Basic and Intermediate Training

Forensic Mapping
Using CAD Zone

For Version 9 Crash Zone & Crime Zone

The Crash Zone
Diagrams, animations and calculations for Crash Reconstructionists.

The Crime Zone
For Investigators who want accurate, detailed crime scene diagrams.
In the course, *Forensic Mapping using CAD Zone*, the student will learn from lecture examples and hands on experience allowing them to generate immediate results. Instruction is included for creating scaled diagrams of collision or crime scenes.

The Crash Zone and Crime Zone programs are exactly the same program except for the title so just install one title only to avoid program conflicts. Both titles provide the complete crash, crime and marine scene symbol libraries. All you do is set the symbol library you wish to use under the “Symbol Group” at the top of the symbol tool bar.

**Entry Level Standards:**

Students should have completed a basic accident investigation, crime scene investigation or forensic mapping course and know how to draw scaled diagrams by hand. In addition, a basic understanding of the Microsoft Windows operating system, computer file management, mouse control and keyboard commands.

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This manual was compiled by **Detective William Redfairn** of the Las Vegas Metropolitan Police Department. Sections of this document incorporate the online manual written by **Derik White** and **Bruce Elliot** as well as training material written by **Anna Rustau**.
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Lesson 1 – Diagram Program Work Environment

The Program Screen

**Title Bar:** Software, version number and drawing name are displayed in the blue bar and also command prompts appear to remind you what the next steps are.

**Menu Bar:** Pull down menu of all the program commands. These commands are also available in a button Icon format in the Left Side Tool Box or 2-letter shortcuts as shown.

**Speed/Setting Bar:** Command shortcuts for basic Windows functions to open, create new drawing, copy/paste, save, undo, redo, properties display drawing aids and viewing tools. The command bar remains the same during all 2D view operations.

**Message Bar:** The yellow colored Status/Message Bar is the last line at the bottom of the CAD Zone Window and provides some **VERY** useful functions.

The Message Bar on the lower left side has 3 functions:
1. As you perform the various commands, the Message Bar will give you step-by-step instructions to complete the task. The CAD Zone system will be much easier to learn and use if you follow the instructions as they appear on the Status/Message Bar.

2. You can click on an object and it display Object Properties (length, angle, etc.).

3. It is also the Command Line where you can see any typed commands such as the two-letter shortcuts or type in a value to define a distance.

On the lower RIGHT side, there is a dynamic Angle-Distance and a XY Coordinate display that allows you to view these properties as you are drawing.

### Drawing Area

The **Drawing Area** is the area that covers the center portion of the screen. This is the area where you draw your scaled diagram.

There are also **Viewing Tools** on the Speed bar at the top to help you maneuver about the drawing area. There are also scroll bars at the right and bottom of the Drawing Window that enable you to scroll (move up/down or side-to-side) when the drawing is too large to fit in the viewing area.

### Mouse Pointer

Almost all operations you do will be with the **Left mouse button**. The mouse pointer starts as an arrow pointer but will change depending on which feature you are using.

- The **Arrow Pointer** is the default pointer and when your mouse pointer looks like an arrow, you are in “selection mode” which means you can select an object in the drawing or select a command icon from the toolbars.

- If the mouse pointer looks like a crosshair, you are performing a command.

- If the mouse pointer looks like a crosshair enclosed in a circle, **Auto Snap** is turned on. When you have auto snap turned on, the cursor will snap to a point, line or object within the target circle so you can draw with precision. To turn auto snap on or off, click the **red magnet icon** on the speed bar.

- The four-sided arrow allows you to **Move** the selected object(s).

- Small blue boxes are **Grips** (handles) that allow you to stretch or rotate objects.
Red Rotation Handle is the square and the target is the pivot point.

Opening Screen Options

Selecting this button gives you options for opening a previous drawing.

Selecting this button gives you options for starting a new drawing.
Selecting this button takes you to the learning center where you will find tutorials, movies, a manual, as well as other helpful learning tools.

Selecting this button allows you see if you are running the latest version of your software and to see the latest announcements and other helpful information.

**File Save Location**

Go to Utilities > Settings > Paths

Use special folders. If this box at the bottom of the Paths tab is checked then the program will re-direct all diagram program settings, diagrams, and images under My Documents. This feature was designed to work with the growing number of Network systems that are locked down and do not allow the user to save or write to their C drive except for designated area such as My Documents. This setting Saves work to: C:|Documents and Settings|Your Name|My Documents|My Cad Zone|Diagrams.

Unchecked saves files to: C:|Program Files|CAD Zone|Crash (Crime) Zone 9|Diagrams

Lock All Paths. Check this box to maintain the path currently set. If un-checked, path will change to match the path a file was opened from or saved to.

Save to Original Folder. This allows you to work in other directories not set as defaults.

**Program Settings & Tools That Make Drawing Easier**

Ortho Icon looks like a small carpenter’s square so you can think of it for drawing straight lines and perfect 90 degree corners and 45 degree angles. Holding your shift key temporarily puts into Ortho Mode without using the button.

Cursor Free is used along with the Angle Draw mode when you want to set a point on the orthogonal axis, but snap it to some object that is off axis.

Angle (Ortho) Trap will “trap” your mouse movement when drawing a line at 0, 45 or 90 degrees when your mouse gets close (not as restricting as the ortho mode).

Auto Snap icon looks like a horseshoe magnet. It allows precise drawing and measuring to “snap” onto a point or exact end of a line.

If these Icons are turned on, they will look “pressed in” and light up in a green color.
Useful Tips – the following is a list of useful keys on the Keyboard

1. The ESC key can be used to “back-up” or “back-out” when doing a command. Also double clicking will end some commands or you can use the right click menu.
2. Pressing the Space Bar will repeat the previous CAD Zone command.
3. You can point to any Icon on a Toolbar with the mouse pointer for a description tool tip of that command is associated with that Icon.
4. If you cursor seems to disappear when you are trying to move it, then you are in the middle of a command. Clicking the Left Mouse button or hitting the ESC key a few times will usually get your cursor back and close out the command.
5. Remember to use the Undo and Redo commands located on the Speed bar if you make a mistake.
6. Command Line is a yellow line at the bottom left and is very important since it will prompt you for the next steps required for the command and will help you learn the program.

It also displays Object Properties so if you click on an object and keep your mouse cursor near it, then you can view length, angle, and layer on the command line. Selecting an object and typing “OI” (Object Information) also displays object properties for that item.

7. Angle-Distance and XY Coordinates display dynamically at the bottom right in the yellow bar. You can use this to guide you when drawing lines, moving object, etc.

Left-Hand Toolbox

While all of the commands can be found on the Pull-Down menus, the left-hand toolbox offers a quicker way to select many of the most commonly used commands. The commands found on the toolbox are arraigned in “Bins or Tool Drawers” where there are groups of similar features just as the commands are arraigned on the pull-down menus.

Selecting Commands – Three Methods you can combine

1. Left Toolbox and Top Speed buttons (visual and easy to remember)
2. Pull Down Menus (need more steps than using buttons)
3. Typed Keyboard Shortcuts. There are two-letter codes for every command in the program. (Displayed beside the command.) Typed into command line down in the lower left corner of the screen.

Lesson 2 – Selecting Objects and Selection Tools

To modify object on screen you need to select the object(s) first. You can click on them using your left mouse button or use your mouse to draw a “window” box on screen to select multiple objects inside the box. The selected objects will highlight magenta in color to let you know what has been selected.
For multiple selections, hold down the Ctrl or Shift button while using your left mouse to select multiple objects. Click on a highlighted object to unselect an object when needed.

If you forget to pick your object first and selected an edit or modify command, a Selection Bar similar to the one below may appear prompting you with options on various ways of selecting your object. (It can be a bit confusing when you are starting off, so try to remember to pick the object first before using many of the editing commands.)

### Exercise

Open an existing diagram from the sample drawings and perform the following concepts.

1. To edit (or modify) objects in your drawing, they must first be selected. Click on an object or use the drag window selection method to select an object.
   a. Dragging the window from left to right selects only the objects fully enclosed inside the window.
   b. Dragging the window from right to left selects everything touched inside the window.
2. When objects are selected, they change to a magenta color and they are enclosed in eight blue Handles or Grips. Using the corner grips stretches the SIZE changing the XY axis proportionally. The side grips stretch in one direction.
3. To rotate your object you can use the red rotational handle that pivots around the red target point. You can put your mouse on and drag the target (pivot) point to a corner if desired and then this becomes the new pivot point.
4. When you point to a selected object with the cursor, you will see a four-headed arrow attached to the cursor. When this happens, you can hold down the left mouse button and Move the object. Let go of the left mouse to drop into place.

   If you need precision when moving an object – such as snapping to a point, use the Move command found in the Tool Zone under the Edit group. The two-letter shortcut for this is “MV” to bring this option up.

### Lesson 3 – View Commands

There are several different View Commands available in the top speed bar, which allow you to maneuver around in your work and view your diagram. It is best to be zoomed in closer when you are working in an area to be more precise in what you are doing.
**Exercise**

Using the sample drawing from Exercise 2, practice the following concepts.

- **Redraw** – cleans up the screen by clearing up any stray marks or reference lines that were left by editing or erasing.

- **Zoom Window** – use your mouse to define the area you want a close up of to make the object inside appear larger and hide the outside part from view.

- **Zoom to Extents** – causes all the objects in your diagram to be displayed on screen.

- **Zoom In/Out** – increases or decreases you screen view.

- **Pan Drawing View** – turns you mouse into a “Hand” to move the drawing around your screen. Use the ESC key or select command to end the pan function. The Scroll Bars on the side and bottom of the screen also moves the drawing area.

**NOTE**

If you have a MOUSE with a **ROLLER WHEEL**, you can use the wheel to zoom in and out quickly to where your mouse is on the screen. If your mouse does not have this active, you can go to your mouse setting in the Windows Control Panel and activate it.

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**CAD Zone’s “Tool Drawers” or Tool Bins**

In Version 9, the vast majority of the program tools have been consolidated into tool groups, i.e., Tool Zone, Line Types, 3D – Recon – Animate, and Symbols.

By clicking on one of these menu items, the large tool box above changes to the selected menu item’s tool groups. This is a quick and easy way of showing a set of related tools.

You will notice that some of the tools have an icon with a small arrow in the lower right corner. This indicates that when the icon is clicked, another menu will appear with a set of tool associated with that icon.
**Tool Zone**

The **Properties Group** contains tools for resetting properties, setting layers, colors, line types, line widths and a tool for matching settings.

The **EZ Tools Group** has tools for easy lines, coordinated data table entry, room – door – stair/ramp and roof building tools, automated intersections and streets, Vehicle specs data base, basic and advanced 3D body poser, symbol manger, access to templates and import data tools.

The **Draw Group** contains common drawing tools for lines, splines, arcs, etc.

The **Snaps Groups** contains tools for quickly snapping objects.

The **Text – Dimension Group** contains tools for inserting text, bubble labels, arrows, dimensions, obtaining object lengths, and measurements.

The **Edit Group** contains tools for object editing, copy, delete, grouping, trimming, etc.

The **Images – Satellite Photos Group** contains tools for working with images and importing satellite images.

The **View Group** contains zoom tools, symbol color blotting, and front / back order.

The **Borders – Forms Group** contains tools for working with forms and borders.

**Line Types**

The **Line Types Tool Drawer** allows you to set the current line type or change a selected object’s line type. When you click on the line type button, a pop out menu will appear where you can pick the desired line type.

If no objects are selected in your drawing, then the current line type will be set to the line type you pick. If objects are selected they will change to the line type you pick, but the current line type will remain the same.
The **3D – Recon – Animate Tool Drawer** contains all the tools for working with CAD Zone’s 3D features, reconstructions tools, and animation tools.

We will not be discussing this tool drawer in this basic class in much detail. However, you can always attend an advanced class or simply use the built in learning tools to find additional information on using these power tools.

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The **Symbols Tool Drawer** contains various symbols for both crash and crime scene investigators. To switch between the two simply click on the *more* button to bring up a list of available symbol types. You can also create your own symbols which will also be found in this tool drawer.
Lesson 4 - Auto Snaps

The **Auto Snaps** icon looks like a horseshoe shaped magnet. This feature allows you to draw with exact precision by attaching line work to existing lines and points. It is also used for correct dimensioning to “snap” onto a point or exact end of a line. **Snaps are very important when doing 3D work to apply your Z elevation to lines and points.**

You can always know when Auto Snaps is **ON**, the cursor will be a **cross hair** enclosed in a circle. When Auto Snaps is **off**, there will be no circle.

With Auto Snaps turned on, a snap is performed if there is any part of the object inside the target cursor (circle). If there is no endpoint or object within the Auto Saps cursor, the point is placed at the cursor location without snapping.

**Exercise**

Continue with the sample diagram from exercise 3. Make sure the Ortho draw icon is turned off so your mouse is free to move in any direction.

Use the Single Line command to create two separate lines aligned horizontally across from each other with space between them as shown below.

1. Turn on the Auto Snap function
2. Use single line command again. Click on one end of the line making sure the end is inside the Auto Snaps target and then click on the other line to join them.
3. The line should now look like it is one solid line, however, it is three separate lines connected together to form one line. Left click in different parts of the line to see the selection handles surround the different section of the line.

Lesson 5 - Drawing Basic Objects

These are the various **Drawing Commands** located in the Tool Zone Drawer. These can be used to manually draw lines, circles, boxes, curves, and arcs.
Exercise

1. Start a new drawing by closing the current drawing (click NO when asked to save the drawing) and then click the New Drawing command in the Speed and Settings Bar.
2. Select the 2-Point Rectangle command from the **Draw Group** in the **Tool Zone Drawer**.
3. Click first point somewhere in your drawing area. Now look to the lower left yellow command line that prompts you to define the second point of the rectangle.
4. Look at the distance read-out (X and Y measurement at the bottom right) to see how far you have moved your cursor. The X measurement is the horizontal distance and the Y measurement is the vertical distance you have moved since the last click of your mouse. Try to make the X and Y distance read 50 feet exactly.

