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THE METHODS OF INSTALLATION AND ADJUSTMENT OF HIGH PRECISION MACHINE TOOLS

To achieve high precision metal processing on machine tools we need to use different methods of equipment installation. Influence of the machine tool installation parameters on the deformation of the carrier system depends on the construction of the equipment. Special attention should also be paid to the vibration isolation of the machine tool. Precision equipmentis characterized by dynamic disturbancesthat occurin the process ofcuttingmetal parts.

Vibration isolation of machine tools, just like other equipment, is carried out through installation of the equipment on an elastic foundation. However, this method only applies to the installation of small-sized machine tools. The choice of the installation method depends on the fluctuations arising on the location of the machine, cutting quality requirements and the features of the equipment. Further more, the machine tool installation method depends on the rigidity of the machine element. To determine whether you can apply one or another way to install a machine tool, it is necessary to determine the range of the relative movements of the tool and workpiece, which affects the accuracy of cutting metal.

With the help of the formulas we can determine the number of natural oscillations of the foundation with machine tool, as well as the amplitude of these oscillations.

The number of vertical oscillations:

$$n_z = 30\sqrt{\frac{C_z \cdot F}{M}}\ (\text{per minute}).$$

The number of horizontal oscillations:

$$n_x = 30\sqrt{\frac{C_x \cdot F}{M}}\ (\text{per minute}).$$

The number of rotational oscillations:

$$n_\varphi = 30\sqrt{\frac{C_\varphi \cdot F}{M}}\ (\text{per minute}).$$

The amplitudes of the forced oscillations are determined by the following formulas:

$$A_z = \frac{9 \cdot P_z}{M \cdot (n_z^2 - n^2)}\ (mm);$$

$$A_x = \frac{9 \cdot P_x}{M \cdot (n_x^2 - n^2)}\ (mm);$$

$$A_\varphi = \frac{9 \cdot P_\varphi}{M \cdot (n_\varphi^2 - n^2)}\ (mm).$$

When designing the foundation for the machine tool it is necessary to know about soil properties that influence the foundation deformation and fluctuations. Soils are divided into clay, sand, coarse and rocky. Before creating the foundation it is necessary to have all the information about a particular type of soil. It is necessary to analyze the density of the soil, its humidity, consistency, etc.

The objective of the paper is to identify the best installation methods for precision machine tools. The paper also presents an analysis of new types of vibration isolation and materials that are used to create the foundation. In particular it is a polymer concrete - a composite material consisting of quartz, granite chips and thermoactive organic compound.