

AIMS² Research Project in Manufacturing Systems Engineering program

Research Duration: Summer 2019 (June – August 2019)

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Title of Project: Metal Additive Manufacturing of Cam Support Plate for Harley Davidson Milwaukee 8 Engine

Goals and Objectives of the Project, Expectations and Outcomes

Describe briefly what students can expect to learn by participating in this project.

The Cam Support Plate is critical to the success of this engine design. A failed cam support plate results in catastrophic engine failure. The Cam Support Plate supports one side of the flywheel, allowing the pinion shaft to turn the oil pump, a chain drive, and the camshaft. The Cam Support Plate directs the flow of oil from the oil pump throughout the engine. Working in conjunction with the oil pump, it is considered to be the heart of the engine. This project details the process of reverse engineering a Cam Support Plate used in the Harley Davidson Milwaukee 8 Engine. During this project, we have reverse engineered the Cam Support Plate by attempting a variety of processes including: white light and laser scanning, physical measuring, virtual recreation, redesign its oil channels, investigate surface finish and reduce the weight of the Cam support plate by using software tools such as SolidWorks, Autodesk Inventor, and Solidthinking Inspire. The focus of this project is to redesign the internal oil channels by removing the edges and making a curvy channel in order to make the oil flow smoother, look into the surface finish, change the topology, and eventually reduce the weight of the plate. Redesigned Cam Support Plate will be printed with Aluminum by an emerging metal 3D printer: Renishaw AM400, laser powder bed fusion system.