

INFLUENCE OF VIBRATION PHASE DELAY ALONG
SEPARATE COORDINATES OF ELASTIC SYSTEM ON
WEAR OF SINGLE POINT CUTTING TOOLS.

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The metal cutting process under any given set of cutting conditions is accompanied by vibrations in the closed dynamic system of the machine tool. Vibration influence all the output characteristics of cutting process precision and surface finish of machine parts, tool life etc. Therefore the problem of vibrations nature, their influence upon cutting parameters always attracts permanent attention of researches.

Experiments had been carried out using spatially constructed test installations with built-in piezooscillators which were mounted on the lathe machine instead of a standard toolpost. Test installations were equipped with modern measuring instruments. The special phase - revolver had been designed permitting variation of the phase of vibrations between two coordinates of the elastic system. It allows cutting both with "co-phase" and "counter-phase" manner.

Using the above installations and methods of mathematical simulation, it has been shown that life of cutting tools functioning with applied vibrations can be shorter or longer than that of cutting tools functioning under conditions of "natural" vibrations. It also proves experimentally, that: - when cutting with co-phased forced vibrations along two coordinates the tool life value decreases as compared with cutting without vibrations ("natural" level of vibrations). - cutting with counter-phase vibrations gives the opposite result, - tool life increases.

The present work attracts attention on the importance of the phase delay between separate coordinates relating to tool life and ways of improvement of tool designs. The development of such researches will give an opportunity to create cutting tools which would poses longer tool life under "natural" vibrations.