Achieving Crowning Contact of Spur Bevel Gears Through Deliberately Introduced Mounting Errors

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Abstract

Spur bevel gears are characterized by a load concentration at the ends of the teeth, where gear teeth are at their weakest. To reduce load concentration at the ends of the teeth, the modification is used by longitudinal crowning of a flank profile. The crowning contact in a spur bevel gear can be achieved through deliberately introduced mounting errors. With a deviation of the shaft angle along with the deviation mounting distance, it is possible to achieve initial contact in the middle of gear tooth surfaces. The problem of the theory of gearing is solved - dependencies are obtained to determine the initial contactpoint of the teeth. For this, the intersection line of an octoid surface of the tooth and a plane of gearing was found, in the presence of mounting errors. The trajectory of the contact point on the surface of the teeth during mating was determined. The maximum achievable contact crowning values are given depending on the degree of transmission accuracy and the total number of teeth. Crowning is calculated for the range of modules 6.3... 10. A fixture design for controlling axial displacement during gear assembly has been developed.

Keywords

Crowning profile   Spur bevel gears   Deliberately mounting deviation

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