Case Study: PACCAR

Validating product performance under real-world conditions

Products are not always used exactly as intended. Its important for manufacturers to understand the various, sometimes harsh, conditions in which their products are being used in order to ensure design integrity.

As one of the world's leading sugar producers, La Union harvests sugar cane on farms throughout Guatemala. Sugar crystals from the farm are sent to food and beverage companies around the globe. Each day during the harvest season as much as 20,000 tons of cut sugar cane stalks are hauled from the fields. The job of transporting the cane from the fields to the processing center falls on the company's fleet of 80 tractor trailers supplied by Kenworth Mexico (KenMex - a division of PACCAR). In order to complete the harvest before the rainy season, these trucks are in service 24 hours a day, seven days a week.

Harsh Conditions
Designed to pull an on-highway weight of 80,000 lbs., these standard tractor trailers are subjected to off-road loads and conditions above and beyond that for which they were intended. Across the crude dirt roads of the Guatemalan sugar cane fields the trucks are routinely asked to pull multiple trailers at an average load weight of 350,000 lbs.; or roughly 270,000 more pounds than which they were designed.

Design Validation Test Plan
In order to ensure that the trucks would withstand these harsh conditions, KenMex parent company, PACCAR, called on 6D to collect and analyze the data and prepare a report. Prior to collecting the data, 6D management met with PACCAR officials to outline the scope of the project and create a test plan. It was decided to run field tests to collect operating data that would be used in the short-term to validate the existing truck design and further down the road to serve as benchmark data for the next generation of Kenworth trucks.

Field Testing
6D engineers traveled to Guatemala to conduct the tests. With KenMex representatives on hand, a new KenMex T880 truck was instrumented with strain gages and accelerometers. The truck was then put through its normal paces in the field hauling large loads of sugar cane across the dirt roads. It was important to capture the real-world use of the vehicle as it was clearly being used in a manner and environment for which it was not intended. Operating data was collected over several days.

Results
In the final analysis test data confirmed that although the vehicles were being used well outside of the intended design – the Kenworth trucks maintained the structural integrity to meet their intended lifecycle.

701B US Route 50 - Milford, OH 45150 - 513.248.4901 - www.sxdtest.com