

MODELING OF RUGOSITY DURING THE COLD GEAR GENERATION BY INTERMITTENT BLOW

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One of the procedures of cold gear generation by profiling is the intermittent blow procedure. The cold working of the teeth systems through plastic deformation calls for the knowing of the deformation force dimension, the micro-hardness of the obtained surfaces, the working precision, as well as the rugosity of the surfaces in order to determine the quality of the worked surfaces. This study aims at modeling of rugosity of surfaces during the cold gear generation process by intermittent blow (hammering).

When determining the dimension of the rugosity in the gear generation process using the cold plastic deformation by intermittent blow one takes into account the height H of the irregularities on the length of the rolled profile and on the generated surfaces with a functional role. We may say that the micro-geometry of the generated surfaces will be described by the known parameters R_a , R_z etc.

From the theoretical analysis of the deformation process by intermittent blow (hammering) it results that, certainly, rugosity depends on the axial feed of the semi-product s_a and on the ray R of the rolling head ($2R=D$). The angle α of the teeth flanks also has a great influence on the rugosity [1].

Taking into account these three parameters one may write that the rugosity on the teeth flanks expressed through the height H is mainly a function under the form of:

$$H = f(R, s_a, \alpha) \quad (1)$$

The maximum height of the irregularities h_0 along the obtained tooth using the cold gear generation by intermittent blow is given by the relations 2 and 3:

$$h_0 = \frac{s^2}{8R}; \quad \text{for the bottom of the empty spot:} \quad (2)$$

$$h_0 = \frac{s^2}{8R} \sin \alpha; \quad \text{for the tooth flank:} \quad (3)$$

Relations 2 and 3 show that in order to obtain a small amount of rugosity one has to use a small feed s and a roll with a diameter as big as possible. For a small amount of rugosity on the tooth flank, relation 3, the action angle α has to be small.

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