INFAC REPORTS ON RECENT HOBBING AND HEAT TREATING EXPERIMENTS

Chicago—Results of recent studies on residual stress in gear hobbing, hobbing without lubricants and heat treating were reported by representatives of INFAC (Instrumented Factory for Gears) at an industry briefing in March of this year.

The results of four experiments on residual stress in gear hobbing indicated the following: conventional hobbing generates lower residual stress than climb hobbing; lower speed/feed means lower residual stresses; stresses in the roots of the gear teeth are generally higher than those in the flanks; and the leading side of the gear tooth flank always has higher stress than the trailing side of the gear tooth flank.

Dry hobbing studies involving residual stress depth profile analysis showed that the profile was independent of speed, but dependent upon feed rate and hardness of the materials.

Heat treating is another important research subject at INFAC. A major statistically designed experiment determined the effects on part quality of the heating cycle, the carbon diffusion cycle, the location of parts within the carburization furnace and of incoming residual stress in parts after carburizing. Results showed an unexpected trend toward less distortion in index and runout for parts with higher incoming stresses. Other conclusions are that the ramp heating cycle produced less error in index and runout in gears after carburizing; the boost heating cycle caused slightly higher tensile residual stresses in the carburized areas; and the furnace location had no effect on residual stresses, but did influence distortion.

In another, preliminary heat treating study, the possibility is being explored that dew probes may be used in place of oxygen probes for atmosphere control in carburizing furnaces.

Another important focus for INFAC has been the use of alternative processing methods to reduce pollution. In an experiment using paints and non-cyanide based plating for selective hardening, several alternative stop-off methods performed well enough for aerospace applications.

In another experiment, the Barkhausen Effect, a magnetic effect, was studied for possible use in gear manufacturing inspection, especially case depth measurement and grinding burns detection. Results indicated that it may have use in case depth measurement, but testing still needs to be done in the detection of grinding burns.

For more information about these experiments, circle Reader Service Number A-102.

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