

A novel tool surface treatment for wear and chipping improvements



This soft metal tool coating provides exceptional tool life improvements in the machining of superalloy materials.

Abstract

Various types of cutting tools have been developed for removing material from a workpiece. While some cutting tools are used in a cutting operation without a coating, others have a coating applied prior to use, to reduce friction, wear and failure.

During cutting very difficult to cut materials such as super alloys, tooling experiences severe seizure due to high thermal and mechanical loads, shortening tool life. Despite the use of super hard coatings, such severe conditions frequently lead to chipping and failure.

This technology employs a method of coating the tool with a soft metal coating that is capable of melting and functioning as an in-situ liquid lubricant during the machining operation. This liquid metal promotes the formation of beneficial tribofilms during high-temperature machining of super alloys, significantly improving the tool's resistance to wear and chipping compared to existing methods.

Applications

- Machining of super alloys such as Inconel, used in Aerospace and Jet Engines, Oil and Gas extraction, Pollution control and waste processing, Automotive, and Marine industries.

Benefits

- Significant tool life increase in the machining of super alloys.
- Decreased production time and costs.
- Increased production reliability and predictability

Tech ID

18-058

Inventors

M. Aramesh, S. Montazeri,

S. C. Veldhuis

Patent Status

Patents pending.

Stage of Research

Experimentally verified.

Data is available upon request.

Contact

Alan Sawula

Business Development Officer

905-525-9140 Ext. 28209

sawulad@mcmaster.ca