

Accepted Manuscript

Environmentally friendly drilling of intermetallic titanium aluminide at different aspect ratio

Nithin Tom Mathew, L. Vijayaraghavan



PII: S0959-6526(16)31466-4

DOI: [10.1016/j.jclepro.2016.09.125](https://doi.org/10.1016/j.jclepro.2016.09.125)

Reference: JCLP 8085

To appear in: *Journal of Cleaner Production*

Received Date: 11 July 2016

Revised Date: 13 September 2016

Accepted Date: 16 September 2016

Please cite this article as: Mathew NT, Vijayaraghavan L, Environmentally friendly drilling of intermetallic titanium aluminide at different aspect ratio, *Journal of Cleaner Production* (2016), doi: 10.1016/j.jclepro.2016.09.125.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Titanium Aluminide at Different Aspect Ratio

Nithin Tom Mathew¹ and L. Vijayaraghavan^{2*}

¹Research Scholar, Department of Mechanical Engineering, Indian Institute of Technology Madras, Chennai – 600 036, email: nithintommathew@gmail.com

²Professor, Department of Mechanical Engineering, Indian Institute of Technology Madras, Chennai – 600 036, email: lvijay@iitm.ac.in

* Corresponding author: L. Vijayaraghavan

E-mail: lvijay@iitm.ac.in

Telephone off: +91 442257 4687

Fax: +91 44 22575705

Abstract

There is an increasing attempt to implement green manufacturing in almost all fields of engineering. Minimum quantity lubrication is considered as a relevant and promising candidate in promoting environmentally friendly machining since it bridges the gap between dry and wet condition. It can keep the work material temperature lower than those in a dry environment by reducing the frictional heat generated during the machining processes and deliver certain amount of cooling effect in the tool-workpiece contact region. The present work is focussed on the drilling of this intermetallic titanium aluminide alloy at low and high aspect ratio under minimum quantity lubrication environment and is compared with dry and wet environments. The feasibility of using minimum quantity lubrication is evaluated based on the thrust force and torque. Burr, being an important factor in drilling have also been studied, and the findings show the presence of uniform burr in minimum quantity lubrication condition. In a complex process like drilling, chip flow is restricted only through the flutes and hence there occurs transformation of chip shape, chip thickening and changes in force and torque as the depth of hole progresses. In order to study these changes peck drilling was adopted and the depth at which the transformation of chip shape occurs is identified.

Keywords: Minimum quantity lubrication, Drilling, Titanium aluminide, Chip transformation, Chip thickening, Burr, Thrust force, Torque

Download English Version:

<https://daneshyari.com/en/article/5481701>

Download Persian Version:

<https://daneshyari.com/article/5481701>

[Daneshyari.com](https://daneshyari.com)