

Chapter 16: LANDSLIDES AND OTHER MASS MOVEMENTS

- SLUMP
 - San Mateo County, CA, 1997
 - Velocity: A few meters per day
- DEBRIS FLOW
 - Sierra Nevada, Stanislaus River
 - Velocity: A few meters per second
- LANDSLIDE
 - La Conchita, California
 - Velocity: About ten meters per second
- FAILURE SURFACES
 - Weak layers below the surface that can “nucleate” motion
 - Examples include weak sedimentary bedding, e.g. shale layers and metamorphic foliation
- LA CONCHITA
 - A mud flow had occurred here in 1995 due to heavy rains
 - Note: clouds of dust - material is dry, not wet
 - The “failure plane” was a saturated layer deep within the 1995 deposit.
- LA MONTAGNA CHE CHAMMINA”
 - Vaoint Dam rockslide, Italian Alps, 1963
 - Engineers built a dam, heard rumbling, then drained reservoir
 - Dipping, weak shale layers paralleled the slope
 - 600 million tons of rock detached and slid downslope
- SNOW AVALANCHES
 - Weak layer collapses, leading to mass movement
 - Analogous to landslides in this way
- WHY MASS MOVEMENTS OCCUR
 - The force pulling mass downslope is greater than the force holding it in place
 - Force holding mass in place is the resistance force (friction)
 - Force pulling mass down is the downslope force (gravity)
- THREE FAILURE TRIGGERS
 - Shocks and vibrations
 - Changes in slope characteristics (e.g. steepness)
 - Changes in slope strength (e.g. weathering, addition of water)