

Landslide Worksheet 2

Use the table on the next page to decide which mitigation method(s) you would choose to mitigate the landslide or potential landslide presented in the lecture. Choose one or two methods you think would be most effective in each situation (but remember that cost is a very important part of the decision).

1) Slide 1

- a. Type of slide slump, rotational
- b. Possible mitigation methods: retaining wall, removal of
material

2) Slide 2

- a. Type of slide rock fall
- b. Possible mitigation methods: rock bolts, scaling, netting,
shotcrete

3) Slide 3

- a. Type of slide mud flow
- b. Possible mitigation methods: debris flow retention
structure

4) Slide 4

- a. Type of slide rock fall
- b. Possible mitigation methods: rock bolts, netting,
scaling

Select landslide engineering options

Engineering option	Description	Effective against:	Relative cost
Removal of material	Literally removing the slope material. Very expensive, cost increases exponentially as the size of the slope increases	Most landslides. However, in most cases the size of the slope will make removal impossible	High to very high (to prohibitively high)
Debris retention structure	Large structure looks similar to a dam but designed to catch debris and let water through	Debris flows	Very High
Rock fall catchment fences	Engineered fences made out of woven steel cables and loops. Distributes stresses	Medium to Large rock falls	Moderate to High
Rock Bolts	Large bolts drilled deep (~25m) into the rock to secure loose blocks. These bolts increase the friction on the block, they do not support it	Moderately to large blocks of rock in danger of sliding (or occasionally falling)	Moderate to High
Retaining wall	A barrier or wall. Increases the shear strength of the slope by supporting slope material. Or blocks falling and rolling material	Smaller landslides composed of sediment, earth, soil, or occasionally mud or smaller rocks.	Moderate to High depending on material
Drainage pipe	A pipe and drain drilled into the slope to remove water	Any landslide where water is an important (Most of them)	Moderate to High
Gabions	Empty wire cages filled with rocks onsite and used to create a retaining wall. Cheaper both to manufacture and transport. Only used if rocks are available onsite	Excellent for building walls to protect small Rock Falls on not very steep slopes (<70 degrees). Otherwise the same as other retaining walls	Moderate
Scaling	Workers knock loose material off slope. Effective if slopes are steep enough that small forces (ie humans) can trigger falls of loose material	Steep Rock Falls (or topples)	Low
Netting	Steel nets blanket the slope. Rocks fall behind the net, not on what's below	Small Rock Falls	Low to moderate
Shotcrete	A mix of wet concrete and asbestos. Sprayed onto highly fracture slopes. Prevent water from infiltrating. Secures small loose material on the surface	Small Rock Falls from highly fractured rock.	Low to moderate