

Dimensions in the Geodatabase

By Derek Law, ESRI Education Services

Many ArcGIS users are familiar with annotation feature classes that enable users to store descriptive text as features in a geodatabase. In addition to the two main types of annotation—simple and feature-linked—dimensions are a less well-known type of annotation.

Using Dimensions

[This description of dimension annotation, along with additional information on other feature classes in a geodatabase, can be found in one of the manuals that comes with ArcGIS, *Building a Geodatabase*, by Andrew MacDonald.]

Dimensions show specific lengths or distances on a map. A dimension may be used to show the length of a side of a building or the distance between two features such as a fire hydrant and the corner of a building. A dimension feature is composed of several parts that may or may not be displayed, depending on the application.

ArcGIS supports two types of dimensions—aligned and linear. Aligned dimensions run parallel to the baseline (shown by the blue line in Figure 1) and represent the true distance between the begin and end dimension points (shown in green and red, respectively).

On the other hand, linear dimensions, shown in Figure 2, do not represent the true distance between begin and end dimension points. Linear dimensions can be vertical, horizontal, or rotated.

A vertical dimension's line represents the vertical distance between the begin and end dimension points as shown in Figure 3a. A horizontal linear dimension, shown in Figure 3b, represents the horizontal distance between the begin and end dimension points. A rotated linear dimension, shown in Figure 3c, has a line at some angle to the baseline and a length that represents the length of the dimension line itself, not the baseline.

All dimensions can be oriented either outward or inward. Outward dimensions have dimension lines pointing to the outside of the feature and represent the distance being measured between the two extension lines. Inward dimensions have arrows pointing in from the outside of the feature and measure the distance between these two arrows. Whether a dimension is outward or inward is determined by the distance that the dimension represents and whether that distance on the map is sufficient to display all of the elements of the dimension between the extension lines. Both types of dimension orientation are shown in Figure 4.

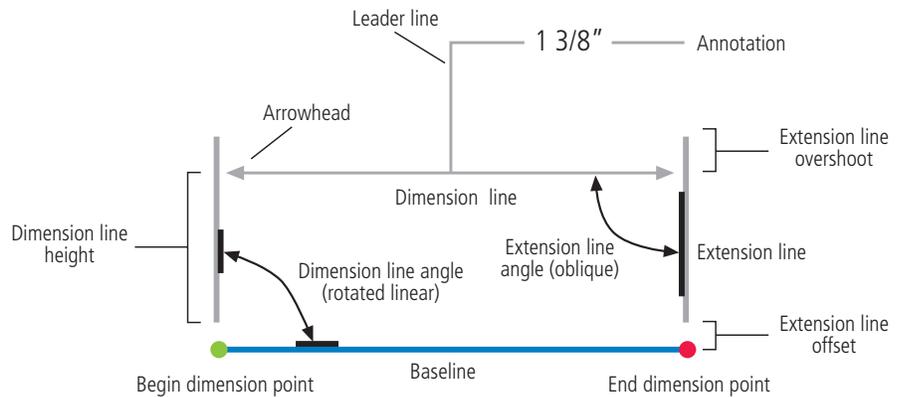


Figure 1: The anatomy of a dimension feature

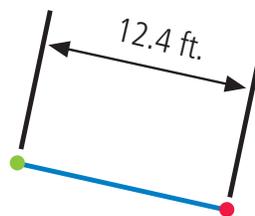


Figure 2: Linear dimensions do not represent the true distance between the begin and end dimension points.

