

# Basic Training for Gear Manufacturing

## Course Outline

The classes are divided into morning and afternoon sessions, spent alternately in the classroom and on the shop floor working with the machines.

### Classroom Training:

- Definition of gear terms
- Discussion and explanation of AGMA Standards
- Use of gear wires and micrometers
- Use of tooth verniers
- Hob characteristics and selection
- Calculation of index, feed and RPM gearing
- Calculation of differential gearing for helical gears
- Gear blank inspection and qualification
- Use of multiple-start hobs
- Hunting ratios

### Hands-on Training:

#### Hobbing

Read blueprint and process sheets for correct gear information, including:

- Type of gear
- Number of teeth
- Pitch
- Pressure angle
- Spur/helical gear
- Finish or pre-shave hob
- Depth or root diameter
- Right or left hand for helical gears
- Concentricity notes
- Mount hob arbor and hob on machine
- Indicate hob
- Set head angles for spur and helical gears
- Mount work arbor on machine and indicate
- Mount work piece on work arbor and tighten
- Install index, feed, & RPM gearing and differential
- Set hob on first lead
- Set length, type and direction of cut
- Touch off on OD of blank with cutter
- Count number of teeth
- Clear cutter up and down and set depth of cut for rough cut
- Factors for depth changes
- Finished piece inspection

#### Shaping

Read blueprint and process sheet for correct gear information, including:

- Type of gear
- Number of teeth
- Pitch
- Pressure angle
- Spur/helical gear
- Depth or root diameter
- Right or left hand for helical gears
- Face width
- Determine if internal or external
- Concentricity notes
- Select shaper cutter
- Mount cutter adapter on machine and indicate
- Mount holding fixture and indicate
- Mount index gearing and E and F gearing
- Mount piece
- Set length of stroke
- Set cutter for clearance — top and bottom
- Touch-off and count teeth
- Set depth of cut for rough cut
- Check wire size after rough cut
- Adjust machine for finish cut (depth)
- Finish gear cuts
- First piece inspection
- Inspection

#### Inspection

Read blueprint and process sheet for correct gear information, including:

- Type of gear
- Number of teeth
- Pitch
- Wire size
- Tooth-to-tooth tolerance
- Depth or root diameter
- Total composite errors
- Lead errors
- AGMA class involute profile
- Run lead and involute machines and learn to interpret the charts generated
- Gear rolling
- Classroom explanation of cutter selection, shaving, and gear cutting machines