

LANDSLIDE

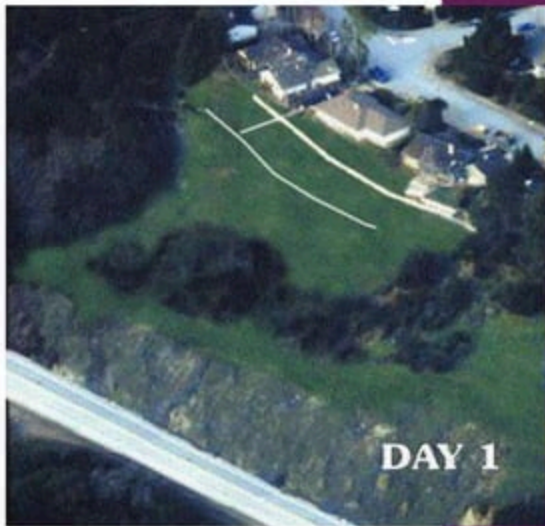


PRESENTED BY:-
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Definition

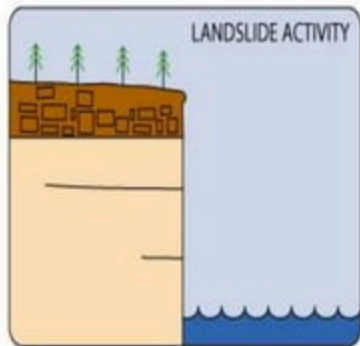
❑ A landslide, also known as a landslip, is a geological phenomenon that includes a wide range of ground movements, such as rock falls, deep failure of slopes and shallow debris flows.

❑ Landslides can occur in offshore, coastal and onshore environments. Although the action of gravity is the primary driving force for a landslide to occur, there are other contributing factors affecting the original slope stability

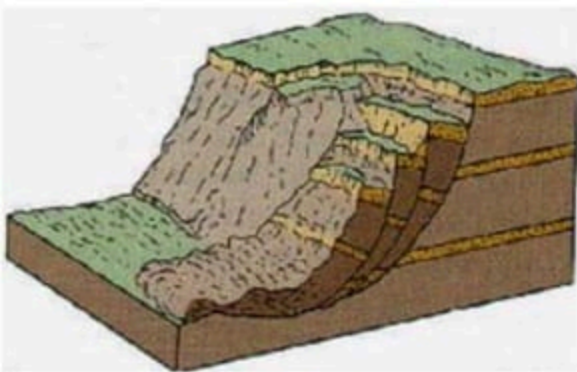


Causes

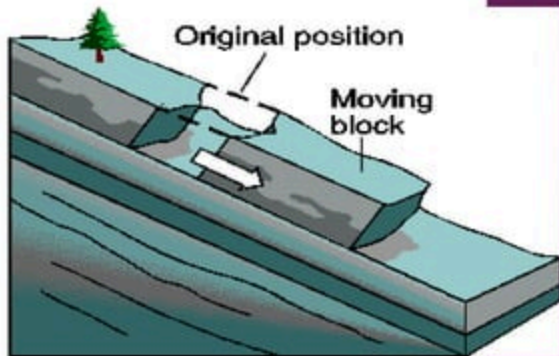
- ☐ Heavy rains
- ☐ Earthquakes
- ☐ Volcano eruptions
- ☐ Floods
- ☐ Ground water changes
- ☐ Rapid snow melt
- ☐ Quarrying



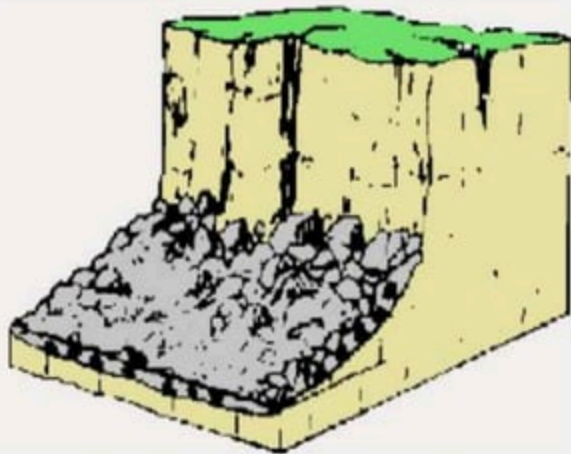
Types of landslide



a) **Rotational slides** move along a surface of rupture that is curved and concave.

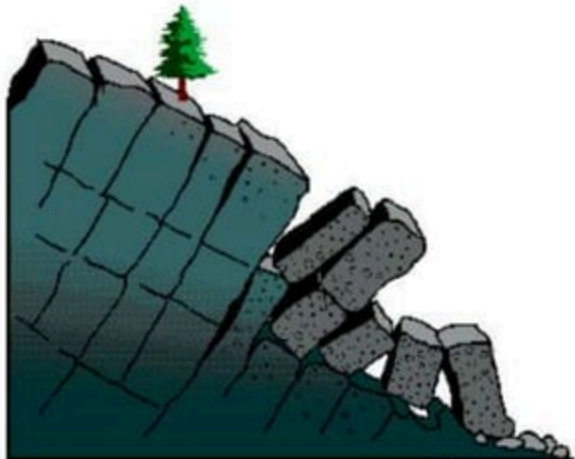


b) **Translational slides** occurs when the failure surface is approximately flat or slightly undulated

