

Close

Web of Science
Page 1 (Records 1 -- 1)

Print

**Record 1 of 1****Title:** An investigation of hole quality during drilling of carbon fibre reinforced plastic and titanium (Ti6Al4V) using tungsten carbide drills**Author(s):** Dahnel, AN (Dahnel, Aishah Najiah); Ascroft, H (Ascroft, Helen); Barnes, S (Barnes, Stuart)**Source:** MATERIALS TODAY-PROCEEDINGS **Volume:** 29 **Special Issue:** SI **Pages:** 161-167 **DOI:** 10.1016/j.matpr.2020.05.640 **Part:** 1 **Published:** 2020**Times Cited in Web of Science Core Collection:** 0**Total Times Cited:** 0**Usage Count (Last 180 days):** 0**Usage Count (Since 2013):** 0**Cited Reference Count:** 14

Abstract: Drilling through Carbon Fibre Reinforced Plastic (CFRP) and Titanium alloy (Ti6Al4V) in a stack is crucial for mechanical assembly of aircraft and automotive parts. This paper presents an investigation of drilled CFRP/Ti stacks hole quality in comparison to when the materials were drilled separately and individually (CFRP-only and Ti-only). The drilling trials were conducted through CFRP/Ti stacks, CFRP-only and Ti-only using carbide drills (6.1 mm diameter) at a cutting speed of 50 m/min and a feed rate of 0.05 mm/rev. The quality of the drilled holes was evaluated with respect to the hole diameters, delamination and pull-out of CFRP as well as Ti burr. It was found that drilling CFRP/Ti stacks resulted in severe Ti adhesion on the cutting edges, which caused oversized drilled holes. CFRP delamination and pull-out was found to increase by 22%-62% and 170%-530% during drilling of CFRP/Ti stacks in comparison to those produced by drilling of CFRP-only. The high damage to CFRP when drilling CFRP/Ti stacks compared to drilling CFRP-only was mainly due to sharp Ti chips, which evacuated through the CFRP plate. Furthermore, it was found that Ti burr which formed at the hole exit increased as tool wear increased. This study suggested that the hole quality and tool life when drilling CFRP/Ti stacks can be improved by improving the evacuation of Ti chip and by reducing the adhesion of Ti on the cutting edges. (C) 2019 Elsevier Ltd. All rights reserved.

Accession Number: WOS:000563753600032**Language:** English**Document Type:** Proceedings Paper**Conference Title:** 4th Advanced Materials Conference (AMC)**Conference Date:** NOV 27-28, 2018**Conference Location:** Kuching, MALAYSIA**Author Keywords:** Machining; Drilling; CFRP; Titanium; Hole diameter; Delamination; Burr; Tool wear**KeyWords Plus:** POLYMERS; DAMAGE**Addresses:** [Dahnel, Aishah Najiah] Int Islamic Univ Malaysia IIUM, Fac Engr, Dept Mfg & Mat Engr, Kuala Lumpur 53100, Malaysia.

[Ascroft, Helen; Barnes, Stuart] Univ Warwick, Warwick Mfg Grp WMG, Coventry CV4 7AL, W Midlands, England.

Corresponding Address: Dahnel, AN (corresponding author), Int Islamic Univ Malaysia IIUM, Fac Engr, Dept Mfg & Mat Engr, Kuala Lumpur 53100, Malaysia.**E-mail Addresses:** aishahnajiah@iium.edu.my**Author Identifiers:**

Author	Web of Science ResearcherID	ORCID Number
DAHNEL, AISHAH NAJIAH		0000-0002-1330-4906

Publisher: ELSEVIER**Publisher Address:** RADARWEG 29, 1043 NX AMSTERDAM, NETHERLANDS**Web of Science Categories:** Materials Science, Multidisciplinary**Research Areas:** Materials Science**IDS Number:** NG1NI**ISSN:** 2214-7853**29-char Source Abbrev.:** MATER TODAY-PROC**ISO Source Abbrev.:** Mater. Today-Proc.**Source Item Page Count:** 7**Funding:**

Funding Agency	Grant Number
Innovate UK through WMG Catapult	
Ministry of Higher Education, Government of Malaysia	
International Islamic University Malaysia (IIUM)	

This research was supported by Innovate UK through WMG Catapult. We thank BAE Systems for technical advices and supplying workpiece materials (CFRP and Ti6Al4V) and carbide drills. Also, we would like to thank the Ministry of Higher Education, Government of Malaysia and International Islamic University Malaysia (IIUM) for financing A. N. Dahnel for doing the research work.

Output Date: 2021-01-19

Close

Web of Science
Page 1 (Records 1 -- 1)

Print



Clarivate

Accelerating innovation

[© 2021 Clarivate](#) [Copyright notice](#) [Terms of use](#) [Privacy statement](#) [Cookie policy](#)

[Sign up for the Web of Science newsletter](#)

[Follow us](#)

