Using ArcGIS™ Military Overlay Editor

GIS by ESRI™

CONTRIBUTING WRITERS

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Quick-start tutorial

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Using the Military Overlay Editor (MOLE) you can display and edit *MIL-STD-2525B* symbology on your ArcGIS maps. MOLE reads the 15-character *MIL-STD-2525B* Symbol ID from a feature class' attribute table and renders the proper military unit or tactical graphic at that feature's geographic location. This tutorial will guide you through setting up a situation map using friendly forces, enemy forces, and an assortment of tactical graphics in central Texas. In the first exercise you will be introduced to MOLE and learn to display and modify the properties of existing MOLE feature classes. In the second exercise you will learn to modify the layer properties of a MOLE feature class in detail. Then in the third exercise you will create new custom MOLE feature classes in a geodatabase and add military symbols to them.

The data and maps required for these exercises are included on the MOLE installation CD under the tutorial subdirectory. Copy this folder to your computer for use in completing these exercises. You must have ArcGIS and MOLE installed in order to use this tutorial. Also for this tutorial it is assumed that you have a basic understanding of the *MIL-STD-2525B* standard and fundamental knowledge of ArcGIS.

Exercise 1: Displaying MOLE symbols

First, it is important to understand that most operations that are common in using MOLE are standard ArcMap procedures and commands. MOLE is acting as a special renderer that allows ArcMap to conform to MIL-STD-2525B specifications. Copy the tutorial directory from the MOLE installation CD to your local hard drive.

Starting MOLE

1. Start ArcMap by either double-clicking a shortcut installed on your desktop or using the Programs list in your Start menu.

2. Click the button to open an existing map.

3. Double-click Browse for maps, navigate to the location where you saved your tutorial data, and open TutorialEx1.mxd.
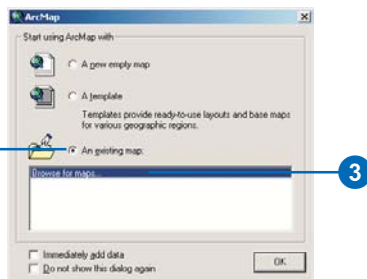
The map should appear similar to the following image.

Open the MOLE toolbars if they are not open already. There are four toolbars: Military Overlay Commands, Military Overlay Tools, Military Tactical Graphics, and Military Force Elements. See Chapter 1, 'Introducing MOLE', for more information about the MOLE toolbars.
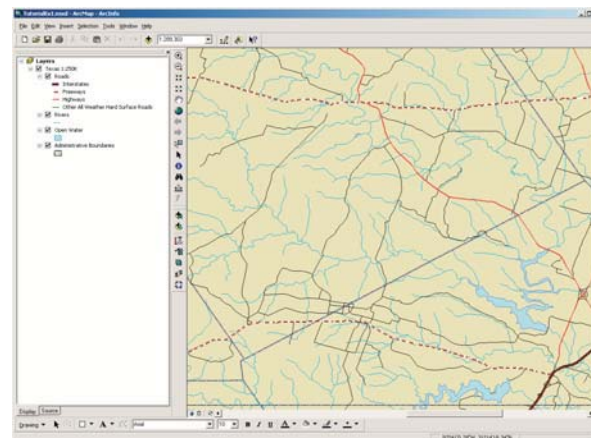
4. Click View in the ArcMap Main menu, point to Toolbars, then click Military Overlay Commands.
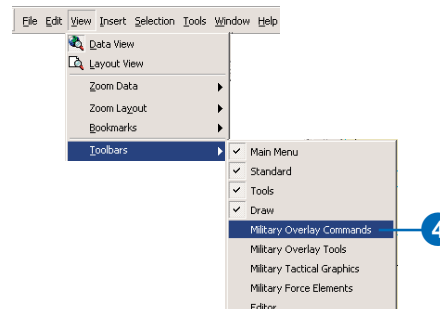
5. Repeat step 4 to open the remaining MOLE toolbars.

6. Arrange the toolbars as you like, either free-floating or docked with other toolbars on the ArcMap application frame.

Opening MOLE force element layers

After you've opened the tutorial map, you should see some basic roads, rivers, and other geographic features. Now you need to add some military unit symbols, or force elements, to your map.

1. Click the Add MOLE Data button on the Military Overlay Commands toolbar.

2. In the browse window navigate to the location where you saved the MOLE tutorial data. Open FriendlyForces from the OPLAN.mdb geodatabase.

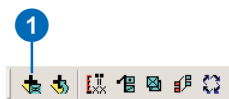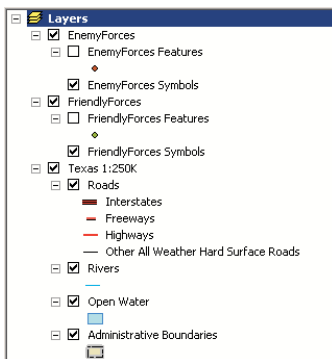   Repeat steps 1–2 to add the EnemyForces feature class. Your ArcMap Table of Contents (TOC) should now look similar to the following image.


Notice that when you add MOLE layers, they are presented in the TOC as a group layer, with their corresponding features also present.

MOLE force element layer properties

MOLE symbology consists of two different types of features: force element features and tactical graphic features. Force element features are point features that represent military units, equipment, or installations. Tactical graphic features are point, line, or polygon features that represent boundaries, obstacles, and directions of movement or attack. In this section you will explore the MOLE force element Layer Properties dialog box.

1. Right-click FriendlyForces Symbols in the TOC, then click Properties.
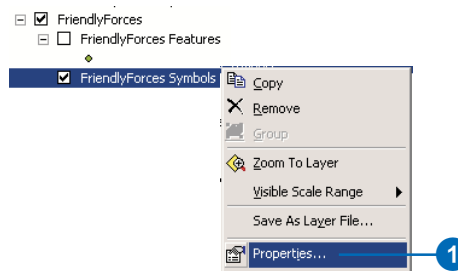
The force element Layer Properties dialog box will be displayed. The parameters within the tabs in the dialog box control the display and behavior properties for this layer.

Explore the options found in each of the tabs. The Layer Properties dialog box will be covered in more detail in the next exercise; for now, simply familiarize yourself with the layer properties options. See the following page for a description of each tab in the Layer Properties dialog box.
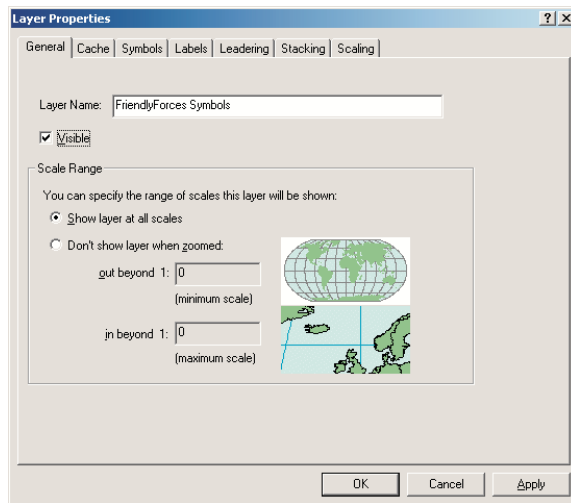
The General tab controls basic layer functions, such as scale dependency, layer name, and its visibility.

The Cache tab allows you to set a database refresh rate. This is only needed if you are working in a multiuser database environment and others are updating the same situation display that you are. You can also change the symbol that displays the current selection.

The Symbols tab allows you to control the appearance of the symbols in the layer. Setting symbol size, color—other than 2525B standards—frame fills, and other specialty functions such as hull polygons for the leaders.

The Labels tab allows you to specify which of the attribute labels gets displayed with the symbol. This does not control access to the attributes, just whether or not they are displayed on the map.

The Leadering tab controls the way units appear on leader lines, the leader line style, and the line symbol used for the leader itself. You can also set the leader tolerance here.

The Stacking tab controls the rules used to make unit stacks. The stacking tolerance can also be set here.

The Scaling tab allows you to set echelon-dependant display scales.

**Opening MOLE tactical graphic layers**

Now, your situation map consists of a few geographic features with symbols representing the ground locations of friendly and enemy forces. In order to make the map an effective planning tool you need to add graphics, which will aid in regulating movement of troops, including lane boundaries and obstacles. You will now add some tactical graphics to your map.

1. Click the Add MOLE Tactical Data button on the Military Overlay Commands toolbar.

2. In the browse window, navigate to the location where you saved the MOLE tutorial data. Open the TacticalLines feature class from the OPLAN.mdb geodatabase.

   Repeat steps 1–2 to add the Boundaries and TacticalAreas feature classes. Your ArcMap data frame should now look similar to the following image.
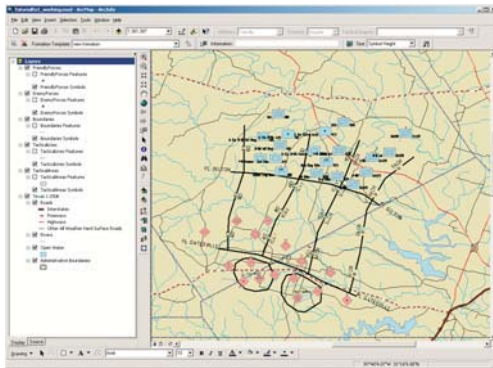
Enabling tactical graphic renderers

MOLE uses different symbology renderers to display different types of tactical graphics, such as obstacles and multipoint arrows. By default, not all of the renderers are enabled initially, so some features in the layers may not be displayed. You need to activate the necessary renderers so that all of the features will be displayed.