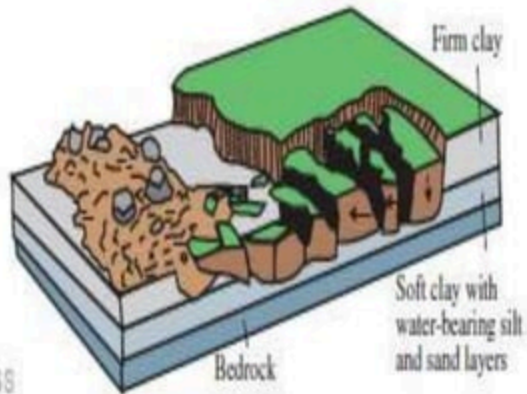


c) Rock Fall:

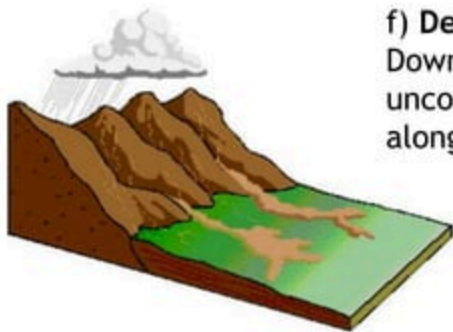
Free falling of detached bodies of bedrock (boulders) from a cliff or steep slope



d) **Rock toppling** occurs when one or more rock units rotate about their base and Collapse.



e) **Lateral spreading** occurs when the soil mass spreads laterally and this spreading comes with tensional cracks in the soil mass.



f) **Debris Flow:**
Down slope movement of collapsed, unconsolidated material typically along a stream channel.

Damage

- ❑ Destroys the slope/hill
- ❑ Eliminates all vegetation
- ❑ Buries houses and sometimes entire villages
- ❑ Weakens the slope and makes it more susceptible to further landslides

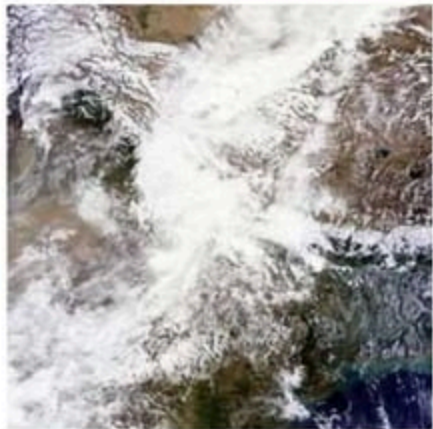


Recent landslides



Date	Place	Casualties
16 June 2013	Kedarnath, Uttarakhand, India	5,700
31 July 2014	Malin, Ambegaon taluka, Pune district, Maharashtra, India	50
30 Oct 2014	KOSLANDA, Sri Lanka	200
20 August 2014	Hiroshima Prefecture, Japan	100

Pictures

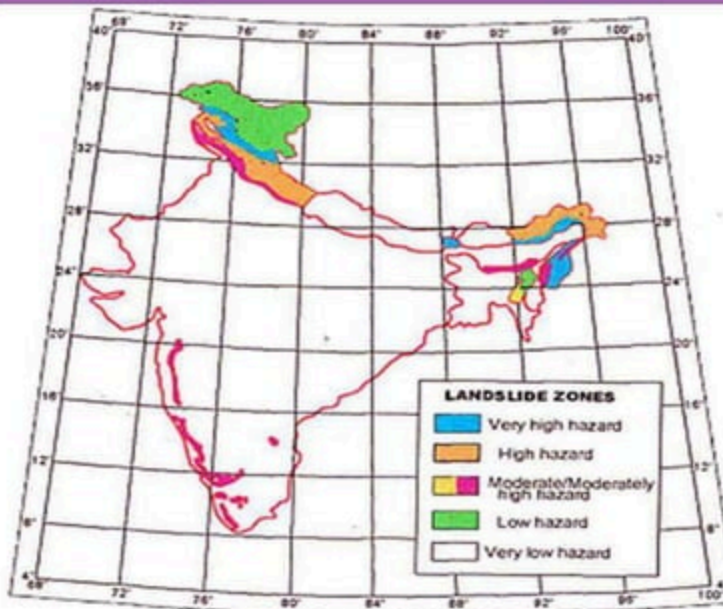


a) NASA satellite imagery of Northern India on 17 June, showing rainclouds that led to the disaster

b) Landslide in Pune, Maharashtra



MAJOR LANDSLIDE ZONE IN INDIA



Landslide Hazard Zones in India

Source: <http://www.gsi.gov.in/Inslide/lhs.htm>

How to Minimize Landslide Hazards

- Choose a **safe location** to build your home, away from steep slopes and places where landslides have occurred in the past.
- Prevent **deforestation** and **vegetation removal**.
- Avoid weakening the slope.



WARNING
FALLING
ROCKS

- Plant ground cover on slopes and build retaining walls.
- In mudflow areas, build channels or deflection walls to direct the flow around buildings.
- Awareness generation: Educate the public about signs that a landslide is imminent so that personal safety measures may be taken.
- Financial Mechanisms: Support the establishment of **landslide insurance**.
- Legal and Policy: legislation to direct a governmental or private program to reduce landslide losses should be strengthened.



References

- ***Landslide Hazard Manual*** (www.engineering4theworld.org/LAP)
- ***TIMES OF INDIA, MUMBAI MAHARASTRA INDIA.***
- <https://en.wikipedia.org/wiki/Landslide>
- ***Landslides Preparedness and Safety Measures***, Department of Disaster Management, Bhutan.
- ***Action Plan for Landslide Risk Mitigation***, Ministry of Home Affairs , Office Memorandum, November 3, 2004, India.

Thank
You