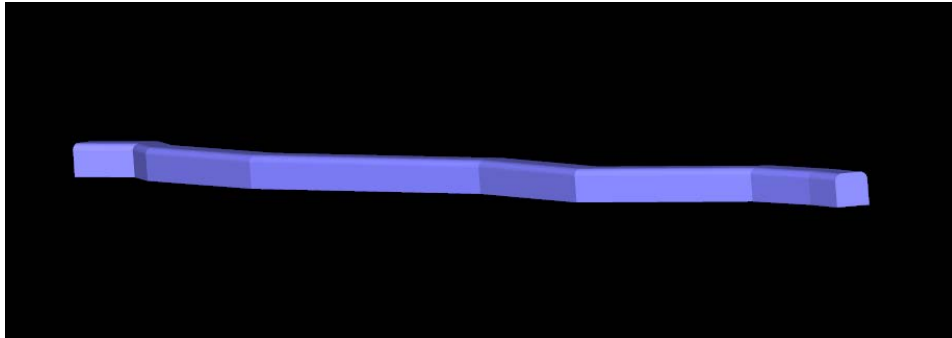



- Click  to close the Filters dialog box.
- Ensure the **0\UNDERGROUND HARD ROCK\TUNNEL SOLIDS** layer is selected.
- From the **Filters** toolbar select the newly created filter from the **Filters** drop-down list.





This will apply the newly created **Filter** and isolate all entities on **LEVEL 83** with the **ACT\_TYPE: ODR Attribute** assigned to it.






12. Run the **Edit | Filters | Remove All** command or click the  button to turn off the **Filter** and restore the other entities in the Model Space.

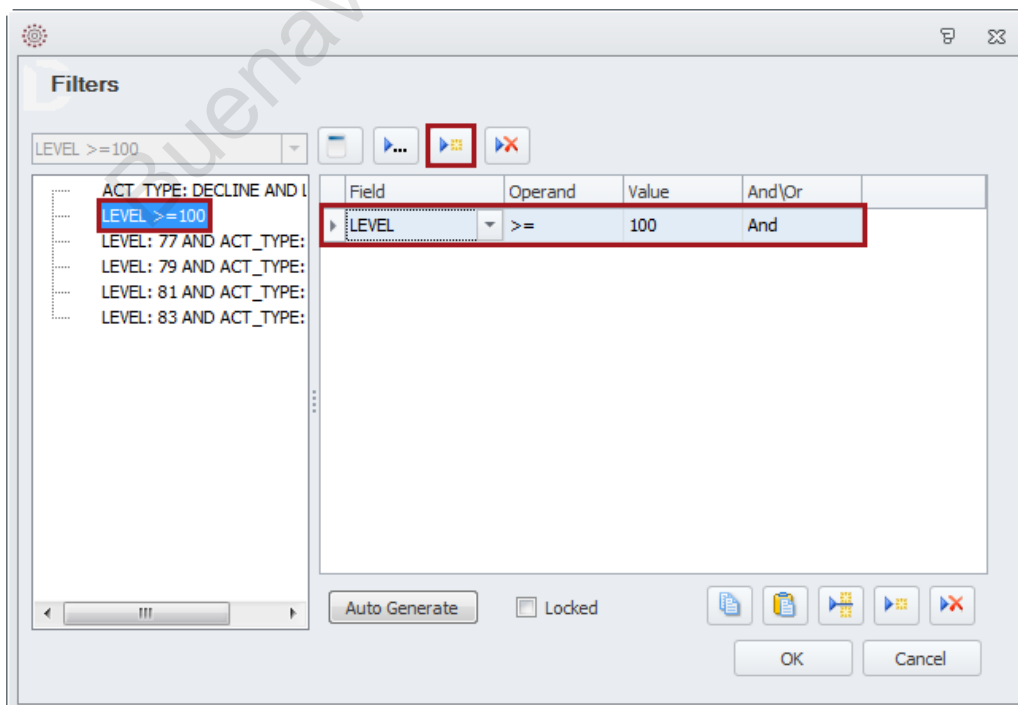
### 15.2.3. MANUALLY CREATE A FILTER

In this exercise, a filter will manually be created to isolate solids that have a level greater than or equal to ( $\geq$ ) 100.




To manually create a filter;

1. Run the **Edit | Filters | Remove All** command or select the  button.
2. Isolate the **0\UNDERGROUND HARD ROCK\TUNNEL SOLIDS** layer and ensure it is the selected layer.
3. Run the **Edit | Filters | Edit** command or click the  button.
4. From the Filters dialog box, click  to add a new Filter named **LEVEL  $\geq$  100**

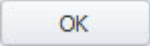


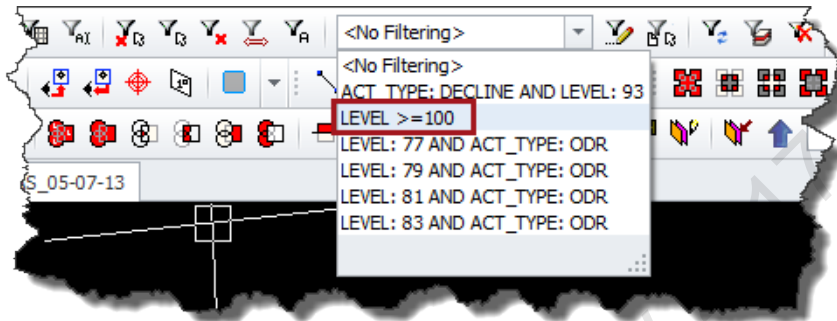


The Filter creation process auto-assigns the existing rules to the new Filter.

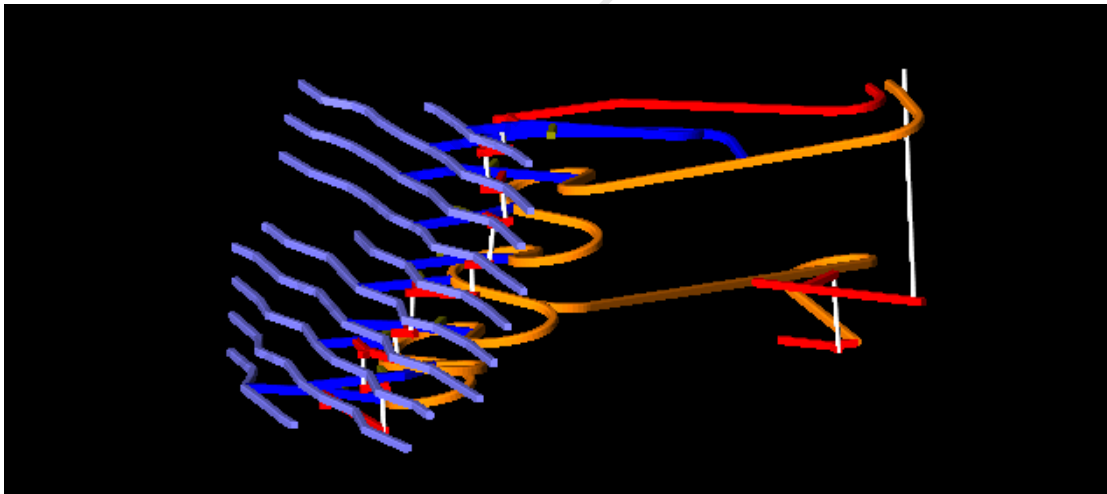
5. Click  to **Delete Selected Rows** and remove all the current rows.
6. Add a new row to the Filter grid and populate the Filter rule as follows;


▶ LEVEL	▼	>=	100	And
---------	---	----	-----	-----

7. Click  to close the **Filters** dialog box.
8. From the **Filters** toolbar, select the newly created filter from the **Filters** drop-down list.



This will apply the newly created **Filter** and isolate all entities with a **Level** greater or equal to 100.



9. Once the isolated entities have been inspected, run the **Edit | Filters | Remove All** command or click  button.

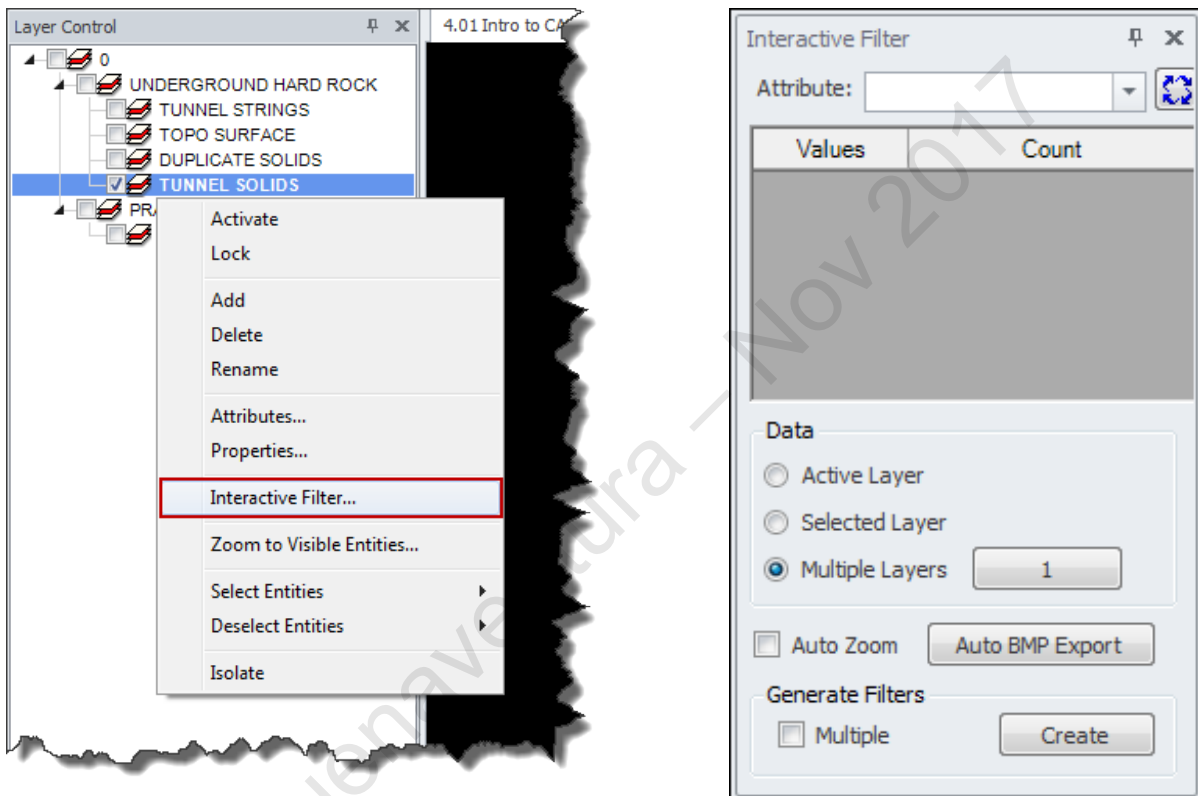
### 15.3. INTERACTIVE FILTER

**Interactive Filtering** is a temporary and quick way of changing the visibility of entities using their Attribute values. This filtering can be used in conjunction with a number of other commands to assist in making only the desired entities visible. Multiple **Interactive Filter** dock windows can be opened at once to allow entities on different layers to be filtered independently.

The **Interactive Filter** includes functionality to generate 'hard' Filters, create bitmap images and apply filtering to single or multiple layers.



*When applying the Interactive Filter to a single layer, right-click on the required layer and select **Interactive Filter** from the shortcut menu to ensure filtering is applied to the correct layer.*




#### 15.3.1. ISOLATE ENTITIES BY THEIR ATTRIBUTE TYPE

In this exercise, we will use the Interactive Filter to isolate specific entities in the Model Space by their Attribute type.



*To isolate entities with the Interactive Filter;*

1. Isolate the **0\UNDERGROUND HARD ROCK\TUNNEL SOLIDS** layer and make it visible, selected and active.
2. Run the **Edit | Filters | Remove All** command or click the  button.
3. From the Layer Control window, **right-click** on the **TUNNEL SOLIDS** layer and select **Interactive Filter** from the shortcut menu.

- From the Interactive Filter, select the  **LEVEL** checkbox from the Attribute drop-down list.
- Click  and leave the Interactive Filter open.

**i** This will present all of the different **LEVELS**, with a count of how many entities of that particular attribute type the **Interactive Filter** has identified.

LEVEL	Count
83	9
81	15
79	7

**💡** Click the **LEVEL** column header to sort the identified attributes in numerical order.

- Click on the **83** row to display all entities in the Model Space with an **Attribute Value** of **LEVEL 83**.
- To confirm this, click on any one of the entities in the Model Space, then refer to the **Properties** window.



- Repeat steps 6 and 7 selecting any of the remaining attributes, or multiple attributes.

**💡** Hold down the **<Ctrl>** key to select multiple attributes. Also, click and drag over multiple rows to select multiple attributes.

- After examining the different attribute types, close the Interactive Filter.
- Run the **Edit | Filters | Remove All** command or click the button to turn off the Filter and restore the other entities in the Model Space.


**⚠️** Finish checking the entity in the Model Space, hit **<Esc>** and ensure there are no entities selected.

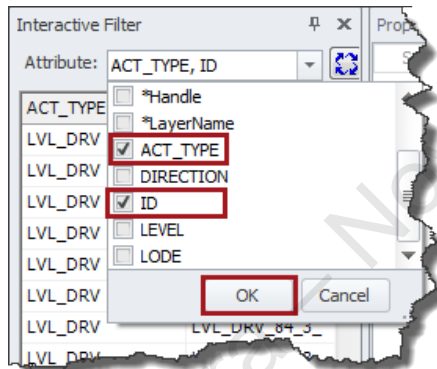
### 15.3.2. TROUBLESHOOTING WITH THE INTERACTIVE FILTER

In this exercise, use the **Interactive Filter** as an effective troubleshooting tool with the ability to quickly filter and isolate **Attributes**, so any potential issues, such as entities with duplicate ID's, can be easily identified.



To troubleshoot with the **Interactive Filter**;

1. Isolate the **0\UNDERGROUND HARD ROCK\TUNNEL SOLIDS** layer and make it visible, selected and active.
2. Run the **Edit | Filters | Remove All** command or select the  button.
3. From the Layer Control window, **right-click** on the **DUPLICATE SOLIDS** layer and select Interactive Filter from the shortcut menu.
4. From the Interactive Filter, select the  **ID** checkbox from the Attribute drop-down menu and select the  **ACT\_TYPE** checkbox from the Attribute drop-down menu.



5. Click  and leave the **Interactive Filter** open.



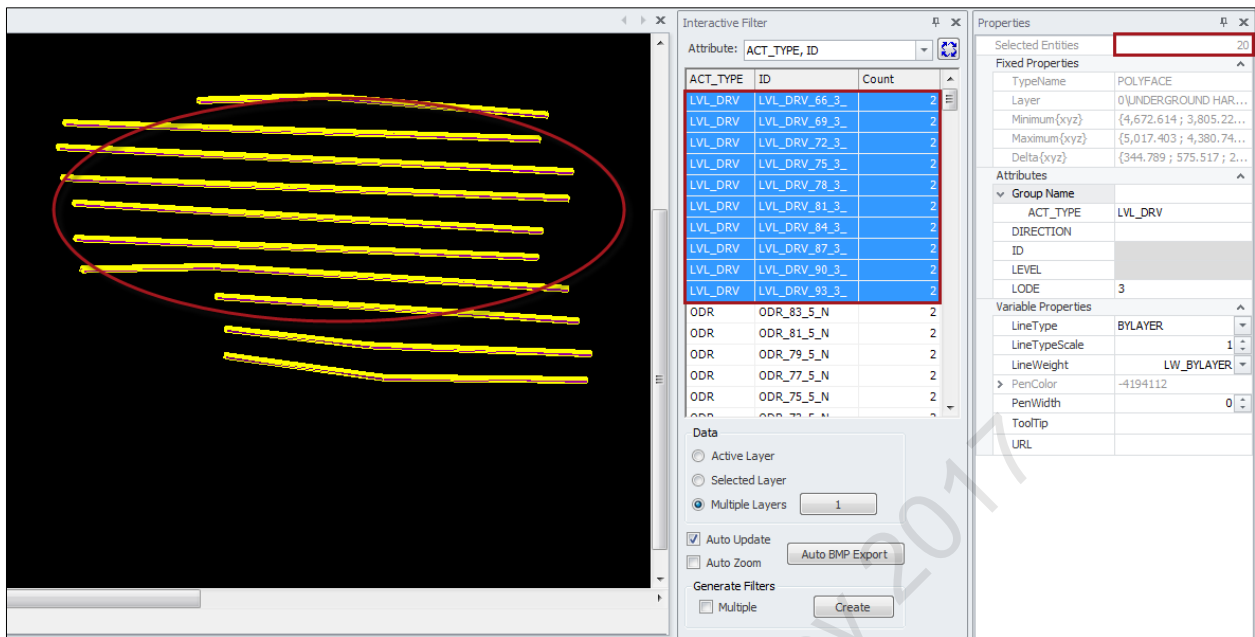
*This will present a list of **ID** attributes, with a count of how many entities of that particular attribute type the **Interactive Filter** has identified.*

6. Select on the **Count** column header twice, to sort the number of identified attributes in descending numerical order i.e. any **ID Attributes** values with a count greater than 1 will display at the top.

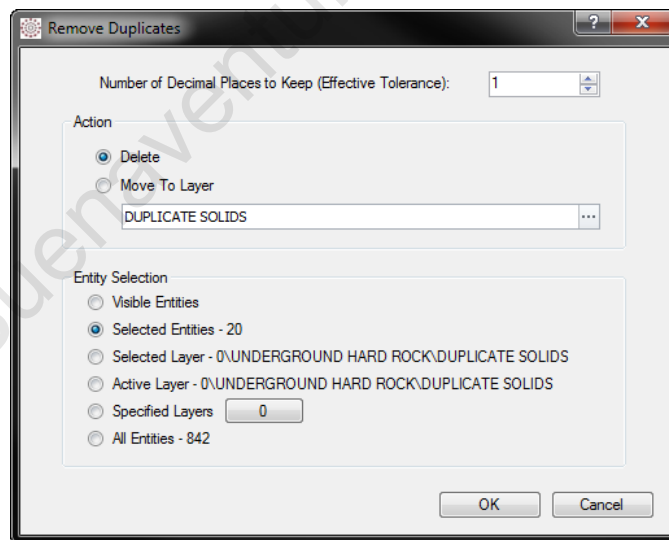
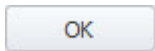




*This will present 14 duplicate **ID** attribute types and an **ACT\_TYPE = LVL\_DRV** (Count = 2).*

- From the **Interactive Filter**, highlight the **ID's & the ACT\_TYPE = LVL\_DRV** presenting more than 1 entity in the count column. This will isolate them in the model space.



