

Review of: "Machinability of Ti6Al4V Alloy: Tackling Challenges in Milling Operations"

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Potential competing interests: No potential competing interests to declare.

Review Comments for the Paper:

Title: "Machinability of Ti6Al4V Alloy: Tackling Challenges in Milling Operations"

The paper addresses an important topic concerning the machinability of Ti6Al4V alloy, which is known for its poor machinability due to its unique material properties. The study covers various aspects of the milling process for Ti6Al4V, including thermal conductivity, chemical reactivity, and the effects of cutting parameters like speed, feed, and depth of cut. However, there are several areas where the manuscript could be improved for clarity, conciseness, and technical depth.

Technical Content and Logical Flow:

- The paper provides a broad overview of the challenges faced during the milling of Ti6Al4V alloy, including tool wear, chip formation, and cooling methods. However, there is a need to clearly outline the novelty and specific contributions of this study. It would be helpful to highlight what new insights or findings this paper offers compared to existing literature.
- The introduction should be more focused on outlining the objectives of the study and how the work presented addresses gaps in the current state of knowledge.
- The subsections in the Introduction (such as 1.1 High Tensile Strength, 1.2 Poor Thermal Conductivity, etc.) are informative but could benefit from being more concise. The information presented is somewhat repetitive and lacks a smooth transition between points.
- The sections on cutting speed, feed per tooth, and depth of cut (Sections 2.1, 2.2, 2.3) are well-structured; however, they can be more quantitative. Including more data, figures, or tables that summarize experimental findings, if available, would strengthen these sections.
- The discussion on chip evolution and morphology (Section 2.4) is comprehensive but lacks coherence in how the various points are connected. Some sentences appear out of context and could be better integrated to maintain a logical flow.

Clarity and Presentation of Content:

- The paper suffers from a lack of clarity in some parts due to overly complex sentences and redundant information. Simplifying sentences and removing redundancy will help improve readability.

- There are several instances where technical terms are not defined or explained adequately (e.g., "BUE," "beta lamellar equiaxed microstructure"). Ensure all technical terms are clearly defined when first introduced.
- In Section 1.3 on "Chemical Reactiveness," the explanation of how chemical reactivity impacts tool wear is confusing and needs refinement. For instance, phrases like "chemically eagerness" should be corrected for clarity and grammatical accuracy.
- The figures mentioned in the text (e.g., Figures 1, 2, 3) are critical to understanding the discussed phenomena. Ensure these figures are well-labeled and clearly referenced in the text. Since they are not provided here, ensure that they are of high quality in the final submission.

Grammar, Typos, and Language Use:

- There are multiple grammatical errors, awkward phrasings, and typos throughout the manuscript. For instance:
 - "Machinability index (20%) of Ti6Al4V, which affects the machining efficiency proportionally" is unclear. Consider revising to "The low machinability index (20%) of Ti6Al4V significantly affects machining efficiency."
 - "The Cooling methods can flush out chips and frictional heat with ample lubrication, desirably controlling the worse effect of Machinability to some extent blissfully." This sentence is awkward and should be rewritten for clarity.
 - "Every manufacturer is anxious about the machinability index" should be revised to more formal language, such as "Manufacturers are concerned about the low machinability index."
- In Section 2, phrases like "escort towards catastrophic failure" and "shearing tricky" should be revised for better clarity. The use of more precise and technical language will make the paper more professional.
- Ensure the use of proper scientific conventions, such as unit symbols (e.g., "W/m°C" should be "W/m·°C").

Recommendations for Improvement:

- **Objective Clarity:** Clearly define the research objectives and contributions in the introduction and conclusion sections.
- **Coherence:** Improve the logical flow between sections and subsections. Ensure each section connects smoothly to the next.
- **Quantitative Analysis:** Incorporate more quantitative data to support claims where possible, such as tool wear rates, chip morphology analysis, or thermal profiles.
- **Language and Grammar:** Perform a thorough grammar check to eliminate errors, awkward phrases, and improve the overall readability of the manuscript.
- **References and Citations:** Ensure that all citations are relevant and up-to-date. Also, ensure that all referenced works are properly formatted according to the journal's guidelines.

While the paper addresses an important topic with potential for practical applications, it requires substantial revisions in terms of content presentation, technical clarity, and grammatical accuracy. By focusing on these areas, the authors can significantly enhance the quality and impact of their work.

Decision: Major Revision Required

The paper should be revised and resubmitted after addressing the points mentioned above for a more comprehensive review.