

Interface

FORCE MEASUREMENT SOLUTIONS.

CASE STUDY

Amusement Thrill Ride Engineering Needs Force Measurement



About

Theme parks and entertainment venues depend on sophisticated mechanical engineering to create immersive experiences while adhering to strict structural regulations. Safety and design engineers require precise measurements of force, torque, and weight to ensure full compliance with global safety standards.

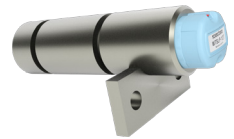
Interface supplies high-precision load cells, torque transducers, multi-axis sensors, wireless telemetry, and advanced instrumentation. These technologies empower engineers to track structural loads, dynamic g-forces, tension, and rotational resistance throughout development, testing, and continuous operation, ensuring attractions run safely and smoothly for millions of visitors annually.

Challenge

Amusement park rides, stages, and animatronics operate under extreme, multi-directional dynamic forces. Equipment wear, component fatigue, or unexpected overloading pose severe mechanical risks if left undetected. Engineers face several distinct technical hurdles when gathering critical force data across complex attraction systems. Sensors must withstand repeated heavy usage, high vibration, mechanical impacts, variable weather, and high humidity while complying with strict amusement safety regulations. For monitoring safety, collecting real-time measurement data from rotating hardware, such as Ferris wheel gondolas or moving ride vehicles, renders traditional wired setups impractical due to cable entanglement.



6A80 6-Axis Standard
Capacity Load Cells



WTSLP Wireless Stainless
Steel



WTS-HK-S Next-Generation
Wireless Handheld

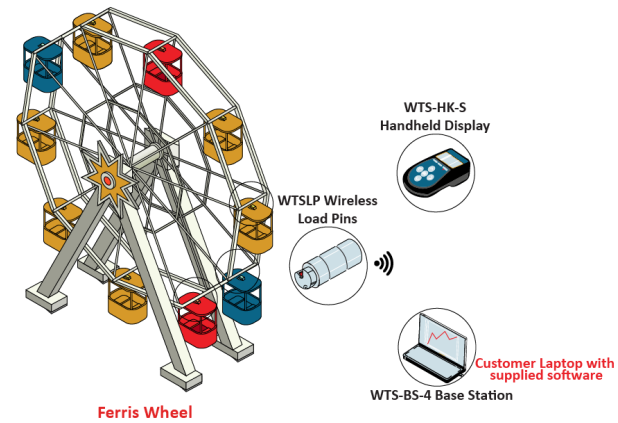


BX8-HD44 Data Acquisition

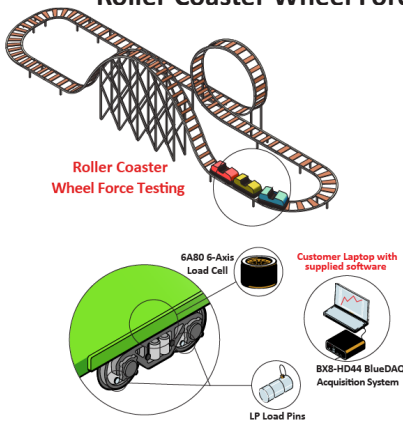
Interface Solutions

Ferris Wheel Gondola Load Testing

Ferris wheel operators and manufacturers must ensure that passenger gondolas remain safely supported throughout operation. As cabins are loaded with passengers and continuously rotate around the wheel, forces are transferred through the gondola hanger assemblies and pivot connections. Interface suggests implementing WTSLP Wireless Custom Load Pins directly into the gondola hanger connection, replacing standard structural pins. The wireless load pins continuously measured the shear forces transferred between the gondola and hanger arm during operation. Force results are wirelessly transmitted directly to engineers PC's for analysis with the WTS-BS-4 USB Industrial Base Station. Or, it can also be transmitted to the WTS-HK-S Next-Generation Wireless Handheld.



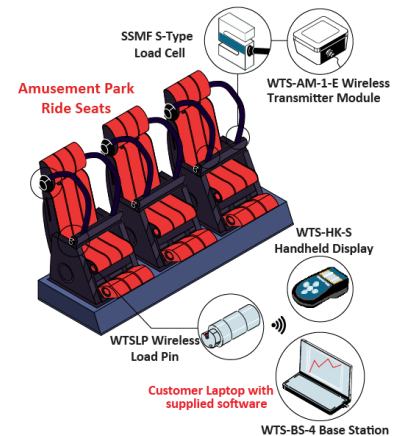
Roller Coaster Wheel Force



Roller coaster wheel assemblies are subjected to extreme changing forces as trains accelerate, brake, navigate tight curves, and pass through inversions. These loading conditions create wear, affect ride smoothness, and introduce potential safety risks if not fully understood during testing. The 6A80 6-Axis Standard Capacity Load Cells were integrated into wheel bogie assemblies to measure multi-directional forces acting on the train during operation. LP Custom Stainless Steel Load Pins were installed at axle and mounting interfaces to capture shear forces and localized wheel loading under dynamic conditions. Results can be displayed and logged using the BX8-HD44 BlueDAQ Series Data Acquisition System when connected to a PC or laptop.

Amusement Park Ride Restraint Testing

Amusement park rides rely on restraint systems to securely hold riders under rapidly changing and multi-directional forces. These systems must perform reliably across a wide range of rider sizes, seating configurations, and dynamic loading conditions. Interface suggests integrating the SSMF Fatigue Rated S-Type Load Cells into the lap and shoulder bar assemblies to measure applied force during ride conditions. Results are wirelessly sent to the customer's PC when connected to the WTS-AM-1E Wireless Strain Bridge Transmitter Module. WTSLP Wireless Custom Stainless Steel Load Pins are used within pivot joints to monitor shear forces during ride motion. When connected to the WTS-BS-4 USB Industrial Base Station, results are wirelessly sent to the WTS-HK-S Next-Generation Wireless Handheld.



Results

Replacing traditional wired sensors with Interface's wireless load pins and telemetry systems eliminate cable entanglement on moving ride assemblies. Additionally, force measurement products, such as multi-axis sensors and load cells provide engineers with clear visibility into stress points and potential performance issues. Ultimately, Interface's products provide engineers with tools for safety compliance and structural integrity.