MDPI- 1045 : Machinability study of hardened 1045 steel when milling with ceramic cutting inserts

MDPI- 1045 – Detailed responses to reviewers' comments

The authors would like to tanks the reviewers for their time and for the comments that helped improving the manuscript. They will find below detailed responses to their comments.

Reviewer 2

1. Row 175: equation (1), letters x and y are subscripts

   These have been modified as requested.

2. Row 162: figure 1 - please, check feed direction section 2.2 please, unify pc and pc cutting speed is denoted vc. Mostly, letter v is lowercase.

   These have been modified as requested in all the manuscript

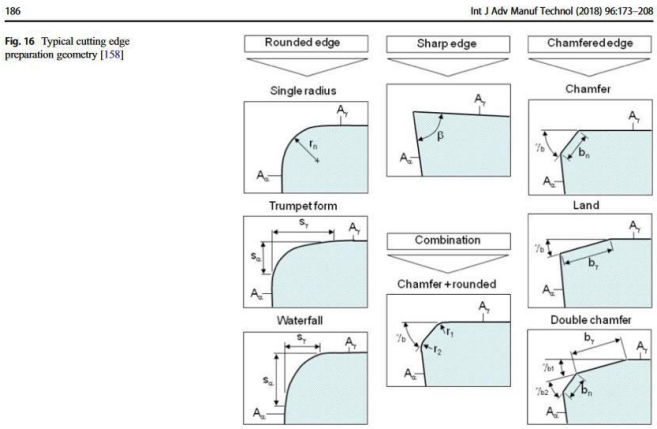
3. Row 265: ...feed rate (f=33.43) is the ... F or f? F is for force.

   This has been modified as requested. "F" in this context stands for the fisher's value and has been replaced with "F-value"

4. Row 424: tool wear (vb) - table 14: tool wear (vb). Please unify. Tables 6-13 would be more clear with a better explanation of abbreviations and the addition of units.

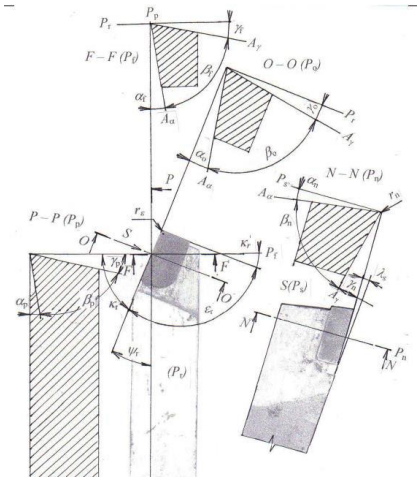
   These symbols have been unified in all the manuscript. Tables 6-13 have also been modified as requested.

5. Question: What is the radius of curvature of the honed cutting edge in Fig.3? Maybe, it would be more appropriate to show other dimensions as in Fig. 3 (b) and (c). "more appropriate to show other dimensions" in Fig. 3b, 3c, 3d, I meant the dimensions according to the next figure. The provided dimensions of cutting edge morphology in Fig. 3b and 3c are useless.



Abdulkadir, L. N., Abou-El-Hossein, K., Jumare, A. I., Odedeyi, P. B., Liman, M. M., & Olaniyan, T. A. (2018). Ultra-precision diamond turning of optical silicon—a review. *The International Journal of Advanced Manufacturing Technology*, *96*(1-4), 173-208.

We recognize rn and rε in cutting tool geometry in two different planes. The reader of the manuscript does not know what is rε that influencing significantly components of machining force and quality of machined surface. (The figure is for turning tool, however, the principle is similar.)



VASILKO, K. (2007). Analytická teória trieskového obrábania (Analytical theory of chip machining). *Prešov: COFIN*.
Vasilko, K., Murčinková, Z., & Nosáľ, J. (2019). Materials and machining trends in terms of the existing axioms of the machining theory. *Materialwissenschaft und Werkstofftechnik*, *50*(2), 165-173.

Additional information on the tool edge preparation have been included in fig. 3. This information provides the parameters r_n , A_α, A_γ, $b_{n,}$, γ_b which permit to establish the actual geometry of the edge. This also included figure to other the position on these parameters.

6. Rows 79-80: The authors pointed out that an edge radius of 15 μm is optimal in terms of tool wear and cutting forces.

   Can we state a similar conclusion for milling with ceramic cutting inserts? We do not know dimensions of cutting wedge in presented study.

   Unfortunately, the authors may not, at this stage make such a conclusion as no modification were performed on the tool edge geometry. Variations in tool geometry could

not cover in this current study but is an area of interest for future work. The edge preparations varied only between honed and chamfered and were selected from commercially available vendors.

7. Suggestion: The manuscript provides too much data and information resulting in difficult reading. I suggest splitting the manuscript into two or more manuscripts.

   The authors removed the analysis of the temperature as suggested by the reviewer. The analysis of variance previously done on temperature data did not shown any significant effect of tested factors on the response. The authors believe this would permit ton conduct additional analysis to identify significance between this response and tested factors. The work now uses three factors, resultant force, power, and wear which provide an adequate view of the machinability.