

EXPERIMENTAL INVESTIGATION OF FRICTIONAL CHARACTERISTICS OF VIBRO-IMPACT MOLING

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TÓM TẮT:

In order to investigate the dynamical behaviour of a vibro-impact mechanism under the influence of friction, a new experimental vibro-impact moling machine has been designed and manufactured. The combination of resonance in an RLC circuit and a solenoid is known to create oscillatory motion of a metal bar within the solenoid. In the experimental rig, a bolt held in place by a block of aluminium obstruct this oscillatory motion of the metal bar. This results in impacts of the metal bar on the bolt. At the same time, the electromagnetic force created within the solenoid acts as a nonlinear spring. Hence, a vibro-impact mechanism has been created. The source of excitation is also part of the system characteristics as well. By varying the excitation voltage and initial gap between the metal bar and the bolt, a variety of system responses are observed. The forward motion of the mole mimicking a soil penetration rate may be scrutinised by plotting time histories and phase planes. The design of the experimental rig is also detailed.