SUMMARY

Alfian Ringga Nugroho, *Major of Mechanical Engineering, Faculty of Engineering Brawijaya University, December 2017, The influence depth of cut and L/D ratio on Down Milling Process with End Mill Tool to Surface Roughness,*
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The L/D ratio is a variation of the length tool from the top of the tool holder to the point of the tool eye where the length is the result of the L/D ratio. This is done with the aim to increase the stiffness of tool eye when doing the process of cutting the object work with depth. In the process of cutting, the ratio of L/D have an important role to improve product quality. One way to look at the quality of the product is looking at the product surface roughness value. Surface roughness can also be affected by vibrations that occur in tools or chatter. The purpose of the research is knowing the influence of L/D ratio with variation of depth of cut 3 mm, 3.5, mm, 4 mm to surface roughness Al-6061. With feedrate and rotation of the spindle constant that is at 50mm / min and 700rpm. The machining process is done by L/D ratio = 3, 4, 5, 6 at each depth of cut variation of 3 mm, 3.5 mm.

The purpose of the research is knowing the effect of L/D tool ratio and depth of cut on milling slot abaout surface roughness side cutting of down milling on Aluminum material 6061. with varitation L/D ratio that is 30/10 mm, 40/10 mm, 50/10 mm , 60/10 mm which will get the value of L/D ratio = 3, 4, 5 and 6. Then, depth of cut variation used is 3 mm, 3.5 mm, 4 mm with feed rate and rotation of the spindle constan that is at 50 mm/min and 700 rpm. To measure the vibration amplitude value in this research using the aid of vibration meter device and to measure the surface roughness value in this research used surface roughness tester tool. In this research for measure the value of vibration amplitude using the aid vibration meter and for measure the surface roughness value used surface roughness tester tool.

The results showed that the depth of cut 3 mm the change in deviation from 0.0118 mm and the furthest negative deviation -0.0125 mm and ratio L/D = 6 whereas at the ratio L/D = 3 vibration between 0.0084 mm and the farthest negative disturbance -0.0088 mm. At depth of cut 3.5 mm / min changes from the between 0.0167 mm and the furthest negative deviation -0.0149 mm with the ratio L/D = 6 whereas the ratio L/D = 3 vibration between 0.0094 mm and the farthest negative distal -0.0101 mm. In depth of cut 4 mm change from between 0,0301 mm and furthest negative deviaton – 0,0247 mm with ratio L/D = 6 whereas with ratio L/D = 3 vibration deviation between 0,0179 mm and furthest negative deviation -0.0162 mm. the largest surface roughness value was found at depth 4mm with using L/D ratio = 6, where at depth 4 mm using L/D ratio 6 the mean value of Ra is 1.815 μm while for the lowest surface roughness value at depth 3 mm with using the ratio L/D = 3 is 0.225 μm. From the research shows that the smaller L/D ratio, then the lower surface roughness value obtained. The vibration amplitude data analysis shows the greater depth of cut, then the vibration amplitude value will be higher. The result shows that the greater ratio L/D tool, then the greater surface roughness obtained at

depth of cut. Depth of cut also shows the effect on surface roughness, where the greater the depth of cut it will increase the amplitude value and surface roughness.

***Keywords**: slot milling, down milling, chatter, L/D tool ratio, depth of cut, surface roughness.*