1. Right-click TacticalLines Symbols in the ArcMap TOC and click Properties.
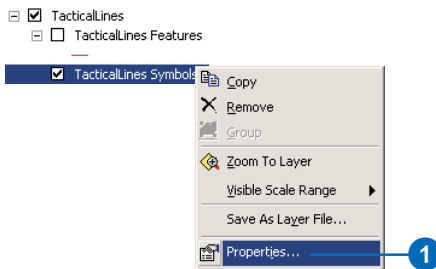
2. Click the Renderers tab in the Layer Properties dialog box.
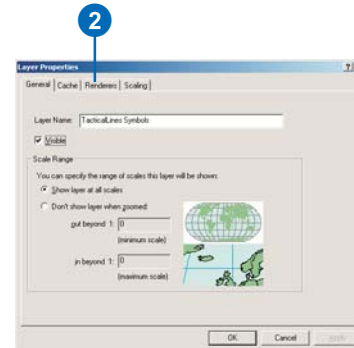
There are two list frames within the renderers tab. The frame on the left contains a list of enabled (associated) renderers, while the frame on the right contains a list of available nonassociated renderers.

3. Click Multipoint Arrows in the Available Compatible Renderers frame.

4. Click the arrow to place Multipoint Arrows inside the Associated Renderers frame.

5. Click Apply and observe the arrows that are now displayed in the data frame.
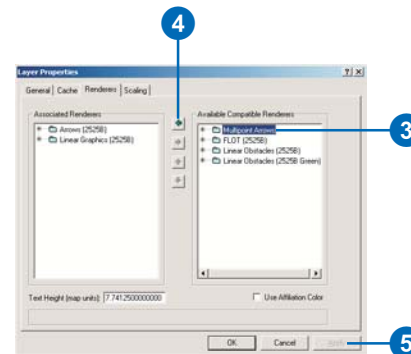
Repeat steps 3–5 to enable the Linear Obstacles (2525B) renderer and observe the features that are now displayed in the data frame, which should appear similar to the image below. Click OK to close the Layer Properties dialog box.

All features in the TacticalLines feature class are now displayed as all of the necessary renderers have been enabled.

You also need to enable an additional renderer for the TacticalAreas feature class.

6. Right-click TacticalAreas Symbols in the ArcMap TOC and click Properties.

7. Click the Renderers tab in the Layer Properties dialog box.

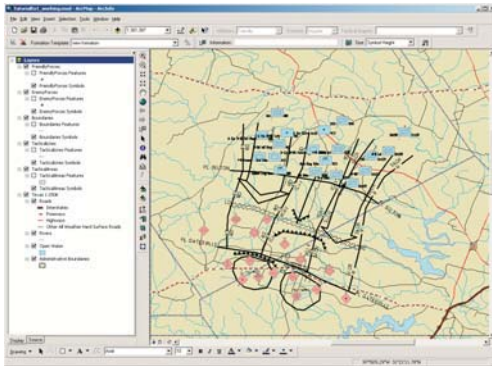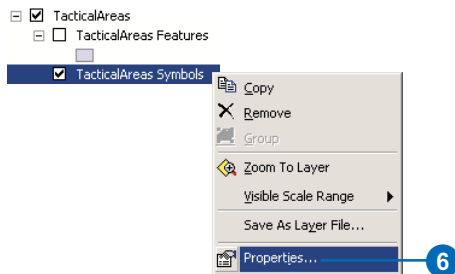8. Click Area Obstacles (2525B) in the Available Compatible Renderers frame.

9. Click the arrow to place the renderer in the Associated Renderers frame.

10. Click OK and observe the new area feature in the lower-left corner of the map.
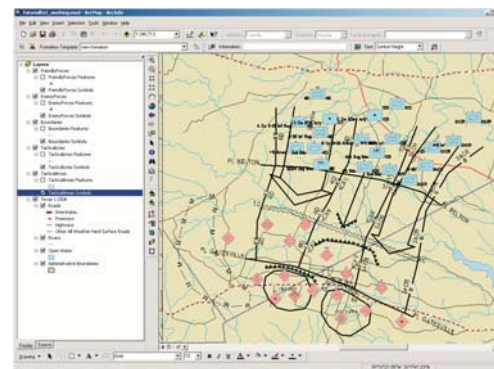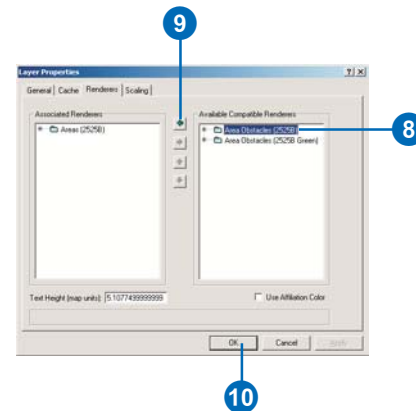
The situation map now contains all available tactical graphic and force element features.

Modifying MOLE layer properties from the Military Overlay Tools toolbar

When you change the display properties of a MOLE layer from its Layer Properties dialog box, the changes are only applied to that particular layer. When you modify the display from the various MOLE toolbars, the changes are applied to all applicable layers. In this section you will explore how to control layer properties through the tools on the toolbars.

1. Uncheck the Boundaries, TacticalLines, and TacticalAreas check boxes in the ArcMap TOC in order to turn off those layers and clear up the display.

2. Ensure Symbol Height is selected in the Size dropdown list in the Military Overlay Tools toolbar, then click the Set Size button.
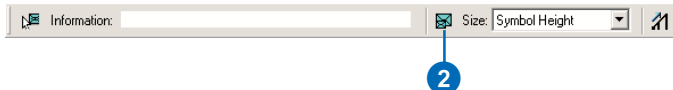
3. Click and drag in the data frame to draw a bounding rectangle.

   The unit symbols on the map change size relative to the height of the box you specified. Experiment changing the symbol heights. When you are ready to continue, return the symbols to approximately their original size.

4. Click the Enable Leadering button in the Military Overlay Commands toolbar.
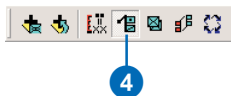
5. Click the Size dropdown arrow in the Military Overlay Tools toolbar, then click Leader Tolerance.

6. Click and drag in the data frame to draw a quarter-sized circle.

   The symbols should now be grouped together in several different leaders and should appear similar to the image below.
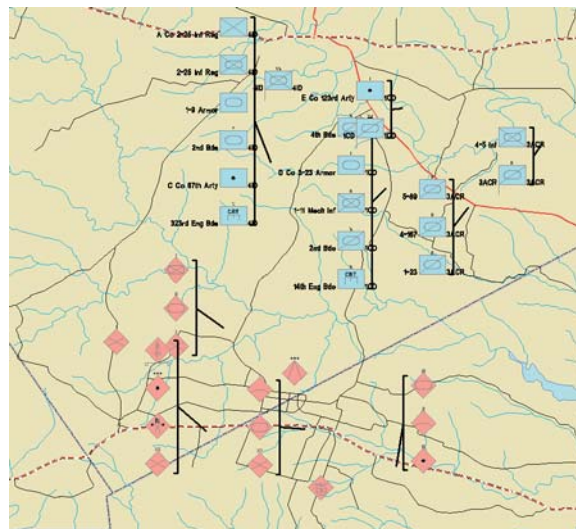
The leader tolerance refers to the maximum distance that force element features can be from each other in order to be grouped together onto a leader. The larger the tolerance—or the larger the circle you draw—the greater the number of force elements that will be grouped together.

You can move the leaders around to place them in better positions.

7. Click the Move Leader button in the Military Overlay Tools toolbar, then click on a leader in the data frame and drag it to a new location in the map.


Since the force elements are leadered together they have been moved from their original positions in the map. MOLE allows you to identify force elements and their true geographic location.

8. Click the check box next to FriendlyForces Features in the ArcMap TOC in order to check it.

   The actual locations of the force elements will be displayed as points.

9. Click the Select Graphics button in the Military Overlay Tools toolbar.
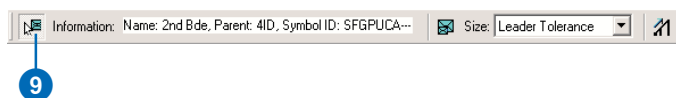
10. Click on a force element symbol, either on a leader or a unit by itself.

   Note that some basic information about the element is displayed in the toolbar's Information text box. The symbol will be outlined in red, and the point representing its ground location will be highlighted.

11. Close the map without saving changes, or save the map with a new name.

In this exercise you were introduced to some basic MOLE functions and learned how to open MOLE layers and different methods for modifying their display properties in ArcMap. In the next exercise you will learn in depth how to modify the layer properties of MOLE force element layers.

Exercise 2: Editing MOLE layer properties

One of the most important aspects of a map is the way it presents the information it is conveying. MOLE provides many options for displaying force element symbols and controlling the appearance of your situation map.

You were introduced to the MOLE force element Layer Properties dialog box in the last exercise. In this exercise you will explore the Layer Properties dialog box in depth and practice modifying the display properties of your MOLE force element layers.

**Opening the MOLE Layer Properties dialog box**

1. Start ArcMap by either double-clicking a shortcut installed on your desktop or using the Programs list in your Start menu.

2. Click the button to open an existing map in the ArcMap dialog box.
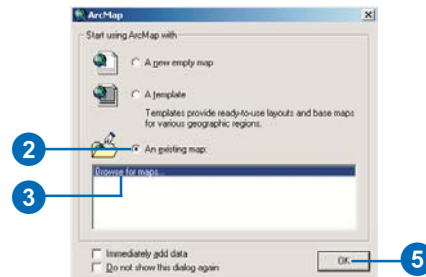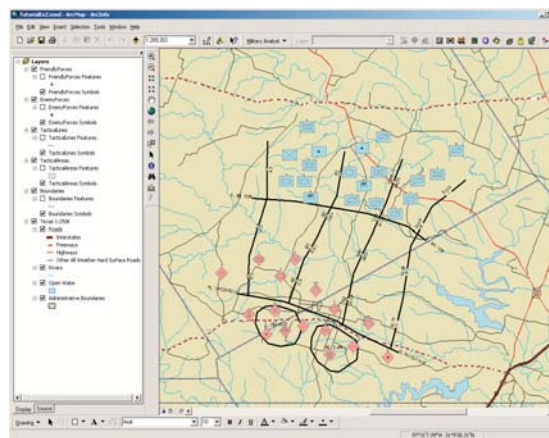
3. Double-click Browse for maps.

