

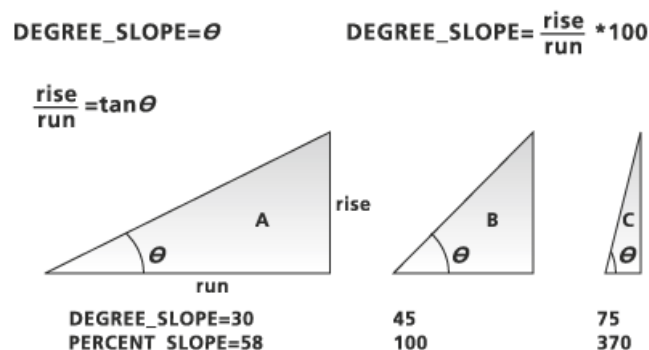
Slope Analysis Methodology

Slope Analysis Methodology

1. Acquire appropriate elevation information. In this case, LIDAR data provided by Centennial.
2. Load Contours into ArcMap 10.1
3. Using 3D Analyst Extension - Create a TIN Surface based on the contours
(http://resources.arcgis.com/en/help/main/10.1/index.html#/Create_TIN/00q90000001v000000/)
4. Using 3D Analyst Extension – Run the Surface Slope Tool
(<http://resources.arcgis.com/en/help/main/10.1/index.html#/00q900000076000000/>) using a custom Break File (attached).
5. Using a Spatial Join, correlate the Surface Slope at the Soil Survey coordinates.

The Surface Slope Tool:

Surface Slope creates an output polygon feature class containing polygons that classify an input TIN or terrain dataset by slope. The slope is the angle of inclination between the surface and a horizontal plane, which may be analysed in degrees or percent. Slope in degrees is given by calculating the arctangent of the ratio of the change in height (dZ) to the change in horizontal distance (dS), or slope = $\text{Arctan}(dZ/dS)$. Percent slope is equal to the change in height divided by the change in horizontal distance multiplied by 100, or $(dZ/dX) * 100$.



The {**slope_field**} is the name of attribute field used to record the polygon aspect codes. Its default value is SlopeCode.

Each triangle is classified into a slope class. Contiguous triangles belonging to the same class are merged during the formation of output polygons. The {units} parameter can be set to use PERCENT or DEGREES. The default is PERCENT. The default percent slope class breaks are 1.00, 2.15, 4.64, 10.00, 21.50, 46.40, 100.00, 1000.00. Optionally, DEGREES may be used to classify slope. The default degree slope class breaks are 0.57, 1.43, 2.66, 5.71, 12.13, 24.89, 45.0, 90.0.

The **{class_breaks_table}** is used to define custom slope classes. The table can be either a TXT or DBF file for a Windows environment, and a DBF file in a UNIX environment. Each record in the table needs to contain two values that are used to represent the slope range of the class and its corresponding class code.

Table example:

break, code

10.0, 11

25.0, 22

40.0, 33

70.0, 44

Note the comma delineation and use of decimals in the first field. Field names are needed but are ignored. The first field represents the breaks and values need to be decimal, the second field represents codes and values need to be integer. The units of the slope range are defined by the {units}. When this argument is not specified, the default classification is used.