THE ANALYSIS OF THE INFLUENCE OF THE CUTTING REGIME PARAMETERS THROUGH THE SIGNAL-NOISE RATIO BY THE LATHING PROCESS OF THE POLYAMIDE PA 66 MoS$_2$

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Abstract: This work presents the analysis of the influence of the cutting parameters through the signal-noise ratio by the longitudinal lathing process of a semi-product made of the polyamide PA 66 MoS$_2$. The experiment plan was conceived following the Taguchi method and the results of the experiments show the greater or lesser influence of each parameter of the cutting regime. On the basis of the results we have obtained an equation for roughness Ra and for the parameters of the cutting regime. Therewith i achieved an analysis of the international dimensional precision (IT), which accuracy caused depending on the roughness obtained abaft remaking.

From the analysis of results of the experiment we can notice that the working feed has the greatest influence on roughness, while the interactions of the basis factors are not significant, thus, they can be neglected. Based on these observations we can write the complete and the reduced relation of the dependence between roughness and the working parameters.

The reduced relation:

$$Y = 0,846 + 0,064\left(\frac{t-0,2}{0,1}\right) + 0,071\left(\frac{s-0,1625}{0,0625}\right) - 0,031\left(\frac{v-176,625}{58,875}\right)$$

The value of the international dimensional precision (IT) can be obtained by using the following empiric relation (Davim, 2004):

$$IT \cong 30 \cdot R_a \ [\mu m]$$

Based on the experimental results presented we can draw the following conclusions:
- the roughness of the lathed surface is mostly influenced by the working feed;
- from the ANOVA table we discover that the interactions between the basis factors (the cutting depth, the working feed and the cutting speed) do not have a major influence on the roughness of the worked surface and that these interactions can be neglected;
- the roughness of the surface (Ra) and the international dimensional precision (IT) increase with the growth of the working feed and decrease with the growth of the cutting speed;
- the roughness of the surface (Ra) and the international dimensional precision (IT) increase with the growth of the cutting depth.

References

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