Gear Forming

What is Gear Forming?

The profile of the cutting part of the tool used is the same as the cross-sectional shape of the gear groove to be processed. When processing with a single tooth profile forming tool, only one tooth groove of the gear is processed each time, and each tooth groove is processed successively through indexing. When using a single tooth profile, requires a large number of tools, low machining accuracy, and low productivity. It is only suitable for a single piece, small batch production, and repair work; When using multiple tooth profiles, it has high productivity and machining accuracy, but the tool is required to have high manufacturing accuracy, complex tool manufacturing process, and high cost. It is only suitable for mass production. In gear forming milling, the workpiece is installed on the dividing head of the **CNC milling** machine, and the disc (or finger) milling cutter with a certain modulus is used to mill the gear teeth. After machining one tooth space, carry out indexing, and then mill the next tooth space. The forming method is generally used to repair and process single gears, and some gears with low speed and low precision requirements.

What is Gear Generating?

Gear generation or generating is carried out by using the meshing principle of gear and gear or rack and gear. One of them is made into a tool, which is used to cut the other, leaving the envelope surface of the tool edge on the gear blank to generate the tooth surface of the gear. The cross-section of the tool used is the tooth profile shape of the rack or gear, which has nothing to do with the number of teeth of the gear workpiece to be processed. Therefore, The gear workpiece with the first mock exam and the same pressure and different tooth number only need one cutter, and the machining accuracy and productivity are high. The basic principle of generating method for **gear machining** is to keep the motion relationship between the cutter and the wheel blank according to the meshing of involute gear for gear cutting, that is, to process the gear by using the principle that the conjugate tooth profile is the envelope of each other. When processing gears, as long as the modulus and pressure angle of the tool and the processed gear are equal, they can be processed with the same tool, which brings great convenience to production.

Difference Between Gear Forming and Gear Generating - Gear Forming vs Gear Generation

1. The gear generating method uses the generating motion formed by the cutter and the gear to process the gear. There are two ways of gear shaping and gear hobbing, and the finishing of gears (grinding and shaving) is also the generating method.

2. Generating method includes the single tooth indexing generating method (conical grinding wheel and double-disc grinding wheel) and the continuous indexing generating method.

3. The gear forming method is to cut the gear profile directly on the milling machine with the same forming tool as the tooth profile curve between teeth.

Gear Forming and Gear Generation Pros and Cons

1. Pros and cons of gear generating

– Advantages: The precision and efficiency are higher than that of forming method, and it is widely used. The first mock exam can be processed by the same cutter. Among them, hobbing is more convenient and widely used than gear shaping; The gear shaper can use the position where the hobbing cannot be processed, such as double or multiple gears with a too-short distance between internal teeth and tool retraction; Gear grinding is generally used on the hard tooth surface, but the efficiency is slightly low; Shaving can not be used on the hard tooth surface, but the processing efficiency is high.

– Disadvantages: we have to specify the specific processing method. Generally, there are no major disadvantages.

2. Pros and cons of gear forming

– Advantages: the gear can be obtained on the milling machine. When the equipment is limited, it is generally used for single-piece processing.

– Disadvantages: the machining accuracy and efficiency are lower than those of the generation method because this method is tooth by tooth processing and discontinuous. In order to reduce the number of tools, the number of teeth is segmented, and a knife is used within a number of teeth, so the tooth profile will bring systematic error.