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Additive/Subtractive Manufacturing

Bi Zhang, Professor of Mechanical Engineering
University of Connecticut

Abstract
Additive Manufacturing (AM) has been developed for industrial applications due to its superior capabilities, such as building complicated parts that are otherwise difficult to manufacture by the conventional methods. However, the dimensional and geometric accuracies as well as surface quality of an AM produced part are inferior to the conventionally machined part, which hinders the AM applications. Additive/subtractive manufacturing (A/SM) adds a subtractive process(es) (e.g., milling and/or laser machining) to the additive process. A part is thus made by A/SM with improved surface finish as well as geometric and dimensional accuracies.

This talk presents the recent outcomes of additive/subtractive manufacturing of an 18Ni maraging steel part, analyzes its microstructure and hardness variations, and compares it with those made by the simplex AM and other methods. The talk also overviews the current state-of-the-art additive/subtractive manufacturing processes, outlines their advantages and future challenges.

Biographical Sketch
Dr. Bi Zhang is a professor of mechanical engineering at the University of Connecticut. He has been working on precision manufacturing with a focus on machining mechanics and processes of hard and brittle materials. Since 2012, he has been working on additive/subtractive manufacturing. He is currently a visiting professor to the Institute of Advanced Manufacturing Technology at Dalian University of Technology, China. He has published over 100 archival journal papers. He is a fellow of ASME and CIRP.

For additional information, please contact Prof. Tai-Hsi Fan at (860) 486-0553, thfan@engr.uconn.edu or Laurie Hockla at (860) 486-2189, hockla@engr.uconn.edu