- In the **Model Space**, select all of the entities and check the properties window there should be a total of **28** entities.
- Run the **Modify | Solids | Extract Duplicates** command, delete the duplicates and click




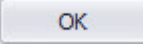
- From the **Interactive Filter** select  to refresh and confirm there are no more duplicate ID's.
- Close the **Interactive Filter** and run the **Edit | Filters | Remove All** command or select the  button.

### 15.3.3. CREATE A FILTER VIA THE INTERACTIVE FILTER

Permanent or hard Filters can also be created from the Interactive Filter.

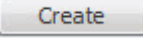
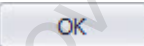



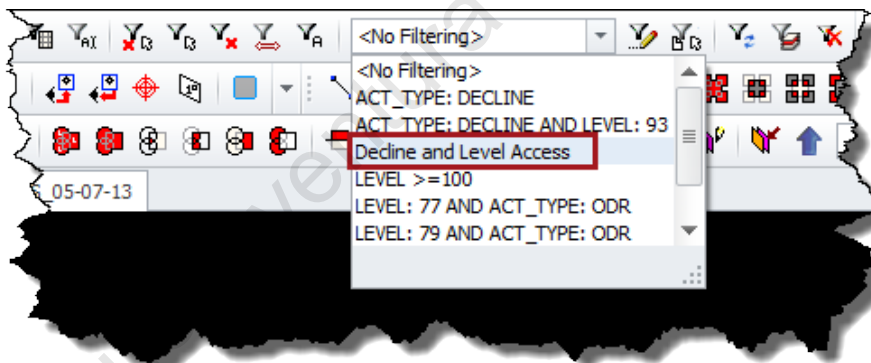
To create a filter via the **Interactive Filter**;

1. Isolate the **0\UNDERGROUND HARD ROCK\TUNNEL SOLIDS** layer and make it visible, selected and active.
2. Run the **Edit | Filters | Remove All** command or select the  button.
3. From the Layer Control window, **right-click** on the **TUNNEL SOLIDS** layer and select **Interactive Filter** from the shortcut menu.
4. From the Interactive Filter, select the  **ACT\_TYPE** checkbox from the Attribute drop-down menu.
5. Click  and leave the Interactive Filter open.

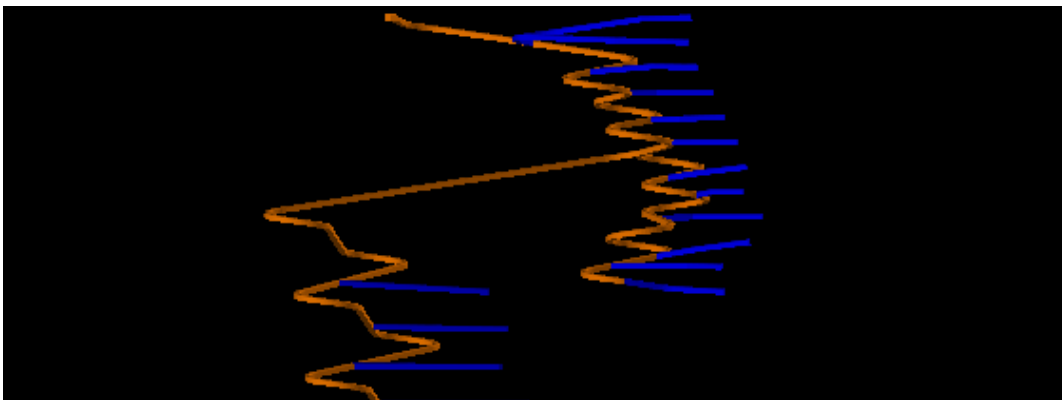



This will present a list of **HORIZON** attributes, with a count of how many entities of that particular attribute type the **Interactive Filter** has identified.

6. From the **Interactive Filter**, highlight the **DECLINE, LVL\_ACC\_1** and **LVL\_ACC\_2** attributes.
7. Click  from the bottom of the **Interactive Filter**.
8. Entitle the new filter **Decline and Level Access** and click .
9. Close the **Interactive Filter** and run the **Edit | Filters | Remove All** command or select the  button.
10. From the **Filters** toolbar, select the newly created filter from the **Filters** drop-down list.



This will apply the newly created **Filter** and isolate the **Decline and Level Access's**.



11. Once the isolated entities have been inspected, run the **Edit | Filters | Remove All** command or select the  button.



## CHAPTER REVIEW

Before proceeding to the next chapters, review the subjects below and confirm the particular skills have been acquired. These skills and knowledge should include;

SKILLS & KNOWLEDGE	CHAPTER REFERENCE
Apply filters to the entities in the model space.	<a href="#">Entity Filters</a>
Use a filter to invert visibility of entities.	<a href="#">Isolate Entities and Invert Visibility</a>
Autogenerate a hard filter.	<a href="#">Auto Generate a Filter</a>
Manually create a hard filter.	<a href="#">Manually Create a Filter</a>
Utilise the interactive filter to create a hard filter.	<a href="#">Create a Filter via the Interactive Filter</a>



*The theories covered in these topics can now be applied to similar processes.*

## 16. FILE MANAGEMENT

There are various commands accessible via the Main Menu to assist in the effective management of files and data in *Deswik.CAD*, some of the more common features are detailed below.

### 16.1. NEW\OPEN\CLOSE FILES

The **New**, **Open** and **Close** commands are relatively consistent with similar commands in most software programs.

#### 16.1.1. NEW FILE

*Deswik.CAD* supports creating new projects in a single *Deswik.CAD* session. The different projects can be identified and selected from the different tabs at the top of the Model Space.



To create a new *Deswik.CAD* project, run the **File | New** command or click the  button from the toolbar.




The default name for a new project is '**Document #**'. Once the new project has been saved for the first time, the project will be labeled using the newly created saved name.

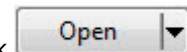
#### 16.1.2. OPEN FILE



To open a previously saved *Deswik.CAD* project;

1. Run the **File | Open** command or click the  button from the toolbar.

2. From the Windows Explorer screen, select the required *Deswik.CAD* file and click

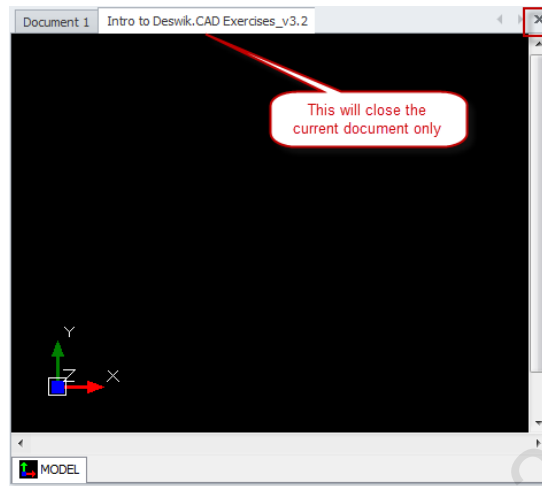


Alternatively, a previously saved project can be opened directly by **double-clicking** the **\*.vdcl** file.

### 16.1.3. CLOSE FILE



To close the current *Deswik.CAD* project, run the **File | Close** command or click the  button from the top right corner of the Model Space.



If there are any changes to the current *Deswik.CAD* document, the user will be prompted to save the changes.

## 16.2. SAVING FILES

*Deswik.CAD* saves a project into a single file with the default extension **\*.vdcl**. There are no restrictions with having spaces in the file name, or the length of the path that the file can be saved in.

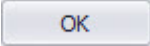
The first time a *Deswik.CAD* project is saved, the user will be requested to specify a **File name** and **Save As** location for the project. Future saves of the project will automatically save to this directory unless specified otherwise.

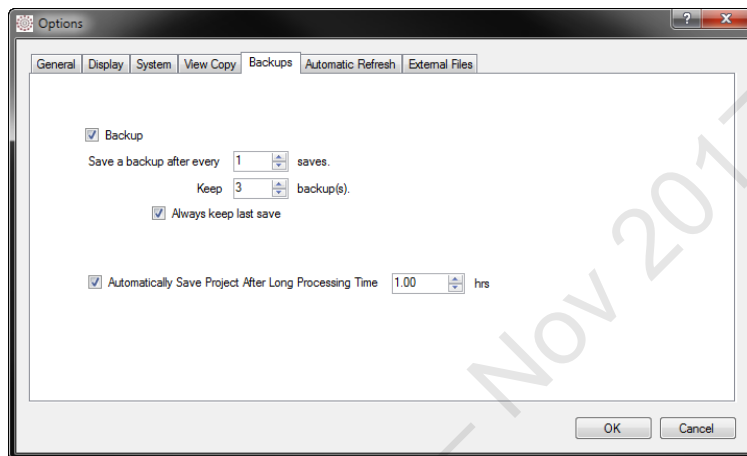
## 16.2.1. AUTOMATIC BACKUPS

Deswik.CAD automatically creates a **Backup** folder, when the project is saved for the first time. The Backup folder is in the same location as the saved project, and all backups are saved to this folder.

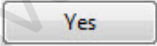


To configure the Automatic Backups;

1. From the main menu select **Tools | Options**.
2. From the presented Options dialog box, select the Backups tab.
3. Select the  Backup checkbox.
4. Modify the other options as required and click 



To load a Deswik.CAD project from a Backup file;

1. Navigate to the Backup folder location in Windows Explorer.
2. **Right-click** the 'project name'.vdcl\_LastSave.bak file and select Rename from the shortcut menu.
3. Replace the \*.bak file extension with \*.vdcl
4. In the Rename dialog box, click 



The Backup file is updated to a Deswik Document file which can be loaded the conventional way by double-clicking the file.

Name	Date modified	Type	Size
250912.vdcl_LastSave.vdcl.lck	18/10/2012 9:49 AM	LCK File	1 KB
250912.vdcl	25/09/2012 4:09 PM	XML Document	1 KB
250912.vdcl_0000.bak	25/09/2012 2:47 PM	BAK File	1,443 KB
250912.vdcl_LastSave.bak	25/09/2012 2:47 PM	BAK File	1,443 KB

Name	Date modified	Type	Size
250912.vdcl_LastSave.vdcl.lck	18/10/2012 9:49 AM	LCK File	1 KB
250912.vdcl	25/09/2012 4:09 PM	XML Document	1 KB
250912.vdcl_0000.bak	25/09/2012 2:47 PM	BAK File	1,443 KB
250912.vdcl_LastSave.bak	25/09/2012 2:47 PM	BAK File	1,443 KB
250912.vdcl_LastSave.vdcl	25/09/2012 2:47 PM	Deswik Document	1,443 KB



In the example above, a copy of the \*.bak file was made first and the copied file was updated to maintain the original Backup file, should it be required again.

---

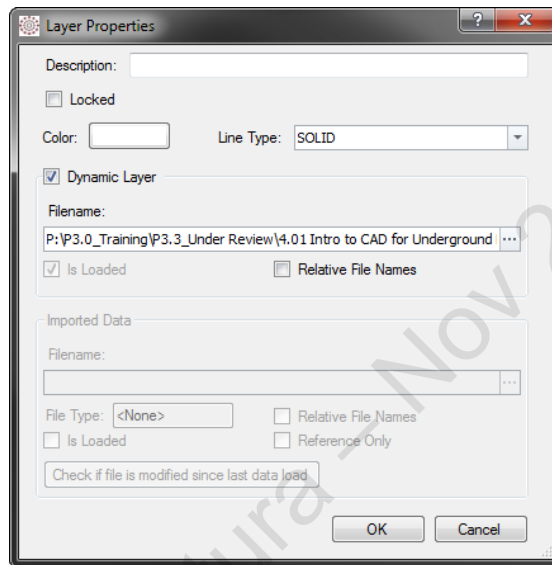
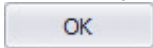
## 16.2.2. DYNAMIC LAYERS

Data on a layer can be saved external to the current project, by setting the **Layer Properties to Dynamic Layer**, which allows for larger files to be broken into smaller files.



To set a layer to **Dynamic Layer**;

1. From the Layer Control window **right-click** on the required layer.
2. Select Properties from the shortcut menu.
3. From the presented Layer Properties dialog box, select the  **Dynamic Layer** checkbox and click



The data on this layer is not loaded with the parent project when it is opened. The layer will be hidden (invisible) in the Layer Control window. When the layer is made Visible for the first time after loading the active project, the data will be loaded from the separate file at that time.

---

## 16.2.3. \*.VDCL FILES AND \*.DCF FILES

By default, projects in *Deswik.CAD* are saved as **\*.vdcl** (Vector Draw Compressed Drawing) file type, however there is an alternative option available when saving: **\*.dcf** (Deswik Layered Document) file type.

The **\*.dcf** file type is ideal to use for projects with multiple layers, but only a few visible layers. Only visible layers are loaded at load time and the remaining layers load as they are made **Visible**, which results in quicker save and load times.



Files can be saved to and from **\*.vdcl** and **\*.dcf** file types with no loss of data, and when a **\*.dcf** file is opened and saved *Deswik.CAD* will only save modified layers, not all layers, significantly reducing save times.

Deswik Document (*.vdcl;*.vdml)
Deswik Layered Document (*.dcf)



Files can also be saved as **\*.vdml** (Vector Draw XML Based Drawing) file type, however this option is primarily used with legacy data, or for technical troubleshooting.



## CHAPTER REVIEW

Before proceeding to the next chapter; review the subjects below and confirm the particular skills have been acquired. These skills and knowledge should include;

SKILLS & KNOWLEDGE	CHAPTER REFERENCE
Open and close <i>Deswik.CAD</i> files.	<a href="#">New\Open\Close Files</a>
Save a project.	<a href="#">Saving Files</a>
Adjust automatic backup settings to suit the user.	<a href="#">Automatic Backups</a>



*The theories covered in these topics can now be applied to similar processes.*

Buenaventura – Nov 2017

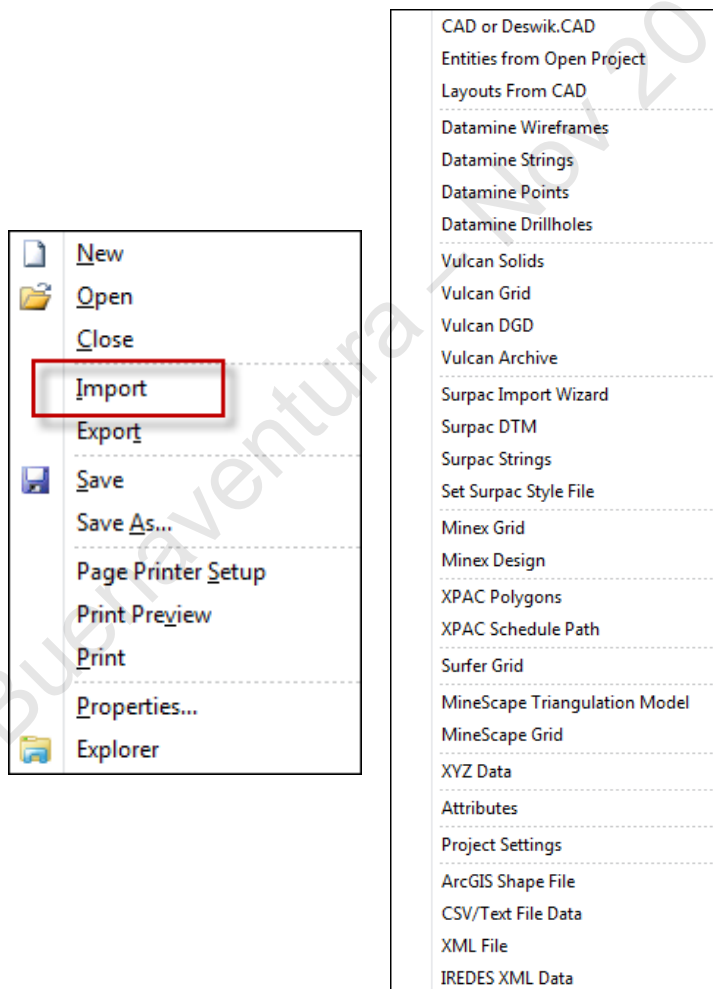
## 17. DATA MANAGEMENT

Data can easily be imported and exported across a wide range of applications and copied and moved between layers in a project.

### 17.1. IMPORTING DATA

*Deswik.CAD* supports importing files created by other general mine planning applications and most CAD applications.

There are 2 main methods of importing data into a *Deswik.CAD* project. The vast majority of data can be imported using the Import commands from the Main menu, as shown below, or via the Drag and Drop method.



*The Import command will automatically write the imported data to a new child layer of the current selected layer. It is recommended to select the layer where the child layer is to be created prior to running the Import command.*

### 17.1.1. IMPORTING FROM THE MAIN MENU

In this exercise, we will import files into a *Deswik.CAD* project via the Main menu.

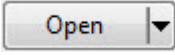


To import via the Main menu;

1. Isolate the **0\PRACTICE** layer and make it visible, selected and active.



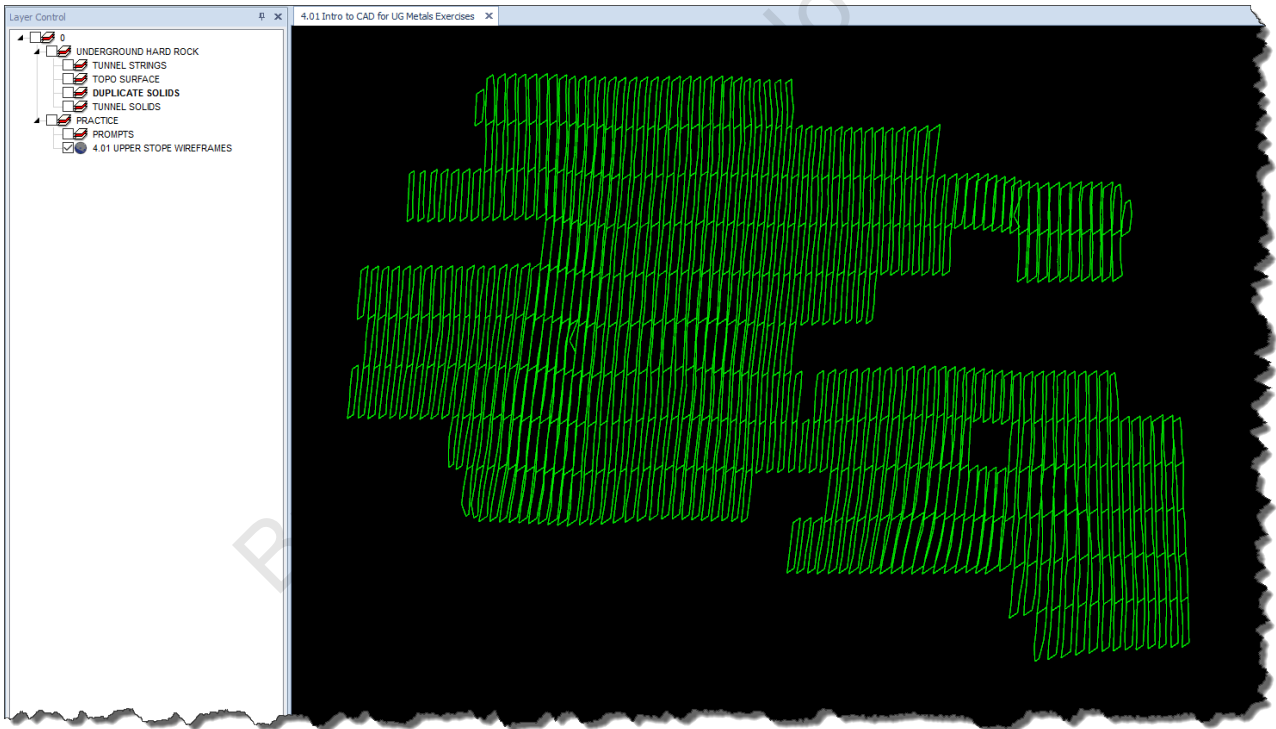
The imported data will be written as a 'child' layer of the selected layer; **0\PRACTICE**.

