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Can Fracking Cause Earthquakes? Investigating the Possible Effects of Fracking Fluids on Earthquakes

Hydraulic fracturing is a method of retrieving oil and natural gas from deep underground by sending fracking fluids (a batch of different chemicals) underground at high pressures to create fractures in shale rock formations. Many issues concerning fracking have been identified, and among these issues, I wanted to find out if it is possible for fracking fluids to contribute to earthquakes.

For testing, I modified an earthquake model originally intended for demonstrating how earthquakes work. This model includes sandpaper strips, bricks, and a crank. I tested hexane, ethyl alcohol, hydrochloric acid, and water, with dry sandpaper as the control. The sandpaper was soaked in one of the ingredients for three minutes then attached to the board and a bottom brick. The crank was wound, and once enough energy built up, the bricks slipped. The slippage (cm) and force (N) was measured for each slip.

I predicted that the hydrochloric acid would slip the most with the least amount of energy. My hypothesis was supported by my data, however, when standard error was calculated, ethyl alcohol was the only significant data point compared to the control. The trends in my data suggest that hexane and hydrochloric acid made it easier to slip at 17.03 and 15.66 N/cm, while water and ethyl alcohol made it more difficult to slip at 24.5 and 31.6 N/cm compared to the control at 20.2 N/cm. From this data I can conclude that fracking fluids may affect slippage, but more research should be done to determine how.