Chapter 4 - Working in a CDOT 3D Design Model

This chapter covers the difference between working in 2D and 3D model, and the 3D concepts you need before moving on to InRoads or other 3D applications.

Chapter Objectives:

- Describe the 2D design plane and the 3D design cube
- Explain how to use Active Depth in 3d drawings
- Explain how to use Display Depth in 3d drawings
- Identify the 3D seed file default depth settings

2D vs. 3D

2D design plane

In MicroStation, you can create either 2D or 3D models within a design file. In a 2D model, the working area is known as the **design plane**. A 2D design plane is similar to drawing on a sheet of paper. You have an X (horizontal) and Y (vertical) axis and all graphics placed in the 2D file are "flat".
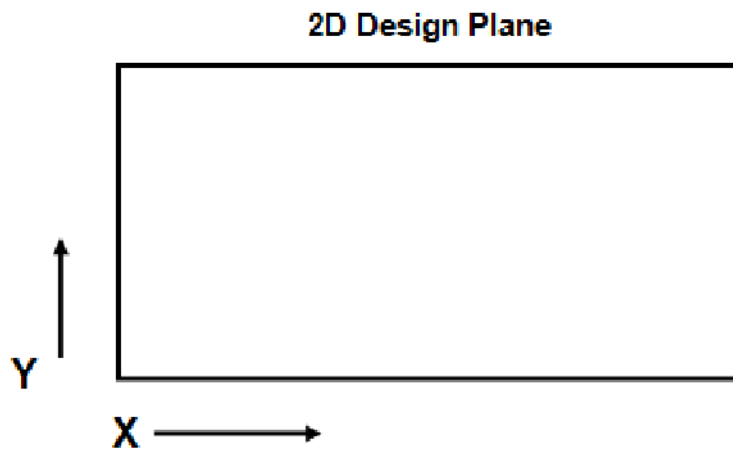

2D Design Plane

You can rotate the 2D design plane about its perpendicular axis (the Z axis coming out of the screen).

3D design cube

In a 3D model, your work area is called the **design cube**. You're working in a volume of space with 3 axes — X, Y and Z. When you place elements, you can place them not only in the correct horizontal (X, Y) location, but also in the correct vertical (depth or Z) location to create a true 3D model of your design.

In the design cube, different view orientations can be set. These include: Top, Bottom, Front, Back, Right, Left, Isometric, and Rotated.
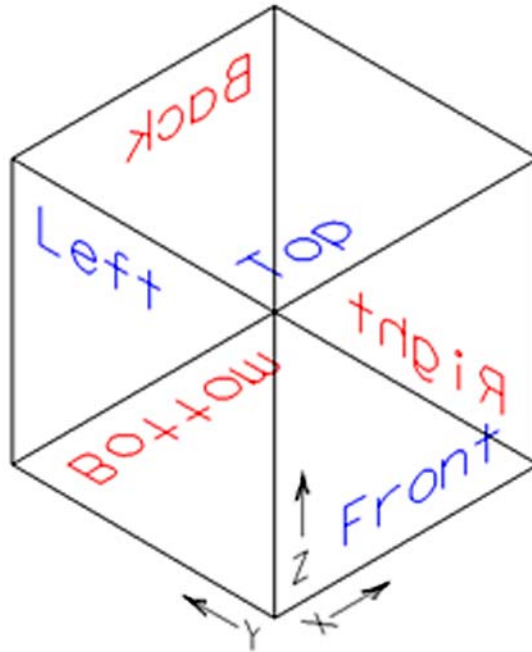

Think of a view as a camera location that's taking a snapshot of your design. When you rotate a view, you're **not** rotating **graphics**. Instead, you're rotating the camera position (or the orientation) of how you're looking at the graphics.

Each "face" of the design cube is a standard view (Top, Front, etc.) In addition you can set an isometric view and you can rotate any view about the X, Y or Z-axis. For most civil drafting and design work, the top view is synonymous with the **plan** view and the **front** view is synonymous with the **elevation** view.

Set view orientations by using either:

♦ The Rotate View command on the View Controls toolbar
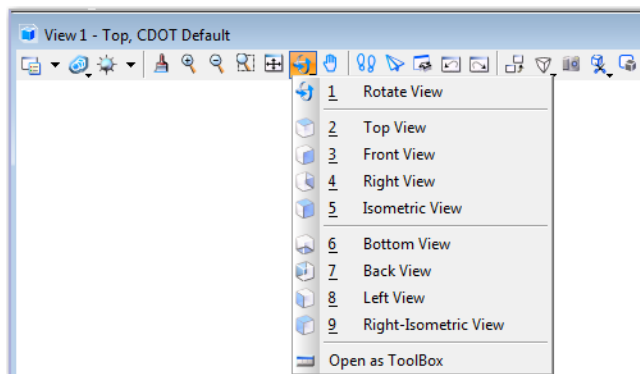
♦ The **vi= <view name >** key-in (e.g. **vi=top**).
♦ The **rv= <x,y,z>** keyin to rotate a view about the x, y and /or z axis (e.g. **rv=,,-30** rotates a view 30 degrees clockwise about the z axis).

