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Fast-Tracking Friction Plate Validation Testing: BorgWarner Improves Efficiency with Machine Learning Methodology

Automotive parts supplier BorgWarner had two options. One, pump the brakes on its rapid sales growth. Two, shift gears on production of its transmission friction plates and send multiple models to a new plant with no experience with the required manufacturing process.

Never a team to shy from progress, BorgWarner executives chose the latter.

The plan was to transfer several friction plate products from Heidelberg, Germany, to the new manufacturing facility in Rzeszów, Poland. In order to ensure a smooth transition and put standard operating procedures in place to minimize inventory costs, the company enlisted a Tauber Institute for Global Operationsⁱ intern team. The team consisted of two students, Kyle Gilbert and Ryan Kennedy.

Gilbert and Kennedy were joined by three BorgWarner project sponsors, manager of quality and manufacturing engineering Christian Bauer, supervisor of friction core engineering Volker Reiners, and operations director Stefan Ueberle. The team was tasked with forecasting performance verification test results for friction plates from a batch of 30 test parts prior to full production.

The plates were required to meet precise specifications for friction coefficients and were tested through specialized machinery. If the performance verification test failed, new sample parts had to be manufactured with different process parameters designed to pass the test. Each repeat test resulted in a significant increase in direct and indirect costs from production delays, inventory build-up and/or product disruption. (See **Appendix A** for a map of the pre-test approval process.)

When the Tauber team arrived at the Heidelberg plant in May 2016, the student interns quickly realized they would have to focus on the finished friction plate verification process, which affected 25% of parts and more than 50% of the daily value created by the BorgWarner Heidelberg and Rzeszów plants. They would have to study the pre-production verification process in depth to achieve a smooth transfer to Rzeszow and

i The Tauber Institute at the University of Michigan is a multidisciplinary operations program that works closely with the university's business and engineering schools.

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