

## The use of mechanical resonance for the reduction of torque pulsation and energy demand in machines with crankshaft systems

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*Abstract:* In this paper the results of investigations concerning the use of mechanical resonance in crankshaft systems have been presented. In the crankshaft system the mass representing piston can be connected to the spring element and due to that the resonance occurs at a certain rotational speed. This speed is determined with the value of the mass attached to the spring and the spring stiffness. At resonance the inertia forces are compensated with the spring force. The energy supplied to the crankshaft system at resonance is used only to cover losses and work load. In the crankshaft system without spring the inertia forces are steady increasing by increase of the rotational speed, what cause higher amplitudes of the dynamical torque on the driving wheel of the motor. With use of mechanical resonance the amplitudes of the dynamical torque in the crankshaft systems can be significantly reduced. The influence of the resonance is similar to that by using a flywheel. The influence of the main parameters of the crankshaft system on the amplitudes of the dynamic torque has been shown. The experimental results have confirmed the reduction of the dynamic torque amplitudes and energy demand in the crankshaft system at the resonance conditions. Keywords: mechanical resonance, crankshaft system, dynamic forces, torque pulsation

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