Introduction to Layers
Introduction To Layers

In manual drafting, details of a design are separated by placing them on different sheets.

This is called overlay or pin drafting

- Each overlay is perfectly aligned with the others.
- All of the layers can be reproduced to reflect the entire design.
- Individual layers may be reproduced to show specific details.
Introduction To Layers

- In AutoCAD, overlays are called layers.
- The use of layers increases productivity.
  - Specific information can be grouped by layer.
  - Drawings can be reproduced by layer or combined in any sequence desired.
  - Each layer can be assigned a different color to improve clarity.
Introduction To Layers

- Each layer can be plotted in a different color or pen width.

- Selected layers can be turned on or off, or frozen to decrease information clutter.

- Changes can be made to a layer promptly.
Layers Used by Field

- Mechanical drafting
- The following may be placed on separate layers:
  - views
  - hidden features
  - dimensions
  - sections
  - notes
  - symbols
Layers Used by Field

- **Architectural Drafting**
  - Drawings usually contain over 100 layers
  - Floor plan layer
  - Foundation plan layer
  - Partition layout layer
  - Plumbing layer
  - Electrical layer
  - Structural layer
  - Roof drainage layer
  - HVAC systems layer
Layers Used by Field

- **Interior Design Drafting**
  - floor plan layer
  - interior partition layer
  - furniture layer
Layers Used by Field

- **Electronics Drafting**
  - Circuit boards have multiple layers to conduct electricity to different components.
  - Each layer of a circuit board is drawn on a different layer.
Setting Linetype by Layer

- AutoCAD allows you to select a linetype for each layer.
  - Any item drawn on that layer would be assigned that linetype.
The “O” Layer

- AutoCAD uses Layer 0 as the default layer.
  - It has a continuous linetype.

- The ZERO layer or “0” layer is a special layer.

- The “0” layer should be kept empty.
- It is reserved for creating BLOCKS.
The “O” Layer

◆ Create the layer FIRST.

◆ MOVE to that layer.

◆ THEN, draw objects on the new layer.

◆ Do not draw objects on Layer 0.
Naming Layers

- Name **Layers** to reflect what is on the **layer**.

- Examples of good layer names:
  - 1stFL_PLAN
  - 1stFL_ELECTRICAL
  - 1stFL_MECHANICAL
Naming Layers

- Name **Layers** to reflect what is on the **layer**.

- Examples of poor layer names:
  - LAYER1
  - LAYER2
  - LAYER3
Naming Layers

- Layer names can have up to 31 characters

- Layer names can include
  - Letters.
  - Numbers.
  - Special characters.

- Layer names **cannot include** / \ | * ? ; or :
Access the **LAYER** command by:

1. Typing **LA** or **LAYER** at the Command: prompt.

   OR

2. Select the **Layers** button on the **Object Properties** toolbar.

   OR

3. Select **Layer** from the **Format** pull-down menu.
**LAYER Command**

- The **only layer present in a new drawing** is the **0 Layer**.

- Add **Layers** as **needed**.

- To **ADD a layer** pick the **New** button.
  - A new layer listing appears using the **default name of Layer 1**.
The Layer Properties Manager dialog box shown in the image contains a table with the following columns:

- **Name**: The name of the layer.
- **On**: Indicates whether the layer is on or off.
- **Freeze**: Indicates whether the layer is frozen or thawed.
- **Linetype**: The line type used in the layer.
- **Color**: The color assigned to the layer.
- **Linetype**: The linetype assigned to the layer.
- **Lineweight**: The lineweight assigned to the layer.
- **Plot Style**: The plot style assigned to the layer.
- **Plot**: Whether the layer is plotted.

The current layer is **TitleBlock**.