You will quickly see that with this method it takes a steady hand and a considerable amount of time to create an object to an exact size. Now let’s look at some easier ways to draw a rectangle and other objects easily and more accurately...

**Direct Distance Method Exercise**

1. Select the two-point rectangle command from the **Polygon Tools** menu located in the **Draw Tool Group**.
2. Click once in the Drawing Area to place the lower left-hand corner of the rectangle.
3. On the keyboard, type the width of the rectangle, a comma, and then the height.
4. Press the Enter Key and the rectangle will be drawn with the exact measurements you entered.

You can also use this method to draw other basic object such as line segments, continuous lines, circles, etc.

- **For a Line**, you simply select the Single or continuous Line command, click in the drawing area for the start point, and move the cursor in the direction you wish (see lower right yellow line to display angle). Once satisfied **type in the length** of the line on the keyboard and press Enter to complete the command.

Another option is a **Single Line Vector**.

- Click a start point then type: **length,<angle** (i.e. 56,<34). Note that zero degrees is west and north is 90 degrees in the program.

**Exercise**

Use each command for assorted lines, circles, spline, arc and leaders. First draw using the mouse only, trying to draw a specific dimension, then try the same command using the direct distance method.
Lesson 6 – Ortho Angle Draw

Ortho is an abbreviation for orthogonal, meaning at right angles or perpendicular. Much of your work consists of drawing lines, placing objects and text in exactly horizontal, vertical or diagonal directions. To make this easier, the system provides three icon tools that restrict the cursor movement.

Using Ortho (Angle Draw)

The Ortho Icon is on the Angle Bar and looks like a carpenter’s square for restricted 0 and 90 degree movement and the right is the Angle 45 Icon. You turn the Angle Draw ON by selecting either the Angle 90 or the Angle 45 Icon; they will display a green background and will constrain the movement of your cursor.

Exercise

1. Select the Angle 90 Icon so the cursor will only move in a horizontal or vertical direction. (Note: you can turn this function on/off while using a drawing command.)
2. Select the Continuous Line command which will allow you to draw a series of connect lines.
3. The point where you first click with the mouse pointer in your drawing area is the point from which you can move the cursor horizontally or vertically to define the direction you want to draw your lines.
4. After you click your starting point, move your mouse up/down or to one side and you will see the line work “rubber band” as a green guideline. Click the mouse to define the end points and direction to draw a series of lines or shapes.
5. Remember the “Undo Last Operation” Icon and the “Redo” Icons if you made an error and need to go back.
6. Turn off the Angle 90 Icon and Select the Angle 45 Icon. Now use the line command to draw two diagonal lines.
7. Turn off the Angle 90 Icon and draw a single line. When Angle Draw is turned off, you can see that the cursor can be moves in any direction freely.

You can use the Angle Draw feature to help draw, place or move items in a straight line. This feature is also very useful when placing text in your diagrams so the text will appear nice and straight.

TIP
You can also use the “Ctrl” key to fix the cursor in X and Y axis travel.
Lesson 7 – Easy Lines

You can also use the Easy Lines method to draw lines to precise measurements for walls of a building, vectors to show angle of departure, etc. In “Normal Mode” Easy Lines lets draw a continuous line by entering a direction and distance for each one.

START POINT – SET ANGLE

MOUSE CLICK ENTRY

DATA ENTRY

LINES, MARKERS AND SURVEY MODE

3 MODES: NORMAL, BASELINE & TRIANGULATION

GO BACK TO REGULAR MENU

There are 3 Modes: Normal, Baseline and Triangulation, with any of them you must first click the bulls-eye start button to pick your starting point.

For the following exercise, we will use the Normal Mode that allows an Angle-Distance input. (We will cover the Baseline and Triangulation option in a later section.)

The angle and distance input can be input using your keyboard or the built in keypad and your mouse.

Exercise

1. Open a New drawing and name it House 1. Set the units to feet and inches and the precision to 0.
2. Bring up the Easy Lines tool by clicking on the Easy Lines tool button in the left-hand toolbox.
3. Check and make sure the Normal Mode is selected.
4. To establish the starting point, click on the Bulls Eye Icon in the center of the Easy Lines toolbox.
5. Click near the lower left of the drawing area for the starting point of the first line.
6. Click on the up (N) direction arrow on the Easy Lines Toolbox.
7. Click 34’2” on the numeric keypad on the toolbox.
8. Click on the Line Draw button in the lower left of the toolbox and a line is drawn vertically on the screen that is 34’2” long. (Remember the drawing is to scale.)

9. Now click the right (E) arrow to establish a new direction and type the length for the next line 37’1” as in the example below.

Use the information in the following example to finish drawing connected lines to complete the outside of the building.

You can use any of the View or Scroll Bar commands while you are drawing lines so you can move around where you are working.

If you wish to start drawing lines or markers from a new starting point, click on the Bulls Eye Icon in the middle of the angle arrows. This allows you to select a new Start Point for the next line segment.

If the angle of a line you wish to draw is not represented by one of the arrow keys, simply click once inside the Angle box “A” on the toolbox and then enter the desired angle from the numeric keypad or your regular keyboard.

Once you click inside the Angle or Distance box, select the “C” button on the toolbox to clear the value that is currently displayed in that box.

The undo arrow button removes the last entry. The “R” button repeats the same angle and distance as previously entered.

Select various starting points by clicking the Bulls Eye then pick the direction and distance but this time use the red marks to show where walls and window will be added later as shown in the drawing below. We will add the doors and other features later.
Click the Back button to Exit this routine. Be sure to SAVE your diagram by clicking the diskette icon on the speed bar. Name your diagram Lesson 7.

**GRIDS as a Drawing Tool (located in the SNAPS tool group)**

Grids behave like electronic graph paper with snap setting to draw exactly to the points on the grid. It offers a fast way to sketch a building layout, room, parking lot, or other items with 90 degree corners.

Several grid spacing options such as 1” to 10’ are offered. Remember to turn off the grid when you are finished using them.

**TIP**

Do not count the grid dots; instead use the Angle-Distance shown at the bottom right to count for you to achieve the desired measurements.
Lesson 8 – Easy Intersections

The **Easy Intersection** wizard allows you to create simple or complex intersection easily and quickly using the following wizard and then placing the intersection in the drawing area.

![Easy Intersection Wizard](image)

**Letter Reference to sections in the Easy Intersection Wizard:**

A. Intersection drawing area preview
B. Street selection check boxes with number of lanes (click to increase/decrease)
C. Template guides (starting template format)
D. Lane Properties (width and line types)
E. Roadway Features (adding details shown)
F. **Street Length** slide bar, **Options** (settings) and **Place** (inserts the intersection into the drawing area)
Forensic Mapping Using CAD Zone

**Easy Intersection Basics**

1. Each section of an intersection is referred to as a “Street.” The Interstate signs with numbers denote each of the streets.
2. Each “Street” is comprised of “Lanes.”
3. Whenever you’ve selected a “Lane” on a street, the interstate sign with that street number will be displayed in the “Properties” heading.
4. Click on a “Lane” and add any of the “Features” to it by checking one or more of the “Feature” boxes.

**Quick Steps**

1. Start with one of the Pre-Built templates from the templates on the right side.
2. Change the rotation of a street by moving your cursor while clicking on and holding down the red rotation handle.
3. Click on a lane to select it. When selected, a lane will be highlighted green with a pink highlight on the associated lane line. The correct lane and lane line will be selected in the “Properties” area of the dialog. There you can change the lane width and line type.
4. Further modify the selected lane by checking the appropriate item from the “Features” area of the dialog. Features include turn bays, medians, turnouts, roundabouts, street names, crosswalks, bypasses, driveways, turn arrows, etc. Features can be moved inside the lane with your cursor by clicking and holding down the blue rotation handle at the top of the lane.
5. When the intersection is complete, click on the “Place” button to place it in the drawing area.

**Easy Intersection Tips**

1. Read the yellow tool tips bar at the top of the wizard when you use the round handles.

2. Clicking on the Crosswalk or Bypasses located left of the word will turn all four crosswalks or bypasses on or off depending on the current state.
3. Holding down the **Shift key** while dragging the light **blue bypass** handles will scale all the bypasses equally and simultaneously.

4. All Features (turn lane, turn arrows, etc.) placed in a lane can be moved back away from the intersection by grabbing the **Blue Move Handle** in the selected lane.

![Diagram](image1.png)

5. Lane features such as bus turn outs, right turn bays, stop bars, etc., can be set for each individual lane in a road segment. Select the lane to be edited by clicking it on the preview window. The lane is highlighted **green**, and features added to them by checking the desired option from the feature list located in the lower-left of the toolbox.

6. Clicking on the **Options** button brings up the **Easy Intersection Options** dialog box. This is used to change lane, crosswalk, turn bay, bus turnout and driveway settings.

![Options Dialog](image2.png)
**Using Easy Intersection**

1. Select Easy Intersection from the Left-Hand Toolbox.
2. Build the intersection you want by selecting a general starting Intersection Template from the right side.
3. Check mark the interstate sign icons to turn a selected road segment **ON** or **OFF**.
4. Click the arrows to increase or decrease the number of lanes in each segment.
5. Use the Street Length slider to increase/decrease the overall length.
6. To set the lane widths and line types, click on the lane segment you want to edit and use the edit box on the top left.
7. Click and hold on the red rotation handle to adjust the **angle** of a section.
8. When you are satisfied with your intersection, click on the “Place” button to place the intersection in the drawing area. At this point, you can manually edit and add more details, change line types, add symbols, buildings, text and dimensions.
9. You can save your intersection in the Easy Intersection dialog by using the Save diskette button. You can open your intersection by using the Open Folder option.

**NOTE**

Once you have placed your intersection you can only perform manual revisions. If you find you made an error, use the UNDO button right away to delete the placed button and reopen Easy Intersection, which saves your last settings while in the same drawing session. If you close the program, Easy Intersection resets itself.

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**Lesson 9 – Easy Street**

Automated Offsets Ideal for a Curved or Straight Section of Road

1. **First draw a curved line** in the drawing area that will depict one side of the center line of the road you plan to draw using the *Spline Curve* draw command.
2. **Select** the curved line so it is highlighted and turns a magenta color.
3. Next click the **“Easy Street”** button from the Quick Pick menu dialog. The Easy Street dialog box below will appear.
4. Set the number of lanes by checking the boxes for the number of lanes, set the widths (double click on width) and line type (pull down appears beside each row with line type).
5. When satisfied with the preview shown at the top, click **Apply** which will add parallel offsets to your curved line in the drawing area as shown below.
This command will recalculate the radius for you with each offset.

You can add a curved section into an Easy Intersection segment with this tool.

**Trouble Shooting Tip:** If your results do not look similar to the example such as lines overlap, it means that you have drawn your main line too short or made the curves too sharp and do not reflect true scaled road dimensions.

**Lesson 10 – EZ Body Poser and Bodies Tool**

**3D Body Poser Button**

Body Poser is a complete tool for creating and posing realistic 3D bodies in your diagrams. The Body Poser toolbox allows you to automatically create and pose a body by selecting pre-set options and then manipulating a wire frame “stick-figure” to position it. When finished, a realistic 2D place view of the posed body is placed in the diagram. A 3D body reflecting the 2D pose appears when the 3D Viewer is opened.

Additionally, any body after being placed in your diagram can be **further edited** by selecting it in the 2D view and then clicking the EZ Body Poser toolbox or selecting the body and right clicking and selecting EZ Body Poser from the list. This feature allows you to adjust an existing body symbol without having to create and place a new one. Once finished, clicking the “Place” button updates the selected body in the drawing to the new pose.
**Features on the Body Poser Toolbox**

**Properties**

Properties are used to define the body’s gender, height, and build (including skeletal). Other features that can be modified include skin tone and clothing color for pants, shirts, shoes, and gloves.

- **Gender:** Click to choose Male, Female or Child

- **Height:** Click the arrow button to increase or decrease the height of the body in feet and inch increments

- **Build:** Choose from one of the four available builds

- **Skin Tone:** Use skin tones to add color to bodies created in Body Poser based on actual skin tones. Click the down arrow and the select a color on the palette and the color is applied to the model in the 3D preview window. (To add skin tone to a body created with the original Bodies toolbox, select it in the 2D view and then edit properties and choose a skin tone from the color palette [colors #134 to 143]).

- **Color Palette:** Use these color palettes to show they type and color of clothing, shoes and gloves found on the body. Choose a color from the drown-down palette menu to apply color to the model in the 3D preview window.

**NOTE:** Changing the color of different body parts is used to represent clothing. No actual clothing are placed onto the body and only the surface color changes except in the case of shoes. When shoes are selected the feet are replaced with a generic shoe.

- **Basic Poses:** Click the icons to choose from fourteen different pre-posed bodies (Standing, laying on side, walking, running, sitting, driving, face up, face down, etc). Chose the position closest to the one you need to load it into the preview window, allowing you to modify and then place the body in your diagram.
**Turn:** The “Turn” feature allows you to rotate the head or hands using the slide control. Click the drop-down menu and choose which body part to rotate; the head, the left hand, or right hand. Use the slider bar and see the position move in the 3D view window.

**Elevation:** Use this feature to elevate the body above the ground plane in 3D. For example, you may want to elevate the body to show it climbing stairs, a ladder, or positioned on a balcony or on furniture. Use the up and down arrows to enter a value in 6-inch increments or click in the field, type a value, and press Enter. You can use the 3D Builder button to elevate the body after it has been placed in your diagram.

