

# Grid and Radius

## 1 Introduction

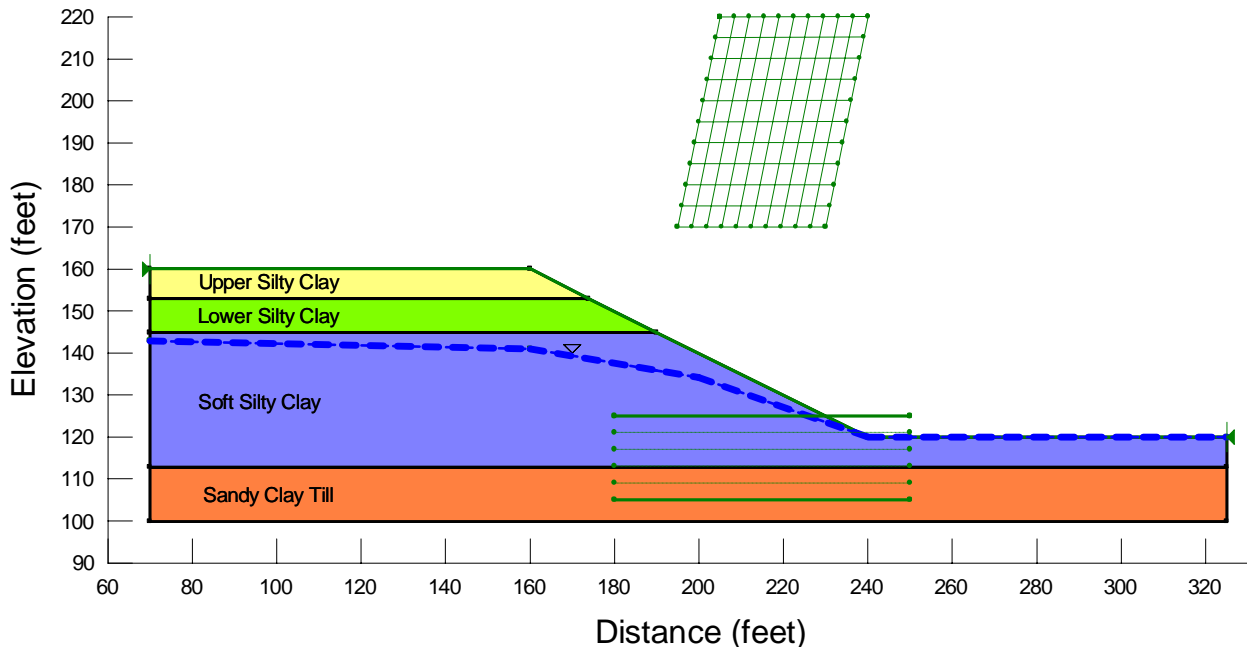
The purpose of this illustrative example is primarily to show how to utilize the grid and radius slip surface option to obtain a circular critical slip surface. Other special features include:

- Multiple soil layers
- Piezometric line
- Viewing and contouring Factors of Safety

## 2 Configuration and setup

With the grid and radius option, the slip surface that develops within the slope is simply the arc of circle. A circle can be described by defining the x,y coordinate of the centre point, as well as the the radius. With the grid and radius slip surface option, you must define a grid of points which are by SLOPE/W as potential centre points for the circular slip surface. You must also define a range or tangential points. Figure 1 Geometry of example showing the grid and radius slip surface option

shows the placement of the search grid and the radii lines for a multi-layered profile.



**Figure 1 Geometry of example showing the grid and radius slip surface option**

By actually sketching a circle using one of the search grid points as a centre, and stretching the circle until it becomes tangent with one of the radius lines, a visual expectation can be developed about whether the grid and radius features have been appropriately defined. This step is not necessary to the solution of the problem. It is simply a visual technique that can be used until placing the grid and radius features become more familiar. Figure 2 shows a schematic representation of one of the slip surfaces that will be analyzed.



