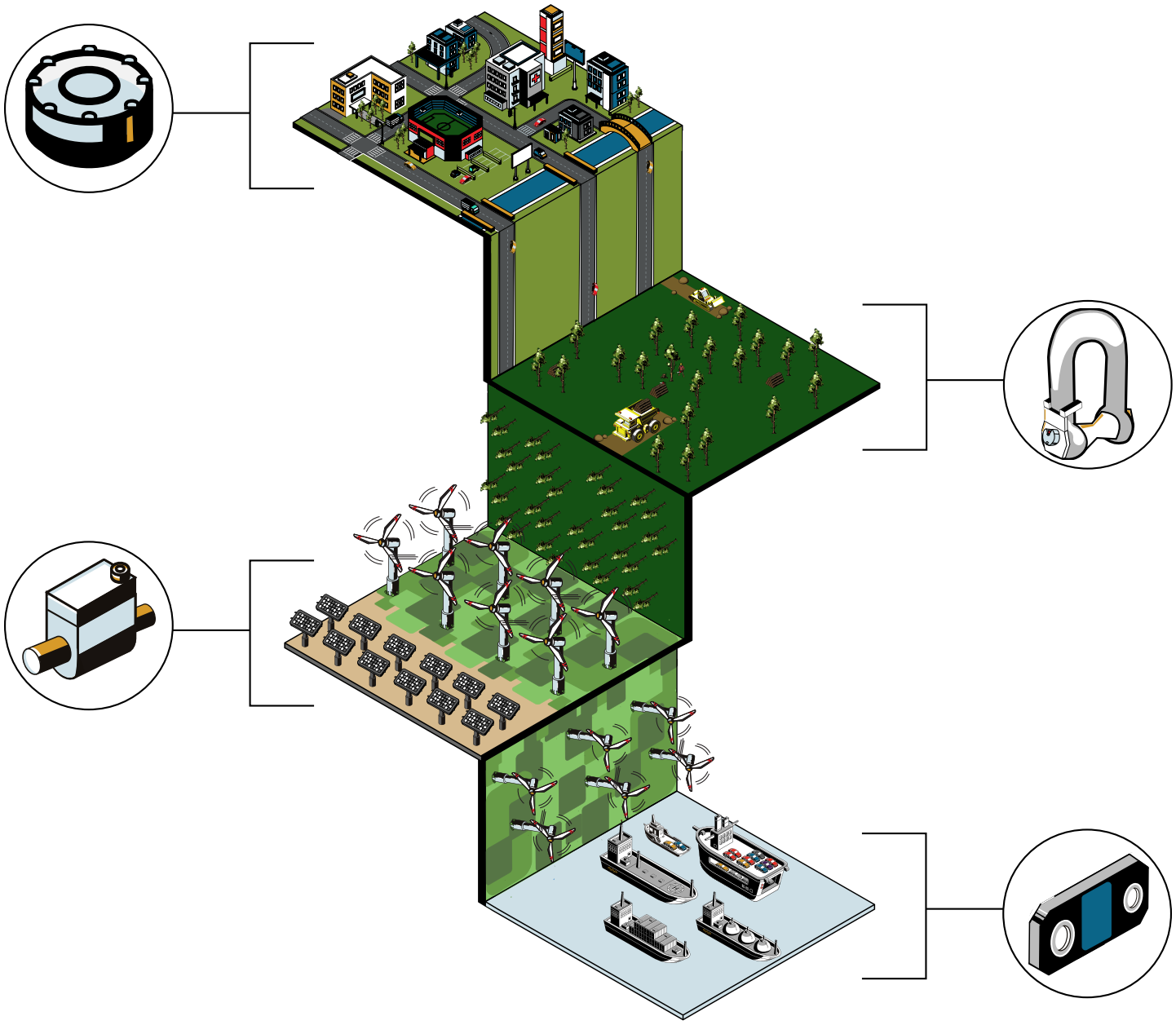
Interface

Application Notes Guide



Application Note Guide v1.5 12-12-24

Aerospace

Aircraft Engine Hoist
Load Shackle

Industry: Aerospace

Summary

Customer Challenge

An aerospace company wants to test their aircraft engine hoist in order to safely lift, remove, or install engines efficiently and safety.

Interface Solution

Interface's solution is to install WTSSHK-B-HL Wireless Bow Shackles to the aircraft engine hoist. A heavy load will be added to the hooks where the aircraft engine would be. Results from the heavy load will be sent wirelessly to both the WTS-BS-4 USB Industrial Base Station attached to the customers computer or laptop, and the WTS-1-HS Handheld display for single transmitters

Results

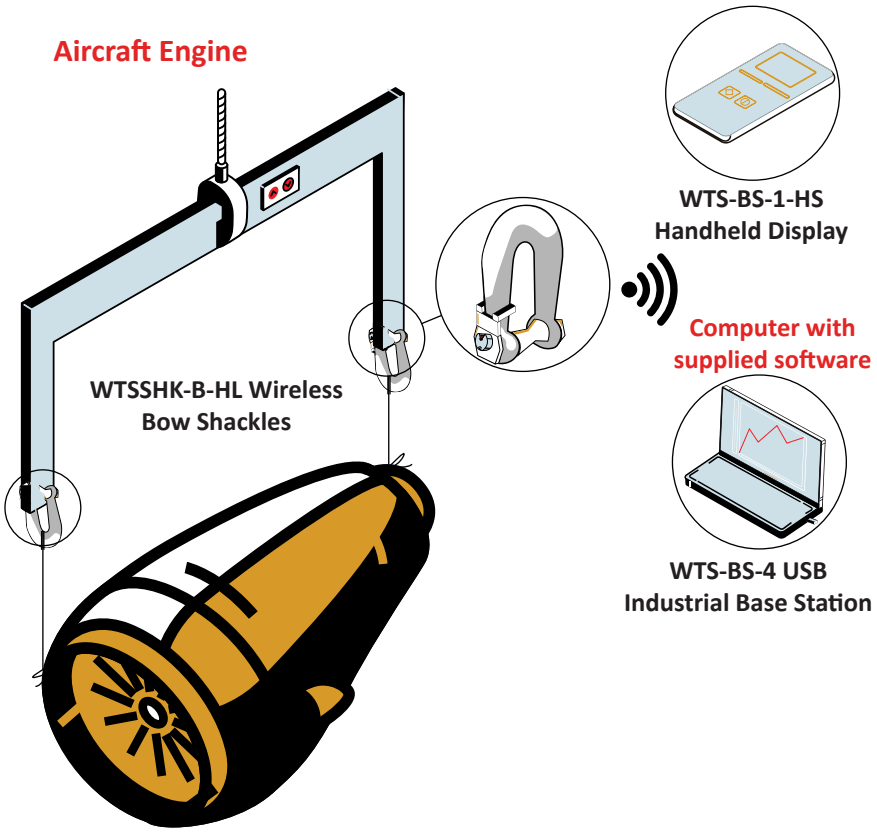
The customer was assured that the aircraft engine hoist was strong and secure enough to lift a heavy engine when installing or removing an engine inside of an aircraft.

Materials

- Two WTSSHK-B-HL Wireless Bow Shackles
- WTS-BS-4 USB Industrial Base Station
- WTS-BS-1-HS Handheld Display for Single Transmitters
- Customer PC or Laptop

How It Works

1. Two WTSSHK-B-HL Wireless Bow Shackles are installed onto the aircraft engine hoist.
2. A heavy load is attached to the hooks of the hoist and slings.
3. The WTSSHK-B-HL Wireless Bow Shackles measure the forces of the heavy load, and transmit the data wirelessly to the customers computer or laptop through the WTS-BS-4 USB Industrial Base Station. The customer can also view results wirelessly when the data is sent to the WTS-BS-1-HS Handheld Display for single transmitters.



Aircraft Lifting Equipment
Load Cell

Industry: Aerospace

Summary

Customer Challenge

An aerospace company wants to check if the valves on their aircraft lifting equipment is working safely and properly.

Interface Solution

Interface's solution is to install a 1200 High Capacity Standard Precision LowProfile™ Load Cell in between the aircraft testing rig and the lifting jack. The load cell will measure the load's force safety valve when the lifting equipment opens. Results will be sent to the 9890 Strain Gage, Load Cell, & mV/V Indicator, where the customer can see it displayed in real-time.

Results

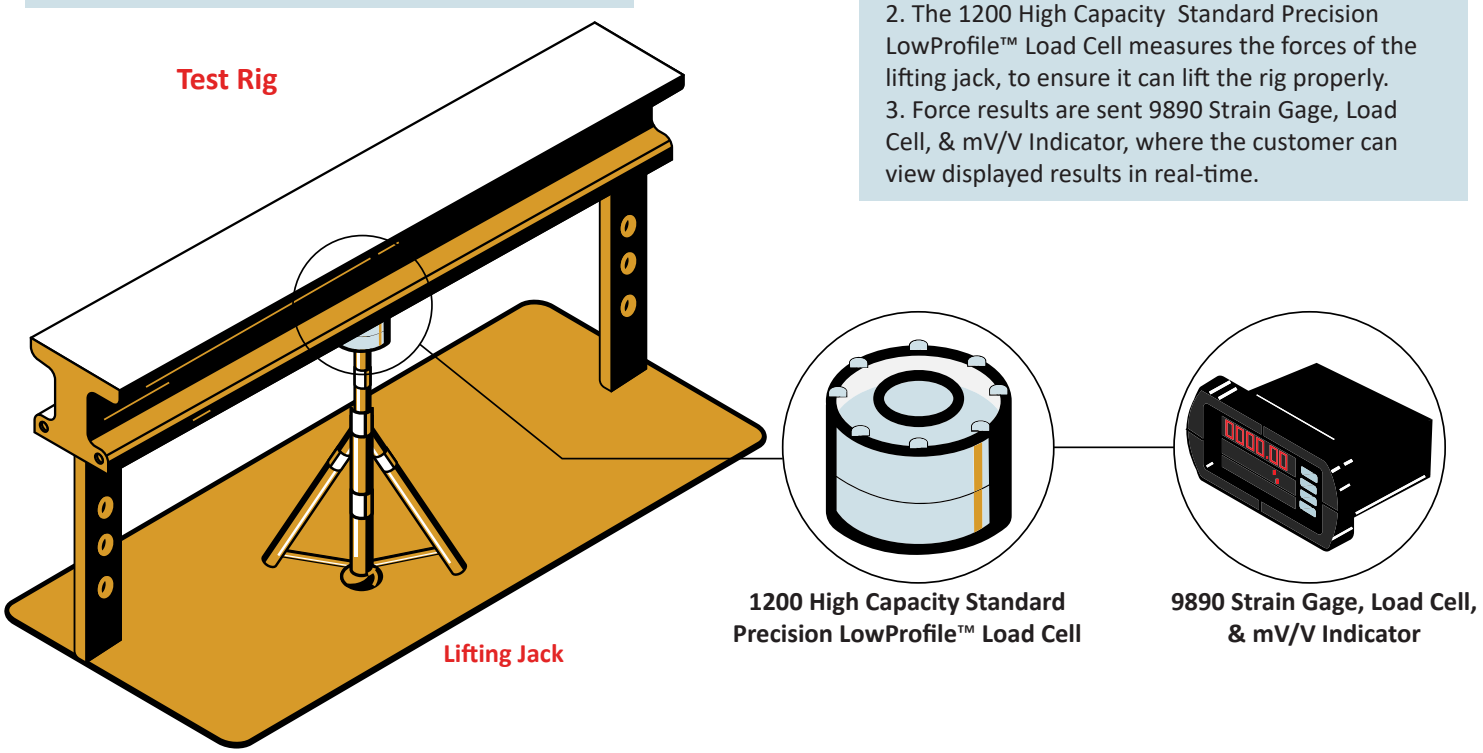
The customer was able to determine that the aircraft lifting equipment was working properly. Since they are ensured of its safe functionality, it can now be used on real aircrafts that need to be lifted.

Materials

- 1200 High Capacity Standard Precision LowProfile™ Load Cell
- 9890 Strain Gage, Load Cell, & mV/V Indicator

How It Works

1. A 1200 High Capacity Standard Precision LowProfile™ Load Cell is placed between the aircraft test rig and the lifting jack.
2. The 1200 High Capacity Standard Precision LowProfile™ Load Cell measures the forces of the lifting jack, to ensure it can lift the rig properly.
3. Force results are sent 9890 Strain Gage, Load Cell, & mV/V Indicator, where the customer can view displayed results in real-time.



1200 High Capacity Standard Precision LowProfile™ Load Cell

9890 Strain Gage, Load Cell, & mV/V Indicator

Aircraft Wing Fatigue Load Cell

Industry: Aerospace, Test and Measurement

Summary

Customer Challenge

Before any of the U.S. Navy's F/A-18 twin-engine supersonic fighter jets can be put into operation, the wings of the aircraft must undergo fatigue testing in a controlled environment to ensure that they are capable of withstanding the forces that will be encountered during real-world flight throughout the lifetime of the aircraft. Highly accurate measurements must be recorded in order to make sure that a near-exact replication of in-flight conditions are being achieved.

Interface Solution

During fatigue tests, Interface Model 1248 Standard Precision Flange LowProfile™ Load Cells are installed in line with the hydraulic cylinders, which apply back-and-forth loading forces to the aircraft. This is carried out over the course of 18 months to simulate in-flight stresses and strains on the wings. Load cells are connected to indicators, which record output.

Results

Capable of withstanding more than 100 million ($1x10^8$) fully reversible load cycles, Interface's LowProfile™ fatigue-rated load cells have performed flawlessly in F/A-18 wing testing - with zero recorded failures in the many years that testing facilities around the world have been using them.

Materials

- 1248 Standard Precision Flange LowProfile™ Load Cell in 500 kN capacity with dual bridge option
- Customer's data acquisition system
- Customer's hydraulic control system

How It Works

1. The F/A-18 is placed on a hydraulic testing bed where it is subjected to loading that simulates in-flight conditions.
2. Interface Model 1248 Standard Precision Flange LowProfile™ load cells are connected to each hydraulic cylinder that applies force to the wings and data is sent to the hydraulic control system.
3. Customer's data acquisition system is then connected to each LowProfile™ Load Cell to record output.
4. The testing facility analyzes the forces being created by hydraulic cylinders to ensure that they are representative of actual in-flight loading conditions.

Aircraft Yoke Torque Measurement

Multi-Axis

Industry: Aerospace

Summary

Customer Challenge

An aircraft manufacturer wants to measure the torque of their aircrafts yoke or control wheel. They want to monitor the torque and forces applied to ensure that the aircrafts controls are operating properly.

Interface Solution

Interface suggests using the AT103 2-Axis Axial Torsion Load Cell to measure both torque and force within this single sensor. It can be installed inside of the yoke, and can measure the rotation of the yoke, and the forward and backwards movements. Data can be measured and paired with the SI-USB4 4-Channel Interface Module, and displayed with the customer's laptop.

Results

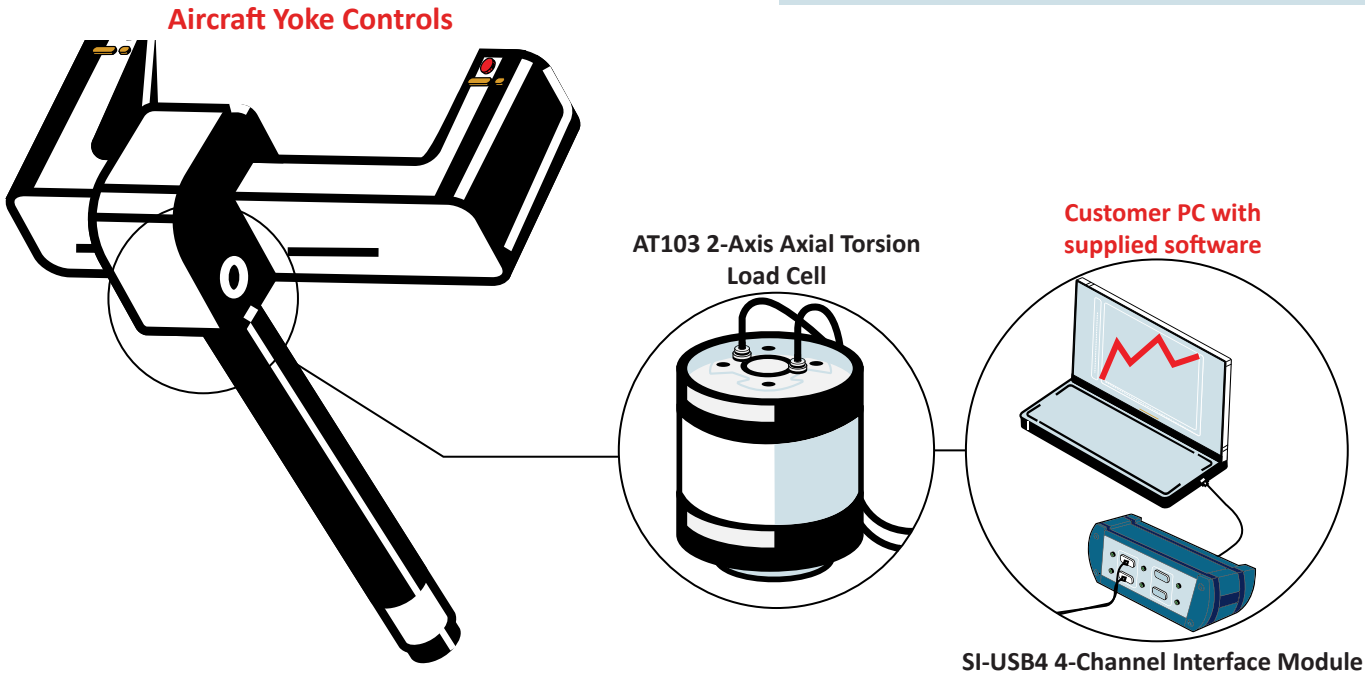
Interface's AT103 2-Axis Axial Torsion Load Cell was able to measure and monitor the torque and force of the yoke control.

Materials

- AT103 2-Axis Axial Torsion Load Cell
- SI-USB4 4-Channel Interface Module with supplied software
- Customer PC or Laptop

How It Works

1. The AT103 2-Axis Axial Torsion Load Cell is installed inside of the yoke or control wheel of the aircraft.
2. Torque and force measurements are monitored and recorded through the SI-USB4 4-Channel Interface Module when connected to the customer's PC or laptop.



Airplane Jacking System

Load Cell and WTS Wireless Telemetry System

Industry: Aerospace

Summary

Customer Challenge

A customer wants to weigh their aircrafts with their jacking system. They need a wireless solution, and they want results to show up in real-time.

Interface Solution

Interface's WTS 1200 Standard Precision LowProfile™ Wireless Load Cells can be installed at each jacking point. When connected to the WTS Wireless Telemetry System, results of all jacking points or individual jacking points can be wirelessly transmitted and displayed through a customer computer with Log 100 software, or using the WTS-BS-1-Wireless Handheld Display for Unlimited Transmitters.

Results

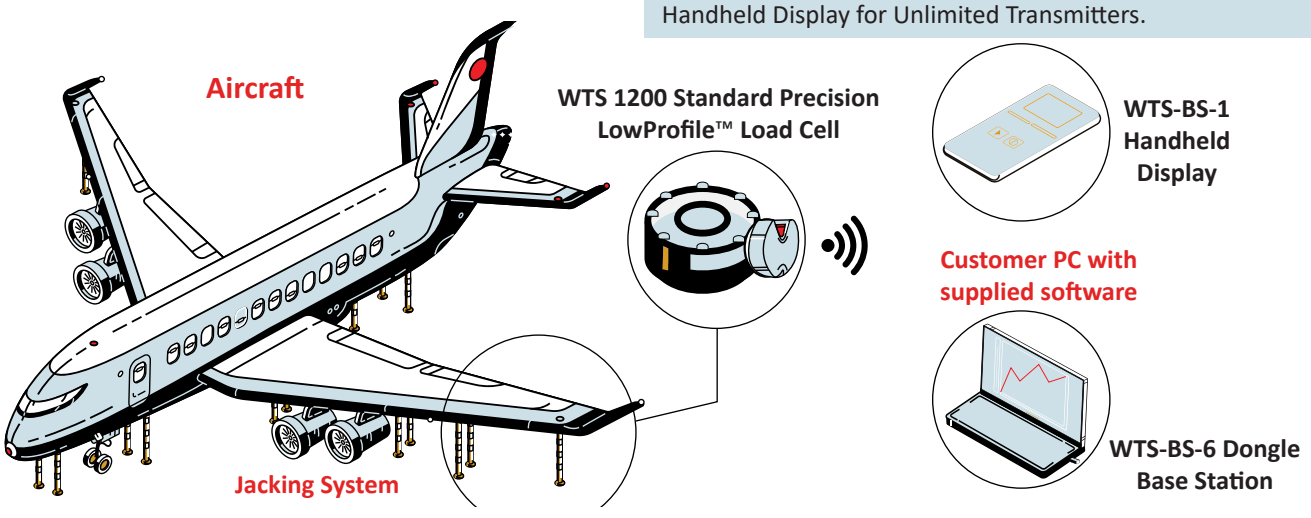
Interface's load cells and WTS Wireless Telemetry System successfully achieved the customer's need to weigh their aircrafts.

Materials

- Multiple WTS 1200 Standard Precision LowProfile™ Wireless Load Cells with integrated wireless acquisition module
- WTS-BS-6 Wireless Telemetry Dongle Base Station
- WTS-BS-1-Wireless Handheld Display for Unlimited Transmitters
- Supplied Log100 Software
- Customer PC or Laptop

How It Works

1. Multiple WTS 1200 Standard Precision LowProfile™ Wireless Load Cells are installed to each of the jacking points along the aircraft.
2. When connected to the integrated Wireless Strain Bridge Transmitter Module, force results of all jacking points or individual jacking points can be wirelessly transmitted to the WTS-BS-6 Wireless Telemetry Dongle Base Station and displayed on the customer's PC. Colored alarms can be set in case there is force overload.
3. Results can also be transmitted to WTS-BS-1-Wireless Handheld Display for Unlimited Transmitters.



Crew Module Center of Gravity Load Cell

Industry: Aerospace

Summary

Customer Challenge

The crew module center of gravity test is conducted to identify the specific point within a spacecraft's crew module where its entire weight is concentrated. The center of gravity test is essential to guarantee the stability and optimal performance of the spacecraft thus ensuring the overall success of the mission.

Interface Solution

Interface's WTSSHK-B Wireless Crosby™ Load Shackles are installed onto the crew module at three points. The crew module is loaded into the test frame, and the center of gravity is calculated with the load shackles. Data is wirelessly transmitted to the customer's computer using WTS-BS-4 Industrial USB Base Station, where it is displayed, logged, and graphed with included Log100 software. Results can also be displayed using Interface's WTS-BS-1-HA Handheld Display for Multiple Transmitters.

Results

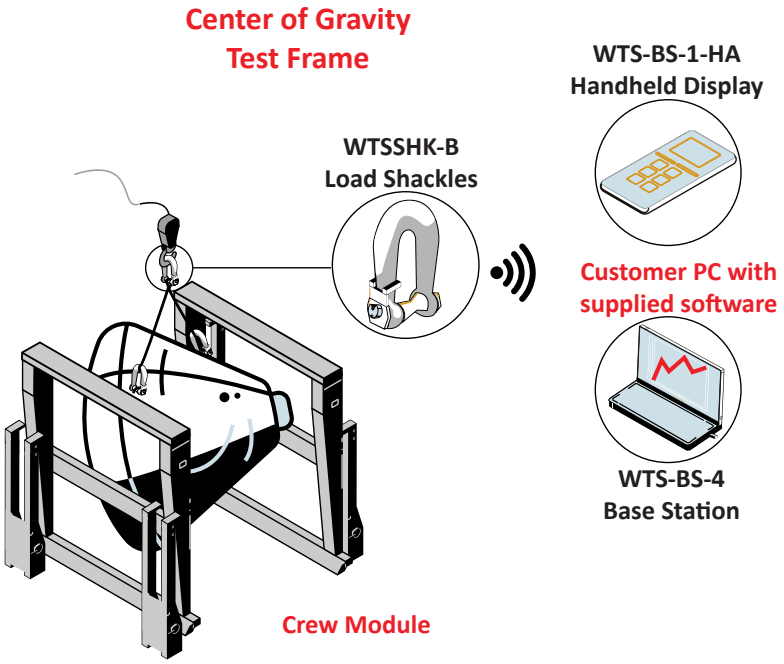
Interface's WTSSHK-B Wireless Crosby™ Load Shackles successfully measured the weight distribution of the crew module, thus calculating the center of gravity.

Materials

- WTSSHK-B Wireless Crosby™ Load Shackles
- WTS-BS-1-HA Handheld Display for Multiple Transmitters
- WTS-BS-4 Industrial USB Base Station
- WTS Toolkit Software and Log100 Software Included
- Customer PC or Laptop
- Crew module test frame
- Crew Module

How It Works

1. Three WTSSHK-B Wireless Crosby™ Load Shackles are installed onto the crew module.
2. The crew module is loaded into the test frame.
3. The crew module is weighed and the center of gravity is calculated. Data is wirelessly transmitted to the customer's computer using WTS-BS-4 Industrial USB Base Station, where it is displayed, logged, and graphed with included Log100 software. Results can also be displayed using Interface's WTS-BS-1-HA Handheld Display for Multiple Transmitters.



Inflatable Space Habitat Load Cell

Industry: Aerospace

Summary

Customer Challenge

Inflatable space habitats are the newest innovation in the space industry, creating a new space for humans can live and work past the Earth's atmosphere. A space company wants to test the overall design and material of the inflatable habitat by conducting a burst test.

Interface Solution

Multiple clevises and LP Stainless Steel Load Pins are attached to the in the webbing material that create the inflatable habitat. When pressure is increased within the inflatable habitat, the load pins will capture how much force the heavy duty material will hold at specific pressures until it explodes.

Results

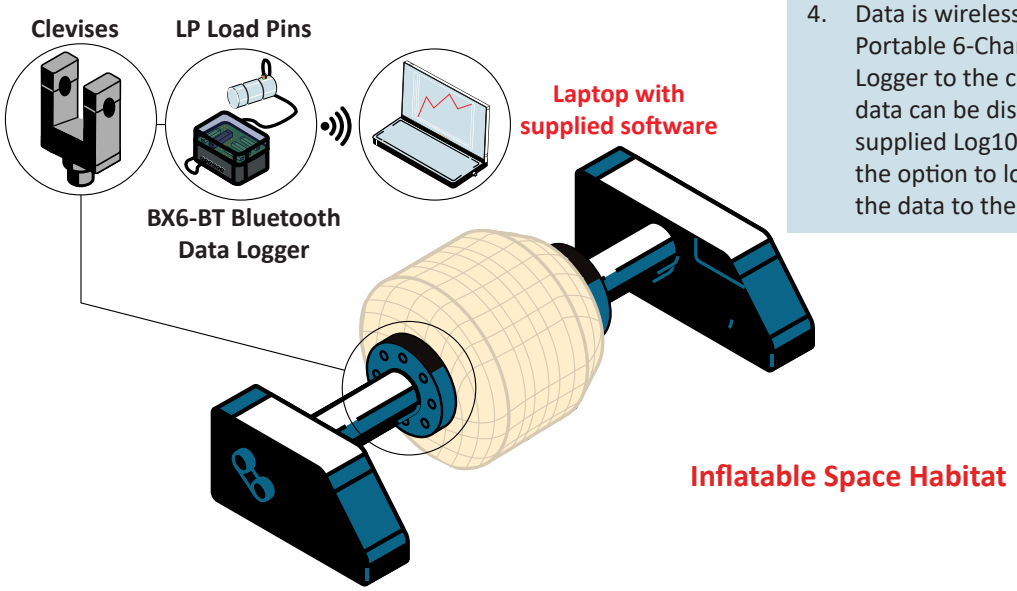
Interface's LP Stainless Steel Load Pins successfully measured the amount of force the inflatable habitat could withstand during the burst test.

Materials

- LP Stainless Steel Load Pins
- Clevises
- BX6-BT Portable 6-Channel High Speed Bluetooth Data Logger with supplied Log100 Software
- Inflatable Structure
- Customer PC

How It Works

1. Clevises and LP Stainless Steel Load Pins are embedded in the base of the inflatable habitat, where straps of hard duty material are woven together, creating the habitats structure. The LP's are connected to the BX6-BT Portable 6-Channel High Speed Bluetooth Data Logger.
2. The habitat is inflated, and PSI is increased slowly until the habitat bursts.
3. The LP's measure the amount of force the woven heavy duty fabric could handle until it bursts.
4. Data is wirelessly transmitted from the BX6-BT Portable 6-Channel High Speed Bluetooth Data Logger to the customer's PC via Bluetooth. The data can be displayed, recorded, and graphed using supplied Log100 software. The customer also has the option to log data onto an SD Card and upload the data to the PC through the SD Card.



Jet Engine Thrust Test
Load Cells

Industry: Aerospace

Summary

Customer Challenge

A customer wants to conduct a static jet engine thrust test that can accurately determine the engine's thrust, burn time, chamber pressure, and other parameters, providing invaluable data to propellant chemists and engineers. They need a high accuracy load cell with excellent repeatability to withstand thrust forces in very harsh environments.

Interface Solution

From ignition to burn-out, Interface's 1000 High Capacity Fatigue-Rated LowProfile™ Load Cell is ideally suited based on their performance for this application. The load cell reacts to the thrust forces produced by the jet engine and the signals are collected and recorded to create a "thrust curve" of the engine.

Results

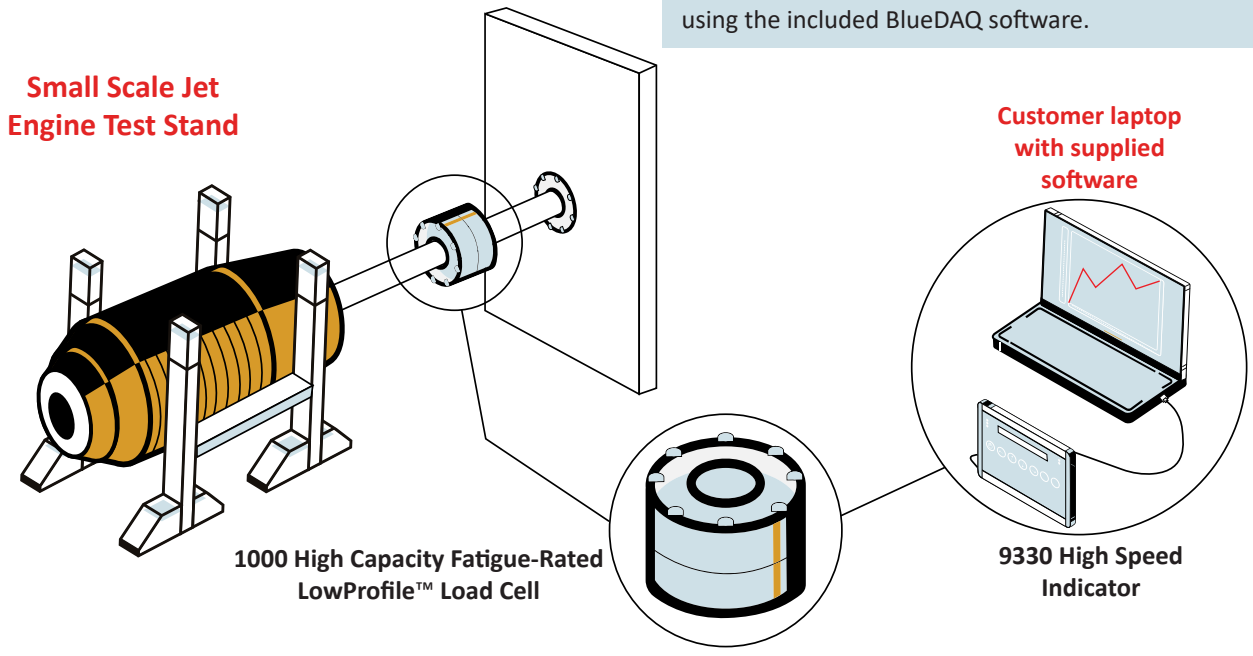
The performance of an Interface LowProfile™ Load Cell allows engineers to be confident in the data acquired from the static testing. Additionally, the repeatability of the load cell results in reduced time between tests, making static jet engine thrust testing more efficient.

Materials

- 1000 High Capacity Fatigue-Rated LowProfile™ Load Cell
- 9330 Battery Powered High Speed Data Logging Indicator with included BlueDAQ software
- Customer PC or Laptop

How It Works

1. The 1000 High Capacity Fatigue-Rated LowProfile™ Load Cell is installed into the static test stand.
2. The jet engine is ignited and produces a full thrust.
3. The 1000 High Capacity Fatigue-Rated LowProfile™ Load Cell absorbs the thrust force and outputs a signal directly to the 9330 High Speed Data Logger.
4. Data is measured and recorded on the customer's laptop using the included BlueDAQ software.



Landing Gear Joint Testing
Load Pin

Industry: Aerospace

Summary

Customer Challenge

An aerospace company wants to test their new spacecraft assembly and design by testing its landing gear joints. They want to ensure there are no flaws in the gear shock absorber design and can handle the applied forces when the craft lands from a flight.

Interface Solution

Interface's WTSLP Wireless Stainless Steel Load Pins can be installed and replace the normal pin joints. The spacecraft undergoes multiple drop tests at different heights, where the forces applied on the load pins are measured. The force results are transmitted wirelessly to the WTS-BS-4 USB Industrial Base Station in the customer's computer, and the WTS-BS-1-Ha Handheld Digital Display for multiple transmitters.

Results

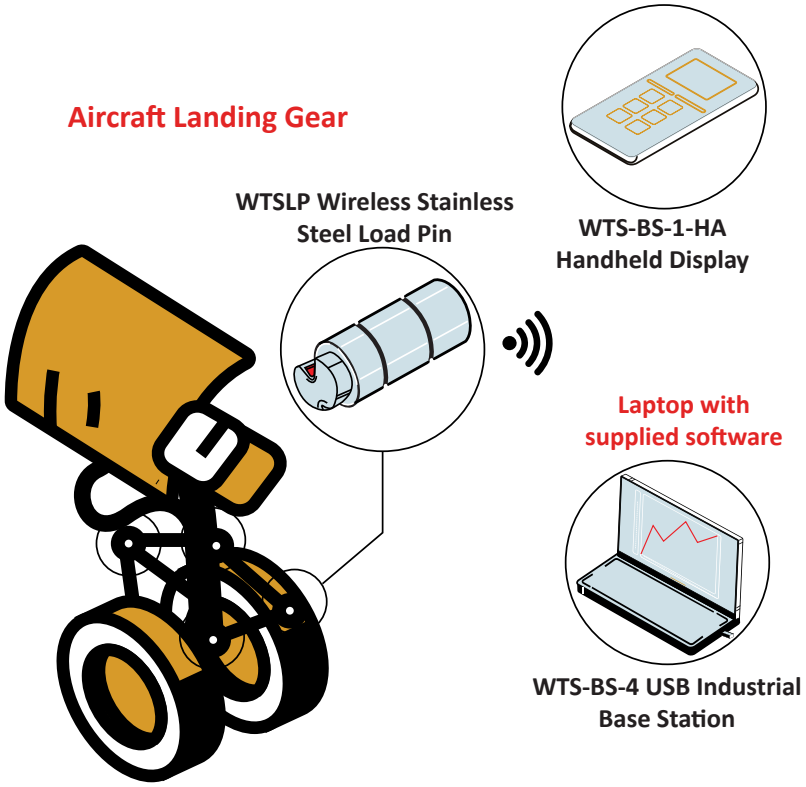
The customer was able to validate their spacecraft's landing gear structure is working effectively and safely.

Materials

- WTSLP Wireless Stainless Steel Load Pins
- WTS-BS-4 USB Industrial Base Station
- WTS Toolkit
- WTS-BS-1-HA Handheld Display for multiple transmitters
- Customer PC or Laptop

How It Works

1. The WTSLP Wireless Stainless Steel Load Pins are installed in the multiple articulating pin joints.
2. After multiple drop tests, the force measurements are transmitted wirelessly to the customer's computer through the WTS-BS-4 USB Industrial Base Station and the WTS-BS-1-HA Handheld Display for multiple transmitters.
3. The customer can record and log data with the supplied WTS toolkit that comes with the WTS-BS-4 USB Industrial Base Station.



Parachute Deployment & Deceleration Testing

Load Cell

Industry: Aerospace, Industrial Automation

Summary

Customer Challenge

Spacecraft landing on a lunar or planetary surface require parachutes to deploy at high speeds under high loads. For example, NASA tested the Mars Science Laboratory parachute in an 80x120-foot wind tunnel at 80 mph speeds and loads up to 85,000 pounds.

Interface Solution

A 1000-series fatigue-rated LowProfile® load cells with eccentric load compensation is employed to sustain and measure high loads with 300% overload protection.

Results

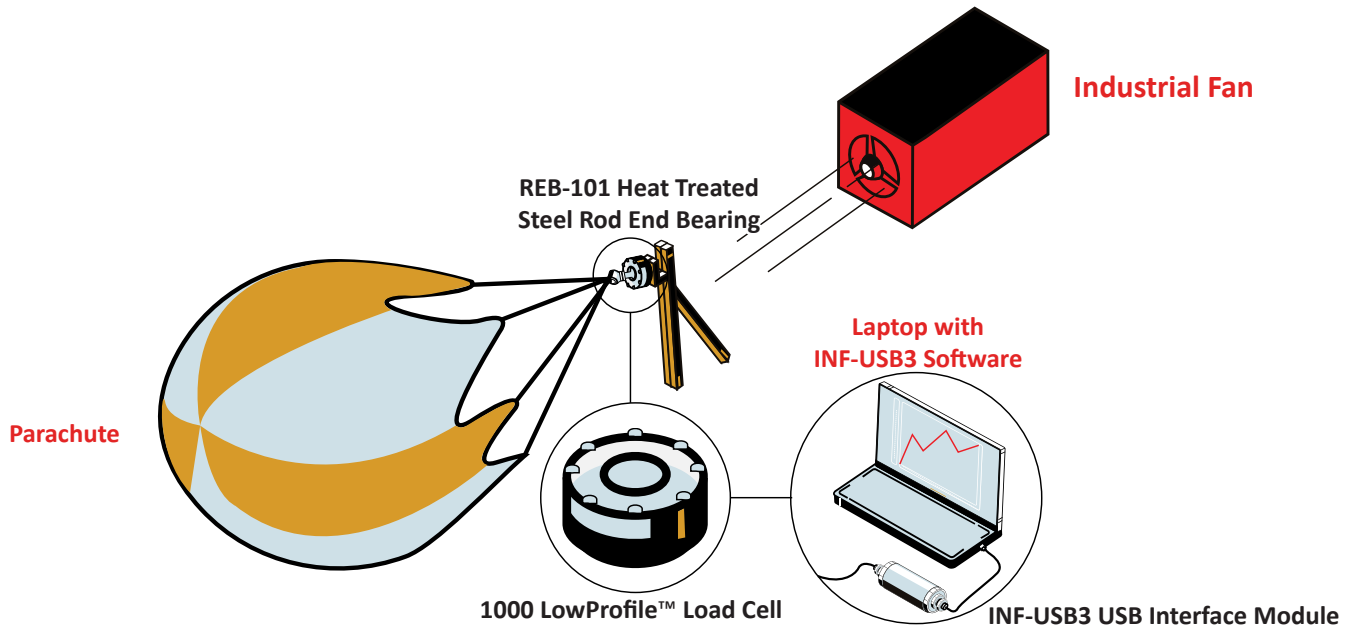
Load cells ensure accurate measurement of applied loads during parachute deployment testing. Multiple tests allow engineers to test various parachute packing techniques.

