

Part 3

COMBATING RILLS AND GULLY EROSION



- **One of the most vexing problems along cut slopes is differential erosion, like that shown here. The selective removal of friable beds can undermine drainage interceptor ditches and negate the intended system of drainage collection , conveyance, and discharge.**

Retrogressive sliver slumps

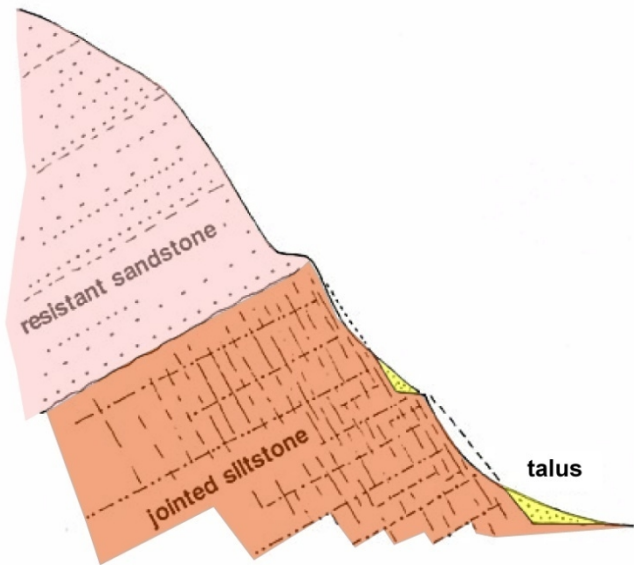


Fig.1a - Erosion of intensely jointed rocks begins

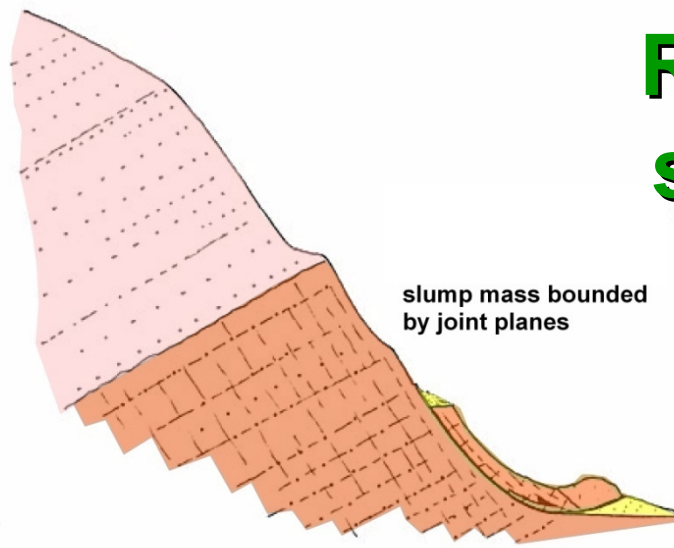


Fig. 1b - Initial slump of sliver of toe slope

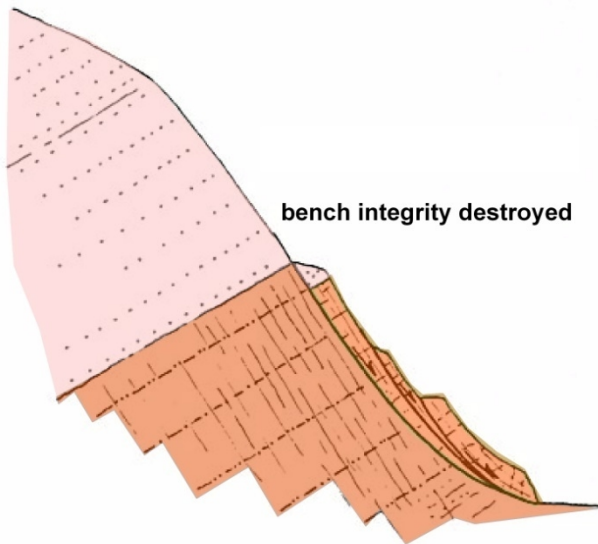


Fig. 1c - Events 2 and 3 follow soon after due to change in lateral restraint

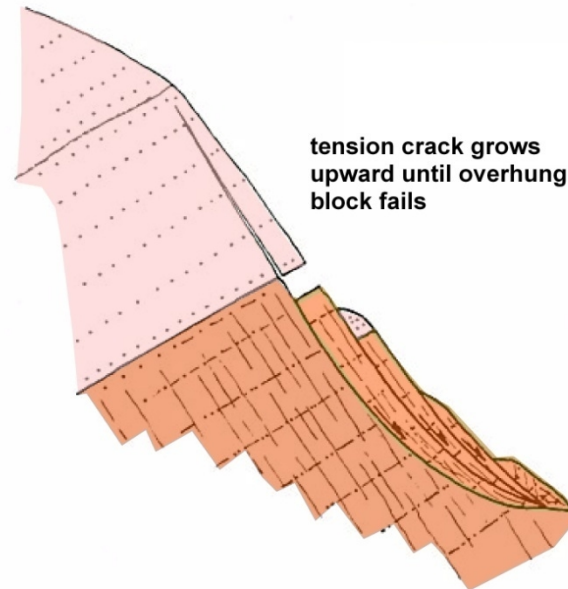


Fig. 1d - Undercutting of massive rock members achieved after slump #4

- Concentrated runoff and debris removal from the toe of a cut slope can also trigger retrogressive slides of steep cuts in jointed rock, as shown here.
- This is the major problem with interceptor ditches that are not, or cannot, be maintained



- **Cut slopes tend to be more cohesive towards their crown, if excavated through the normal residual soil horizon. **Rill erosion** is most problematic in low cohesion materials, like sand.**



- Once a **rill** is established, it may soon form a deeply incised erosion gully, like that shown here. These can be very difficult to mitigate, requiring a lot of hand work.



- **Many people don't believe in drainage benches; especially if it hasn't rained recently. This shows the scale of erosion that can occur on a 3:1 fill slope in cohesive materials subject to seasonal desiccation.**



- This shows a new **v-ditch** at the foot of a 3:1 fill slope with silt fences (at left); which was **completely filled** by raveling debris.



- **Drainage terraces** are intended to curtail surficial raveling and gully erosion of both cut and fill slopes, which can be severe prior to establishment of vegetation on such slopes.



- **Staked hay bales** are often employed as temporary erosion control weirs, to catch suspended sediment and retard velocity of runoff on steep, exposed slopes



- **Polyethylene sheeting** is often used to cover slopes, after a landslide. Impermeable membranes restrict direct infiltration, but seldom prevent actual slope movements, which is usually exacerbated by shallow groundwater flow.



- **Batter boards** have been employed on steep slopes with mixed results. They are intended to provide temporary support until woody vegetation can take root.



- **Batter boards and paving blocks** and other precast interlocking systems like that pictured above can serve as useful facing elements restricting further slope raveling, but their success is dependent on **adequate subdrainage** being provided. North side of US Hwy 101 in downtown Los Angeles.



- A wide array of **precast masonry paving blocks** are available for facing slopes.
- Some systems offer interconnecting blocks, and most allow free drainage through some system of macro voids. This is a channel in Japan.