2. Run the **File | Import | DataMine | Strings** command.
3. Navigate to the **4.01 Intro to CAD for UG HR Datasets** folder.
4. Select the **4.01 Upper Stope Wireframes.dm** file and click 
5. Isolate the newly imported **0\PRACTICE\4.01 Upper Stope Wireframes** layer.



When importing data into a newly created *Deswik.CAD* project, the data may not appear in the Model Space. This could be caused by the imported data being in a different scale to the current *Deswik.CAD* session.

6. Run the **View | Zoom | All** command.




### 17.1.2. IMPORTING VIA DRAG AND DROP METHOD

In this exercise, we will import files into a *Deswik.CAD* project via the Drag and Drop method.



To import via Drag and Drop;

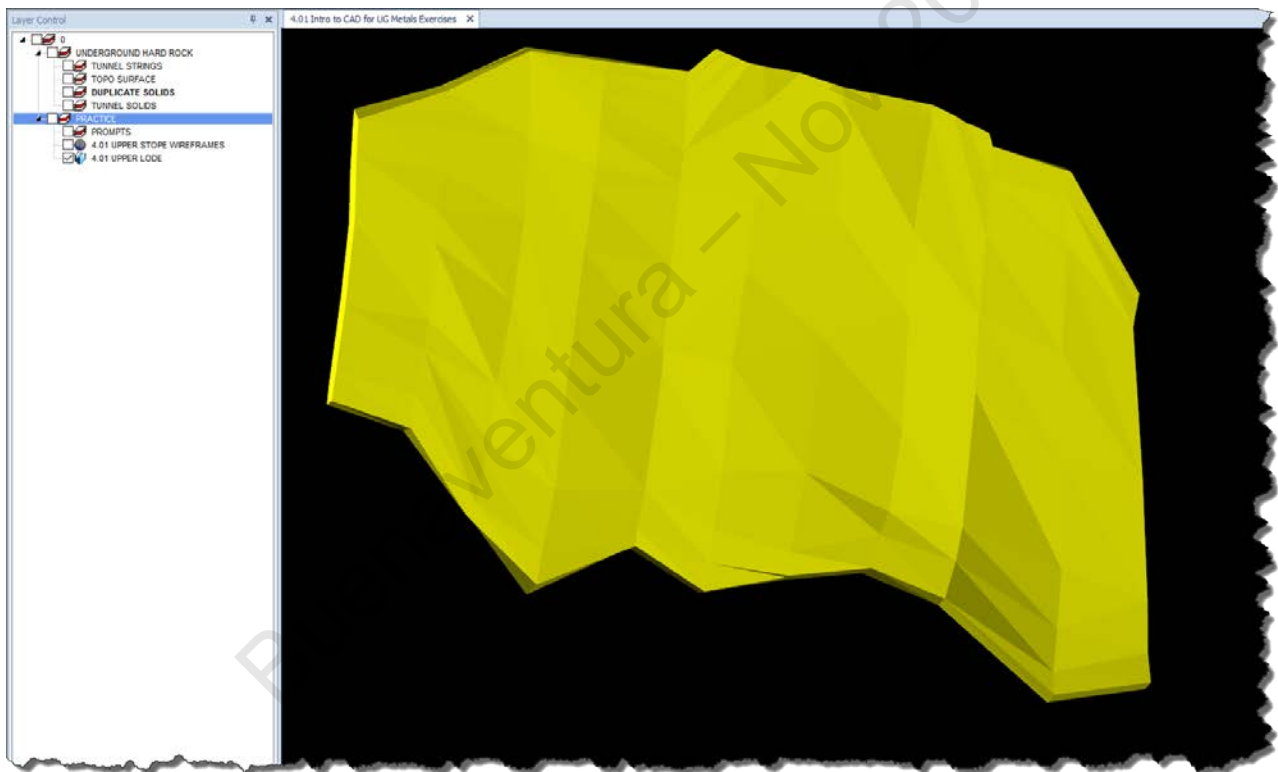
1. Isolate the **0\NPRACTICE** layer and make it visible, selected and active.
2. From the Main menu, run the **File | Explorer** command or click the  button from the toolbar.



3. Navigate to the **4.01 Intro to CAD for UG HR Datasets** folder.
4. Click on the **4.01 Upper Lode.00t** file and drag the file into the Model Space of the *Deswik.CAD* project.





The imported data is written as a 'child' layer of the selected layer.



### 17.1.3. VALIDATING IMPORTED DATA

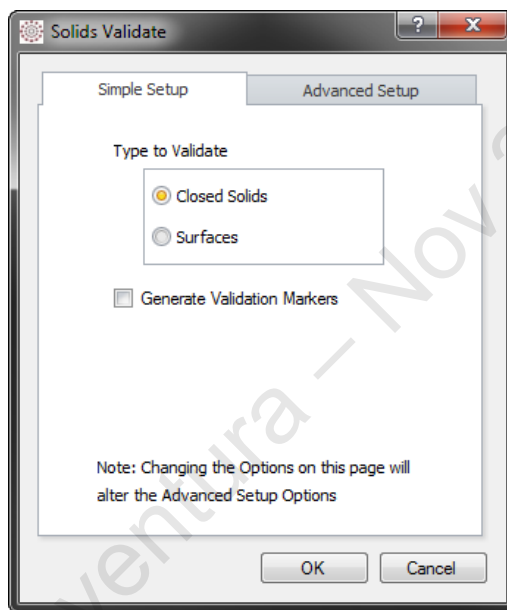
Once data has been imported into *Deswik.CAD* it is important to validate the data.

 To validate imported data;

1. Isolate the **0\PRACTISE\VALENS\_UG\_UPPER EAST** layer and make it visible, selected and active.
2. From the Main menu run the **Modify | Solids | Validate** command or click  from the toolbar.

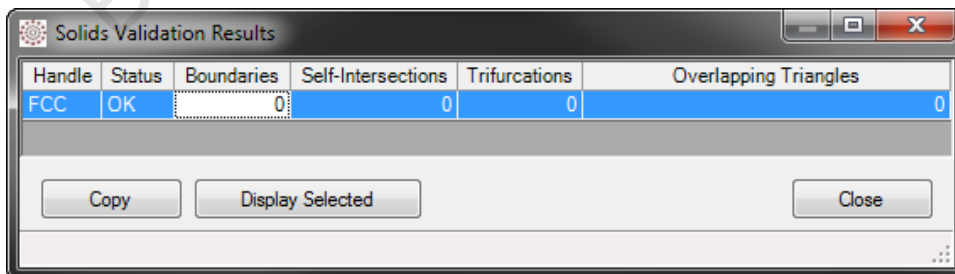


3. Select Visible Entities from the Select Entities dialog box.
4. From the Solids to Validate dialog box, toggle on Closed Solids.



5. Click 

 A validation report is generated; check that the imported surface Status is OK.

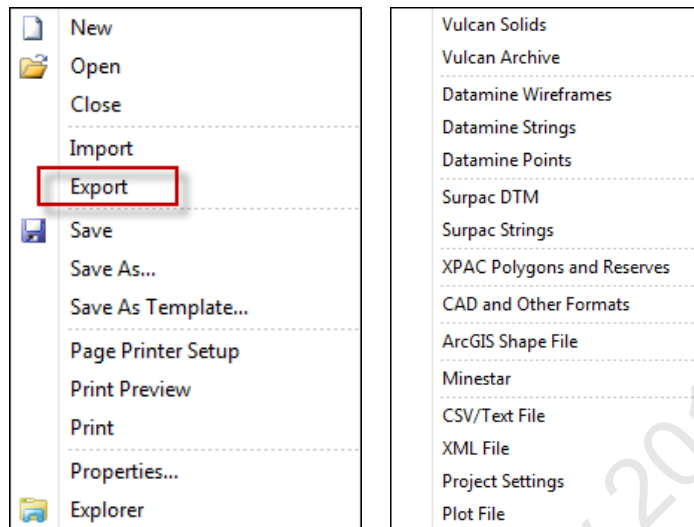


Handle	Status	Boundaries	Self-Intersections	Trifurcations	Overlapping Triangles
FCC	OK	0	0	0	0

Buttons: Copy, Display Selected, Close

## 17.2. EXPORTING DATA

*Deswik.CAD* can export data from existing projects in various file formats so the data can be used by other programs.

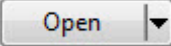
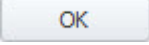


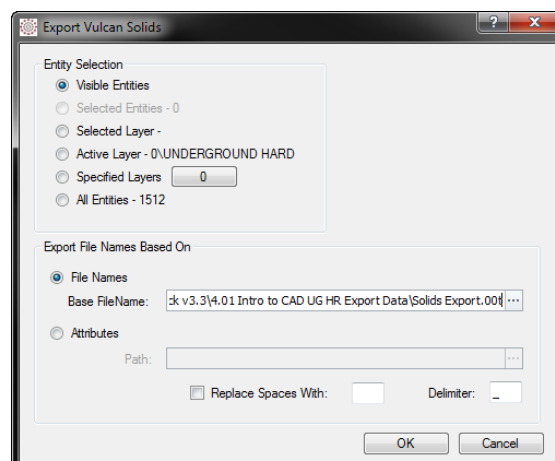
### 17.2.1. EXPORT TO DESWIK.CAD ENTITIES

In this exercise, we will export entities from a *Deswik.CAD* project to Vulcan Solids format.



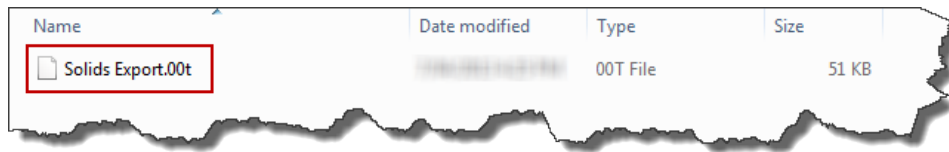
To export to Vulcan Solids format;

1. Isolate the **0\PRACTISE\VALENS\_UG\_UPPER EAST** layer and make it visible, selected and active.
2. Select **File | Export | Vulcan Solids** command.
3. From the presented Export Vulcan Solids dialog box, ensure the Entity Selection is toggled on  Visible Entities.
4. From the Export File Names Based On section, toggle on  File Names and map where the exported entities are to be saved to by selecting  next to the Base File Name field.
5. Navigate to the **4.01 Intro to CAD for UG HR Export Data** folder.
6. Input Solids Export in the File Name field and select  
7. From the Export Vulcan Solids dialog box select  





Review the **4.01 Intro to CAD for UG HR Exported Data** folder for the exported \*.00t Vulcan file.



Finish reviewing the exported data, hit **<Esc>** and ensure there are no entities selected in the Model Space.

## 17.2.2. COPY TO CLIPBOARD

Deswik.CAD supports creating a screen capture of the current view in the Model Space and copying it to the **Clipboard**, which can then be pasted into any editing document.



To copy an image to the Clipboard, run the **View | Copy to Clipboard** command from the Main menu.

## 17.3. COPYING AND MOVING DATA

The **Copy** and **Move** commands in Deswik.CAD will copy or move entities to another layer. In these exercises, we will Copy and Move selected Entities, and check that the correct entities have been Copied or Moved.



The **Copy** and **Move** commands will copy or move **Selected** or **Visible** entities to an **Active** or **Selected** layer. Think ahead by making the destination layer **Active** or **Selected**, prior to running the command.

### 17.3.1. COPYING DATA

Entities can be copied from a layer and placed onto another layer, in the same position/coordinates as the original entities using the **Modify | Copy** commands from the Main menu.

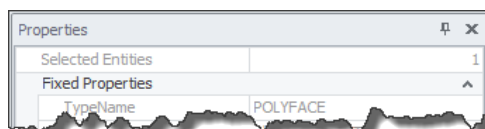


To copy data;

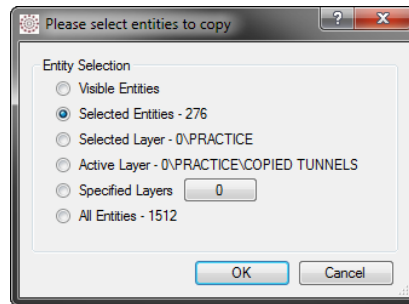
1. Isolate the **0\UNDERGROUND HARD ROCK\TUNNEL STRINGS** layer and make it visible and active.
2. Click on the **0\PRACTICE** layer to ensure the layer is selected.
3. **Right-click** on the **0\PRACTICE** layer and select Add from the shortcut menu.
4. In the presented Add Layer dialog box, enter Copied Tunnels in the Layer Name field.
5. Select the  Set Active checkbox and click
6. Drag a selection window over some of the tunnel strings in the Model Space.

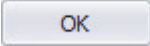



Check the **Selected Entities** field in the Properties window.



7. Run the **Modify | Copy | Copy to Active Layer** command.
8. From the presented Please select entities to copy dialog box, ensure the Entity Selection is toggled on  Selected Entities – #.




9. Click 
10. **Isolate** the **0\PRACTICE\COPIED TUNNELS** layer which now contains the copied entity.
11. **Click** on the entity or drag a selection window over the entity in the Model Space and confirm that the correct number of entities have been copied across by checking the **Properties** window.

 *Finish checking the entity in the Model Space, hit <Esc> and ensure there are no entities selected.*


---


### 17.3.2. COPY AND PASTE DATA


Entities can be copied and pasted between projects in Deswik.CAD using Copy and Paste commands.

 *Although these commands can be used to copy data in an active document, it is recommended to use the **Modify | Copy** commands when working with entities within the same project.*

 *To copy and paste data between projects;*

1. Select the entity or entities to copy and run the **Edit | Copy** command or click the  button from the toolbar.

 *The copied data is temporarily stored in the clipboard until it is pasted.*

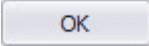
2. Navigate to the required *Deswik.CAD* project and paste the data in the desired location and layer by running the **Edit | Paste** command or click the  button from the toolbar.

### 17.3.3. MOVING DATA

Entities can be moved from a layer and placed onto another layer, in the same position/coordinates as the original entities, using the **Modify | Move** commands from the Main menu.

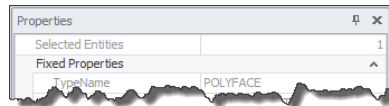


To move data;

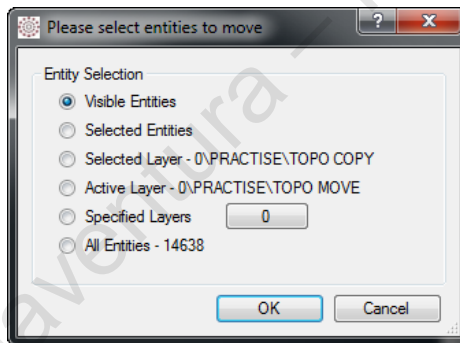
1. Isolate the **0\PRACTICE\VALENS\_UG\_UPPER EAST** layer and make it visible and active.
2. Click on the **0\PRACTICE** layer to ensure the layer is Selected.
3. **Right-click** on the **0\PRACTICE** layer and select Add from the shortcut menu.
4. In the presented Add Layer dialog box, input Lode Move in the Layer Name field.
5. Select the  Set Active checkbox and click 
6. Click on the entity or drag a selection window over the entity in the Model Space.

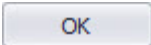


Check the **Selected Entities** field in the **Properties** window.



7. Run the **Modify | Move | Move to Active Layer** command.
8. From the presented, select entities to move dialog box, toggle on  Visible Entities.



9. Click 
10. **Isolate** the **0\PRACTICE\LODE MOVE** layer, which now contains the moved entity.
11. Select the entity or drag a selection window over the entity in the Model Space and confirm that 1 entity has been moved across by checking the **Properties** window.



Finish checking the entity in the Model Space, hit **<Esc>** and ensure there are no entities selected.



## CHAPTER REVIEW

Before proceeding to the next chapter, review the subjects below and confirm the particular skills have been acquired. These skills and knowledge should include;

SKILLS & KNOWLEDGE	CHAPTER REFERENCE
Import data from other software packages.	<a href="#">Importing from the Main Menu</a>
Validate imported data.	<a href="#">Validating Imported Data</a>
Export entities to various file formats.	<a href="#">Exporting Data</a>
Copy and paste the model space without creating a layout.	<a href="#">Copy to Clipboard</a>
Move or copy data from one layer to another.	<a href="#">Copy and Move Data</a>




*The theories covered in these topics can now be applied to similar processes.*


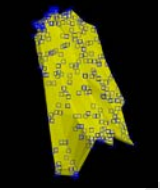

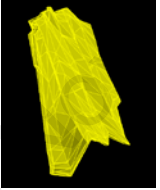


Buenaventura – Nov 2017

## 18. ENTITY SELECTION

There are several methods of **Selecting Entities** within *Deswik.CAD* depending on the type of selection required by the user.

 *Entities selected will display differently in the Model Space, depending on which option is selected from the **View | Solid Selection** toolbar, which is 'pinned' vertically on the left side of the CAD display.*



COMMAND	BUTTON/ICON	DISPLAY
<b>View   Solid Selection   Grips</b>		
<b>View   Solid Selection   Highlight</b>		
<b>View   Solid Selection   Box</b>		

 *The default selection view is **View | Solid Selection | Box**, however entities in the Model Space can be selected with no active view command or a combination of the selection view commands.*

## 18.1. SINGLE AND MULTIPLE SELECTION

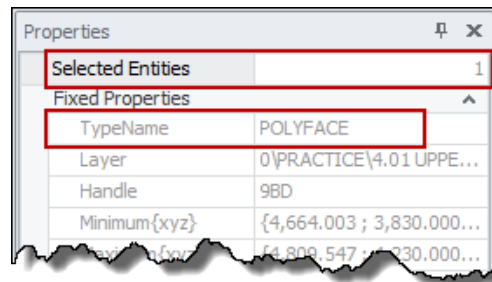
A single entity or a selection of entities can be selected from the Model Space in *Deswik.CAD*.