- **0**: Off, Linetype Continuous, Lineweight Default, Plot Style Color_7
- **Defpoints**: On, Freeze, Linetype Continuous, Lineweight Default, Plot Style Color_7
- **Figure**: On, Freeze, Linetype Continuous, Lineweight Default, Plot Style Color_4
- **FigureCoords**: On, Freeze, Linetype Continuous, Lineweight Default, Plot Style Color_4
- **Measurements**: On, Freeze, Linetype Continuous, Lineweight Default, Plot Style Color_2
- **TitleBlock**: On, Freeze, Linetype Continuous, Lineweight Default, Plot Style Color_7
- **TitleBlockText**: On, Freeze, Linetype Continuous, Lineweight Default, Plot Style Color_7
- **XYCoordinates**: On, Freeze, Linetype Continuous, Lineweight Default, Plot Style Color_6

There are 8 total layers and 8 layers displayed.

The highlighted area in the dialog box is the "New" button, which is used to create a new layer.
**LAYER Command**

- You can enter **several new layers at the same time**.

- Entering **several layer names at the same time** is **faster** than entering them individually.
Setting a New Current Layer

- You can set a **new current layer** by:
  - 1. **Highlighting the layer name** in the layer list
  - **Picking the Current:** button.
- OR
  - 2. **Double-clicking on the layer.**
Viewing Layer Status

- The **status of each layer** is displayed with icons to the right of the layer name.
- **ToolTips** indicate what each icon represents.
  - Changing **layer name**.
  - Turning layers **on/off**.
  - **Thawing/freezing** layers.
  - **Thawing/freezing** layers in viewports.
  - **Unlocked** and **locked** layers.
  - **Layer color**.
  - **Layer linetype**.
### Layer Properties Manager

**Current layer:** 0

<table>
<thead>
<tr>
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</table>

**Search for layer:**

All: 44 layers displayed of 44 total layers

- [ ] Invert filter
- [ ] Indicate layers in use

[Settings...]

[OK] [Cancel] [Apply] [Help]
Selecting Multiple Layers

Several layers can be selected at once in the layer dialog box.

Hold [Shift] to select layers contiguously.

Hold [Ctrl] to select multiple layers individually, NOT contiguously.
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30 Total layers  30 Layers displayed

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30 Total layers, 30 Layers displayed
Setting the Layer Color

- Layers are coded by name and number
  - 1 red
  - 2 yellow
  - 3 green
  - 4 cyan
  - 5 blue
  - 6 magenta
  - 7 white

- Memorize these numbers/colors.
Setting the Layer Color

- Color settings affect the appearance of plotted drawings.

- Plotter pen widths are associated with drawing color.
  - Color = line width
  - Color = pen weight

- The colors you use must correspond to the proper pen widths.
Setting the Layer Color

For this class, use

- **Thin Lines** (text, guidelines) - White OR Yellow
- **Object Lines** (medium thickness) - Cyan OR Green OR Magenta
- **Thick Lines** (thickest) - Blue OR Red
Setting/Changing Linetype Assignments
Setting the Layer Linetype

- AutoCAD linetypes are listed on Page 156 of the text.

- Linetype assignments to a layer can be changed.
  - All entities drawn on that layer would be that line type
    - Center
    - Hidden
    - Continuous
Setting the Layer Linetype

- To change a linetype for a layer.
  - Pick the **layer** you want to change
  - Pick its linetype.
Click on the word "Continuous" to select a linetype for this layer.
Changing Linetype Assignments

- **The first time** you use this dialog box, **only** the *Continuous* linetype will be displayed.
- You need to **load** any other linetypes to be used in the drawing.
The first time you use this dialog box, only the **Continuous** linetype will be displayed.
Click on the word “Load” to access other line types.
The image shows a dialog box titled "Load or Reload Linetypes". The dialog box contains a list of available linetypes for AutoCAD. The linetypes are as follows:

- **ACAD_ISO02W100**: ISO dash___________________
- **ACAD_ISO03W100**: ISO dash space______
- **ACAD_ISO04W100**: ISO long-dash dot_______._______._______._______.____
- **ACAD_ISO05W100**: ISO long-dash double-dot_____._______._______.____
- **ACAD_ISO06W100**: ISO long-dash triple-dot_______._______._______._______.____
- **ACAD_ISO07W100**: ISO dot_____________________
- **ACAD_ISO08W100**: ISO long-dash short-dash_______._______._______.____
- **ACAD_ISO09W100**: ISO long-dash double-short-dash_______._______._______.____
- **ACAD_ISO10W100**: ISO dash dot_______._______._______._______.____
- **ACAD_ISO11W100**: ISO double-dash dot_______._______._______._______.____
- **ACAD_ISO12W100**: ISO________________________

The dialog box also includes buttons for "OK", "Cancel", and "Help".
Loading Linetypes

1. Pick the **Load** button to display the **Load or Reload Linetypes** dialog box.

2. Select the file where the linetypes are stored “ACAD.LIN”.
   - **AutoCAD** stores line types in the file **ACAD.LIN**

3. Select the linetypes to load

4. Pick OK.
   - You can also **double-click** on a linetype to select it.
## Load or Reload Linetypes

### Available Linetypes

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<th>Description</th>
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### Buttons

- **File...**
- **OK**
- **Cancel**
- **Help**
Changing Layers
Quickly Setting a Layer Current

- Use the **Layer Control** drop-down list located in **Object Properties** to quickly change to another layer.

- Pick the **name of the layer** and that layer is set current.

- The dialog box automatically closes.

- You can also use **CLAYER** command
Making Object’s Layer Current
Making Object’s Layer Current

- You can select an object on the drawing and have the layer of that object become current.
Making Object’s Layer Current

1. Select **Make Object’s Layer Current** in the Object Properties toolbar.

2. Select the object.
   - AutoCAD then displays a prompt “PLUMBING is now the current layer” giving the name of the layer on which the object you selected was on.
Changing Object Layers
Easy Way
Changing Object Layers

- **Always draw objects on appropriate layers first.**
  - Select the CORRECT layer first.
  - THEN, draw the object.

- If objects are drawn on the wrong layer, they can be:
  - Moved from one layer to another.
Changing Object Layers

To change object from one layer to another:

1. Select the object
2. Select the desired Layer from the Layers button in the Object Properties toolbar

The object is moved to the selected layer.
Specify radius of circle or [Diameter]:

Command:

2.5000, 4.5000, 0.0000
Changing Object Layers
The Hard Time Consuming Way -

The DDMODIFY Command
Changing Object Layers

- **DDMODIFY**
  - Tells you EVERYTHING about a particular drawing entity.
  - Often it is TOO MUCH information.

- Has a SMALL close box

- Cumbersome to use.
Changing Object Layers

- **DDMODIFY** can be used to change object from one layer to another
  - 1. Select the **Properties** button in the **Object Properties** toolbar
    - OR
  - Select **Properties** from the **Modify pull-down menu**
    - OR
  - Type “DDMODIFY” or “MO”
  - 2. Select the object.
    - A dialog box appears that relates to the specific object you selected.
Overriding Layer Settings
Overriding Layer Settings

- Color and linetype settings reference layer settings by default.
- The “BYLAYER” setting on the Object Properties toolbar.
**Overriding Layer Settings**

- When you create a layer, you also establish a **color** and a **linetype** to go with that layer, the **ByLayer** setting.

- **ANY SETTING** except **BYLAYER** is an **override**.
AutoCAD offers the user tremendous flexibility.