Materials

- 1000 Fatigue-Rated LowProfile® Load Cells capacity up to 50K pounds-force (lbf)
- REB-101 Heat Treated Steel Rod End Bearing
- INF-USB3 USB Interface Module

How It Works

1. Support structure capable of sustaining required loads is built inside wind tunnel.
2. A single load cell is installed as part of the support structure and connected to the parachute deployment system.
3. After the wind tunnel is brought up to speed, a mortar launches the parachute, aiming toward the upper middle portion of the tunnel where speeds are highest.
4. As the parachute canopy deploys, the load cell(s) measure the force applied with an accuracy of 0.03%.



Planetary Sample Collecting Multi-Axis

Industry: Aerospace

Summary

Customer Challenge

As space exploration continues to grow and evolve, more robotic systems are created to collect samples of objects and materials on planetary surfaces. Robotic arms with sampling tools need to be tested for scooping, drilling, and collecting samples.

Interface Solution

Interface's Model 6A40 6-Axis Load Cell can be installed between the flange and the sample collecting tool. When connected to the BX8-HD44 Data Acquisition, the customer can receive force and torque measurements when connected to their control system using BlueDAQ software.

Results

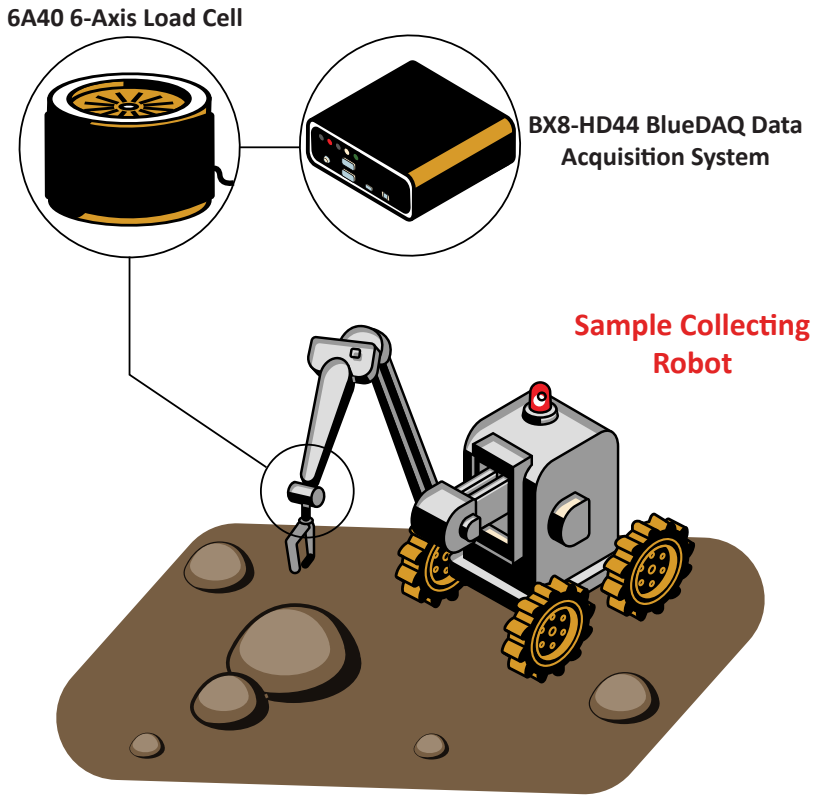
Interface's 6A40-6 Axis Load Cell was able to measure all forces and torques (Fx, Fy, Fz, Mx, My, Mz. The BXB-HD44 Data Acquisition was able to log, display, and graph measurements while sending scaled analog output signals for these axes to the customer's robot control system.

Materials

- 6A40 6-Axis Load Cell
- BX8-HD44 BlueDAQ Series Data Acquisition System with included BlueDAQ software
- Customer's sample collecting robot and control system

How It Works

1. The 6A40 6-Axis Load Cell is positioned between the flange and the grinder.
2. 6A40 6-Axis Load Cell is linked to the BX8-HD44 BlueDAQ Series Data Acquisition System, which gathers force and torque measurement data.
3. The customer connects the BX8's analog outputs to their control system. This enables the customer to monitor, log, display, and graph these measurements. The results are sent to the customer's control system via analog or digital output.



Propeller Testing
Multi-Axis
Industry: Aerospace

Summary

Customer Challenge

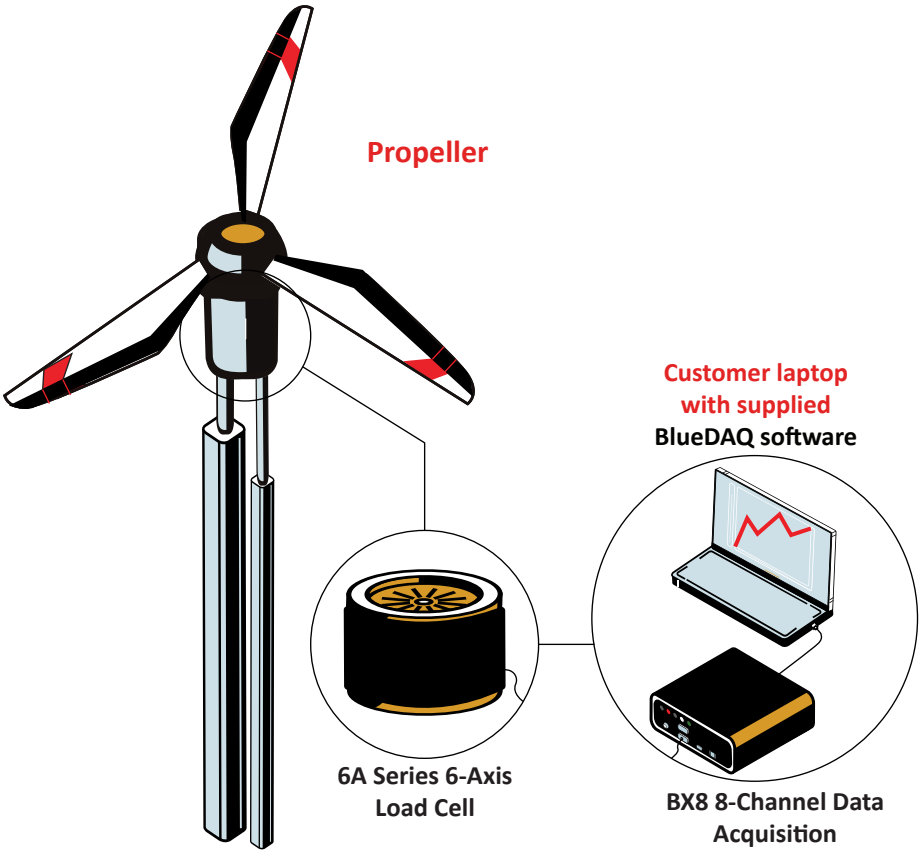
An aerospace customer wants to test their propeller's loads as it undergoes a multi-rotor system performance test. They want to measure the different vibrations, blade deflections, rotor tilts, and any other interferences the propellers may experience.

Interface Solution

Interface suggests using the 6A Series 6-Axis, and mounting it between the propellers motor and the hydraulic actuator per propeller. The 6A 6-Axis load cell will measure the movements of the propeller's on all axis, and can also be calibrated specifically to a single range or direction. Results can be displayed and logged using the BX8 8-Channel Data Acquisition and Amplifier when connected to a PC or laptop.

Results

Interface's 6A Series 6-Axis Load cell successfully was able to measure all axis of the propeller's performance tests. When necessary, it was also calibrated to measure a single direction.



How It Works

1. The 6A Series 6 Axis Load Cell is installed between the propeller's motor and the hydraulic actuator.
2. Different tests were performed on the propeller's dynamics.
3. Results were captured using the BX8 8-Channel Data Acquisition and Amplifier when connected to the customer's laptop.

Materials

- 6A Series 6-Axis Load Cell
- BX8 8-Channel Data Acquisition and Amplifier
- Linear hydraulic actuators
- BlueDAQ software
- Customer PC or Laptop

Reduced Gravity Simulation
Load Cell

Industry: Aerospace

Summary

Customer Challenge

Develop a system to provide a full range of natural motion for a realistic simulation of reduced gravity environments. The system can simulate future missions to the moon, mars, asteroids, or any other celestial destination. The simulated weightlessness can train crew how to handle a wide range of microgravity activities, including walking, running, and jumping. The system can also be used for surface operation studies, suit and vehicle development, robotic development, and mass handling studies.

Interface Solution

The 1100 series load cell is installed in-line with a steel support cable to actively measure the vertical load on the system. A control system, (which includes the 9870 High-Speed High Performance TEDS Ready Indicator), monitors the load cell output and continuously offloads a portion of a human or robotic payload weight during all dynamic motions.

Results

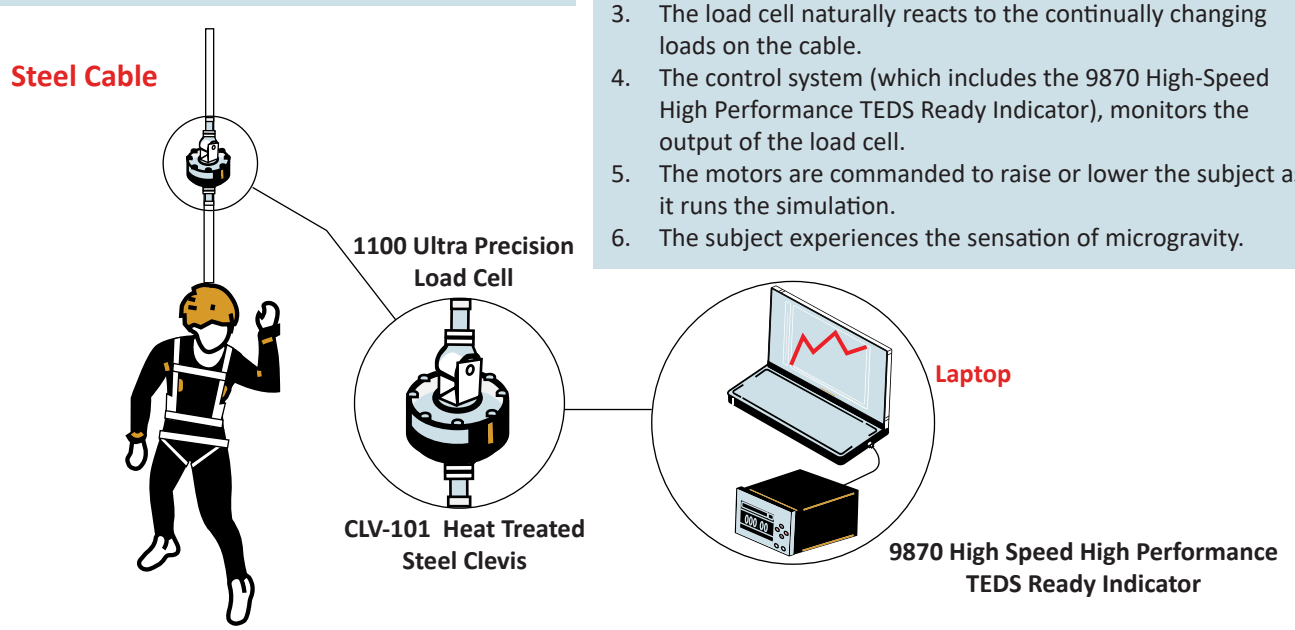
Using the precise feedback from the load cell, the control system is able to command a motor to raise or lower the subject to maintain a constant offload force. During the simulation, the system actively compensates for the movement of the subject to accurately reproduce a microgravity environment.

Materials

- 1100 Ultra Precision Load Cell
- CLV-101 Heat Treated Steel Clevis
- 9870 High-Speed High Performance TEDS Ready Indicator

How It Works

1. The 1100 series load cell is installed in the vertical axis steel cable.
2. The subject and simulation exercise are loaded into to system.
3. The load cell naturally reacts to the continually changing loads on the cable.
4. The control system (which includes the 9870 High-Speed High Performance TEDS Ready Indicator), monitors the output of the load cell.
5. The motors are commanded to raise or lower the subject as it runs the simulation.
6. The subject experiences the sensation of microgravity.



Rescue Helicopter Hoist Test
Load Shackle

Industry: Aerospace

Summary

Customer Challenge

A customer wants to test the strength of the cable line used in the hoist of their helicopter during rescue missions and situations. They want to see if both the cable and the hoist can withstand a heavy load safely, and for long periods of time while the helicopter is in flight.

Interface Solution

Interface's WTSSHK-D Wireless Crosby™ Load Shackle is attached to each mooring cable in use. Results are sent to the customers through the WTS-BS-4 USB Industrial Base Station when connected to the customer's supplied PC computer/ Laptop. Data can also be transmitted to the WTS-BS-1-HS Handheld Display for Single Transmitters, giving the customer the option to view mooring cable line tension.

Results

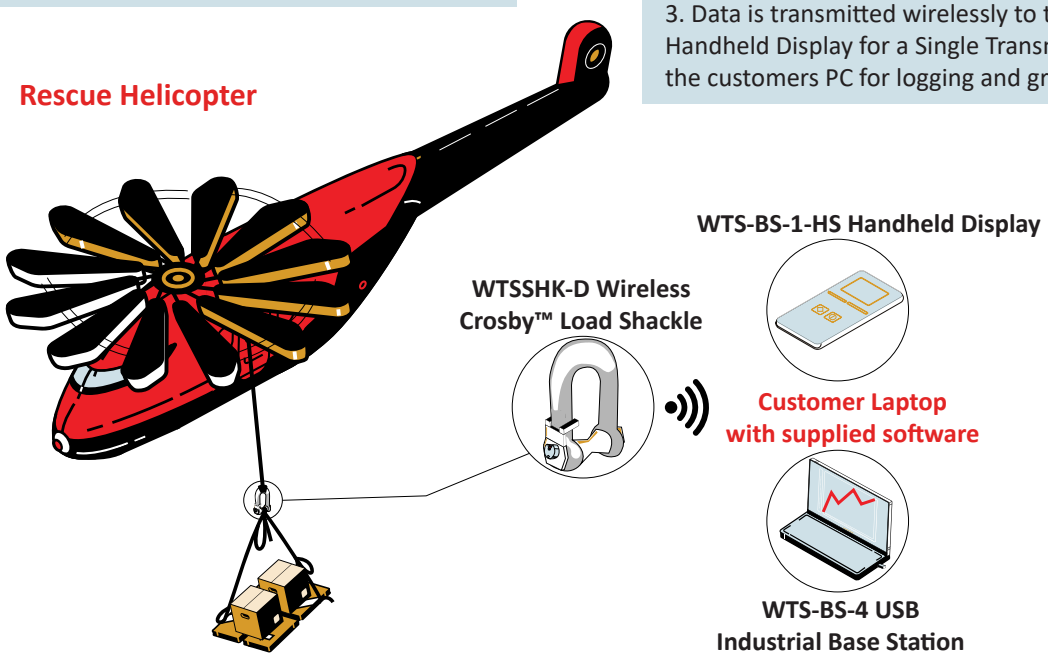
The customer was able to add a heavy load to the end of the helicopter hoist, to ensure it is strong and safe enough to carry both rescue personnel and objects while being in midair.

Materials

- WTSSHK-D Wireless Crosby™ Load Shackle
- WTS-BS-1-HS Handheld Display for Single Transmitters
- WTS-BS-4 USB Industrial Base Station
- WTS Toolkit & Log100 Software
- Customer PC

How It Works

1. The WTSSHK-D Wireless Crosby™ Load Shackle is installed at the end of the hoist.
2. A heavy load is attached to the shackle at its maximum capacity, and tested through mid flight in order to monitor the condition of the helicopter hoist.
3. Data is transmitted wirelessly to the WTS-BS-1-HS Handheld Display for a Single Transmitter, and also to the customers PC for logging and graphing information.



Rocket Center of Gravity
Load Cells

Industry: Aerospace

Summary

Customer Challenge

A space company wants to measure the center of gravity of their rocket in order to test its stability, control, performance, and safety objectives.

Interface Solution

Interface sugggests using four 1200 Standard Precision LowProfile™ Load Cells, and installing it into the test frame. Once the rocket is placed, the 1280 Programmable Weight Indicator and Controller gathers the center of gravity with a customized program.

Results

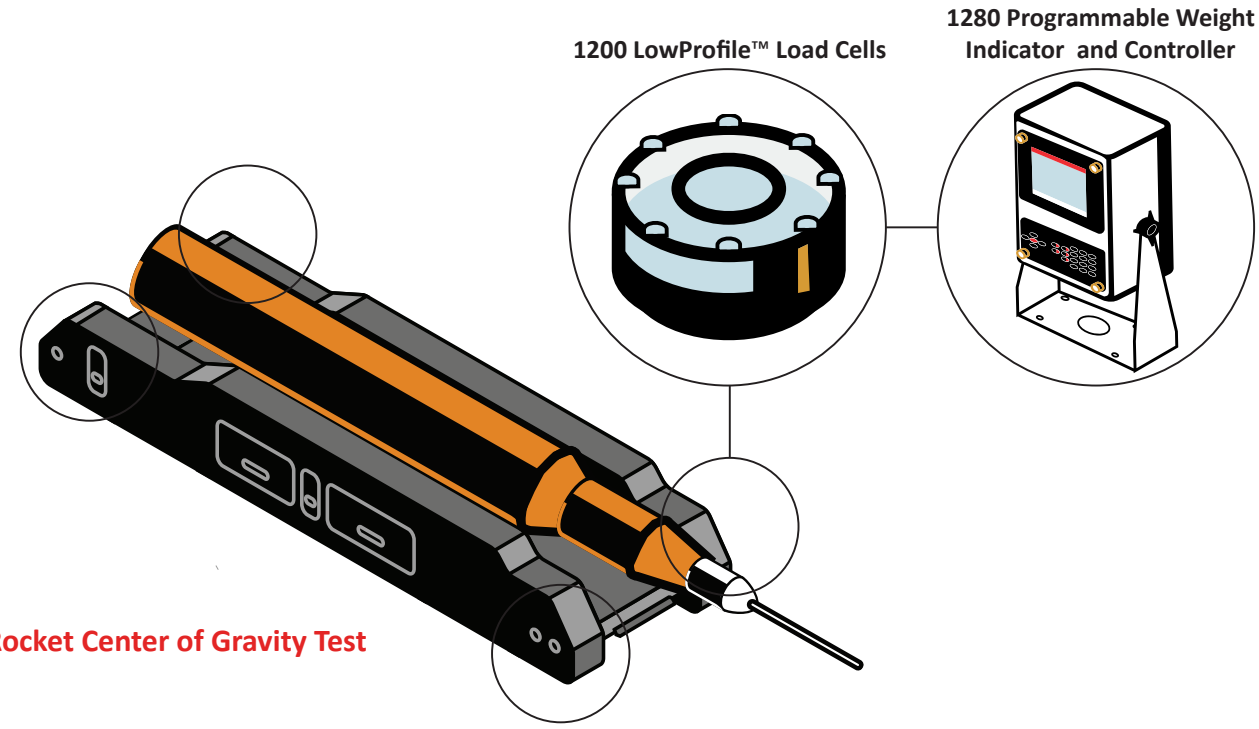
Interface's LowProfile™ load cells and paired instrumentation successfully measured the center of gravity of the rocket.

Materials

- Four 1200 Standard Precision LowProfile™ Load Cells
- 1280 Programmable Weight Indicator and Controller with custom program
- Customer PC
- Customer Rocket

How It Works

1. Four 1200 LowProfile Load Cells are installed into the corners of the center of gravity testing frame.
2. The rocket is placed on the frame, and the 1280 Programmable Weight Indicator and Controller gathers the center of gravity results with a customized program for this application.



Rocket Center of Gravity Test

Rocket Structural Testing
Load Cell

Industry: Aerospace

Summary

Customer Challenge

NASA's Space Launch System (SLS) core stage will be the largest ever built at 27 feet in diameter and 200+ feet tall. Core components including liquid hydrogen and oxygen tanks must withstand launch loads up to 9 million pounds-force (lbf).

Interface Solution

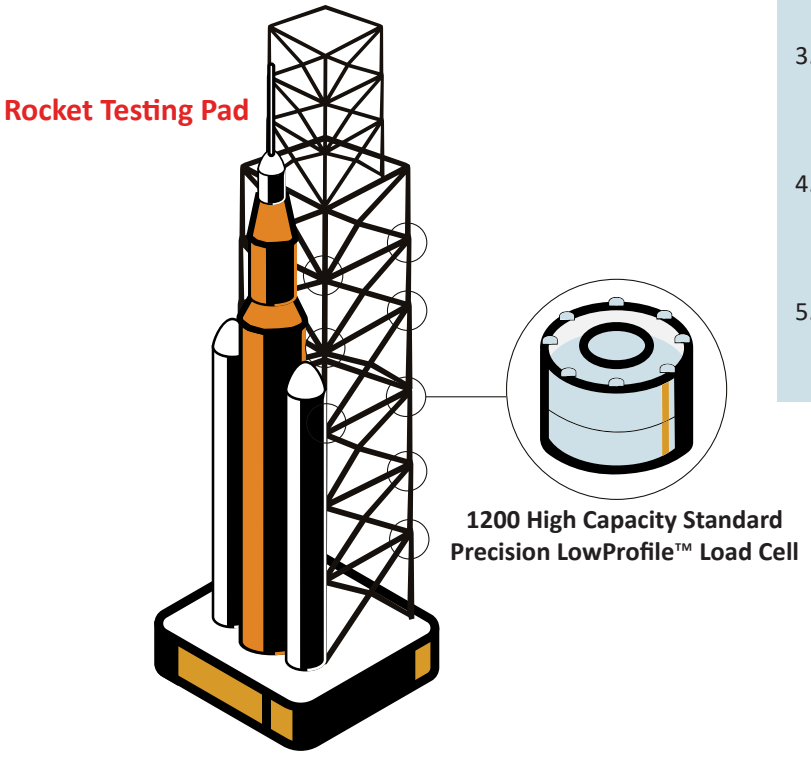
Interface load cells attached to hydraulic cylinders at various locations along test stands to provide precise test forces. Strain gages bonded to rocket structure surface and connected to data acquisition system for stress analysis.

Results

Engineers are able to measure loads applied at various areas on the rocket structure, verifying the structural performance under simulated launch conditions.

Materials

- 1200 High Capacity Standard Precision Low-Profile™ Load Cell Model 1260 for 600,000 lbf capacity.
- 1200 High Capacity Standard Precision LowProfile™ Load Cell Model 1280 for 1,000,000 lbf capacity.
- 1200 High Capacity Standard Precision LowProfile™ Load Cell Model 1290 for 2,000,000 lbf capacity.



How It Works

1. Marshall Space Flight Center in Hunstville, Alabama built a 215-foot twin tower static test stand to test the 185-foot hydrogen tank. A second 85-foot test stand was built to test oxygen tank and forward skirt.
2. The test stands contain hydraulic cylinders placed at strategic locations to push, pull or twist the structure to produce the required loads calculated by the test engineers to simulate actual launch conditions.
3. Multiple Interface 1200-series load cells of up to 2 million lbf capacity are attached in arrays to the hydraulic cylinders to measure the load being produced by each cylinder within 0.07%.
4. Load cell outputs are also fed back to the control system to control the cylinder forces. Temperature-compensated strain gages within each load cell reduce errors in output to 0.0008%/°F (0.0015%/°C).
5. Strain gauges bonded to the rocket structure being tested are connected to a data acquisition system for stress analysis.

Rover Landing Gear
Load Cell

Industry: Aerospace

Summary

Customer Challenge

A space company wants to measure the cushioning effect of their rover's landing legs through a drop test. They want to test how much force the landing gear can absorb until issues are caused in the legs.

Interface Solution

Interface suggests using the INFRD Platform Scale, which has four shear beam load cells installed at the corners of the scale. A drop test is conducted at different heights, and the results are summed using a JB104SS Junction Box built in the scale. The results are measured and logged on the provided SD card. Results can be also be viewed and logged when the 9330 connects to a PC.

Results

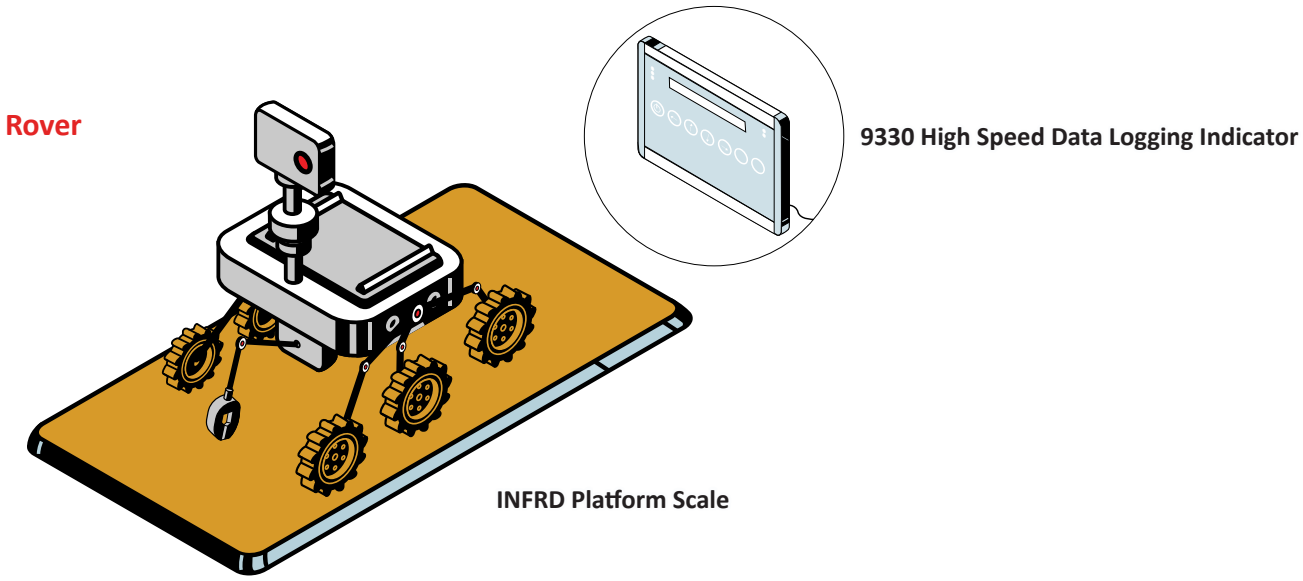
The INFRD Platform Scale was able to capture the forces that was implemented onto the rover's landing gear through these drop tests.

Materials

- INFRD Platform Scale
- 9330 Battery Powered High Speed Data Logging Indicator with BlueDAQ software and SD card
- Customer PC or Laptop
- Rover

How It Works

1. The rover undergoes drop tests onto the INFRD Platform Scale.
2. The forces are summed together through the built in JB104SS Junction Box.
3. The results are measured and logged on the provided SD card. Another option is the results can be also be viewed and logged when connected to a PC.



Rover Wheel Torque Monitoring

Torque Transducer

Industry: Aerospace

Summary

Customer Challenge

A space company wants a system to measure the wheel spin torque and force applied onto the wheels of their space rovers. They want to be able to monitor the torque measurements to see whether or not the rover is in motion or static as the motor runs. The force measurement is needed to monitor contact with the ground for ground control.

Interface Solution

Interface suggests using the T14 Slip-Ring Shaft Style Rotary Torque Transducer, installed inside of the rover's wheel alongside the motor. To create a wireless system, the torque sensor is attached to the WTS-AM-1E Wireless Strain Bridge Transmitter Module, which will wireless transmit the sensor's measurements to the WTS-BS-1 Handheld Display for Multiple Transmitters, or the customer's PC through the WTS-BS-4 Wireless Base Station with USB Interface.

Results

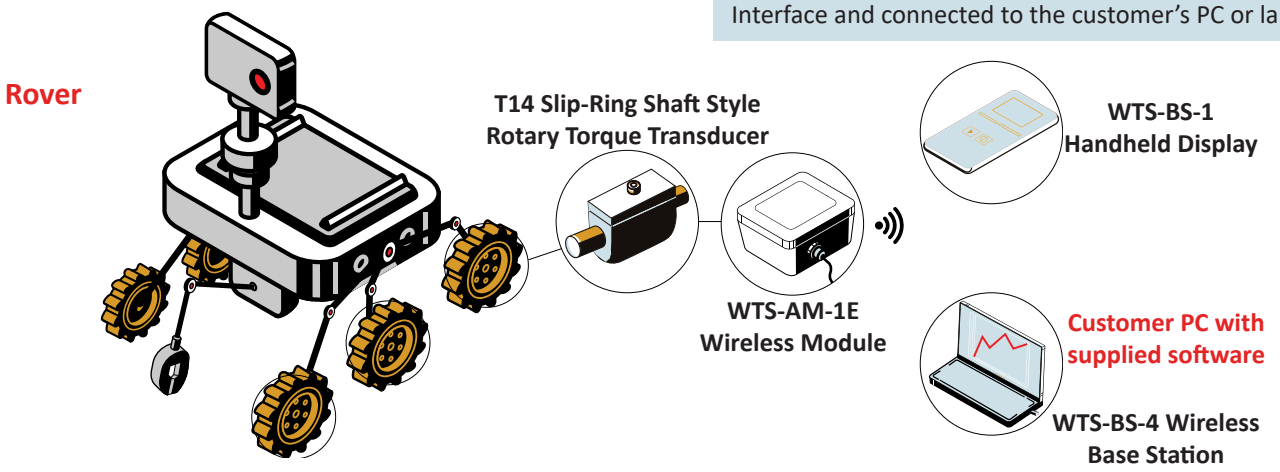
Interface's torque sensor and Wireless Telemetry System (WTS) solution successfully measured the rover wheels spin torque and forces.

Materials

- T14 Slip-Ring Shaft Style Rotary Torque Transducer
- WTS-AM-1E Wireless Strain Bridge Transmitter Module
- WTS-BS-1 Handheld Display for Multiple Transmitters
- WTS-BS-4 Wireless Base Station with USB Interface
- Customer PC or Laptop

How It Works

1. The T14 Slip-Ring Shaft Style Rotary Torque Transducer is installed inside the rover's wheels, and connected to the motor.
2. The WTS-AM-1E Wireless Strain Bridge Transmitter Module connects to the T14, collecting data results of the wheels when the rover is static or moving.
3. Data results are transmitted wirelessly to either the WTS-BS-1 Handheld Display for Multiple Transmitters, or, to the WTS-BS-4 Wireless Base Station with USB Interface and connected to the customer's PC or laptop.



Satellite Deployment
Load Washers

Industry: Aerospace

Summary

Customer Challenge

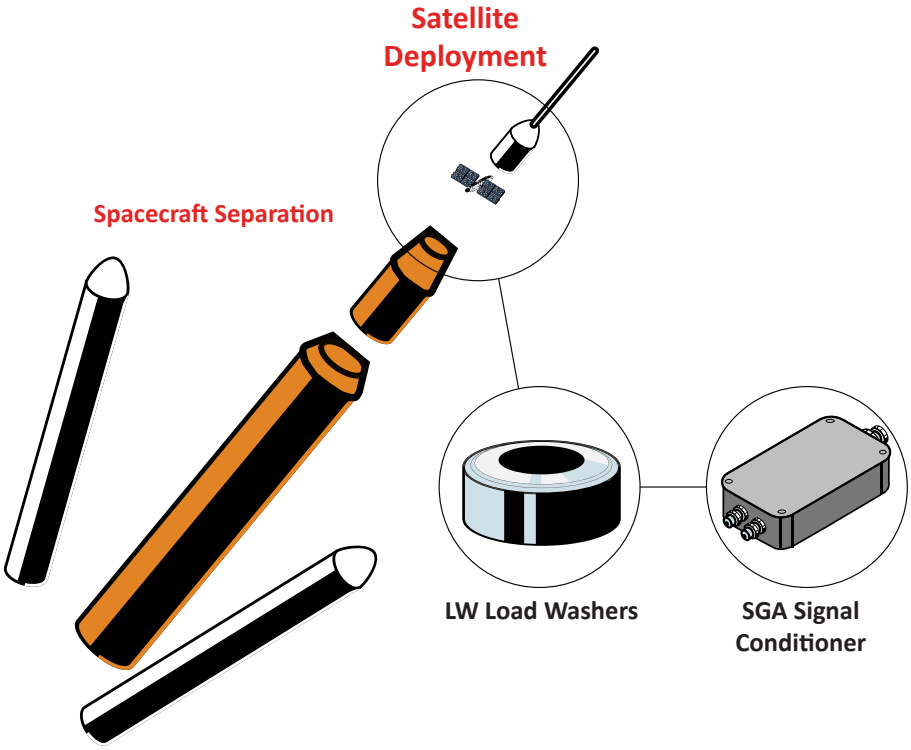
Satellite deployment requires the measurement of force in order to release a satellite from a rocket or a spacecraft. Compression forces from the payload's spring mechanism needs to be tested to ensure deployment is successful, and that the satellite does not get damaged as its released.

Interface Solution

Interface suggests using custom LW Load Washers within the springs of the separation mechanism. Measuring the force on the springs ensures the two pieces of the spacecraft are properly locked down during launch, but also ensures that separation occurs for the satellite to release into space. Force readings can be amplified with SGA AC/DC Powered Signal Conditioners, and signals can be supplied to the control system of the satellite.

Results

Interface's custom LW Load Washers successfully ensured the two pieces of the spacecraft were locked together during launch, but also ensured it would be separated in space for the satellite to deploy.



Materials

- Multiple custom LW Load Washers
- SGA AC/DC Powered Signal Conditioners

How It Works

1. Multiple custom LW Load Washers are installed into the springs of the, mechanism holding the two parts of the spacecraft together. Compression forces are measured to ensure the spacecraft is locked properly during launch. It is also tested to ensure all springs will separate in space, so that the satellite inside will deploy.
2. Readings can be amplified with SGA AC/DC Powered Signal Conditioners paired for every three LW Load Washers. Signals can be supplied to the control system of the satellite.

Space Dock Capture Ring Force Testing

Wireless Telemetry System

Industry: Aerospace

Summary

Customer Challenge

A space company wants to test their spacecraft docking simulator. They wish to test the forces of the actuators used during the “lunge”, when the soft capture ring is lunged forward to latch onto a space vehicle that has been mounted. They want to ensure they are working properly when engaged, and that it does not go past its overload force limit.

Interface Solution

Interface suggests using multiple WTS 1200 Standard Precision LowProfile™ Wireless Load Cells to be installed to the actuators of the capture ring. Both as wireless solutions, measurements can be recorded through the WTS-AM-1E Wireless Strain Bridge Transmitter Module, which then can transmit to the WTS-BS-1 Handheld Display or the WTS-BS-6 Wireless Telemetry Dongle Base Station for the customer to record, log, and graph on their computer.

Results

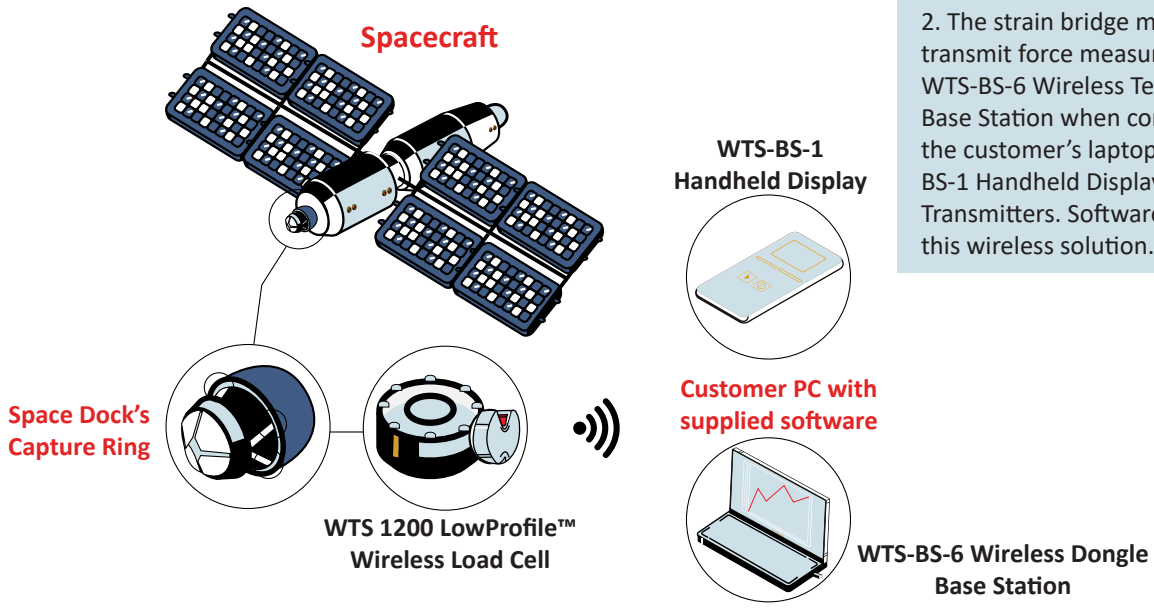
Interface’s Wireless telemetry system successfully measured the forces of the soft capture ring of the space docking port with overload protection.

Materials

- WTS 1200 Standard Precision LowProfile™ Wireless Load Cells
- WTS-BS-1 Handheld Display for Unlimited Transmitters
- WTS-AM-1E Wireless Strain Bridge Transmitter Module
- WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied software
- Customer PC or Laptop

How It Works

1. The WTS 1200 Standard Precision LowProfile™ Wireless Load Cells are installed at the ends of the actuators. Each load cell is paired and connected to a WTS-AM-1E Wireless Strain Bridge Transmitter Module.
2. The strain bridge modules wirelessly transmit force measurements to the WTS-BS-6 Wireless Telemetry Dongle Base Station when connected to the customer’s laptop, or, the WTS-BS-1 Handheld Display for Unlimited Transmitters. Software is included for this wireless solution.