To select a single entity, hover over the entity in the Model Space and click on the entity to select it.



When selecting **Entities**, always check the **Properties** window to confirm the correct number and type of **Entities** have been selected.



To select multiple entities;

1. Hover over the required entity in the Model Space then click on the entity to select it.
2. Hold down the **<CTRL>** key and select any other required entities.

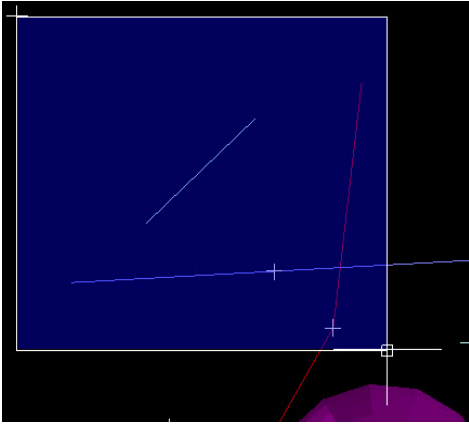

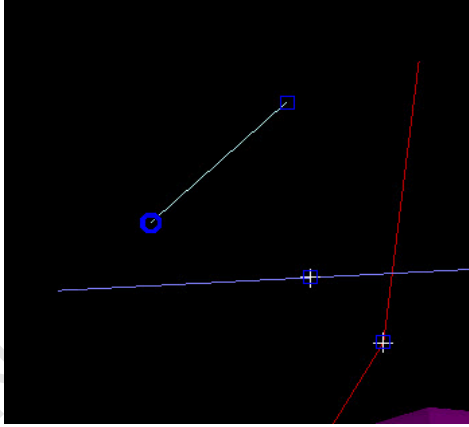
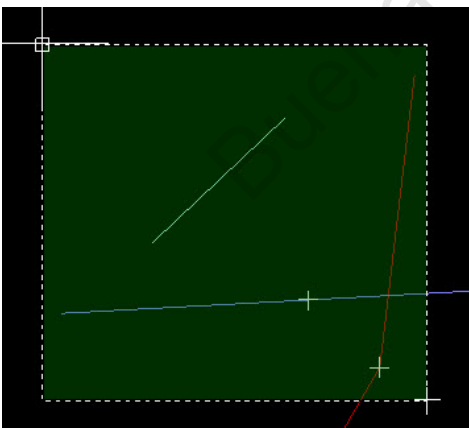

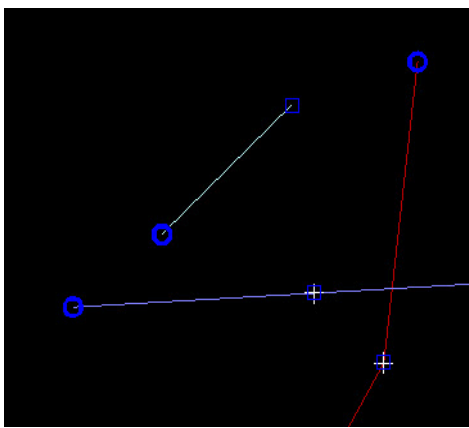


When multiple Entities are selected, the **Properties** window displays the number of **Selected Entities**, however will only display the Entity type (**TypeName**), if all **Selected Entities** are the same type.

## 18.2. BLUE VS GREEN SELECTION WINDOW



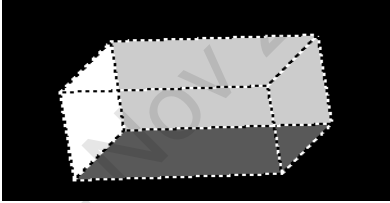
Clicking and dragging a selection window over entities in the Model Space will result in different selections depending on the direction of the selection window.


- Dragging the window from **left to right** produces a **blue selection window** which selects all entities that fall **completely inside** the selection window.
- Dragging the window from **right to left** produces a **green selection window** which selects all entities that fall **partially inside** the selection window.

BLUE SELECTION WINDOW		
		
<p>A blue selection window has been dragged over multiple entities in the Model Space.</p>		<p>The green polyline and 2 points are selected as they are the only entities completely inside the blue selection window.</p>
GREEN SELECTION WINDOW		
		
<p>A green selection window has been dragged over multiple entities in the Model Space.</p>		<p>All the entities that were completely inside the green selection window are selected.</p>

### 18.3. SELECTING ENTITIES WITHIN A COMMAND

When *Deswik.CAD* prompts the user to select entities from within a command, the entities display in the Model Space with a series of dotted lines as the following examples illustrate;

ENTITY TYPE	ENTITY IN THE MODEL SPACE
Polyline	
Surface	
Solid	

 To avoid incorrect processing of entities, if any objects display as shown above when selected, and the user is unsure of what command is running to create this appearance, hit **<Esc>** to clear out of all commands and start again.

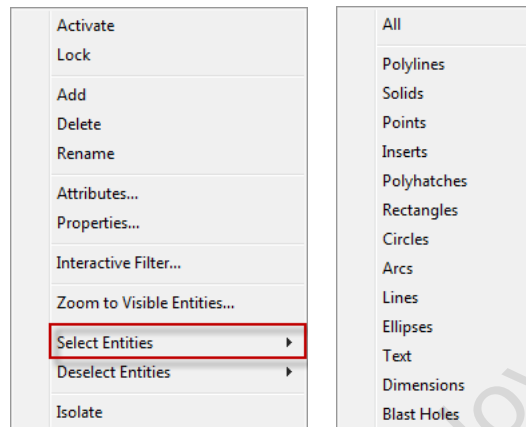
## 18.4. LAYER CONTROL SELECTING

Entities of a certain type contained on a specific layer, can be selected via the **Layer Control** window.



To select entities via the Layer Control window;

1. **Right-click** on the desired layer.
2. From the presented shortcut menu, click Select Entities which in turn presents a list of entity types that can be selected on that layer.



*Optional Practice*

Use the different selection methods as described above to select various entity types in the Model Space.

## 18.5. GRIPS

Select an entity in the **Model Space**, and **Grips** are displayed at strategic points on these entities. These **Grips** are small, blue square outlines, although some entities will display one solid blue square **Grip** as well.

Some entities, such as polylines, have a 'direction' associated with them that is dependent on the order that the points were drawn. The start points of polylines will be indicated by a blue, heavy-outlined circle to differentiate them visually from the other grips.

### 18.5.1. MODIFY A POLYLINE WITH GRIPS

In this exercise, we will digitize a simple haulroad polyline and modify it by selecting a Grip.



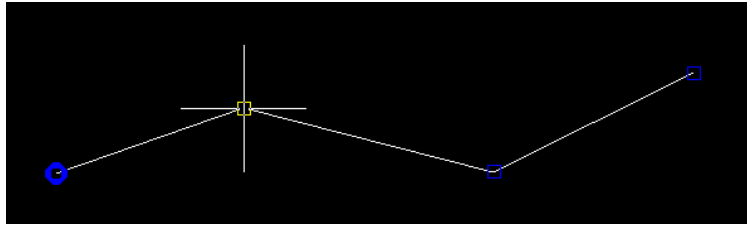
To modify a polyline with Grips;

1. Add a new layer and name it: **0\PRACTICE\GRIPS**
2. Isolate the layer and make it visible and active.
3. Draw a simple polyline in the Model Space by running the **Draw | Polyline** command or click the

 button from the toolbar.



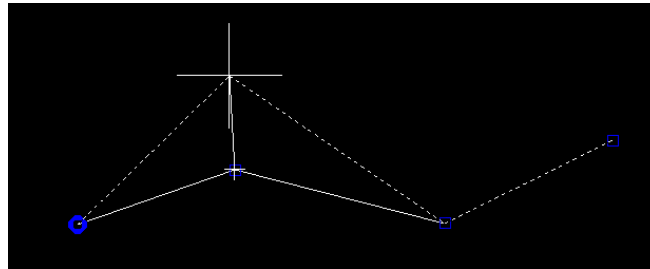
4. Follow the prompts to draw a simple polyline and **right-click** to complete the command.
5. Select the polyline by clicking on it.
6. Position the cursor directly over a **Grip** until the **Grip** turns yellow.



7. **Left-click** to select the Grip.



*Deswik.CAD highlights the selected entity (using dashed lines) and displays a 'leader' line from the selected Grip's current location to the cursor location. When the cursor is moved, the position of the Grip is changed.*



8. Click a second time when satisfied with the new position of the **Grip**.




*Deswik.CAD will move the grip to the new location, modifying the entity.*




*Finish checking the entity in the Model Space, hit **<Esc>** and ensure there are no entities selected.*

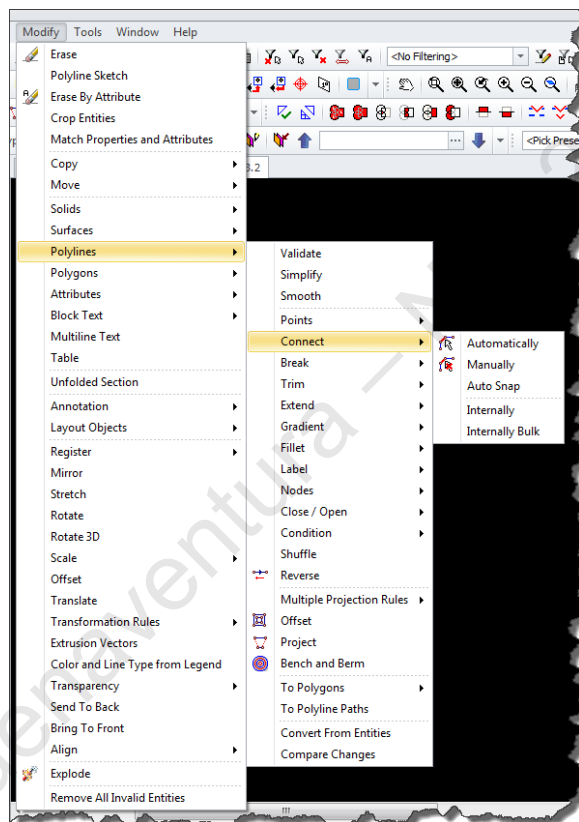
## 18.6. IDENTIFY AND MODIFY ENTITIES


There are several options and commands available in *Deswik.CAD* to identify and modify entities. As outlined earlier, the easiest way to identify an entity is to select the entity in the Model Space and refer to the Properties window.

 To modify entities;

1. Select the entity in the Model Space.
2. From the Main menu click the **Modify** tab to display an extensive menu of Modify commands.

 The **Modify** | **Polylines** | **Connect** commands are shown below as an example of the **Modify** commands.



 Many of the Modify commands in *Deswik.CAD* are covered in the more advanced *Deswik Training Tutorials*.



## CHAPTER REVIEW

Before proceeding to the next chapter, review the subjects below and confirm the particular skills have been acquired. These skills and knowledge should include;

SKILLS & KNOWLEDGE	CHAPTER REFERENCE
Select more than one entity at a time.	<a href="#">Single and Multiple Selection</a>
Use the appropriate selection method when required.	<a href="#">Blue vs Green Selection Window</a>
Select entity's without disturbing the model space.	<a href="#">Layer Control Selecting</a>
Grips.	<a href="#">Grips</a>
Modify a polyline with grips.	<a href="#">Modify a Polyline with Grips</a>
Identify and modify entities.	<a href="#">Identify and Modify Entities</a>



*The theories covered in these topics can now be applied to similar processes.*

Buenaventura – Nov 2017

## 19. SNAPPING

**Snap** modes allows the user to snap to a precise locations i.e. point, midpoint and intersection on an entity. Use **Snap Mode** to select precise locations whenever you are prompted to select a point or entity.

The **Snap Mode** commands each highlight the snap point using various yellow symbols that change depending on the Snap Mode chosen, providing a visual cue that indicates which **Snap Mode** is in effect.



*If a Snap Mode is enabled and the cursor is hovered over a point on an entity, the snapping symbol will only appear when you are running a command, which prompts the user to select a point or entity.*



*The **Snap Mode** toolbar is pictured horizontally below. In the default view, the toolbar is 'pinned' vertically to the middle left of the main screen.*



*The **Snap Mode** buttons are all toggle buttons. By default, the **Snapping** commands are disabled and the **Snap Mode** is set to **Grip Snapping** which snaps the cursor to any grip on a selected entity (including start and end points) as the cursor is moved over these locations in the Model Space.*

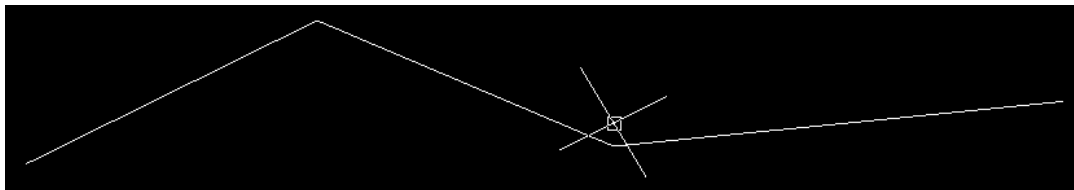
### 19.1. SNAPPING TO PRECISE LOCATIONS

In these exercises, we will draw a simple polyline and use some of the available commands to **Snap** to precise locations on the polyline.



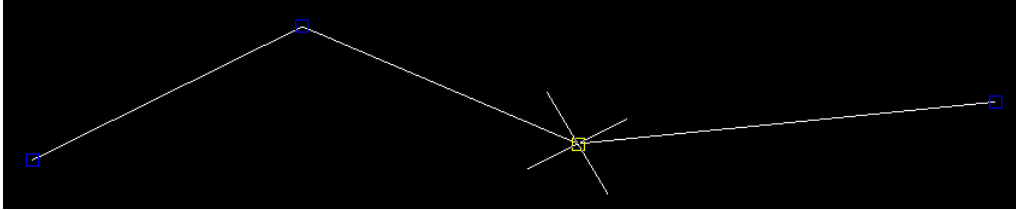
*To snap to precise locations;*


1. Add a new layer and name it: **0\PRACTICE\SNAPPING**
2. Isolate the new layer and make it visible and active.
3. Ensure all Snapping is toggled off; run the **Format | Snap Mode | None** command or click the button.
4. Draw a simple polyline and **right-click** to complete the command.
5. Without selecting the polyline from the Model Space, hover the cursor over various points on the polyline.





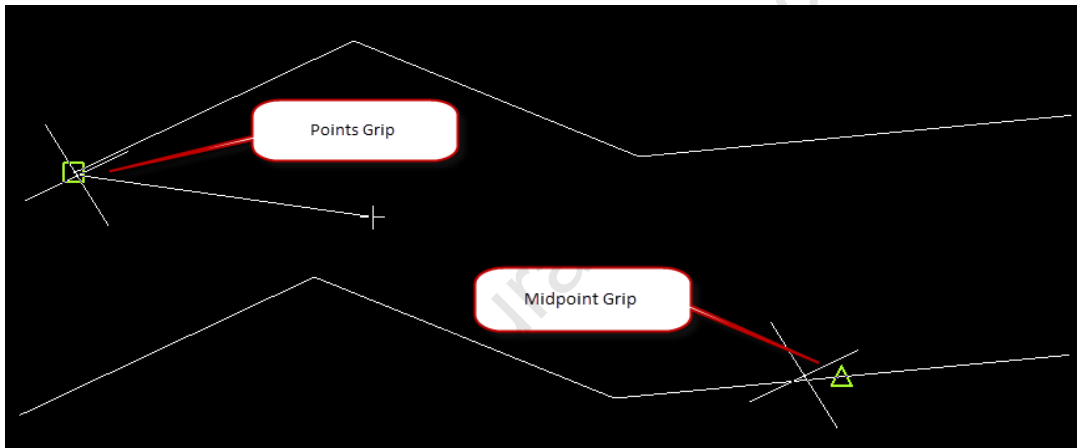
Nothing should display in the Model Space if the entity is not selected, now select the polyline and the blue grips will turn yellow as the user hovers over them as they did in the last exercise!



6. Run the **Format | Snap Mode | Points** command or click the  button to enable point snapping.
7. Modify the polyline manually by running the **Draw | Polyline** command and snapping to a precise point/s on the existing polyline.



When Snap Modes are enabled to select precise positions, a green snapping symbol displays and the shape will depend on which mode/s are enabled and where the cursor is located in the Model Space.




Combine Snap Modes easily by toggling on multiple Snap Mode buttons simultaneously.



*Optional Practice*

Isolate and make visible the **0\UNDERGROUND HARD ROCK\TUNNEL STRINGS** layer and use the different Snap Modes individually or in combination with each other to snap to other precise locations i.e.

perpendicular or intersection. Click  to turn off all Snap Modes and hit **<Esc>** to ensure no entities are selected when finished.

## 20. VIEWING DATA

There are many commands and options in *Deswik.CAD* to manipulate the view of the data in the Model Space.

### 20.1. ROTATING

The **Rotate** command enables the user to change the orientation of viewing entities in the Model Space. By moving the mouse, the user is able to rotate the view within two or three dimensions, using one of three different rotation origins.

**i** The **View | Rotate** toolbar is pictured horizontally below. In the default view, the toolbar is 'pinned' vertically to the top right of the screen.

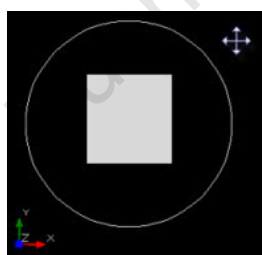


To perform a basic Rotate command, hold down the **<Shift>** key and **left-click** at the same time. This will display a circle in the Model Space which acts as a Rotation Display Guide. The user can then release the **<Shift>** key and continue rotating the view.

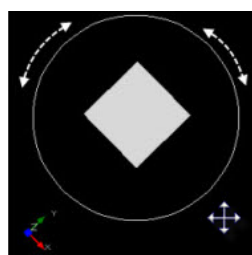
#### 20.1.1. TWIST AND ROTATE

No matter how the user chooses to set the rotation origin, there are two ways to move your data around the rotation origin:

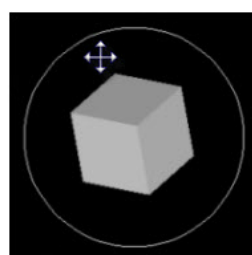
- **TWIST:** Click the cursor anywhere *outside* of the circle, hold and drag the mouse to twist the object (360° to the left or right) around a center of origin within two dimensions.
- **ROTATE:** Click the cursor anywhere *inside* of the circle, hold and drag the mouse to rotate the object around a center of origin within three dimensions.