**Custom Poses:** This feature allows you to open and save custom poses that you have created with Body Poser. Once you create a body, you can assign a name and save it to the Custom Poses list for use later.

**View Windows:** Three 2D view panels display the body as a stick figure with green control points at the joints used to rotate the various body segments. A fourth panel displays the body in 3D as it appears with features and options selected.

To pose a limb, position the mouse pointer in any of the stick figure’s green control handles in any of the three 2D windows. Hold down the left mouse button and drag your mouse to reposition the limb at the selected joint.
When a handle is selected, it turns dark blue and your mouse changes to a four-way arrow.

Additionally, the selected handle’s description appears (example right elbow) in the yellow prompt line at the top of each 2D panel. This is very helpful if the control points are close together and it is difficult to see which one is selected. The selected handle is also highlighted in the other two view windows, allowing you to easily track the changes in the model between the different views.

Sometimes nodes may appear on top of each other in a 2D view making it difficult to select the one you want. Holding down the Control key (Ctrl) on your keyboard while selecting a node in one view allows you to keep that node selected and move between the different 2D windows without reselecting it.

Drag the red triangle handle in the center of each pose view to “Pivot” the entire body. Press the Escape key (Esc) of your keyboard to “undo” a limb back to its previous position while you’re in the process of moving it; you must continue holding your mouse on the selected handle and press without letting up on the left mouse button.

### 3D Controls Located on Lower Right Sidebar of Easy Body Poser

**Flip:** Use this button to create a mirror image of the body when using a side view, walking, or sitting body. For example, the “walking” body switches from right to left leg forward.

**Snapshot:** Use the Snapshot command to take a “photo” of the current 3D body pose. The snapshots are saved as jpg files in the Snapshots folder on your hard disk.

**Zoom:** These buttons change your view in the 3D preview screen.

**3D Views:** The Flat View buttons are used to generate a flat (2D) view from one of five specified sides: front, top, left, right, and back. The Isometric View buttons are used to display different sides of the body tilted at 30-degree angles.

**Options:** Render Display – These setting affect how the 3D model of the body is displayed and the majority of users will just stay with the program defaults.
Place: Click the Place button to place the posed body in the drawing area once you have selected all the options.

Close: Click the Close button to close the Body Poser Dialog toolbox.

### Placing a body with Body Poser – Exercise

1. Open the Ex Body Poser from the Tool Zone Drawer – EZ Tools Group.
2. Pick the face up icon from the pre-posed body icons. A preview of the face up body will appear in the Body Poser toolbox.
3. Pose the body by positioning your mouse pointer on one of the green nodes and dragging it to a new position. In this example, the right-leg and right-arm were repositioned.

4. Select a Skin Tone from the drop-down palette.
5. Choose the short-sleeve shirt and select a color from the drop-down palette.
6. Choose the long-leg pants option and select a color from the drop-down palette.
7. Choose the shoes option and select a color from the drip-down palette.
8. Rotate the head to the right by selecting “Head” from the Turn drop-down menu and moving the selection slide to the right.

![Turn Menu](image)

9. Click the Place button to close the Body Poser toolbox and move your mouse pointer into the drawing window. The mouse pointer appears with the posed body symbol attached to it.
10. Click to set the body’s anchor point. Move the mouse to rotate the body to the desired position and click again to finish placing it in your 2D drawing area.
11. Click the 3D viewer icon located on the Speed bar to view the body in 3D.

![Body Pose](image)

**NOTE**

If needed, modify the body after placement by selecting it, and re-opening Body Poser. The selected body appears in Body Poser allowing you to modify it. When finished, click the Place button to automatically update the selected body in your diagram.

Click the **Bodies** icon from the **Quick Pick toolbox** to bring up the Bodies Dialog box. It allows you to place a person/body in a drawing and select gender, height, build type, and position.

This was the original body poser before the new 3D EZ Body Poser making this toll almost obsolete.

It is useful for DISMEMBERED bodies since the parts are easy to move separately.

- Once the body is placed, you can modify the position and edit the color which will carry over to the 3D view also.
- To bend an arm, leg, etc. select part(s) using shift and the left mouse button to pick them all. Move the pivot point to a joint area then use the rotate handle to rotate into place. You can remove or swap parts between body symbols also. You will find some pre-posed bodies in the Symbols directory.
Lesson 11 – Easy Stairs and Ramps

Easy stairs is an easy-to-use tool for building stairs, ladders, and ramps in 2D and 3D. Five pre-drawn templates are provided to help you quickly get started. Choose between creating or converting them to ramps with just one click. Create accurate stairs by entering values for rise, tread and width of the steps, as well as the height and length of the staircase.

Landings and different Railing types can be easily added with just one mouse click. Once the stairs are placed in the drawing, you may explode and modify them; the changes will appear in 3D without losing its 3D properties.

To accurately create a diagram and 3D model of a stairway, you must have several measurements, including riser (individual step height), tread (individual step depth), step width, and the number of steps. Alternative, you could measure the overall height and length and let the program calculate the measurements for the individual steps. These diagrams show the different measurements as they are called in the Easy Stairs toolbox.

Features on the Easy Stairs Toolbox

Templates: Click the icons to choose the type of stairway. Choose from Single stairs, Up/Down stairs, Double Landing (L-shaped), Ladder, or Spiral. Once the template is selected, it is displayed in the preview window allowing you to modify or place it in the diagram.
**Stairs and Ramp Checkboxes:** Select a template to display it in the preview window. Change between creating stairs or a ramp by checking either the Stair or Ramp option.

You can use the arrow buttons or click in any of these fields and type a value. After typing a value, press the Enter key to update the information.

**Stair #1:** When building a double staircase with a landing between, click the arrow button to increase or decrease the number of stairs contained in section 1.

**Stair #2:** Use the arrow button to increase or decrease the number of stairs contained in section 2.

In a double stairway, the Height and Length values are the measurements for only the lower section of stair (Stair #1). If you enter a value for Height or Length, the values for Riser and Tread are automatically re-calculated when you press the Enter key. This gives you another method of creating an accurate model of the stairs, depending on which measurements you have available.

Use the Height field to enter an overall height for the lower section of stairs (Stairs #1).

Use the Length field to enter an overall length of the lower section of stairs (Stairs #1).

The Landing Length field is used to enter a measurement for the landing. If the stairway has two landings, this value is applied to both.

**Elevation:** Sets the elevation (the distance above or below the ground plane) of the stairs in 3D. For example, you may want to elevate a set of stairs to a second floor, or create basement stairs below the ground plane.

You can create stairs below the ground plane by applying a negative value to the Riser or a negative value to the overall Height of the stairs.

**Preview Windows:** The plan (top) and 3D preview windows display the stairs and modifications as you make them. You can place your cursor in the 3D preview window and drag the mouse to adjust the view of the 3D model.
Creating a Stairway with the Easy Stairs Toolbox – Exercise

1. Open Easy Stairs and Ramps from the Quick Pick menu.
2. Click the Double Landing Icon from the template icons.
3. Enter riser, tread, and width values for the steps. Use either the up/down arrow button, or type a value in each field and press the Enter key.
4. Enter a value for the number of steps in each section of the stairway in the Stairs #1 and Stairs #2 fields.
5. Click the down-arrow to display the color menu; choose a color for the stairs.
6. Add railings from the Features section of the dialog and assign a height.

7. Use the pre-set view icons or use your mouse to drag the 3D preview to show different views of the stairs.
8. Click the Place button to close the Easy Stairs toolbox and move the mouse pointer into the drawing window.
9. Click the left mouse button to set the symbol’s anchor point. Move the mouse to rotate the symbol to the desired rotation and click the left mouse button to finish placing the symbol.
Lesson 12 – Easy Builder and Auto-Dimensions

This toolbox lets you select a basic building shape and enter the length of each wall. You can even select to automatically dimension the side of the building and place text.

**Exercise**

1. Start a new drawing by clicking on the New button in the Speed Bar.
2. Select the Easy Builder icon from the left-hand toolbox.
3. Select a building shape.
4. To specify the length of the walls, you can either enter the measurements in the text entry boxes or use the mouse in the preview window to drag the wall to a new size.
5. Click the Mirror and Rotate buttons on the right side of the toolbox to adjust the orientation of the building.
6. You can automatically dimension all of the walls by checking the Auto Dimension box on the lower left of the toolbox. Click the big or small letter A button to change the size of the text.
7. When the building looks exactly the way you want it, click the Place button and click in the diagram where you want it.
8. Save your diagram and name it Lesson 12.

**Faster Alternate Building Foot Print Drawing Method**

Turn on the Ortho 90 angle. Click on the Continuous Line command and click your starting point in the Drawing Area. Now use the mouse to point in a direction and type your desired distance. Continue going around pointing and typing your distances until all walls are done.
Lesson 13 – Doors and Windows

The CAD Zone program features specialized tools for placing doors, windows and opening in walls. Use this tool to snap the door, window or an opening exactly onto the wall in 2D or 3D if desired.

Exercise

1. Open the drawing Lesson 7.
2. Open the Doors and Windows toolbox.
3. Click the up or down arrow to set the door width or type the value in the box.
4. Enter the values for the height and footer height of the door. These values are only used if you plan to view your diagram in 3D.
5. Click the Place button.
6. Click first on the desired wall to select it.
7. Left click again to show the hinge point.
8. Move the cursor across the wall to see how it affects the door swing. When you like the swing, left click to finish.
9. To remove a door, window, or opening placed with this tool, click the Remove and Repair button at the bottom of the toolbox, and then click the item to remove.
10. Finish placing doors and windows in the rest of your diagram.
11. Once completed, save the changes to your diagram.

To place a window, you just repeat the above steps after checking the “Place Window” box.

Similarly, check the “Place Opening” box to place an opening in a wall. You can use this option to make a door or window opening and then use one of the door or window symbols if you want a precise position and color.

As you are using these features, look at the message bar at the bottom of the screen for instructions on what to do next.

Lesson 14 – Adding and Editing Text Labels

The Quick Text feature is used to label objects and place text in your diagram. The dialog box gives you option for adjusting the height of your text, centering your text, make your text bold, repeating your text, and adding an arrow leader to your text.
Exercise

1. Open the diagram Lesson 7.
2. Select the Text command.
3. Enter the desired text in the text entry box or click on one of the pre-defined labels to place it. (You can add/remove labels to customize your frequently used text list.)
4. Move the cursor back into the drawing window to see an outline box showing preview size of the text. To adjust its size, repeatedly click the big “A” or small “A” button on the toolbox.
5. Left click once to anchor the text, move the cursor to rotate it to the desired angle then left click again to finish. Turn Ortho Angle 90 on for horizontal or vertical placement.
6. Turn on “Show Arrow” to add text with a leader.
7. Turn on “Repeat” if you want to place the same text in several locations.
8. Continue to add text to your diagram. Practice adding some horizontal and some rotated text.
9. When completed save your diagram.

To Edit Text that has already been placed, click the selected text and then select the Text command on the left tool drawer or right click on the text and select “Edit.” The text will be shown in the Text Edit screen so it can now be edited. Be sure to click “Apply” to complete and apply your changes.
# Using Bubble Labels

The Diagram Program allows you to place Bubble Label “markers” to draw attention to witness, sample, photo, evidence, and other items located in your diagram.

The Bubble Label command is found on the left hand tool drawer of the Text – Dimension Group.

Clicking a marker icon displays it in the preview window where it can be edited.

Clicking on the “Larger and Smaller” text icons changes the text height. The color of the bubble may be changed using the Color Palette button. You are also given the option to bold and to add Arrow Leaders to point at a specific object or point in your diagram.

## Exercise

1. Select the Bubble Label command from the left hand toolbox.
2. When the Bubble Label toolbox appears, select the desired bubble type.
3. Click on the arrow button to enter the desired number or click in the text field and type in the desired number.
4. Move your mouse pointer into the Drawing Area and click the left mouse button to place the tip of the arrow of the bubble label.
5. Move your mouse pointer to position the bubble text to the desired location. As long as the bubble label dialog box is displayed, you can continue to place additional bubble. Click “Back” to finish placing bubbles.

# Lesson 15 - Dimensions

The Dimension tool lets you place a dimension between any points on which you click or snap. The program measures the objects and generates the dimension value for you automatically. This is why it is very important that you make your drawings to scale.
Exercise

If you are dimensioning to existing points, like the corner points of the walls of a building, make sure Auto Snap is on and set Unit precision to the number of decimal places desired.

1. Continue with the drawing Lesson 7.
2. Select the Dimension command from the left hand tool drawer.
3. Left click on the first point of the object to dimension; left click on the second point. When dimensioning a wall, be sure to snap exactly to the corner points.
4. Move the cursor away from the wall and notice an outline of the dimension.
5. Click the big “A” or small “a” button on the toolbox to adjust the text height.
6. Left click a final time to position the dimension text and dimension lines.
7. Continue to place dimensions in this manner by clicking on two new points. Also try the “single click” mode to dimension any line by just clicking once anywhere along the line.
8. Once a dimension is placed in the diagram, it can be easily changed. First left click on the dimension to select it and then either use right click to bring up a menu selection or select the Dimension command from the left hand tool drawer to bring up the Text Edit option box.
9. Continue to add dimensions to the Lesson 7 diagram.
10. Save your diagram when finished.

Select any of the options to adjust the position, size, etc. and even font type and color from the More Settings options. The Slide Text feature allows you to move the text outside of the dimension lines. This can be very helpful in situations where there is not enough space.

When you place a dimension, the program calculates the distance between the points exactly the distance it was drawn. Occasionally, you may want to overwrite this or add a text note; this can be done by typing in the display area of the Text dialog box.

To Display Length, Angles, and Other Properties of Lines, Splines and Arcs

If you left click on a line, curve or spline and then move your mouse slightly the length appear on the yellow command line in the lower left of your computer screen or in the “Heads Up display at the top of the drawing area. You can also select the line and then type “oi” for Object Info. A dialog appears with all the information for the lines, splines, arcs, shapes, etc.