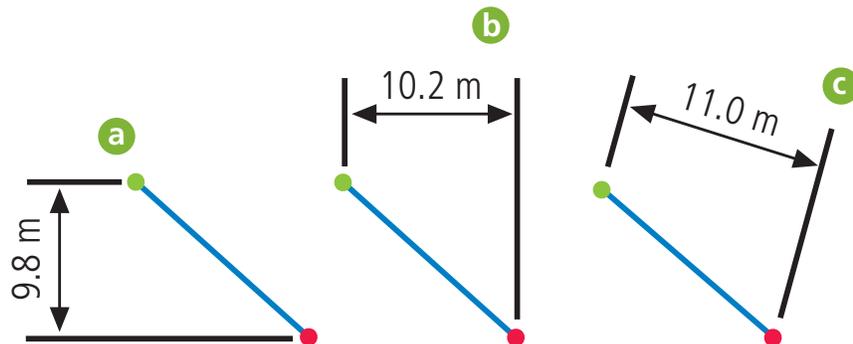


Figure 3: Vertical, horizontal, and rotated dimensions

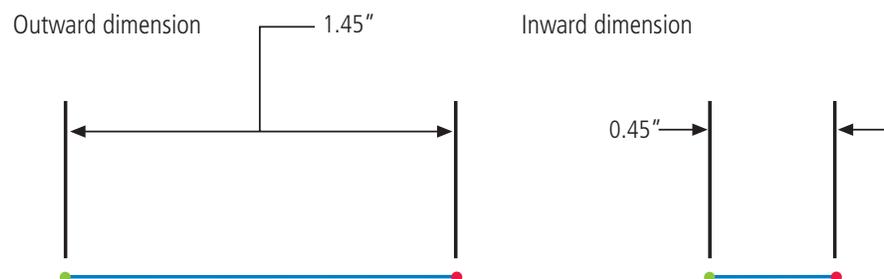
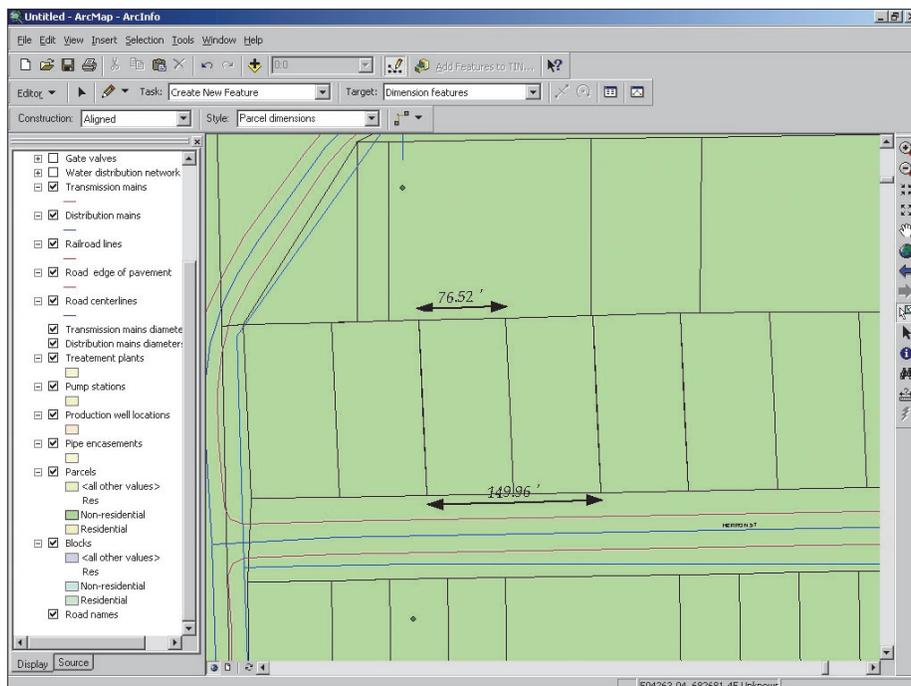


Figure 4: Outward- and inward- oriented dimensions



Dimensions show specific lengths or distances on a map and can be used to show the length of a side of a building or the distance between two features such as a fire hydrant and the corner of a building.

Dimension Feature Classes in ArcCatalog

A dimension feature class can be easily created just like any other feature class in a geodatabase using ArcCatalog.

1. In ArcCatalog's Table of Contents, right-click on the geodatabase to access its context menu and choose **New > Feature Class**.

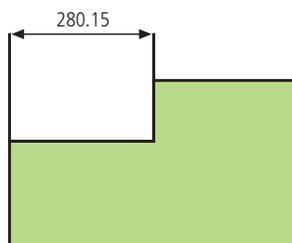
2. The New Feature Class wizard will appear. Give the dimension feature class a name and under the Type section, select the "This feature class will store annotation features, network features, dimension features, or custom objects" radio button option. Then select **ESRI Dimension Feature** from the drop-down list.

3. Click **Next**. In the following panel, a reference scale should be specified along with the map units for the feature class. The reference scale refers to the scale of the map at which the symbology of the dimension feature is viewed at the size described in the style. For example, if the dimension text is set to Arial 12 point, and the reference scale is 1:1,000, then the text will be 12 points at 1:1,000. As you zoom out from this scale, the text becomes smaller, and as you zoom in from this scale, the text becomes larger.

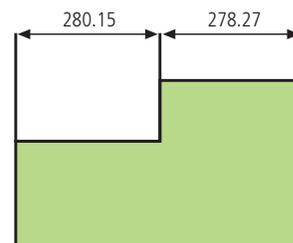
4. A default style for the dimension feature class will need to be specified next. A dimension feature's style describes its symbology, which parts of the dimension are drawn, and how those parts are drawn. Three options are available.