Hovering your cursor anywhere in the Model space displays the "move" cursor.



Click, hold and drag your cursor while *outside* of the circle to "twist" your view in 2D only.



Click, hold and drag your cursor while *inside* of the circle to rotate your entity in 3D.



While the Rotate command is active, a circle is displayed in the center of the Model Space and it is recommended that the user does not perform any other activities. When the user is finished with the Rotate command; hit **<Esc>** or right-click out of the command so other functions can be performed within the project.

## 20.2. 3D VIEWS


Deswik.CAD offers several 3-dimensional views that automatically change the orientation of the **View Plane** in the Model Space. The user is able to select any one of these **3D Views** using the **View** command from the Main menu, as well as the shortcut buttons on the **View | 3D Views** toolbar.

**i** The **View | 3D Views** toolbar is pictured horizontally below. In the default view, the toolbar is 'pinned' vertically to the middle right of the main screen.




**i** Optional Practice

Use combinations of the Rotate and 3D Views commands to view entities in the Model Space.

**!** The optimal 3D View is Top view, also known as Plan View. It is recommended that when finished viewing in other 3D Views that you run the **View | 3D Views | Top** command or click the  button.


## 20.3. VISUAL STYLES

A Visual Style is a collection of settings that control the display of edges and shading of the visible entities in the Model Space. Shaded  style is the default/optimal view and when another Visual Style is selected, it is applied to all visible entities.


**i** The **View | Visual Styles** toolbar is pictured horizontally below. In the default view, the toolbar is 'pinned' vertically to the bottom left of the screen.



**i** Make Visible, Isolate and Activate the **0\PRACTICE\VALENS\_UG\_UPPER EAST** layer, and practice viewing the data using the various **View | Visual Styles** toolbar commands.

**!** It is recommended that when finished viewing in other Visual Styles that the user run the **View | Visual Styles | Shaded** command or click the  button.

## 20.4. ANIMATION

To create Animations of selected entities and manage the various settings, Deswik.CAD has an Animation mode which is enabled by running the **View | Visual Styles | Animation** command or by clicking the  button.

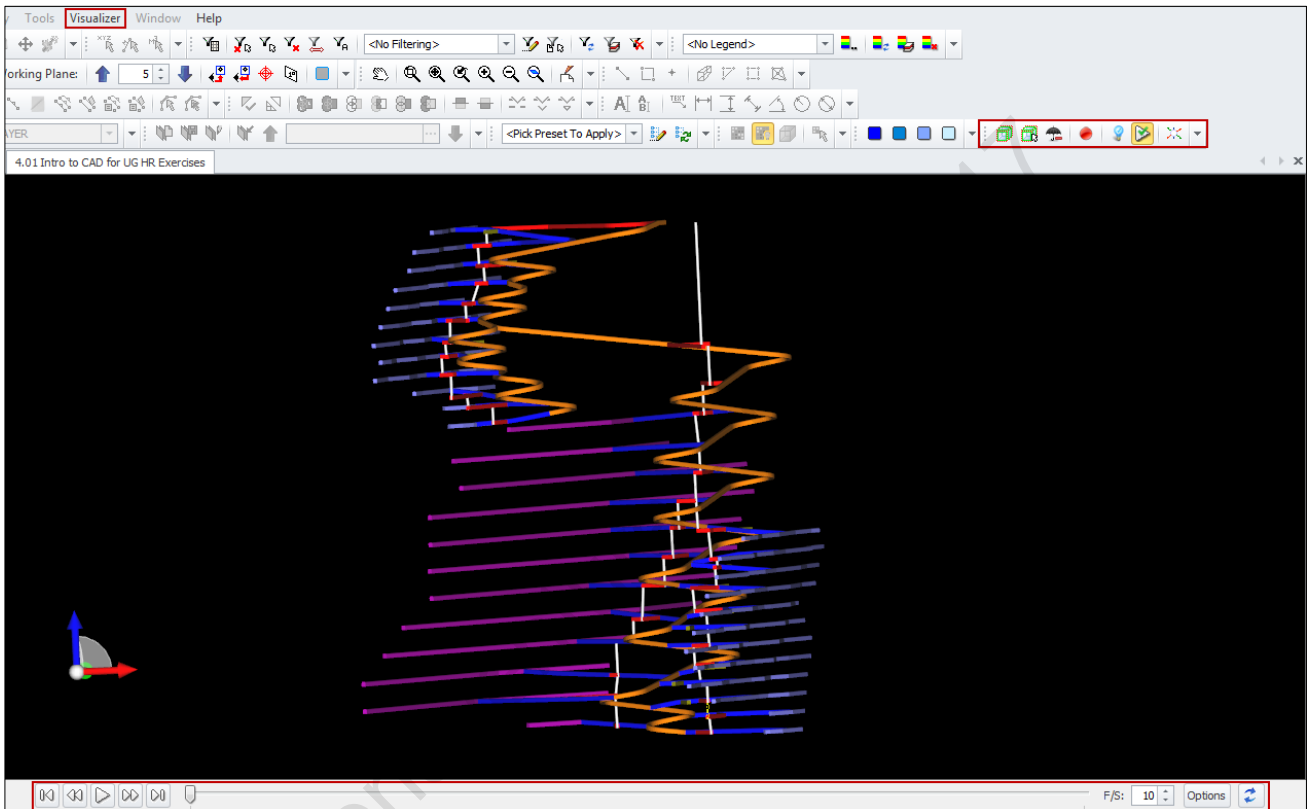
Deswik.CAD determines the sequence of the animation according to either **Start** and **Finish** dates applied as attributes or direct linking to a related **Deswik.Scheduler** project.



The **View | Visual Styles** toolbar is pictured horizontally below. In the default view, the toolbar is 'pinned' vertically to the bottom left of the screen.







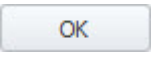
Once Animation mode has been enabled, a new **Visualizer** menu is added to the Main menu, a **Visualizer** toolbar is added above the Model Space and a **Playback** toolbar is added below the Model Space.



### 20.4.1. VIEWING AN ANIMATION



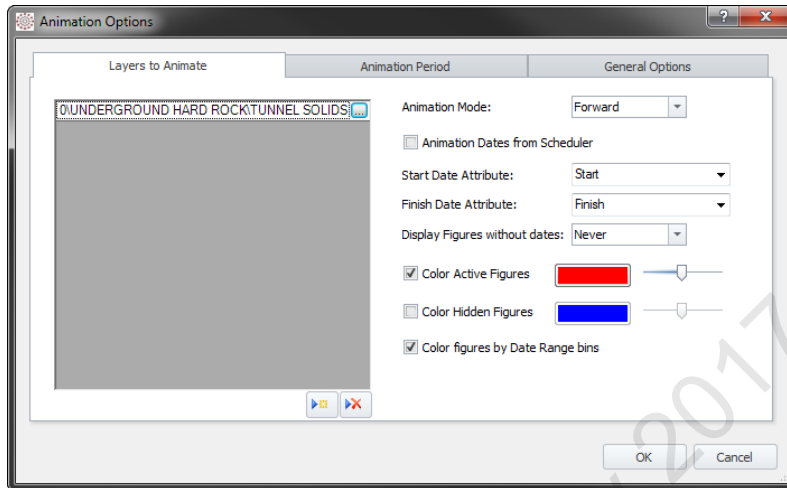
To view an Animation:


1. Isolate the **UNDERGROUND HARD ROCK\TUNNEL SOLIDS** layer and make it visible, selected and active.
2. Run the **View | Visual Styles | Animation** command or click the  button from the toolbar.
3. From the playback controls under the Model Space, click the  button.
4. From the presented Animation Options dialog box, in the Layers to Animate tab, delete any rows displaying in the grid with the  button.
5. Click  to add a new row.
6. From the Layer Selection dialog box, select the **TUNNEL SOLIDS** layer and click .
7. From the Animation Options dialog select Backward from the Animation Mode drop-down menu.




As a general rule, for mining solids the graphics should animate backwards so when the mining solids are completed they vanish from the graphics. As opposed to dump solids that should be animated forwards so the solids appear when they are finished.

8. Click 



9. From the playback controls under the Model Space (Animation mode), click the  button.

10. After viewing the Animation, return the view to Plan View by running the View | Visual Styles | Shaded command or clicking  from the toolbar.










The Animation can also be viewed manually using the slider on the playback controls.

## 20.4.2. VISUALIZER SHORTCUT KEYS

Once Animation mode is enabled, the Visualizer toolbar automatically displays.




The Visualizer commands in *Deswik.CAD* are summarized below:

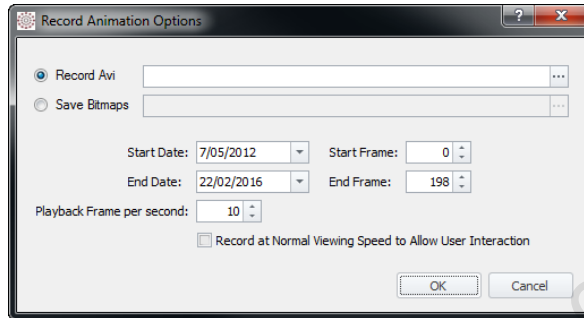
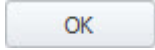
SYMBOL	COMMAND	DETAIL
	<b>Visualizer   View   Display Clipping Box</b>	<i>Toggle the use of clipping with a Clipping Box.</i>
	<b>Visualizer   View   Clipping Box Frame Selection</b>	<i>Center the Clipping Box and set the Clipping Extents on the selected entities.</i>
	<b>Visualizer   View   Shade Clipping Box</b>	<i>Enable/disable the shading on the clipping box.</i>
	<b>Visualizer   Record Animation</b>	<i>Record an AVI animation based on the current settings.</i>
	<b>Visualizer   View   Specular Lighting</b>	<i>Enable/disable specular lighting of entities in the Model Space.</i>
	<b>Visualizer   View   Toggle Animation Mode</b>	<i>Toggle the Visualizer's animation mode on or off.</i>
	<b>Visualizer   Display Rotation Point Guide</b>	<i>Display the target point of rotation as small axis.</i>

### 20.4.3. RECORDING AN ANIMATION



To record an Animation;

1. Run the **Visualizer | Record Animation** command or click the  button from the toolbar.
2. Select the desired settings from the presented Record Animation Options dialog box and click



### 20.4.4. VISUALIZER CLIPPING

The **Clipping** commands allow the user to limit the amount of entities visible on the screen by hiding all data outside the **Clipping Box**.

The **Visualizer | View | Display Clipping Box** command displays a **3D Clipping Box** in the Model Space with an XYZ clipping axis to manually modify the extents of the **Clipping Box**.

The **Visualizer | View | Clipping Box Frame Selection** command displays a **3D Clipping Box** in the Model Space that is centered around the selected entities.



*The **Clipping** commands allow the user to limit the amount of information visible on the screen by 'clipping', or hiding, all data outside of a visible 'Clipping box'. Once you have clipped entities in the Model Space, you can rotate the View Plane to see them from multiple angles.*



### CHAPTER REVIEW

Before proceeding to the next chapter, review the subjects below and confirm the particular skills have been acquired. These skills and knowledge should include;

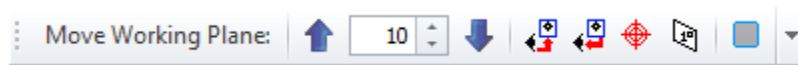
SKILLS AND KNOWLEDGE	CHAPTER REFERENCE
Snap to precise locations.	<a href="#">Snapping to Precise Locations</a>
Rotate the data in the model space.	<a href="#">Rotating</a>
Apply a 3-D view to the data.	<a href="#">3D Views</a>
Switch on and off animation.	<a href="#">Visual Styles</a>
Record an animation.	<a href="#">Record an Animation</a>




*The theories covered in these topics can now be applied to similar processes.*

## 21. WORKING PLANES

**Working Planes** dictate the level and position that the majority of entities can be viewed and created in a 3D virtual CAD environment.



The following table is an overview of the Working Plane commands in *Deswik.CAD*;


SYMBOL	COMMAND	DETAIL
	<b>View   Working Plane   Move   Up</b>	<i>Move the Working Plane closer.</i>
	<b>View   Working Plane   Move   Down</b>	<i>Move the Working Plane away.</i>
	<b>View   Working Plane   Move   Distance</b>	<i>Set the distance to move the Working Plane.</i>
	<b>View   Working Plane   From View</b>	<i>Set the Working Plane to the current view.</i>
	<b>View   Working Plane   To View</b>	<i>Set the current view to the Working Plane.</i>
	<b>View   Working Plane   Snap</b>	<i>Set the center of the Working Plane.</i>
	<b>View   Working Plane   Properties</b>	<i>Edit the Working Plane properties.</i>
	<b>View   Working Plane   Display Guide</b>	<i>Display a guide representing the Working Plane.</i>

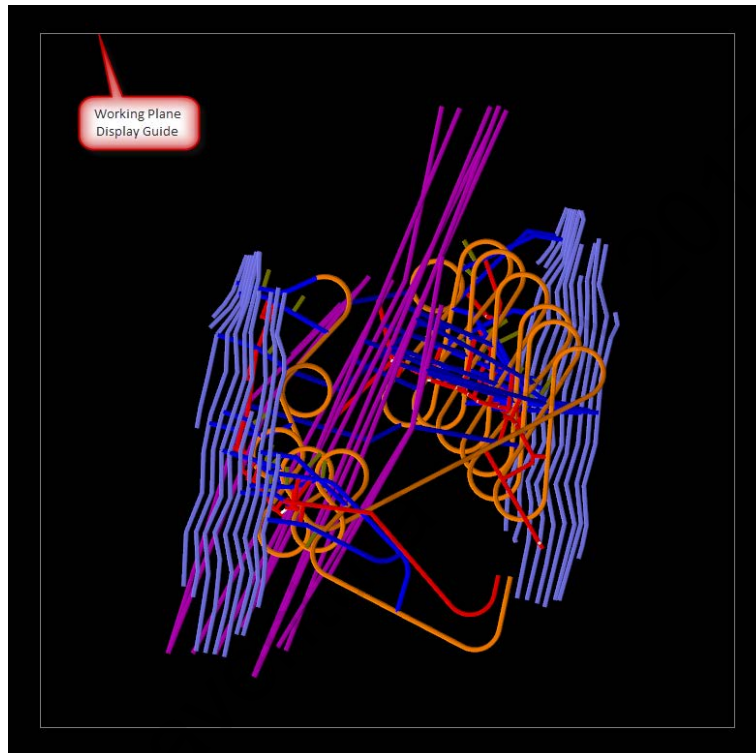
## 21.1. DISPLAY GUIDE

The Working Plane display guide is essentially a square in the Model Space that indicates the Working Plane.



To enable the Display Guide;

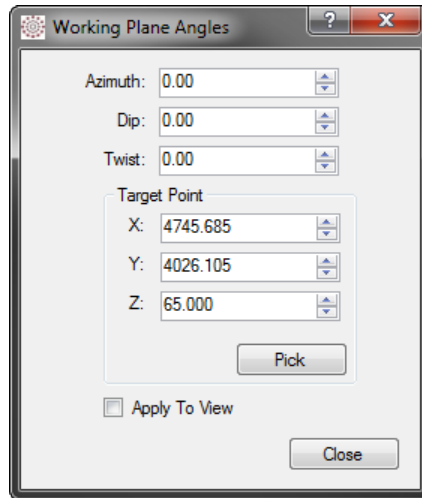
1. Isolate the **0\UNDERGROUND HARD ROCK\TUNNEL SOLIDS** layer and make it visible.
2. Run the **View | Working Plane | Display Guide** command or click the  button from the toolbar.



If the Display Guide does not show in the Model Space, return the view to Plan View, and run the **View | Working Plane | From View** command or click  from the toolbar.

## 21.2. SET WORKING PLANE PROPERTIES

The Azimuth, Dip, Twist and X, Y, Z coordinate properties of the Working Plane can be set by running the **View | Working Plane | Properties** command.



### 21.2.1. DIGITIZING POLYLINES AT DIFFERENT RL'S

In this exercise, we will draw 2 polylines at different Z coordinates to see the effect in the Model Space.



To draw Polylines at different RL's;

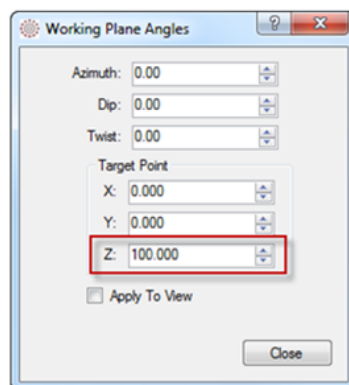
1. Add a new layer and name it: **0\PRACTICE\RL**
2. Isolate the new layer and make it visible and active.
3. Draw a simple polyline in the Model Space.
4. Run the **View | Working Plane | Properties** command or click the  button from the toolbar.
5. From the presented Working Plane Angles dialog box, change the Z coordinate to 100.
6. From the Main menu set the Pen Color for new entities to red.



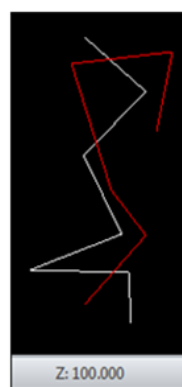
7. Draw another simple polyline.
8. Use the Rotation commands to view the entities from different perspectives.



First Polyline



Z coordinate from 0 to 100



Second Polyline




Rotated View

## 21.3. VIEWING PLANE

The Viewing Plane represents the current view of the entities in the Model Space and can be adjusted by manually selecting the points in the Model Space, using the **View | Plane by Points** toolbar.

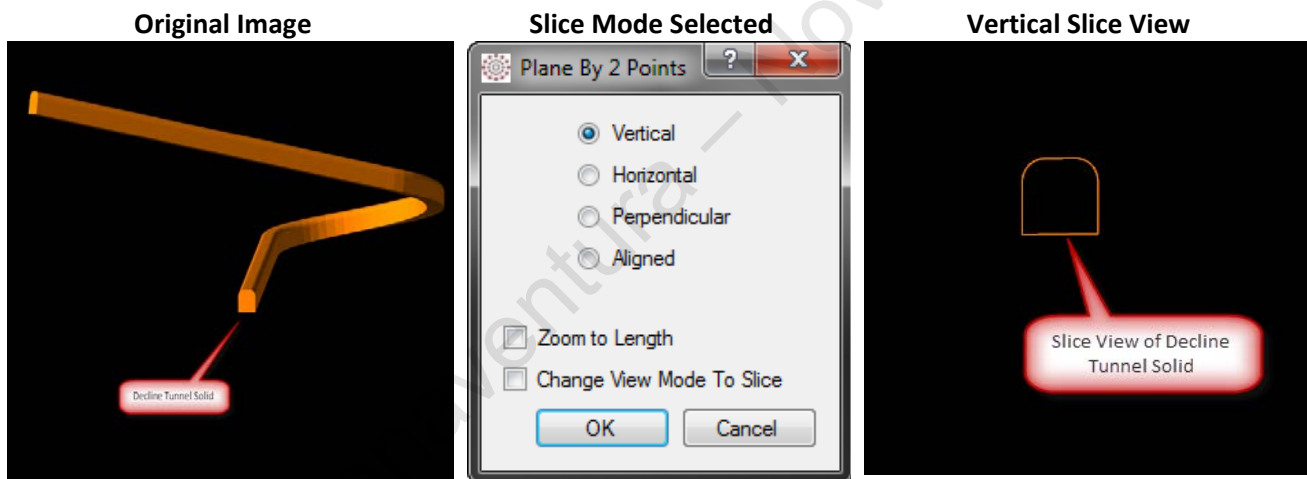
- The **Plane by 1 Point** command sets a new Working Plane by selecting a center point.
- The **Plane by 2 Points** command sets a new Working Plane by selecting 2 points.
- The **Plane by 3 Points** command sets a new Working Plane by selecting 3 points to reside on the new plane.

