

Geomorphology - lab report example

[Science](#), [Geography](#)



Geomorphology

GSC336, LAB DRIVING AND RESISTING FORCES Semester: Objective: Gain a deeper understanding of Driving and Resisting Forces by building a simple model and applying your knowledge,

Data Matrix

Slope angle (radians)

Slope angle (Degrees)

Shear stress (acts to impel material downslope)

Normal stress (acts to hold material in place)

0

0

0

9800

0.1

5.729577951

978.3674831

9751.04082

0.2

11.4591559

1946.959442

9604.652463

0.3

17.18873385

2896.098025

9362.297593

0. 4

22. 91831181

3816. 299755

9026. 397741

0. 5

28. 64788976

4698. 370278

8600. 309107

0. 6

34. 37746771

5533. 496239

8088. 289026

0. 7

40. 10704566

6313. 333335

7495. 453435

0. 8

45. 83662361

7030. 089691

6827. 725752

0. 9

51. 56620156

7676. 603714

6091. 777689

1

57. 29577951

8246. 415651

5294. 962598

1. 1

63. 02535746

8733. 832129

4445. 24199

1. 2

68. 75493542

9133. 983042

3551. 105994

1. 3

74. 48451337

9442. 870217

2621. 488521

1. 4

80. 21409132

9657. 407354

1665. 678

1. 5

85. 94366927

9775. 450869

693. 2245763

1. 57

89. 95437384

9799. 996893

7. 804001765

Scatter Plot

Questions

1. Is shearing force a Driving or Resisting Force? Is normal force a Driving or Resisting force? Which is which? In your own words, justify your answers. (5 pts)

Shear force is a driving force because its effect is felt parallel to the slope. Normal force is a resisting force because it effects acts perpendicular to the slope (Lemke).

2. In your own words, explain Normal and Resisting Forces using a Boulder on a hillslope as an example. Hint: see you textbook, Chapter 1, for help. (5 pts)

Normal forces or resting forces on a boulder cliff tends to restrict the movement of an object. The angle of the slope is a contributing factor to the movement of a boulder along a hill slope. Additionally, the stability of the slope also affects the movement of an object. In this case, factors such as friction and cohesion determine how fast an object moves (Lemke).

3. Based on your scatter plot and knowledge acquired from your textbook, what is the critical angle, in degrees, that determines if the boulder would move, or not? Why did you choose this angle? (5 pts)

The critical angle for determining whether the boulder would move, or not is 45. 840 degrees. At this point, the boulder would assume a stationery motion. The value is arrived by observing the point of intersection between the curves of shear and normal stress.

4. A local business informs you they have a 1 m-thick rock slab with a density of 1000 kg m^{-3} lying in their backyard that slopes at 25 degrees. Given normal weather conditions and unsaturated soils, will this rock slide and potentially destroy their business? Justify your answer in terms of angle, Driving and Resisting forces. (5 pts)

At 25 degrees, the sheer force on the rock will be 984. 807753 while the normal stress will be 173. 6481777 (in the opposite direction). This means that the forces propelling the rock slab downwards are greater than the resisting forces. Assuming that the weather conditions remain at normal levels it is highly likely that the rock in question will inflict a considerable damage to the surrounding property.

Work Cited

Lemke, Karen A. " Slope Stability & Mass Wasting." University of Wisconsin-Stevens Point, December 1, 2013. Web. January 26, 2015 < http://www4.uwsp.edu/geo/faculty/lemke/geomorphology/lectures/10_mass_wasting.html>