

5.2 Types of Slope Failures

Soil slope failures are generally of four types:

1. Translational Failure
2. Rotational Failure
3. Wedge Failure
4. Compound Failure

1. Translational Failure

- Translation failure occurs in the case of infinite slopes and here the failure surface is parallel to the slope surface.
- A slope is said to be Infinite, when the slope has no definite boundaries and soil under the free surface contains the same properties up to identical depths along the slope.
- As said above, when the soil along the slope has similar properties up to a certain depth and soil below this layer is strong or hard stratum, the weak topsoil will form a parallel slip surface when failed.
- This type of failure can be observed in slopes of layered materials or natural slope formations.

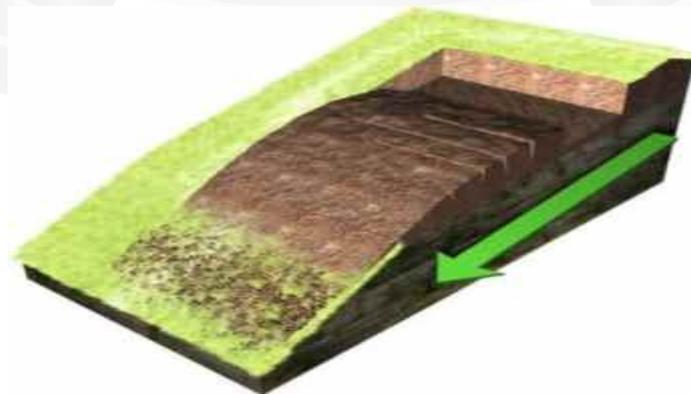


Fig 5.1: Translational Failure

2. Rotational Failure

- In the case of rotational failure, the failure occurs by rotation along a slip surface and the shape thus obtained in slip surface is curved. Failed surface moves outwards and downwards.
- In homogeneous soils, the shape is circular while in case of non-homogeneous soils it is non-circular.
- Rotational failure may occur in three different ways :
 1. Face failure or slope failure
 2. Toe failure
 3. Base failure

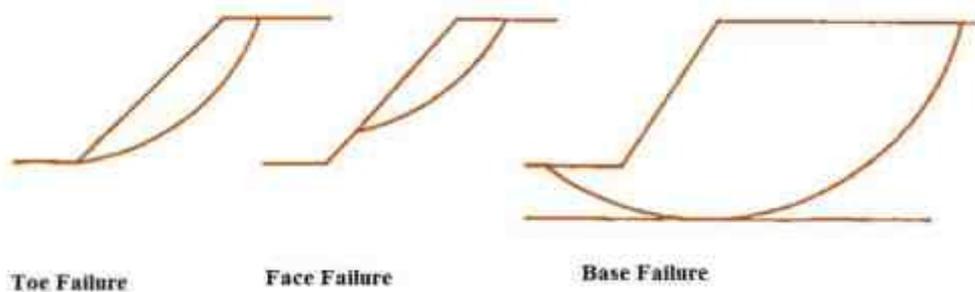


Fig 5.2: Types of Rotational Failures

- Face failure occurs when soil above the toe contains weak stratum. In this case the failure plane intersects the slope above toe.
- Toe failure is the most common failure in which failure plane passes through toe of slope.
- Base failure occurs when there is a weak soil strata under the toe and failure plane passes through base of slope.
- Rotational failure can be seen in finite slopes such as earthen dams, embankments, man-made slopes etc.



Fig 5.3: Rotational Failure

3. Wedge Failure

- Wedge failure, also known as block failure or plane failure, generates a failure plane that is inclined.
- This type of failure occurs when there are fissures, joints, or weak soil layers in slope, or when a slope is made of two different materials.
- It is more similar to translational failure but the difference is that translational failure only occurs in case of infinite slopes but wedge failure can occur in both infinite and finite slopes.

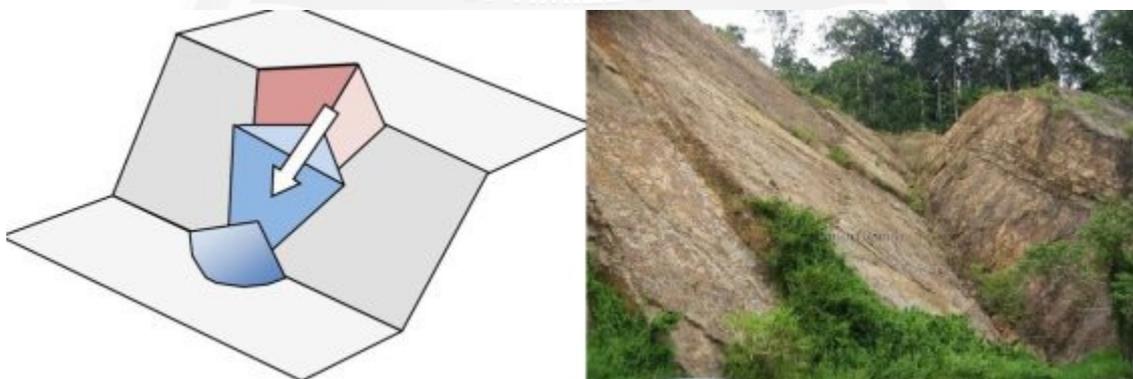


Fig 5.4: Wedge Failure

4.Compound Failure

- A Compound failure is a combination of translational slide and rotational slide.
- In this case, the slip surface is curved at two ends like rotational slip surface and flat at central portion like in translational failure.
- The slip surface becomes flat whenever there is a hard soil layer at a considerable depth from toe.

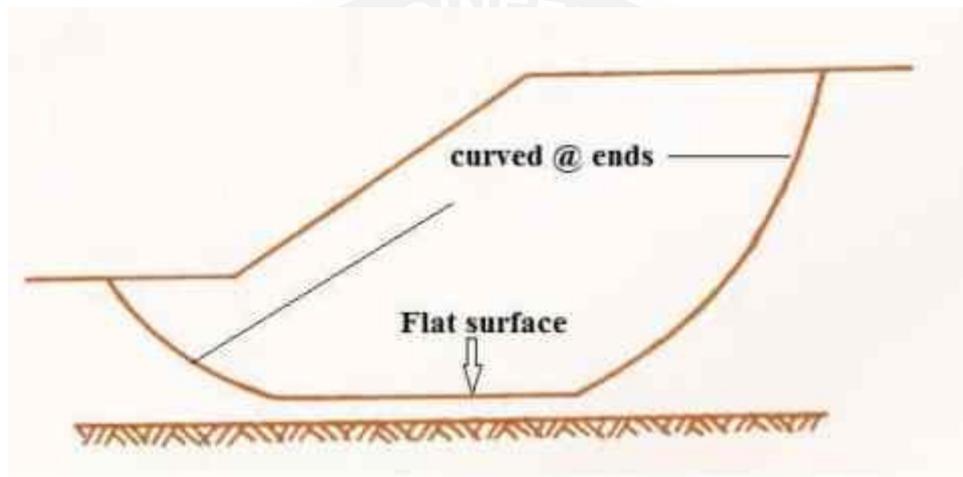


Fig 5.5: Compound Failure