 The Plane by \_ Points toolbar is pictured horizontally below. In the default view, the toolbar is 'pinned' vertically to the bottom right of the screen.



 By default the Apply to Working Plane  and Apply to View  buttons are toggled on.


The **Plane by 1 Point / Plane by 2 Points** commands also display a dialog box to set the view direction with an option to **Change View Mode to Slice** or sectional view.






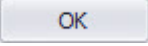
 Use Snap Modes with the Plane by Points commands to be more precise when selecting a center point.


### 21.3.1. MODIFY VIEWING PLANES

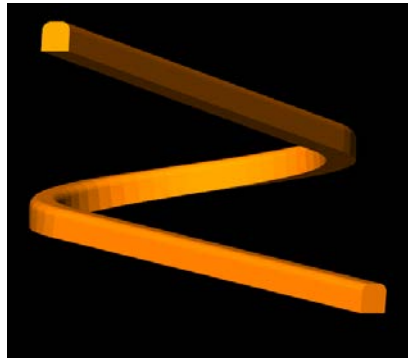
In this exercise, we will use the Plane by 2 Points command to obtain a vertical, sectional view of the Mining Solids as illustrated above.



 To modify the viewing plane;

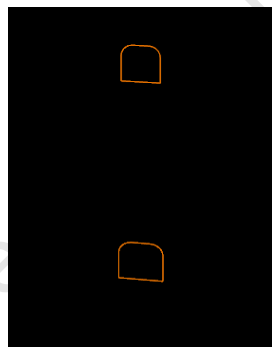
1. Isolate the **0\UNDERGROUND HARD ROCKTUNNEL SOLIDS** layer and make it visible.
2. Isolate 1 of the Decline Solids by selecting 1 of the decline solids then run the **Edit | Filters | Isolate Selected Entities**  command.
3. Run the **View | Working Plane | Display Guide** command or click  from the toolbar.
4. Run the **View | Plane by 2 Points** command or click  from the toolbar.

5. Follow the prompts and select 2 points on either side of the Mining Solids.
6. From the presented Plane by 2 Points dialog box, toggle on  Vertical, but leave the  Change View Mode to Slice checkbox cleared.
7. Click 

 This will adjust the View Plane to the specified 2 Points with a Vertical alignment.




8. Turn off the Display Guide by clicking the  button from the toolbar.
9. Run the **View | Visual Styles | 3D Slicing** command or click the  button from the toolbar to generate a sectional view.








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### 21.3.2. RESETTING THE VIEW PLANE

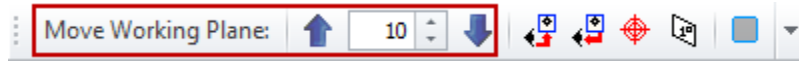
The Working Plane or View Plane can be restored to their original orientation and the crosshairs reset.

 To reset the working/viewing plane;

1. Return to the original View by running the **View | 3D Views | Top View** command or by clicking  from the toolbar.
2. Return to the original Style by running the **View | Visual Styles | Shaded** command or by clicking  from the toolbar.
3. Return to the original alignment and restore the crosshairs by running the **View | Working Plane | From View** command or by clicking  from the toolbar.
4. Run the **View | Zoom | All command** or click the  button from the toolbar.

## 21.4. MOVE WORKING PLANE

The Move Working Plane commands allow the user to Set a Distance, and move the Working Plane either Up (closer) or Down (away) from the Plan View.







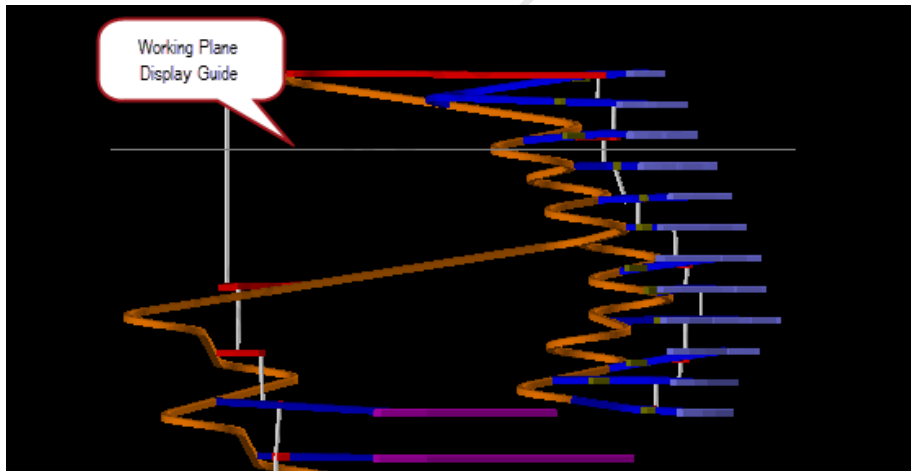
### 21.4.1. MOVING THE WORKING PLANE

In this exercise, we will view the Mining Solids from the north, set a distance and move the Working Plane.



*To move the working plane;*

1. Isolate the **0\UNDERGROUND HARD ROCK\TUNNEL SOLIDS** layer and make it visible and active.
2. Run the **View | 3D Views | From North** command or the select the  button from the toolbar, to view the image from a north facing perspective.
3. Turn on the Display Guide by selecting  from the toolbar.
4. From the Working Plane toolbar, adjust the move distance to 5 meters.
5. Select  to move the Working Plane up or select  to move the Working Plane down by 5 meters.



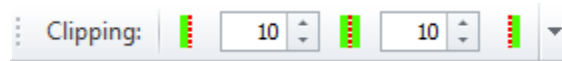
6. Return the **Working Plane** to its original alignment and turn off the **Display Guide**.

## 21.5. CLIPPING

The **Clipping** commands allow the user to limit the amount of information visible on the screen by 'clipping', or hiding, all data outside of a specified distance from the current Working Plane.



*The Clipping tool only adjusts the viewing of the entities that fall inside the specified clipping distance. It does not physically adjust the entity, just the viewing of it!*



*To enable Clipping;*

1. From the Clipping toolbar, set the 2 clipping distances (Near and Far distances in meters).
2. Alternate clicking on the 3 Clipping commands to clip the current view in the Model Space;

- **Near** Clipping
- **Near and Far** Clipping
- **Far** Clipping



*Once the user has finished with the various Clipping views, ensure all the Clipping commands are turned off by simply clicking on them again to turn them off.*



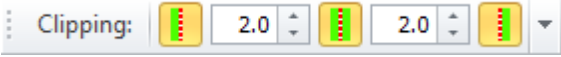



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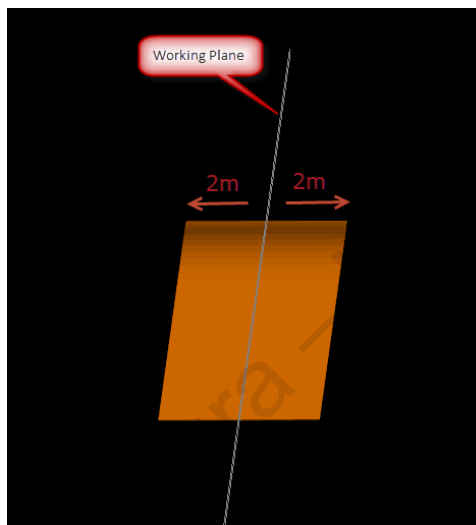
### 21.5.1. CLIPPING AND MOVING THE WORKING PLANE

In this exercise, we will combine **Clipping** commands with **Working Plane** commands, to moving through specific views in the Model space.



To Clip and move the Working Plane;

1. Isolate the **UNDERGROUND HARD ROCK\TUNNEL SOLIDS** layer and make it visible and active.
2. Turn on the Display Guide by clicking  from the toolbar.
3. With both distances set at 2 meters, click  to enable all Clipping.
4.  Clipping:  2.0  2.0 
5. From the Working Plane toolbar, move the Working Plane up and down and view the results in the Model space.







6. Return the **Working Plane** to its original alignment, turn off the **Display Guide** and turn the **Clipping** commands off.

## 21.6. PLANE DEFINITION

The **Plane Definition** commands allows the user to save defined views of your project, which *Deswik.CAD* can later load in the Model Space.



The Plane Definition commands in *Deswik.CAD* are used to create, modify and load defined views.

SYMBOL	COMMAND	DETAIL
	<b>View   Plane Definition   Create from View</b>	<i>Create a new Plane Definition from the current view plane.</i>
	<b>View   Plane Definition   Replace with Current View</b>	<i>Replace the selected Plane Definition settings with the current view settings.</i>
	<b>View   Plane Definition   Modify</b>	<i>Modify the selected Plane Definition settings.</i>
	<b>View   Plane Definition   Load</b>	<i>Load the selected Plane Definition.</i>


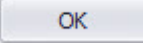
### 21.6.1. CREATING A PLANE DEFINITION

To create a **Plane Definition**, several options are available including creating from the current view plane and creating from a selected polyline. Depending on which option is selected, a **Plane Definition** dialog box will display to define the settings of the view to be saved.

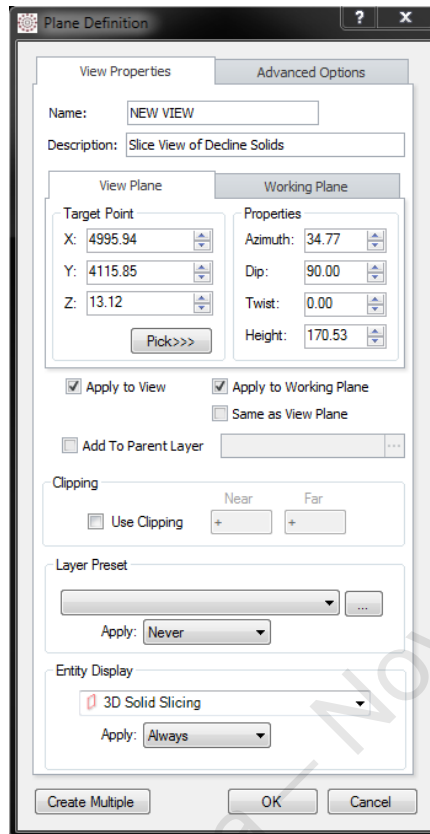
In this exercise, we will create a **Plane Definition** based on the current view.



*To create a Plane Definition;*


1. Isolate the **0\UNDERGROUND HARD ROCK\TUNNEL SOLIDS** layer and make it visible and active.
2. Use the Rotation and Zoom commands to produce a random view of the Mining Solids.
3. Run the **View | Plane Definition | Create from View** command or click the  button from the toolbar.
4. From the presented Add Plane Definition dialog box, input New View in the Plane Definition field.
5. Click 

- From the View Properties tab of the presented Plane Definition dialog box, enter New View of Mining Solids in the Description field.

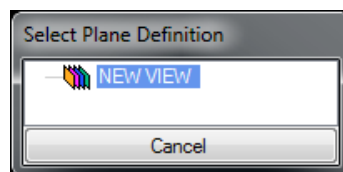


- Click 

- Return the view in the Model Space to **Plan View**.

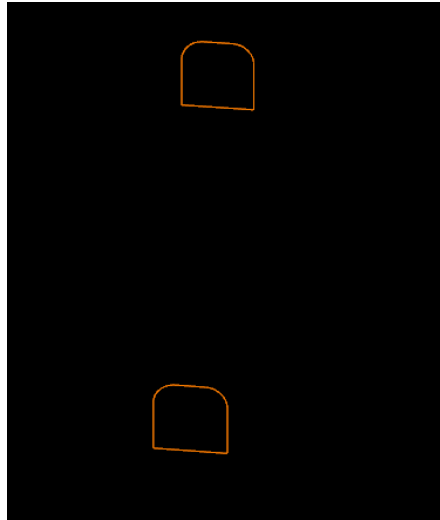
- From the **Plane Definition** toolbar click 

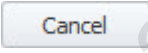
- From the presented **Select Plane Definition** dialog box, **right-click** the **NEW VIEW** layer and click **Apply**.





The saved **Plane Definition** is displayed in the Model Space.



11. Exit out of the saved **Plane Definition** view by clicking  from the **Select Plane Definition** dialog box.
12. Return the view to **Plan View**.

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## 21.7. LAYER PRESETS


**Layer Presets** allows the user to change the properties of all layers in a project including visibility, filters and legends.


### 21.7.1. CREATING LAYER PRESETS

By creating a **Layer Preset**, the user can quickly restore the layer tree and layer Properties to a preset template.



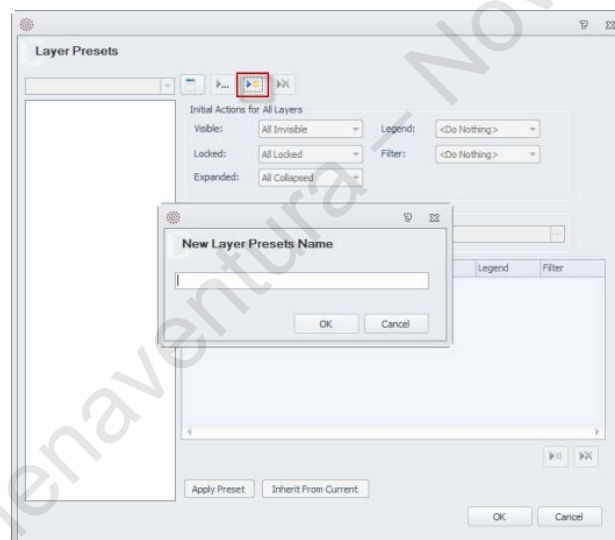
To create or edit **Layer Presets**;

1. From the Main menu run the **Layer | Presets | Edit Presets** command or click the  button from the toolbar.

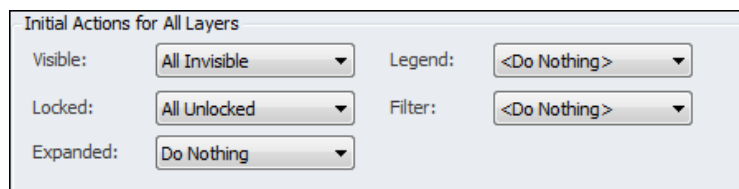
2. 

3. From the presented Layer Presets dialog box click  to add a new row to the list.

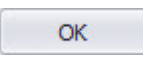
4. Enter a New Layer Presets Name.



5. Define the **Initial Actions for All Layers** from the drop-down lists.




*Additional actions can be applied by adding additional rows to the **Active Layer** grid and creating a set of rules for the **Layer Presets**.*

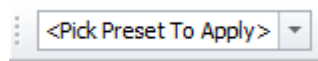
6. Click  to save the changes and close the dialog box.



*Settings from the current layer tree can also be applied to a project by selecting *

## 21.7.2. APPLYING LAYER PRESETS

Layer Presets can be applied by clicking the  button from the **Layer Presets** dialog box or by selecting the **Layer Preset** from the toolbar.



### CHAPTER REVIEW

Before proceeding to the next chapter; review the subjects below and confirm the particular skills have been acquired. These skills and knowledge should include;

SKILLS & KNOWLEDGE	CHAPTER REFERENCE
Switch on and off the working plane display guide.	<a href="#">Display Guide</a>
Edit the working plane properties.	<a href="#">Set Working Plane Properties</a>
Use the plane by two point's commands for a long section view.	<a href="#">Modify Viewing Planes</a>
Reset the view plane.	<a href="#">Resetting the View Plane</a>
Move the working plane to different RL's.	<a href="#">Move Working Plane</a>
Apply 10m clipping to the working plane.	<a href="#">Clipping</a>
Set up a plane definition.	<a href="#">Plane Definition</a>
Set up a layer preset.	<a href="#">Layer Presets</a>

 *The theories covered in these topics can now be applied to similar processes.*

## 22. LEGENDS

A **Legend** is a convenient method of grouping data into multiple bins based on Attribute values. **Legends** can be used for coloring graphical entities with common Attributes, or reporting quantities of material with common Attributes from a geological model.



All Legend commands can be accessed via the Main menu – **Edit | Legends** – or by the **Legends** shortcut toolbar.



### 22.1. CREATING LEGENDS

A **Legend** might be useful to color all entities with a common Attribute value the same color. Alternatively, a **Legend** could be used to color all entities where an Attribute falls into a range of values e.g. if the average elevation is greater than 100 and less than 150.

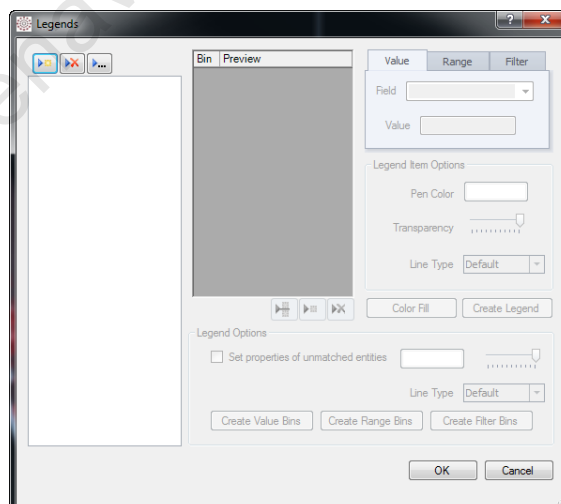
#### 22.1.1. CREATING A VALUE BINS LEGEND

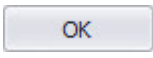
In this exercise, we will create a Legend based on the horizon Attributes.