   A browse window appears.

4. Navigate to the location where you saved your MOLE tutorial data, click TutorialEx2.mxd, and click Open.

5. Click OK in the ArcMap dialog box.
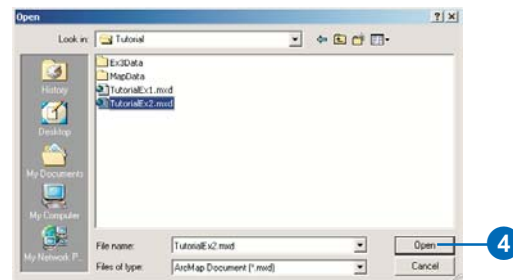
   The map document TutorialEx2.mxd will open.

The map document TutorialEx2.mxd consists of a sample MOLE scenario so you can practice modifying the layer properties.

6. Right-click on the FriendlyForces Symbols layer in the ArcMap table of contents.

7. Click Properties in the Layer menu.

The MOLE force element Layer Properties dialog box will open.

You can also double-click on the layer to open the Layer Properties dialog box.
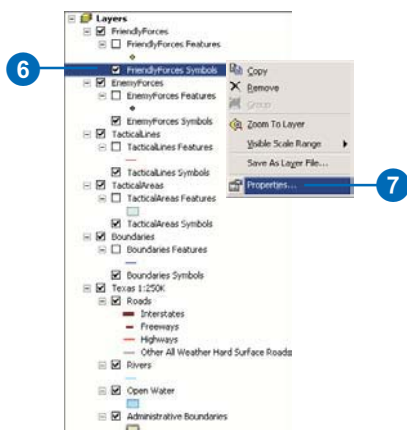
MOLE Layer Properties Symbols tab

From the Symbols tab in the MOLE Layer Properties dialog box you can modify the size and color of the force element symbols of a single MOLE layer. You can also add graphics to assist in visualizing stacked and leadered force elements; this will be covered later in this exercise.
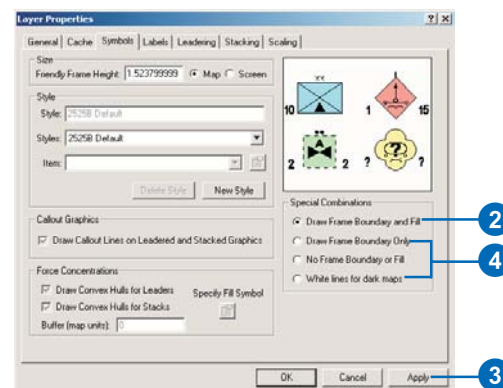
1. Click on the Symbols tab in the MOLE Layer Properties dialog box.
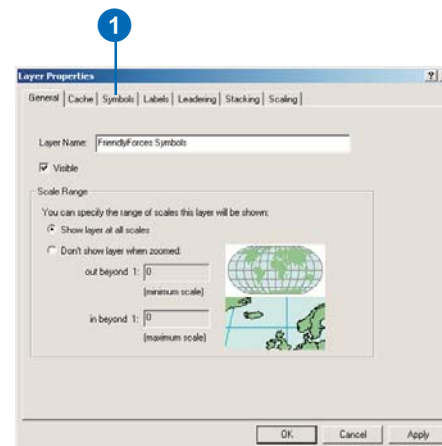
2. In the Special Combinations area, click the Draw Frame Boundary Only button. Observe the changes in the preview window.

3. Click Apply and observe the changes to the layer.

4. Repeat steps 2 and 3 for the other options in the Special Combinations field.

5. Click the Draw Frame Boundary and Fill button to return the symbols to the default symbology and click Apply.
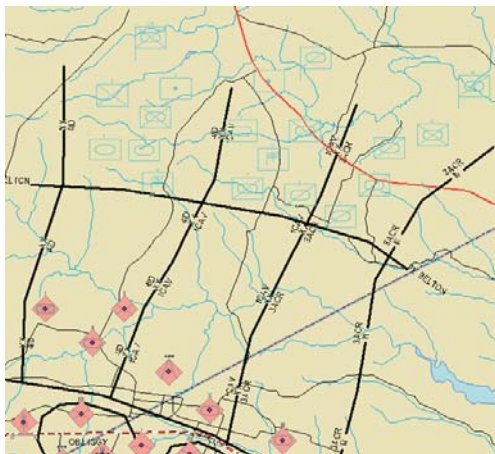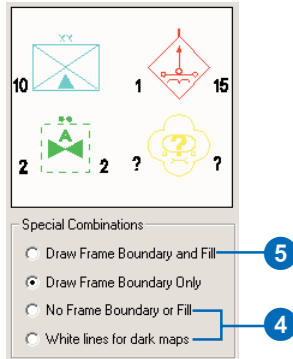
Only the outlines of the force element symbols are displayed when the Draw Frame Boundary Only option is selected.

6. Click New Style in the Layer Properties dialog box.
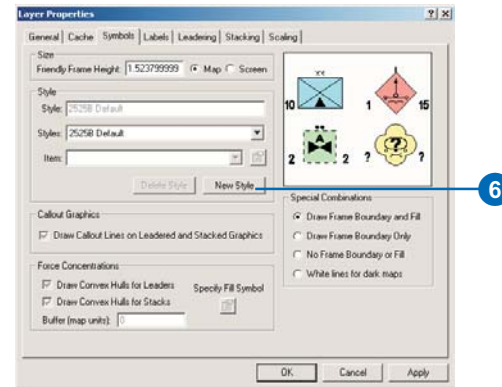
7. Click the Item dropdown arrow.

8. Click Friendly Present Frame Fill from the dropdown list.
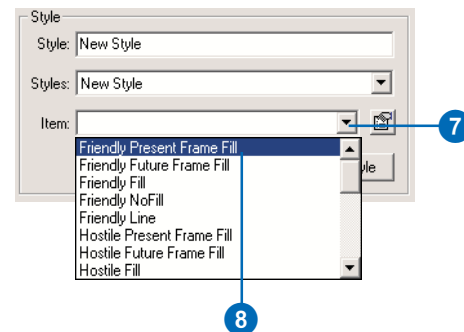
The Symbol Properties Editor dialog box will open.

9. Click the Color dropdown arrow.

10. Click Ultra Blue.

11. Click OK.
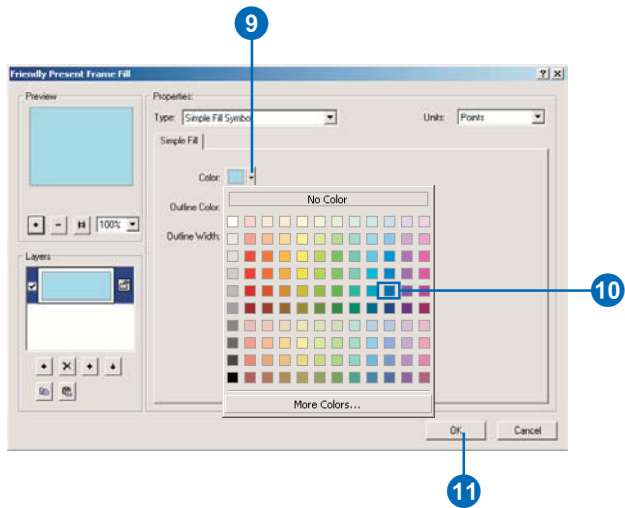
12. Observe the changes in the Layer Properties Symbols preview window.
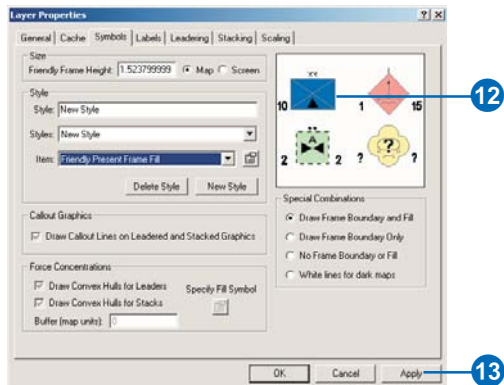
13. Click Apply and observe the changes to the layer in the data frame.

14. Click the Styles dropdown arrow, then click 2525B Default.

15. Click Apply to revert the layer to its original symbology.

You can also change the size of the symbols from the Layer Properties dialog box. There are two ways to set the symbol size. The first way is to set the symbols to the scale of the data frame by specifying a symbol height in map units. The second way is to set the symbol height to a fixed percentage of the data frame height so that the symbols remain the same size regardless of the scale.