Lesson 16 – Placing Symbols

CAD Zone includes a large number of pre-drawn symbols and several options to help you quickly place symbols in your diagram.

Click on Symbols in the left hand toolbox. This brings up the Symbols Manager.
Select from one of the Symbol Groups using the pull down arrow at the top of the tool drawer. The symbol groups include: Crash, Crime, Marine and My Symbols.

The name buttons at the top of the tool drawer represent the various Symbol categories: Quick Pick, Landscape, Bodies, Vehicles, etc. and some have sub-categories below containing groups of symbols that you can see in the preview.

**NOTE**

You can create your own symbols and even add your own library name using Windows file explorer in this directory: C:\Program Files\CAD Zone\Crash or Crime Zone 9

### Inserting Symbols

1. Click once on one of the symbols shown in the symbol tool drawer.
2. Move your cursor into the drawing area and notice a preview of the symbol is attached to the cursor. (You do not have to keep holding down the left mouse button.)
3. Each symbol needs **TWO clicks to place them**. The first left mouse click is the Pivot or the Anchor Point where it inserts; the second left mouse click allows you to Rotate about the pivot point so you can place the symbol at the desired angle.

Once you select a symbol from the Symbol tool drawer, there are several options offered that allow you to make changes upon placement.

- To change a symbol’s **Color**, select it from the Symbol tool drawer and click the color palette button at the bottom of the toolbox. (Use the Edit command to change the symbol properties after it has been placed in your diagram.)
- The **Mirror** buttons flip the symbol – try this with a non-symmetrical shape.
- All of the symbols represent **real life scale** but occasionally you may need to modify the symbol size. To change a symbol’s size as you insert it, left click the **Dynamic Symbol Scale** button on the bottom of the Symbol toolbox.
Click in the drawing to anchor the symbol them move the cursor and you will see it scale dynamically as you move your mouse. Left click when it is the desired size. For vehicles, it corresponds to rear wheel center and corresponding front wheel center. Using this tool, you can have the correct placement and wheelbase on your vehicle in just 2 clicks! Use the snaps if you have measured points as a reference.

- Most symbols are a collection of objects such as lines, arcs, text, etc. that are “grouped together” into one object making it easy to move or rotate the symbol.
- The dynamite button or Explode reduces symbols to individual lines and also makes your 3D objects into flat 2D objects. Semi trailer-truck units can be exploded and moves individually without making them into 2D objects.

**Exercise**

1. Continue with the drawing Lesson 7.
2. Practice by placing several symbols in your diagram to show furniture, bodies, North arrow, trees, and so on. (See below for some ideas – but experiment and use some of your own ideas from cases you may have worked on.)
3. Practice rotating symbols, snap some into place on a wall (like cabinets), and use the dynamic Symbol Scale to change a symbol’s size on placement. You should also practice moving symbols that is not placed perfectly the first time.
4. Use Auto-snap to place a symbol that is attached to a wall at two points, like a door or window.
5. Place a vehicle outside the house. You will not that it snaps to the rear passenger axel to place it and the second placement point is the front corresponding axel. This is a very useful feature if you have measured points that you can snap to in order to accurately place the vehicle. Use the Dynamic scale to make the wheelbase a bit larger – the mirror command allows you to snap to the driver’s side axels.
6. When you have finished adding symbols to your diagram, save it.

**Symbol Placement Ideas**

![Symbol Placement Ideas Diagram](image-url)
Lesson 17 – Editing Options

EDITING COMMANDS

**BREAK:** This tool allows you to “erase” a section of a line or object. This command can be useful when drawing intersections, driveways, merging lanes, etc.

**Exercise**

1. Start a new drawing and add some line work to it.
2. Select a line, then go to the left hand Edit tool bin and select the Break icon.
3. Left click the mouse pointer on the line where you want the break to begin. The break will start at the point closest to the place you point. The mouse pointer cross hair must touch the line.
4. Move your mouse pointer along the line and a dynamic preview of the break (line erasing) follows your cursor movement.
5. Click on the line where you want the break to end. You now have two separate and independent lines.

**TRIM & EXTEND:** This tool lengthens and shortens lines precisely to other lines. You can use this command to trim or extend lines, continuous lines, arcs, and curves. For example, when creating a building or intersection you can trim or extend a line that represents one side so it connects precisely to another.

**Exercise**

1. Start a new drawing.
2. Use the Single Line command and draw 4 single lines (about 50-60 feet each) to form a box shape. When drawing the box, make 2 of the corners overlap and 2 of them too short (not connected).
3. From the left hand Edit tool bin, select the Trim & Extend icon.
4. To trim two lines so they match precisely, first select the lines that needs to be trimmed (is too long) or extended (is too short).
5. Next, select the line to which you want to trim/extend the first line to meet.
6. Perform this process for each corner of the box.
7. DO NOT DELETE this box.

**Fillet:** This tool is used to make a curve between 2 points (defined radius)
Exercise

1. Continue to use the box drawn in the previous step.
2. From the left hand Edit tool bin, select the Fillet icon.
3. The Fillet Settings Bar pops up below your speed bar just above your drawing area so you can type in the precise radius for your fillet curve.
4. Enter 10 in the “Fillet Radius” text box to make a 10-foot radius fillet.
5. Click the first line to be filleted.
6. Click the second line to be filleted.
7. Move your cursor around the area and notice the preview of the fillet arc moves to give you different placement options.
8. Left click then the preview fillet arc is in the correct location.
9. The filleted objects will be trimmed automatically to meet the fillet arc exactly at the tangent points.

OFFSET: This tool is used to make a parallel copy or to double up lines. Use the Offset command to make parallel copies of: single lines, continuous lines, polygons, curves, arcs, or ellipses. Applications can be for making double walls or adding sidewalks, extra road lanes, etc.

Exercise

1. Start with a new drawing.
2. Draw a line in your drawing area which will be the “base” for drawing additional parallel lines.
3. From the left hand Edit tool bin, select the Offset icon. A Settings Bar will appear below the top Speed Bar. It displays and “Offset Distance” box that contains a value and a check box labeled “Fixed Distance.”
4. If the Fixed Distance check box is checked, this will be the offset distance between the original object and the new, parallel object. Click either side.
5. If more than one object is selected to be offset, a fixed offset distance must be entered, i.e., there is no rubber banding preview as with single objects.
6. If the Fixed Distance box is not checked, the parallel object moves freely as you move the cursor, and the distance between the two objects is dynamically displayed in the Offset Distance box as you move your cursor.
7. When the parallel object is in the desired location, left click to place it. If you wish to repeat the process, press the Space Bar to repeat the previous command.

STRETCH: This tool is used to select object to lengthen or stretch. Use the Stretch command to lengthen a roadway or building. The Stretch command can also be useful for depicting crush damage on an exploded vehicle symbol. However, the Stretch command cannot be used on unexploded 3D symbols, use the handles on those symbols instead.
### Exercise

1. Start a new drawing.
2. Use the EASY INTERSECTION to draw a simple intersection and place it in your drawing.
3. From the left hand Edit tool bin, select the Stretch Tools icon and the Stretch command from the drop down menu. Then drag a “stretch window” on one end of the roadway that encloses the lines (one end) on the intersection that we want to shorten or lengthen,
4. Click to define a starting reference point such as the end of the centerline.
5. Click outward to place an ending reference point (use the Ortho 90 to make it straight). Watch the bottom right command line for movement distance or simply type in a value such as 79 to add exactly 75-feet.
6. DO NOT CLOSE YOUR DRAWING!

### MOVE

**MOVE:** This tool allows you to move objects precisely using snaps.

### Exercise

1. Use the drawing from the previous exercise.
2. Select the object(s) you wish to move.
3. From the left hand Edit tool bin, choose the Move command icon from the Move Tools.
4. Left click a reference point that defines where selected object are moved from.
5. Next, left click a point to define where the selection will be moved to.

To move the object(s) to an exact location, be sure to use a Snap command.

### COPY

**COPY:** This tool is used to make one or multiple copies of a selected item(s)

**TIP**

You can also move objects without selecting a command by using a “mouse method” 4sided arrow but this does not let you use snaps so it is less precise.
Exercise

1. Select the object(s) you wish to copy.
2. From the left hand Edit tool bin, choose the Copy command icon.
3. Left click or snap to a reference point that will define where the selection will be copied from.
4. Move your mouse to where you want to place the selected object and left click. You can use snaps or one of the two Ortho angles for precision. You should see a ghost outline of the copies which provides a dynamic preview of where copies will be placed.
5. Use the Esc key or double click to end this command.

Like other Windows based programs, you can also use the copy/paste icons on the top speed bar (or keyboard Ctrl C and Ctrl V commands) to copy objects with your drawing, between two open drawings or even other Windows programs such as a Word document.

DELETE: This tool is used to erase objects you select. When this command is selected it performs the same function as the Delete key on your keyboard; use the Delete (or Erase) command to remove unwanted objects.

To delete objects from your drawing:

1. Select the object(s) to be deleted.
2. Choose the Delete command from the left hand Edit tool bin.
3. The selected object(s) will be deleted.

Like other drawing and editing commands, Erase is reversible. To restore an item or selection that has been erased, left click the Undo button on the top Speed Bar.

EDIT: This tool is used to change color, layer, line type, width or to edit text and dimensions.

Exercise

1. Select the object(s) to be modified.
2. Choose the Edit command from the left hand Edit tool bin.
3. Depending on the selected object you will get different options:
   a. For TEXT: it brings up the “Text Edit” dialog options
   b. For DIMENSIONS: it brings up the “Dimension Edit” dialog
   c. For LINES you get the following option bar
d. For SYMBOLS you will get the following option bar

**IMPORTANT:** If using either of the two above option bars for changes, you must click OK when completed or the changes will not be made.

**BRING TO FRONT/SEND TO BACK:** This tool is found in the View tool bin and is used with digital images and hatching. The tool allows you to place selected objects in front of or behind other objects.

### Lesson 18 – Using Line Types

There are close to 100 custom 2D/3D line types included in the CAD Zone software.

![Line Types](image)

- **Standard Line Types**
- **Specific Lane Markings**
- **3D Guard Rails**
- **Jersey Walls and Barriers**
- **Specific Tire Marks**
- **Various Types of Fences**
- **Miscellaneous 3D Line Types**
Lines will follow 3D measured points and the Color and Height can be modified.

You can select the different lines types by first click on the Line Types button is the Quick Pick Toolbox.

You can change an existing line(s) by first selecting the line(s), then clicking on the line type you wish to change it into from the Line Types icon menu.

Alternatively, you can draw using a selected line type. First, select the line type from the Line Types menu. You will see a small “T” appear in the properties rectangular box at the top showing you set a line type. Then use any of the line or curve drawing commands to draw your line(s). Once you have completed using this line type, click the Reset button in the Properties tool bin to go back to a regular line type.

Exercise

1. Open the sample drawings “3D Traffic Fatality.”
2. Experiment with changing line types and drawing with the line type turned on.
3. Select an edge of road line then click a fence line type from the Line Types toolbox.
4. While your line is still highlighted magenta, select other Line Types to change to.
5. Now go back to the Tool Zone and pick the line drawing command to draw new lines with a Line Type turned on. (Note the little “T” in the properties box.)
6. On the Properties tool bin select the red “Reset” button to reset back to a solid regular line type. The little “T” is now removed.
7. Practice “breaking” a Guard Rail or Fence line like a vehicle had driven through it using the break command. Then view your drawing in 3D by pressing the 3D button.

If you are planning to do 3D you can set the height of a 3D line type. Select the line(s) and then click the 3D Builder button on the top speed bar. Set the exact height of guardrails, fences, etc. If also changing color, check the box for maintaining color for 3D viewing.

The PROPERTIES icon displayed on the top speed bar shows any Line Setting you have turned on.

Example:  

1. This shows that “Scene” is your current layer
2. The “T” lets you know you have a custom line type selected
3. The “W” means you have set a custom line width
**Exercise**

The following exercise is a chance to review several of the previous lessons, including drawing, editing, using line types, and placing text and symbols. Refer to the previous exercises for more details on how to perform each step, if need.

Add more detail to your drawing such as vehicles, tire marks, bodies, evidence, bubble labels, traffic signs etc. Remember to SAVE your drawing often by clicking on the diskette icon in the Speed Bar.

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**Lesson 19 – Adding a Form (Boarder) and Printing**

You can use the **FORMS** feature to place a boarder around your diagram.

There are two options for making your own forms.

1. **Using the Custom Forms** features as described below automatically sizes a custom border around your on-screen drawing. This form installs as individual lines and text making it easy to edit but a little difficult to move after it is placed. Forms are automatically place on layer 1023 so it can be turned on/off or grouped into one symbol if needed.

2. **Making your form into a Symbol** can allow you to scale manually with corner grips, move as one object and set layer preference. It comes in as one grouped object so it needs to be exploded before you can edit the txt. This process takes a few more steps but allows you more flexibility.

3. **You can make a Custom Form and also make it into a Symbol** giving you both options!
**Exercise**

1. Using the drawing from the previous exercise, try the various Customs Forms.
2. Click on the “X” in the text fields then the Edit button to replace the “X” with your own text.
3. The “X” is there so there is a predefined text size so all you have to do is edit it. Edit the “Your Department Here” text to replace with your own agency or firm name.

**Using Form Creator**

Use the Form Creator command to create your own custom forms and title block, which may be placed repeatedly in your drawing. There are three “Auto-fit” and two “As-is” buttons. Auto-fit forms will automatically scale the form to fit over the entire contents of the drawing area and does not affect your drawing scale.

