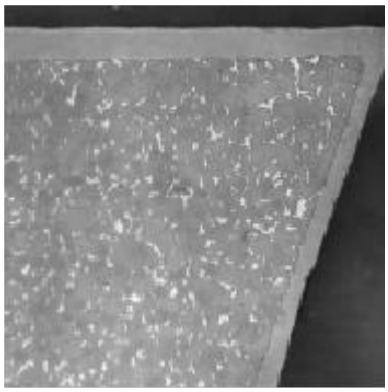
EDPT 601

Materials Manufacturing Technology

Assignment 7
Machining



Source: Courtesy of KennaMetal Inc.

Source: KennaMetal Inc., Catalog No. 7021

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Student Name Semester _____ Student ID _____ Group _____	Date ____/____/____ dd / mm / yy
(For instructor use only) **Evaluation**	
Grade	
Comments	

1- A St. 37 bar ϕ50*250 mm^2 is machined between centers on a lathe down to ϕ40 mm in a single pass using a HSS tool with æ = 45°, a cutting speed of 50 m/min and a feed of 0.3 mm/rev. Determine the depth of cut, the feed rate and the machining time.

2- In drilling a through hole ϕ15 mm in a St. 50 sheet 20 mm thickness, using a HSS twist drill, the cutting speed is 30 m/min and the feed is 0.2 mm/rev. Determine the machining time.

3- A HSS peripheral milling cutter ϕ50*63 mm^2, z = 8 teeth is used for slab milling of a CI block 100*56*32 mm^3 down to a thickness of 30 mm in a roughing pass, using a cutting speed of 20 m/min and a feed of 0.2 mm/tooth. Determine the machining time.

4- A carbide tipped face milling cutter ϕ63 mm, z = 8 teeth is used for machining the same workpiece of the previous question under the following cutting conditions: cutting speed = 60 m/min and feed = 0.2 min/tooth. Determine the machining time.

5- A twist drill ϕ20 mm is used for enlarging a previously drilled through hole ϕ15 mm, in a St. 50 block 40 mm thick, using a cutting speed of 30 m/min and a feed of 0.2 mm/rev. Determine the depth of cut and calculate the machining time.

Useful Formulae:

Cutting and Rotational Speeds:

$$v = \frac{\pi.D.N}{1000}$$ for rotating tools or work pieces (e.g. turning, drilling, milling, boring, counter-boring, reaming, counter-sinking,…etc.)

Where: v = The cutting speed [m/min],
N = The rotational speed [rpm], and
D = The major diameter [mm].

Feed Rate:

$$u = s.N$$ for turning, drilling, boring, reaming,…etc.

Where: u = The feed rate [mm/min],
s = The Feed [mm/rev], and
N = The rotational speed [rpm].

$$u = s_z.z.N$$ for milling.

Where: u = The feed rate [mm/min],
s_z = The feed per tooth [mm/tooth],
z = The number of teeth of the milling cutter [], and
N = The rotational speed [rpm].

$$u = s.n$$ for shaping, planning, and slotting.

Where: u = The feed rate [mm/min],
s = The feed per stroke [mm/stroke], and
n = The number of strokes per unit time [stroke/min].

Machining Time:

$$Machining\ Time = \frac{Machined\ distance\ in\ feed\ direction}{Feed\ rate}$$

Machining Allowance and Depth of Cut:

$$Number\ of\ strokes = \frac{Machining\ allowance}{Depth\ of\ cut}$$

Special cases: Parting off, sawing, broaching, drilling, and hole enlarging.