Spacecraft Repair Robot
Multi-Axis

Industry: Aerospace

Summary

Customer Challenge

With the increase in space mission along the years, there has been a growth in ongoing developments for autonomous robots that will be tasked with repairing satellites and spacecrafts while in space. Through this R&D phase, force and torque sensors are needed through any testing operations.

Interface Solution

Interface's multi-axis sensors such as the 6ADF Series 6-Axis DIN Flange-Type Load Cells are popularly used in robotics testing. These sensors are easy to install, and measure force and torque in 6-axes. It can be utilized during the testing stages for these spacecraft repair robots by monitoring the movements before they are able to be deployed in space. Paired with Interface's BX8-HD44 BlueDAQ Series Data Acquisition System for Multi Axis Sensors, force feedback and torque can be displayed, graphed and recorded.

Results

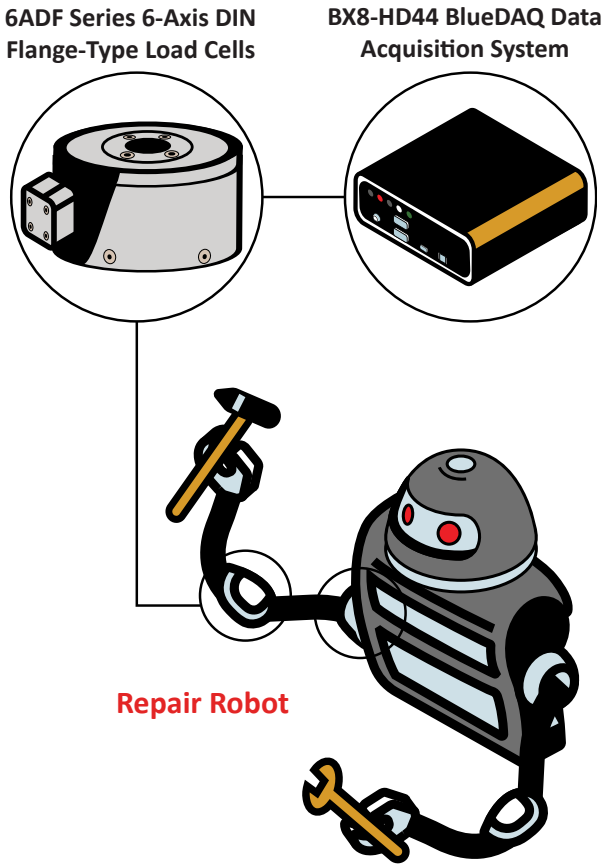
Interface's multi-axis load cells were used in the research and development of spacecraft repair robots, through the testing and monitoring process of their limbs and other movements.

Materials

- 6ADF Series 6-Axis DIN Flange-Type Load Cells
- BX8-HD44 BlueDAQ Series Data Acquisition System for Multi Axis Sensors with supplied BlueDAQ software

How It Works

1. The 6ADF Series 6-Axis DIN Flange-Type Load Cells are connected to the motors in the limbs, which measure any movements in the limbs of the robot.
2. During testing operations, the force data is displayed, graphed, and recorded with supplied BlueDAQ software.



Spacewalk Simulator
S-Type
Industry: Aerospace

Summary

Customer Challenge

Spacewalks training is a necessary component for astronauts to successfully perform tasks outside of their space craft once in the vacuum of space. Space simulators have been created to train astronauts in a variety of situations, to ensure their success and safety during real life missions in space. Load cells are needed to monitor forces during the simulation.

Interface Solution

In order to monitor and maintain the forces of the subject when the subject moves, a WSSB Welded Stainless Steel IP68 Environment Protected S-Beam load cell can be connected to the cable. This will monitor the constant force needed as someone is using the spacewalk simulator. The DMA2 DIN Rail Mount Signal Conditioner will signal the customer's controller system.

Results

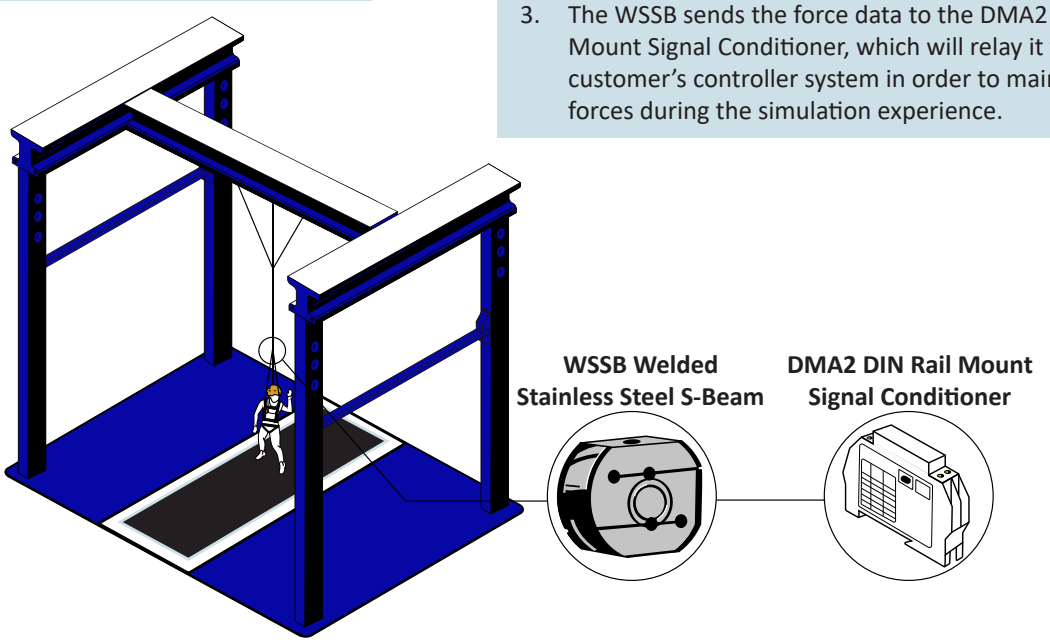
The customer was able to successfully monitor and maintain the force of subject when the spacewalk simulator was in use.

Materials

- WSSB Welded Stainless Steel IP68 Environment Protected S-Beam
- Rod End Bearings
- DMA2 DIN Rail Mount Signail Conditioner
- Customer's control system
- Customer's spacewalk simulator

How It Works

1. The WSSB Welded Stainless Steel IP68 Environment Protected S-Beam is attached to the cable with rod end bearings of the spacewalk simulator, and the subject in training.
2. The WSSB captures the force data of the subject as the simulator controller moves the subject on all axis.
3. The WSSB sends the force data to the DMA2 DIN Rail Mount Signal Conditioner, which will relay it to the customer's controller system in order to maintain the forces during the simulation experience.



Vacuum Testing for Aviation Performance

Torque Transducer

Industry: Aerospace

Summary

Customer Challenge

The vacuum pump in a plane plays an important part in a number of systems, such as gyroscopic instruments, suction gauges and pneumatic systems. These instruments rely on the vacuum pump to function in a low pressure air environment. A torque test is needed for regular maintenance and inspection.

Interface Solution

Interface's T2 Ultra Precision Shaft Style Rotary Torque Transducer with torque couplings can be attached to the vacuum pump during performance testing. It will measure the amount of torque that is being used on the pump's motor or drive system. Results can be displayed, recorded, and logged using the SI-USB4 4 Channel USB Interface Module when connected to the customer's computer.

Results

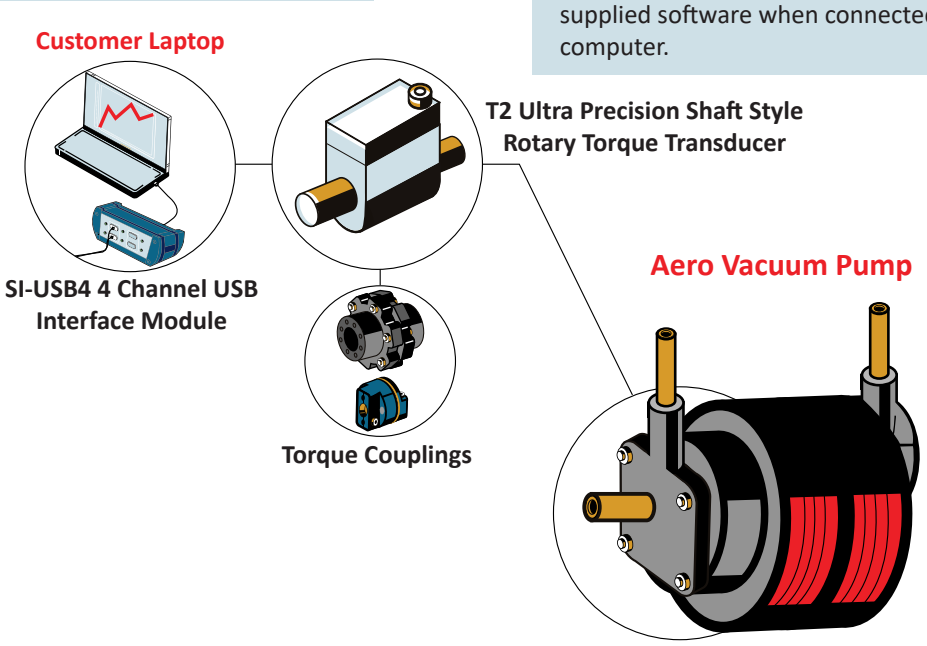
Interface's T2 Ultra Precision Shaft Style Rotary Torque Transducer successfully measured and monitored the torsion results during the vacuum performance test.

Materials

- T2 Ultra Precision Shaft Style Rotary Torque Transducer
- Interface Torque Couplings
- SI-USB4 4 Channel USB Interface Module with supplied software (2 channels required)
- Customer PC

How It Works

1. The T2 Ultra Precision Shaft Style Rotary Torque Transducer with torque couplings is attached to the vacuum pump during the performance test.
2. Torsion measurements are sent to the SI-USB4 4 Channel USB Interface Module.
3. Results can be recorded, graphed, and logged with supplied software when connected to the customer's computer.



Wind Tunnel
Multi-Axis

Industry: Aerospace

Summary

Customer Challenge

A major aerospace company was developing a new airplane and needed to test their scaled model for aerodynamics in a wind tunnel, by measuring loads created by lift and drag.

Interface Solution

A Model 6A154 6-Axis Load Cell was mounted in the floor of the wind tunnel, and connected to the scaled model by a "stalk". A BX8-AS Interface BlueDAQ Series Data Acquisition System was connected to the sensor to collect data.

Results

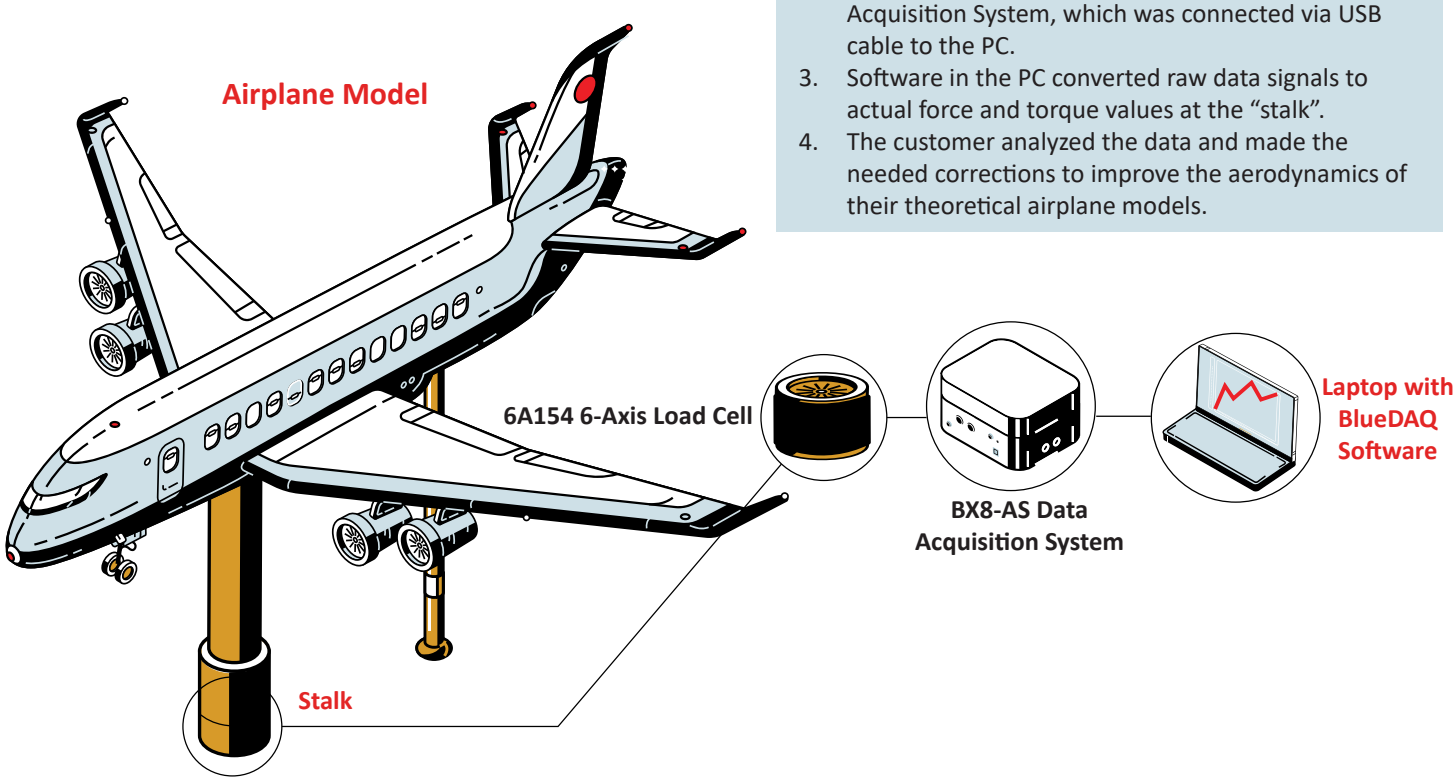
The company analyzed the collected data and made the necessary adjustments in their design to improve the aerodynamics of their theoretical airplane models.

Materials

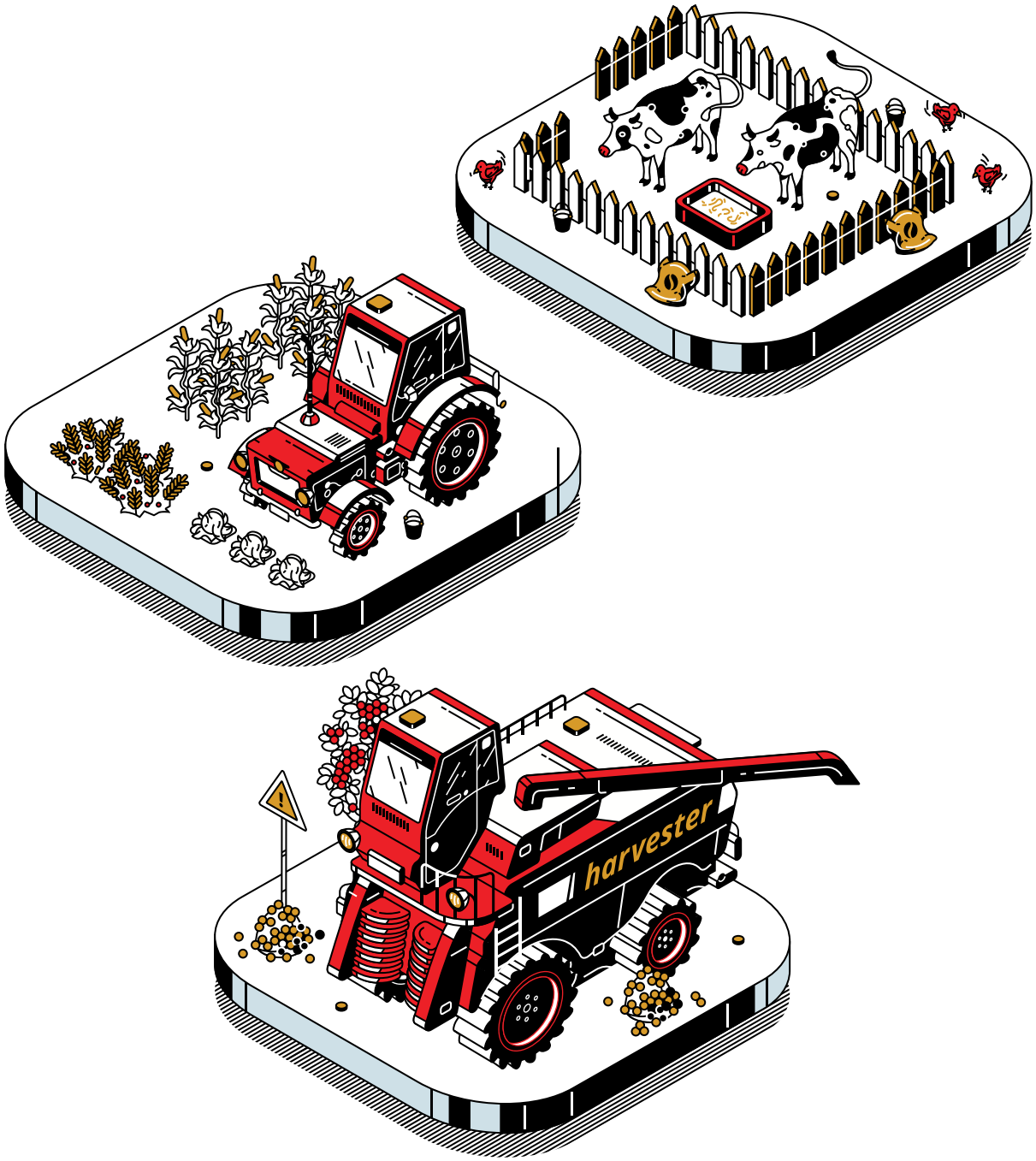
- 6A154 6-Axis Load Cell
- BX8-AS Interface BlueDAQ Series Data Acquisition System
- Customer PC with supplied BlueDAQ Software

How It Works

1. The wind tunnel blew air over the scaled model creating lift and drag, which was measured and compared to the theoretical airplane models.
2. The output of the 6-Axis sensor was connected to the BX8-AS Interface BlueDAQ Series Data Acquisition System, which was connected via USB cable to the PC.
3. Software in the PC converted raw data signals to actual force and torque values at the "stalk".
4. The customer analyzed the data and made the needed corrections to improve the aerodynamics of their theoretical airplane models.



Agriculture



BTS Equine Bridle Tension System

Interface Mini™ and BlueTooth®

Industry: Agriculture

Summary

Customer Challenge

The customer needs to quantify the so-called "poll pressure." Bits designed to give strong poll pressure using simple pulley lever principles show a much attenuated transfer of the rein tension through the bit to the poll. The attenuation is readily understood when the equine mouth is recognized as a "floating" fulcrum degrading the otherwise required fixed pivot point of an ideal lever.

Interface Solution

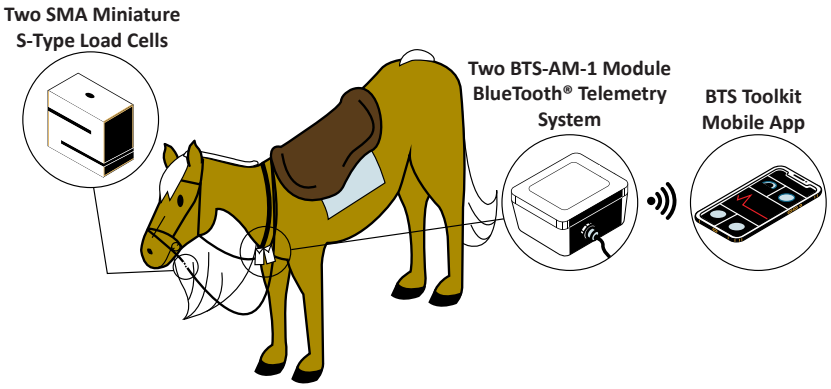
A BTS Equine Bridle Tension System, with two SMA Miniature S-Type Load Cells in both the line of the reins and that of the cheekpiece on one side of the horse, is used to study the dynamic response of the cheekpiece tension to rein tension in the ridden horse. Results are transmitted by the BTS-AM-1 Bluetooth Low Energy (BLE) Strain Bridge Transmitter Module to the BTS Toolkit Mobile App and displayed on a mobile device.

Results

The fundamental operation of the bits could in principle be discovered on the laboratory bench. But in practice of course, the equine mouth is expected to provide the fulcrum. Within the real experimental system comprising the rider's hands, the horse's mouth, and the bit, the elasticity of the equine mouth provides a "floating" fulcrum and a potential source of time-lag and decoherence between the dynamic rein and cheekpiece tensions.

Materials

- Two SMA Miniature S-Type Load Cells
- Two BTS-AM-1 Module BlueTooth® Telemetry System
- BTS Toolkit Mobile App



Horse with Reins

How It Works

The SMA Miniature S-Type Load Cells are inserted into the line of the cheekpiece and reins on one side of the horse. The SMA Miniature S-Type Load Cells are resistive wire strip strain gages whose changes in potential difference, produced with strain, are transferred to transmitters which send the data by the BTS Bluetooth® Telemetry System to a receiver connected to a USB port of a PC. The BTS-AM-1 Bluetooth® Low Energy (BLE) Strain Bridge Transmitter Modules are held inside modified camera cases attached to a breastplate on the horse. The rider is therefore not carrying any of the electrical equipment. Before the data is collected and after the cheekpiece is pretensioned, the SMA Miniature S-Type Load Cells are tared to zero. This makes it possible in some cases to see negative net values for cheekpiece tension when rein tension is applied to the cheek. The rider takes a normal contact on both reins and performs ridden exercises in the three lower gaits, and the natural resistive counter-contact from the body of the horse provides pairs of force data from the rein and cheekpiece. Because the cheekpiece is directly attached to the headpiece, we can assume that forces seen in the cheekpiece are those that are applied to the poll of the horse.

Chicken Weighing
Load Beam
Industry: Agriculture

Summary

Customer Challenge

A customer wants a weighing system to help them determine a specific weight for their chickens. They need a weighing system that will ensure accurate weight measurements to keep their birds at their weight in order to sell to supermarkets. They also need a system that will be able to undergo harsh conditions and unusual temperatures.

Interface Solution

Interface's SPI Low Capacity Platform Scale Load Cell is able to undergo strained temperatures and transmits highly accurate results. A plate can be put on top of the SPI, and then a chicken can be weighed on top of the plate. Data results can be displayed on the 480 Bidirectional Digital Weight Indicator.

Results

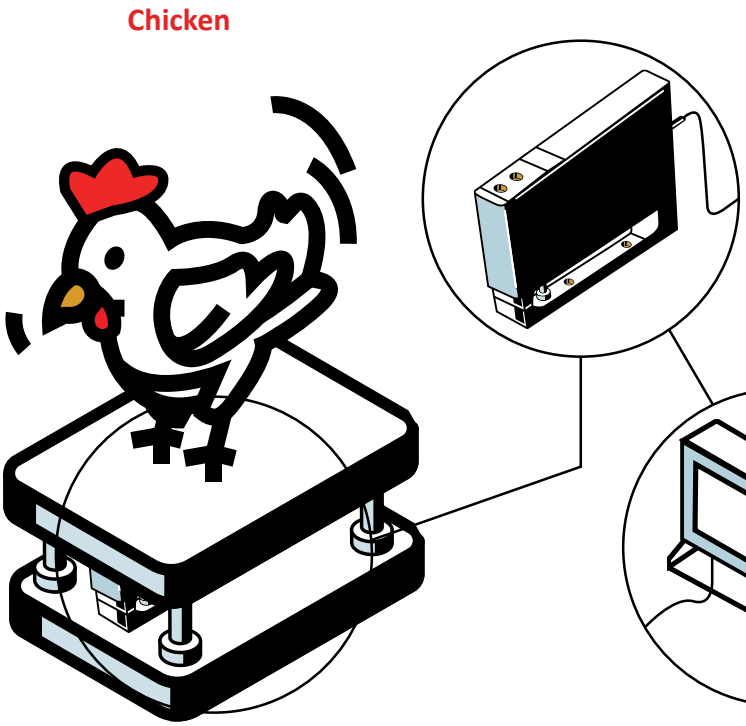
The customer is able to weigh their chickens, and maintain their weight through the accurate results from Interface's SPI Low Capacity Platform Scale Load Cell.

Materials

- SPI Low Capacity Platform Scale Load Cell
- 480 Bidirectional Digital Weight Indicator

How It Works

1. Metal plates are attached on the top and the bottom of the SPI Low Capacity Platform Scale Load Cell.
2. Chickens are placed on top of the plate and SPI for accurate weight measurements.
3. The SPI Low Capacity Platform Scale Load Cell is attached to the 480 Bidirectional Digital Weight Indicator. Results are displayed on the 480.



SPI Low Capacity Platform Scale Load Cell

480 Bidirectional Digital Weight Indicator

Haywire Twist Testing
S-Type
Industry: Agriculture

Summary

Customer Challenge

Farmers may experience issues when it comes to their cattle fence on their ranch. If fencing becomes loose, livestock may escape or cause further damage. A farmer is seeking a force test on their twisted haywire of their fencing to see how durable it is from daily stress of their livestock.

Interface Solution

Interface suggests installing the SSMF Fatigue Rated S-Type Load Cell in the test frame. The SSMF measures and monitors the force of the twisted haywire being tested. The results will be captured by the WTS-AM-1E and transmitted to the customer's PC using the WTS-BS-6 Wireless Telemetry Dongle Base Station.

Results

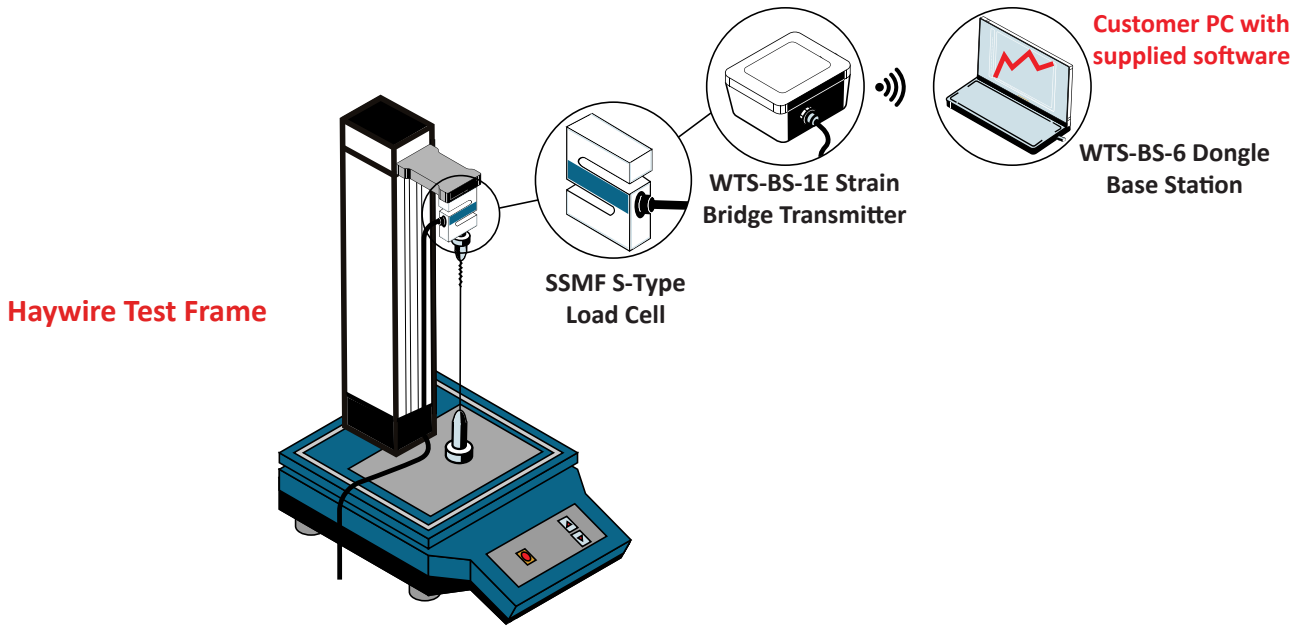
The customer was able to monitor the forces the twisted haywire could withstand, specifically the amount of force it took for it to break.

Materials

- SSMF Fatigue Rated S-Type
- WTS-AM-1E Wireless Strain Bridge Transmitter Modules with Log100 software
- WTS-BS-6 Wireless Telemetry Dongle Base Station
- Customer haywire twisting test frame
- Customer PC or Laptop

How It Works

1. The SSMF Fatigue Rated S-Type is installed into the test frame. The SSMF measures and monitors the amount of force that the of the twisted haywire can withstand.
2. Results are captured when connected to the WTS-AM-1E Wireless Strain Bridge Transmitter, and wirelessly transmitted to the customer's PC using the WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied Log100 software.



Livestock Weighing System
Load Beam

Industry: Agriculture

Summary

Customer Challenge

A rancher wants to accurately weigh their cows for multiple reasons. They want to make sure their cows are at a healthy weight, and also want to maintain their weight. But they also want to know the optimal time for breeding based on the weight of their livestock.

Interface Solution

Interface's solution is to bolt four SSB Sealed Beam Load Cells at the bottom of a metal platform, that is placed on the inside of the customer's cattle cage. Once the cow has walked onto the plate, the SSB Sealed Beam Load Cells will measure the force pressure applied. With all four connected to JB104SS Junction Box, which is then connected to the 480 Bidirectional Weight Indicator, combined accurate weight results will be displayed.

Results

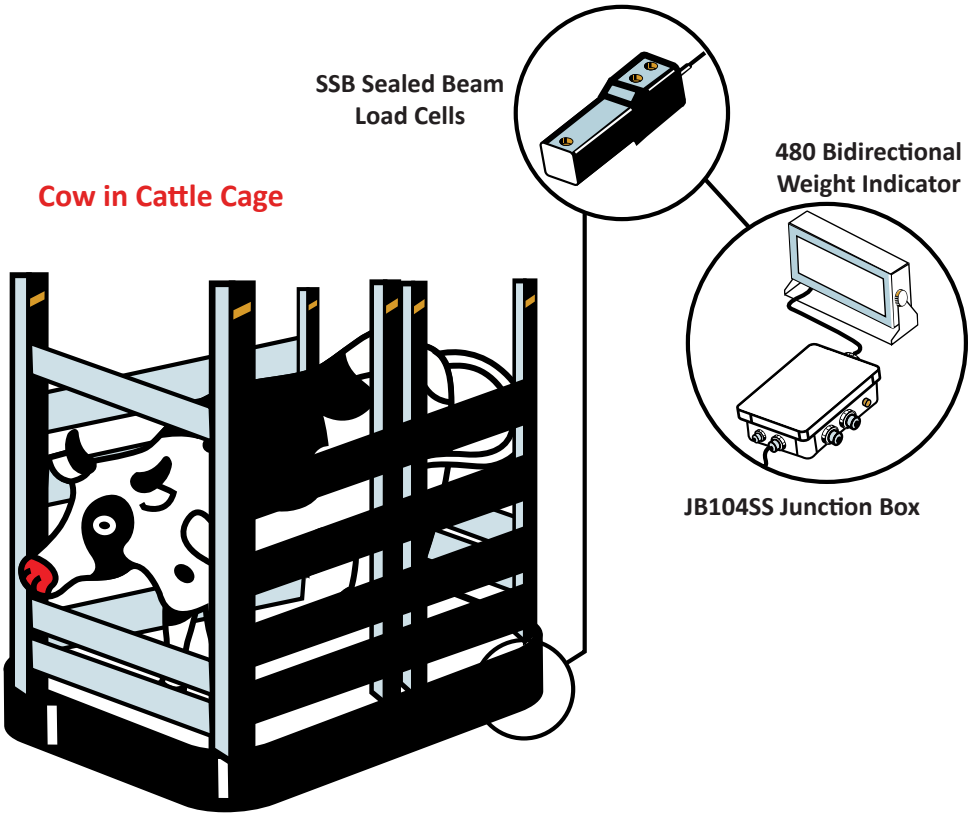
The customer was able to determine accurate weight measurements of their livestock in order to keep them healthy, or, to determine when was a good time to breed.

Materials

- Four SSB Sealed Beam Load Cells
- JB104SS Junction Box
- 480 Bidirectional Weight Indicator

How It Works

1. Four SSB Sealed Beam Load Cells are bolted to the bottom of a metal platform, which was placed inside a cattle cage.
2. A cow was led inside the cattle cage, where it was weighed on the metal platform.
3. The multiple SSB's were wired together to a JB104SS Junction Box, which was then connected to the 480 Bidirectional Weight Indicator to measure the combined results of the four SSB Sealed Beam Load Cells.



Poultry Feeder Monitoring
Torque Transducer
Industry: Agriculture

Summary

Customer Challenge

A customer wants to monitor the motor that operates their poultry feeders. The poultry feeders must give out an equal distribution of feed per poultry house.

Interface Solution

Interface's solution is to use the T5 Standard Precision Pedestal Mount Shaft Style Rotary Torque Transducer, with the speed/angle option, which will be attached between a poultry feeder and a motor with Interface's couplings. Torsion measurements can be graphed and logged sing the 9850 Torque Transducer and Load Cell Indicator.

Results

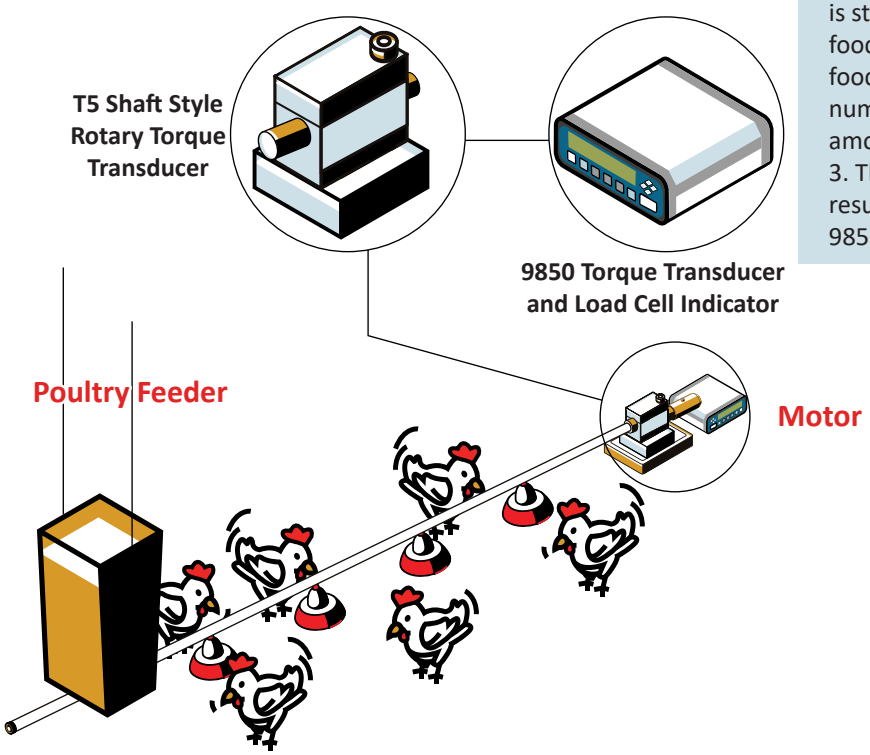
The customer was able to monitor their poultry feeders, and that every feeder got the same amount of food distributed to it.

Materials

- T5 Standard Precision Pedestal Mount Shaft Style Rotary Torque Transducer
- 9850 Torque Transducer and Load Cell Indicator

How It Works

1. The T5 Standard Precision Pedestal Mount Shaft Style Rotary Torque Transducer is attached with Interface's Couplings in between the poultry feeder and the motor.
2. The T5 can measure the torque to see if any of the feed is stuck, which would stop the motor from dispensing the food. It can also detect if the motor is dispensing too much food with the angle measurement, and also count the number of rotations so the food is dispensed is at the same amount each and every time.
3. The customer was able to log and graph the torque results on their computer when connected to Interface's 9850 Torque Transducer and Load Cell Indicator.



Silo Grain Dispensing
Load Cell and Wireless Telemetry System

Industry: Agriculture

Summary

Customer Challenge

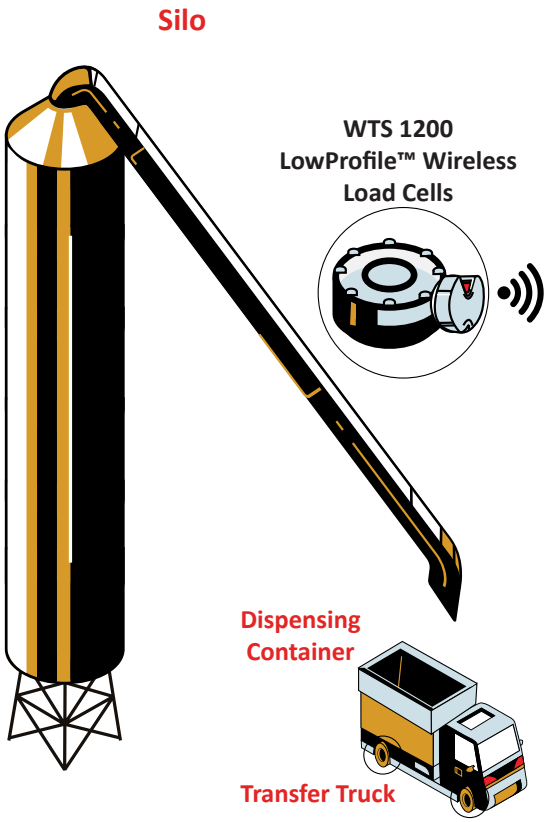
A silo is returning grain into a dispensing container. A customer wants to measure and record the grain being put in and out of their grain dispensing container, as it dispenses content into a carrier truck for transportation. The customer would also prefer a wireless solution.

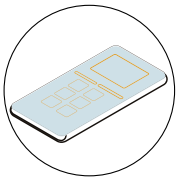
Interface Solution

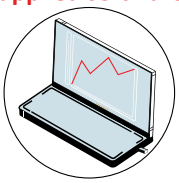
Interface suggests a wireless solution, by installing WTS 1200 Standard Precision LowProfile™ Wireless Load Cells at the legs of the grain dispensing container. The 1200 can measure the distribution correlation of the grain as it inputted and outputted from the container. Results will be transmitted and displayed using the WTS-BS-1-HA Handheld Display for multiple transmitters, and will be logged and graphed using the WTS-BS-4 USB Industrial Base Station.

Results

The customer was able to log and graph the measurement results of the grain content that the silo dispenses into the grain dispensing container, and also when the grain is dispensed into the carrier truck.







