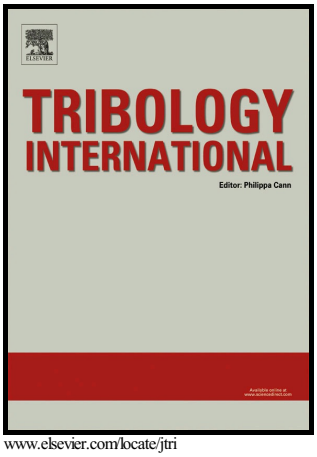

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Recent Developments and Performance Review of Metal Working Fluids

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Abstract

There have been continues efforts in developing novel metal working fluids (MWF) to replace the conventional mineral oil based MWF. This paper reviews recent developments in cutting fluids performance and tribological studies of different MWF formulation including the application of vegetable oils, fatty acid methyl ester, ionic liquids and nanolubricants. It was concluded that more studies should be focused on obtaining theoretical models which can predict the performance of a MWF based on its physical properties. In order to have a holistic view on the overall feasibility and possibility of large scale industrial application, further studies on the stability and life cycle assessment of the novel MWF are required.

Keywords: Metal working fluids; Vegetable Oil; Fatty Acid Methyl Ester; Ionic liquid; Nanofluid.

1. Introduction

Since before recorded history, the making of things have been an essential feature of human civilization. Nowadays, the making of things is known as manufacturing. In particular, metalworking is a process whereby a bulk metal is converted into a component or a part. Two modes of operations are identified for metalworking processes which are the metal debris