IRIS EARTHQUAKE Resources

FREE EDUCATIONAL RESOURCES

Modeling Asperities on a Strike-Slip Fault with Spaghetti

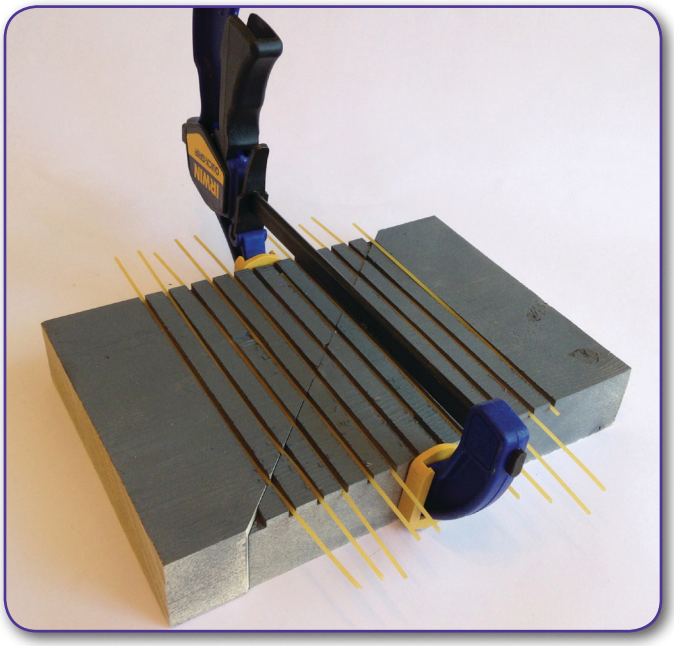
http://www.iris.edu/hq/inclass/lesson/asperities_vice

What is an Asperity?

An asperity (is an area on a fault that is stuck or locked. In the Earth, tectonic earthquakes are caused by slip along a fault plane, where two rock bodies are in rigid contact. The friction along the fault plane is not uniform in strength, so overall movement involves slip on one or more asperities, or "stuck patches" where the friction is highest. Most of the energy that is released by earthquakes comes from the patches that become "unstuck."

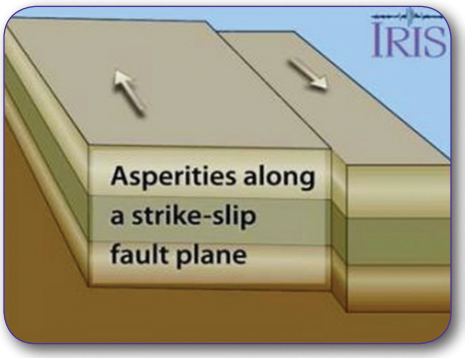
Exploring with a Physical Model

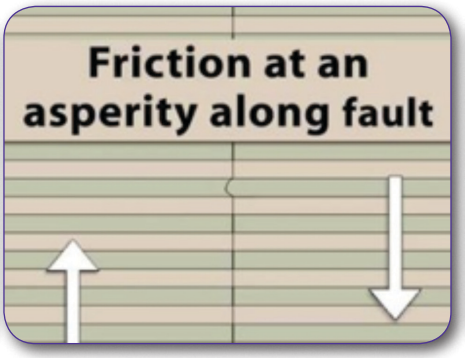
Scrap lumber, raw spaghetti, and a ratcheting bar-clamp can be combined to create a physical model of asperities on a fault. In the model the wood represents the fault, the spaghetti represent asperities or stuck patches on the fault, and squeezing the clamp represents tectonic forces. As you slowly apply stress with the clamp, a few spaghetti strands may break (foreshocks) a few seconds prior to many strands breaking in rapid succession (mainshock). This event may be followed by a few remaining strands breaking (aftershocks).



Supporting Video and Animations

The physical model described above can be used in combination with several animations on the topic to extend students learning.





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Support for IRIS comes from the National Science Foundation, other federal agencies universities, and private foundations