Materials

- WTS 1200 Standard Precision LowProfile™ Wireless Load Cells
- WTS-BS-4 USB Industrial Base Station
- WTS-BS-1-HA Handheld Display for multiple transmitters
- WTS Toolkit and Log100 Software
- Customer PC or Laptop

How It Works

1. Multiple WTS 1200 Standard Precision LowProfile™ Wireless Load Cells are installed at the legs of the grain dispensing container.
2. As the silo puts grain into the grain dispensing container, force measurements of the distribution is measured and totaled using the supplied Log100 Software.
3. The customer can view real-time results using the WTS-BS-1-HA Handheld Display for multiple transmitters, or on their PC computer or laptop when the WTS-BS-4 USB Industrial Base station is attached. The Log100 can display, log, graph, and total the sum weight of all load cells.

Silo Monitoring and Weighing
Load Cell

Industry: Agriculture

Summary

Customer Challenge

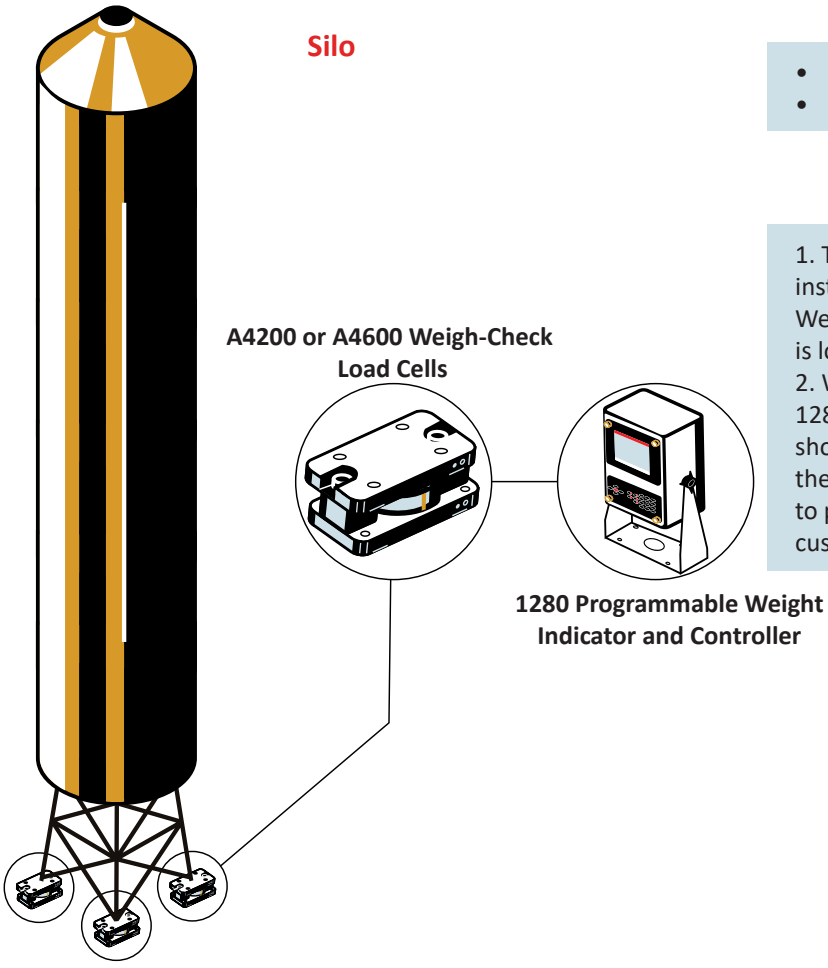
A customer wants weigh and monitor the content inside their silo.

Interface Solution

Using Interface, Inc.'s A4200 Zinc Plated or A4600 Stainless Steel Weigh-check Load Cells, paired with 1280 Programmable Weight Indicator and Controller, the customer is able to monitor the amount of content by weight in their silo.

Results

The customer was provided a customizable solution to monitor and weigh their silo with Interface, Inc.'s load cells and instrumentation. Results from the 1280 Programmable Weight Indicator and Controller was sent to the customer's control center.



Materials

- A4200 or A4600 Weigh-Check Load Cells
- 1280 Programmable Weight Indicator and Controller

How It Works

1. The A4200 or A4600 Weigh-Check Load Cells is installed under the legs of the silo, or base of the silo. The Weigh-Check Load Cell will measure the load as material is loaded into or unloaded out of the silo.
2. Weight measurements will be displayed on the 1280 Programmable Weight Indicator and Controller, showing the weight for each leg and corresponding to the total weight of the silo. The 1280 also has the ability to perform batching functions, and send results to the customer's control center.

Tractor Linkage Draft Control Load Pin

Industry: IoT

Summary

Customer Challenge

A farmer wants to measure the forces applied on their tractor's draft control, between the tractor and any linked on attachments. Measuring the force will help the farmer be able sense any strains on the hitch of the tractor, and will be needed in order to apply any specific settings to the draft control when the tractor encounters rough terrain.

Interface Solution

Interface's WTSLP Wireless Stainless Steel Load Pin is a wireless load pin that can be installed directly in the hitch, replacing the normal shear pin of the tractor. Force results are transmitted wirelessly to the WTS-BS-4 USB Industrial Base Station, where the customer can view the results on their PC computer or Laptop with the supplied WTS toolkit. The customer can also view results on the WTS-BS-1-HS Handheld Display for Single Transmitters in real-time.

Results

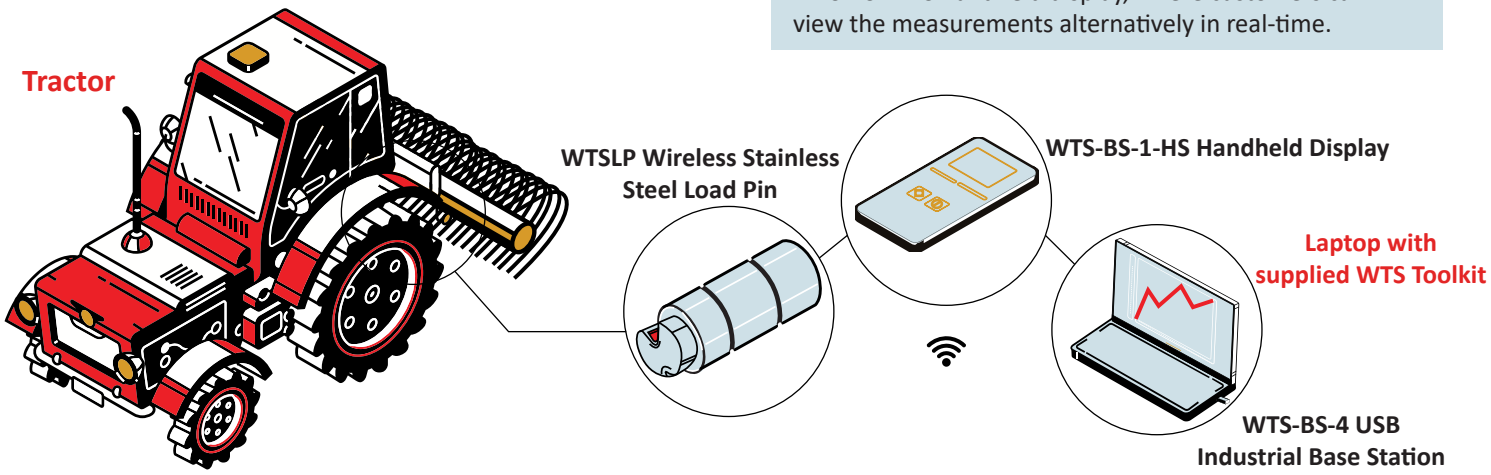
The customer is able to determine the specific draft control settings for their tractor after using Interface's custom solution Wireless Load Pin and Wireless Telemetry System products.

Materials

- WTSLP Wireless Stainless Steel Load Pin
- WTS-BS-1-HS Handheld Display for Single Transmitters
- WTS-BS-4 USB Industrial Base Station
- WTS Toolkit (graphing, logging, and set up software, included with WTS-BS-4)
- Customer PC Computer or Laptop

How It Works

1. The WTSLP Wireless Stainless Steel Load Pin is installed where the tractor's original shear pin would be located.
2. An implement is installed to the hitch.
3. The force results are measured and relayed to the wireless telemetry systems, such as the WTS-BS-4 USB Industrial Base Station, where the customer is able to review the results on their PC computer or laptop with the supplied WTS toolkit. It is also transmitted to the WTS-BS-1-HS handheld display, where customers can view the measurements alternatively in real-time.



Tractor PTO Torque Testing

Torque Transducer

Industry: Agriculture

Summary

Customer Challenge

A customer wants to measure the torque and speed of their tractor's PTO (power takeoff test) system. They want to ensure the tractor's PTO system is functioning properly, and they want to measure the torque being delivered to an implement.

Interface Solution

Interface's solution is to use their T27 Bearingless Hollow Flange Style Rotary Torque Transducer to measure the tractor's torque and speed of their tractor's PTO system.

Results

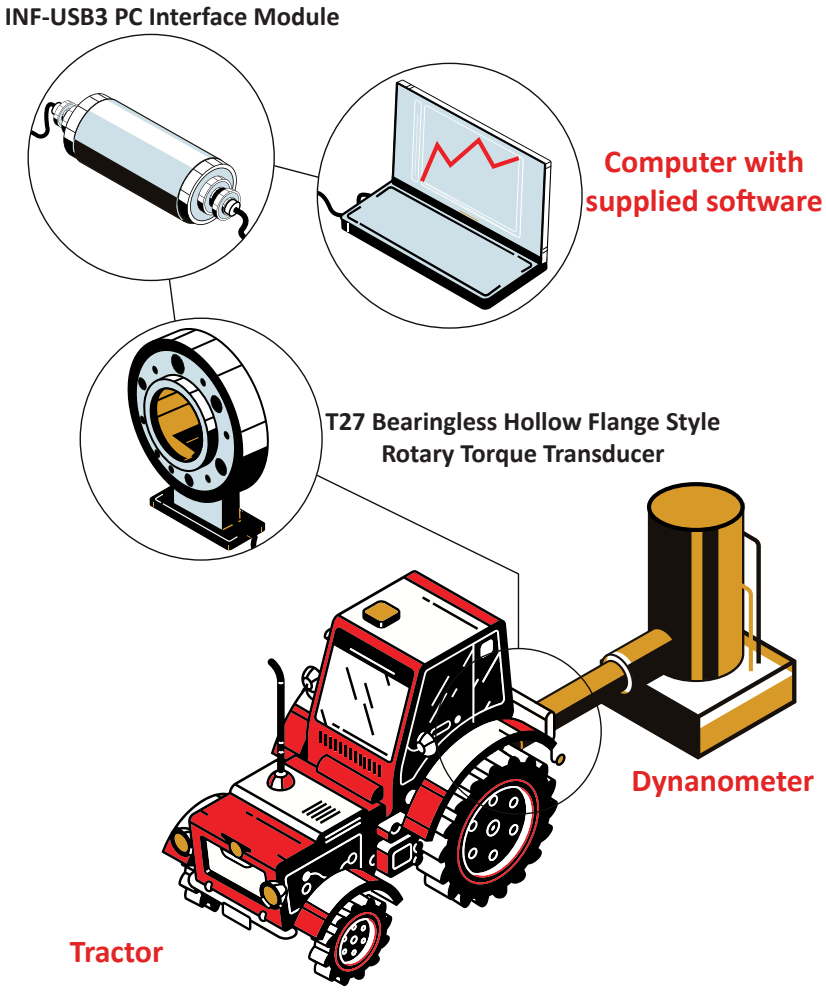
Interface's T27 Bearingless Hollow Flange Style Rotary Torque Transducer successfully and accurately measured the torque and speed of the tractor's PTO system.

Materials

- Customer supplied dynamometer
- T27 Bearingless Hollow Flange Style Rotary Torque Transducer
- INF3-USB Universal Serial Bus Single Channel PC Interface Module
- Supplied configuration, display, graphing, and logging software
- Customer PC or Laptop

How It Works

1. The T27 Bearingless Hollow Flange Style Rotary Torque Transducer is bolted to the tractors PTO shaft. A dynamometer is attached on the other end.
2. The T27 Bearingless Hollow Flange Style Rotary Torque Transducer measures the tractor's torque and speed with high accurate results.
3. With the INF3-USB PC Interface Module the customer was able to display, graph, and log the recorded torque and speed of the tractor's PTO system with the supplied INF3-USB software.



Vertical Farming Irrigation System

Wireless Telemetry System

Industry: Agriculture

Summary

Customer Challenge

Vertical farming is the production of produce in a vertical manner using smart technology systems, while indoors using an irrigation system. A wireless force measurement solution is needed to monitor the amount of water being used, to ensure the produce is being watered just the right amount.

Interface Solution

Interface suggests installing four MBI Overload Protected Miniature Beam Load Cells under each corner of the trays of the produce. The produce is watered and the amount of water that is collected is weighed. A JB104SS 4-Channel Stainless Steel Junction Box is connected to each load cell, and to a WTS-AM-1E that wirelessly transmits the sum weight to the WTS-BS-1-HA Wireless Handheld Display for multiple transmitters, and the WTS-BS-6 Wireless Telemetry Dongle Base Station when connected to the customer's PC. Results can be displayed, logged, and graphed seen in real time.

Results

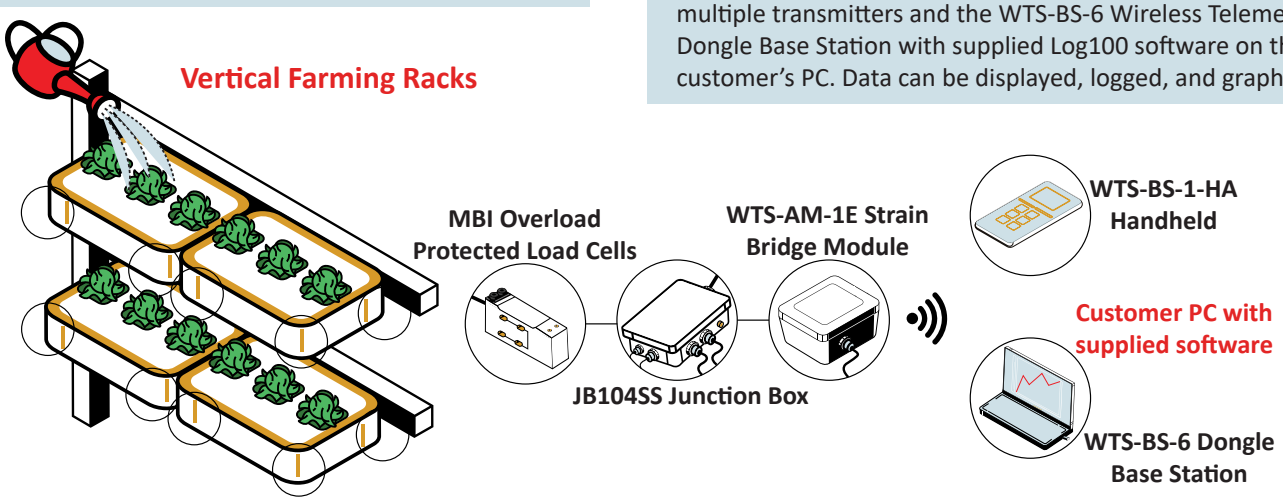
Interface's Wireless Telemetry System was able to monitor and weigh the amount of water being used on the produce in this vertical farming system.

Materials

- Four MBI Overload Protected Miniature Beam Load Cells
- JB104SS 4-Channel Stainless Steel Junction Box
- WTS-AM-1E Wireless Strain Bridge Transmitter Module
- WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied Log100 software
- WTS-BS-1-HA Wireless Handheld Display for multiple transmitters
- Customer PC or Laptop

How It Works

1. Four MBI Overload Protected Miniature Beam Load Cells are installed under the tray that holds the produce. Each load cell is connected to a JB104SS 4-Channel Stainless Steel Junction Box.
2. The produce is watered and the junction box captures the sum weight of the tray.
3. The WTS-AM-1E wirelessly transmit the sum weight to both the WTS-BS-1-HA Wireless Handheld Display for multiple transmitters and the WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied Log100 software on the customer's PC. Data can be displayed, logged, and graphed.



Vertical Farming Monitoring
Wireless Telemetry System

Industry: Agriculture

Summary

Customer Challenge

Vertical farming is the production of produce in a vertical manner using smart technology systems. Automated mechanics are used to pick up and move the products, thus using less human involvement and possible contamination. A wireless force measurement system is needed to monitor the robotics that pick up and move the produce to their next destination of the packaging process.

Interface Solution

Interface suggests installing SPI Low Capacity Platform Scale Load Cells, along with WTS-AM-1E Wireless Strain Bridge Transmitter Modules, in the center of the platforms of the robotic lifting system that move around the produce. The WTS-AM-1E's wirelessly transmit the data collected from the SPI's to the WTS-BS-1-HA Wireless Handheld Display for multiple transmitters, and the WTS-BS-6 Wireless Telemetry Dongle Base Station when connected to the customer's PC. Results can be displayed, logged, and graphed seen in real time.

Results

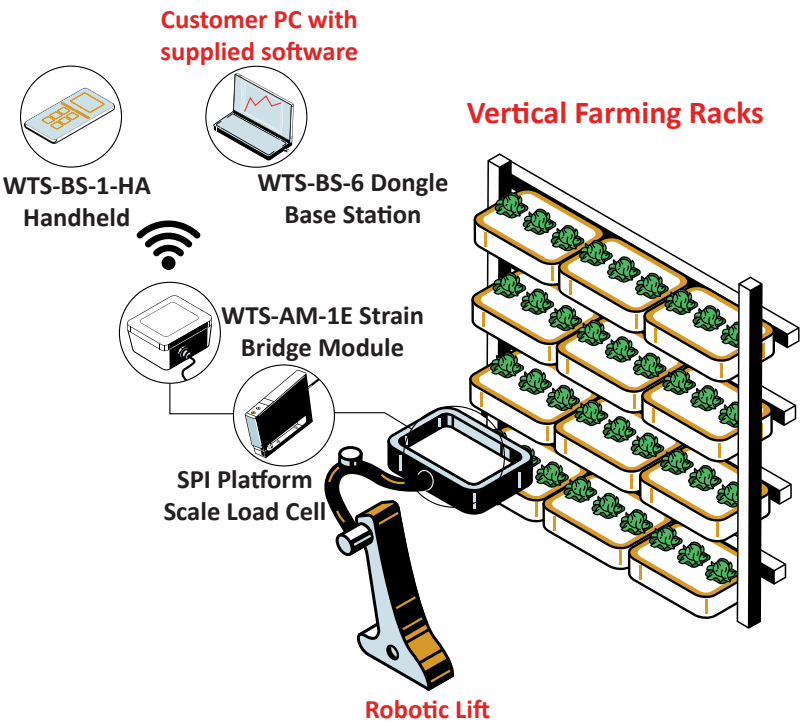
Interface's load cells and Wireless Telemetry System successfully detected and monitored the produce platform for their robotic lift system, and can now be navigated to the next step of their packaging line.

Materials

- SPI Low Capacity Platform Scale Load Cells
- WTS-AM-1E Wireless Strain Bridge Transmitter Modules
- WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied Log100 software
- WTS-BS-1-HA Wireless Handheld Display for multiple transmitters
- Customer PC or Laptop

How It Works

1. The SPI Low Capacity Platform Scale Load Cells and WTS-AM-1E Wireless Strain Bridge Transmitter Modules are installed in the center of the platform on the lifting mechanism.
2. The produce is slided onto the lifting mechanism.
3. The produce weight is detected by the SPI's, and the WTS-AM-1E's wirelessly transmit the data to both the WTS-BS-1-HA Wireless Handheld Display for multiple transmitters and the WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied Log100 software on the customer's PC. Data can be displayed, logged, and graphed.



WTS Equine Bridle Tension System

Interface Mini™ and Wireless Telemetry System

Industry: Agriculture

Summary

Customer Challenge

The customer needs to quantify the so-called "poll pressure." Bits designed to give strong poll pressure using simple pulley lever principles show a much attenuated transfer of the rein tension through the bit to the poll. The attenuation is readily understood when the equine mouth is recognized as a "floating" fulcrum degrading the otherwise required fixed pivot point of an ideal lever.

Interface Solution

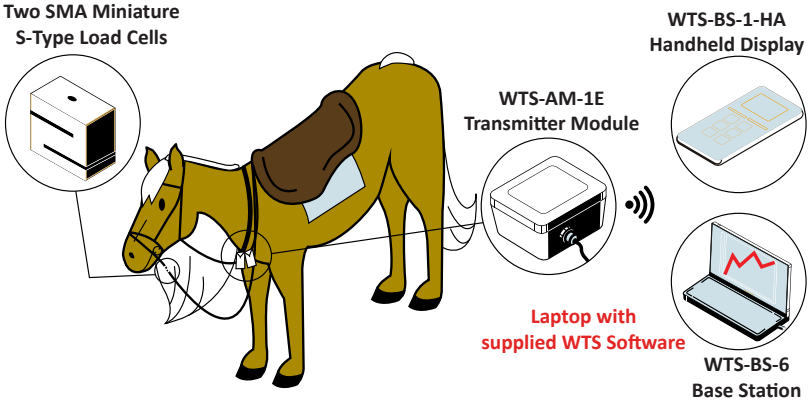
A WTS Equine Bridle Tension System, with two SMA Miniature S-Type Load Cells in both the line of the reins and that of the cheekpiece on one side of the horse, is used to study the dynamic response of the cheekpiece tension to rein tension in the ridden horse. Utilizing the Wireless Telemetry System (WTS), the valuable data can be displayed and/or recorded in real time using a PC or a handheld receiver depending on the requirements and preferences of the customer.

Results

The fundamental operation of the bits could in principle be discovered on the laboratory bench. But in practice of course, the equine mouth is expected to provide the fulcrum. Within the real experimental system comprising the rider's hands, the horse's mouth, and the bit, the elasticity of the equine mouth provides a "floating" fulcrum and a potential source of time-lag and decoherence between the dynamic rein and cheekpiece tensions.

Materials

- Two SMA Miniature S-Type Load Cells
- Two WTS-AM-1E Wireless Strain Bridge Transmitter Module
- WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters
- WTS-BS-6 Wireless Telemetry Dongle Base Station
- WTS Toolkit Software & Log100 Software included
- Customer supplied PC or laptop

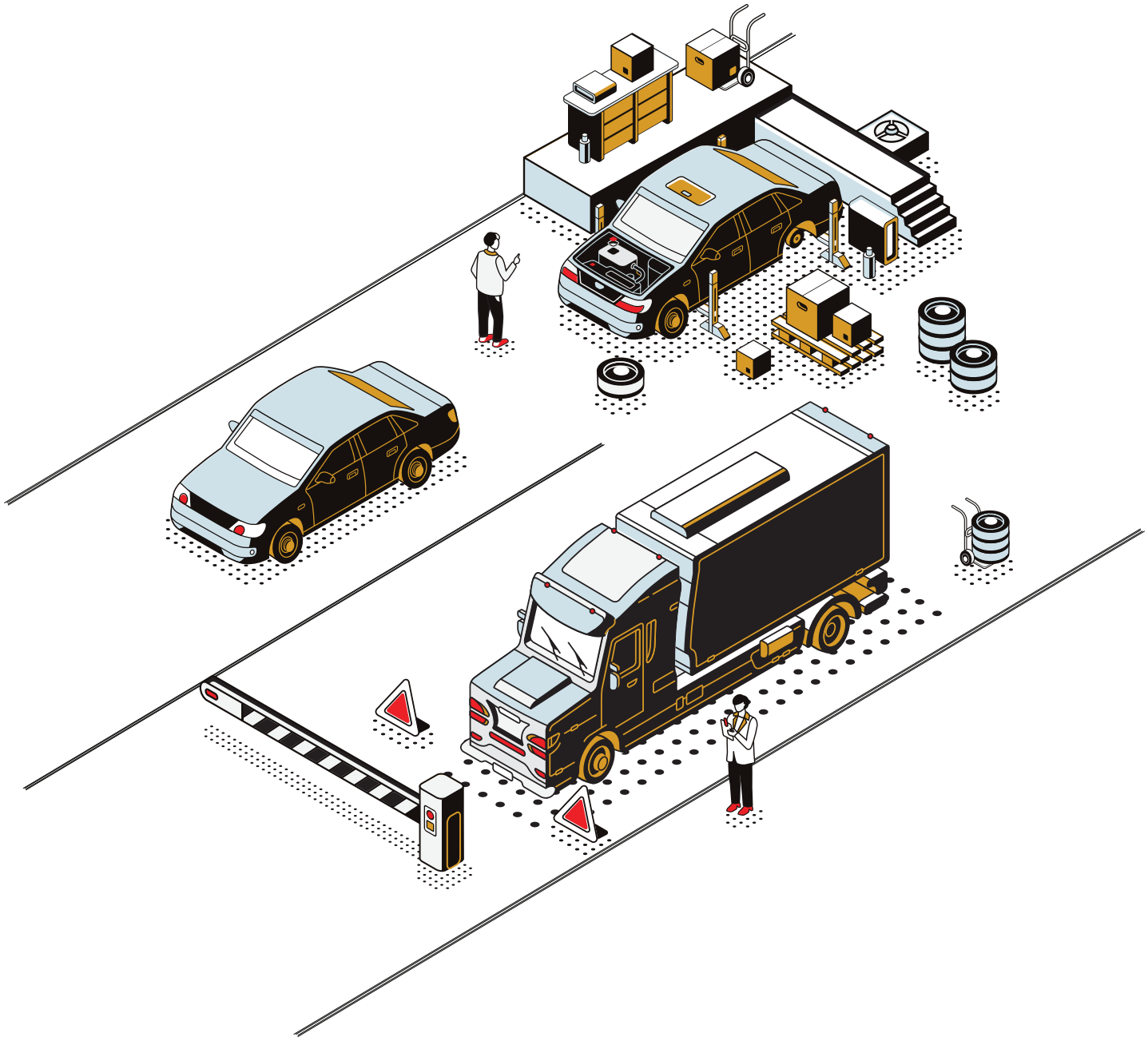


Horse with Reigns

How It Works

The SMA Miniature S-Type Load Cells are inserted into the line of the cheekpiece and reins on one side of the horse. The SMA Miniature S-Type Load Cell's are resistive wire strip strain gages whose changes in potential difference, produced with strain, are transferred to transmitters which send the data wirelessly to a receiver connected to a USB port of a PC or a WTS-BS-1-HA Handheld Module. The WTS-AM-1E Transmitter Module are held inside modified camera cases attached to a breastplate on the horse. The rider is therefore not carrying any of the electrical equipment. Before the data is collected and after the cheekpiece is pretensioned, the SMA Miniature S-Type Load Cells are tared to zero. This makes it possible in some cases to see negative net values for cheekpiece tension when rein tension is applied to the cheek. The rider takes a normal contact on both reins and performs ridden exercises in the three lower gaits, and the natural resistive counter-contact from the body of the horse provides pairs of force data from the rein and cheekpiece. Because the cheekpiece is directly attached to the headpiece, we can assume that forces seen in the cheekpiece are those that are applied to the poll of the horse.

Automotive and Vehicle



AxialTQ™ Engine Dynamometer

Torque Transducer

Industry: Automotive and Vehicle

Summary

Customer Challenge

The customer needs to measure the torque and the speed (RPM) produced by an engine and calculate it simultaneously.

Interface Solution

The Interface AxialTQ™ Wireless Rotary Torque Measurement System was developed in direct collaboration with over 30 end-users who shared their wish-lists for operational priorities, user interface, design, features, real-world field issues and more.

Results

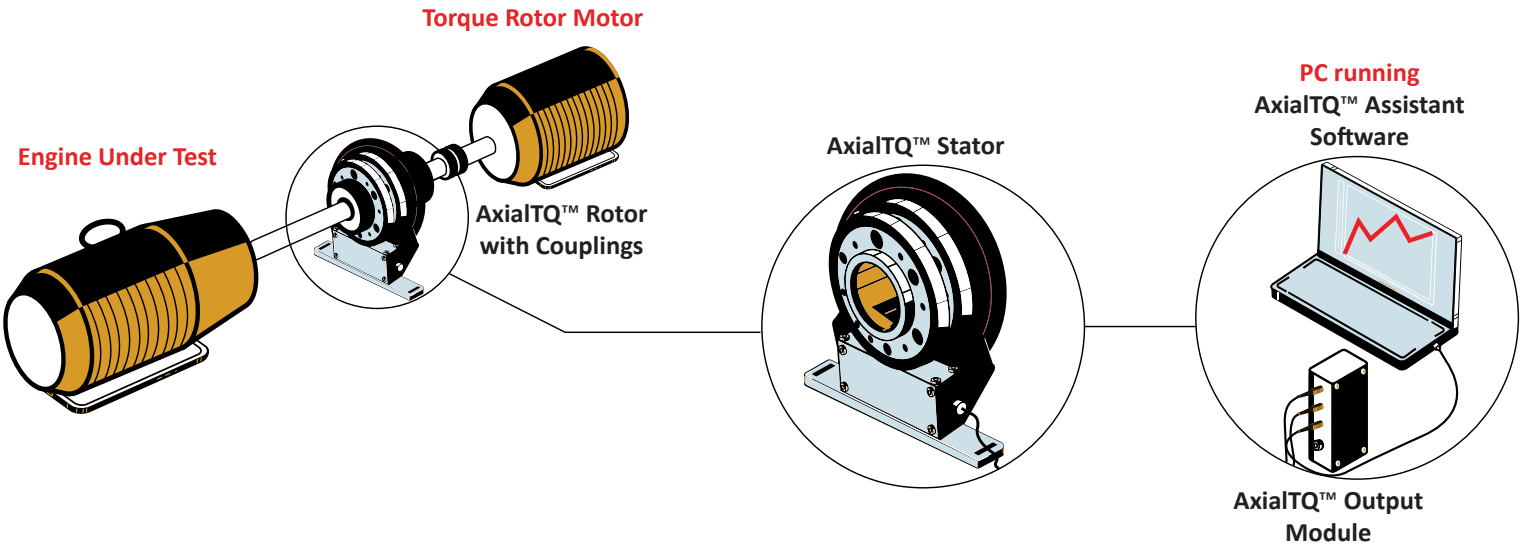
The Interface AxialTQ™ Wireless Rotary Torque Measurement System accurately and simultaneously measured and calculated the torque and rotational speed (RPM) of the engine in real-time while collecting the data.

Materials

- AxialTQ™ Wireless Rotary Torque Transducer
- AxialTQ™ Output Module
- Customer PC running AxialTQ™ Assistant Software

How It Works

The AxialTQ™ rotor senses the torque with a high precision sensing element and strain gages. The electrical output is converted from an analog to a digital signal in the rotor. The high accuracy of the system is based on this combination of the proven sensing element technology with next generation electronics to provide the highest quality torque measurement available in the industry.



Airbag Connector Testing

Interface Mini™

Industry: Automotive and Vehicle

Summary

Customer Challenge

Testing airbag connectors functionality is needed ensure perfect deployment in case of a car crash. There are eight to twelve connectors installed in each vehicle, and tests are needed to be made in order to clarify the connectors are working effectively. These connectors usually work when latched, but that does not ensure the electrical properties are working. The amount of force needs to be tested in order to see when an electrical current has been made.

Interface Solution

Interface's solution is to attach the WMC Sealed Stainless Steel Miniature Load Cell to the actuator of the test rig. The airbag connector is held in place at the bottom of the test rig. Forces are applied and measured using the 9330 High Speed Data Logger as the connector is pushed down to latch together. Results can be logged, downloaded, and reviewed when connected to a PC or laptop.

Results

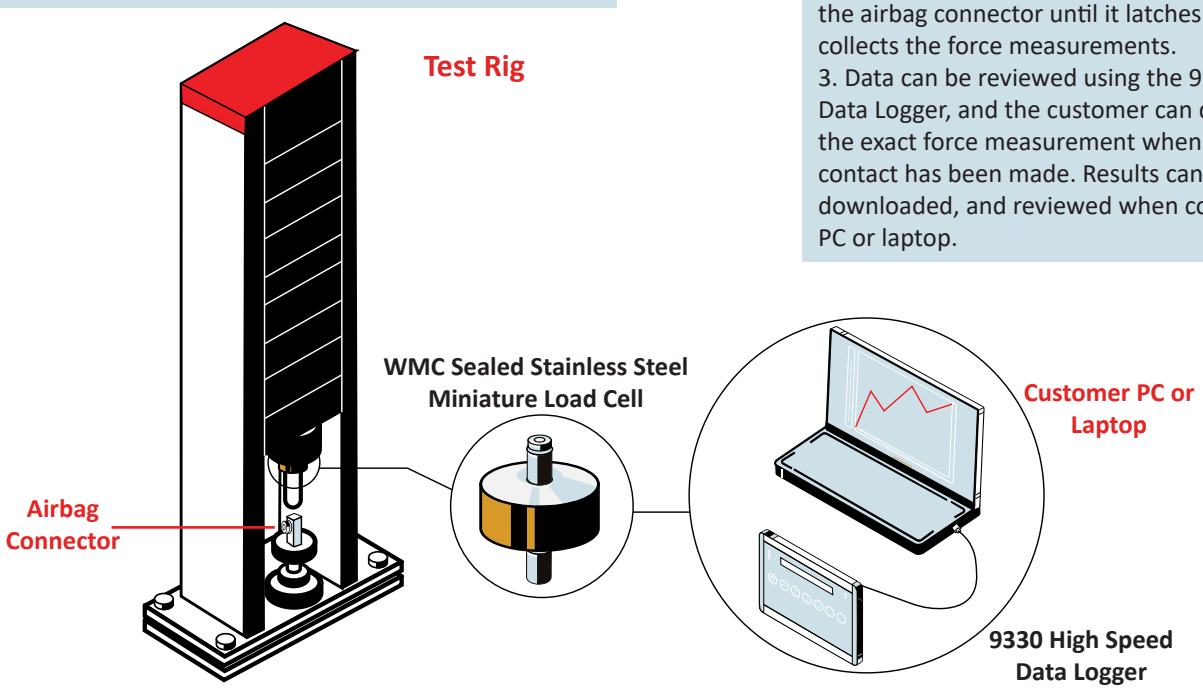
The customer was able to measure the amount of force it took to latch the airbag connector, in order to detect the electrical current and proceed with more testing.

Materials

- WMC Sealed Stainless Steel Miniature Load Cell
- 9330 High Speed Data Logger
- Customer PC or Laptop

How It Works

1. The WMC Sealed Stainless Steel Miniature Load Cell is attached to the test rig.
2. The actuator of the test rig presses down onto the airbag connector until it latches. The WMC collects the force measurements.
3. Data can be reviewed using the 9330 High Speed Data Logger, and the customer can determine the exact force measurement when electrical contact has been made. Results can be logged, downloaded, and reviewed when connected to a PC or laptop.



Automotive Resistance Spot Welding

Load Button

Industry: Automotive and Vehicle

Summary

Customer Challenge

An automotive manufacturer is looking for a force measurement system to optimize its quality with their spot welding process. A force measurement system is needed to monitor the amount of force being applied through the welding process.

Interface Solution

The ConvexBT Load Button Load Cell can be used to measure the amount of force being applied in a resistance spot welding machine. The 9330 Battery Powered High Speed Data Logging Indicator can display and log the information onto an SD card, or directly onto the customer's computer using BlueDAQ software.

Results

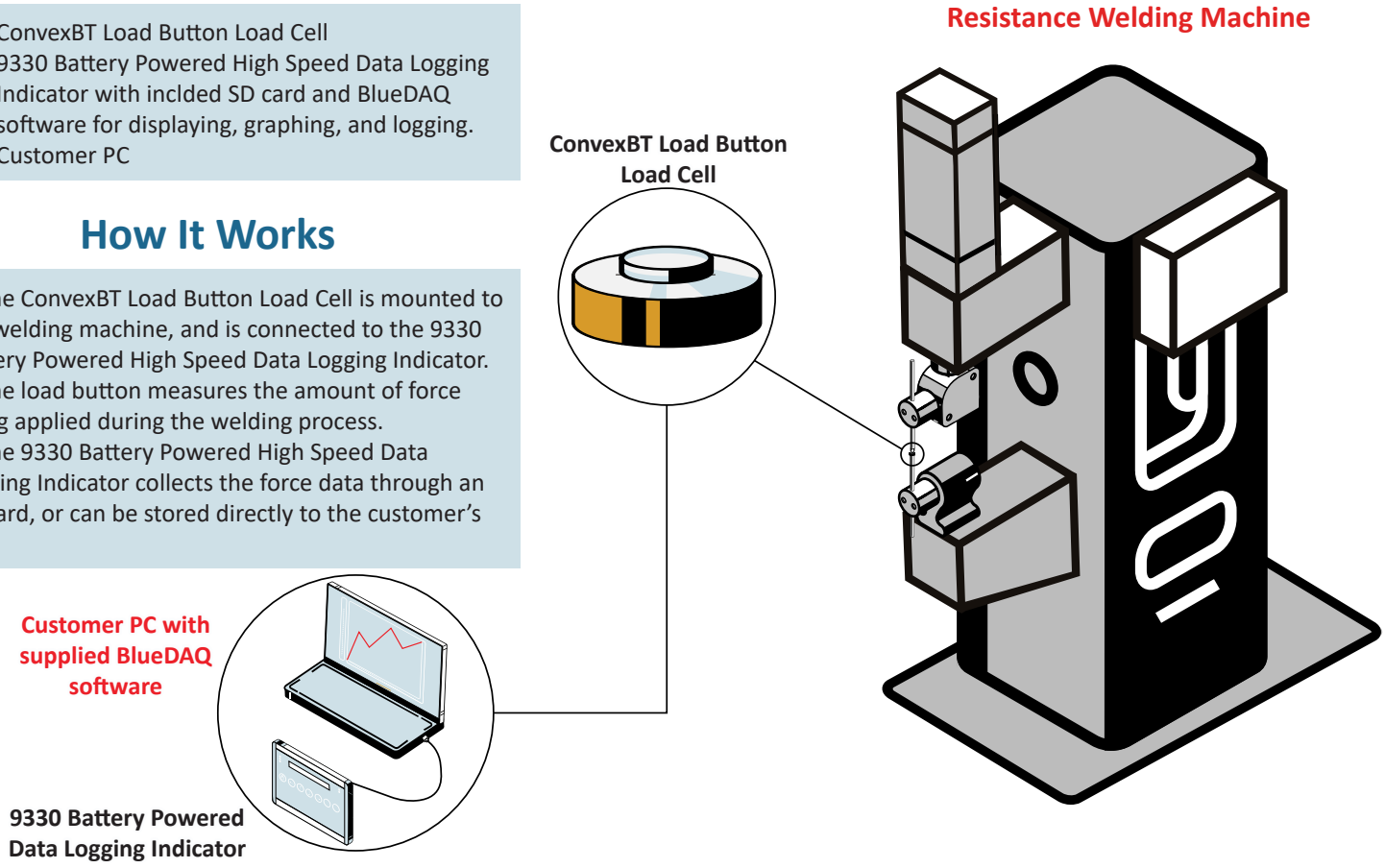
Interface's load button and instrumentation successfully measured the forces applied during the resistance spot welding process.