**Exercise - Creating a Custom Form**

1. Start with a new drawing.
2. Select “Custom Form 1.”
3. Edit the text and add/remove and modify the features as you wish.
4. Once complete, draw a window with your mouse around the drawing objects to select and highlight the items to be saved as your form.
5. Click the User Forms tool from the Borders and Forms tool bin.
6. Click on the Form Creator icon in the Forms menu.
7. The Form Creator toolbox is displayed. In this example, we’ll create an auto-fit form. Click the “User Form 1 (Auto-Fit) icon as shown
If an existing form is assigned to the selected button, a message “Button already assigned to User Form 1. Do you want to overwrite it?” appears. Click the “Yes” button to overwrite the existing form or select a different one.

8. Next you are prompted to select two reference points for the form. These points establish the area in your form that will be fitted around the contents in the drawing area. It is important that the points be placed exactly right or the form will not be placed correctly around the diagram. Do not place too close to border edges or you will have extra “white space” around your drawing. Turn your snaps OFF for this step.

9. Left click the Pick Pt 1” icon on the toolbox, and position your cursor near the lower-left corner of the form. Left click your mouse to set the first reference point (see illustration below for correct placement). Once the reference point is set, the toolbox prompts you: “1st Ref Point is good, now pick 2nd point”.

Left click the Pick Pt 2” button on the toolbox and move your cursor to the upper-right corner to set the second reference point as shown in the illustration below. If the second reference point is placed correctly, you will be prompted: “Red points good. Press OK to accept and create User Form1”.

10. Click the OK button to finish creating the form.
11. To place the custom form in a diagram, select the User Form 1 icon from the Forms bin. The form is placed around your diagram and the program screen is re-drawn displaying the contents of the drawing fitted inside the form between the points you assigned.

**Printing and Print Tiling**

**DRAWINGS IN CADZONE SOFTWARE SHOULD ALWAYS BE CREATED 1:1 SO MEASUREMENTS AND DIMENSIONS REFLECT REAL WORLD UNITS.** THE ONLY TIME YOU “SCALE” YOUR DIAGRAM IS IN THE PRINT FUNCTION MENU FOR OUTPUT.

When you are ready to print your diagram, click the Printer icon on the Speed bar. There are three basic ways to determine how your diagram will be printed.

- **Fit to Paper** fits the entire diagram on a single sheet of paper and displays the scale.
- **Current View** prints the current zoomed view of the diagram on a single sheet of paper.
- **Scale** allows entering an exact scale to use for printing. This scale is entered in the format X inched on paper = Y feet in the real world.

**Print Tiling**

When printing diagrams to an exact scale, it is possible to specify a scale that does not allow the diagram to fit on one sheet of paper. In this case, the program automatically uses Print Tiling to divide the drawing up so it can be printed on multiple sheets. Sheets can be spliced and taped together when a large-scale plotter is not available.
You can select the Page(s) you want to print and they will highlight in yellow.

Page Borders (4 pages in this case)

**Note:** You can use your mouse to POSITION the drawing to fit inside the paper border better!

Two options at the bottom of the toolbox help adjust the rotation of text on the print. Some printers rotate all text in the diagram by 90 degrees. If you notice this happening, select Text Rotate Adjust and see if this solves the problem.

- **Pen Width** – Adjusts the thickness that the lines in the diagram will be printed in. It does not change the actual lines in the diagram itself.
- **Selection Only** – Prints only the selected entities in the drawing.
- **All Color to Black** – Prints all entities in black regardless of their color.

**CAD Zone programs include a PDF print driver.** If you need to send a file to someone to view or print this is a great format to send the file(s) because anyone can open them and they cannot easily be modified. (There is an option during the program install to allow the PDF function to be installed also.) After you have saved your work, go to the FILE pull down and select “SAVE AS.” In the file formats pull-down you will see the PDF option. You can also save to a PDF from the Print set-up but it is easier to save as a PDF.

More printing information will be covered in the Advanced training later on.

**Lesson 20 – File Basics**

**Open Existing Drawing**

The .CZD (CAD Zone Drawing) format is the default. To open other file formats, click the “files of type” down arrow to see other options. You can select AutoCAD (.DWG) files, .DXF files, PocketZone (CAD Zone data collector), Laser Technology RAW files, ASCII Coordinate data files from total stations etc.
If necessary, change the path and drive in order to locate the folder you wish to open that contains the diagram files. You can click on the “Open” button to browse various folders to find your files. In the list window, double-click the file name, or select the file name and click Open.

**The program default path for the DIAGRAMS folder can be:**

C:\Documents and Settings\Your Name\Documents\My CAD Zone\Diagrams  OR  
C:\Programs Files Cad Zone\Crash Zone 9\Diagrams\ 

Check under the **UTILITIES pull-down select SETTINGS than the PATHS tab.** This allows you to set path where your work will be saved and also save to original folders and lock paths. If you do not have full Admin rights you will need to select “Use Special Folders” to save under My Documents path.

**Emergency Backup**

In case you forget to perform a regular save and something goes wrong, a **named** drawing will do an automatic backup every 5 minutes to the job .BAK file. (Name your drawing as soon as you get started to preserve your work!)

If this happens, shut down the CAD Zone program **WITHOUT** saving (if it is not already closed). Click the Open file icon and set the “Files of type” to search for the .BAK file extension than find the corresponding drawing name, rename it to something else (i.e. add a “2” to the end of it). Then open and save as a different CZD drawing file.
**Merging and Aligning 2 Drawings or Jobs**

Merging two drawings or jobs requires that they each contain at least 2 common points (or a common line) that will be used to align them together. Shoot several stationary objects such as a fire hydrant, manhole center, power pole, survey marker, stop bars, etc. that you can use later to merge and align two drawings.

1. **Open** your first drawing and this will become your **BASE** drawing.
2. **Merge** your second drawing by going to the **File** pull down menu and selecting **Merge** from the options. Browse for your second drawing that will be added over the top of your **Base** drawing.
3. When you click open and go to place this in your **Base** drawing – **BE SURE** you place it **off to one side**, away from your base drawing.
4. Now **select the merged drawing** data that you just placed to one side using your left mouse to draw a window around the objects so they are all highlighted **magenta**. Be sure you **turn on** the **Auto Snap** option (magnet on the top speed bar) for the next steps.
5. Now run the **Align** command by either typing “AG” or go to the **Edit tool** drop down menu to, “**Align Common Points**”. This will help you precisely place your merged data over the top of your base using two common points.
6. You are prompted to “Pick common (pivot) point of the first selected objects.” So snap to the **first common point** on your **Merged** drawing that is highlighted and still off to the side. Next click on the **second common point** on this same drawing.
7. If you make a mistake, click the **UNDO** button on the top row and try again. You can also follow the instructions on the **command line** when using this command to help you keep track of your steps and it will prompt you what to do next.

**Lesson 21 – Using Layers**

**Layers are a powerful drawing tool and visual aid.** The layers behave like a stack of transparencies that contain various drawing items on each sheet such as” photos, evidence, txt, measured points, line work, etc. You can display and hide viewed items by turning layers ON or OFF. **It allows you to save all data in ONE file, print multiple variations of the same drawing, and choose what you wish to print or display at any time.**

Click on the **Layer Manager** in the Speed bar. Grab the header and move the dialog box onto your drawing area so you can keep it open while you work (you can tuck to the side and pull in as needed).
Pin the layer dialog to the left side of the Program Window

Layer Cleanup

Refresh – updates recent layer changes

Long/Short List – display all layers or just those being used on the diagram

Layer Name – assign text name

Layer Lock – Lets you view items on that layer but you cannot select or modify them

Layer On and Off button

Sets the selected layer to be the Current Layer

This star means there are object on that layer

The **current layer** name and **set color** shows up in the rectangular **Properties Box** in the top Speed bar menu. Clicking on the Properties Box also allows you to change your current working layer at any time. Items you draw will be placed on your current working layer.

**Moving objects to a different layer:** Select the object(s) so they highlight **magenta**, then click on the **Properties Box** or the **Properties** button. This brings up the option to change layer (plus other options). Use the down arrow to select a new layer from the list then click **OK** when done to accept your new selections.

**Common Uses for Layers**

A. Aerial photos or digital photographs can be put on a **separate layer** so you can choose to view or print them or have them off.

B. Keep points, point number, elevations, line work, evidence, etc. on separate layers so you can **choose** what you want to display and print.

C. Working on a template or else where you have congested points or data. You may wish to **lock** that layer with those items so that you **do not accidentally move** or select it when drawing in that area.

D. **Remember** if an item is on a locked layer – you cannot move or modify it until the layer is unlocked. You cannot turn your current working layer off.
**To Open Layer Manager:** Select Layer Manager from the Draw pull-down menu, select the Layer Manager icon from the Speed bar, or type MGL on the keyboard. A dialog box appears, displaying a list of layers. You can use the scroll bar to display the status of all layers supported by the Diagram program. There are 1024 layers available.

**Move and Size the Layer Dialog:** You can move and resize the layer dialog if needed. The move button is located at the upper right corner of the layer dialog on the title bar to the left of the help icon. Click this button to position and size the layer dialog to fit on the left toolbox. Click it again to restore its last position.

### Button and Icons on the Layer Manager

- **Set Current Layer:** Clicking on this button will make the selected layer the current layer. You can also double click on a layer to make it current. Anything drawn or placed in the drawing area will be placed on the current layer. In a new drawing, Layer 0 is the default.

- **Data on Layer Icon:** Layers containing data are marked with a green diamond icon.

- **Display / Hide:** The Layer Display button is an on/off toggle. You can turn single or multiple layer displays on or off with the Display /Hide button. If the selected layer is currently displayed then clicking on this button will hide it and vice versa. A hidden layer’s name or number will be displayed in a “grayed out” text.

**YOU CANNOT HIDE THE CURRENT LAYER.** If you want to hide the current layer then you need to select a different layer to be current.

- **Layer Lock / Unlock:** This button allows you to see layers but not be able to modify them. If you need the layer displayed for reference but don’t want to be able to select it or alter it then you will want to lock the layer.

You will still be able to snap to points on locked layers. This feature is also very useful for drawing or tracing over a digital image or aerial photo so the image is not selected and information you are adding is covered up.

### Selecting Multiple Layers

You can select multiple layers and hide/display or lock/unlock those layers at one time. Hold down your left mouse key and drag over consecutive layers to select. To select layers out of sequence, hold down the Control key and left click the desired layers.

- **Name Layer:** You can select a layer to name or re-name the layer using the Name Layer tool. Select a layer, click on the Name Layer button to display the Layer Name dialog box. Click in the
“Enter Layer Name” field and type to enter a name for the layer. If the layer already has a name, that name will be displayed in the dialog. You can un-name a layer by clicking on the un-name button.

**Important:** You cannot rename a layer using a number for the first character. If you want to show a number followed by text then begin the name with a dash or underscore.

**Long / Short List:** The Short List button toggles between displaying all 1024 layers to only displaying layers which contain data or are labeled.

**Refresh Layer Manager:** Sometimes the data on the drawing will not match the information in the layer manager. For example, you can make a layer current that has no data on it. Then, you draw on that layer while the layer manager is open. You would expect to see a green diamond next to the layer denoting there is data on that layer. Clicking on the Refresh button refreshes the layer manager and displays the green diamond.

**Layer Clean-Up:** Layer Clean-Up is an easy method to manage layers in your drawing. This is especially useful when importing AutoCAD drawings that may contain many layers that aren’t needed or aren’t names to match your standards.

### Lesson 22 – Texture - Hatch Patterns and Fills

The Texture Hatch tool combines all the tools you need to hatch, fill, and add textures to your drawing. The tool can be found by clicking the Texture button located in the EX Tools bin.
Textures or Hatch Patterns – You decide

Click on the Texture or Hatch group button to get a list of textures or hatches. Clicking on a texture or hatch name will show that pattern in the display window.

It is best to put your hatch/fill on a separate layer so you can turn it on/off or lock it so it does not cover any of your drawing details. Use lighter colors for better readability. More hatch patterns and hatch setting options are available in the pull-down menu when you select one of the hatch commands.

**TIP**
ZOOM IN so you are close while working for precision and for complex shapes or those that are not perfectly closed use the manual trace.

**Note:** Use the Texture / Hatch tools to auto surface roadways and terrain where their boundaries are defined by lines, arcs, and curves. Use the Auto Surface tool to automatically surface an area defined by a cloud of loose points. This is described in the program help under Surfacing. You can further define the boundaries of a point cloud by creating a boundary around the points with lines, arcs, or curves.
Example of Texture Hatch Used in a Diagram

**Exercise**

Experiment using the different Texture Hatch commands using the drawing from *Lesson 18*. Try using the different options that are available. Place text on top of the texture hatch and then practice bringing the text to front and sending it to the back.
Lesson 23 – Manual and Electronic Measurement Data

Manual Measurements

There are two options for input of Baseline-Offset and Triangulation measurements.

1. **EASY LINES method:** places points quickly and easily, but does not label your points or give you an option to print out your entered data. Good if you have a small job with just a few points.
2. **COORDINATE DATA TABLE:** offers a spreadsheet entry format with preview. It even labels points and provides 2 coordinate print out options. This is the best method to use, offers more features, and allows you to edit your file if needed.

Easy Lines Manual Entry

**Normal Mode:** Click the bulls-eye and then click the onscreen stating point, then enter the Angle (use the compass to point) and then type in a distance. Then select to draw a line button or place marker button.

**Baseline Mode:** Click the bulls-eye to create a start point on the screen, then enter Distance 1 and Distance 2, the first is the distance along the baseline and the second is the offset distance. The “flip” button is the same as a negative value. This mode allows only red (permanent) or blue (temporary) markers – no lines.

**Triangulation Mode:** Click the bulls-eye and select 2 triangulation points on the screen. Enter Distance 1 and Distance 2, the first is the distance from the $1^{st}$ triangulation point and Distance 2 is the distance from the $2^{nd}$ point. “Flip” is the intersection on the opposite side and you can only place markers in this mode.

