

Surface Roughness Analysis on Sheet Metals During AWJ Machining Using Low Pressure

¹Nazrin Mokhtar, ¹Mebrahitom Asmelash, ²Kushendarsyah Saptaji & ¹*Azmir Azhari

¹Faculty of Manufacturing and Mechatronic Engineering Technology, Universiti Malaysia Pahang

²Department of Mechanical Engineering, Faculty of Engineering and Technology, Sampoerna University, Jakarta, Indonesia

*Corresponding Author

ABSTRACT:

The present study discusses the effect of abrasive waterjet machining (AWJ) parameters on surface roughness during cutting of sheets metals of stainless steel 304 and pure copper. A relatively low hydraulic pressure below 150 MPa was used. Several machining parameters were chosen namely pressure, traverse rate, stand-off distance and abrasive mass flowrate. It was found that increasing the pressure leads to an increase in the surface roughness. Varying other parameters did not clearly show any trends on the surface roughness. A higher surface roughness happened during AWJ machining of stainless steel 304 compared to pure copper due to its former higher hardness. The surface roughness at the upper region closer to the top surface is higher than the bottom section regardless of machining parameters. Furthermore, embedded particles are more dominant in pure copper than stainless steels 304. It can be concluded that a low water pressure in AWJ machining process can be used to cut sheet metals successfully with acceptable cutting quality.

KEYWORDS:

Abrasive waterjet machining; Sheet metals; Surface roughness

ACKNOWLEDGMENT

Authors would like to gratefully acknowledge the financial support from the Ministry of Higher Education Malaysia through FRGS/1/2019/TK03/UMP/02/25 (RDU1901161).