

NEW ELECTRO-VIBROIMPACT SYSTEM

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TÓM TẮT:

In this paper, a new vibro-impact mechanism based on a solenoid-actuated vibrator and its optimization are presented. The vibratory unit deploying electro-mechanical interactions of a conductor with oscillating magnetic field has been realized. The combination of resonance in an RLC circuit and a solenoid is found to create an oscillatory motion to the metal bar within the solenoid. This results in impacts of the metal bar on an obstacle block. Unanimously, the electromagnetic force generated within the solenoid acts as a non-linear electromagnetic spring. Hence, a vibro-impact mechanism gets created. This system is improved by adding a solid-state relay in series to the RLC circuit, which switches the power supply on and off periodically in accordance to a train of square waves produced by a function generator. This new control over the supplied harmonic voltage allows a small scale in the geometry of the vibratory unit but significantly increases the magnitude of impact forces and the progression rates obtained. This implies a very promising deployment of the mechanism in actual soil conditions.