16. Click the Map button in the Size area of the Layer Properties dialog box.

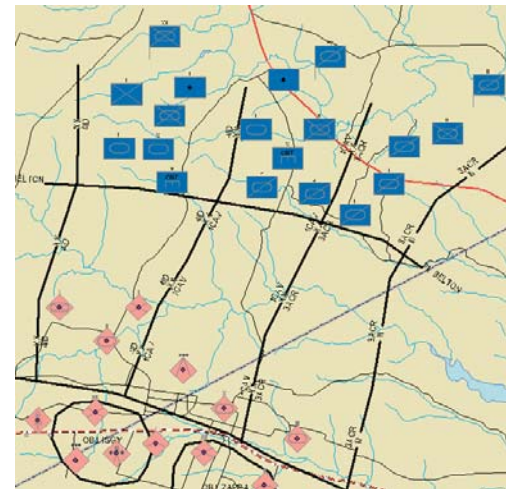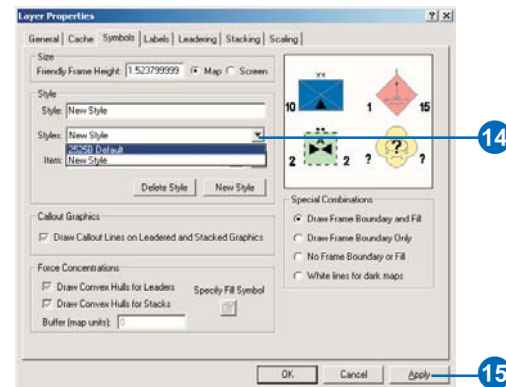17. Double-click on the value in the Friendly Frame Height text box so that it is highlighted. Type in the value "0.005" and click Apply.
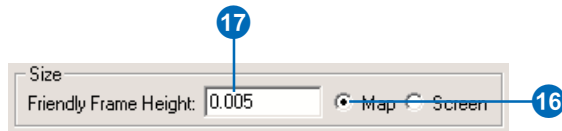
With the Map button selected, the symbols will be displayed in the specified number of map units, which are decimal degrees in this case.
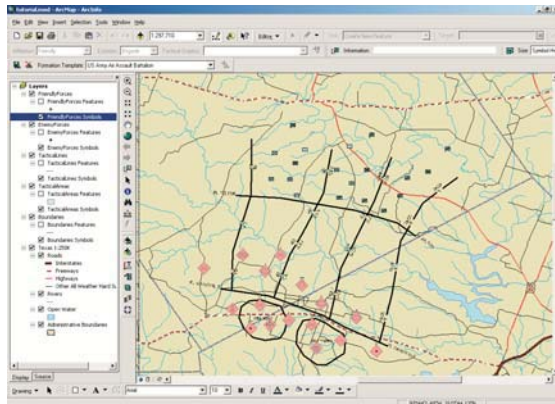
18. Click the Screen button.

19. Double-click the value in the Friendly Frame Height text box so that it is highlighted. Type the value "0.1" and click Apply.
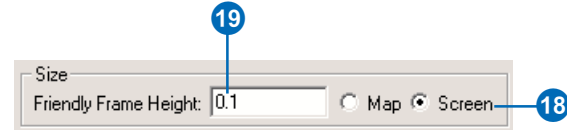
The height of the symbols in the layer will be displayed at 10 percent of the data frame height, and will remain at this constant size as you zoom in and out.
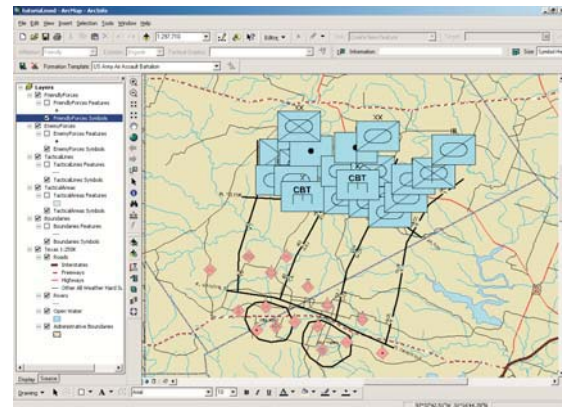
20. Click the Map button.

21. Double-click the value in the Friendly Frame Height text box, type "0.01", and click Apply.

Many of the properties you change in the Layer Properties dialog box, such as symbol size and leadering, can also be changed using tools on the MOLE toolbars. The difference is that when you change properties from the 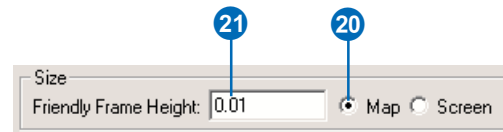toolbars the changes are applied to all force element layers within the table of contents. When you change properties from the Layer Properties dialog box the changes are only applied to the particular layer you are currently working with. See 'Exercise 1: Displaying MOLE symbols' earlier in this chapter for more information.

MOLE Layer Properties Leadering tab

Leadering is a way to organize and group the force element symbols being displayed based on rules that you specify from the Layer Properties dialog box. It is useful if you have many overlapping symbols and want to clean up the display, or if you want to group related units together or define perimeters or areas of interest for formations.

Before you apply the leadering settings, turn on the labels around the symbols so the parent unit label is displayed.

1. Click the Labels tab in the Layer Properties dialog box.

2. Click the All On button and examine the choices in the Label Visibility list box and the Examples window.

3. Click All Off.

4. Click the Parent Formation check box and click Apply.
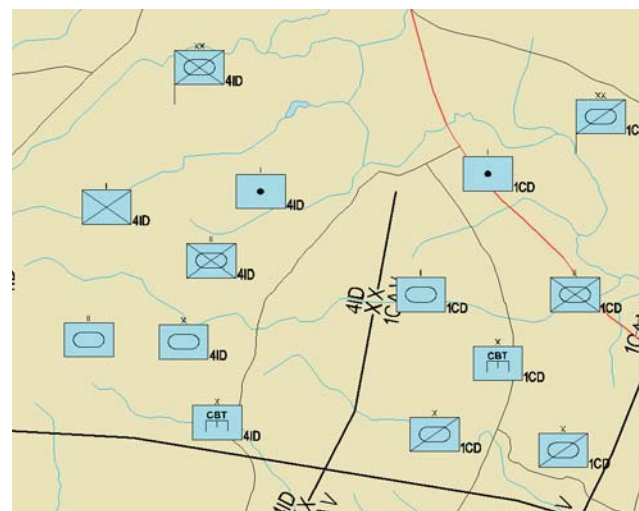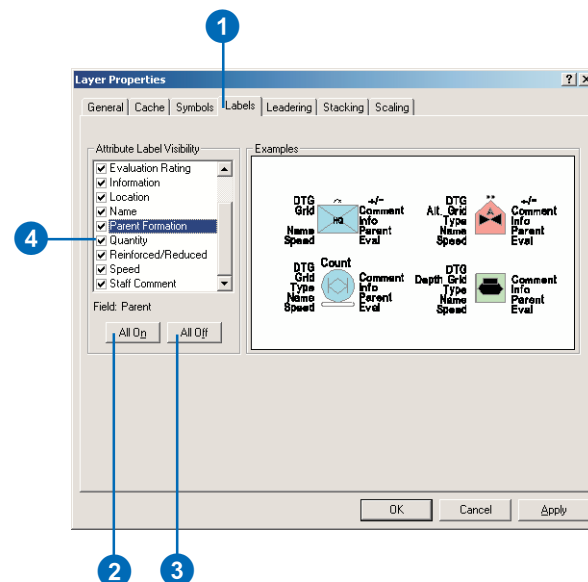
The parent label as it appears in the display

Familiarize yourself with the Leadering tab.

5. Click the Leadering tab in the Layer Properties dialog box.

6. Click the Enable Leadering check box.

7. Click on each of the Leadering Rules so that they are highlighted and note the description of each one below the list of rules.

There are three different rules upon which to base leadering. The Matching Affiliation Rule groups all force elements within a layer that have the same affiliation property. This means all friendly graphic are placed together in a leader, all enemy graphics are placed in a different leader, and so on. The Matching Higher Formation Rule groups all force elements that belong to a common higher formation, or parent unit. The Proximity Rule groups force elements that are within a specified distance of each other. The distance can either be an explicit distance in map units or a multiple of the symbol height. For this exercise you will use the Matching Higher Formation Rule.

8. Click on each of the Available Leader Styles and note the appearance of each in the preview window. Ensure Bracket Leader Style is selected before moving on.

9. Check the Matching Higher Formation Rule check box and make sure the check boxes of the other rules are unchecked, then click OK.
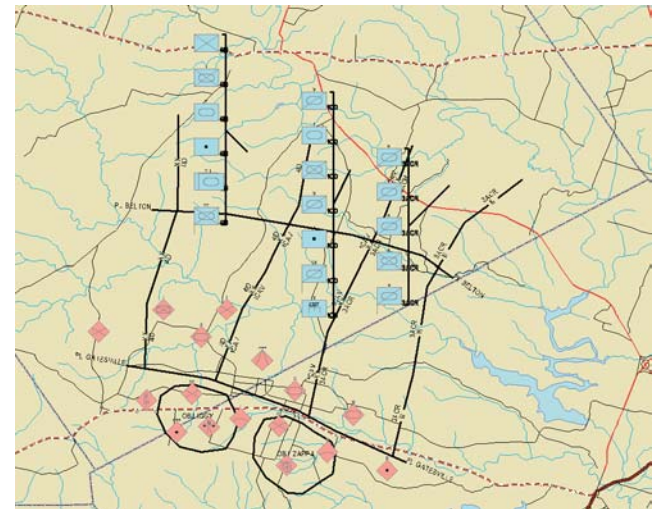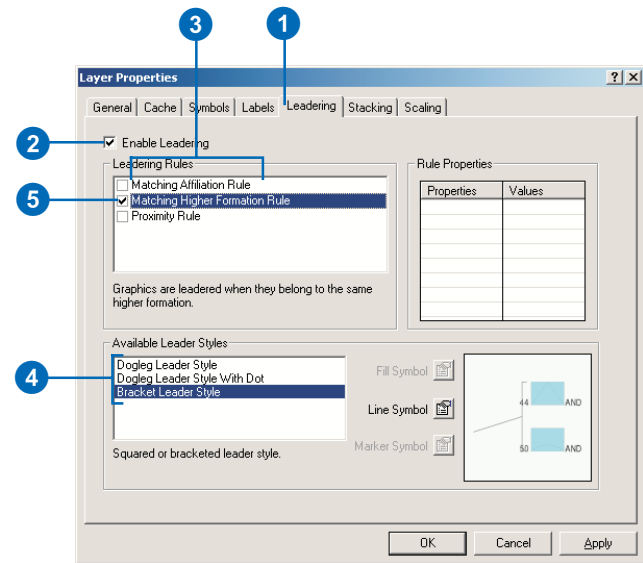
Now that the symbols are leadered they have moved from their original positions. To see the ground locations of the symbols, display the FriendlyForces Features.

