



Document details

1 of 1

[Export](#) [Download](#) [More... >](#)

Materials Science Forum

Volume 1010 MSF, 2020, Pages 181-186

3rd International Conference on Advanced Materials Characterization Techniques, AMCT 2019; Kangar; Malaysia; 23 July 2019 through 24 July 2019; Code 245409

Comparative study on the performance of zta cutting tool with the addition of different particle size of mgo additive (Conference Paper)

Mudzaffar, R.N., Mohd. Khairy, H.H., Mohd. Zaki, N.K., Ahmad Azhar, A.Z., Manshor, H., Rejab, N.A., Mohd. Ali, A.

[View additional authors](#)

Save all to author list

^aDepartment of Materials and Manufacturing Engineering, Kulliyah of Engineering, International Islamic University Malaysia, Jalan Gombak, Kuala Lumpur 53100, Malaysia^bSchool of Material and Mineral Resources Engineering, Engineering Campus, Universiti Sains Malaysia, Nibong Tebal, Pulau Pinang 14300, Malaysia[View additional affiliations](#)

Abstract

This paper investigated the performance of Zirconia toughened alumina (ZTA) cutting tool with the addition of different particle size of MgO additive. Therefore, the objective of this research is to compare the effects of machining parameters on tool wears of ZTA cutting tools added with micro and nano particle of MgO. The experiments were conducted using BridgePort-Romi Powerpath CNC machine using a tool holder Sandvik Coromant (CoroTurn CCLNR 164D-4) to hold the cutting tools properly. The parameters are set up as cutting speeds used between range 354 to 472 m/min, feed rate from 0.1 to 0.5 mm/rev with a constant depth of cut of 0.2 mm. Three types of wear were analyzed which are flank wear, crater wear and tool chipping. Flank wear and crater wear images captured using measuring microscope (NIKON MM-400/L) and the crater wear areas are analyzed using MatLab programming software. Tool chipping is observed via SEM (JEOL JSM-5600). The experimental result shows that flank wear and crater wear increase when cutting speed and feed rate increase. ZMN cutting tool shows lower value of flank wear at 0.143 mm and 3.741 mm² for crater wear than ZMM, 0.321 mm and 3.808 mm² respectively. On the contrary, cutting speed did not affect the tool chipping severely as feed rate. Moreover, ZMN also shows that the tool breakage occurred severely than ZMM due to the high load on the tool nose. © 2020 Trans Tech Publications Ltd, Switzerland.

Author keywords

[Ceramic](#) [Cutting tool](#) [MgO](#) [Tool wear](#) [Turning](#) [ZTA](#)

Indexed keywords

Engineering controlled terms:

[Additives](#) [Alumina](#) [Aluminum oxide](#) [Computer control systems](#) [Cutting](#) [Magnesia](#) [MATLAB](#) [Nanoparticles](#) [Oxide minerals](#) [Particle size](#) [Wear of materials](#) [Zirconia](#)

Engineering uncontrolled terms

[Comparative studies](#) [Cutting speed](#) [Different particle sizes](#) [Machining parameters](#) [Matlab programming](#) [Micro and nano-particle](#) [Tool breakage](#) [Zirconia toughened alumina](#)

Engineering main heading:

[Cutting tools](#)

Cited by 0 documents

Inform me when this document is cited in Scopus:

[Set citation alert >](#)[Set citation feed >](#)


Related documents

Find more related documents in Scopus based on:

[Authors >](#) [Keywords >](#)

ISSN: 02555476
ISBN: 978-303571582-8
CODEN: MSFOE
Source Type: Book Series
Original language: English

DOI: 10.4028/www.scientific.net/MSF.1010.181
Document Type: Conference Paper
Volume Editors: Mohd Zaki R.,Che Pa F.,Mohd Zaki R.,Ahmad K.R.,Che Pa F.,Wahid M.F.M.,Wan Ibrahim W.M.A.,Darus M.,Ahmad Z.A.,Ismail K.N.,Idris M.S.,Jamil N.H.,Kasmuin M.Z.,Ibrahim A.H.
Publisher: Trans Tech Publications Ltd

 Mudzaffar, R.N.; Department of Materials and Manufacturing Engineering, Kulliyah of Engineering, International Islamic University Malaysia, Jalan Gombak, Kuala Lumpur, Malaysia;
© Copyright 2020 Elsevier B.V., All rights reserved.

About Scopus

[What is Scopus](#)
[Content coverage](#)
[Scopus blog](#)
[Scopus API](#)
[Privacy matters](#)

Language

[日本語に切り替える](#)
[切换到简体中文](#)
[切换到繁體中文](#)
[Русский язык](#)

Customer Service

[Help](#)
[Contact us](#)

ELSEVIER

[Terms and conditions](#) ↗ [Privacy policy](#) ↗

Copyright © Elsevier B.V. ↗. All rights reserved. Scopus® is a registered trademark of Elsevier B.V.

We use cookies to help provide and enhance our service and tailor content. By continuing, you agree to the use of cookies.

 RELX