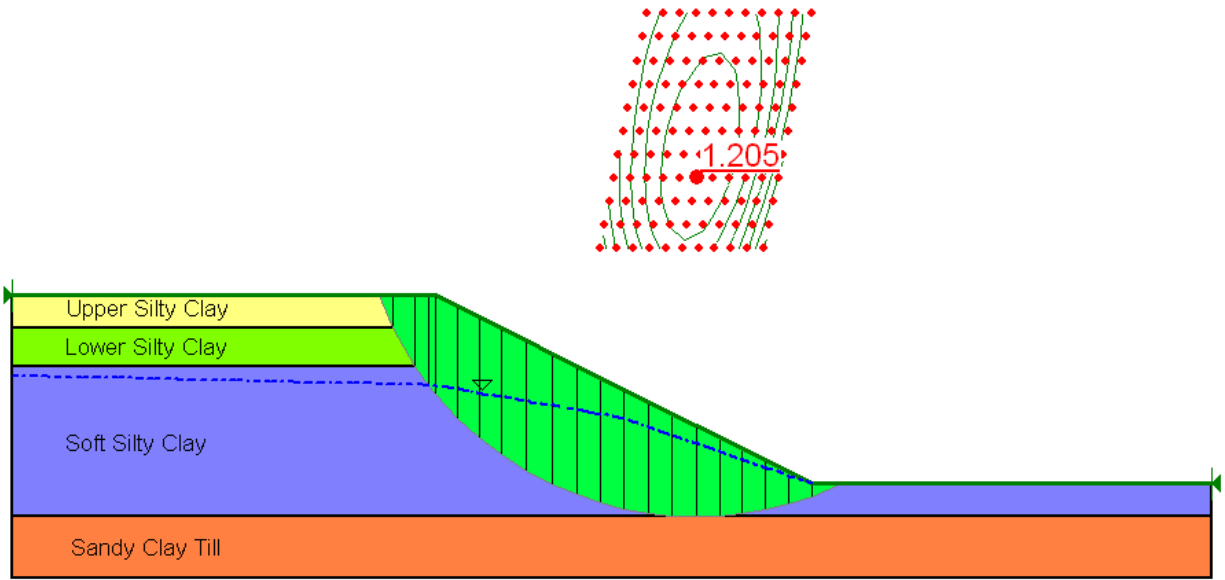


Figure 3 Factor of safety and critical slip surface

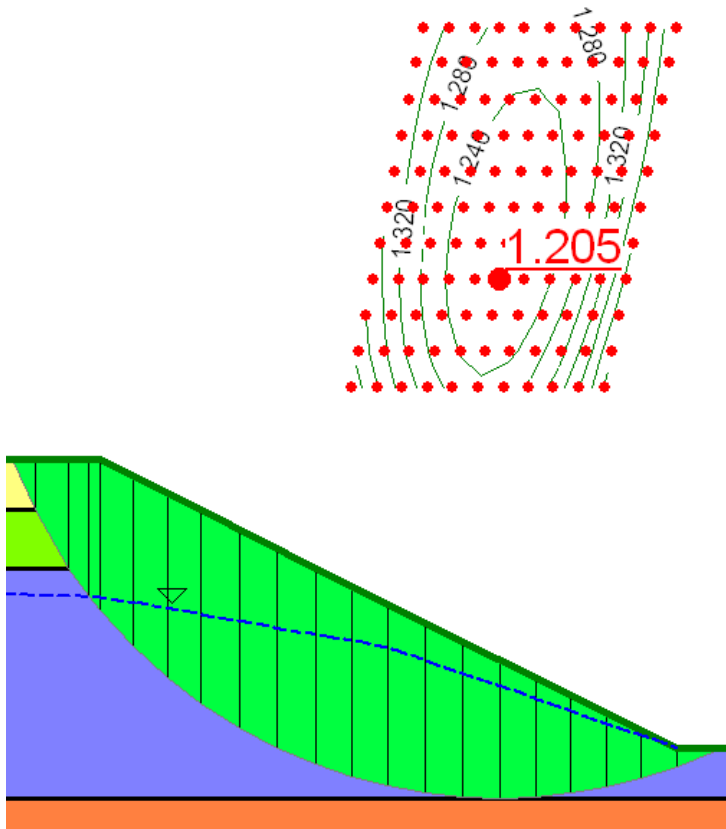


Figure 4 Factor of safety results and contours within the search grid

Viewing slice information and conducting hand calculations to spot check results, such as the computed pore-water pressure at the base of a slice, can also be very helpful in interpreting the results and ensuring the model was set up the way you intended it to be.

#### **4 Other options of Grid and Radius**

SLOPE/W uses three corner points to define the centre grid, but you can collapse the three corner points to be one single point to model a single centre of rotation. That is, all three points have the same X and Y coordinates. Similarly, SLOPE/W uses four corner points to define the radius, but you can also collapse the four points into two points or a single point. This flexibility can be useful, as it not only allows you to reduce the total number of trial slip surfaces, it also allows you to look at slip surfaces passing through a particular section or point. For example, if you want to study a case where all slip surfaces must exit at the toe of a slope, you should model the four radius points with a single point.

Cases 2, 3 and 4 illustrate the same example, but modeled with different options in controlling the grid and radius corner points.