10. In the ArcMap table of contents click the FriendlyForces Features check box.
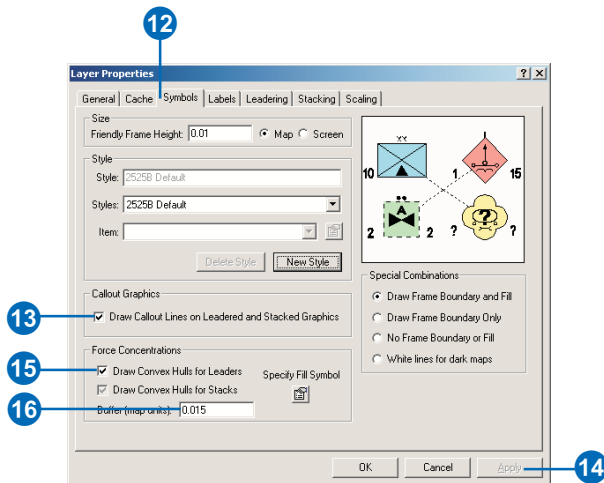

11. Double-click FriendlyForces Symbols in the table of contents. The Layer Properties dialog box will open.

12. Click the Symbols tab in the Layer Properties dialog box.

13. Click the check box to Draw Callout Lines on Leadered and Stacked Graphics.

14. Click Apply.
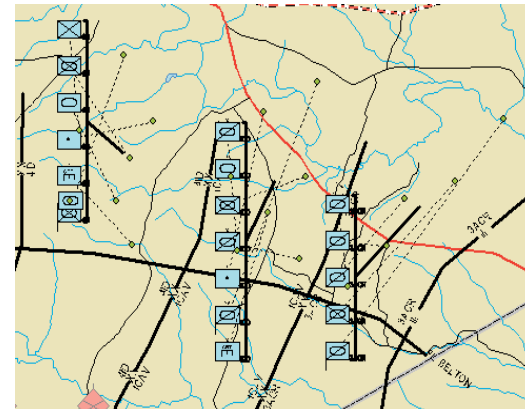
The callout lines connect the leadered MOLE symbols to their feature points, which represent their ground locations. If you select a feature point its corresponding MOLE symbol will be outlined in red.

You can also outline the groups of feature points (force concentrations) that compose each leader in order to define attributes such as areas of responsibility or boundaries.

15. Click the Draw Convex Hulls for Leaders check box in the Force Concentrations frame of the Layer Properties dialog box and click Apply.

16. Type "0.015" in the Buffer (map units) text box and click Apply.

Red lines will be drawn around the points contained by each leader, and the lines will be buffered by 0.015 decimal degrees.

You can change the style of the outlines with the Specify Stack and Leader Convex Hull Symbol dialog box by clicking the Specify Fill Symbol button.
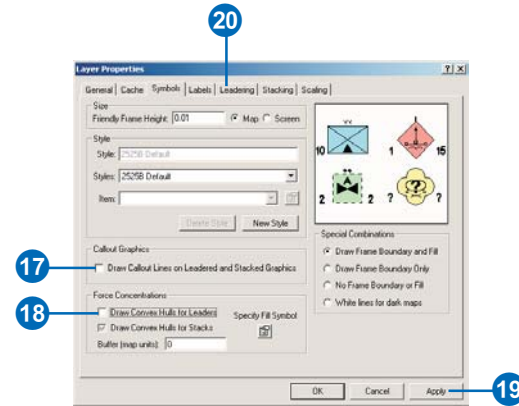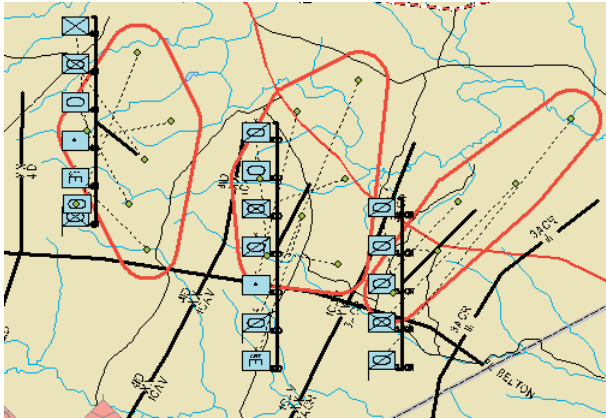
17. Click the Draw Callout Lines on Leadered and Stacked Graphics check box to uncheck it.

18. Click the Draw Convex Hulls for Leaders check box to uncheck it.

19. Click Apply.

20. Click the Leadering tab in the Layer Properties dialog box.

21. Click the Enable Leadering check box to uncheck it.

22. Click Apply.

MOLE Layer Properties Stacking tab

Stacking is another way to group force element symbols together according to rules which you specify in the Layer Properties dialog box. Symbols that meet the criteria you set are stacked on top of each other, rather than being placed in brackets as they are with leadering.

Familiarize yourself with the contents of the Stacking tab.

1. Click the Stacking tab in the Layer Properties dialog box.

2. Click the Enable Stacking check box.

3. Click on each of the Stacking Rules and note the description of each below the list of rules.
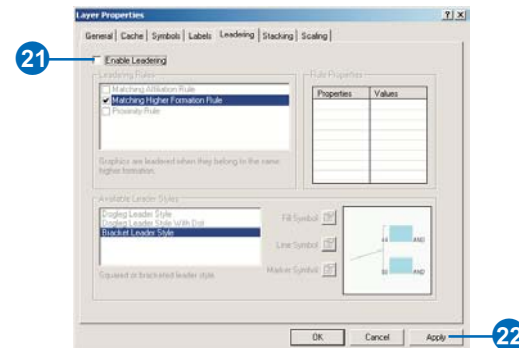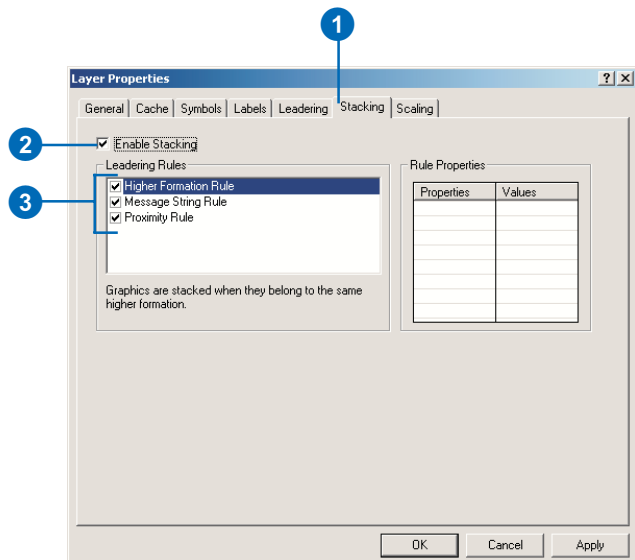

There are three different rules upon which to base stacking. The Higher Formation Rule groups all symbols that belong to a common higher formation, or parent unit. The Message String Rule groups all force symbols with matching Symbol_ID value. The Proximity Rule groups symbols that are within a specified distance of each other, as it does for leadering.

4. Click in the Higher Formation Rule and Message String Rule check boxes to uncheck them.

5. Click on the Proximity Rule to activate the Rule Properties text box.
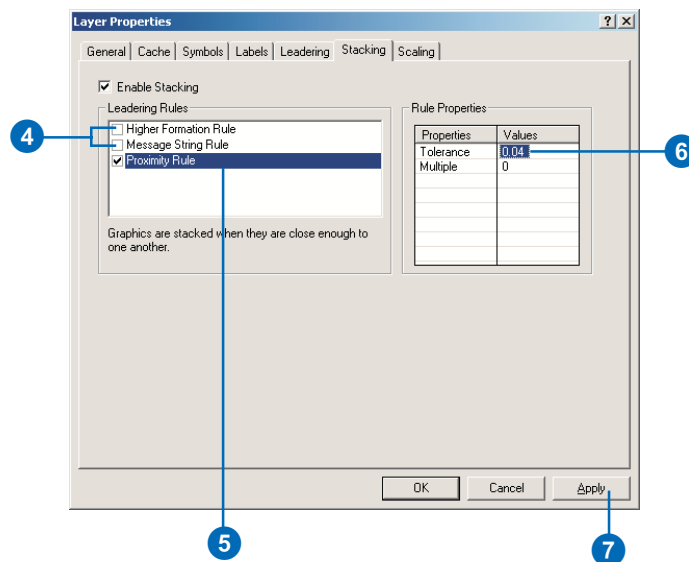
There are two ways to set the stacking distance. Specifying a Tolerance value in the Rule Properties text box sets a minimum distance in map units, which MOLE uses to determine which symbols should be stacked. Symbols within this distance of each other will be stacked together. The tolerance is applied to the center point of the symbols. If a Multiple value is specified it will be multiplied by the Friendly Frame Height value—in the Symbols tab of the Layer Properties dialog box—to define the stacking distance. In both cases, increasing the value will increase the number of symbols being stacked.

6. Left-click and hold in the Tolerance Value field in the Rule Properties text box and type "0.04".

7. Click Apply.

   The symbols within 0.04 decimal degrees of each other will be stacked.