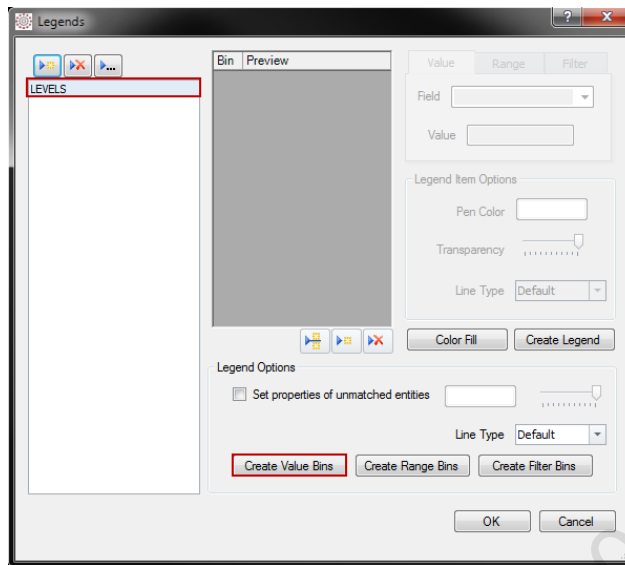
To create a Value Bin Legend;

1. Isolate the **0\UNDERGROUND HARD ROCK/TUNNEL SOLIDS** layer and make it visible and Selected.
2. Run the **Edit | Legends | Edit** command or click  from the toolbar.
3. In the presented Legends dialog box, click  to add a new Legend.



4. From the **New Save Name** dialog box, enter **LEVELS** in the **Name** field and click 

- Click the **Create Value Bins** button.

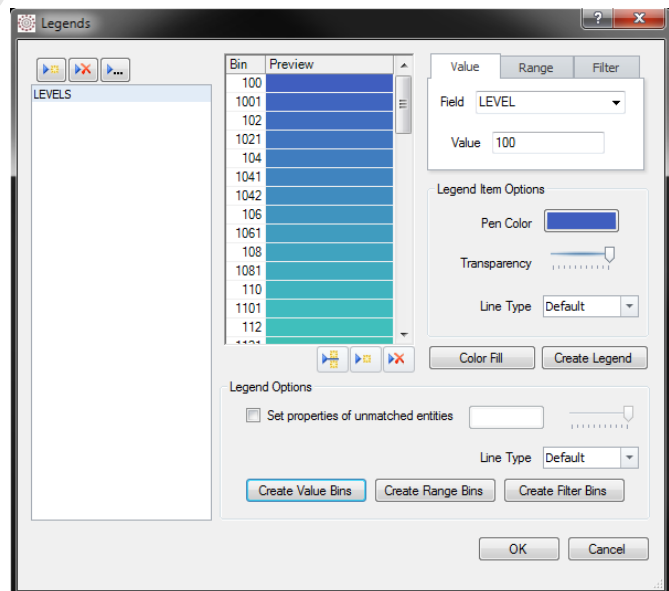
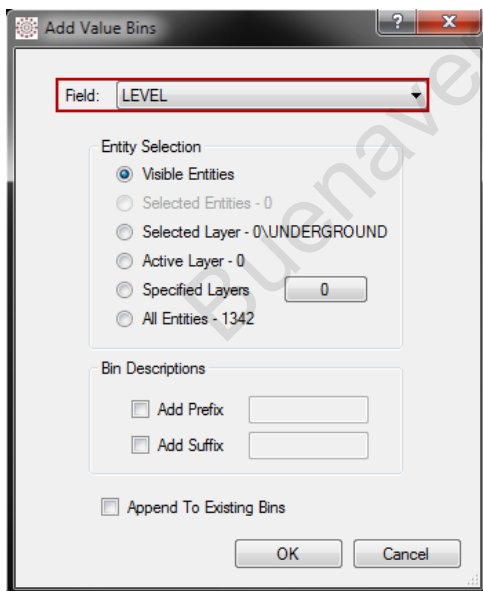


- From the presented Add Value Bins dialog box, select the **LEVEL** attribute from the Field drop-down menu and click **OK**.



*This will auto-populate the bins according to the entities with the LEVEL attribute applied to them.*

- From the Legends dialog box click **OK**.

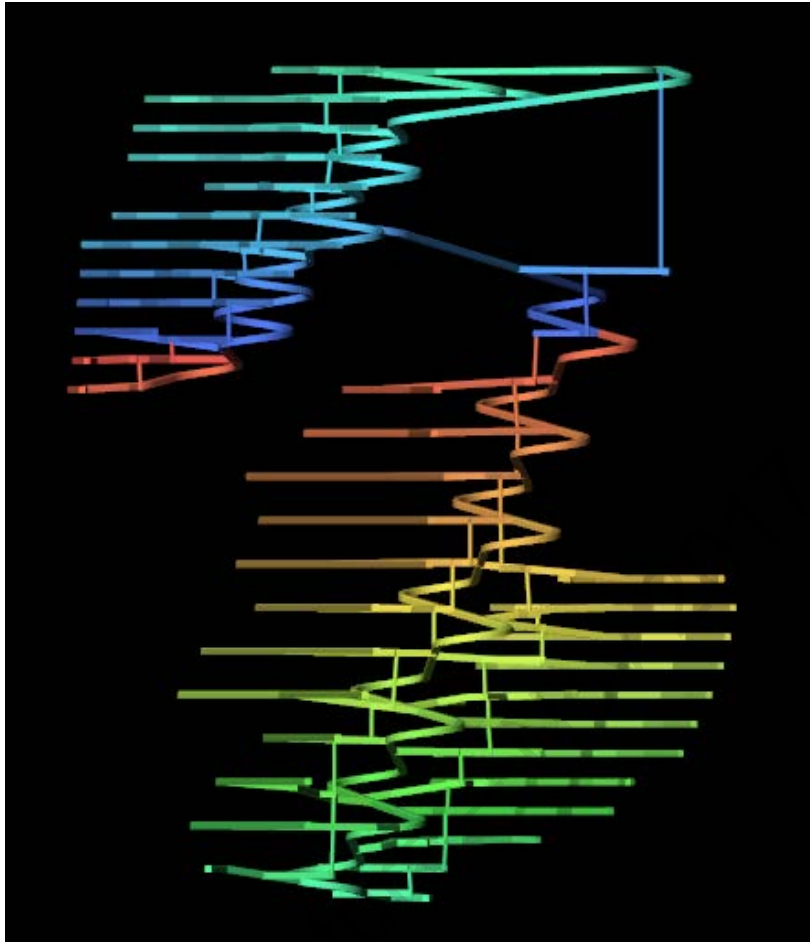



- To apply the Legend, ensure the **TUNNEL SOLIDS** layer is Selected.
- From the Legends toolbar, select the newly created LEVELS legend from the Legends drop-down menu.





This will apply the newly created legend to all entities with the LEVEL attribute assigned to it.





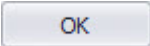

10. After viewing the entities with the BENCH attribute, run the **Edit | Legends | Remove All** command or click the  button from the toolbar.

## 22.1.2. CREATING A RANGE BINS LEGEND

In this exercise, we will create a Legend based on the volume range of the Tunnel Solids.

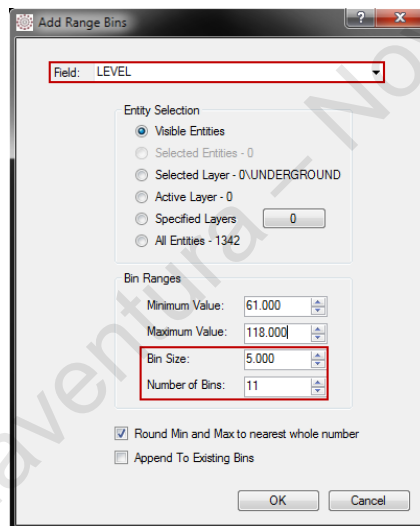


To create a Range Bin Legend;

1. Isolate the **0\UNDERGROUND HARD ROCK\TUNNEL SOLIDS** layer and make it visible and active.
2. Run the **Edit | Legends | Edit** command or click  from the toolbar.
3. In the presented Legends dialog box click  to add a new Legend.
4. In the New Save Name dialog box, enter **Level 5m Ranges** in the Name field and click .
5. Click the  button.
6. From the presented Add Range Bins dialog box, select Level from the Field drop-down menu.
7. Change the Bin Size to 5000



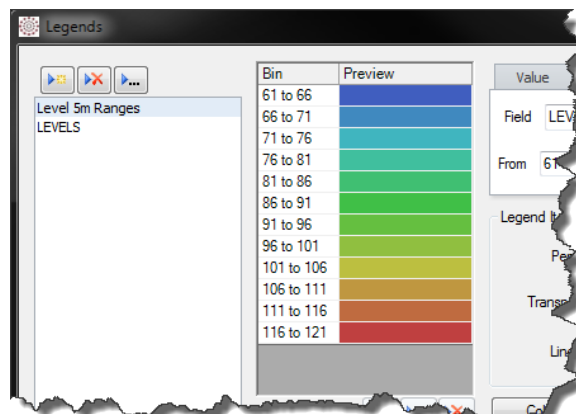
Changing the Bin Size will automatically update the Number of Bins i.e. the larger the Bin Size the smaller the Number of Bins. If the Bin Size was left at one (1), the Number of Bins is ~390000 which is not manageable!



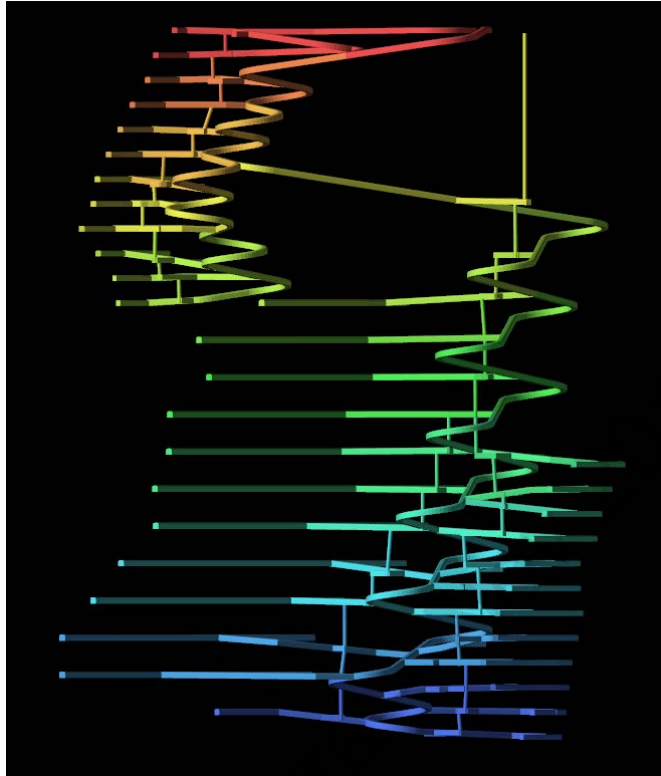
8. Click 



This will auto-populate the bins according to the Level range.




9. From the Legends dialog box, click 
10. To apply the Legend, ensure the **TUNNEL SOLIDS** layer is Selected.
11. From the Legends toolbar, select the newly created Level 5m Ranges legend from the Legends drop-down menu.




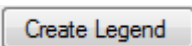
12. Run the **Edit | Legends | Remove All** command or click the  button from the toolbar.

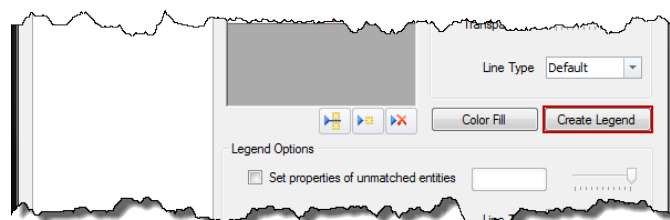
### 22.1.3. CREATE A POP-UP LEGEND

Once a **Legend** has been created, a pop-up Legend can be generated and inserted as a bitmap image on the active layer or on a **Plot**.

 *Plots are covered in the next section of the tutorial.*

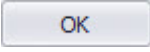
 *To create a pop-up Legend;*

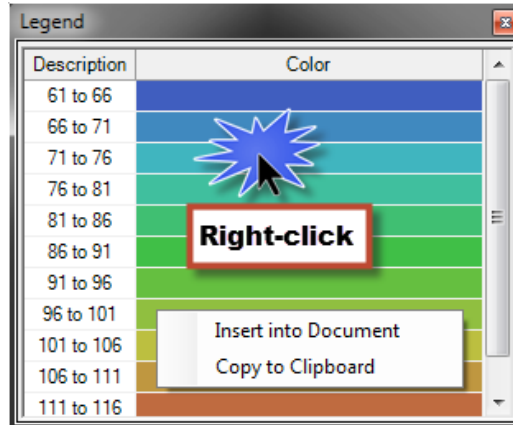
1. From the **Legends** dialog box, highlight the required Legend and click the  button.






This will create the pop-up Legend.

2. Click  to close the **Legends** dialog box, but leave the pop-up Legend open.
3. **Right-click** inside the pop-up Legend and select **Insert into Document**.



4. Follow the prompt to select an Insertion Point for the Legend.
5. To format the Legend once it has been inserted, **double-click** the Legend from the Model Space to display a **Table** dialog box with formatting options.
6. Run the **Edit | Legends | Remove All** command or click the  button from the toolbar.



## CHAPTER REVIEW

Before proceeding to the next chapter; review the subjects below and confirm the particular skills have been acquired. These skills and knowledge should include;

SKILLS & KNOWLEDGE	CHAPTER REFERENCE
Create a legend based on attribute values.	<a href="#">Creating a Value Bins Legend</a>
Create a legend with bins based on a range of information from attributes.	<a href="#">Creating a Range Bins Legend</a>



The theories covered in these topics can now be applied to similar processes.

## 23. QUERIES

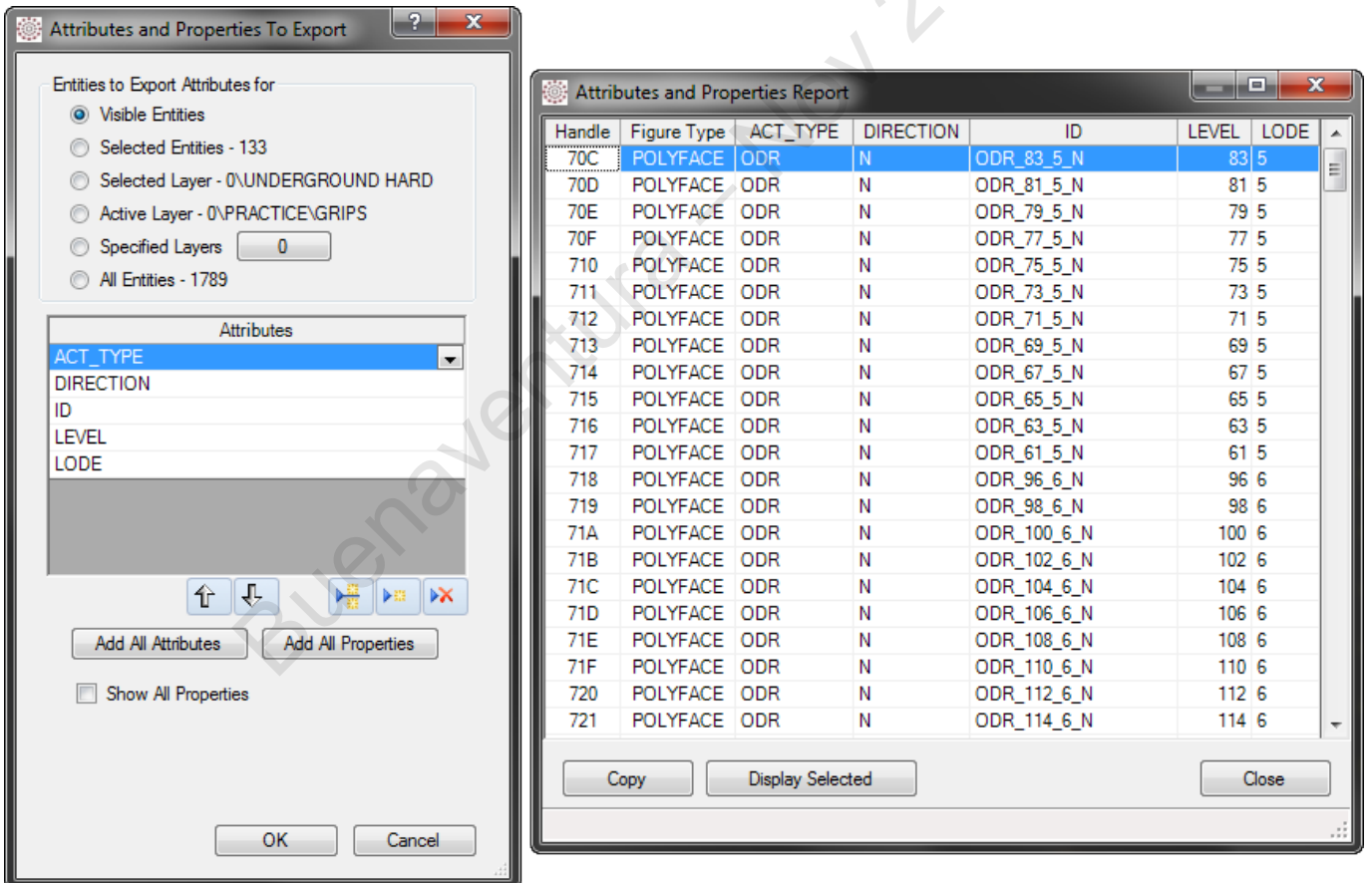
The **Tools | Query** commands allow the user to run various queries to obtain detailed information and/or generate *reports* on the selected properties. The most common Query commands, Point, Distance and Volume also have toolbar shortcuts.



There are a range of Query commands available, including Attributes and Properties and Histogram which are described in more detail below.

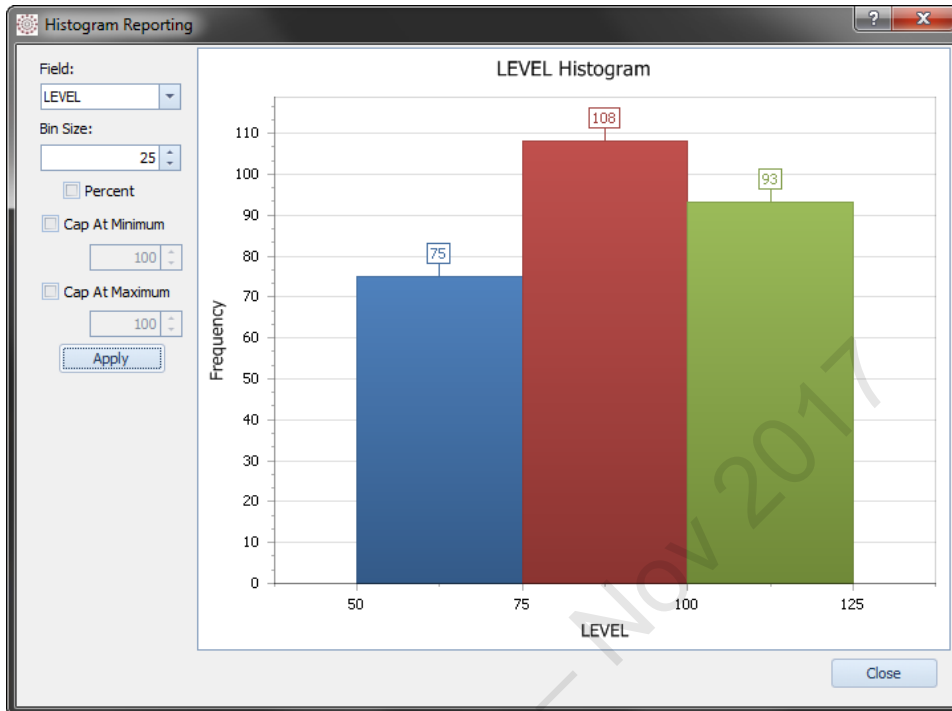
### 23.1. ATTRIBUTES AND PROPERTIES

Running the **Tools | Query | Attributes and Properties** command displays an Attributes and Properties to Export dialog box. After selecting the required Attributes and Properties, *Deswik.CAD* generates an Attributes and Properties report.