**EZ Baseline:** Baseline Easy Lines is used to set points (markers) based on baseline measuring procedures. When you switch to EZ Baseline the compass arrows change to the green color so you know you are in Baseline mode. The field changes to D1 and D2 for Distance from the $1^{st}$ marker and Distance from the $2^{nd}$ marker. To place points using the Baseline Easy Lines Methods:

1. **Click** on the **bulls-eye** to set the Base Point.
2. **Click** on the screen to set a base starting point (green target appears). After setting the base point, you will be prompted to show the direction of the baseline by moving your mouse in the desired direction and clicking. If you want to set the angle other than horizontal/vertical, then hold down the Ctrl key and use the bottom Angle display to set the desired angle.
3. **Click** the number pad and enter the first distance (D1). This is the distance along the baseline from the base point. If you enter a negative number for D1 the distance will be along the baseline in the opposite direction.
4. **Click** on one of the marker buttons, either temporary (blue) marker or the permanent (red) marker. Repeat to place as many markers as you need.

Once the markers are placed in the drawing, you can snap lines or vehicles to them so they are placed exactly at the desired location.

If the marker is placed on the wrong side of the baseline, then click on the “Flip” button and pick the marker again. It will place the marker on the opposite side of the baseline. Once you select the Flip feature it will stay selected until you click on it again.

**EZ Triangulation:** With triangulation measurements, **two reference points** are needed. Other points are located as being at the **intersection of 2 lines based on radial measurements.**

When you switch to EZ Triangulation, you’ll notice the color of the arrows change to red so you know which mode you are using. Entry fields are D1 (distance from point 1) and D2 (distance from point 2).

**Exercise**

1. Click on the bulls-eye to set the reference points.
2. Click or snap on the screen to set your first reference point. Click on the screen to set your second base point (note distance on bottom right).
3. The base points will be shown as magenta colored triangles with cross hairs inside them. Click on the number pad to enter the first distance (D1). This is the length of the radius from the first reference point to the marker.
4. Click in or tab to the second field (D2). This is the length of the radius from the second reference point to the marker.
5. Now pick a marker, either a temporary (blue) marker or a permanent (red) marker. Where the two radii intersect (entered above) is where your marker will be placed. If the marker is on the wrong side of the baseline then click on the “Flip” button and select the marker again. This will place the marker on the opposite side of the reference points. **REMEMBER** - Once you select the Flip feature, it will stay selected until you click on it again.
6. Repeat steps 3 through 5 to place any remaining points.
**Coordinate Date Table:** Data is entered in a spreadsheet format and give you an instant preview. The entered data is automatically updated.

The **Coordinate Data Table** is a very powerful tool that can save you time and help achieve accurate diagrams.

1. When you type in coordinate data, it will automatically provide a preview.
2. Can automatically generate lines and curves (join like descriptions, **SC** for start curve and **EC** for end curve),
3. Place your different test fields and line work on separate layers automatically.
4. EDITABLE preview window before you bring the data into the diagram.
5. SEARCH & FIND – left click on the point number and it will highlight with a **big red circle** so you can find that point quickly on the screen. Release mouse for off.
6. Right click in the row number to **INSERT** or **DELETE** a row.
7. **Save** your file if you made changes and rename it so you still have your original version if you need to compare.
8. Zoom/pan tools on the right side to move within the preview window. Click the “Place” button to import the data shown in the preview window into your drawing.
**Dynamic Text Adjust:** Adjust the size of the text displayed in the preview window by clicking the “larger and smaller A” text icons located on the right of the preview.

**Units:** The data entered into the Data Field manually or imported will take on the units picked in the “Units” field. You can choose from Inches, Feet, Millimeters, Centimeters and Meters.

**Point Numbering Offset:** If you want to place your data to begin from a point number other than Pt#1, then click on the “Point Numbering Offset” checkbox and set the offset value. If you have already placed some data and open the Coordinate Data Table again, you will be prompted to use an offset number to ensure you don’t create duplicate point numbers in the drawing.

**Save Button:** The Save command allows you to save the coordinate data as a .TXT (text), .CSV file, .DAT, and .ASC file types. This file can be imported into Excel or other spreadsheet programs and used for the generation of a printed copy of the ASCII coordinates.

**Export Button:** Export will open up the current data in an Excel spreadsheet for printing purposes (if Excel is installed on your computer). This is a good method for editing data and then re-importing using the “.CSV” file format.

**Place Button:** Click the Place button to place the data shown in the preview window into the drawing area. You will automatically be prompted to save when you click the Place button.

Once loaded into the drawing window, the text (point numbers, descriptions, and elevation data), points and lines are placed on separate layers. Use the Layer Manager to turn on/off.

**Exercise**

1. Enter the following data into a Coordinate Data Table as shown. Set the N direction to point to the first selection pointing to the Right in a horizontal position.

<table>
<thead>
<tr>
<th>Pt#</th>
<th>Base (+)</th>
<th>Base (-)</th>
<th>Up</th>
<th>Down</th>
<th>Elev (Z)</th>
<th>Desc</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>50</td>
<td>0</td>
<td>0</td>
<td>25</td>
<td>EP1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td>EP1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>75</td>
<td>0</td>
<td>0</td>
<td>25</td>
<td>EP2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>75</td>
<td></td>
<td></td>
<td></td>
<td>EP2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td></td>
<td>EP2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>25</td>
<td>0</td>
<td></td>
<td>EP3</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>100</td>
<td></td>
<td></td>
<td>25</td>
<td>EP3</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>55</td>
<td></td>
<td>8</td>
<td></td>
<td>Veh1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>70</td>
<td></td>
<td>8</td>
<td></td>
<td>Veh1</td>
<td></td>
</tr>
<tr>
<td>Pt#</td>
<td>Base (+)</td>
<td>Base (-)</td>
<td>Up</td>
<td>Down</td>
<td>Elev (Z)</td>
<td>Desc</td>
</tr>
<tr>
<td>-----</td>
<td>----------</td>
<td>----------</td>
<td>----</td>
<td>------</td>
<td>----------</td>
<td>------</td>
</tr>
<tr>
<td>10</td>
<td>70</td>
<td></td>
<td>15</td>
<td></td>
<td></td>
<td>Veh1</td>
</tr>
<tr>
<td>11</td>
<td>55</td>
<td></td>
<td>15</td>
<td></td>
<td></td>
<td>Veh1 CL</td>
</tr>
<tr>
<td>12</td>
<td>65.5</td>
<td></td>
<td></td>
<td>2.5</td>
<td></td>
<td>Veh2</td>
</tr>
<tr>
<td>13</td>
<td>72</td>
<td></td>
<td></td>
<td>5.5</td>
<td></td>
<td>Veh2</td>
</tr>
<tr>
<td>14</td>
<td>78</td>
<td></td>
<td></td>
<td>8.5</td>
<td></td>
<td>Veh2</td>
</tr>
<tr>
<td>15</td>
<td>71.5</td>
<td></td>
<td></td>
<td>11</td>
<td></td>
<td>Veh2 CL</td>
</tr>
<tr>
<td>16</td>
<td>55</td>
<td></td>
<td></td>
<td>9</td>
<td></td>
<td>Skid 1 A3</td>
</tr>
<tr>
<td>17</td>
<td>30</td>
<td></td>
<td></td>
<td>8</td>
<td></td>
<td>Skid 1</td>
</tr>
<tr>
<td>18</td>
<td>10</td>
<td></td>
<td></td>
<td>5</td>
<td></td>
<td>Skid 1</td>
</tr>
<tr>
<td>19</td>
<td>55</td>
<td></td>
<td></td>
<td>14</td>
<td></td>
<td>Skid 2 A3</td>
</tr>
<tr>
<td>20</td>
<td>30</td>
<td></td>
<td></td>
<td>13</td>
<td></td>
<td>Skid 2</td>
</tr>
<tr>
<td>21</td>
<td>10</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
<td>Skid 2</td>
</tr>
</tbody>
</table>

2. After your first entry, move your mouse into the Description field: Right click to see how you can add control codes such as CL for close, A3 for arcs, etc. plus it keeps a listing of descriptions used so you can auto insert them from the list rather than type them in each time.
3. Use the “A” up and down arrows for sizing text to a readable size.
4. Once completed, save the data (saves as a txt file) and also try the “Export” save for Excel format.
5. Use the **Place** button to put data in the drawing area (the table is just a preview box). If you are using the baseline or triangulation modes, your start point is your insertion point that can be placed precisely in your diagram.
6. Forgot to enter data and it need editing?
   a. Close drawing and start a new drawing.
   b. Open Coordinate Data Table and open the txt file you just saved.
   c. Make changes, Save, Place again.
7. After placing your diagram, save.
8. Put Baseline onto a separate layer you can turn off.
9. Open the Layer Display to see the various layers you can turn on/off.
10. Add two missing road lines over the old base line.
11. Use Fillet Command to add curved corners (12’ radius) to your intersection.
12. Place a Vehicle Symbol in your diagram.
   a. Copy and paste one of the rotated rectangles in a blank area of your drawing area.
   b. Rotate the rectangle to be horizontal.
   c. Place and scale a vehicle inside of the rectangle using the following steps:
To get the **specifications** for your vehicles and a scaled rectangle to use as a **guideline** to size 3D symbols, use the **VEHICLE SPECS Database** on the **EZ Tools Bin**.

![Vehicle Database Screenshot](image)

a) To **stretch or resize an object** such as a car or sofa, you **must** keep the object in the **horizontal position** as it appears in the symbol library to resize it **proportionally**.

b) Select a truck from the Vehicle Database to get a scaled box then pick the top view of a pick-up and place it in the rectangle box horizontally, use Ortho 90 to keep the symbol straight.

c) Now click on the vehicle symbol so that the grips (blue handles) show. Use the blue grips to **stretch or shrink** to fit the symbol to your sized rectangle box.
d) While the vehicle is still highlighted, go to the top menu bar and select the 3D Builder button and set the symbol height. You have now sized a vehicle in 3D!

e) Now use the Move command from the left Quick Pick menu. Snap to rear corner and match to corresponding outline in the measured drawing. Select the vehicle to highlight it and then move the rotation pivot point of the vehicle symbol to the right rear corner. Now you can easily Rotate the symbol into position. If you do not see the red rotation handle you are zoomed too far out!

Continue with the Drawing

13. Change the arcs to tire mark line types.
14. Ass some trees, a top view stop sign, etc.
15. View in 3D.
16. Add Linear and Angular Dimensions.
17. Add a border, north arrow and scale bar. Save your Drawing!

Finished Diagram Example:

Electronic Data Entry

Crash Zone / Crime Zone allows you to directly import data from Sokkia and Nikon total stations (AIMS version), SDR data collectors, LTI Raw files, and CAD Zone’s Pocket Zone data collection program. You can also import 3D data in an ACII Coordinate data format that is a common format that can be generated from measurements taken with any brand of total station. The 3D elevation data is automatically recognized and displayed in the 3D view along with automated and 3D line work.
• CAD Zone programs can also Read and Write to DXF and DWG (AutoCAD) files.
• Direct download of SOKKIA and SDR saves both RAW and Coordinate files.
• The custom TDS-AMS LT Crash Zone version has direct download for NIKON total stations. This AIMS version has an interface for RAW data files plus powerful download/upload options.

**ASCII Import Dialog**

The ASCII Import feature allow you to import ASCII format Coordinate Files that are retrieved from total stations, data collectors, manual entry, Excel files and other methods of generating coordinate files.

If you do not have a coordinate file to import, the data can also be entered manually right into the table. You can also enter into Notepad or a spreadsheet and then import it. The data fields can be separated (or delimited) by a comma, space, or tab between them. The most common coordinate format is: **Point#, Northing, Easting, Elevation, Description**.

**If You Use a Total Station or Laser with 3D Data**

---

**Elevation Adjust**: If your total station or laser data is not near the ground plane, it often appears up in the air in 3D view when your total station data has a 100’ starting elevation. This command allows a point elevation shift if you’re starting elevation for your data was not zero set or if you need to adjust your ground plane elevation. (Use the PREFERENCES while in 3D if you wish to turn the ground plane on/off.)

---

**Coordinate Import: Automated Lines and Labels**

• The ASCII import can automatically create lines and curves using descriptions which you designate while recording the data at the scene.
• Layers are automatically created for each of the following: point nodes, point number, description, elevation and lines.

Automated line work can be done in a simple manner using these guidelines:

1. **Continuous Lines**

   A continuous lines is automatically connected between “like labeled” descriptions using any description codes you want.

   All Individual lines must be labeled with unique descriptions in order for them to be drawn properly. For example, use EP1 for one side of the road edge of pavement and EP2 for the other side of the road.

2. **Automated Lines Control Codes (curves, arcs and closed shapes)**
The ASCII import can also automatically create lines and curves as part of our line work. If the data points have an elevation, both the lines and curves will be in 3D. This can be done in an uncomplicated manner using these simple line codes after your description codes.

**SC – Start Curve** – Starts a Splined (fit) curve command by forcing a curve through point

**EC – End Curve** – Ends the curve sequence and goes back into straight line mode

**CL – Close Shape** – Close label to automatically connect and close shapes for a building or car shape without going back to the first point shot

**A3 – 3 Point Arc** – 3 point arc by appending the code A3 to a current description results in a 3 point arc connected to that point and the following 2 point of the same description

**R – Resolve** – Resolve calculates a 4th corner for you and closes the shape

**GPS Formats**

This allows you to recreate your GPS measured data from a TXT or LOG file generated from your GPS device or software. The file is displayed in a Lat, Long, Elevation, description, GPS Code format in the Coordinate Data Table.