- You can make any object any color
- You can make any layer any color
- You can make any object any linetype
- You can make any layer any linetype
Overriding Layer Settings

- You can override the current object color.
- All objects created will be drawn with the color of the override setting.
- Layer settings will have NO effect.
- THIS IS NOT RECOMMENDED!
Overriding Layer Settings

1. BYLAYER setting result
   - **Layer Setting** | **Object Appearance**
     - RED | RED
     - CONTINUOUS | CONTINUOUS

2. Override setting result
   - Overrides set to Color = GREEN; Linetype = HIDDEN
     - **Layer Setting** | **Object Appearance**
     - RED | GREEN
     - CONTINUOUS | HIDDEN
Overriding the Current Object Color

- Select the Color Control drop-down list from the Object Properties toolbar.
- Select the color you wish.
Overriding the Current Object Color

- Once an absolute color is specified,
  - All objects created are drawn in the specified color,
  - REGARDLESS of the current layer settings.
Overriding the Current Object Color

- The system variable that controls color is **CEColor**.
  - **CEColor** stands for current entity color.

- Setting the CELType variable from the Command: prompt
  - Command: CECOLOR
  - New value for CECOLOR <“BYLAYER”>: (enter new color value)

- **THIS IS NOT RECOMMENDED !**
Overriding the Current Object Linetype

- You can override the current object linetype.

- All objects created will be drawn with the linetype of the override setting.

- Layer settings will have no effect.

- This is similar to setting the color different from the layer settings.
Overriding the Current Object Linetype

◆ The variable that controls linetype is
  ◆ CELType
  ◆ **CELType** stands for current entity color.

◆ Setting the CELType variable from the Command: prompt
  ◆ 1. Command: CELType
  ◆ 2. New value for CELTYPE <“BYLAYER”>:
     (enter new linetype value).
  ◆ 3. Select the linetype you wish.
Overriding the Current Object Linetype

Once an absolute linetype is specified, all objects created are drawn in the specified linetype, REGARDLESS of the current layer settings.

THIS IS NOT RECOMMENDED!
Customizing the Layer Listing
Because of the large number of layer names possible, it may be necessary to customize which layers are shown.

Unwanted layers can be not shown by selecting the Show drop-down box and setting options and filters.
Layer Filters
Layer Filters

- Layer filters screen out any layers that have features you do not want
Customizing the Layer Listing

- Choices include:
  - All
  - All in use
  - All unused
  - All Xref dependent
  - All not Xref dependent
  - All that pass filter
  - Set Filter dialog
Customizing the Layer Listing

- Choices include:
  - **All**
  - Default option
  - Shows all defined layer names
Customizing the Layer Listing

- Choices include:
  - All in use
  - The current layer and any layers that contain drawing objects
Customizing the Layer Listing

- Choices include:
  - All unused
  - Displays all non-current layers that contain no objects
Customizing the Layer Listing

- Choices include:
  - All Xref dependent
  - This displays all layers brought in with externally referenced drawings
Customizing the Layer Listing

- Choices include:
  - All not Xref dependent
  - Displays all layers native to the current drawing, and none that have been brought in with externally referenced drawings
Customizing the Layer Listing

Choices include:

- All that pass filter
- Current filtering criteria is used to determine which layer names are displayed
Customizing the Layer Listing

Choices include:

- **Set Filter dialog**
  - Displays the *Set Layer Filter* dialog box

Choices include:

- Layer names:
- Layer settings drop-down menus
- Colors: and Linetypes:
- Reset button - returns all settings to the default values
- Apply this filter to the layer control on the Object Properties toolbar check box.
Customizing the Layer Listing

- Set Filter dialog
  - **Layer names**: you can select a single layer name or use a combination of characters and wildcards to select layers
  - **Layer settings drop-down menus**: various combinations of layers which are On or Off can be selected
  - **Colors**: and **Linetypes**: - used to filter layers by color or linetype. The default “*” represents all layers and colors.
Customizing the Layer Listing

- **Set Filter dialog**
  - *Reset button* - returns all settings to the default values
  - *Apply this filter to the layer control on the Object Properties toolbar check box.* -
    - when checked, only layers passing the filter are displayed in the Layer control drop-down menu in the **Object Properties** toolbar.