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LUNAR REGOLITH PENETRATORS AND CUTTERS

Frank Barnes and Stein Sture

An apparatus has been designed and built for conducting simulation experiments on cutting tool penetration in the centrifuge. This equipment is mounted on the laminar container which is used for the regolith densification study, so that the end product of the latter, i.e., a regolith bed with the proper density profile, can be used directly for the penetration tests.

In this apparatus, an etching tool is suspended through a pulley system by the action of a double-acting air cylinder. By adjusting the air pressure acting on each side of the cylinder, the net downward force acting on the tool can be controlled. The penetration of the tool is measured by an LVDT. This apparatus has been proof-tested in the centrifuge and is ready for use in conjunction with the regolith densification experiments.

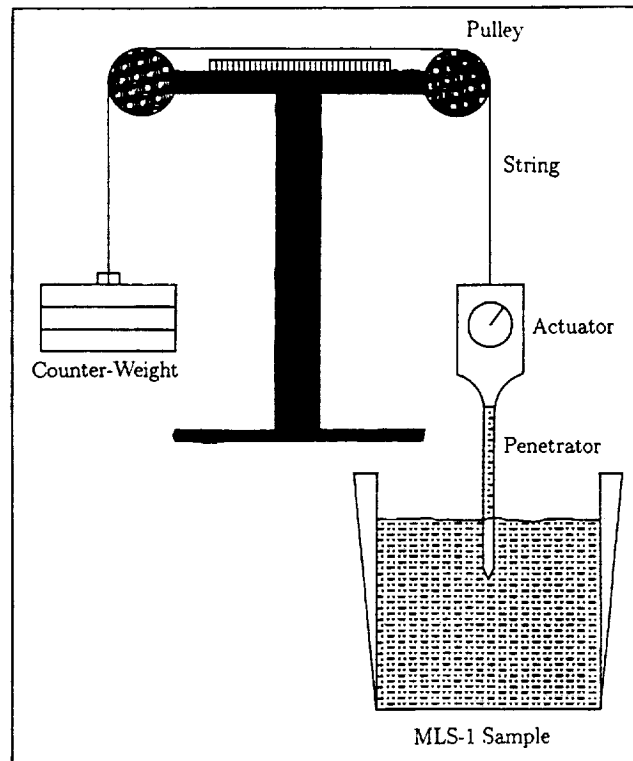


Fig 9.1 Experimental set-up of lunar regolith penetration study

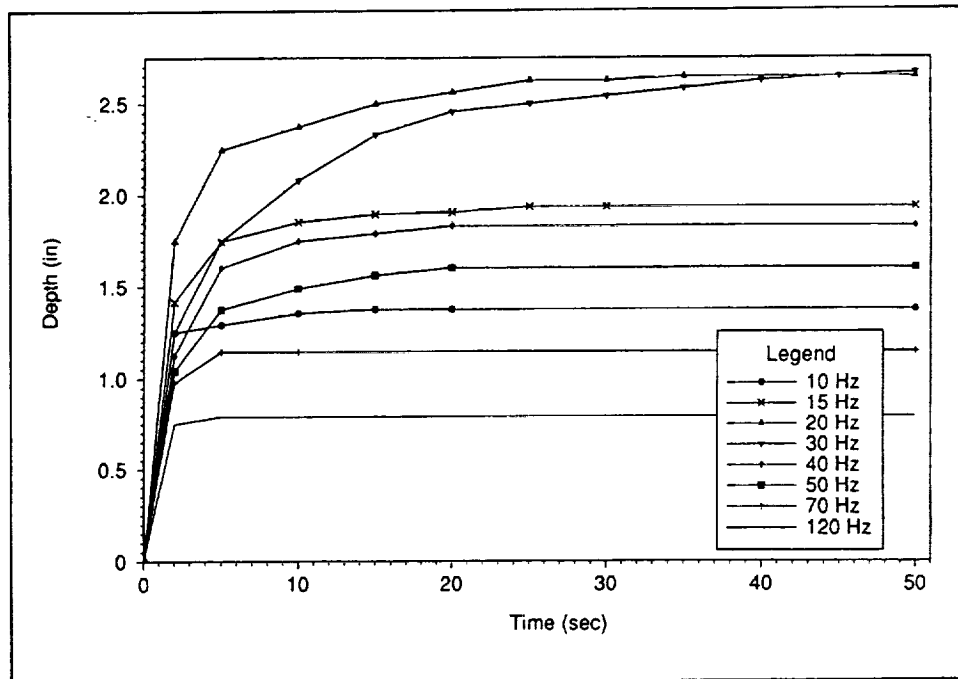


Fig 9.2 Average depth of 6" steel tip rod

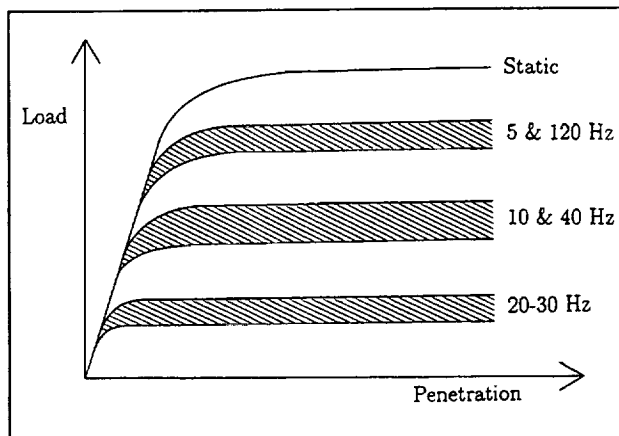


Fig 9.3 Static vs. vibrational assisted penetration