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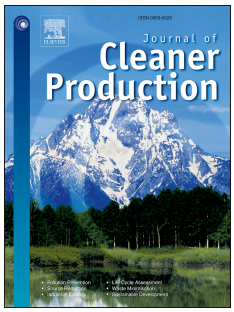


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# Environmentally Friendly Drilling of Intermetallic Titanium Aluminide at Different Aspect Ratio

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**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