8. Click the Enable Stacking check box to uncheck it, then click Apply.
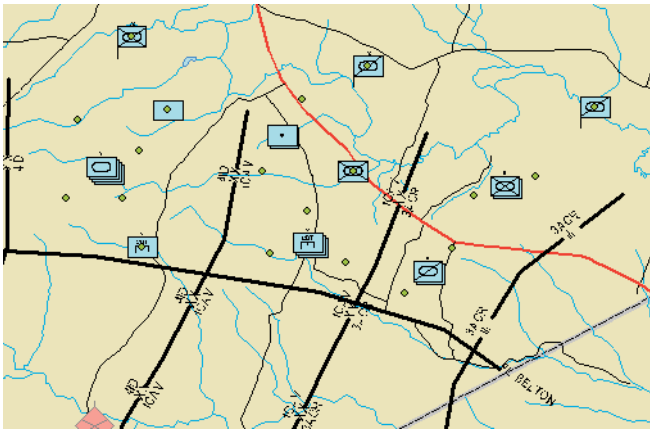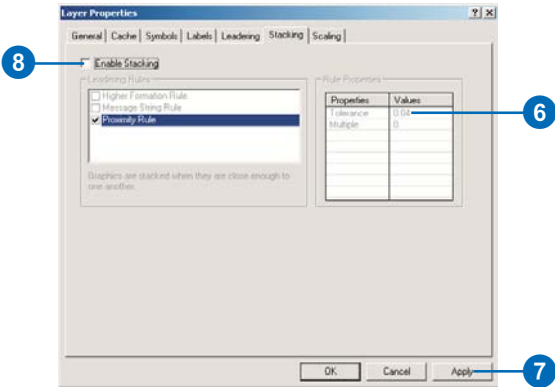
MOLE Layer Properties Scaling tab

MOLE allows you to set scale-dependent display of force element symbols from the Layer Properties dialog box. The scale dependency is based upon the layer's echelon (unit size) property. You can set as many rules for scale dependency as you like. This differentiates it from the Echelon Scaling Equalizer available in the Military Overlay Commands toolbar, which allows a maximum of three rules.

Echelon Filter Name	Echelons (Units) Displayed	Scale Range
Companies	Company	1:0 - 1:150K
Battalions	Battalion - Regiment	1:100K - 1:250K
Brigades	Brigade - Division	1:250K - 1:2M

These are the scaling rules you will create.
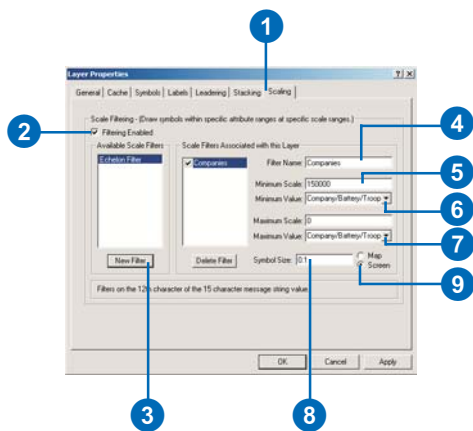
1. Click the Scaling tab in the Layer Properties dialog box.

2. Click the Enable Scaling check box.

3. Click the New Filter button.

   This will be the first scaling rule you will set. You will set a total of three.

4. Highlight "Echelon Filter" in the Filter Name text box and type "Companies".

5. Double-click in the Minimum Scale text box and type "150000".

6. Click the Minimum Value dropdown arrow, then click Team/Crew(A) in the dropdown list.

7. Click the Maximum Value dropdown arrow, then click Company/Battery/Troop(E) in the dropdown list.

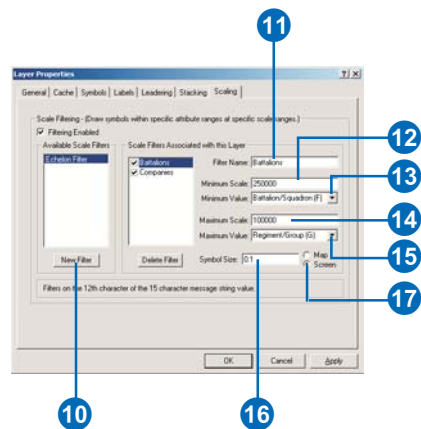8. Double-click in the Symbol Size text box and type "0.08".

9. Click the Screen button.

This causes force element symbols representing company-sized echelons and smaller to only be displayed when you are zoomed into the data frame from the scales 1:0 to 1:150,000.

10. Click the New Filter button.

11. Highlight "Echelon Filter" in the Filter Name text box and type "Battalions".

12. Double-click in the Minimum Scale text box and type "250000".

13. Click the Minimum Value dropdown arrow, then click Battalion/Squadron(F) in the dropdown list.

14. Double-click in the Maximum Scale text box and type "100000".

15. Click the Maximum Value dropdown arrow, then click Regiment/Group(G) in the dropdown list.

16. Double-click in the Symbol Size text box and type "0.1".

17. Click the Screen button.

In addition to the first rule, this causes force element symbols representing battalion and regiment-sized echelons to be displayed from the scales 1:100,000 to 1:250,000. Note that the rules overlap and will both be applied from 1:100,000 to 1:150,000.
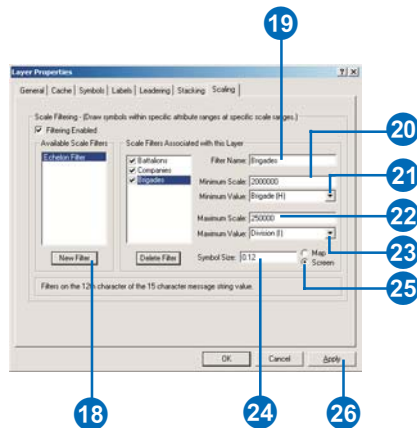

18. Click the New Filter button.

19. Highlight "Echelon Filter" in the Filter Name text box and type "Brigades".

20. Double-click in the Minimum Scale text box and type "2000000".

21. Click the Minimum Value dropdown arrow, then click Brigade(H) in the dropdown list.

22. Double-click in the Maximum Scale text box and type "250000".

23. Click the Maximum Value dropdown arrow, then click Division(I) in the dropdown list.

24. Double-click in the Symbol Size text box and type "0.12".

25. Click the Screen button.

26. Click Apply.

In addition to the first two rules, this causes force element symbols representing brigade and division-sized echelons to be displayed from the scales 1:250,000 to 1:2,000,000.

Now that you have set up your scaling rules, zoom in and out of the data frame and notice that different symbols are displayed at different zoom scales. You can also manually type in a map scale in the ArcMap Standard toolbar to experiment with specific scales.

Close the map without saving changes when you are finished, or save the map with a different name.

In this exercise you learned in detail how to modify and control the layer properties of an existing MOLE force element layer and saw how MOLE allows you to optimize the appearance of your map. In the next exercise you will be introduced to the process of creating new MOLE feature classes and populating them with symbols.

Exercise 3: Creating MOLE layers

In the first two exercises you've learned how to display MOLE symbols and modify their properties. In order to use MOLE effectively you also need to know how to build MOLE layers. In this exercise you will create a personal geodatabase with two custom MOLE feature classes—a force element layer (point) and a tactical graphic layer (line)—and add features to it. Using custom MOLE feature classes in a geodatabase, rather than using shapefiles, gives you an advantage by allowing you to utilize the MOLE symbol editor interface to add and edit tactical graphic and force element features. If your MOLE features are stored in shapefiles, in order to edit or add new features you must manually enter the MIL-STD-2525B symbol IDs associated with the features into the shapefile's attribute table. For more information on geodatabases, see *Building a Geodatabase*. For more information on using ArcCatalog, see *Using ArcCatalog*.

Note: If you are using an ArcView® license, you will not be able to create a MOLE custom object feature class. You can, however, copy and modify existing custom object feature classes. Included on the MOLE installation CD is a personal geodatabase named MOLEtemplate.mdb. It contains an empty MOLE custom feature class for each possible type of MOLE feature. Copy the geodatabase to a folder on your computer, then complete the following steps. If you are an ArcEditor™ or ArcInfo™ user, skip ahead to the section 'Creating a personal geodatabase' in this exercise.

MOLEtemplate.mdb for ArcView users

1. Start ArcCatalog by double-clicking a shortcut installed on your desktop or using the Programs list in your Start menu.

2. In the Catalog tree, in the ArcCatalog window, navigate to the folder where you copied the MOLEtemplate.mdb geodatabase to. Right-click MOLEtemplate.mdb and click Rename.
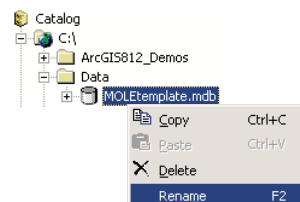
3. Type "Sitmap" in the highlighted area and press Enter.

4. Expand Sitmap.mdb in the Catalog tree by clicking the plus sign (+) next to it. Right-click ForceElements and click copy.
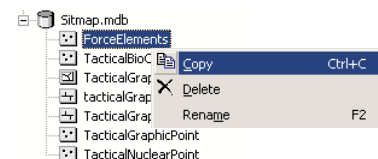
5. Right-click Sitmap.mdb in the Catalog tree and click Paste. Click OK in the Data Transfer window.

   There will now be a feature class named ForceElements and one named ForceElements_1 in Sitmap.mdb.

6. Right-click ForceElements in the Catalog tree and click Rename. Type "Allies" in the highlighted area and press Enter.

7. Right-click ForceElements_1 and click Rename. Type "Axis" in the highlighted area and press Enter.

8. Right-click the feature class in Sitmap.mdb named TacticalGraphicLine and click Rename. Type "Graphics" in the highlighted area and press Enter.

9. Skip ahead to the section in the tutorial named 'Adding MOLE force element layers to the ArcMap display' and continue with the exercise.

Creating a personal geodatabase

1. Start ArcCatalog by double-clicking a shortcut installed on your desktop or using the Programs list in your Start menu.

2. Navigate to the folder where you saved your MOLE tutorial data in the Catalog tree in the ArcCatalog window. Right-click the Tutorial folder, select New, then click Personal Geodatabase.
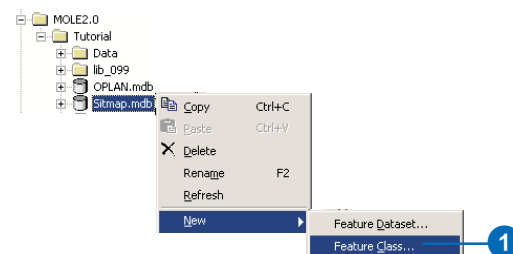
   An empty geodatabase, New Personal Geodatabase.mdb, will appear in the Catalog tree.