- The default style that is automatically applied by ArcGIS
- A new style created by the user
- A predefined style imported from an existing dimension feature class

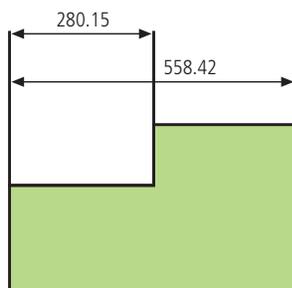
If the user decides to create a style, the appearance of the dimension feature classes can



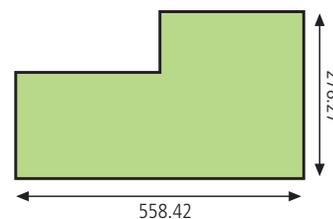
Dimension edge



Continue dimension



Baseline dimension



Perpendicular dimensions

Figure 5: The tool palette has four tools for adding four different types of dimensions—dimension edge, continue dimension, baseline dimension, and perpendicular dimensions.

be customized via the Dimension Style Properties dialog box. Table 1 lists and describes the dimension style properties that were illustrated in Figure 1.

5. Once the dimension style has been set, the user can assign a custom storage keyword for the feature class or just use the default keyword. The keyword, used to help quickly identify the feature class in the geodatabase, is especially useful within enterprise geodatabases.

6. Finally, the attribute fields of the dimension feature class need to be specified. There are several predefined attributes that describe properties of dimension features, but additional attributes can be included. Note that the SHAPE attribute field contains the geometry of the feature class. By selecting this field, then accessing its spatial reference property, the spatial domain and projection of the fea-

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ture class can be defined. A predefined table schema can also be imported. Once everything is set, click Finish and the new dimension feature class is created.

Creating Dimensions in ArcMap

Once a dimension feature class has been created in ArcCatalog, dimension features can be added during an edit session in ArcMap. A dimension feature requires that a specific number of points be entered into the edit sketch to describe its geometry. Standard edit tools can be used to manually input the points required for these construction methods. For example, the Sketch tool in the Editor toolbar can be used to create dimension features.

Choose View > Toolbar > Dimensioning to add the Dimensioning toolbar to an ArcMap edit session. The Dimensioning toolbar contains several autodimensioning tools that enable the creation of new dimension features from existing dimension features and other features. In the Dimensioning toolbar, there are two drop-down lists and one tool palette. The controls on the Dimensioning toolbar are only active during an edit session when the Target layer in the drop-down list in the Editor toolbar is a dimension feature class. The Construction drop-down list contains the methods for constructing dimension features. The Construction method dictates the number of points required to construct a dimension feature and the type of dimension feature created. The Style drop-down list controls the dimension feature's symbology properties.

New dimension features are created and assigned the style that is selected in the Style drop-down list. The tool palette has four tools for adding four different types of dimensions—Dimension Edge, Continue Dimension, Baseline Dimension, and Perpendicular Dimensions. The Dimension Edge tool is only active when a feature is selected. The Baseline Dimension and Continue Dimension tools are only active if a dimension feature is selected.

Dimension	Properties
Dimension line symbol	The symbol used for the dimension line.
Begin symbol	The symbol used for the arrow at the end of the begin dimension line.
End symbol	The symbol used for the arrow at the end of the end dimension line.
Begin dimension point	The symbol used to mark the beginning of the baseline.
End dimension point	The symbol used to mark the end of the baseline.
Dimension line display	Indicates which dimension lines should be displayed: all, begin only, end only, or none.
Arrow display	Indicates which begin and end symbols (arrows) should be displayed: begin only, end only, both, or neither.
Extension line symbol	The symbol used for the extension line.
Extension line display	Indicates which of the extension lines should be displayed: begin only, end only, both, or neither.
Offset	The distance between the dimension point and the beginning of the dimension line.
Overshot	The distance the extension line reaches beyond the dimension line.
Value to display for the text	The actual string that is displayed for the dimension text. This can be the value of the dimension only (the length of the feature or a user-specified value), the value with a prefix and/or suffix, or a custom expression.
Arrow fit and text fit	The adjustment in the display of the arrows and text when the dimension's length is too short to show the arrows and text between the extension lines.

Table 1: Dimension style properties

Dimension features can also be created using Autodimension tools in the tool palette.

Summary

Dimensions are a useful form of map annotation that can help show distances or specific lengths on a map. Both aligned and linear dimension features are supported in ArcGIS, and dimension features have properties that facilitate user customization for a variety of applications. A dimension feature class can be

easily created in the geodatabase, and ArcMap has a special Dimensioning toolbar to add dimension features. See the ArcGIS Desktop online help for additional information.

About the Author

Derek Law has a master's degree in remote sensing from the University of Victoria, British Columbia, Canada. He is an instructor with ESRI's training group and teaches courses in ArcView 3.x, ArcGIS, and ArcIMS technologies.