

ABSTRACT

DESIGN MANUFACTURE OF ACTIVE DRIVEN ROTARY TOOL FOR TURNING APPLICATION MACHINING MAGNESIUM

By

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Magnesium is an alkaline earth metal and including the third-most element in seawater. Because it has a mild nature, magnesium suitable used for a replacement to cast iron and steel in a heavy automotive components. Magnesium has a good characteristics in cutting and profitable. However besides the advantages that magnesium have, it's also known as a metal that easy to burn especially when machining process with high speed and feeds number. The chip will be burn when the temperature higher than the temperature melting point of the material (400°C - 600°C). While the driven rotary is activated, the cutting blade area get the cooling when the cutting blade area doesn't touch the material during the process. Therefore, the cutting temperature will potentially decrease so that the ignition chip at magnesium machining will decrease and it's causes the tool won't easy to worn-out. The purpose of research is to design, build and test the system of active driven rotary tool for turning application of magnesium.

The concept of design is to create a replacement tool post in lathe machine using active driven rotary tool. The rotary tool designed with propulsion system using the brushless DC motor, transmision system use gear and mandrel for gripping tool holder. Total dimensions of the machine designed is (158 x 150) mm. The highest run out of the test results 0.12 mm tool rotation used variation of 92.6 rpm to 2117 rpm, maximum vibration with velocity of 1.7 mm/s is still acceptable with ISO 2372 standard and feeding roughness parameters 0.05 mm and depth of cut 0.02 mm and also round workpieces 950 rpm resulted roughness of 2.46 μm . The result of roughness test is still in the tolerance limits of the ISO standard Roughness Number.

Key word : magnesium, rotary tool, lathe, roughness, run out, vibration.