3. Right-click the file New Personal Geodatabase.mdb, then click Rename.

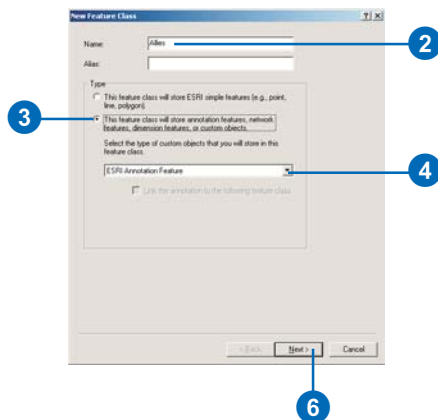4. Type "Sitmap" in the highlighted area and press Enter.
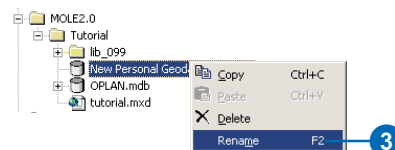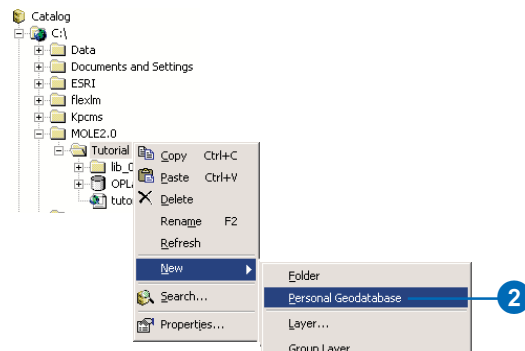
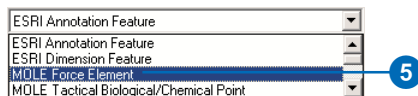## Creating custom MOLE force element feature classes

1. Right-click Sitmap.mdb in the Catalog tree, click New, then click Feature Class.

2. Type "Allies" in the Name text box in the New Feature Class dialog box.

3. Click the button to store custom objects.

4. Click the custom objects dropdown arrow.

5. Click MOLE Force Element from the custom objects dropdown list.

6. Click Next in the New Feature Class dialog box, then click Yes in the message box asking if you want support for Z values.

7. Click Next again, keeping the Default button selected.

8. Click Shape in the Field Names list. In the Field Properties list, ensure that Spatial Reference is set to GCS_WGS_1984. If it is, click Finish and skip to step 13.
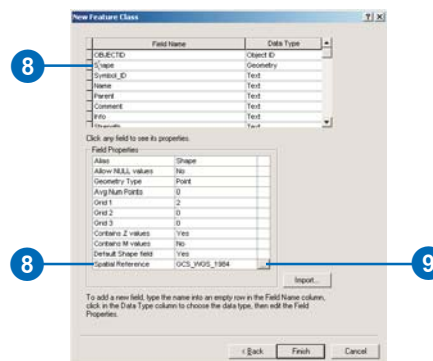
9. Click the ellipse next to the Spatial Reference field if the Spatial Reference is not set to GCS_WGS_1984.

10. Click Select in the Spatial Reference Properties dialog box.

11. Navigate to and select Geographic Coordinate Systems > World > WGS 1984.prj in the browse window, then click Add.

12. Click OK in the Spatial Reference Properties dialog box, then click Finish.
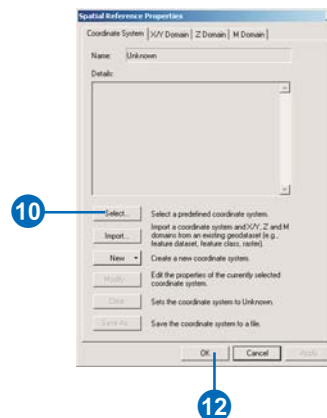
13. Repeat the preceding steps to create another MOLE force element feature class, Axis, in the Sitmap geodatabase.

Now you will create a MOLE tactical graphic custom feature class.

Creating custom MOLE tactical graphics feature classes

1. Repeat steps 1–4 from the last procedure, creating the feature class Graphics.

2. Click MOLE Tactical Graphic Line from the custom objects dropdown list.
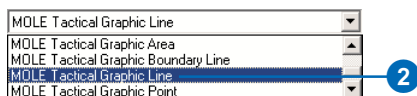
3. Repeat steps 6–12 from the last procedure.

Adding MOLE force element layers to the ArcMap display

The feature classes you created in the previous set of steps are initially empty. The next step is to populate them with MOLE symbols. Because you created custom feature classes in a geodatabase you will be able to take advantage of the MOLE symbol editors, which makes it easy to edit the feature classes and add symbols to them. First, you need to open the feature classes in ArcMap.

1. Start ArcMap by double-clicking a shortcut installed on your desktop or using the Programs list in your Start menu.

2. Click OK in the ArcMap startup dialog box to open an empty map.

3. Open the MOLE toolbars following the steps in Exercise 1, if they are not already displayed.

Before opening the MOLE layers you should display a base layer to use as a geographic reference for adding MOLE symbols in your area of interest. For this exercise use the tutorial data for the background.

4. Click the Add Data button in the ArcMap Standard toolbar.

5. Navigate to the folder where you saved the MOLE tutorial data, open the Ex3Data folder, and open Texas_Sub.lyr.

6. Click the Add MOLE Tactical Data button in the Military Overlay Commands toolbar.

   This button is used to open MOLE tactical graphic layers.
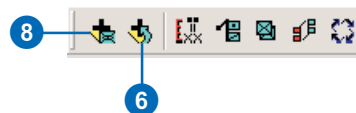
7. Navigate to Sitmap.mdb and open Graphics.

8. Click the Add MOLE Data button in the Military Overlay Commands toolbar.

   This button is used to open MOLE force element layers.

9. Navigate to Sitmap.mdb and open the Allies and Axis feature classes.

The feature classes are now displayed in the ArcMap table of contents (TOC). Note that each MOLE layer is actually a group layer composed of a simple point or line feature layer and a MOLE symbol layer.

Simple point feature

MOLE symbol layer
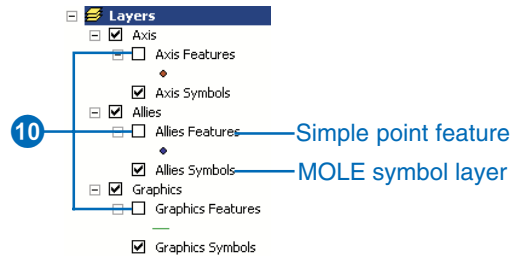
10. Click the check boxes next to Allies Features, Axis Features, and Graphics Features in the TOC to check them.

In order to add symbols to the MOLE layers you must edit the layers.

Adding symbols to MOLE force element layers (Allies layer)

1. Click the Editor Toolbar button in the ArcMap Standard toolbar.
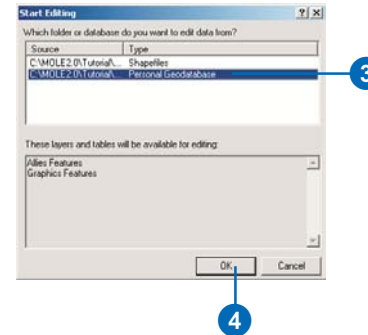
2. Click the Editor dropdown arrow in the Editor toolbar and click Start Editing.
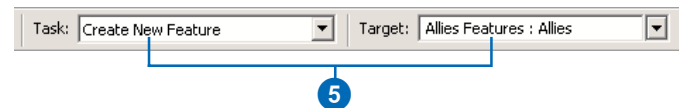
The Start Editing dialog box will open.

3. Click Personal Geodatabase in the table where it asks which folder to edit from.

4. Click OK.

Add features to the Allies force element layer first.

5. Ensure Allies Features is selected in the Editor toolbar as the target and Create New Feature is selected as the task.
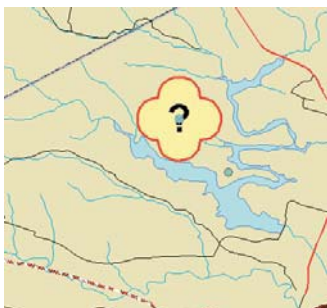
6. Click the Create New Feature button in the Editor toolbar.

7. Click in the data frame to place a point near the lake to the north.

The MOLE unknown force element feature symbol will appear and be selected.

8. Click the Attributes button in the Editor toolbar.

The MOLE Attributes editor dialog box will open. The text boxes around the symbol represent the fields in the MOLE feature attribute table. Values entered in these text boxes will appear as text labels around the symbols in the display. See Exercise 2 in this chapter for more information on labels.
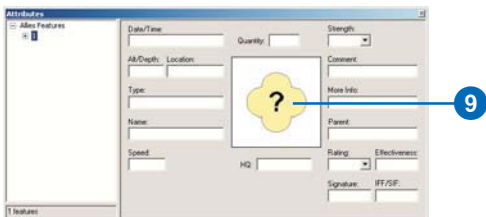
9. Click the symbol in the center of the Attributes editor dialog box to open the MOLE Force Element Symbol Editor.

The Force Element Symbol Editor provides an interface that allows you to quickly add new force elements to the display and change existing ones. You can manually enter the Symbol ID (15-character code) of the desired element, or choose from the list. Changes made to the element are applied to the Symbol ID and saved in the layer's feature attribute table.
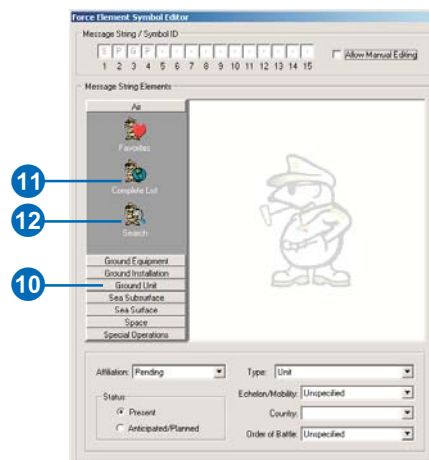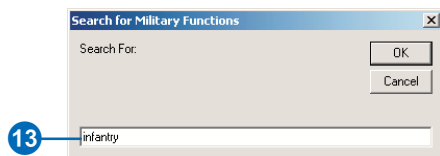

10. Click the Ground Unit button.

11. Click Complete list.

    Scroll down the list and note the units that are available.