Using Active Depth

When working in a 3D design model and placing graphics in a view, at what depth are the graphics being placed? They are placed at the active depth. The active depth is a plane, parallel to your view screen, on which you're placing elements. For example, if you are creating a topo map and manually drawing the 5000-foot contour in the top view, you first set the active depth for the top view to 5000, and then draw the contour.
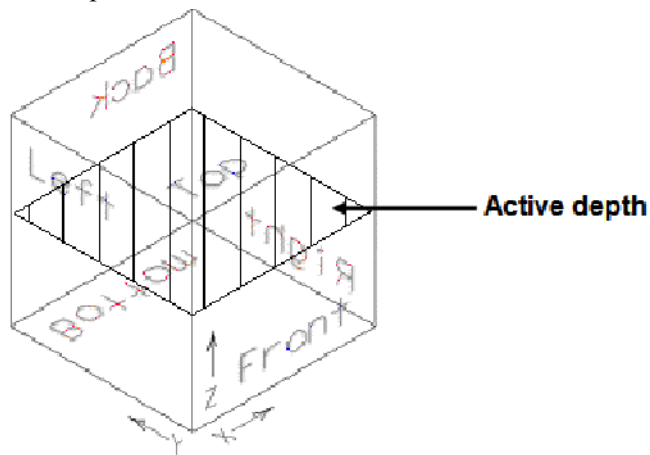
To set a view's active depth:

* Key in **az=\<depth>**.
* **\<D>** to select the view of interest.

The active depth is view dependent. Therefore, you must tell MicroStation which view you're setting the active depth in by data pointing in the view.

Note: For most civil work, you'll set an active depth in the top (plan) view. The active depth is then the elevation at which you're placing graphics. If you switch to a Front view, you'll see the elements at the different elevations.

Active depth is synonymous with the term *active z*.

To check a view's current active depth:

* Key in **az=$**
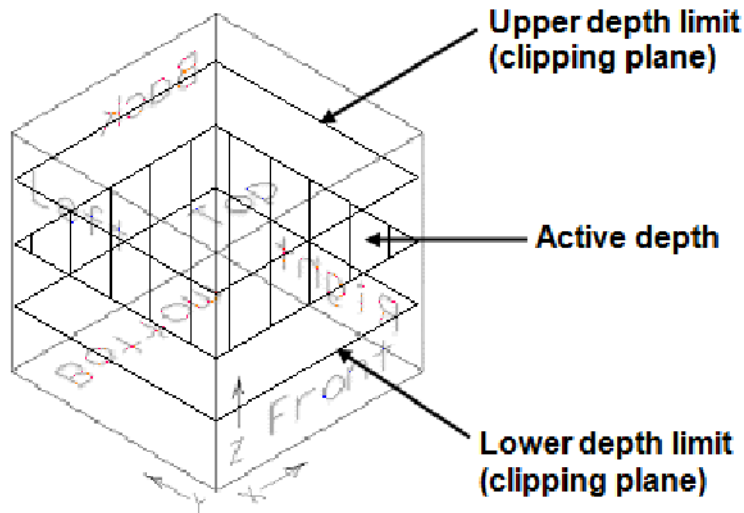* **\<D>** in the view of interest

The current active depth is displayed in the message field.

Note: Use the delta key-in **dz=\<depth>** to move the active depth by the delta \<depth> amount, then **\<D>** in the view. Multiple data points change the depth each time.

Using Display Depth

Display depth is the depth range or the "slice" of the design cube in which elements are visible. You set the display depth by specifying an upper and lower depth (elevation) range for the view.

To set a view's display depth:

- Key in **dp=<lower depth, upper depth>**
- **<D>** in the view of interest

Note: Like active depth, display depth is also **view dependent**. So you have to tell MicroStation which view you're setting the display depth range for by data pointing in the view (the top view in most cases). This allows you to have different display depths in different views.

Display Depth tips:

- Display depth limits are also known as the view's **clipping planes**.
- A view's active depth is always within its display depth range (i.e. you can not set an active depth outside the display depth).
- Use the key-in **dd=<delta lower depth, delta upper depth>** to expand the display depth by the delta amount. This moves the display depth as specified from its current location.
- The **Fit** command automatically changes a view's display depth (expands or shrinks to fit elements currently turned on in the view).

   Note: If you can't see graphics in a 3D model, they may just be outside your display depth. Fit your view as a quick check.

- The current active and display depth settings are saved when you save settings **(File > Save Settings)**. This determines the default depth when you open a design file.

To check a view's display depth:

- Key in **dp=$**.
- **<D>** in the view of interest

The view's current display depth is displayed in the message field.

Show Display Depth > Select view   View 1: Display Depth=-1000.000,15000.000

CDOT 3D Seed File Defaults

The CDOT default settings for active and display depth are set in the CDOT 3D seed files for each specialty group.

Active Depth

The CDOT default setting for active depth is **0**.

Display Depth

The CDOT default setting for display depth is **-1000, 15000**.