Synopsis

Title of the Document: **Effect of tool rotation speed and shoulder diameter on mechanical and microstructural properties of molybdenum reinforced surface composite.**

Submitted by: **Ashutosh kumar, M.Tech. (2016-2018)**

Guided by: **Dr. Amit Arora, Assistant Professor, Materials Science and Engineering.**

Abstract:

Aluminum and its alloys are light in weight and offer high strength to weight ratio. Therefore its use in automobile and aerospace industry has increased significantly over the last two decades. But these alloys suffer from low hardness, low wear and corrosion resistant property. To improve these surface properties, several surface modification have been done. Different processing methods have been used for the fabrcation of surface composite. In the present study Friction stir processing (FSP) is used to fabricate the surface composite with Molybdenum (Mo) as reinforcement particle. FSP is a technique in which frictional heat is generated due to the interaction of rotating tool with the workpiece. This heat plasticize the matrix material and enable it to incorporate different particles as reinforcement. There are various process parameters such as tool rotation speed, traverse speed and tool geometry that effect the distribution of particle and microstructure of the fabricated composite using FSP. In the present study different tool rotation speeds and shoulder diameters were used to reinforce metallic particles of Molybdenum (Mo) into the Aluminum 1050 matrix using friction stir processing. Defect-free surface composites were obtained at all the rotation speed with all shoulder diameters. Molybdenum particles were successfully reinforced in the aluminum matrix

without any formation of intermetallics. Effect of tool rotation speed and tool shoulder diameter on the surface hardness and microstructure of the developed surface composite has been investigated. Influence of tool rotation speed and shoulder diameter on particle distribution and reinforcement percentage has also been studied.

Keywords: Surface composite, Friction stir processing (FSP), Metal matrix composite (MMC), reinforcement percentage, Aluminum, Molybdenum.