12. Click the Search button.

13. Type "infantry" in the search dialog box and click OK.

    Only infantry units will be displayed in the Symbol Editor list.

14. Click Airborne in the list of ground units.

Note that the symbol in the Attributes editor and map display is automatically updated as changes are made in the Symbol Editor. The Symbol_ID field at the top of the Symbol Editor is also updated as changes are made.

15. Click the Affiliation dropdown arrow at the bottom of the Symbol Editor and click Friend.

16. Click the Echelon/Mobility dropdown arrow and click Division.

17. Click the Country dropdown arrow and click United States (US).

18. Click the Order of Battle dropdown arrow and click Ground.

19. Click the Close button at the top of the Symbol Editor to close it and do the same for the Attributes editor.
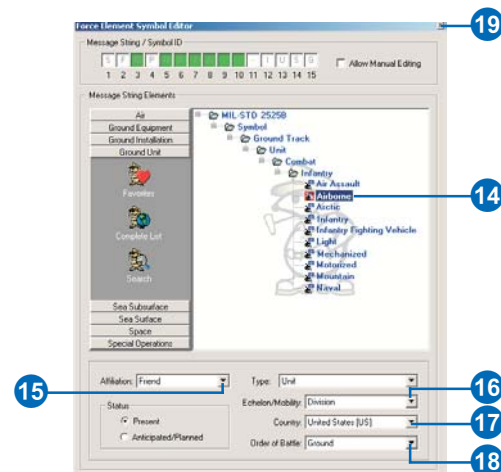

Adding symbols to MOLE force element layers (Axis layer)

Now repeat the previous steps to add a chemical weapons raw materials production facility symbol to the Axis layer.

1. Click the Target dropdown arrow in the Editor toolbar and click Axis Features : Axis.
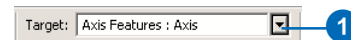
2. Ensure the edit task is set to Create New Feature, then click the Create New Feature button in the Editor toolbar.

3. Click in the data frame to place a point above the lake to the south as shown on the next page.

4. With the new symbol selected, follow steps 8–9 from the previous section to open the MOLE Force Element Symbol Editor.
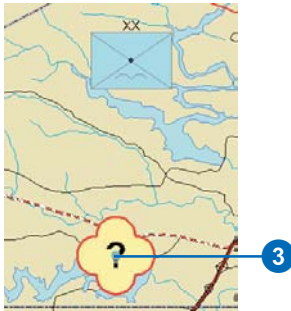
This time the symbol you'll add is a ground installation type element.

5. Click the Ground Installation button.

6. Click Search and type "nbc".

7. Click Chemical in the list of elements matching the search to select it.

8. Set the Affiliation to Hostile and the Type to Installation and keep the default values for the rest of the fields.

9. Close the Symbol Editor and Attribute Editor dialog boxes. Save your edits.

Note how the Friendly and Hostile type symbols are different, as specified in MIL-STD-2525B. You can experiment with adding other types of force element symbols and changing the affiliation and echelon/mobility properties to see the different symbol types that are available.
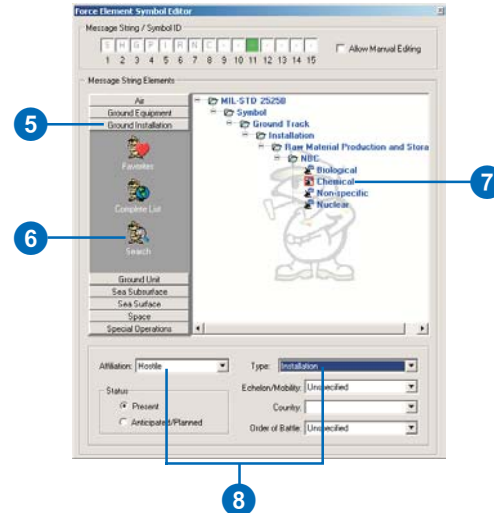

Adding MOLE tactical graphic symbols

Adding MOLE tactical graphic symbols to a map is very similar to adding force elements. For this portion of the exercise it is assumed that you have completed the first part, your MOLE layers and toolbars are displayed, and you have started editing. You will create an axis of advance symbol.

The first step is to enable the necessary MOLE tactical graphic renderers.

1. Double-click the Graphics Symbols layer in the TOC to open the Layer Properties dialog box.
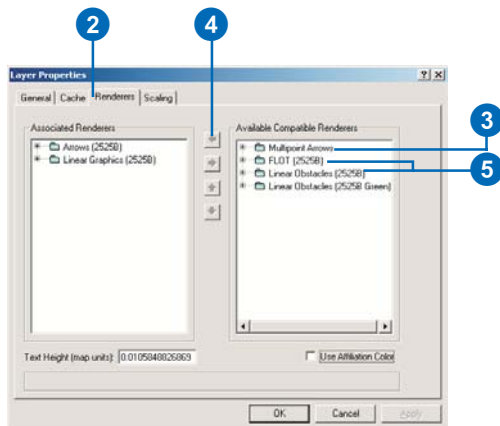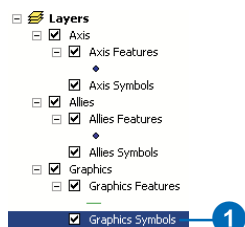
The Associated Renderers list shows the renderers that are currently being used. The Available Compatible Renderers shows the other renderers that are not being used. The renderers in the list can be expanded by clicking the plus sign in order to see the features that are drawn by each renderer.

2. Click the Renderers tab in the Layer Properties dialog box.

3. Click Multipoint Arrows in the Available Compatible Renderers list so it is highlighted.

4. Click the arrow to place the renderer in the Associated Renderers list.

5. Follow steps 3 and 4 for FLOT (2525B) and Linear Obstacles (2525B), then click OK.

6. Click the Target dropdown arrow in the Editor toolbar and click Graphics Features.
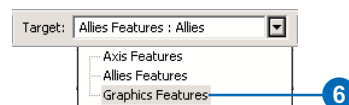
7. Ensure Create New Feature is selected in the Task list in the Editor toolbar.

8. Click the Create New Feature button in the Editor toolbar.

9. Click in the data frame to place the first vertex of the line to the left of the force element symbol you created earlier.

10. Continue placing vertices as shown. To create a multipoint arrow symbol, the final vertex you place must be behind the previous vertex. This will form the arrowhead.

11. To complete the line, press F2 or right-click and click Finish Sketch.
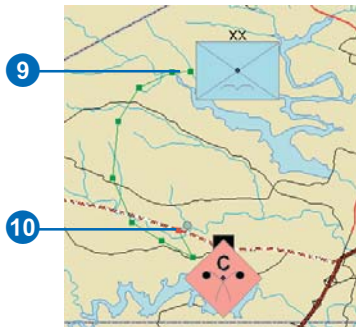
By default, a direction of main attack arrow will be drawn and selected.

12. Click the Attributes button in the Editor toolbar.

The MOLE Attributes editor dialog box will open. As with force elements, the text boxes around the symbol represent the fields in the MOLE feature attribute table. Values entered in these text boxes will appear as text labels around the symbols in the display.

13. Click the symbol to open the MOLE symbol editor.
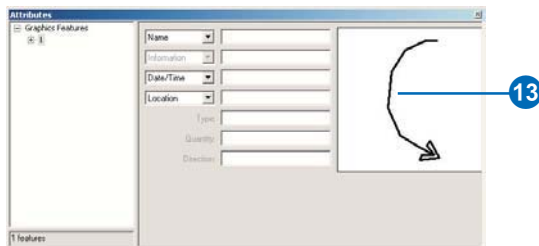
14. Click Complete list.

Note the red box on Direction of Main Attack in the list, indicating that it is the currently selected symbol.
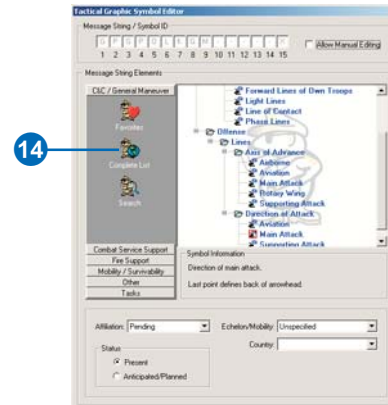

15. Click Supporting Attack under Axis of Advance in the list. Note that the symbol changes in the Attributes editor as well as in the data frame.


16. Close the Tactical Graphic Symbol Editor and the Attributes editor and save your edits.

17. Click the Graphics Feature check box in the TOC to uncheck it. Your ArcMap display should look similar to the image on the following page.
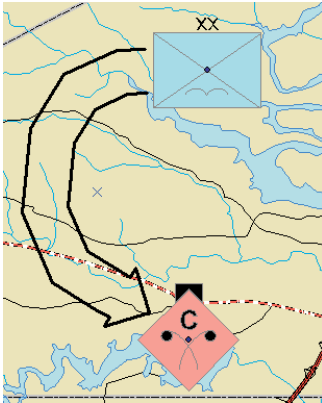
You can continue adding force element and tactical graphic symbols to your map as you wish. Save your edits and save changes to the map.

You can also add tactical graphics by using the shortcuts in the MOLE Tactical Graphics toolbar.
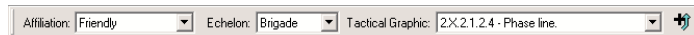
In this exercise you learned how to create custom MOLE feature classes in a geodatabase in ArcCatalog. You also practiced editing the feature classes and adding force element and tactical graphic symbols to them. Continue reading the remaining chapters in this manual in order to reinforce and expand upon what you have learned in these exercises.