**To Use GPS Formats in Coordinate Data Table**

1. With the Coordinate Data Table opened, select the GPD Formats radial button.

2. Select the radial button for State Plane or UTM coordinates.

3. Click the Open command from the lower-right corner of the toolbox, navigate to the location of the file, and click the Open button to load it.

4. The file is opened in the Coordinate Data Table and is ready for further editing if necessary.

**Differences between State Plane or UTM coordinates**

Both projection schemes for State Plane and UTM coordinates are based on ellipsoid coordinates to X,Y coordinates but there are a couple of key differences:
Lesson 24 – Importing Bitmaps (Digital, Satellite and Aerial Photos)

Digital Images: Use this tool to add digital photos (jpg, bmp or wmf) or aerial and satellite photos to your drawing. You can also trace and draw over any images.

To place an image in your drawing:

1. First you must click 2 points to define a window frame” where your image will be inserted
2. Then browse to find the image you wish to insert. Click “Open” to insert the image.
3. Images can be easily Moved, Rotated, Scaled and Edited as shown below.

Scale Bitmap Images:

1. Click the Bitmap Scale command from the Images Satellite Photos tool bin, or select the tool from the right click mouse menu.
2. When prompted to “select bitmap entity” click on the image that you wish to scale.
3. Next, select the two reference points in the diagram with a known measured distance between them.
4. Click in the “Enter Actual Distance” field and type to enter the real-world distance.
5. Click the “Adjust Bitmap Now” button to re-size the image.

Bitmap Edit

- Image Fade (slide bar) allows better visibility if drawing over an image or just using as a background reference.
- Send to Back or Bring to Front icons moves the image to the background or brings it forward so that any line work, symbols, text, etc. placed on the drawing are not hidden behind the image.
- Change Image Layer moves the image to a separate layer making it easy to turn the layer on/off to display.
- Lock Layer makes it easier to trace and draw over your image by keeping it in the background.
- You can also rotate a bitmap by selecting the image and using the movable pivot to rotate or by using the rotate command in the Editing tools.
**Digital Images in 3D**

You can also see your digital images in 3D view mode making it possible to place objects and use aerial photos for background reference. You can add symbols such as treed, buildings, vehicles, people and 3D building onto your aerial photo base.

You can also insert digital images in 3D Wall Evidence Mode to depict evidence on vertical surfaces or even place a larger image to depict a realistic background or building façade.

**Exporting Images – Vector vs. Raster**

You can print from CAD Zone but sometimes you may need to send a drawing file to someone or save a drawing to put into a Word document, Cad Zone gives you several options including a **PDF format save** (ADOBE) that most anyone can open. The formats under Save give you the nicest and sharpest images.

The **Raster** save formats are under the File pull-down to the “Export Image” but the .JPG and the .BMP **do not** provide crisp lines or print as clearly as other formats will.

**Some BITMAP Image Tips:**

1. If you are printing 3D Screen Shots – increase Screen Resolution in Control Panel before you take the screen shots to get sharper images.
2. To print only a digital image from inside Crash Zone or one of the 3D Snapshots, click on the image to select it. Go to Print and in the lower left check the box that says “Selection Only” so only that image prints.
**Bing Satellite Photos (digital satellite and aerial photos)**

Bing satellite and aerial photos are just a mouse click away! Enter an address or name of a place and instantly get a recent satellite or aerial photo. Zoom and pan to the exact view you want, place it in the drawing to real world scale automatically! These images are not only to scale but are also georeferenced so that you can overlay GPS data.

![Using Maps Satellite Image](image)

**Using the Bing Satellite Photos Commands**

In order to use the Bing Satellite Photo feature you must have an internet connection.

**Full Zoom** – The map viewer will automatically zoom in as far as it can on the address or place you’ve entered. Zoom in and out of the image using the [+] and [-] buttons on the map screen. You can also use your mouse wheel to zoom in and out. Hold down the left mouse button to pan.

**Places** – Many places can be called up by name alone, no address necessary. For example, you can enter Autzen Stadium, Golden Gate Bridge, Mount Rushmore, Space Needle and CN Tower to bring up an image.
Quick Steps to Place and Image

1. Click on the Satellite button in the Images Satellite Photos tool bin to open the Bing map finder.
2. Enter an address or place name and click the Locate button.
3. Pan and zoom to get the exact size and position you want to bring into your drawing.
4. Click on the Place button. You can drag and click to place the image anywhere in your diagram or hit Enter to automatically place the image geo referenced.

5. You can select whether your image displays only Roads, Aerial view, or Hybrid view (as seen above) which is a combination of the Road and Aerial views.
Lesson 25 - Templates

Clicking the Templates button in the EZ Tools tool bin brings up the “Load a Template” dialog. The Load a Template dialog allows you to preview and select pre-drawn templates, road, and intersections. The pre-drawn templates that are included with CAD Zone are all stored in sub-folders under the main Template folder.

To place a template in your drawing simply select it from the appropriate folder in the templates toolbox (by clicking on its name) and clicking Open. Then place the template in the drawing area by clicking or snapping to a specific point in your drawing.

Also included is the ability to create your own customizable template library from pre-made drawings. You can import AutoCAD or other CAD drawings (dxf or dwg) from engineering drawings to build a template library of your common intersections.

Lesson 26 – 3D Basics and 3D Line Work

CAD Zone software makes it easy to generate a 3D scene by automating much of the work and keeping the concepts simple. Most objects like symbols, line types, and bodies are converted to 3D automatically. To see other objects in the 3D view, like a wall, simply assign then a height, an elevation if needed and a color. Then launch the 3D Viewer to see the rendered model.
3D Exercise 1

1. Start a new diagram and call it 3D Exercise.
2. Place an intersection (use Easy Intersection to save time).
3. Add vehicles, traffic lights, power poles, trees and people.
4. Add a few building shapes and some chain link fencing.
5. Now look at your drawing in 3D by clicking the 3D button in the top Speed Bar.

You can see that the vehicles, fencing and some of the other objects were converted to 3D automatically. However, everything else in the diagram is still displayed as flat, 2D objects. Now let’s switch back to 2D and see how easy it is to complete this 3D diagram.

6. Select all the walls of one building and click on the 3D builder button 🌐 on the Speed Bar.
7. Assign a wall height of 15’ and leave the elevation at 0 (ground plane).
8. Check the box for wall paint and roof and then select colors. To make the walls appear solid, select wall paint and choose the desired color. If you do not turn on the wall paint, the walls are displayed as wire frame and you can see through them. We will also check to display a roof and choose a roof color
9. Now click Apply to Selected objects to apply the 3D information to the walls we selected earlier. The selected lines will be grouped together when you assign them 3D information. Let’s switch back to the 3D Viewer and see our changes. SAVE your drawing!

Fence, Railing or Jersey walls: You can also set exact height and color of 3D line types by selecting the line(s) first and then click the 3D Builder button.

3D Exercise 2

1. Select the chain link fence you drew earlier. Click on 3D Builder
2. Assign a height to the fence by setting the 3D line Type symbol height in the dialog. “Maintain line type color in 3D” allows you to set your own color that overwrites the default.

3D Viewer: This takes you from your 2D diagram into a dynamic 3D view. Use the button, target, arrow keys or your mouse to maneuver within the 3D view. Snapshot – allow you to save your 3D views!

When you first launch the 3D Viewer you see the scene in 3D with a small 2D Preview window. In the preview window is a RED Camera target and the GREEN site target representing where you are looking.

You can also adjust the elevation of both the target and camera on the speed bar at the upper-right of the screen. If you set the elevation of the camera and target to 3.5’, you will be able to approximate the view a driver of a small car was seeing prior to the accident.
**3D Exercise 3**

1. Open the 3D Gas Station Homicide sample diagram and move the camera around.
2. To further adjust the view; slowly drag the camera symbol with your mouse along the street and watch the view update. There are many other ways you can navigate around your diagram using the viewing buttons at the top.
3. Whenever you are satisfied with the view of a scene, you can take a “snap shot” using the camera icon at the top of the 3D view screen. This saves the view to a .jpg image file with the same name as the drawing for later reference. You can load that image into a report or you can load it back into the 2D diagram.
4. You can take as many snapshots as you want as you move around your 3D diagram. Anything that is on the screen will be recorded in the snap shot, including the 2D preview window. If you don’t want the preview window to show up in the snap shot, click the X button to close it first, and then click the snap shot button. To restore the 2D preview window, just click the icon that shows a 2D view of an airplane, which is the same as the bird’s eye view in the 2D program.
5. Now let’s switch back to the 2D diagram and look at our snap shots. Here you can see a preview of all the snap shots you took of this diagram in the 3D Viewer. The Show All options lets you see all the snap shots in your folder, even those taken from other diagrams.
6. Select a snap shot and click the place button. Click anywhere in your 2D diagram to place the image. Once placed in the diagram, you can re-size the image, move it, or delete it. To later recall the Snapshot Manager to view images, go to the 3D Tools and click on the Camera icon in that tool box.
7. With this simple diagram, we have demonstrated all the basic features you need to create a 3D diagram and obtain snap shots of the views you want. A series of snap shots can be taken and used to make a simple PowerPoint or Movie Maker animation (this will be covered in the advanced lessons).

**Working with 2D and 3D Line Types**

You can change existing lines by first selecting them, then click on the line type you wish to make it into from the Line Type menu line icon shown below.

You can also draw using a pre-selected line type by first selecting the line type off the Lines Types menu icon. You will see a small “T” appear in the properties rectangular box at the top to show you have a line type set. Then use any of the line or curve drawing commands. Click the Norm button to reset back to regular view.

For 3D lane lines that convert to the 3D view, use the thick lane lines shown on the left side of the menu.
Line Widths can be selected from the Width icon located in the Properties tool bin. If you do not see the line width desired, you can edit a line and click the “W” and type in a measured width.

**Exercise**

1. Start a new drawing.
2. Use the Easy Intersection tool to make a “T-Intersection.”
3. Add vehicles, signs and crash symbol.
4. Use the Curve and line commands to make vehicle paths.
5. Edit lines to make into directional line types. (The arrows go in the direction the line was drawn.)
The medians, guardrails, fences, culverts, raised reflectors, etc. will also show as 3D symbolic depictions. The 3D line types can have height set, colored and gaps added.

**To Set Height and Color of the 3D Line Types**

Select the 3D line then click the 3D Builder button on the top Speed Bar. A dialog box appears to set the height and color of the 3D line type and the “Maintain Line Type Color in 3D” allows you to change the color and carry over into the 3D rendered surfaces too.

**Exercise**

Use the Spline curve line to make a gentle sweeping curve from the top to the bottom of the screen that will be one side of a road, then use the **Easy Street** offset command button from the Quick Pick menu to set number of lanes, widths, and line types and then apply the changes.

1. Add some guardrails and fences to your drawing.
2. Size the guardrail and fences using the 3D Builder button.
3. Use the Break command to make 2 small breaks.
4. Then remove the section to show it broke.
5. Make some regular lines and use the edit command to practice changing widths, color, and type.

**NOTE**

The Easy Street command makes proper offsets and rectangles, each increasing or decreasing the radius of curves for you mathematically and not just parallel copies.

**Joining 3D points with a 3D line the Snaps MUST be on or your lines will only be 2D. Use this for showing 3D Trajectories.**

**Bullet Trajectory Exercise**

1. Open the drawing called 3D House Homicide.
2. Draw 2 points, which depict a bullet trajectory originating near the bedroom doorway and a second point in front of the wall.
3. Select the first point near the door and use 3D Builder to elevate the point 4 feet, then select the second point and elevate it 6 feet (you must click apply each time).
4. Use the line command with the snaps turned on to draw a line between the two points.
5. View in 3D and experiment with using the Trajectory line types (there are different color in case of cross fire to show the difference.
6. To calculate an elevation along a trajectory line or a road line, use the Point command and place a point somewhere on the 3D line or 3D curve. Now use the crossing window (left to right) to select ONLY that point. Keep your mouse near the point and look down at the command line to see the calculated elevation of the selected 3D point.
7. To extend a 3D line (trajectory or other straight line) you can use the **extend** command. Pick the end of the line to extend and then type the distance to extend.

8. Use the Slope Calculator tool to give you the angle and horizontal distance.

In the Symbol Library under “North +” there are elevation posts you can use that show up in the 3D viewer as shown to the right.

**Lesson 27 – Useful Tips and Blot Out Function**

**Blot Out** is a tool under the “VIEW” tool bin that works with text and symbols. Select the text or symbol to blot out, and use the tool button or bring up the right click menu and click on “Blot Out.” This will make the background around the text or symbol opaque, which will cover anything beneath it. Text on top of a hatch or fill will stand out more; a car symbol will not look like a road centerline is running over the top of it.
Blot Color, also on the right click menu, lets you set the color of the “blot” so you can match a surface color. For example, you may wish to have the blot color of a vehicle match the color of the surface the vehicle is on. Blot also works on groups and multiple selected symbols.

You can automatically match the color on the screen by clicking on the “properties match” tool and then clicking on the hatch or fill on the screen.

**Tips and Reminders**

1. WHENEVER you seem to be having problems sometimes you have made setting changes that you did not realize or forgot you made. Clicking on the Happy Face Reset RESTORES the DEFAULT settings for color, lines, layers and text. Use this button whenever you import a drawing from another program that may have set defaults.

2. When you draw a line, the information is displayed at the bottom right shows the angle and distance in real time. If you define an angle with the mouse or set to ortho angle 90, you can just type in an exact distance.

3. To get object information with your mouse, select the line, arc, circle, etc. and hold the mouse pointer just next to it for details to appear at the bottom left of your screen or in the new Heads-Up Display located at the top of the Drawing Area.
4. SELECTING an object and typing “OI” for “Object Info” displays the object’s details.
5. The Trap button traps your mouse movement when drawing a line at: 0, 45 or 90 degrees when your mouse gets close and is not as restricting as the ortho mode.
6. The Units button lets you change your drawing units FEET or Meter and the number of decimal places or Fractional Inches DISPLAYED. This can be set when you first start a new drawing and changed at any time during your job. If you notice numbers you enter are being rounded off – check this setting and the decimal places it is set to.

