

High-Precision Torque Measurements on a Top Fuel Dragster



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Company/Institute: TECAT Performance Systems

Industry/Application Area: Motorsports

Product Used: CEA-XX-250US-350 Four-Element, Full-Bridge Strain Gage

The Challenge

Kalitta Motorsports wanted to collect on-track vehicle performance data that would enable the team to optimize vehicle setup and maximize performance.

The Solution

Using TECAT Performance's WISER system and Micro Measurements CEA-06-250US-350 fullbridge strain gages, the Kalitta team was able to optimize vehicle setup of its 8000HP Top Fuel dragster by measuring torque at engine out, clutch out, and at the wheels. This data helped Kalitta to determine horsepower transfer from the engine to the rear axle, conduct engine diagnostics, and improve wheel lock-out at launch.

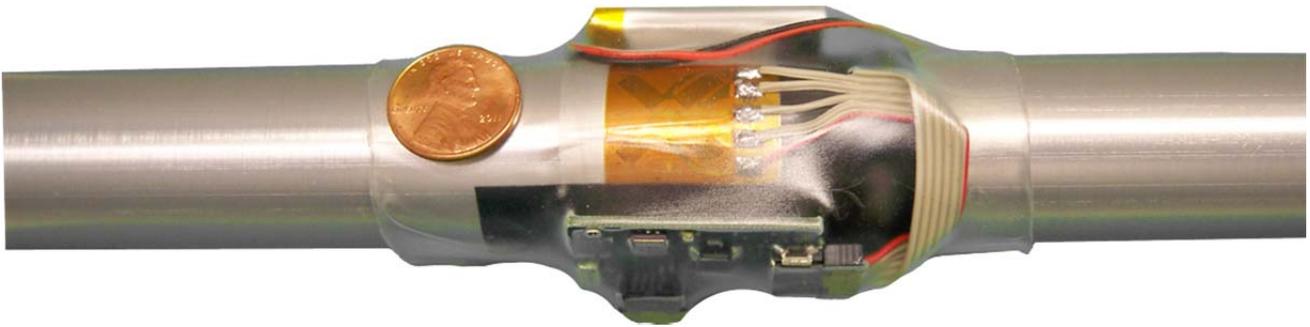


Figure 1: The complete system, shown mounted to a test bar. The Micro-Measurement strain gage is connected to the WISER data acquisition/communications system, and both are powered from the lithium poly battery, seen at the top.

The User Explains

In order for the Kalitta team to be able to take on-track measurements, the strain gage and sensor technology used had to be very compact, lightweight, and highly accurate over a range of temperatures. In addition, the data had to be transmitted wirelessly, as the mounting locations were difficult to access once the vehicle was assembled, and because the data was being collected on shafts spinning at high speeds. TECAT engineers started by mounting Micro-Measurements strain gages to the surfaces of the engine crankshaft, the clutch, and the rear axle. Next, they mounted TECAT's WISER systems — real-time data acquisition systems that provide resolved live torque data — to the same components and connected the systems to the strain gages with ribbon cable. The complete systems were mounted without modifying the vehicle components themselves. This enabled the Kalitta team to build the vehicle as they would for a race, without alterations, and collect data on-track. The team has used these systems prior to races in order to optimize the vehicle setup.

"The strain gage and sensor technology used had to be very compact, lightweight, and highly accurate over a range of temperatures. We utilized Micro-Measurements CEA-06-250US-350 full-bridge strain gages, which were mounted to the surfaces of the engine crankshaft, the clutch, and the rear axle."



Acknowledgement:

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