

OMIC R&D TECHNOLOGY BOARD

CONCEPTUAL ABSTRACT



TITLE: Evaluate machining of 3D printed parts as compared to traditional stock material

RELATED ROAD-MAPPING DESIGNATION ID#: M12

SUPPORTIVE INDUSTRY: SECO, Mitsubishi, Sumitomo, Sandvik, Daimler, Boeing, Sugino, Heidenhain.

PROJECT TYPE: General Project - Machining

PROBLEM STATEMENT (What Are We Trying to Solve?): With 3D printing becoming more and more prominent in the modern manufacturing setting there lies an inherent concern over machineability and being able to locate the part to begin machining operations. This concern of machineability comes from heightened porosity within the crystalline structure of the material. This is due to inconsistent print zone conformity throughout the part which would wreak havoc on cutting tools. Another concern with these parts is that they have inconsistent levels of hardness due to the temperature needed to deposit material into a structure.

PROJECT DESCRIPTION: This project will consist of machining a typical industry facsimile part from either block or forged material using a standard cutting tool package appropriate for roughing, semi finishing and finishing. This will be paired with modern toolpath techniques to ensure a reasonable material removal rate throughout the program. Tool wear data will be captured with an optical microscope along with part dimensions, surface finishes, simple GD+T and program time. Using the same machine and tooling package, a comparison program will be written to machine the 3D printed part. Obviously, some of the roughing tools will not be used due to the near net nature of the 3D printed part. A comparison will be made by gathering the same data as the control and combined in the data collection document to show the differentiations. An in-depth cost benefit analysis will be made with collected data.

Identify Related OMIC R&D Resources:

- Okuma M560V
- Haimer Preset Machine
- Gefertec 3D Printer
- Axile CNC Machine
- Capture 3D ATOS Scanner
- Lecia Optical Microscope

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PROJECT DELIVERABLES:

- Design or partner with sponsor to create part to machine.
- Create fixturing for both parts.
- Create or utilize current GD+T for part.
- Collect data on comparison documentation.
- Report and Presentation to OMIC Tech Board