Materials

- ConvexBT Load Button Load Cell
- 9330 Battery Powered High Speed Data Logging Indicator with inclded SD card and BlueDAQ software for displaying, graphing, and logging.
- Customer PC

How It Works

1. The ConvexBT Load Button Load Cell is mounted to the welding machine, and is connected to the 9330 Battery Powered High Speed Data Logging Indicator.
2. The load button measures the amount of force being applied during the welding process.
3. The 9330 Battery Powered High Speed Data Logging Indicator collects the force data through an SD card, or can be stored directly to the customer's PC.



Automotive Window Pinch Force Testing

Interface Mini™

Industry: Automotive and Vehicle

Summary

Customer Challenge

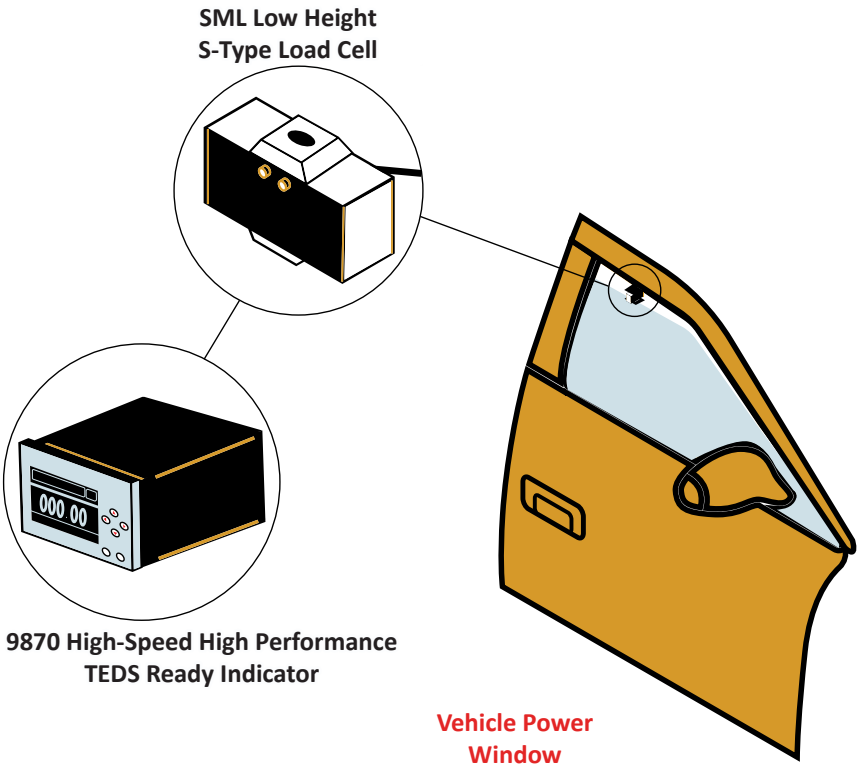
An automotive manufacturer needs a force testing system for their vehicle power windows. They want to prevent any injuries or other safety concerns by testing the strength of pinch force of their power windows.

Interface Solution

Interface's SML Low Height S-Type Load Cell can be placed in between the power window and the door frame. Two plates are attached to the top and bottom of the SML with LB Load Buttons. As the power window pinches the SML load cell, force results are sent and displayed using the 9870 High-Speed High Performance TEDS ready Indicator.

Results

The automotive manufacturer was able to successfully determine the force strength of their power windows.



How It Works

1. The SML Low Height S-Type Load Cell is placed between the power window and the top of the door frame. Two plates are attached to the top and bottom of the SML with LB Load Buttons.
2. The load cell is pinched with the power window, and the force data is collected by the 9870 High-Speed High Performance TEDS Ready Indicator
3. The 9870 High-Speed High Performance TEDS Ready Indicator is able to clarify the amount of force it took for the anti-pinch system to activate

Materials

- SML Low Height S-Type Load Cell
- LB Load Buttons
- 9870 High-Speed High Performance TEDS Ready Indicator

Bluetooth® Brake Pedal
Interface Mini™

Industry: Automotive and Vehicle

Summary

Customer Challenge

The customer needs to measure brake pedal force when the pedal is pressed during automobile testing.

Interface Solution

As the pedal is pressed, force is measured by the BPL-300-C Brake Pedal Load Cell. Results are transmitted by the BTS-AM-1 Bluetooth® Low Energy (BLE) Strain Bridge Transmitter Module to the BTS Toolkit Mobile App and displayed on a mobile device.

Results

The customer objective has been achieved when a brake test was executed the force measurement was simultaneously displayed and graphed for examination in real time in the tested vehicle.

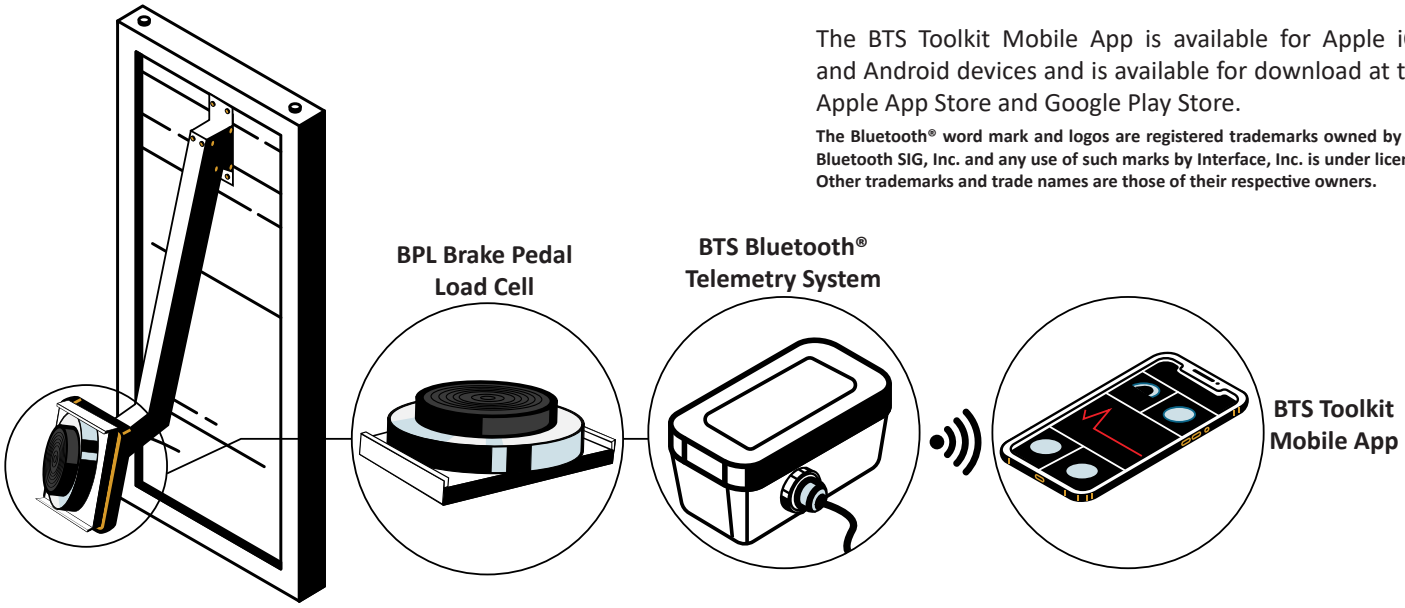
Materials

- BPL-300-C Brake Pedal Load Cell
- BTS-AM-1 Bluetooth® Low Energy (BLE) Strain Bridge Transmitter Module
- BTS Toolkit Mobile App on iPhone or Android Devices

How It Works

1. The Interface BPL-300-C is securely mounted on the top of the brake pedal.
2. The load cell is connected to the BTS-AM-1 Module.
3. The BTS-AM-1 Module transmits via Bluetooth to the BTS Toolkit Mobile App.
4. The BTS Toolkit Mobile App runs on iPhone or Android devices.
5. Brake test is performed and results are displayed in real time.

Brake Pedal Cross Section



The BTS Toolkit Mobile App is available for Apple iOS and Android devices and is available for download at the Apple App Store and Google Play Store.

Brake Caliper Testing
Load Washer

Industry: Automotive and Vehicle

Summary

Customer Challenge

A brake caliper is a component in a disc brake system that houses the brake pads and applies pressure to them, causing them to clamp onto the brake disc or rotor. Over time, the caliper changes due to factors like aging, temperature fluctuations, and environmental conditions. As a result, it becomes crucial to continuously calibrate and test calipers to ensure optimal braking performance and vehicle safety.

Interface Solution

Interface's LW General Purpose Load Washer Load Cell is placed between the piston and brake pad of the caliper. A brake pad test is conducted and the data collected from the LW is displayed, graphed, and logged on the customer's PC with supplied SI-USB4 software, when connected to the SI-USB4 4-Channel USB Interface Module.

Results

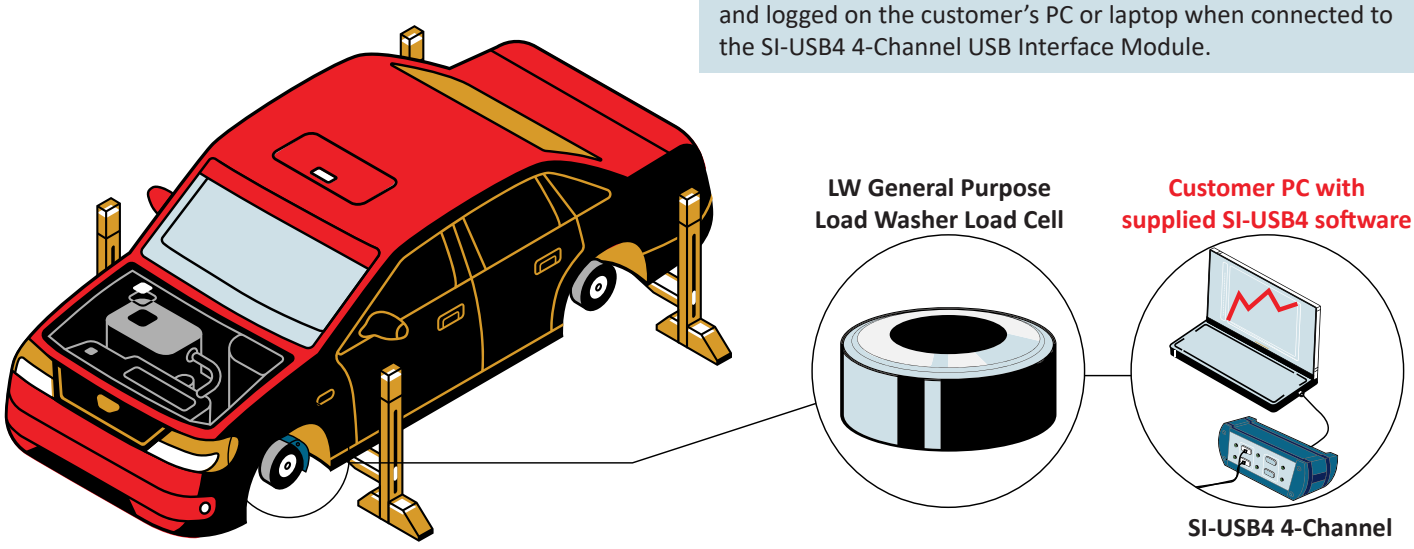
Interface's LW General Purpose Load Washer Load Cell was the perfect solution to measuring and testing the caliper's clamp force, ensuring braking capabilities and vehicle safety.

Materials

- LW General Purpose Load Washer Load Cell
- SI-USB4 4-Channel USB Interface Module with supplied SI-USB4 software
- Customer PC or Laptop

How It Works

1. The LW General Purpose Load Washer Load Cell is placed between the piston and brake pad of the caliper of the car undergoing a brake pad test.
2. The brake pad test is conducted.
3. The force data collected from the LW is displayed, graphed, and logged on the customer's PC or laptop when connected to the SI-USB4 4-Channel USB Interface Module.



Dual Motor Dynamometer
AxialTQ™

Industry: Automotive and Vehicle

Summary

Customer Challenge

A vehicle manufacturer needs a torque measurement system for their dual motors used in both their electric and hybrid vehicles. The system needs to test the torque and speed of their electric motors.

Interface Solution

Two of Interface's AxialTQ™ Wireless Rotary Torque Transducer (which comes with the AxialTQ™ Output Modules and the provided AxialTQ™ Assistant software) can be installed to a both ends of the dual-ended dynamometer, thus testing two motors at the same time. Data results are calculated and collected in real-time using the AxialTQ™ Output Module and assistant software.

Results

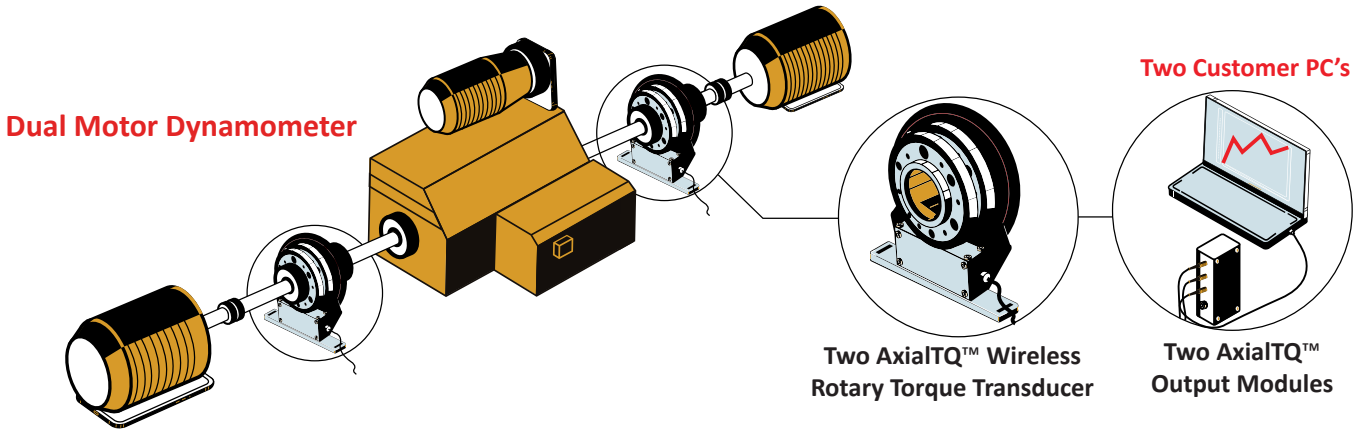
Interface's AxialTQ™ Wireless Rotary Torque Transducers accurately measured the torque and RPM of both of the electric and hybrid vehicle motors used in dual-motor electric and hybrid vehicles.

Materials

- Two AxialTQ™ Wireless Rotary Torque Transducer with rotors and stators
  – Two AxialTQ™ Output Module
  – supplied AxialTQ™ Assistant Software
- AxialTQ™ Speed Gear Option
- Interface Integrated Disc Couplings
- Two Customer PC's or Laptop's
- Customer's test fixture

How It Works

1. Two AxialTQ™ Wireless Rotary Torque Transducers are installed on the dual-ended dynamometer.
2. The AxialTQ™ Wireless Rotary Torque Transducers tests and senses both of the electric vehicles motor attached with high accuracy. It both measured and calculated the electric vehicles torque and rotational speed (RPM), while collecting data.
3. Results can be reviewed on two customer PC 's or laptop's with two included AxialTQ™ Assistant Software. Also, the analog outputs from each ATQ can be sent to the customers system for further evaluation.



Electric Vehicle Battery Monitoring

Interface Mini™

Industry: Automotive and Vehicle

Summary

Customer Challenge

A customer would like a system to monitor their lithium-batteries for electric vehicles. Normally, lithium-batteries are measured through voltage and current measurements, or (ICV), to analyze and monitor it's life.

Interface Solution

Interface suggests using a different method by installing their LBM Compression Load Button Load Cell in between two garolite end plates, and measuring the force due to cell swelling or expansion. Instead of monitoring through voltage (ICV), this method is based on measured force (ICF). Paired with the 9330 Battery Powered High Speed Data Logging Indicator, force results can be displayed, recorded, and logged with supplied software.

Results

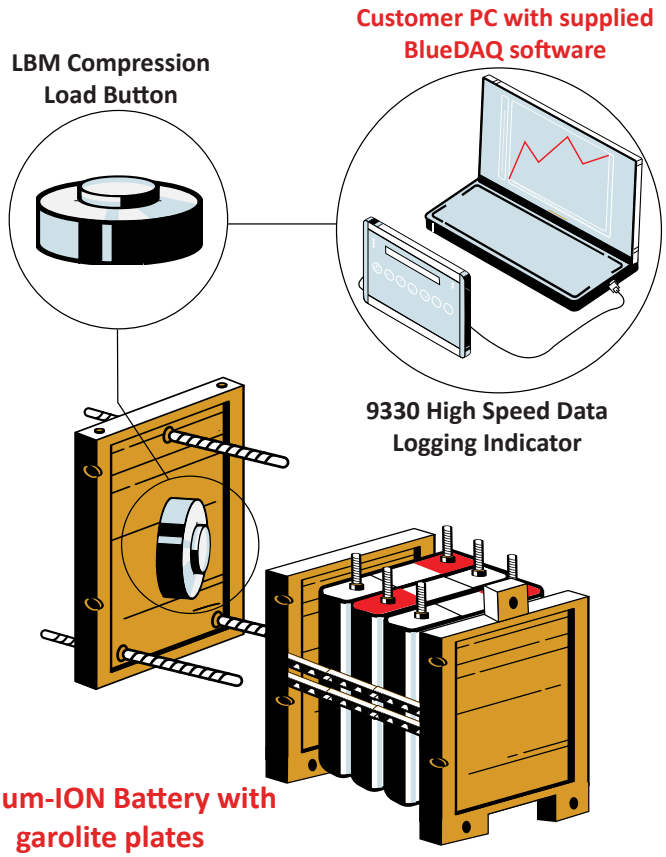
Interface successfully created a ICF system to monitor the customer's lithium-ion batteries for their electric vehicles.

Materials

- LBM Compression Load Button Load Cell
- 9330 Battery Powered High Speed Data Logging Indicator with BlueDAQ software
- Lithium-Ion Battery
- Garolite Plates
- Customer PC or Laptop

How It Works

1. The customer's lithium-ion cells are installed between two garolite end plates. The LBM Compression Load Button Load Cell is bolted and separated from the battery cells using one of the garolite plates.
2. Through testing, the lithium-ion battery expands, and the LBM Compression Load Button Load Cell measures the amount of force being pressed up on the end plate as the battery cell expands.
3. The 9330 Battery Powered High Speed Data Logging Indicator measures and records the results on the customer's laptop using the included BlueDAQ software.



Electric Vehicle Structural Battery Testing

Load Cells

Industry: Automotive and Vehicle

Summary

Customer Challenge

As electric vehicles push advancements in efficiency gains, structural battery packaging is at the forefront for optimization. This drives the need to validate structural battery pack design, both in terms of life expectancy against design targets as well as crash test compliance and survivability.

Interface Solution

Interface's solution includes 1100 Ultra-Precision LowProfile Load Cells in-line with hydraulic or electromechanical actuators in customer's test stand. Also utilized are 6AXX 6-Axis Load Cells to capture reactive forces transmitting through pack structure. Multi-axis measurement brings greater system level insight and improved product success.

Results

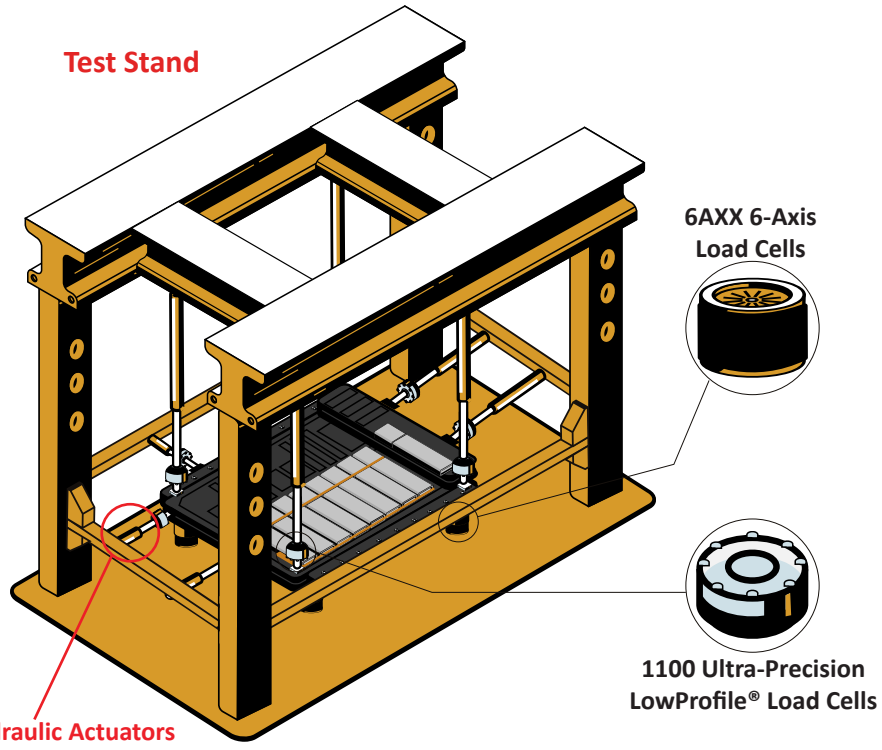
The tests performed using Interface's force measurement products validated the battery packs strong structural design.

Materials

- (12) 1100 Ultra-Precision LowProfile® Load Cells
- Four 6AXX 6-Axis Load Cells
- Customer's data acquisition system
- Customer's EV battery pack
- Customer test stand with controller and actuators

How It Works

1. Interface's 1100 Ultra-Precision LowProfile® Load Cells and 6AXX 6-Axis Load Cells are all installed throughout the test stand for the EV battery pack. The 1100's will measure the force of the actuators performing the tests, and the 6AXX 6-Axis Load Cells will measure tension and compression.
2. The difference force tests are performed and force data results are captured by the customer's data acquisition system.



Engine Dynamometer
Load Cell

Industry: Automotive and Vehicle

Summary

Customer Challenge

Internal combustion engines are by far the most common power source for land vehicles. From a 2-stroke motor in a lawn mower, to a V-8 stock car engine, horsepower and torque are the bench marks of engine performance. Engine manufacturers and aftermarket suppliers use an engine dynamometer (dyno for short) to accurately measure an engines performance. An engine dyno isolates an engine's power output to help quantify its overall performance, applying a load directly to the engine and utilizing a load cell to measure the torque absorbed by the loading mechanism. Horsepower is then calculated using the torque and RPM of the engine.

Interface Solution

A precision S-Type Load Cell is attached to a torque arm which "feels" the torque from the engine loading system. The Interface Model SSMF is a great choice because it is fatigue-rated for 1x107 fully reversed cycles, and is environmentally sealed to withstand harsh environments. Utilizing the Model CSC Signal Conditioner provides a clear signal to a data-acquisition system.

Results

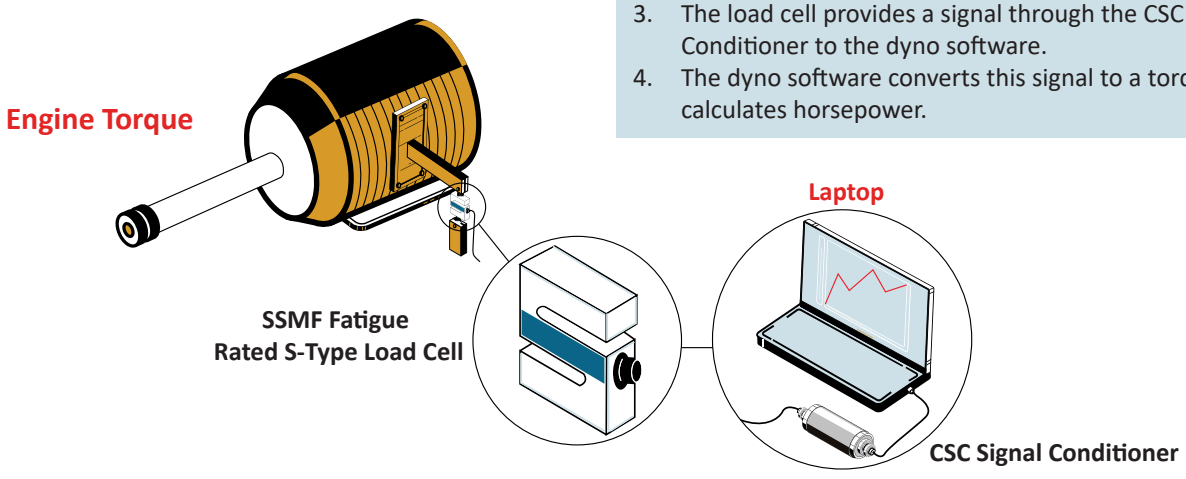
The load cell reacts precisely with the amount of torque being produced by the engine and provides accurate signals to the data-acquisition system. Engineers are then able to analyze the power transfer for the engine and optimize for performance.

Materials

- SSMF Fatigue Rated S-Type Load Cell
- Rod End Bearings
- CSC Environmentally Sealed Signal Conditioner

How It Works

1. The engine is loaded and secured into the dyno. All support systems are installed and tested., and he engine is started.
2. The dyno applies a load to engine. The load cell naturally reacts to the torque of the loading mechanism, utilizing the Rod End Bearings to compensate for non-linear movement.
3. The load cell provides a signal through the CSC Signal Conditioner to the dyno software.
4. The dyno software converts this signal to a torque reading and calculates horsepower.



Engine Head Bolt Tightening Torque Transducer

Industry: Automotive and Vehicle

Summary

Customer Challenge

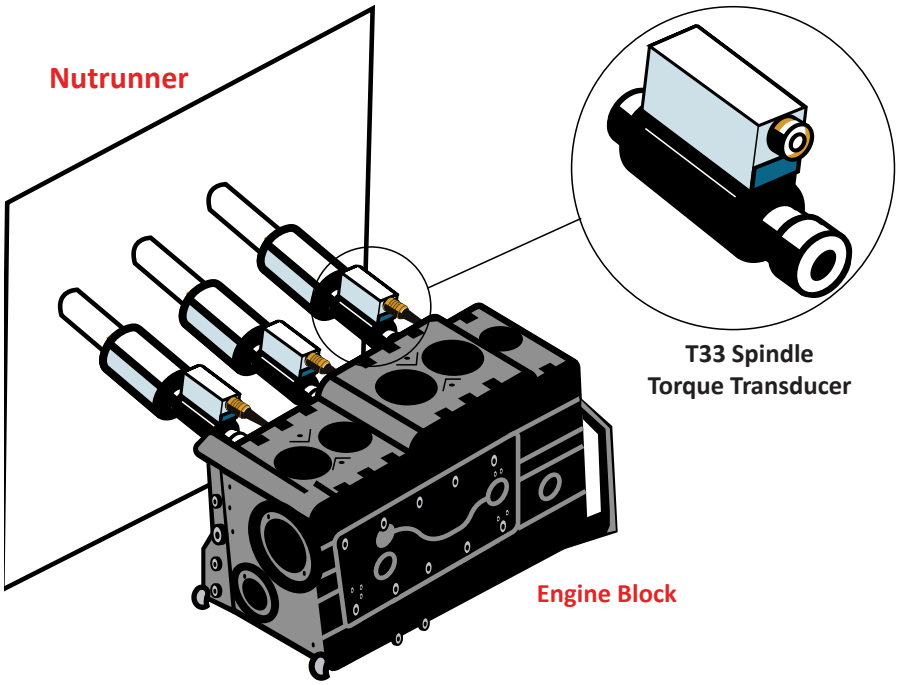
An industrial automation company was building an automated assembly machine for an auto manufacturing plant. They needed to tighten all of the head bolts on an engine on their assembly line to a specific torque value. Having the head bolts precisely and consistently tightened to the engine block is critical to the operation of the engine.

Interface Solution

Several Interface Model T33 Spindle Torque Transducers were installed in their new machine to control torque and angle, and ensure the head bolt was properly tightened. The square drive of the T33 allowed the customer to fix their tool directly to the end of the torque sensor, streamlining the installation.

Results

The head bolts were correctly installed according to manufacturer specifications, producing an engine that meets performance and reliability expectations of the auto manufacturing plant.



Materials

- T33 Spindle Torque Transducer

How It Works

1. Several Interface Model T33 Spindle Torque Transducers are installed in-line with the nutrunner screwing spindle.
2. Fastening tools are attached to the end of each T33.
3. The machine comes down and screws on the engine head bolts.
4. The torque and angle profile are sent to the customer's machine controller.
5. Based on the feedback received by the machine controller, the automation will pass the engine to the next step in the assembly line or fail and have the engine evaluated further.

Fastening Work Bench
Torque Transducer
Industry: Automotive and Vehicle

Summary

Customer Challenge

Customer is looking for a way to increase productivity by creating a fastening work bench for screw installation with related data collection. This increased productivity will come through the use of automated tooling and torque transducer measurements which are included as a part of an organized and efficient process.

Interface Solution

Interface supplied a Model T15 Hex Drive Rotary Torque Transducer with integrated USB output for this project. USB output can measure and record torque, rotational speed and angle.

Results

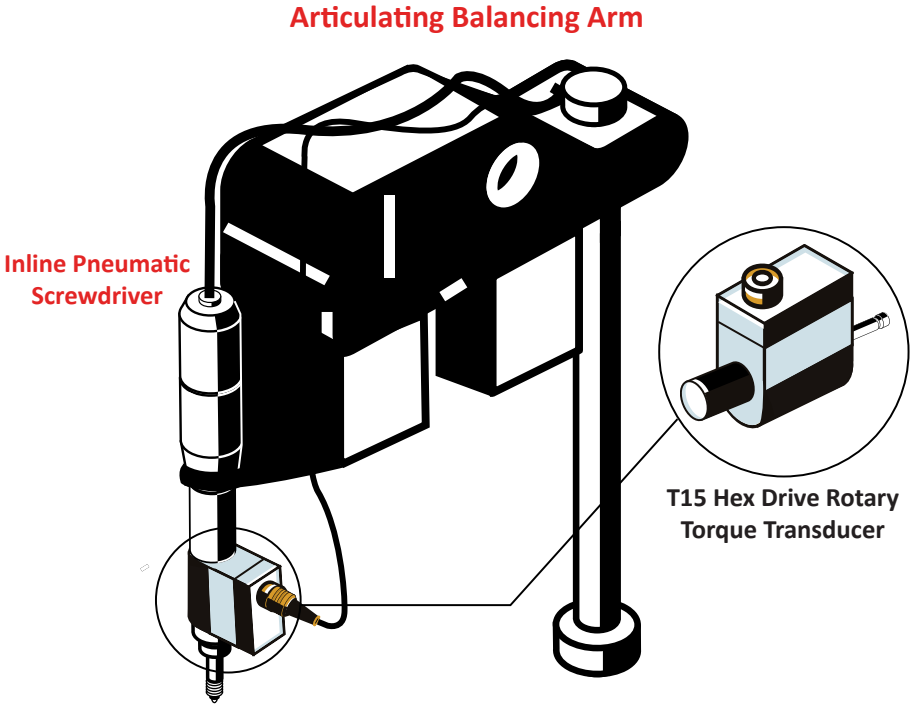
Customer was able to use many different screwdriver bit types with ease of installation due to the quick release feature of Model T15.

Materials

- T15 Hex Drive Rotary Torque Transducer with integrated USB Output Option
- T-USB-VS Software
- PC Computer
- Inline Electric or Pneumatic Screwdriver
- Articulating Balancing Arm

How It Works

1. Customer attaches T15 Hex Drive Rotary Torque Transducer to an electric or pneumatic screwdriver.
2. Customer attaches bit to T15 Hex Drive Rotary Torque Transducer.
3. T15 Hex Drive Rotary Torque Transducer is connected to USB and supplied software is loaded.
4. Customer performs fastening operations and fastening details are automatically recorded to the PC.



In Motion Rail Weigh Load Cell

Industry: Automotive and Vehicle

Summary

Customer Challenge

A rail station owner wanted to collect data on the load profiles for rail cars as they were entering into the station in-motion. The customer wanted to build their own low cost set-up using components from Interface and their existing PC setup for the purpose of logging weight load characteristics in order to diagnose possible side to side loading issues, overload issues, wheel flats or wheel impact issues, at any rail car speed.

Interface Solution

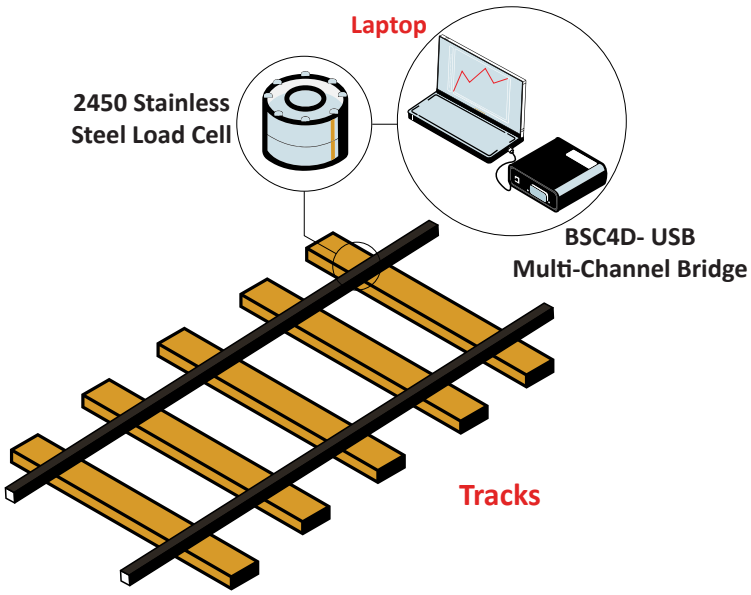
(12) 2450 50K capacity standard stainless steel load cells were mounted in to metal fabricated box-like structures and bolted into six consecutive cement rail ties, one on each side of each tie under the rail with a direct line of force with the rail. The cells were split into three groups of four: front, middle, and back. Each group of cells was connected to a dedicated BSC4D that accepted four load cell inputs. The BSC4D were connected to a PC through a USB hub.

Results

After all the connections were made the operator had a valuable tool for monitoring load characteristics which were used to detect a number of diagnostic conditions. The manager saved cost by creating his own set-up in-house for in-motion rail car load measuring as compared to alternative solutions from other competitors.

Materials

- (12) 2450 50K capacity Standard Stainless Steel Load Cells
- Three BSC4D-USB Multi-Channel Bridges
- Amplifier & PC Interface Module



How It Works

1. The customer made a special fixture that allowed for the mounting of the 2450 50K Capacity Standard Stainless Steel Load Cells. On the top there was a plate with a threaded rod which threaded into the load cell and on the bottom was an encasement that ensured proper clearance, stability, and proper enclosure from the elements.
2. The cement rail ties were modified on both sides underneath the rail area to provide a recessed clearance for the cell fixtures. The fixtures were then fastened into the tie. Each tie has 2 fixtures. There were 6 ties altogether. There were two ties (four cells) per group: front, middle, and back.
3. The load cells within the installed fixtures were connected via cables to the appropriate BSC4D -USB Multi-Channel Bridge Amplifier & PC Interface Module, using proper protective accessories and maintaining clearance from any potential snag or crush points.
4. The interface modules were each connected to a PC through a USB hub.
5. The PC had the BlueDAQ software installed that came with the interface modules.
6. After the set-up was complete the operator had full access to logged load data from all 12 load cells which was used to diagnose rail-car issues.

Lug Nut Assembly
Torque Transducer
Industry: Automotive and Vehicle

Summary

Customer Challenge

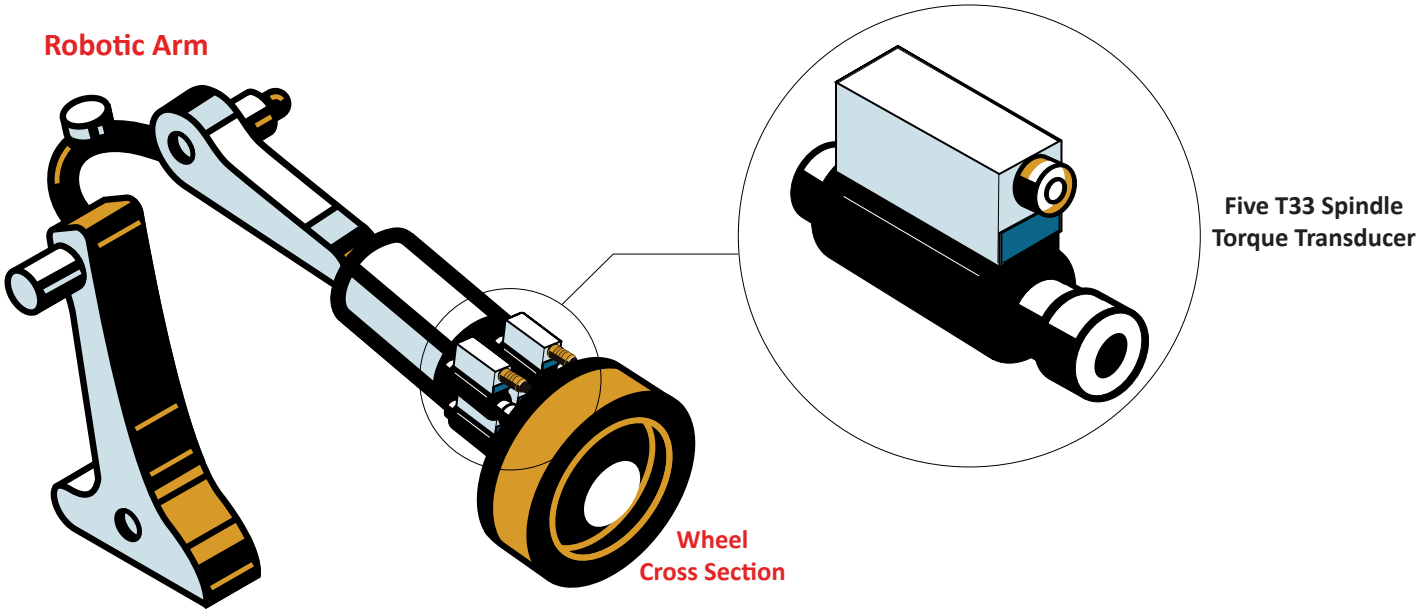
Customer is looking for a way to increase productivity for automobile wheel installation while ensuring that the lug nuts are installed to the proper torque values for safety purposes.

Interface Solution

Interface supplied five T33 Spindle Torque Transducers for use in customer's Wheel Installation Assembly Machine which come standard with +/-5VDC analog output for torque measurements and a 360 pulse, 2-track encoder for Speed/Angle measurement.

