BORGWARNER TRANSMISSION SYSTEMS
MULTI-STAGE INVENTORY OPTIMIZATION
AND MACHINE LEARNING ANALYTICS

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BorgWarner Transmission Systems in Heidelberg, Germany, is a leading manufacturer in friction plates and other clutch components for customers located throughout Europe, with €126MM in sales in 2015. BorgWarner is transferring several friction plate product lines from Heidelberg to a new manufacturing facility in Rzeszów, Poland, and must have standard operating procedures set in place to ensure a smooth transition. On this project, the Tauber team was tasked with two main objectives:
1. Create and define a cross-functional standard operating procedure for the pretest process to minimize inventory levels and optimize saturation batch sizes while maintaining service levels
2. Create a prediction tool to systematically evaluate process parameters for friction plate production in order to maximize first pass yields for pre-production testing

The team created a combination of communication, scheduling, inventory, and Machine Learning tools to improve output and resolve current problems. Combined use of the deliverables will allow the Heidelberg facility to free up capital through inventory reductions and service level improvements by integrating dynamic lead times, scheduling optimization, and streamlined processes.

The Tauber team recommended a 20% decrease in raw inventory levels while maintaining a 99% service level. At saturated paper inventory levels, the team recommended a 60% decrease in saturated paper inventory levels while simultaneously increasing service level from 70% to 98%. Through improved scheduling techniques, utilizing Linear Programming heuristics, the team identified an opportunity to reduce changeover costs by €100k annually at current production rates and limit changeover costs to €50k annually regardless of changeover frequency. Furthermore, using Machine Learning, the Tauber team established the opportunity to realize savings up to €500k annually for pre-production testing. The modified processes were implemented for several part numbers to confirm functionality and savings, and will soon be expanded to all available part numbers.

In addition to the hard savings, the increased robustness of the processes will help reduce the risk of customer delivery interruptions caused by the lack of released material. The improvements have also strengthened the BorgWarner Quality Management System regarding the collaboration with suppliers as well as with internal and external customers.