## 23.2. HISTOGRAM

Running the **Tools | Query | Histogram** command generates a Histogram that depicts the distribution frequency, for a specified Attribute for selected entities.



When the **Histogram Reporting** dialog box is first displayed, the **Histogram** is blank. The **Histogram** populates after the options on the left of the dialog box are populated and **Apply** is selected.



### CHAPTER REVIEW

Before proceeding to the next chapter, review the subjects below and confirm the particular skills have been acquired. These skills and knowledge should include;

SKILLS & KNOWLEDGE	CHAPTER REFERENCE
Query information about an entity.	<a href="#">Attributes and Properties</a>
Create a histogram.	<a href="#">Histogram</a>



The theories covered in these topics can now be applied to similar processes.

## 24. PLOTTING

*Deswik.CAD* is able to print either directly from the Model Space or from Layouts.

When printing from the Model Space, the data that is visible on the screen will be printed to the page at an undefined scale.



*Because the Print command does not support printing to multiple pages, when printing the Model Space it is critical that the size of the piece of paper is large enough in its defined orientation to fit all of the data onto a single page. This can be confirmed by looking at a preview before printing.*



*The first time a document is printed from the Model Space of an open project, it is recommended that the user ensures the Page Printer Setup and Printer Settings are set up correctly.*

### 24.1. LAYOUTS (PLOTS)

Within *Deswik.CAD*, there can be two distinct working environments, or 'spaces', in which the user can create objects. Typically, a model composed of geometric entities is created in the Model Space. However, if it is necessary to print the model, the user is able to create a **Layout**, which is essentially a 'paper space'. The Model Space and a Layout exist simultaneously, and are accessible on tabs located at the bottom left of the drawing area. There will only ever be one Model Space tab; however, one or more Layout tabs may be present at any given time.



*The Layout, similar to the Model Space, also has its own Layer Control window, which displays automatically when the Layout is selected. Within a Layout, Viewports are inserted to display views of the 3D Model Space data. Any number of Viewports can be created within a Layout and any number of Layouts can be created within a project.*

#### 24.1.1. CREATING A LAYOUT

In these exercises, we will create a Layout (Plot), then insert a Viewport into the Layout and modify the view of the image to the user's preference. We will then create a Viewport Grid, North Arrow and Scalebar and adjust them to the required view.



*To create a Layout;*

1. Add a new layer called **0\PRACTICE\PLOTTING** and make it Active.
2. Isolate and select the **PLOTTING** layer.
3. From the Main menu run the **Insert | Layout** command.

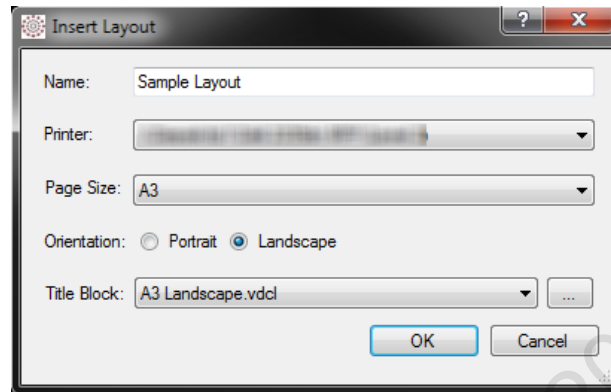
4. In the presented Insert Layout dialog box, input **Sample Layout** in the Name field.



*The user will need to map a printer to Deswik.CAD and adjust the print settings.*

5. Select **A3** from the **Page Size** drop-down menu.

6. Toggle on Landscape Orientation and select **A3 Landscape.vdcl** from the Title Block drop-down menu.

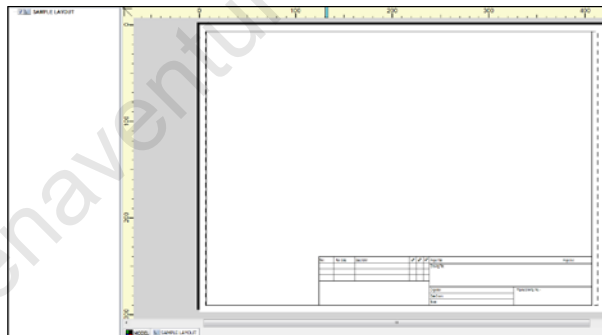


*Additional default Title Blocks can be found in the file location **C:\ProgramData\Deswik\Titleblocks***

7. Click 



*Deswik.CAD will insert a new window in the position of the Model Space called '**SAMPLE LAYOUT**' and create a new layer with the same name in the Layer Control window.*



8. Run the **View | Zoom | All** command.

## 24.2. TITLE BLOCKS

Title blocks can be modified to suit the users requirements.

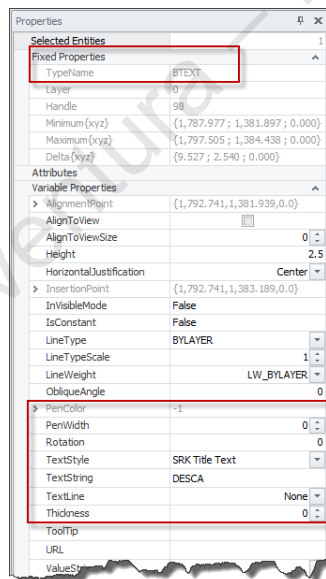


To modify a Title Block;

1. From the Main menu run the **File | Open** command or click the  button from the toolbar.
2. Navigate to the **C:\ProgramData\Deswik\Titleblocks** directory and open the required \*.vdcf file.
3. Run the **View | Zoom | All** command.



4. Click in the area of the Title Block to modify which will populate the **Properties** window.
5. From the **Properties** window modify Title Block text details as required.



6. Hit **<Enter>** to save the changes for the current project.



To save the Title Block as a new default; run the **File | Save As** command and save the new Title Block in the **C:\ProgramData\Deswik\Titleblocks** file directory.

---

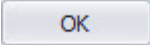
### 24.2.1. CREATE/EDIT TITLE BLOCK TEXT



To create/edit Title Block inputs or text;

1. From the Layout Space, **double-click** on the Title Block border.
2. From the presented Edit Block Text dialog box, input Values for the required fields.

Tag	Value	Invisible
PROJNO		<input type="checkbox"/>
PROJTITLE		<input type="checkbox"/>
TITLE	Intro to Deswik CAD	<input type="checkbox"/>
ORIG		<input type="checkbox"/>
DATE		<input type="checkbox"/>
SCALE		<input type="checkbox"/>
DWGNO		<input type="checkbox"/>
RA		<input type="checkbox"/>
RDA		<input type="checkbox"/>
DESCA		<input type="checkbox"/>
DA		<input type="checkbox"/>
CA		<input type="checkbox"/>

3. Click  to save the changes and close the dialog box.

Rev.	Rev. Date	Description			Project Title	Project No.
					Intro to Deswik CAD	
					Originator	Figure Drawing No.:-
					Date Drawn	
					Scale	

### 24.3. VIEWPORTS

Once you have created a Layout, you can split the drawing area into one or more adjacent rectangular views known as **Viewports**. Viewports are areas that display different views of the Model Space.


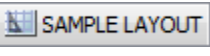
---

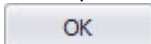
#### 24.3.1. CREATING VIEWPORTS

In these exercises, we will insert 1 Viewport into the Sample Layout created in the last exercise.



To create a Viewport;

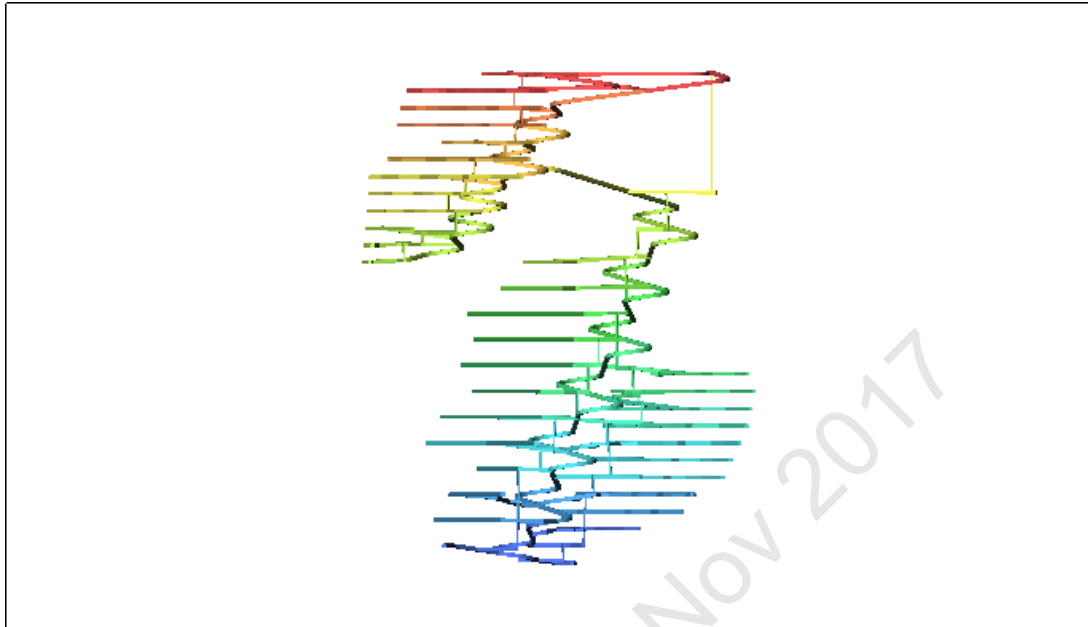
1. Select the  tab to return to the Model Space.
2. Isolate the **0\UNDERGROUND HARD ROCK\TUNNEL SOLIDS** layer and make it visible and active.
3. Select the  tab to return to the Layout Space.
4. Run the **Insert | Viewport** command.
5. In the presented **Viewport Layer** dialog box, enter **Sample Viewport** in the **Name** field and click





9. Click  to close the dialog box.

- The default Entity Display for Viewports is 2D Solid; when 3D Solid Shaded is selected, the image in the Viewport will reflect the image in the Model Space.



- To modify the Viewport settings further, **right-click** on the SAMPLE VIEWPORT layer in the Layer Control window and select **Modify Viewport**.

Buenaventura - Nov 2017

## 24.4. DRAWING VIEWPORT GRID, NORTH ARROW AND SCALEBAR

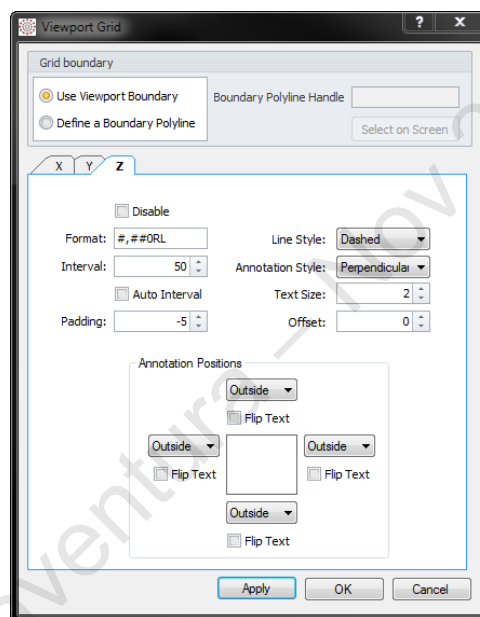
In these exercises, we will add a Viewport Grid, North Arrow and Scalebar to the Viewport.

### 24.4.1. CREATING A VIEWPORT GRID



To create a Viewport Grid;

1. From the Main menu, run the **Draw | Viewport Grid** command.
2. Follow the prompt and click on the Viewport.
3. In the X tab, click the Disable  selection box.
4. In the Y tab, click the Disable  selection box.
5. Set the Z tab settings as follows:



6. Click  to apply the settings to the Viewport.
7. Modify the Grid settings and keep selecting  until the grid matches your preferences.
8. Once finished, click  to close the Viewport Grid form.
9. To modify the Grid settings further, **right-click** on the GRID layer in the Layer Control window and select **Modify Grid**.

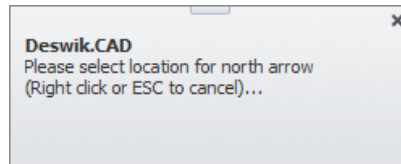
---

### 24.4.2. CREATING A NORTH ARROW



To create a North Arrow;

1. Click on the Viewport and run the **Draw | North Arrow** command.
2. Follow the prompt to select the location of the North Arrow.



3. From the presented North Arrow dialog box, click

OK



*Deswik.CAD will apply a North Arrow to the Viewport and create a NORTH ARROW child layer to the SAMPLE VIEWPORT layer.*

---

### 24.4.3. SCALEBAR



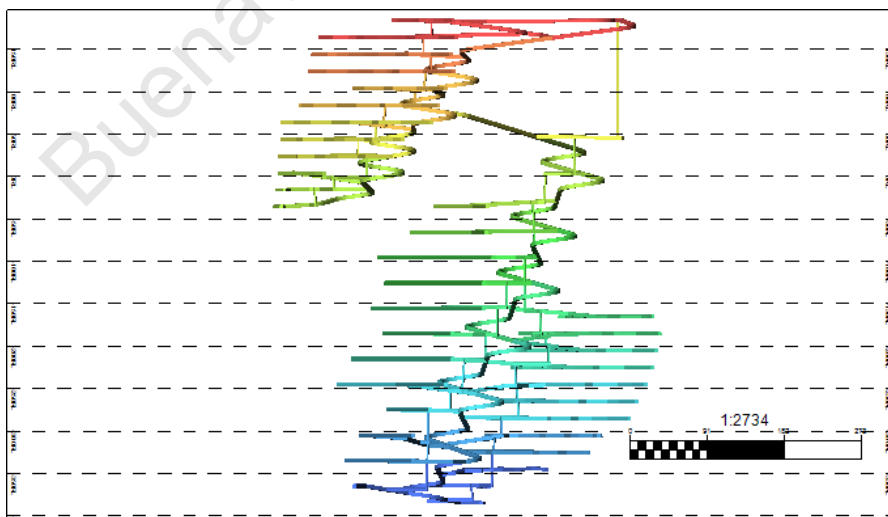
To create a Scalebar;

1. Click on the Viewport and run the **Draw | Scalebar** command.
2. Follow the prompt to select the location of the Scalebar.
3. From the presented Scalebar dialog box, click

OK



*Deswik.CAD will apply a Scalebar to the Viewport and create a SCALEBAR child layer to the SAMPLE VIEWPORT layer.*



To modify the Scalebar settings further, **right-click** on the SCALEBAR layer in the Layer Control window and select *Modify Scalebar*.

## 24.5. PRINT PREVIEW

Before printing the Layout and Viewport, run the **File | Print Preview** command to review the outputs first.



*If changes are required, close the Print Preview dialog box, make the required changes and run the **File | Print Preview** command again.*



### CHAPTER REVIEW

Before proceeding to the next chapter review; the subjects below and confirm the particular skills have been acquired. These skills and knowledge should include;

SKILLS & KNOWLEDGE	CHAPTER REFERENCE
Insert a layout into the <i>Deswik.CAD</i> project.	<a href="#">Layouts (Plots)</a>
Edit the text in a title block.	<a href="#">Title Blocks</a>
Insert a viewport onto the layout.	<a href="#">Viewports</a>
Add grid to the view port.	<a href="#">Creating a Viewport Grid</a>
Add a north arrow to the view port.	<a href="#">Creating a North Arrow</a>
Insert a scale bar for a view port.	<a href="#">Scalebar</a>
Review the layout and print.	<a href="#">Print Preview</a>



*The theories covered in these topics can now be applied to similar processes.*

## 25. SUPPORT

Should you require any further support and assistance with *Deswik.CAD*, the following options are available.

### 25.1. HELP FILES

The Help files contain concise and user friendly support documents on the majority of *Deswik.CAD* tools and functions.



To successfully navigate the **Help Files**, base your search criteria around **Keywords**.

For example: If you require further information on how to adjust your *Filters* to a certain *View*, start by searching in the *Help Files* for the keywords '*Filters*' and/or '*View*'.

Or

If you know where the command you require help with is located in the *Main Menu*, search the *Help Files* via the *Contents* tab which is set out in the same format as the *Main Menu*.

### 25.2. CLIENT PORTAL

The **Deswik Client Portal** provides access to a variety of support and information channels.

These include:

- Current released Deswik suite installs and patches
- How to guides
- Troubleshooting guides
- Direct secure mailbox channel to Deswik Support
- Roadmap of upcoming functionality and estimated release dates.

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#### 25.2.1. CLIENT PORTAL ACCESS

To access the **Deswik Client Portal** a user account must be created by Deswik Support.

To register for a user account, follow the link below:

<https://clientportal.deswik.com/user/register>

Once a user account has been generated, the Deswik Client Portal can be accessed by going to:

<https://clientportal.deswik.com/user/login>

### 25.3. SUPPORT CONTACTS

Deswik offers a range of **support offerings** to help you get the best experience from your Deswik software purchase. Deswik has support and training locations around the world. You can reach us via phone, email or the web.

To phone or email us, please contact a Support Centre in your region:

LOCATION	CONTACT
Australia	+617 3229 2708 Or 1300 653 032 <a href="mailto:support@deswik.com">support@deswik.com</a>
Canada	+1 778 375 3202 <a href="mailto:support_na@deswik.com">support_na@deswik.com</a>
South Africa	+27 11 958 0273 <a href="mailto:support_sa@deswik.com">support_sa@deswik.com</a>
United Kingdom	+44 1494 678 920 <a href="mailto:support_uk@deswik.com">support_uk@deswik.com</a>

*End of tutorial*