Results

Customer was able to perform five simultaneous torque measurements during wheel installation in seconds. The T33 Spindle Torque Transducer provided a +/-5VDC Signal for torque and TTL Signal for angle measurement back to customer's control system so proper values could be applied and recorded.



Materials

- T33 Spindle Torque Transducer with standard +/-5VDC Signal for Torque with Integrated Angle Measurement
- Customer's control and data acquisition system

How It Works

1. Customer installs multiple T33 Spindle Torque Transducers into assembly machine.
2. Customer connects T33 interconnect cables to their control and data acquisition system.
3. Customer performs wheel installation process while torque and speed/angle readings are automatically sent back to customers instrumentation for control and recording purposes.

MDPS Testing
Load Cell

Industry: Automotive and Vehicle

Summary

Customer Challenge

A car manufacturer wants to test the power steering for their vehicles. They want to test the linkage tension and compression between the rack and pinion.

Interface Solution

On a test frame, Interface's 1200 Standard Precision LowProfile™ Load Cell is installed at the end of the rack and pinion actuator. As the wheel is turned, the load cell tests the push and pull forces. Force measurements can be displayed in real time using the highly accurate 9870 High-Speed High Performance TEDS Ready Indicator.

Results

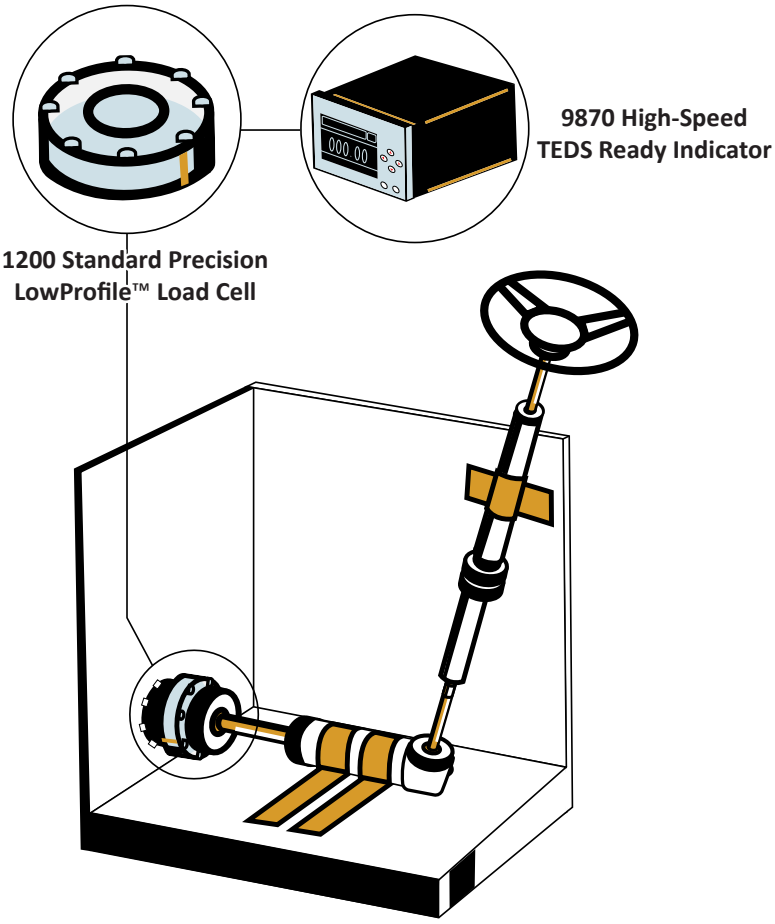
Interface's 1200 Standard Precision LowProfile™ Load Cell successfully measured the tension and compression between the rack and pinion of the customer's MDPS system.

Materials

- 1200 Standard Precision LowProfile™ Load Cell
- 9870 High-Speed High Performance TEDS Ready Indicator
- Customer's MDPS test frame

How It Works

1. The 1200 Standard Precision LowProfile™ Load Cell is installed at the end of the rack and pinion actuator.
2. As the wheel turns, the lateral push and pull forces are tested to determine the strength of the rack and pinion link.
3. Force measurements can be displayed in real time using the highly accurate 9870 High-Speed High Performance TEDS Ready Indicator.



Motor Test Stand
Torque Transducer
Industry: Automotive and Vehicle

Summary

Customer Challenge

In the Quality Control Lab at a major Automotive Manufacturing company, a Test Engineer needed to test, record and audit the torque produced by a new motor design under start load.

Interface Solution

Interface supplied a Model AxialTQ Rotary Torque Transducer that connected between the motor and the differential, on the drive shaft, that could measure and record these torque values.

Results

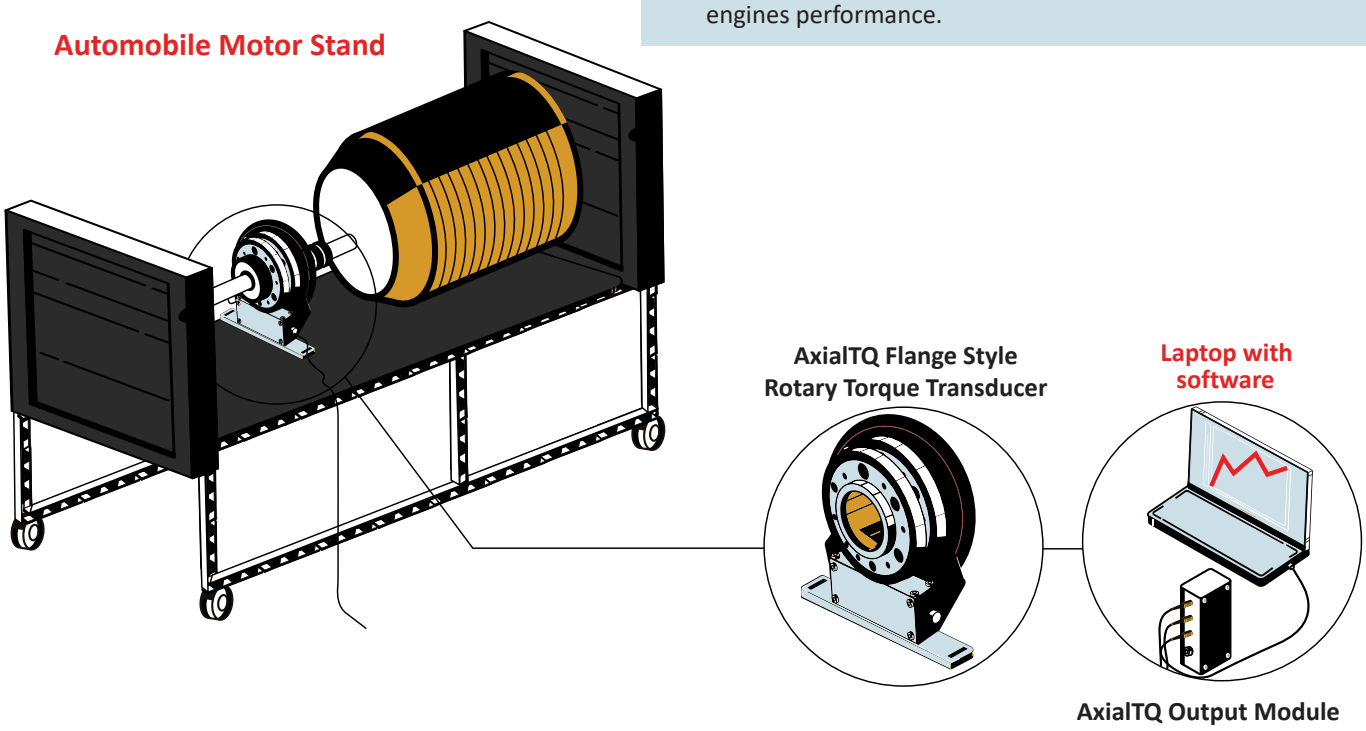
Based on the data collected using the AxialTQ, AxialTQ Output Module, and customer laptop, the Test Engineer was able to make recommendations to optimize the amount of torque created by the new motor design.

Materials

- AxialTQ Flange Style Rotary Torque Transducer.
- AxialTQ Output Module with Included Software.
- Interconnect Cable.

How It Works

1. The AxialTQ is installed in line with the motor being tested.
2. The AxialTQ's rotor measures the Motor's Torque and sends the data to the Output Module.
3. AxialTQ Output Module displays and transmits the AxialTQ Signal to the PC Over USB.
4. The PC Software Graphs and Logs the Torque Data.
5. The Test Engineer analyzes & audits the data to optimize the engines performance.



Pedal- Force and Distance

Interface Mini™

Industry: Automotive and Vehicle

Summary

Customer Challenge

Customer needs to measure pedal force in relationship to distance the pedal is pushing during automobile testing.

Interface Solution

As pedal is pushed, force is measured by BPL Pedal Load Cell and distance is measured by LVDT. Results are shown graphically and on a display while the data is being logged to a CSV file by model SI-USB4

Results

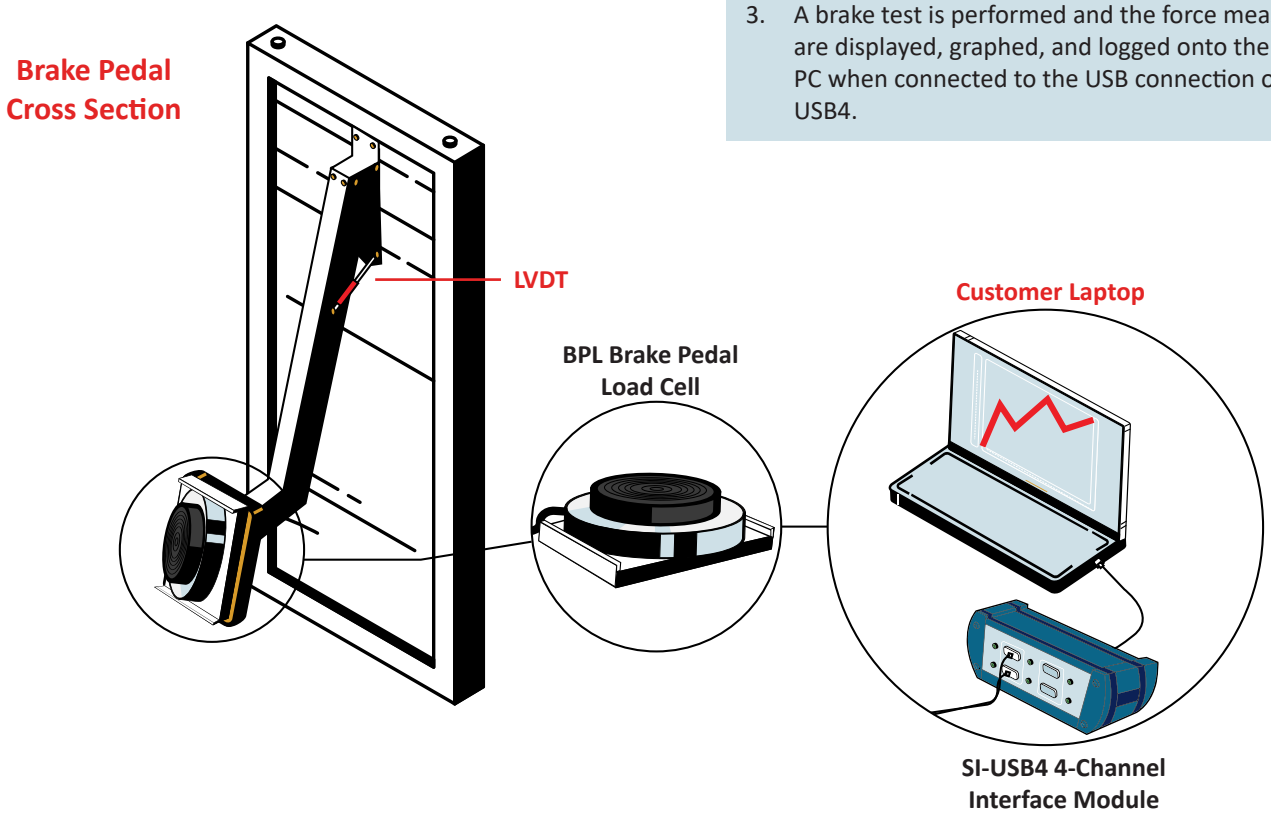
Customer objective has been achieved. When pedal test was executed, the force measurement and distance measurement were simultaneously displayed, graphed and logged for examination in their lab.

Materials

- BPL Brake Pedal Load Cell
- LVDT sensor
- SI-USB4 4-Channel USB Interface Module
- Customer PC or laptop

How It Works

1. The BPL Brake Pedal Load Cell securely mounted on the top of the brake pedal, and the customer's LDVT is installed on the back of the braking assembly.
2. Both the BPL and LDVT is connected to the SI-USB4 4-Channel USB Interface Module.
3. A brake test is performed and the force measurements are displayed, graphed, and logged onto the customer's PC when connected to the USB connection of the SI-USB4.



Pre-Installation Sealing Sensor Testing

Load Cell

Industry: Automotive and Vehicle

Summary

Customer Challenge

An automotive manufacturer needs a force testing system for their door and window seals. Their seals have an integrated anti-pinch electrical system that activates depending on the forces applied to the seals (in case of someone's finger or head getting caught). They need a system that will be able to measure and display the forces applied in real time.

Interface Solution

Interface's solution is to install a 1101 Compression-Only Ultra Precision LowProfile™ Load Cell to the customer's test stand. When connected to the INF-USB3 Universal Serial Bus Single Channel PC Interface Module, the forces applied will be displayed and logged onto the customer's PC computer or laptop.

Results

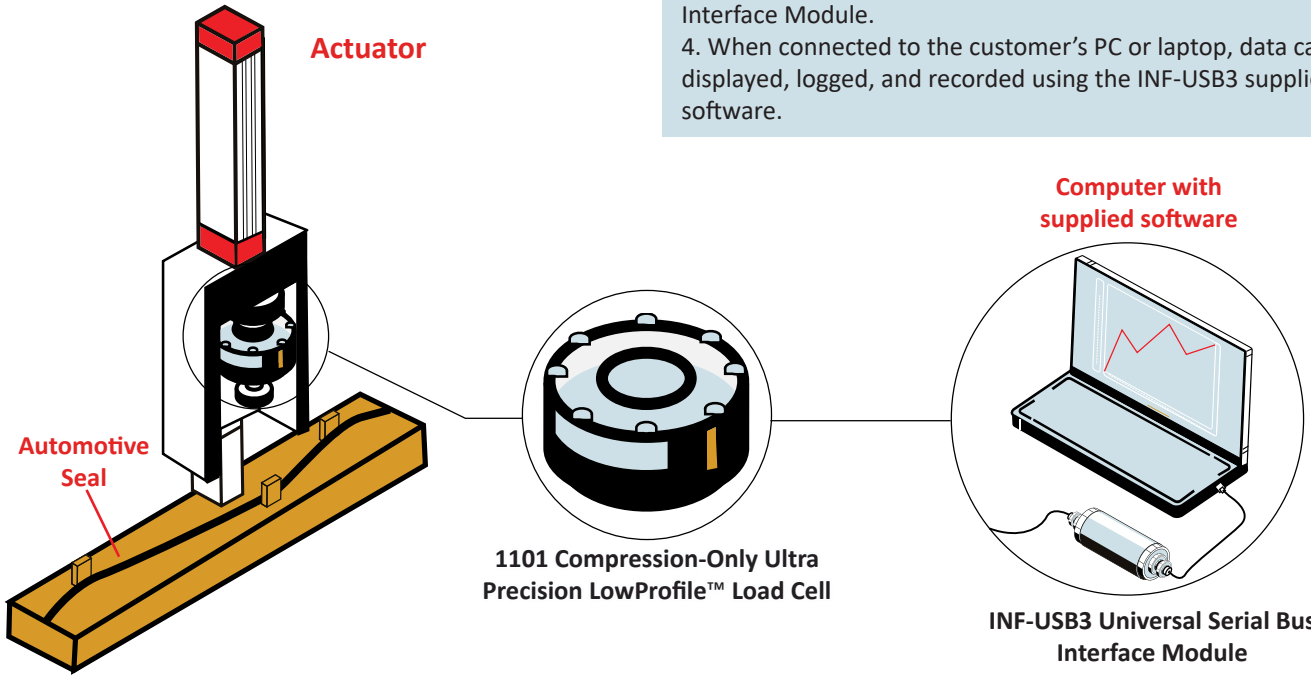
The automotive manufacturer was able to successfully determine the force measurements that activated their doors, windows, and sunroofs anti-pinch system.

Materials

- 1101 Compression-Only Ultra Precision LowProfile™ Load Cell
- INF-USB3 Universal Serial Bus Single Channel PC Interface Module with supplied software
- Customer PC or Laptop

How It Works

1. The 1101 Compression-Only Ultra Precision LowProfile™ Load Cell is attached to the customer's actuator testing frame.
2. Forces are applied to the door and window seals. The anti-pinch safety system is activated.
3. These forces that are applied are then measured and logged, using the INF-USB3 Universal Serial Bus Single Channel PC Interface Module.
4. When connected to the customer's PC or laptop, data can be displayed, logged, and recorded using the INF-USB3 supplied software.



Race car Suspension Testing
Load Cell

Industry: Automotive and Vehicle, Test and Measurement

Summary

Customer Challenge

Race car suspensions require fine tuning for beast performance on various tracks. Simulation of bumps, banking and other track conditions result in off-axis loading.

Interface Solution

Interface 1200-series load cell mounted on top of each post in a 4-, 5-, or 7-post rig allows race teams to measure forces during simulated laps. Moment compensating design of 1200-series load cells provide accurate readings during off-axis loading.

Results

Highly accurate (0.04%) measurement of loads applied to individual suspension points.

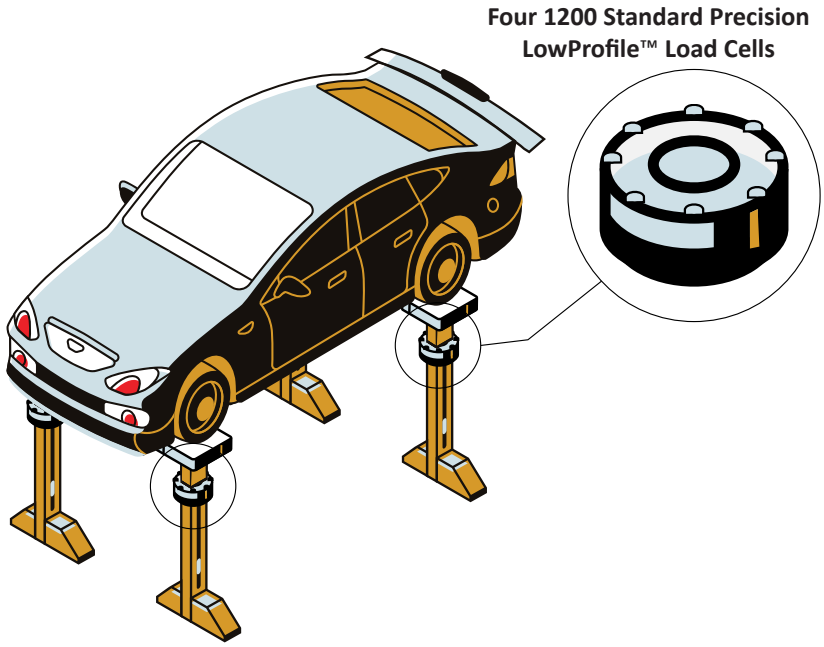
Materials

- Four 1200 Standard Precision LowProfile™ Load Cells

How It Works

1. A multiple-post vehicle suspension test rig is built into or under the floor of a race team facility. A 4-post rig tests forces at each wheel; 5-post rig adds a rear suspension point and a 7-post rig tests aerodynamic forces in addition to road (wheel) loading.
2. An Interface 1200-series load cell is mounted on each post.
3. Hydraulic actuators individually apply forces to each post to simulate the surface conditions of the track.
4. Load cells measure the aggregate of the forces being applied from both the post on which the load cell is mounted and forces from other posts being applied to the vehicle (such as when simulating a banked surface).
5. Load cell output is fed to the control system to determine cylinder force required to produce the correct force to simulate the track condition.

Race car



Vehicle Suspension Rig

Racing Shocks Testing
Load Cell

Industry: Automotive and Vehicle

Summary

Customer Challenge

A shocks test must be conducted on an off-road racing vehicle. A shocks test is conducted to determine the durability and performance when there is sudden heavy forces or impacts.

Interface Solution

Interface's 1200 High Capacity Standard Precision LowProfile™ Load Cell can be installed into the shocks testing machine. Once the machine has been calibrated, a shocks impact test is done. The 1200 High Capacity Load Cell measure the different forces during the shocks test. Force results are captured by the 1200 and displayed using the 9840 Calibration Grade Multi-Channel Load Cell Indicator.

Results

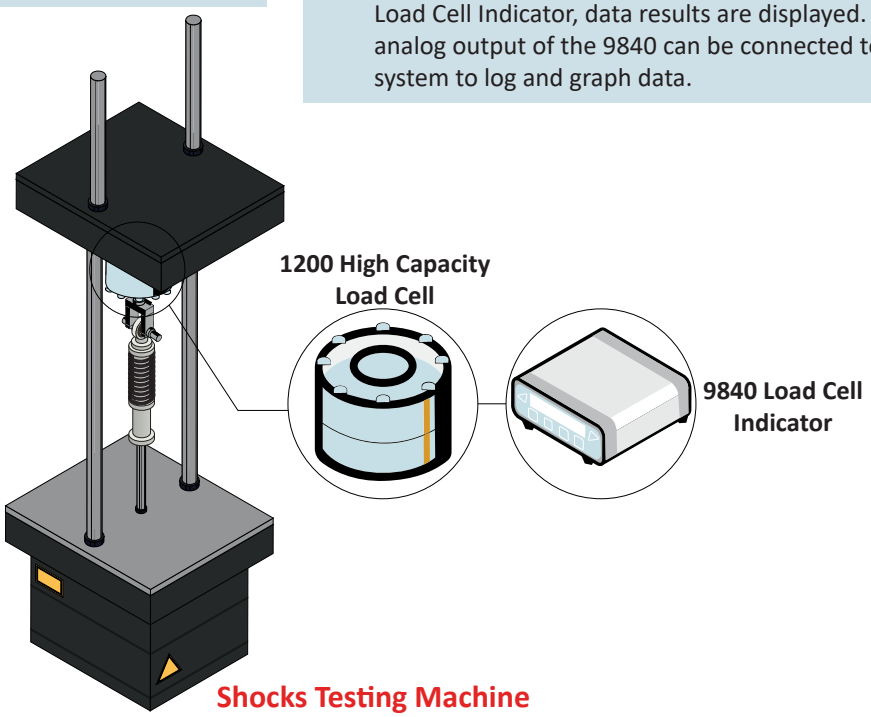
Interface's 1200 High Capacity Standard Precision LowProfile™ Load Cells successfully evaluated the forces during the shocks test, determining how well it can handle the racing environment.

Materials

- 1200 High Capacity Standard Precision LowProfile™ Load Cells
- 9840 Calibration Grade Multi-Channel Load Cell Indicator
- Customer's shocks testing machine

How It Works

1. A 1200 High Capacity Standard Precision LowProfile™ Load Cell is installed into the shock testing machine.
2. A shocks test is conducted on racing car shocks, and the 1200 capture the forces.
3. When connected to the 9840 Calibration Grade Multi-Channel Load Cell Indicator, data results are displayed. If needed, the analog output of the 9840 can be connected to their control system to log and graph data.



Seat Testing Machine
Multi-Axis

Industry: Automotive and Vehicle

Summary

Customer Challenge

An automotive seat manufacturer was conducting durability testing on their seats. During testing, the customer was consistently overloading and replacing their single-axis load cells. After a thorough inspection, it was discovered that this was due to bending moments that had never been quantified.

Interface Solution

Interface Model 6A68C 6-Axis load cell was installed in their existing test machine. The 6-Axis Sensor was intentionally oversized allowing the customer to measure the unidentified bending moments while preventing any damage to the 6-Axis Sensor. A Model BX8 was used to graph, log, & store the data collected at the sensor.

Results

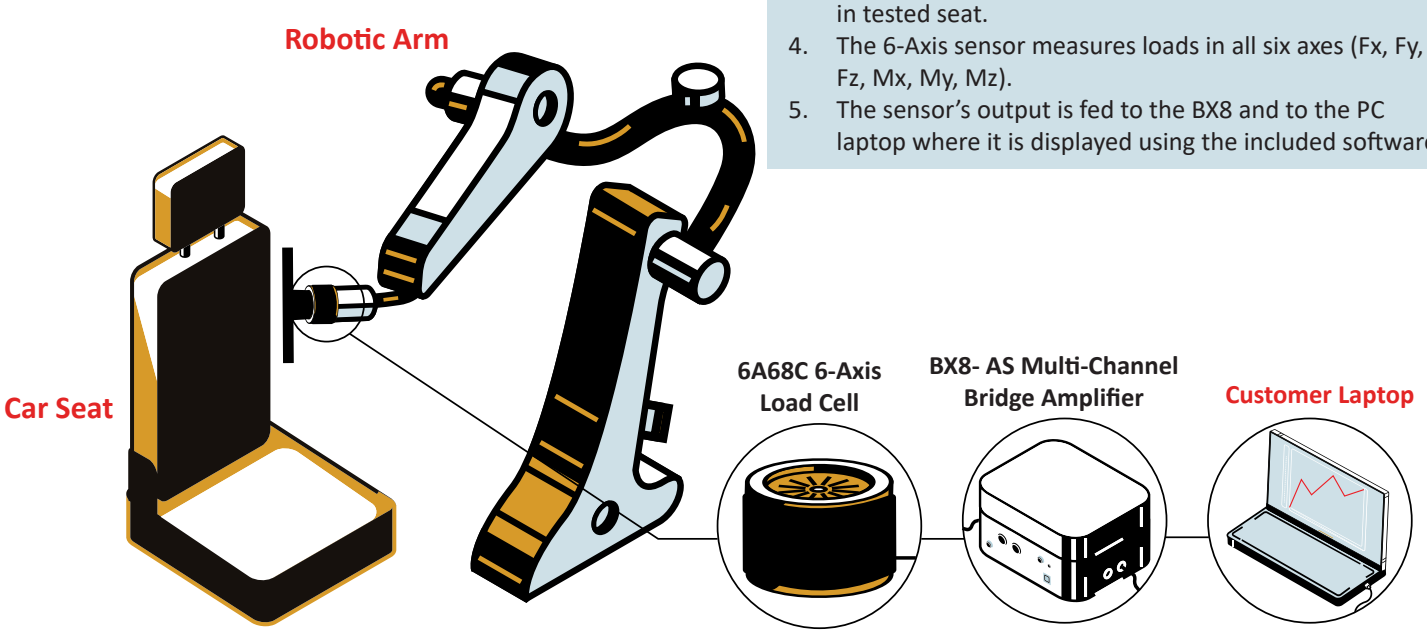
The customer was able to identify previously unknown bending moments, permitting them to choose how they would like to proceed with testing. Select a more appropriate single-axis load cell capacity, capable of withstanding the entire combined loads; including the bending moment. Continue using a 6-Axis Sensor to take measurements. Redesign their testing fixture to eliminate bending moment.

Materials

- 6A68C 6-Axis Load Cell
- BX8- AS Multi-Channel Bridge Amplifier & PC Interface Module with Software
- Appropriate Cabling

How It Works

1. The 6A68C 6-Axis sensor is installed between simulated seated human and the robotic arm.
2. The BX8- AS connected between the 6-Axis Sensor and the customer's PC Laptop.
3. The testing machine repetitively places simulated human in tested seat.
4. The 6-Axis sensor measures loads in all six axes (Fx, Fy, Fz, Mx, My, Mz).
5. The sensor's output is fed to the BX8 and to the PC laptop where it is displayed using the included software.



Tire Force and Moment Torque Transducer

Industry: Automotive and Vehicle

Summary

Customer Challenge

A tire production company wants to put their tires under a stress test. They want to research the dynamic control capabilities of their tires. They want to measure both the torque and lateral force of the tire.

Interface Solution

Interface suggests using the AT105 Contactless Force/Torque Transducer to measure both the lateral force and torque of the tired being tested. Torque and force results can be displayed and graphed when connected to theSI-USB4 4 Channel USB Interface Module.

Results

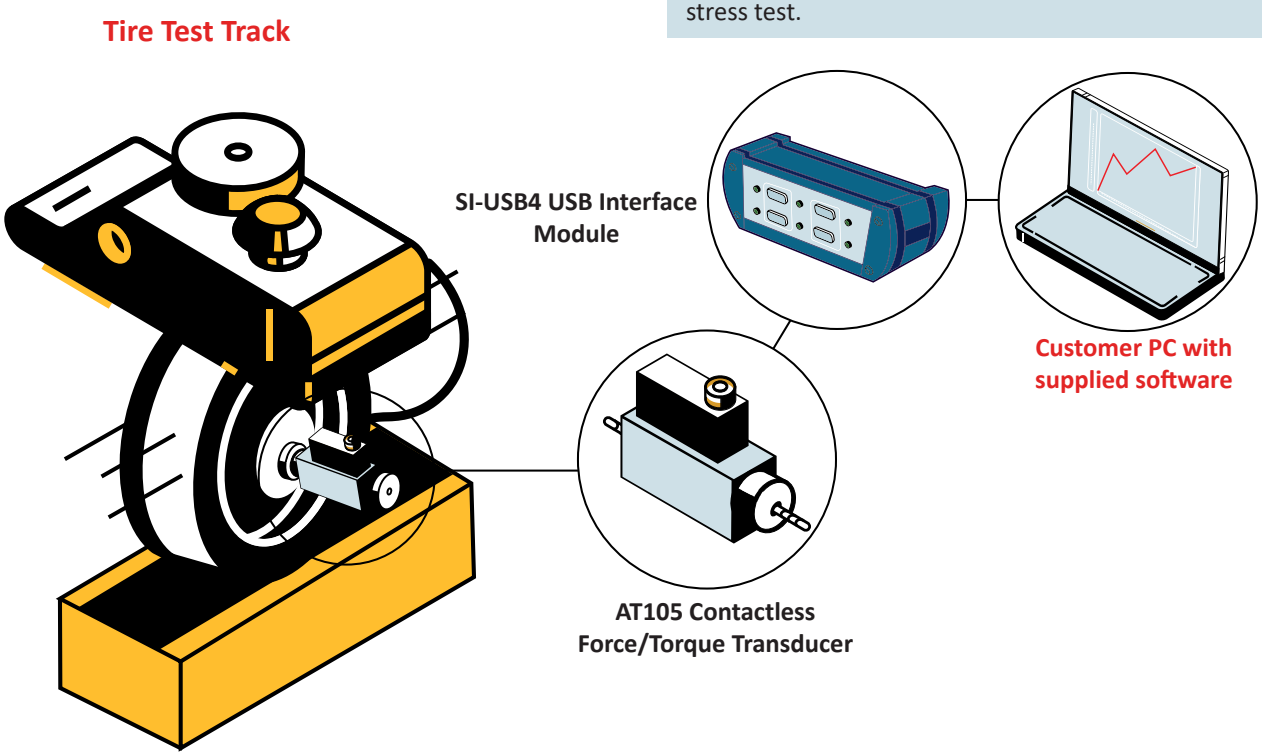
After conducting a stress test on their tires, the tire production company was able to record and log the measurements of the torque and lateral forces implemented on their tires.

Materials

- AT105 Contactless Force/Torque Transducer
- SI-USB4 4 Channel USB Interface Module with supplied software
- Customer PC or Laptop

How It Works

1. The AT105 Contactless Force/Torque Transducer is installed in the customer's tire friction test track.
2. The tire was tested on the company's test track where torque and lateral force was measured.
3. The SI-USB4 4 Channel USB Interface Module was able to log and graph both the torque and force results from the tire stress test.



Torque Measurement for Electric Vehicles

AxialTQ™

Industry: Automotive and Vehicle

Summary

Customer Challenge

An electric vehicle manufacturer needed a torque measurement system for their electric vehicle motors. These motors run at significantly higher rotational speeds than their internal combustion engine (ICE) counterparts, and have much higher power densities due to the small size and light weight. The system would be used to test the torque and speed of their electric motors to achieve and ensure optimum instant peak torque performance.

Interface Solution

Interface's AxialTQ™ Wireless Rotary Torque Transducer is a highly accurate system that provides the highest quality torque measurement. This product comes with the AxialTQ™ Output Module and the provided AxialTQ™ Assistant software, that can be installed on a test bench. Data results are calculated and collected in real-time.

Results

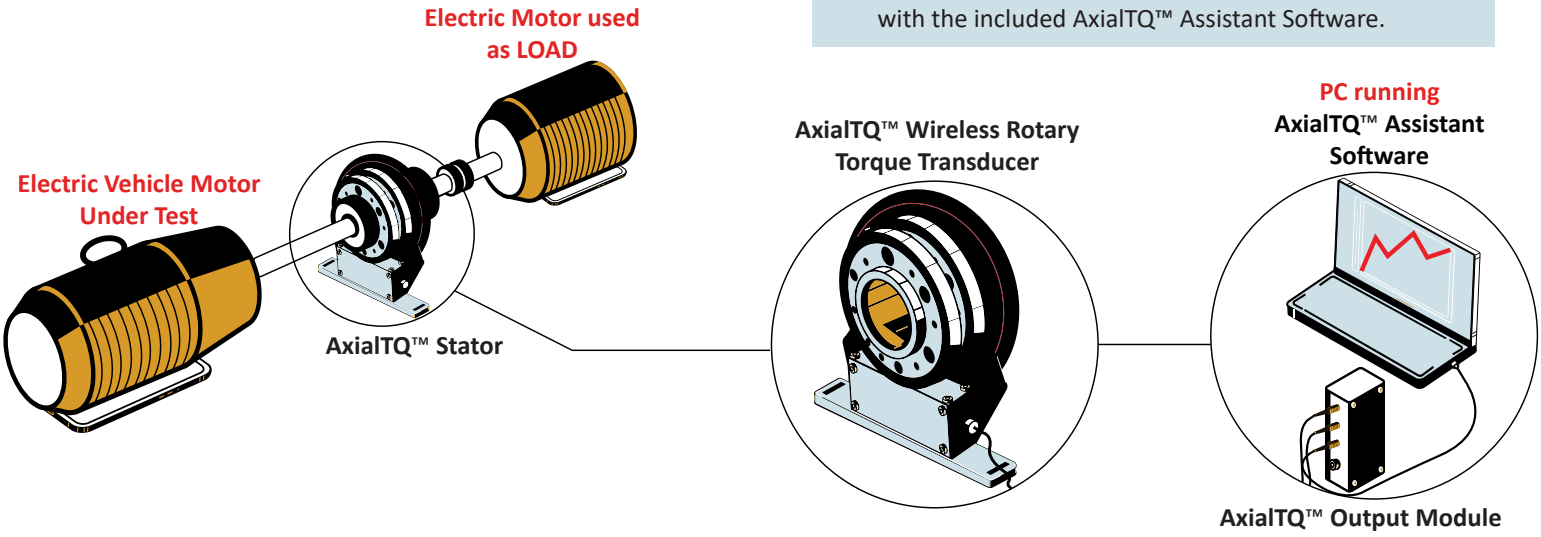
Interface's AxialTQ Wireless Rotary Torque Measurement System accurately measured the torque and RPM of the electric vehicle motor and they were able to achieve their required instant peak torque.

Materials

- AxialTQ™ Wireless Rotary Torque Transducer – Rotor – Stator – AxialTQ™ Output Module – supplied AxialTQ™ Assistant Software
- AxialTQ™ Speed Gear Option
- Interface Integrated Disc Couplings
- Customer's PC or Laptop
- Customer's test bench

How It Works

1. The AxialTQ™ Wireless Rotary Torque Transducer is installed on a test bench.
2. The AxialTQ™ Wireless Rotary Torque Transducer tests and senses the electric vehicles motor with high accuracy. It both measured and calculated the electric vehicles torque and rotational speed (RPM), while collecting data.
3. Results can be reviewed on the customer's PC or laptop with the included AxialTQ™ Assistant Software.



Vacuum Testing for Automotive Performance

Torque Transducer

Industry: Automotive and Vehicle

Summary

Customer Challenge

The vacuum pump in a car plays an important part in a number of systems, such as power brakes, HVAC, and sometimes even in the turbocharger or emissions control systems. Its primary function is to create a vacuum or negative pressure within a specific system. A torque test needs to be performed in order to ensure it is performing properly.

Interface Solution

Interface's T2 Ultra Precision Shaft Style Rotary Torque Transducer with torque couplings can be attached to the vacuum pump during performance testing. It will measure the amount of torque that is being used on the pump's motor or drive system. Results can be displayed, recorded, and logged using the SI-USB4 4 Channel USB Interface Module when connected to the customer's computer.

Results

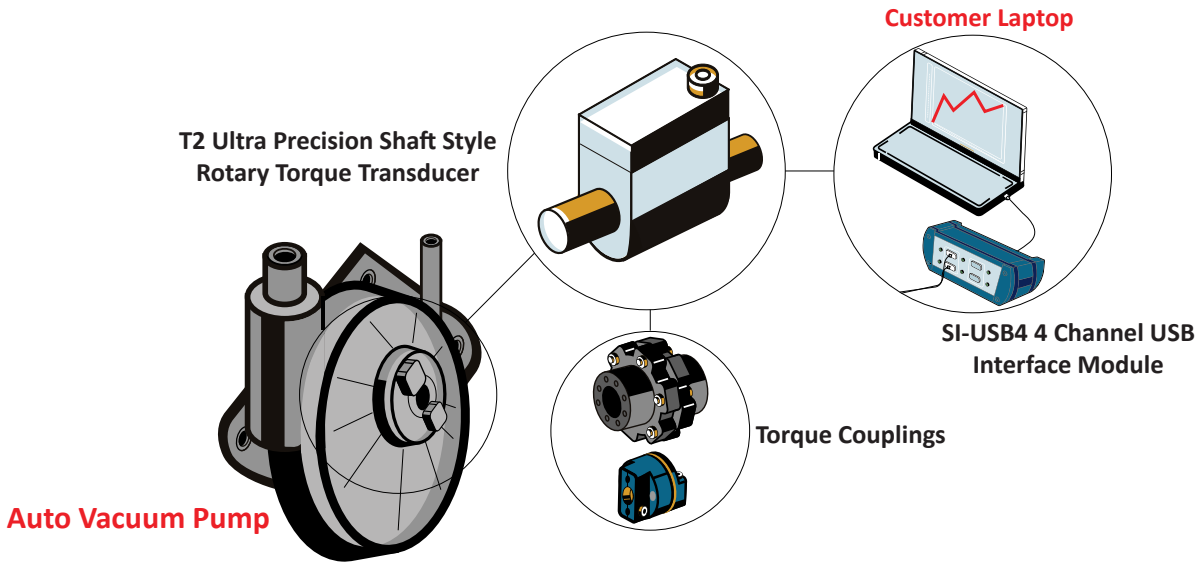
Interface's T2 Ultra Precision Shaft Style Rotary Torque Transducer successfully measured and monitored the torsion results during the vacuum performance test.

