Continental
The Future in Motion

Data Driven Product Quality Improvement

EXECUTIVE SUMMARY

Product quality has always been at the heart of automotive manufacturing. With the rising importance of Noise Vibration Harshness (NVH), typical engineering skills need to be enriched with novel methods for finding problems' root causes. A close collaboration between our data scientists and the product engineers helped leverage data to enhance their quality and to guide engineers in the problem resolution work.

› CHALLENGE	› SOLUTION	› VALUE	› CLIENT
Improving noise characteristics of brake systems is a difficult endeavor due to complex interactions between the product's components. As modern one-box brake systems are often located close to the passenger compartment, it is crucial to control noise! Despite producing every part the same way on the same production equipment, the final tests at the end of line revealed varying noise behavior. Large amounts of data were collected during the production process and the challenge was to utilize it to find root causes for the NVH performance.	Data collected during the NVH tests and component dimensions from the suppliers were analyzed to pinpoint features directly affecting the noise. The analysis itself had few challenges of its own, like too few scrap cases compared to okay parts, heterogeneous reasons for scrap etc. Nonetheless, upon testing numerous hypotheses, it clearly highlighted the most crucial features on which the engineers could fully focus on.	The NVH analysis led to direct savings in terms of time and money and provided transparency about the systems' numerous interactions. Over 750,000 hypotheses were tested, which is impossible if done with traditional means. The analysis also helps discover relationships, which were previously not expected to exist. Also, potential NVH drivers at component level could be identified at an earlier stage of production. Overall, it enabled the engineers to effectively tackle quality issues where root causes could be identified in the depth of data.	"The support of the CES team was crucial for achieving our goal of a significant quality improvement. Given the final product's technical complexity, we needed guidance on which component interactions to focus on. The Data Services team conducted data analyses which we would not have been able to perform ourselves in terms of methodology and data volume. This resulted in insights that helped us frame our problem and finally initiate tailored design enhancements that significantly improved quality." **Joachim Bohn**, Head of R&D Mechanics, Continental AG, Business Unit Vehicle Dynamics

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