

Dynamics of vibrating machines with inertia excitation considering drive elasticity

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Abstract: The dynamics of the vibration machine with unbalance vibration exciter taking into account the elasticity of its connection with the asynchronous motor is studied. The expression describing torsional oscillations of the elastic coupling in the steady (near-steady) operation of the vibration machine and the formula of the vibratory moment for the machine with plane oscillations of the working body are obtained. The amplitude-frequency characteristics of oscillations of the vibration machine drive using “soft” and “rigid” elastic couplings are constructed. The nature of changes in the magnitude of the vibratory moment, depending on the vibration exciter speed is determined. It is shown that the presence of the elastic coupling in the vibration machine drive in certain operation modes can lead to an increase in the motor load and promotes the appearance of the Sommerfeld effect during start-up. Critical frequencies of the vibration machine drive with unbalance vibration exciter are specified. Recommendations on the choice of natural frequencies of the drive in order to avoid resonant oscillations are formulated.

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