Materials

- T2 Ultra Precision Shaft Style Rotary Torque Transducer
- Torque Couplings
- SI-USB4 4 Channel USB Interface Module with supplied software
- Customer PC

How It Works

1. The T2 Ultra Precision Shaft Style Rotary Torque Transducer with torque couplings is attached to the vacuum pump during the performance test.
2. Torsion measurements are sent to the SI-USB4 4 Channel USB Interface Module.
3. Results can be recorded, graphed, and logged with supplied software when connected to the customer's computer.



Vehicle Crash Test Load Cell Wall

Multi-Axis

Industry: Automotive and Vehicle

Summary

Customer Challenge

A facility wants to do crash tests on their vehicles. There are multiple tests such as structural testing of the vehicle, developmental tests, and regulatory and compliance tests. They need to measure the force of the vehicle crash tests, on all axis.

Interface Solution

Interface' suggests using multiple 3A400 3-Axis Force Load Cells, and attach it to the back of a cement crash wall. When connected to the BX8-HD44 Interface BlueDAQ Series Data Acquisition System, force result measurements will be recorded and displayed with the customer's PC or laptop.

Results

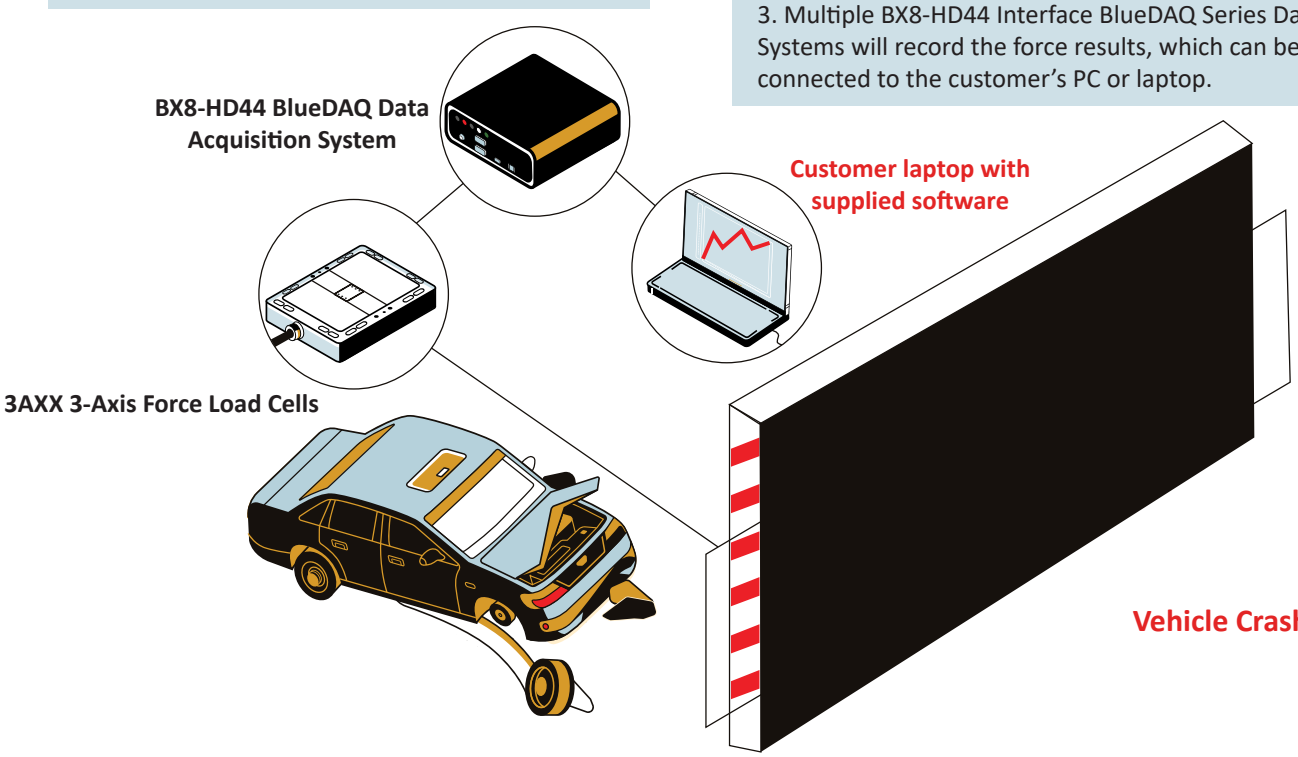
The customer was able to measure the force of impact for all of their different vehicle crash testing demonstrations.

Materials

- 3AXX 3-Axis Force Load Cells
- BX8-HD44 Interface BlueDAQ Series Data Acquisition System
- Customer PC or Laptop

How It Works

1. Multiple 3A400 3-Axis Force Load Cells are bolted and attached to the back of a cement crash test wall, creating a load cell wall.
2. The vehicle crash test is performed, and the 3-Axis load cells measure all forces on all axis.
3. Multiple BX8-HD44 Interface BlueDAQ Series Data Acquisition Systems will record the force results, which can be viewed when connected to the customer's PC or laptop.



WTS Pedal Force Testing

Interface Mini™

Industry: Automotive and Vehicle

Summary

Customer Need / Challenge

To meet certain vehicle safety protocols, pedal force must be measured and recorded. In order to quantify the quality of the braking system, the relationship between pedal force and braking force at the axle must be ascertained, either during an on-road stopping test or in a simulated indoor environment with a dynamometer, where pedal force can be measured.

Interface Solution

Using an Interface Model BPL Pedal Load Cell along with the Model Wireless Telemetry System (WTS) provides a solution that measures the force being applied during the use of a brake pedal cycle. Utilizing wireless telemetry with the following Interface components, the valuable data can be displayed and recorded in real time using a PC and/or a handheld receiver depending on the requirements and preferences of the customer.

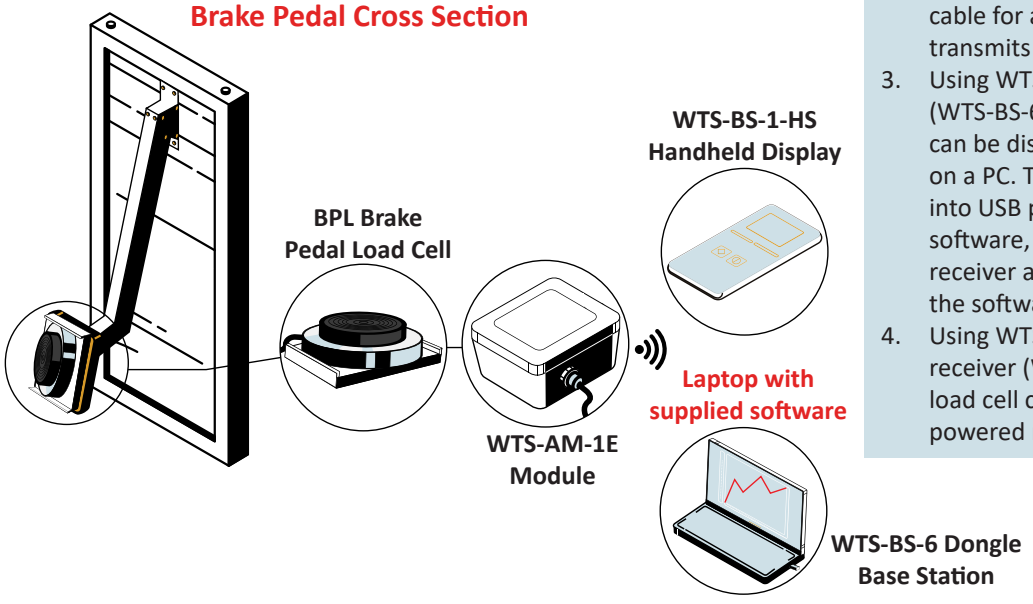
Results

The relationship between pedal force and axle braking force is measured and recorded to ensure compliance with required safety regulations. Any necessary calibrations, adjustments, or modifications to the braking system can be assessed by whether the results of the brake testing fall within appropriate ranges of a pre-determined testing protocol.

Materials

- Model BPL Pedal Load Cell (mounting equipment- straps included)
- Model WTS Wireless Modules:
  - Transmitter Module (WTS-AM-1E)
  - Handheld Module (WTS-BS-1-HS)
  - Base Station Module (WTS-BS-6)

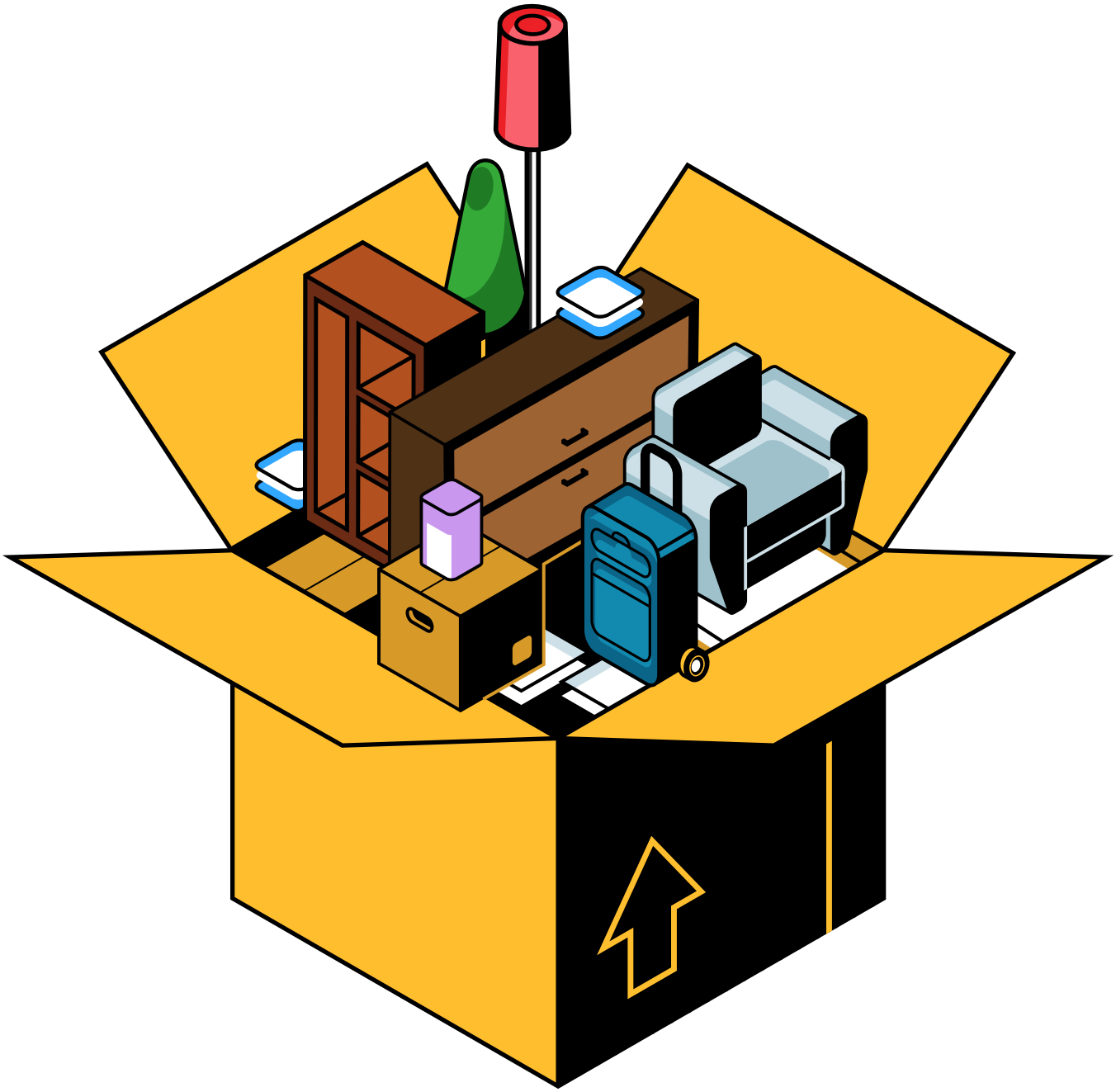
Brake Pedal Cross Section



How It Works

1. Model BPL Pedal Load Cell Load is installed onto pedal so that the output cable to the transmitter has clearance from any snagging throughout the entire pedal pumping cycle.
2. Mount the transmitter WTS-AM-1E in a safe location so that there is enough slack in the cable for a full pedal pumping cycle. The Module transmits wirelessly to the WTS Toolkit App.
3. Using WTS Wireless System with the receiver (WTS-BS-6), force readings from the load cell can be displayed, logged and graphed directly on a PC. To do so, plug in the WTS-BS-6 receiver into USB port on the PC, install the WTS Toolkit software, and finally pair the transmitter to the receiver as outlined in the documentation with the software.
4. Using WTS Wireless System with the handheld receiver (WTS-BS-1-HS), force readings from the load cell can be displayed on a wireless battery powered receiver.

Consumer Product Goods



Bike Handlebar Fatigue Testing

S-Type

Industry: CPG

Summary

Customer Challenge

A bike manufacturing company wants to test the handlebars for their bikes. They need to conduct fatigue tests on their handlebars to observe its structure and performance durability. Thus, ensuring safety and high performance for future consumers.

Interface Solution

Interface suggests using their Interface Mini™ products such as the SSMF Fatigue Rated S-Type Load Cells. Two of these S-type load cells can be attached on either end of the bike's handlebar stem, where it will measure the forces applied as the handlebar undergoes its fatigue test. Results can be measured, logged, and graphed with the SSI-USB4 4-Channel USB Interface Module.

Results

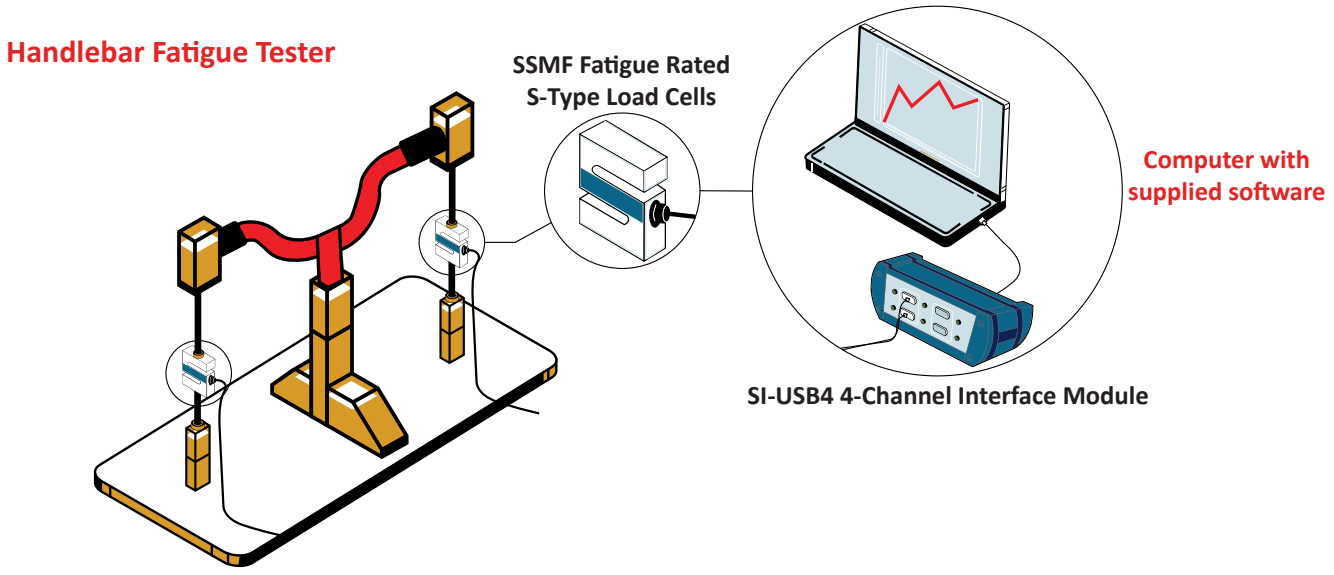
Interface's products were used during the handlebar fatigue test to successfully test the bike handlebar's durability and overall structural quality.

Materials

- Two SSMF Fatigue Rated S-Type Load Cells
- SI-USB4 4-Channel USB Interface Module with supplied graphing software and analog output
- Customer PC or Laptop

How It Works

1. Two SSMF Fatigue Rated S Type Load Cells are installed to the actuators of the fatigue test machine, and the ends of the handle bars.
2. Forces are applied, and the two SSMF Fatigue Rated S Type Load Cells record and collect the data during the fatigue cycles.
3. Results are sent to the SI-USB4 4-Channel USB Interface Module where the results can be logged and graphed onto the customer's PC or laptop.



Bike Helmet Impact Test
Load Cells

Industry: CDG

Summary

Customer Challenge

A bike manufacturing company wants to test the impact of a bike helmet when dropped from different heights, onto a flat surface such as an anvil. This test is necessary to ensure consumer safety, and that their products are made of the highest quality until sold to the public.

Interface Solution

Interface suggests installing one of their 1101 Compression-Only Ultra Precision LowProfile™ Load Cell at the bottom of an anvil. The bike helmet is then dropped from multiple heights, at multiple angles, onto the anvil. The measurements from impact are then recorded and logged when attached to the customer's PC laptop or computer.

Results

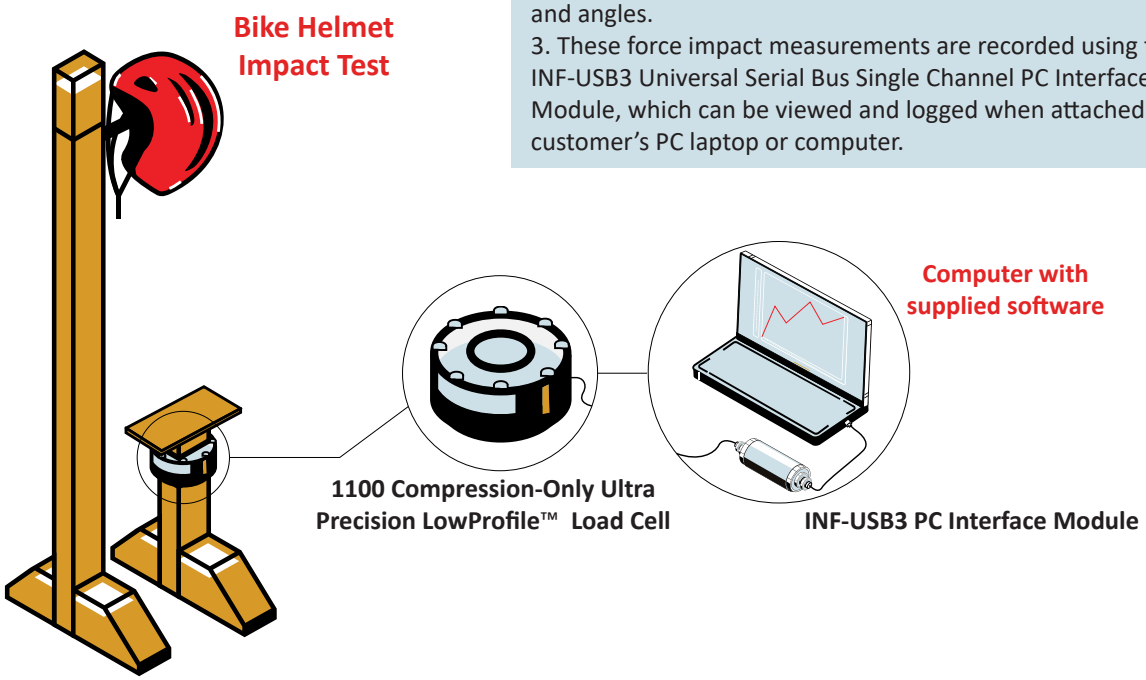
Interface's 1101 Compression-Only Ultra Precision LowProfile™ Load Cell measured accurate force results of the bike helmet impacts at different height levels.

Materials

- 1101 Compression-Only Ultra Precision LowProfile™ Load Cell
- INF-USB3 Universal Serial Bus Single Channel PC Interface Module with supplied software
- Customer PC or Laptop

How It Works

1. The 1101 Compression-Only Ultra Precision LowProfile™ Load Cell is attached at the bottom of the anvil.
2. The bike helmet is attached and dropped at different heights onto the anvil. The 1101 Compression-Only Ultra Precision LowProfile™ Load Cell measures the force impact of the bike helmet as it continuous to undergo drops at different heights and angles.
3. These force impact measurements are recorded using the INF-USB3 Universal Serial Bus Single Channel PC Interface Module, which can be viewed and logged when attached to the customer's PC laptop or computer.



Bike Frame Fatigue Testing
Load Cell

Industry: CPG

Summary

Customer Challenge

A bike manufacturing company wants to perform a fatigue test on their bike frames. They want to analyze the strength of their bike frames in order to ensure durability and high quality standards for future customers.

Interface Solution

Interface suggests installing Model 1000 Fatigue-Rated LowProfile™ Load Cell to the customer's bike frame fatigue tester. This load cell will provide the customer highly accurate results through the fatigue cycling. Results are collected using the INF-USB3 Universal Serial Bus Single Channel PC Interface Module, and displayed on the customer's PC or Laptop with Interface's provided software.

Results

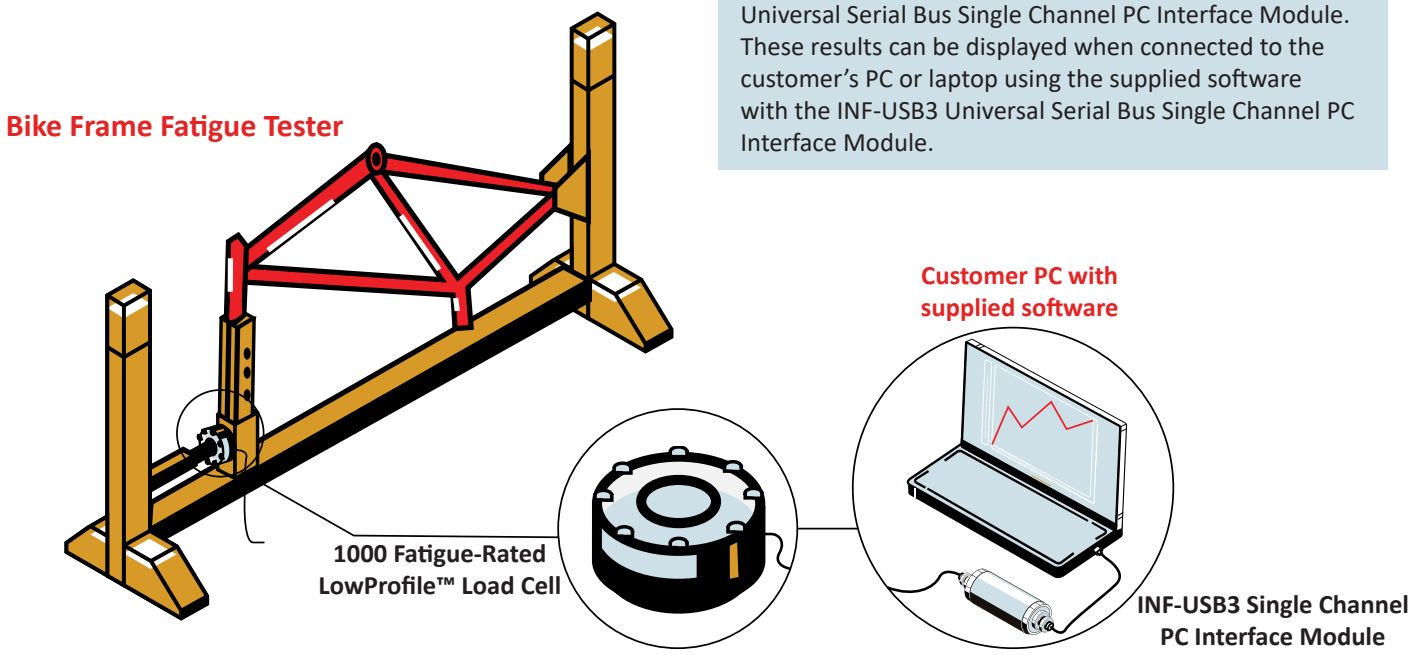
The bike manufacturing company successfully had their bikes undergo fatigue frame testing, receiving highly accurate results with Interface's load cell and instrumentation.

Materials

- 1000 Fatigue-Rated LowProfile™ Load Cell
- INF-USB3 Universal Serial Bus Single Channel PC Interface Module with supplied software
- Customer PC or Laptop

How It Works

1. The 1000 Fatigue-Rated LowProfile™ Load Cell is attached to the actuator of the fatigue testing machine.
2. The load cell undergoes a number of fatigue cycles on the bike frame, and records highly accurate results.
3. The data results are collected using the INF-USB3 Universal Serial Bus Single Channel PC Interface Module. These results can be displayed when connected to the customer's PC or laptop using the supplied software with the INF-USB3 Universal Serial Bus Single Channel PC Interface Module.



Bike Load Testing

Interface Mini™ and Wireless Telemetry System

Industry: CPG

Summary

Customer Challenge

A mountain bike manufacturing company wants a system that measures their bike frames load capacities and vibrations on the frame. They want to ensure the bike's high quality and frame load durability during this final step of the product testing process for their future consumers.

Interface Solution

Interface suggests installing Model SSMF Fatigue Rated S-Type Load Cell, connected to the WTS-AM-1E Wireless Strain Bridge , between the mountain bike's seat and the bike frame. This will measure the vibrations and load forces applied onto the bike frame. The results will be captured by the WTS-AM-1E and transmitted to the customer's PC using the WTS-BS-6 Wireless Telemetry Dongle Base Station.

Results

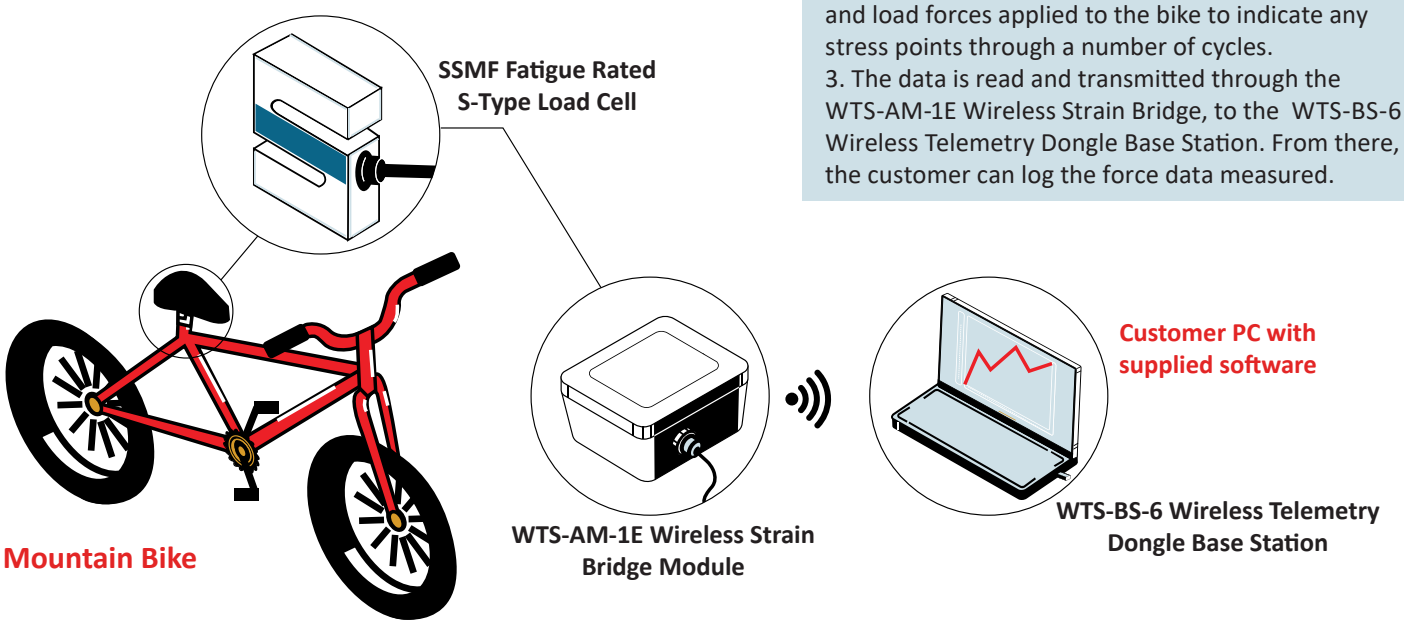
The mountain bike manufacturing company was able to gather highly accurate data to determine that their bikes met performance standards through this final testing.

Materials

- SSMF Fatigue Rated S-Type Load Cell
- WTS-AM-1E Wireless Strain Bridge
- WTS-BS-6 Wireless Telemetry Dongle Base Station
- Customer PC or Laptop

How It Works

1. The SSMF Fatigue Rated S-Type Load Cell is connected to the WTS-AM-1E Wireless Strain Bridge, and installed between the mountain bike's seat and the bike frame.
2. A heavy load is added to the seat, where the SSMF Fatigue Rated S-Type Load Cell measures the vibrations and load forces applied to the bike to indicate any stress points through a number of cycles.
3. The data is read and transmitted through the WTS-AM-1E Wireless Strain Bridge, to the WTS-BS-6 Wireless Telemetry Dongle Base Station. From there, the customer can log the force data measured.



Bike Power Pedals

S-Type and Wireless Telemetry System

Industry: CPG

Summary

Customer Challenge

A bike manufacturer wants to test the functionality of their power pedals. They need a reliable system to measure how much force the cyclist pushes down onto the bike pedals, and they would prefer a wireless system that can be paired with their computer to review data results. This is test is necessary for training consumers.

Interface Solution

Interface suggests four Model SML Low Height S-Type Load Cells installed within the bike's pedals. The two SMLs are paired with four WTS-AM-4 Wireless Strain Bridge Transmitter Modules, which will transmit the force data from the cyclist to the WTS-BS-6 Wireless Telemetry Dongle Base Station Dongle connected to the customer's PC or laptop. Interface will also provide the software needed with their wireless products.

Results

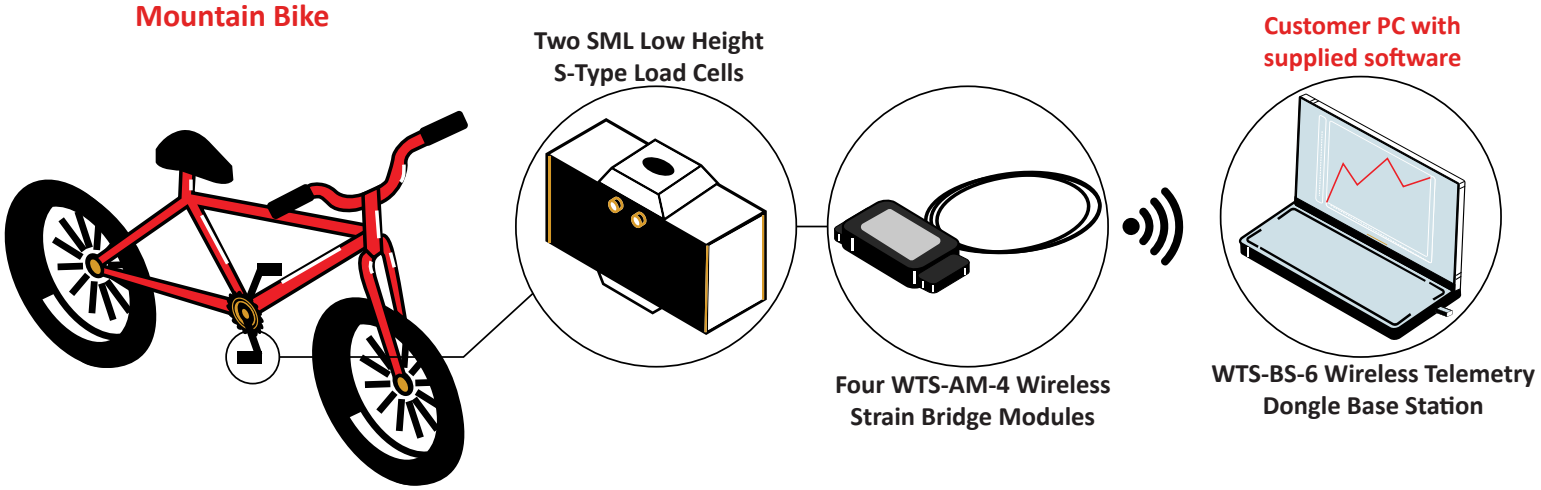
The bike manufacturer was able to measure the pedal power applied by the cyclist. The customer was able to measure and log the data wirelessly transmitted to their PC computer.

Materials

- Two SML Low Height S-Type Load Cells
- Four WTS-AM-4 Wireless Strain Bridge Transmitter Modules
- WTS-BS-6 Wireless Telemetry Dongle Base Station
- Customer PC or Laptop

How It Works

1. The SML Low Height S-Type Load Cells are installed inside the bike pedal, connected to the WTS-AM-4 Strain Bridge Transmitter Modules.
2. During the testing stage, a cyclist uses the bike and pushes force down onto the bike pedals.
3. The data is read and transmitted through the WTS-AM-4 Wireless Strain Bridge Modules, to the WTS-BS-6 Wireless Telemetry Dongle Base Station. From there, the customer can log the force data measured.



Dental Handpiece Torque Check

Torque Transducer

Industry: CPG

Summary

Customer Challenge

A dental handpiece manufacturer wants to improve their instruments for future consumers that will buy their products. They want to test the torque of their electrical dental handpiece tools in order to measure its overall efficiency.

Interface Solution

Interfaces T2 Ultra Precision Shaft Style Rotary Torque Transducer can be installed in the dental handpiece, connecting to the dental handpiece's motor. Torsion measurements are graphed and logged using the SI-USB4 4 Channel USB Interface Module, indicating any unusual fluctuations.

Results

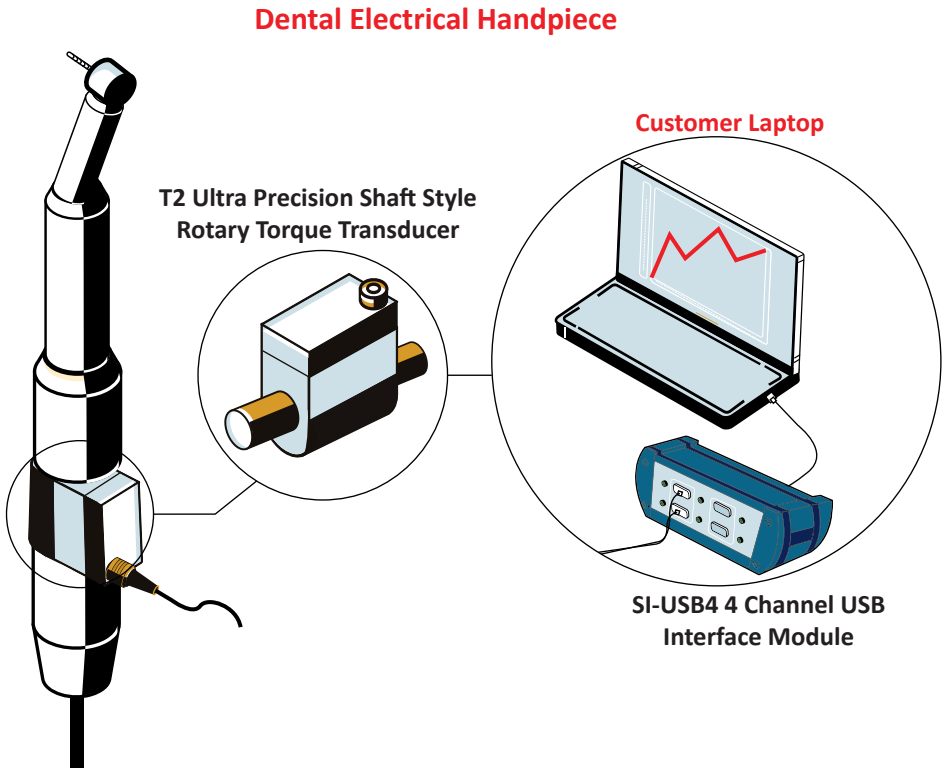
The dental handpiece manufacturer was able to successfully measure the torque of their electrical dental instruments.

Materials

- T2 Ultra Precision Shaft Style Rotary Torque Transducer
- SI-USB4 4 Channel USB Interface Module
- Customer PC or Laptop

How It Works

1. The T2 Ultra Precision Shaft Style Rotary Torque Transducer is installed in the electric dental handpiece tool.
2. Torsion measurements are sent to the SI-USB4 4 Channel USB Interface Module.
3. Results can be recorded, graphed, and logged when connected to the customer's PC laptop or computer.



Fitness Equipment and Machines

Load Cell

Industry: CPG

Summary

Customer Challenge

A fitness machine manufacturer wants multiple load measurement systems for their different fitness machines such as the elliptical, leg press, rowing machine, and the cable machine. They want to ensure the machines malfunction properly to prevent injuries for consumers using the machines at home or at their local gyms.

Interface Solution

A combination of products such as the WMCFP Overload Protected Sealed Stainless Steel Miniature Load Cell, SSB Sealed Beam Load Cells, and AT103 Axial Torsion Force and Torque Transducers. Paired with Interface's proper instrumentation, the forces can be measured, graphed, and displayed during the testing stage.

Results

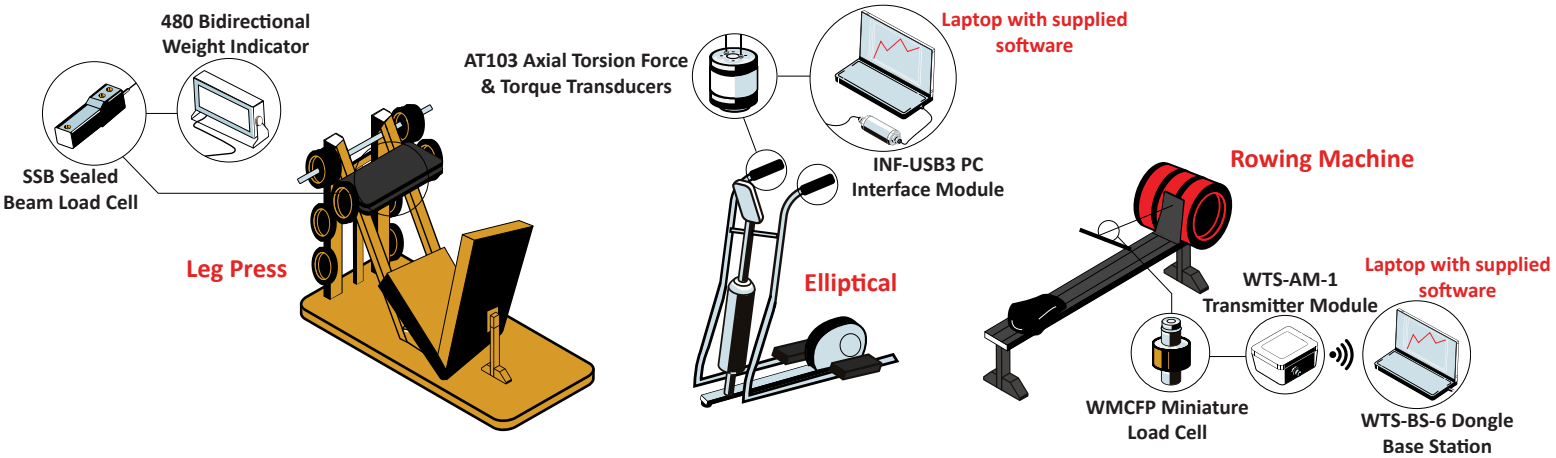
Interface's products all effectively measured forces needed for those working out or undergoing athletic training. Not only did it ensure the machines were working properly, but it also helped those using them to track their endurance performance.

