

How HORIBA helped major transmission manufacturer complete large scale EOL testing program

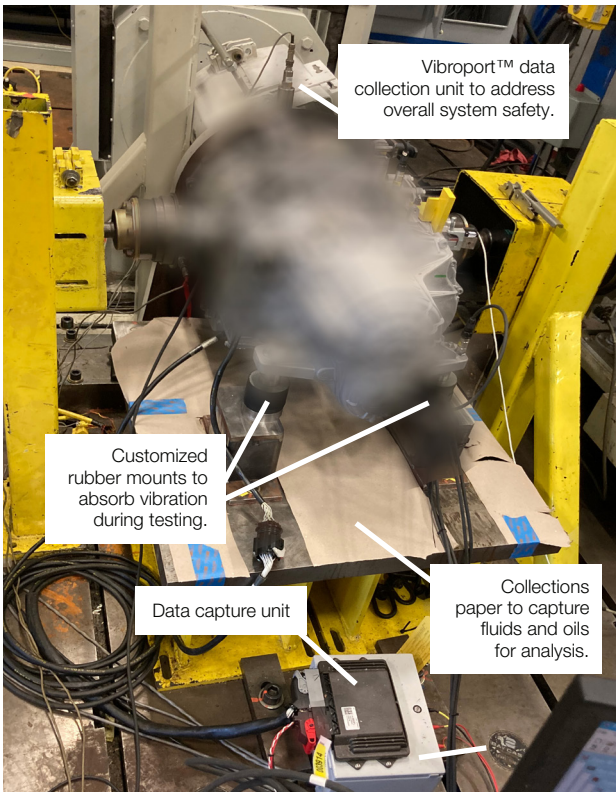


Figure 1: A specialized dynamometer set-up was designed to address vibration and other data collection challenges.

A large manufacturer of high performance vehicle transmissions came to HORIBA for help with their end-of-line (EOL) testing. They did not have the in-house capacity to complete this work on schedule and were looking to outsource the entire program. The customer needed to fully break-in each transmission prior to final placement in a high-performance vehicle using simulated real-world performance data on every transmission supplied. A full understanding of component behavior during a series of gear shifting events was also required. In total, nearly 1,000 transmissions had to be carefully and individually inspected and tested.

Our testing services team collaborated with the customer to design a customized testing plan with dynamometer modifications, gear-shift simulation, HIL, and real-time customer access to data.

This project presented a series of challenges, including the customer's need to frequently review large amounts of raw data to check for feedback changes that would indicate wear and tear outside acceptable tolerances. Several stake holders across different time zones needed access. To handle this high-capacity data requirement and improve communication, we made modifications that allowed us to tie-in remotely and

provide real-time data. We also implemented a NVH procedure at customer specified speed/torque/gear profiles which we ran with high frequency data collection software, a procedure that had to be completed multiple times throughout the EOL run-in process.

Vibration levels proved to be a significant concern. To address this challenge our testing engineers designed a unique rubber-footed dynamometer mounting system and added Vibroport™ data collection points to address safety concerns (see figure 1).

To simulate gear shifting events and gather performance data, a unique hardware-in-the-loop (HIL) solution was implemented. The set-up used CAN ApE™ to interface with the transmission control unit and manipulate the transmission manually to simulate an automatic shifting event. Extensive CAN bus™-related expertise is required to simultaneously manage both software and various physical parameters of a test sample, our test engineers specialize in this type of complex durability testing. HORIBA STARS Test Automation Software was used to control the overall process, and to collect and deliver data.

Over the 9-month program the need to check for leaks on each specimen was added to the scope, leading to a collection paper solution that captured oil and other leaked fluids for further analysis (see figure 1).

We provide advanced engineering, pioneering research, and testing services built on 70 years of experience helping to develop some of the world's most iconic vehicles.

Why choose The HORIBA Testing Services Team?

Our expertise, collaboration, and experience is what sets us apart. This is true of both our regional test engineers in Troy, Michigan and our global team of experts. Our facility in Troy hosts 14 fully configurable powertrain test cells with a wide range of torque/speed options and advanced battery simulation up to 1,100 volts DC and 1,200 amps DC for fast and accurate e-motor component testing for high power applications. With so many options, the possibilities are endless.