IPE-432

MACHINE TOOLS SESSONAL

Md. Hasibul Islam

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1 Experiment 05: Study of Gear Shaper (Kaniz Maam)

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There are two methods:

1. Forming
2. Generating (in this experiment)

1.1 Advantages of Generating

- Involute profile
- speed & motion control
- ex - gear shaper, gear hober

1.2 Important Points

- in this experiment: cutter → gear , work piece → Gearblank
- Indexing: dividing equally any cylindrical or circular objects
- Automatic indexing is used in this experiment. That means, for 1 revolution of cutter, there will be 1 revolution of gear blank.
- Motion is maintained through change gear.
- Cutter: Z_c and work : Z
- $\frac{1}{Z_c}\times$ gear cutter = $\frac{1}{Z}\times$ gear blank

1.3 Depth of Cut

- one pass : cut a single teeth at a time. More friction, heat generation & gear cutter may break
- multi pass : cutting teeth by step by step in multiple pass. Time consuming.

1.4 Motions : 5 motions

- Principle motion : Reciprocating motion
- Auxiliary motion : Rotating motion of gear cutter
- Auxiliary motion : Rotating motion of gear blank
- Auxiliary motion : Radial in feed motion
- Auxiliary motion : Withdrawal motion

1.4.1 Reciprocating Motion

Fly wheel → Rack & pinion → Shaft (Horizontal spline shaft) → Shaft (vertical spline shaft) → Reciprocating motion

- Motion in cutter.
- Cutting stroke : material will remove.
- Return stroke : no material will remove.
- Withdrawal motions helps not to cut in return stroke.

1.4.2 Rotating Motion of Gear Cutter

Motor → Pulley → Sprocket → Worm screw → Worm wheel → Bevel gear → Change gear → worm wheel → Cutter spindle → Cutter

1.4.3 Rotating Motion of Gear Blank

(Motor → Pulley → Sprocket → Worm screw → Worm wheel → Bevel gear → Change gear) → Worm screw → Worm wheel → gear blank

- Change gear : A, B, C, D
- C : Z_c (teeth of cutting gear)

1.4.4 Radial In feed Motion

Change gear → cam → in feed motion.

- From table: A, B : find out feed per stroke

Follow Lab sheet also.