"FEATURES OF THE TECHNOLOGY OF CUTTING WORMS WITH A CUTTER ON CNC MACHINES"

Asatillaev Yuldoshali Malikovich
Namangan Engineering Construction Institute, Associate Professor
Ergashev Akmaljon Tokhirjon ugli
Namangan Engineering Construction Institute Master student,

Annotation: This article describes the essence of the concept of "worm", the purpose of worm gears, types of worms, a summary of the design of the process of processing worms, the advantages of using a CNC lathe.

Key words: Worm, worm wheel, cylindrical, globoid, design, Lathes, milling equipment, CNC lathes.

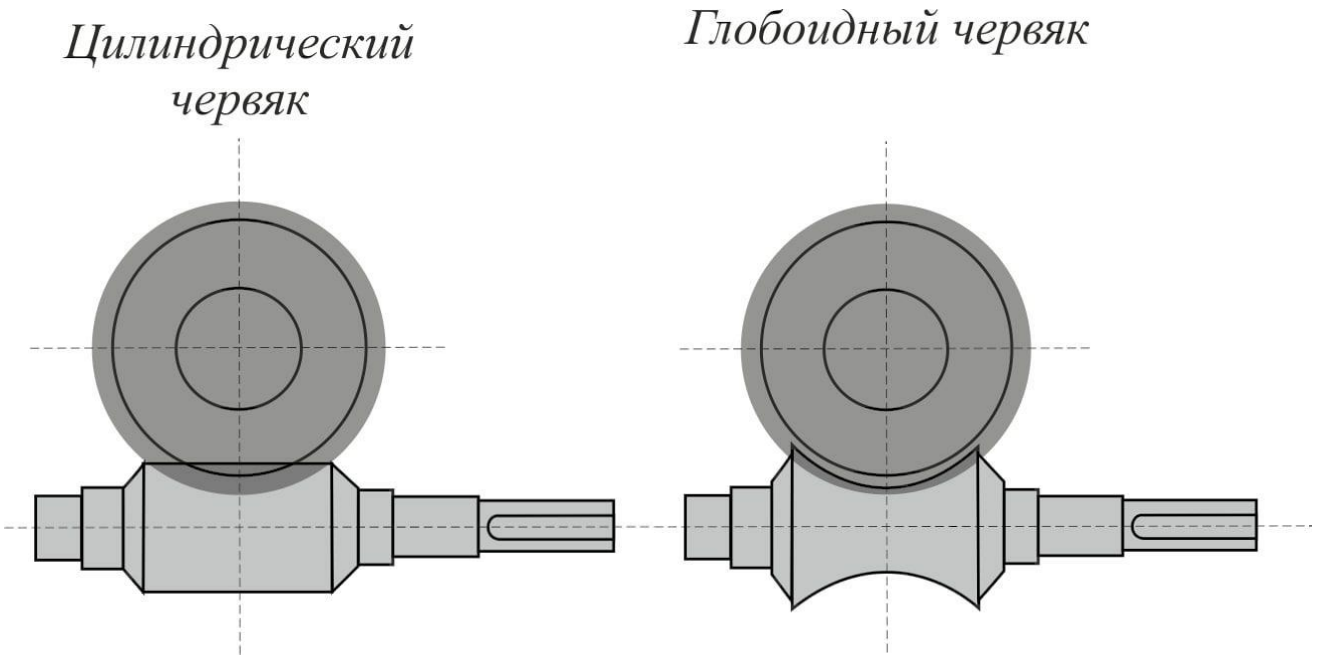
Such a concept as a "worm" in mechanical engineering implies a screw with a special thread, the profile of which has a trapezoidal shape. In practice, in mechanical engineering, single-start, two-start and four-start worms are used.

The worm gear serves as a transmitter of rotation between the shafts and the worm screw associated with it. Worm drives have the ability to transmit motion at an angle of 90°.

According to the geometric view, worm gears combine the properties of gears (gear) and screw pairs. The combination of features of various mechanisms determines the features of the worm gear and approaches to the design of the transmission.

The worm gear consists of two links. The driving link is the worm, the driven link is the worm wheel. The leading link of the worm gear is the “Worm”, and the driven link is the worm wheel.

According to their design, worms are cylindrical and globoid. In cylindrical worm gears, the shape of the worm is cylindrical, and in the globoid gear, the worm has a shape narrowed in the center (i.e. repeats the shape of the wheel).



From the above figure, it can be seen that loboid worms have an unusual shape and therefore are a little more difficult to manufacture than cylindrical worms that have a simple cylindrical surface.

For the manufacture of worms, the design of the technological process for the manufacture of this part is required.

The first stage in the design will be the creation of a drawing of the workpiece, based on such factors as: the drawing of the finished part, the type of production, the requirements for the quality of the part, etc.

After calculating the allowances of machined surfaces and creating a drawing of the workpiece, you should select the method for obtaining the workpiece. Often, rolled products of a suitable diameter are used as a workpiece or a workpiece is obtained by stamping.

After receiving the workpiece, it is required to design a processing route, select equipment for processing.

The choice of equipment for processing the part is the most important part of the project, it should include the requirements for the quality of the final product, the devices for processing on machines and many other factors affecting the quality and efficiency of the process.

Cutting the worm with milling equipment is essentially a more efficient method of processing, but the profile of the worms is distorted.

The simplest type of processing of worms is cutting them on a lathe with a cutter with a straight profile. To obtain the correct profile of the turns, the profile of the cutter must have the contour of the cavity between the teeth of the worm in its certain section and be aligned with the plane of this section when cutting.

Fine cutting of the worm is performed as follows. First, one side of the coil is processed until the required angle of the worm profile and the required surface finish are obtained. Then the worm is turned and the second side of the coil is processed with the same cutter. This procedure for processing the worm is explained by the fact that when cutting the right thread, the left cutter works in unfavorable conditions due to the “running” of the helical surface onto the cutting edge. Similarly, when cutting a left-hand thread, the right cutter works under the same conditions.

Since when cutting worms with a large pitch, chips with a thickness of about 45 mm are removed, the spring cutters used in this case do not provide the required profile. Therefore, for cutting worms, it is advisable to use cutters with a rake angle reduced from 65 to 40 °. one).

With the beginning of the use of CNC machines for processing various parts, many production indicators have changed for the better. CNC machines not only simplify work and help save working time, but their quality indicators are the highest than conventional machines.

When analyzing modern CNC lathes available on the market of foreign countries, the newest, recently tested and optimized according to the latest requirements, in which they tried to take into account all the shortcomings of previous models, the 161F4 lathe was studied.

The special CNC turning machine RTS 161F4 is designed for cutting helical surfaces of screws, worms, screws by whirl milling.

The characteristics of this machine have impressive improvements and the rigidity of the machine design allows you to fully use the capabilities of high-speed cutting and carbide tools in the processing of both ferrous and non-ferrous metals.

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