

# What Makes a Slope Stable or Unstable?

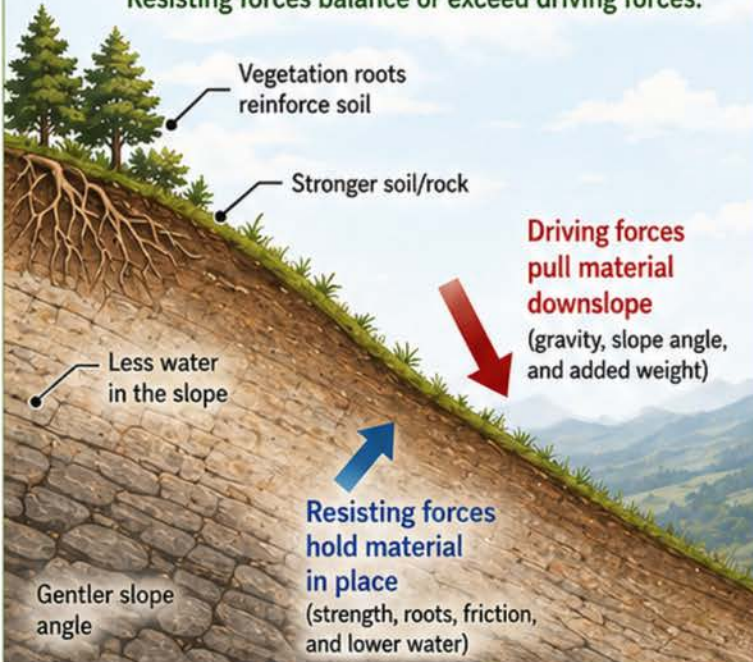
Slopes fail when driving forces exceed resisting forces.

## 1 THE BASIC IDEA

Slope stability depends on the balance between forces pulling material downhill and forces holding it in place.

## 2 STABLE SLOPE

Resisting forces balance or exceed driving forces.



DRIVING FORCES



RESISTING FORCES

Resisting  $\geq$  driving = stable

## 3 SLOPE NEAR FAILURE

Driving forces exceed resisting forces.



DRIVING FORCES



RESISTING FORCES

Driving  $>$  resisting = instability / potential failure

## 4 WHAT AFFECTS STABILITY?



### GRAVITY

The constant pull of gravity drives movement downslope.



### SLOPE ANGLE

Steeper slopes increase driving forces.



### SOIL/ROCK STRENGTH

Stronger materials and good structure resist movement.



### VEGETATION ROOTS

Roots bind soil together and add strength.



### WATER

Water infiltration raises pore pressure and reduces strength.

## 5 THE BALANCE THAT MATTERS

When resisting forces are greater than or equal to driving forces, the slope is **stable**.



When driving forces exceed resisting forces, instability occurs and **failure** can happen.



## POLICY TAKEAWAY

Slope stability is not just about steepness. Drainage, grading, vegetation, and ground conditions all affect whether land can safely support development or infrastructure.