

Prince of Songkla University

Faculty of Engineering

Final Examination : Semester 1

Academic Year : 2006

Subject : 226 – 409 Machining Technology

Room : A203

Date : 3 August 2006

Time : 9.00-12.00

ทูลจกริตในการสอบ โทษขันต่ำคือปรับตกรในรายวิชาที่ทูลจกริต และพักรการเรียน 1 ภาคการศึกษ

Answer all the questions. There are 3 questions. The full marks are 60 marks.

1. An aluminium workpiece is being machined as shown in Figure 1. The machining process is orthogonal cutting with single edge tool. The cutting force F_p is given by the following equation i.e.

$$F_p = \tau bt \cos(\beta - \alpha) / [\sin \phi \cos (\Phi + \beta - \alpha)]$$

When shear stress $\tau = 200 \times 10^3 \text{ N/m}^2$, $\alpha =$ rake angle, $\phi =$ shear angle and $\beta =$ friction angle. The relationship of the angle is known by

$$\phi = 40^\circ - (\beta - \alpha)$$

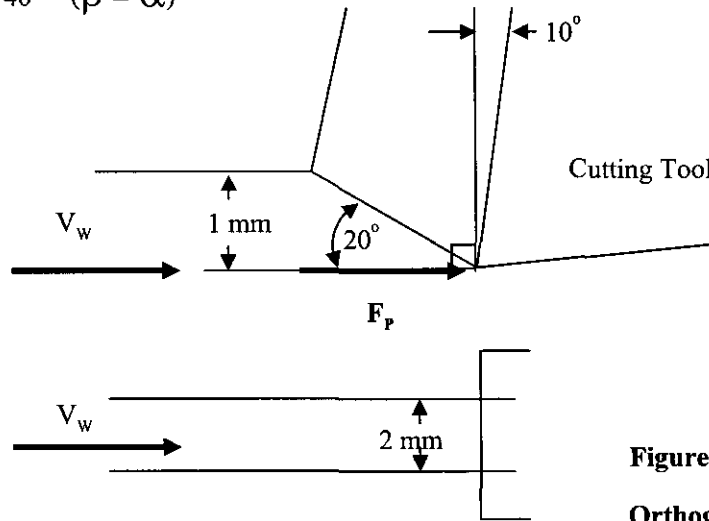


Figure 1 Single Edge Orthogonal Cutting

What is the value of F_p ? If the maximum value of power used is 15 kW, what is the maximum value of cutting V_w in m/min?

(20 Marks)

2. The surface finish of the workpiece is as shown in Figure 2.

2.1.1 Compute for the values of R_a , R_q , R_t and R_z

2.1.2 If the mark of roughness must be completely removed, how deep in mm the surface material must be removed.

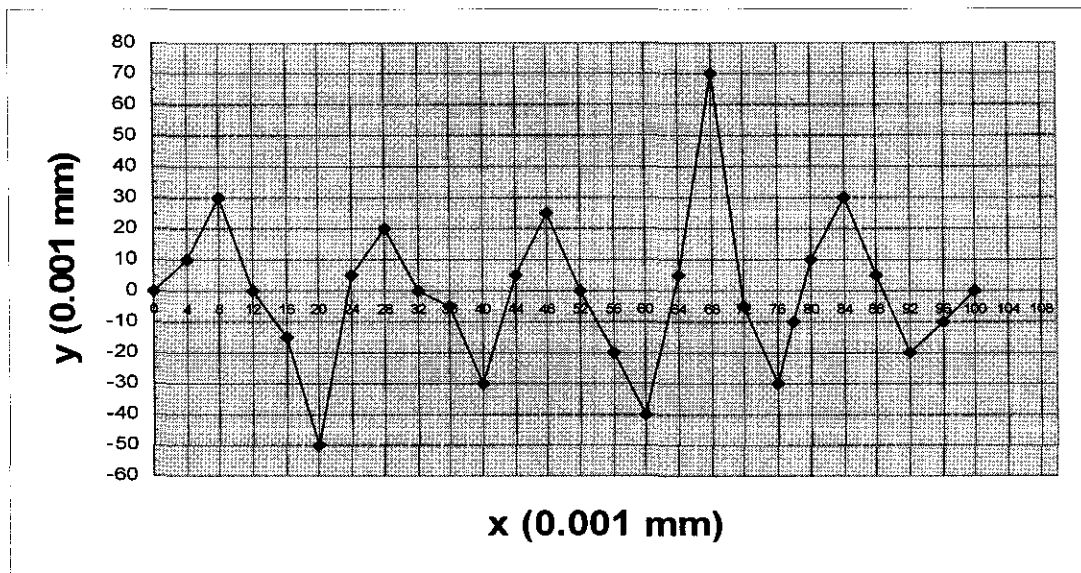


Figure 2 Surface Roughness Profile

(20 Marks)

3. Answer the following questions.

3.1 In precision machining, the workpiece is carbon steel, the usual water miscible fluid is used as cutting fluid. One of the following carbide tools can be chosen for use i.e.

P10 P30 K30 K20 N10 N40

Select one of the tool as the best tool for the job. Give your reason why you choose that tool.

3.2 In turning with a ceramic tool, we are advised not to use any cutting fluid. What is the reason ?

3.3 What are the reasons for using cutting fluids in machining ? Please explain.

3.4 What is the composition of water miscible fluid or soluble oil ?

3.5 Cutting tools are classified in ISO system as grade P, M and K. Explain what is the condition that each grade is suitable for.

(20 Marks)

Assoc. Prof. Dr. Supachok Wiriyacosol, Examiner.

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