Fundamentals of Gears and Gear Manufacturing

SME recently released a 22-minute video, "Fundamentals of Gears and Gear Manufacturing," which introduces beginners to the gear business.

The narrator starts with an overview of manufacturing methods and finishing techniques, then moves to a description of the functions of gears: reversing rotational direction, altering the angular orientation of rotary motion, converting rotary to linear motion and vice versa, changing speed and changing power transmission ratios.

The narrator defines the key aspects of a gear, including base and pitch circle, line of center, pitch point, line of action, pressure angle, outside and root circles, addendum, dedendum, tooth thickness, circular pitch, face width, tooth face and tooth flank.

As soon as viewers learn the specifics of gears and their measurements, images of gear teeth pop up on the screen. The narrator elaborates on these images by noting the difference between internal and external teeth as well as the varieties of axis configurations.

Once a gear's features are defined, the video goes into greater detail about gear manufacturing processes. In this section, the narrator focuses on gear generating and gear form cutting. The gear generating process is broken down into hobbing and shaping.

Several minutes are devoted to hobbing, describing its benefits and drawbacks. For instance, hobbing is limited to producing external gear teeth on spur and helical gears.

The video also explains how shaping produces gears by rotating the workpieces in conjunction with a reciprocating cutting tool. The video demonstrates the use of shaper cutters that are pinion shaped or multi-tooth rack-shaped or are single-point cutting tools.

As for the other processes, the film touches on broaching and milling. Broaching is recognized as the fastest method of machining gears. Furthermore, pot broaching for external teeth is shown. Two variations on the milling process are given, standard and gashing on heavy-duty machines.

The video also comes with a free study guide and review quiz.

"Fundamentals of Gears and Gear Manufacturing" is available to SME members for $229 and to non-members for $255. To order, contact SME's customer service center by telephone at (800) 733-4769 or by fax at (312) 240-8252. ○

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