CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)

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Project Number

J1524

Project Title

It's Our Fault! Exploring the Relationship between Friction in Fault Zones and Pressure Required to Cause an Earthquake

Abstract

Objectives/Goals

The object of our experiment is to explore the relationship between the friction existing between earth segments in a fault zone, and the amount of force necessary to generate movement in the fault.

Methods/Materials

MATERIALS: - a 1lb 2" by 4" wood block about 8" long; - a 4' by 6" wood plank; - tinkertoy set; - 5 lbs clay (4 lbs needed for test); - 4 sheets 8 1/2 by 11" sandpaper(50 grade); - 5 lb scale; - stapler; - packing tape

Test Board: - 2 sheets 50 grade sandpaper cut in half ; - Staple each piece rough side up to connect across length of board; - Sand 1 side of wood block ; - Drill ceiling hook into middle of wood block so open part is facing up; - Place tinkertoy crank on end of board; tape down legs; - Tape one end of string to spring scale and the other to crank; - Connect other end of spring scale to block

Testing Procedure: - Use wood block with no clay for 1st test. Turn crank; observe Newtons required to move block ; - Record observation; - Repeat test nine times, recording observations ; - Repeat test sequence with 1lb, 2lbs, 3lbs, 4lbs, and 5lbs, ; - Average data for each set of tests

Results

Test Averages: 1lb-4.65; 2lbs-9.45; 3lbs-14.1; 4lbs-16.1; 5lbs-18.85

Originally we assumed that as we increased mass on the block, the Newtons would increase at the same rate because the results of the 1lb and 2lb test began looking like a direct variation. But as we continued our testing, we were disappointed to find out that the Newtons increase no longer maintained the same pattern. These results are apparent in our data. We were surprised when the difference of Newtons between each lb decreased. If this data were to relate directly to earthquakes, it would prove on a small scale that more friction results in a more forceful earthquake. A large amount of friction within a fault would keep the fault from shifting until a large enough amount of force could be generated to move it.

Conclusions/Discussion

We now know how potential and kinetic energy work in relation to earthquakes. In the simulation we created, we found that mass increases friction. The mass (clay weights)and the number of Newtons required to move it, increased in a relationship of 1 to 5. After that, the number of Newtons began to increase at a more gradual rate, and the pulls became more sporadic.

Summary Statement

The purpose of our experiment is to explore the effect of friction on seismic movement.

Help Received

Special Thanks to our science teacher, George Merilatt for helping us formulate our project idea. To our parents for helping us gather supplies and for their support.