**DO NOT** draw to any scale other than real world measurement (1:1) or your dimensions and symbols will no longer be to scale. The only time you SCALE the drawing is when you go to print and you can set the scale in the print menu.

7. Coordinate display settings manual entry: lets you change your coordinate setting between Relative, Absolute, and Base point methods (for advanced users only). Allows you to change your 0,0 reference point to where you wish.

<table>
<thead>
<tr>
<th>How to Copy Your Diagram into A Word Document</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Have BOTH your CAD Zone Drawing and your Word document open.</td>
</tr>
<tr>
<td>• Use your mouse to highlight the drawing in Crash/Crime Zone.</td>
</tr>
<tr>
<td>• Use the Copy to Clipboard command (or type Ctrl C).</td>
</tr>
<tr>
<td>• Switch to your Word document and Paste (or type Ctrl V).</td>
</tr>
<tr>
<td>• Use the corner handles in Word to resize the image if needed.</td>
</tr>
</tbody>
</table>

**Lesson 28 – Creating Your Own Symbols**

Use the Create Symbol command to create your own symbols, which may then be placed repeatedly in drawings. A bitmap preview button is automatically created in your Symbol Manager so you can later select the symbol you want and click to place it.

<table>
<thead>
<tr>
<th>Exercise</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Open a new drawing and draw some object to create a symbol.</td>
</tr>
<tr>
<td>2. Select the objects to be included in the symbol by clicking on them or drawing a selection box around them.</td>
</tr>
<tr>
<td>3. Select the Draw menu, select Symbol Tools, and then select Create Symbol (or type YC on your keyboard).</td>
</tr>
</tbody>
</table>
4. Type in the symbol’s name. Press Enter or click the OK button.
5. Select two handle points to use for placing the symbol. Normally you will want to snap exactly to the handle points. The objects should return to their normal color and no longer be selected.
6. The symbol is automatically saved to the “My Symbols” folder in the Symbol Manager.

The first handle point you select is the point where the mouse pointer is attached when you place the symbol. If Dynamic Scale is turned on, the symbol can be scaled relative to this handle point.

Next to the Symbol name box on the Settings Bar is a check box labeled “Replace original w/symbol.” If you check this box, the selected objects in your drawing are replaced by the symbol. If unchecked, the object remains separate and the symbol is loaded into memory but is not placed in the drawing.

**Another Way to Make Symbols in Crash/Crime Zone**

Use the **Symbol Create Wizard** command to create a symbol made up of existing objects, which may then be placed repeatedly in your drawing (rotated and rescaled as desired) or saved to a disk for future use.

**Using the Symbol Create Wizard**

1. Use the various drawing tools in the Diagram Program to draw an object you wish to turn into a symbol.
2. Using the mouse or selection commands, select the object to be saved as a symbol.

3. Open the symbols tool drawer by choosing it from the left hand tool box.
4. Click the Create Symbol icon located at the bottom of the Symbol tool bin.

The Symbol Create toolbox is displayed on the screen prompting you to enter a symbol name and click the “next” button.
5. Click in the symbol name field and enter a name.
6. Click the Next button located at the end of the symbol name field.

Next we will need to assign two symbol “handles” for the symbol. Every symbol in the program has two handles; the first handle anchors the symbol, the second is the finishing placement point. Keep in mind how your symbol will be placed in your drawing when assigning symbol handles, as the handles assist in their placement in the diagram. For example, vehicle handles are placed at the wheel centers, while a symbol that attaches to a wall, such as a refrigerator has handles that are placed at the “back” of the symbol.

7. When prompted by the toolbox to “Pick handle Pt 1” select the Auto Snap command from the Speed Bar located at the top of the program screen.
8. Move the cursor to the symbol where the first handle is to be placed, and click the mouse to snap the handle point.
9. Move the cursor to the symbol where the second handle is to be placed, and click the mouse to snap the handle point.

10. Click the OK button to create and save the symbol to the “My Symbols” folder located on the symbol manager.
Placing a Saved Custom Symbol

1. Open the symbol manager by choosing its button from the left hand tool box.

2. Click the Symbols Group drop down arrow from the upper-right corner of the symbol manager and select “My Symbols” from the displayed menu.

3. The “My Symbols” group is displayed in the symbol manager showing all of the custom symbols you have saved.
4. Click the desired symbol icon and place it in your diagram in the same manner you would any symbol.

Advanced Tips and Tricks

Keyboard Shortcuts

A few of the common program 2-letter short cuts that you may want to print and keep by your computer or memorize are listed below. They will appear in the pop-up tool tips and beside the commands in the pull-downs if you want to see more of the others.

<table>
<thead>
<tr>
<th>2-Letter Short Cut</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>EX</td>
<td>Explode</td>
</tr>
<tr>
<td>LS</td>
<td>Single Line</td>
</tr>
<tr>
<td>LC</td>
<td>Continuous Line</td>
</tr>
<tr>
<td>BR</td>
<td>Break</td>
</tr>
<tr>
<td>OF</td>
<td>Offset</td>
</tr>
<tr>
<td>CV</td>
<td>Spline Curve</td>
</tr>
<tr>
<td>MV</td>
<td>Move (this command allows you to snap precisely)</td>
</tr>
</tbody>
</table>
ER  Erase / Delete
MC  Copy (Multi-Copy)
TR  Trim / Extend
QL  Text (comes from “Quick Line of Text”)
QD  Dimension (Quick Dimension)
QE  Edit (Quick Edit)

**Import / Export Data Groups (easy to find, ready to go!)**

This is the new “Import Data” tool group. It is located on the File pull-down menu and in the Easy Tools area of the Tool Zone. The Import Data group makes it much quicker to find the import tool you need to bring in your ASCII, Pocket Zone Data, DXF and DWG files, CAD Zone backup files, your LTI data, your AIMS and SDR data, and bitmaps and satellite images.

![Import Data](import_data.png)

This is the new “Export Data” tool group. It is located on the File pull-down menu. The Export Data group makes it much quicker to find the export tool you need to save out your work to DXF and DWG files, bitmap images (bmp, jpg, and wmf), and PDF files.

![Export Data](export_data.png)

**Point Label Display (CDT, PZD data points)**

Points and their associated data are placed into the drawing when a Pocket Zone (.pzd), Coordinate Data Table, AIMS, or LTI data is imported. The point labels are no longer loose text on individual layers. Point labels are now point data that’s stored with the point. Each of the labels, Point Number, Elevation, Description, and Notes can be displayed individually or all together with the point. The label text size is screen based and stays the same size on the screen regardless of how much you zoom in and out. You
can even turn all the point labels off and still see the point data by selecting the point and then hover over the point with the cursor and the data will be displayed in the Heads-Up Display.

**Point Labels Control**

The Point Labels Controls can be found on the Setting dialog or by bringing up the Points Labels Control dialog on-screen. Using this dialog to hide or display any or all of the four labels; Description, Notes, Point Number, and Point Elevation. Adjust the screen size of the point labels in the text height dialog using the up and down text size button. The labels will change dynamically on the screen.

**More Tips**

1. You can explode a point label, making it “loose” text in the drawing.
2. The Description labels by default are displayed horizontally. In some cases, descriptions can get in the way of each other such as when the points are in line horizontally. In that case, simply click on the “Rotate Desc Label 45” button in the Points Label dialog. This will display the Description labels at a 45 degree angle.

**Description Test at 0 Degree Rotation**

**Description Text at 45 Degree Rotation**

**Note:** You can select a single or multiple point labels and explode them with the “Explode (EX)” command. Only do this if you need to have complete control over the text. Once exploded, it is no longer a Point Label and will not be affected by the Point Label dialog. It is just plain text and can be moved, erased, and modified like normal text.
3 Ways to Open the Point Labels Dialog

There are three ways to bring up this dialog after you have selected a point.

1. Hit the <Tab> key on your keyboard.
2. Right click and select Point Labels Control from the right click menu.
3. Open Layer Manager and try to make any changes to any of the Point Labels layers. Layers that contain data have a green diamond next to them in the Layer Manager. Orange diamonds appear next to layer names that were once used before Point Labels. They match the Point Data display names even though the actual data is NOT contained in the layer. If you try to modify a layer with an orange diamond next to it then the Point Labels dialog will automatically pop up.

Point Data and Heads-Up Display

You can select a point that contains point data and he data will be displayed on the Heads-Up Display, even if the point data isn’t displayed on the point. This snapshot show a point selected that has point data turned off. The Point Number, Description, Elevation, and X, Y coordinates are displayed on the Heads-Up Display.

Select Like Surfaces (change textures in the drawing)

You can “Apply” a new pattern to a selected pattern in the drawing with the Texture/Hatch tool. In some cases you may have used the surface tool to generate a pattern that’s created with multiple triangles or sections. If you wanted to change all of these sections to a different pattern you can easily select all the section of that particular pattern by selecting one section and then clicking on the “Select Like Surfaces” tool. It will go through the drawing and select all the surface sections that match the selected section. At this point you can “Apply” a new pattern to all of them at once.

In the following series of images, the flat grey road fill and green grass fill were changed to an asphalt and grass texture using the above methodology.
Solid fill for road and grass  Select a road fill section  Click on “Select Like Surfaces”

Select and apply new texture  Repeat and apply to grass  Finished Product

TIP: After selecting like surfaces and applying a new texture you may want to send the bitmap to the back or front of the display. In the above example, we want to send the asphalt and grass to the back of the display. Updating to a new texture moves it to the front or top of the display and it will cover up the vehicles, trees, and other objects built on top of the surfaces. Once the texture (texture sections) are selected simply click on the “Send to Back” or “Send to Front” button. Refresh the screen to verify the display is correct.

Create Your Own Textures

A texture is simply a bitmap. It can be a hand drawn image or photograph as long as it’s a bitmap with the file extension.bmp. This image or bitmap is repeated over and over until it completely fills the selected boundary. A great place to find suitable bitmap textures is on the internet. Every texture included in the program was captured from the internet.

You want images that will stack upon itself as closely as possible top to bottom, left to right. Once you have experimented with creating your own images it will become obvious what works and what does not. The following examples show the textures used for asphalt, leaves, and a tile roof. The image of the tile roof is the trickiest as you can see in the larger textured example.
Using a program such as Windows Paint will allow you to adjust the overall size of the image and convert the image to a bitmap.

**Step 1)** Find a suitable bitmap image. You will most likely have to modify it in a bitmap editing program such as Paint.

**Step 2)** Open the image up in Paint.

**Step 3)** Re-size the image so it is perfectly square. Most of the images included with CAD Zone are roughly 256 x 256 pixels. Grab the “sizing” handles on the lower right hand corner of the image and drag inward until you get the extents of the image you want. The pixel width and height are displayed at the bottom of the Paint program screen.

**Step 4)** Save the image as a 24 bit bitmap from Paint. The image needs to be saved in the Textures folder found under the Custom folder. (`\Cad Zone\Crash Zone 9\Custom\Textures`)

**Step 5)** Open the diagram program. Open the Texture dialog. Look for your new texture in the list and try it out.
Critical Speed Calculator (four methods, validate your calculations)

The Critical Speed Yaw calculator is found in the 3D-Recon-Animate Tool Drawer and has been updated with options for “Fixed Chord,” “ADPC Method”, “Dynamic Chord” calculations, and new features in R Views.

R Views: Using the Critical Speed Calculator on a curve will generate eight different critical speed solutions. The curve will automatically be divided into eight sections and a critical speed will be calculated for each section. The first two sections are divided into 1/4 and 1/3 the overall length of the curve. Both start at one end of the curve. They are labeled R1/4 and R1/3. Six equal and overlapping sections are generated over the entire curve. There are labeled R1 thru R6. This gives you an opportunity to compare critical speed values at different sections of the curve.

Fixed Chord: Set the length of the chord. As many chords the curve can handle at that length will be displayed.

ADPC Method (Absolute Data Point Calculation): The ADPC method calculates the chords strictly from the measured data points used to draw the curve and not the curve itself.

Dynamic Chord: Set a custom chord length and then slide the chord to any position along the length of the curve.

Other Tips and Tricks

- Mouse Wheel - roll to Zoom In / Zoom Out
- Mouse Wheel - press down and hold to Pan
- Heads-Up Display On/Off – Type CU to turn the Heads-Up Display text on and off. If on, the HUD text will be displayed in the upper left hand portion of the drawing window.
- Right Click on the circle, arc, and polygon tool Groups to get the first entity from that group, i.e., 2 pt circle, 3 pt arc, and rectangle to draw so you don’t have to pick from the drop down list.
- Double click on text, dimensions, and hatch/texture patterns to edit.
- Repeat the last command with the keyboard Spacebar.
- Use the Shift Key to add and remove selected items to a group of selected items.
- Don’t forget the Blot Out tool to put background fill on text and symbols when you want them to stand out. This works especially well when you place a symbol or text on a surface fill or bit-
map image. The Blot Out tool is found in the View section of the Tool Zone or by right-clicking on the selected symbol or text.

✔ Can’t find a drawing file? Use the File Find tool to find any file on your computer. File Find is on the File pull-down menu. Can’t find a symbol? Use the Symbol Find tool located at the bottom of the Symbol Manager dialog.

**Learning Center (new resources, Update tool)**

For other tips, tricks and help in using CAD Zone, simply go to the Learning Center.

![Learning Center](image)

While in the Learning Center, be sure to check out the links for reconstruction data! Also you might want to click on the Update button to make sure you are running the latest version of the program and to see the latest announcements and other helpful information.

**ABOVE ALL HAVE FUN AND DO NOT BE AFRAID TO EXPLORE THE PROGRAM!**
NOTES: