

## ABSTRACT

### THE ANALYSIS OF SURFACE ROUGHNESS VALUE OF MAGNESIUM AZ31 THAT IS TURNING USING ROTARY CUTTING TOOL

By

AHMAD RAMA DONI

Magnesium is one of the materials which are widely used in automotive component because it is lighter than cast iron and steel. However, magnesium has the excellences of good and profitable cutting characteristics. Nevertheless, magnesium is also known as a combustible metal since it has a low flash point. Thus, in the magnesium machining process, cooling fluid is very needed to lower cutting temperature, but over the times, the use of cooling fluid has been minimized due to the environmental pollution. One of the lowering methods in magnesium machining process is by using lathe in which the tool will be cooling during rotating period without drilling. Besides the aspect of temperature, surface roughness value must also be considered. It is because the surface roughness value is one of the important critical quality characteristics in the machining process. The testing results of the material roughness values of magnesium AZ31 are: work piece speed parameter ( $V_w$ ) 25,50,120,160,200 m/min, cutting speed ( $V_t$ ) 25,50,75 m/min, motion meal ( $f$ ) 0.05 and 0.1 mm/rev, and the depth of cut 0.2 mm by using *insert* (chisel) of 16 and 20 mm in diameter with the measurement of roughness value by using a *surface tester* obtained the minimum roughness value of 0.62  $\mu\text{m}$  in the use of insert 16 mm and maximum roughness value of 2, 86  $\mu\text{m}$  in the use of *insert* 20 mm. Those show that the larger the diameter of the *insert* used in this research, the higher the roughness value produced. The other result also shows the influence of every parameter variation which is used. The higher the motion meal, the higher the value of roughness, the higher the cutting speed of lathe, the lower the value of the roughness. In the use of *insert* 16 mm, the higher the rotational speed of the work piece, the lower the value of the roughness produced, but in the use of *insert* 20 mm, it is obtained the opposite result.

**Keywords :** Magnesium AZ31, lathe, roughness value, *surface tester*.