Materials

- Two AT103 Axial Torsion Force & Torque Transducers
- WMCFP Overload Protected Sealed Stainless Steel Miniature Load Cell
- SSB Sealed Beam Load Cell
- INF-USB3 Universal Serial Bus Single Channel PC Interface Module
- 480 Bidirectional Weight Indicator
- WTS-AM-1 Wireless Strain Bridge Transmitter Module
- WTS-BS-6 Wireless Telemetry Dongle Base Station
- Customer PC or Laptop

How It Works

1. **Elliptical**-Two AT103 Axial Torsion Force & Torque Transducers can be installed inside of the handles of the elliptical. This will measure the athlete's push and pull forces when in use. Data can be measured when paired with the INF-USB3 Universal Serial Bus Single Channel PC Interface Module, and displayed with the customer's laptop.
2. **Leg Press**- An SSB Sealed Beam Load Cell can be installed under the plate of the leg press. Forces from when someone pushes up on the leg press will be measured using the 480 Bidirectional Weight Indicator.
3. **Rowing Machine**- The WMCFP Overload Protected Sealed Stainless Steel Miniature Load Cell is installed in line of the rowing cable, with rod end bearings. When pulled, forces are recorded using the WTS-AM-1 Wireless Strain Bridge Transmitter Module, and transmitted to a PC or laptop through the WTS-BS-6 Wireless Telemetry Dongle Base Station.



Food and Beverage Conveyor Belt

Interface Mini™

Industry: CPG

Summary

Customer Challenge

Conveyor belts for the food and beverage industry need to be maintained and have proper alignment for the products being transported. A load cell is needed to prevent misalignment and to reduce the risk of damage or malfunction of the belt while in operation.

Interface Solution

Interface suggests installing multiple PBLC Pillow Block Load Bearing Load Cells onto the conveyor belt. They are designed for easy maintenance. The PBLC's measure and monitor the force of the conveyor belt, while preventing misalignment.

Results

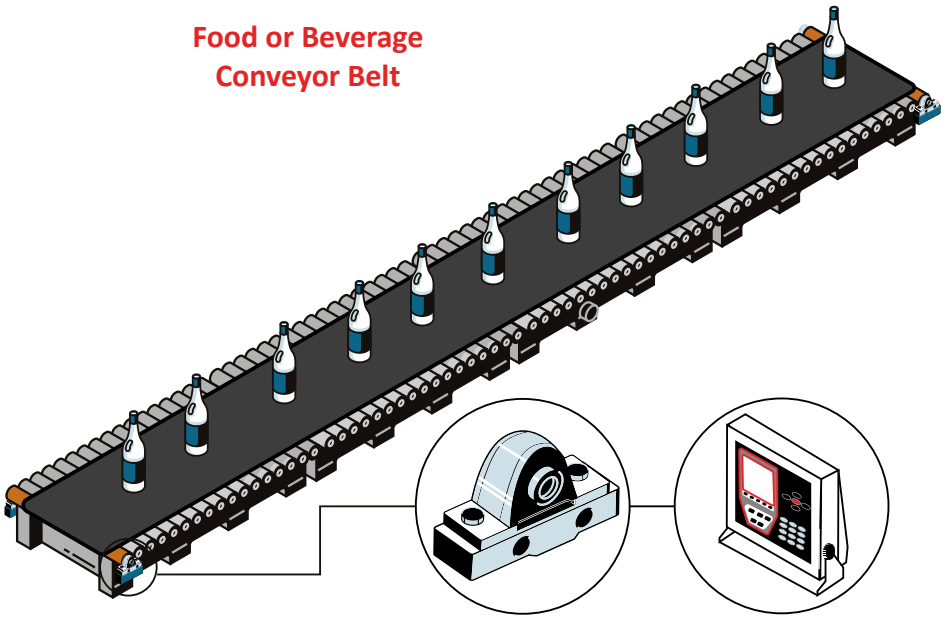
The PBLC Pillow Block Load Cells successfully maintained the proper alignment of the conveyor belt for the food and beverages being transported, while also monitoring the forces being implemented.

Materials

- Multiple PBLC Pillow Block Load Cells
- 920i Programmable Weight Indicator and Controller

How It Works

1. The PBLC Pillow Block Load Bearing Load Cells are installed at the wheels at each end of the conveyor belt.
2. When connected to the 920i Programmable Weight Indicator and Controller, the customer can see the weight for every pillow block or the total weight.
3. The PBLC Pillow Block Load Bearing Load Cells also maintain the proper alignment of the conveyor belts, reducing damage or malfunctions during operations. The 920i can communicate to the customer's control center via RS232 if an possible error is detected.



Fruit Weighing

Load Cell and Wireless Telemetry System

Industry: CPG

Summary

Customer Challenge

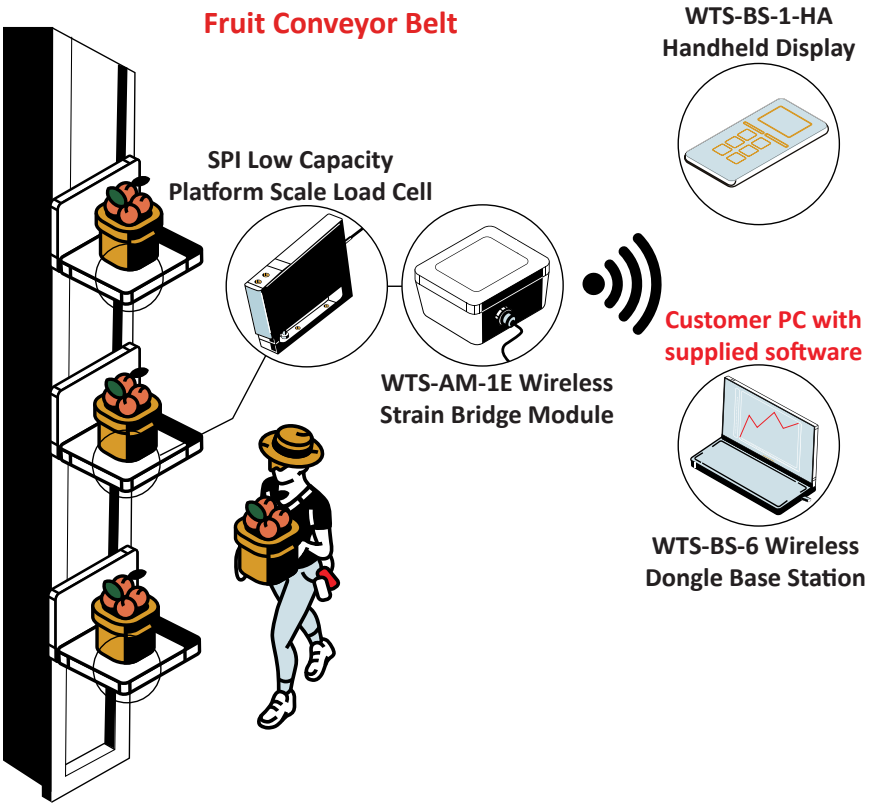
A customer owns and operates a fruit packaging plant. They want to weigh the bins full of fruit that are loaded onto conveyor belts that transfer the fruit to other steps of the distribution process, in order to finally read the hands of the consumer in grocery stores.

Interface Solution

Interface suggests installing SPI Low Capacity Platform Scale Load Cells, along with WTS-AM-1E Wireless Strain Bridge Transmitter Modules, in the center of the platforms the bins of fruit are loaded on. The WTS-AM-1E's wirelessly transmit the data collected from the SPI's to the WTS-BS-1-HA Wireless Handheld Display for multiple transmitters, and the WTS-BS-6 Wireless Telemetry Dongle Base Station when connected to the customer's PC. Results can be graphed, logged, and seen in real time.

Results

Interface's load cells and Wireless Telemetry System successfully weighed the fruit bins in real time when loaded onto the conveyor belt.



How It Works

1. The SPI Low Capacity Platform Scale Load Cells and WTS-AM-1E Wireless Strain Bridge Transmitter Modules are installed in the center of the platform plates.
2. The fruit bins are loaded on.
3. The weight is captured by the SPI's, and the WTS-AM-1E's wirelessly transmit the data to both the WTS-BS-1-HA Wireless Handheld Display for multiple transmitters and the WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied software on the customer's PC.

Materials

- SPI Low Capacity Platform Scale Load Cells
- WTS-AM-1E Wireless Strain Bridge Transmitter Modules
- WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied software
- WTS-BS-1-HA Wireless Handheld Display for multiple transmitters
- Customer PC or Laptop

Furniture Fatigue Cycle Testing

Load Cell

Industry: CPG

Summary

Customer Challenge

To meet safety protocols in relation to the manufacturing of various furniture products, fatigue testing, shock testing, and proof testing must be rigorously performed before diffusion into the marketplace, and into the homes of consumers. Force testing on furniture products are critical in determining the posted max loads in order to protect manufacturers from liability due to damages that might result from the misuse of those products and overloading.

Interface Solution

Using an Interface Model SSMF Fatigue Rated S-Type Load Cell along with Interface Model 9890 Strain Gage, Load Cell, & mV/V Indicator provides a solution that measures the force being applied in fatigue cycle testing of a furniture product, in this case testing the rocking mechanism in an office chair. Unlike other similar load cells, the Model SSMF is fatigue rated making it highly suitable for fatigue testing. No fatigue failure of any fatigue-rated Interface load cell, used within it's ratings, has ever been reported.

Results

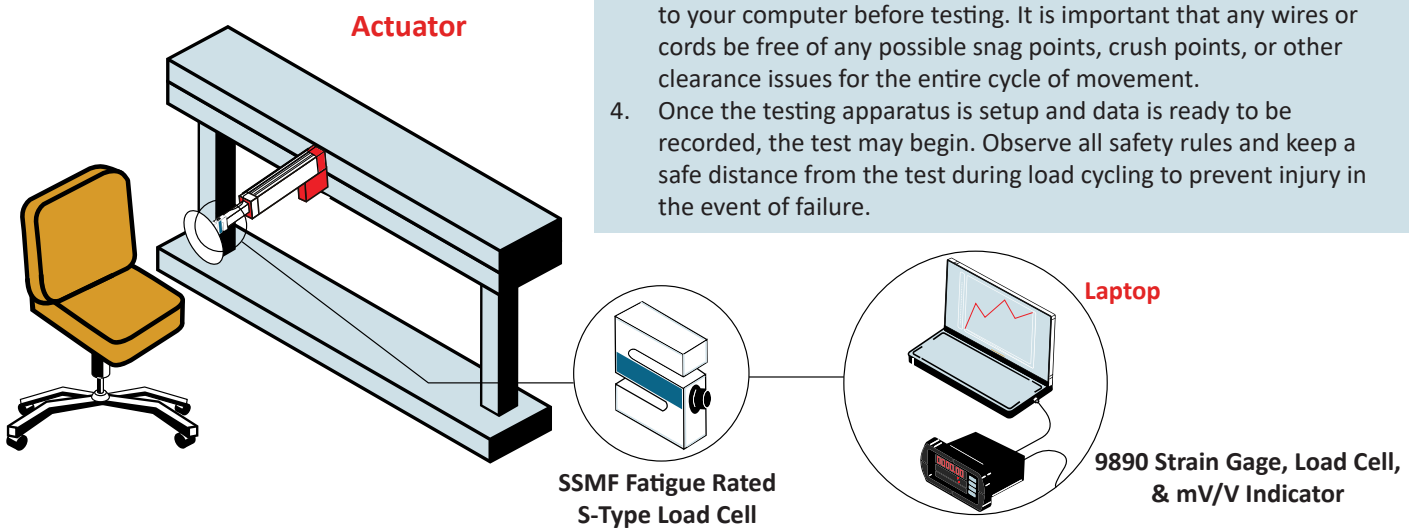
The furniture manufacturer was able to obtain accurate data about the rocking mechanism the office chair as it was fatigue cycled into failure. Adjustments were made to the design to improve the safety and life of the furniture, ensuring product quality and protecting the manufacturer from future liability.

Materials

- SSMF Fatigue Rated S-Type Load Cell
- 9890 Strain Gage, Load Cell, & mV/V Indicator, which comes standard with logging and configuration software

How It Works

1. Determine the feature on the product to be tested, and build an apparatus that will focus loads into that area.
2. Once the load applicators or cylinders are in place, install the SMF Fatigue Rated S-Type Load cell somewhere along the direct line of force between the cylinder and the load affected area.
3. To read the load forces, connect the 9890 to your load cell and to your computer before testing. It is important that any wires or cords be free of any possible snag points, crush points, or other clearance issues for the entire cycle of movement.
4. Once the testing apparatus is setup and data is ready to be recorded, the test may begin. Observe all safety rules and keep a safe distance from the test during load cycling to prevent injury in the event of failure.



Golf Ball Tee
Interface Mini™

Industry: CPG

Summary

Customer Challenge

A customer wants to ensure their golf ball automatic tee mechanism is working for their consumers- both buying their tee's for home use or for golfing ranges. They need a system that will sense the presence of a golf ball, which will trigger and automatically dispense new golf ball to the tee.

Interface Solution

Interface's WMC Sealed Stainless Steel Miniature Load Cell can be installed within the golf tee, which would measure the golf balls pressure on the tee when loaded or unloaded. This load cell is electrically connected to the motor which initiates the cycle to release another ball onto the tee. Force measurements can be measured using the 9330 High Speed Data Logger when connected to the customer's PC or laptop.

Results

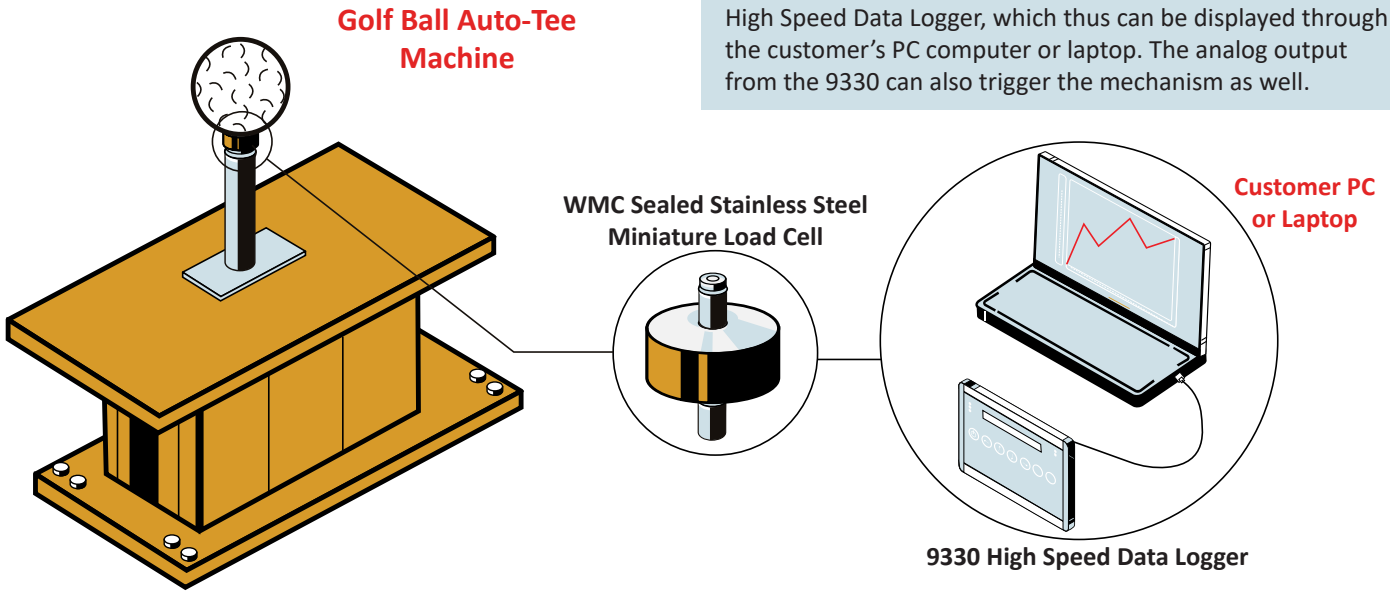
With Interface's products, the customer was provided a force solution that was able to measure the presence of a golf ball on their auto-tee machine.

Materials

- WMC Sealed Stainless Steel Miniature Load Cell
- 9330 High Speed Data Logger
- Customer PLC (Programmable Logic Controller)
- Customer PC or Laptop

How It Works

1. The WMC Sealed Stainless Steel Miniature Load Cell is installed into the golf tee. It will sense the pressure of the golf ball when it is dispensed or removed.
2. When the WMC senses no pressure, it will trigger the tee's motor to dispense a new ball onto the tee to be hit.
3. The forces from the WMC can be measured using the 9330 High Speed Data Logger, which thus can be displayed through the customer's PC computer or laptop. The analog output from the 9330 can also trigger the mechanism as well.



Golf Club Swing Accuracy
Wireless Telemetry System

Industry: CPG

Summary

Customer Challenge

Golfers undergoing training or practice wants a system that will monitor and record their striking accuracy and swing movement.

Interface Solution

Interface can create a custom made SSB Sealed Beam Load Cell that can be attached in line with the golf handle. When a golf ball is struck, force measurements are recorded, logged, and graphed using the WTS-AM-1E Wireless Strain Bridge Transmitter. The results will transmit directly to the WTS-BS-6 Wireless Telemetry Dongle Base Station when connected to the customer's PC or laptop.

Results

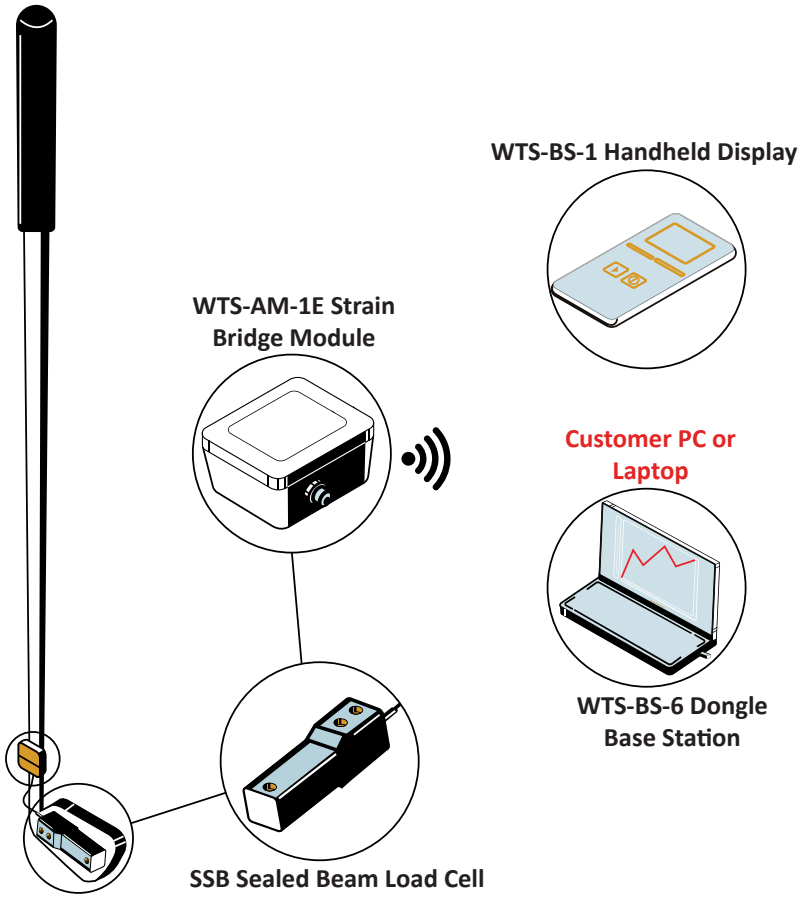
The customer was able to successfully record, graph, and log a golf player's striking accuracy and swing movement with Interface's wireless force system.

Materials

- SSB Sealed Beam Load Cell
- WTS-AM-1E Wireless Strain Bridge Transmitter Module
- WTS-BS-6 Wireless Telemetry Dongle Base Station
- WTS-BS-1 Handheld Display
- Customer PC or Laptop

How It Works

1. The SSB Sealed Beam Load Cell is installed in-line with the gold club handle. When a player strikes a golf ball, the SSB will also be struck.
2. The SSB is connected to the WTS-AM-1E Wireless Strain Bridge Transmitter where force results are collected.
3. It is then transmitted to the WTS-BS-6 Wireless Telemetry Dongle Base Station where the results are recorded, graphed, and logged when connected to the customer's PC or laptop. The customer also has the option to have the results displayed to the WTS-BS-1 Handheld Display.



Headset Manufacturing

Interface Mini™

Industry: Manufacturing

Summary

Customer Challenge

During headset manufacturing, the headsets are assembled in multiple steps. Load cells are needed during the manufacturing process for assembly verification, ensuring all parts of the headset such as cables, microphones, and other components are assembled correctly and securely.

Interface Solution

Interface's LWPF1 Press Force Load Washers can be installed into machines that require compression or pressing components together during the headset manufacturing process. The LWPF1's will be able to monitor and read the correct amount of force it takes to press components of the headset together. Results were monitored using the INF-USB3 Universal Serial Bus Single Channel PC Interface Module.

Results

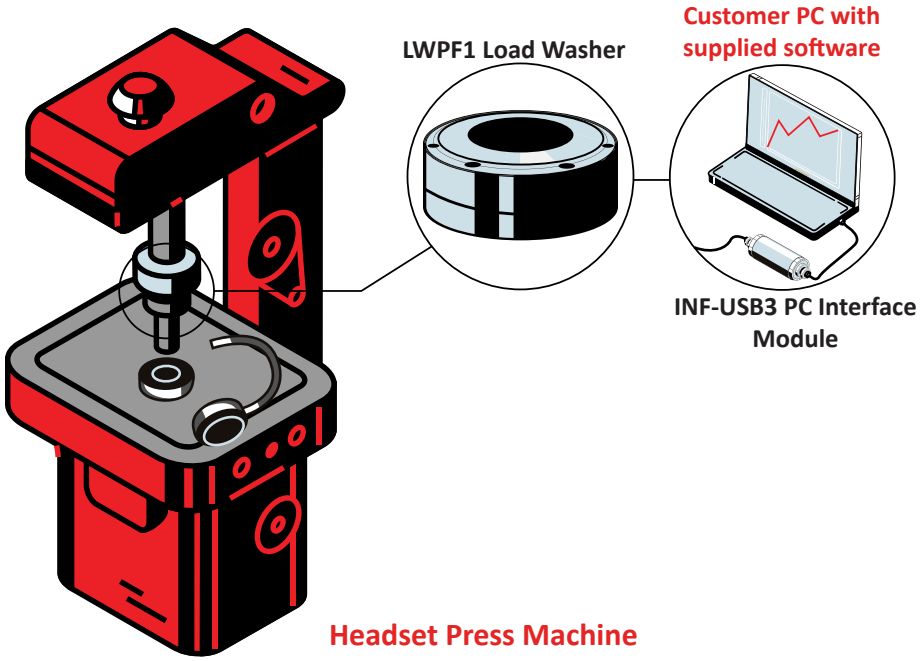
Interface's LWPF Press Force Load Washers successfully measured the forces of different machines during the headset manufacturing process.

Materials

- LWPF1 Press Force Load Washers
- INF-USB3 Universal Serial Bus Single Channel PC Interface Module with supplied software
- Customer press machine
- Customer PC

How It Works

1. Multiple LWPF1 Press Force Load Washers are installed into machines that use compressive forces, such as trademark stamping and headset molds.
2. The force results were monitored when connected to the INF-USB3 Universal Serial Bus Single Channel PC Interface Module.



Ice Machine Weighing
Bluetooth® Telemetry System
Industry: CPG

Summary

Customer Challenge

A manufacturer would like to check the amount of ice in their ice machines. They want to ensure it is working properly for future consumers. If the amount is below the desired weight, they want it to notify when to add more.

Interface Solution

Interface suggests using their Bluetooth® Telemetry System as an easy wireless solution to this application. Four SSB Sealed Beam Load Cells are mounted to the feet of the ice machine, and connected to the BTS Bluetooth Telemetry System. Force results are wirelessly transmitted to the customer's using the BTS Mobile App.

Results

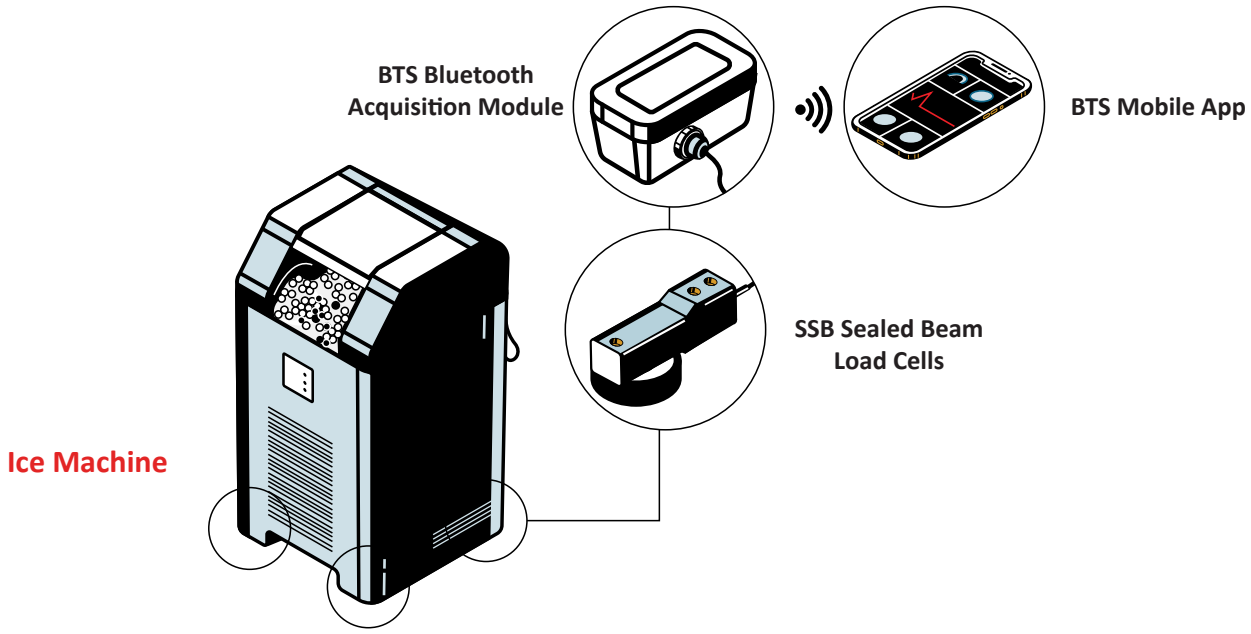
Interface's Bluetooth® Telemetry System successfully measured the ice machine's weight and wirelessly transmitted it to the customer's phone for quick and immediate results.

Materials

- Four SSB Sealed Beam Load Cells
- BTS Bluetooth® Telemetry System
- BTS Mobile App
- Customer's phone

How It Works

1. Four SSB Sealed Beam Load cells are mounted to the feet of the ice machine.
2. When connected to the BTS Bluetooth® Telemetry system, the force results are transmitted wirelessly to the customer's phone.
3. The customer is able to remotely view the weight of the ice machine.



Mountain Bike Shocks Testing
Load Cell

Industry: CPG

Summary

Customer Challenge

A mountain bike manufacturing company wants to test the durability of the forks on the front of their bikes, and the rear shocks of their bikes as well. They want to test the front suspension, and ensure that the bikes shocks absorption is working properly for bike riders.

Interface Solution

Interface suggests installing the 1000 High Capacity Fatigue-Rated LowProfile™ Load Cell in a fatigue frame using the company's bike forks. The forks undergo a fatigue test for a number of hours. Test results from the 1000 High Capacity Fatigue-Rated LowProfile™ Load Cell will be sent to the INF-USB3 Universal Serial Bus Single Channel PC Interface Module where the customer can view, log, and graph the results on their PC computer or laptop with provided software.

Results

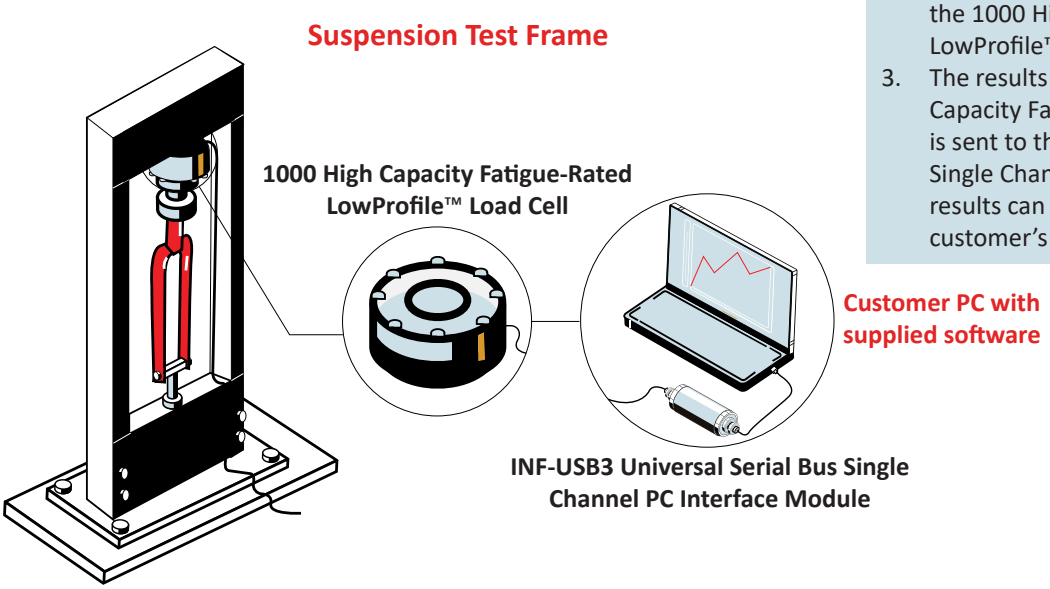
The customer was able to test the bike's front and rear shocks using Interface's products. They determined if there were any weak spots in the forks or if it was working properly.

Materials

- 1000 High Capacity Fatigue-Rated LowProfile™ Load Cell
- INF-USB3 Universal Serial Bus Single Channel PC Interface Module
- Customer's PC or Laptop

How It Works

1. The 1000 High Capacity Fatigue-Rated LowProfile™ Load Cell is attached to the actuator of the fatigue testing machine.
2. The bike's forks undergoes a fatigue cycling test where force results are collected by the 1000 High Capacity Fatigue-Rated LowProfile™ Load Cell.
3. The results captured by the 1000 High Capacity Fatigue-Rated LowProfile™ Load Cell is sent to the INF-USB3 Universal Serial Bus Single Channel PC Interface Module, where results can be graphed and logged on the customer's PC with provided software.



Mouse Touch-Pad Force
S-Type
Industry: CPG

Summary

Customer Challenge

A laptop manufacturer wants to test their mouse touch-pads. They want to ensure it is functioning properly for future consumers, thus measuring the right amount of sensitivity when touched. They need a system that measures the force it takes for the mouse pad to activate a response on the laptop.

Interface Solution

Interface suggests using the SMTM Micro S-Type Load Cell, from their Interface Mini™ line. The SMTM can be installed in the customer's actuator test rig. The SMTM will record the amount of force it takes to press on the track-pad and create a response, on different areas of the track-pad. The actuator will aid with tactile feedback by providing movements such as dragging or creating friction. The measurements can be captured using the 9330 Battery Powered High Speed Data Logging Indicator through an SD card, or another laptop directly.

Results

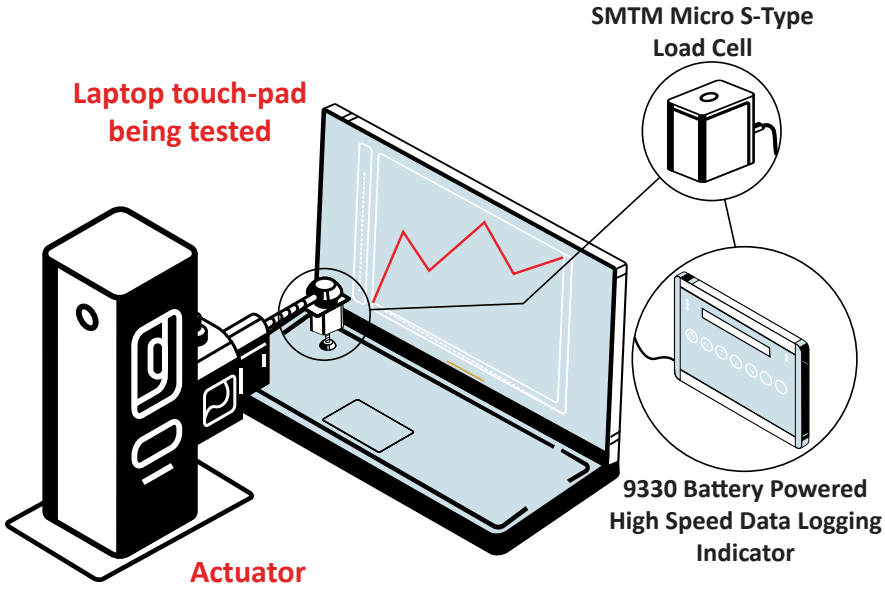
The SMTM Micro S-Type Load Cell was able to measure the forces applied to the mouse touch-pad at different locations. Interface's products successfully measured the forces needed to make the mouse touch-pad create a response.

Materials

- SMTM Micro S-Type Load Cell
- 9330 Battery Powered High Speed Data Logging Indicator
- BlueDAQ Software
- Customer's touch-pad being tested
- Customer's Actuator test rig

How It Works

1. The SMTM Micro S-Type Load Cell is installed in the customer's actuator test rig.
2. The actuator uses the SMTM and presses on the mouse's touch-pad at different locations.
3. The SMTM is connected to the 9330 Battery Powered High Speed Data Logging Indicator, with included BlueDAQ software, where force results from the touch-pad test can be captured using an SD card, then displayed on another PC or laptop.



Pots and Pans Press
Load Cells

Industry: Manufacturing, CPG

Summary

Customer Challenge

During the manufacturing processes for aluminum pots and pans, this involves sheets of aluminum that are spun and pressed into the required shapes. A load cell is needed to measure the force exerted during the shaping process.

Interface Solution

Interface's 1210 Standard Precision Universal LowProfile™ Load Cell is installed into the press machine that shapes the pots and pans. Force results a synced through the INF-USB3 Universal Serial Bus Single Channel PC Interface Module. These results can be displayed on the customer's PC with supplied software.

Results

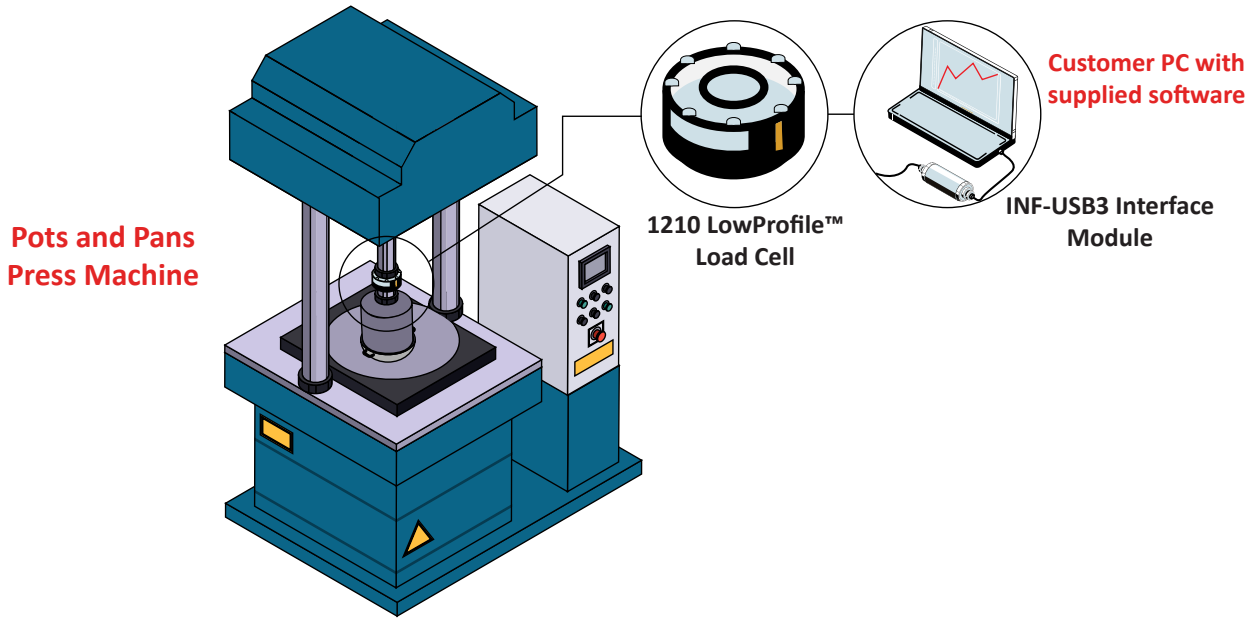
Interface's LowProfile™ load cell and instrumentation successfully and accurately measured the forces exerted during the pots and pans manufacturing process.

Materials

- 1210 Standard Precision Universal LowProfile™ Load Cell
- INF-USB3 Universal Serial Bus Single Channel PC Interface Module with supplied software
- Customer computer
- Customer pots and pan press machine

How It Works

1. The 1210 Standard Precision Universal LowProfile™ Load Cell is installed into the mechanism that presses the aluminum sheets.
2. An aluminum sheet is pressed and shaped into a pot or pan.
3. The 1210 measures the forces exerted, and is sent to the INF-USB3 Universal Serial Bus Single Channel PC Interface Module where the force results are displayed, logged, and graphed on the customer's computer.



Printer Cartridge Seal
Multi-Axis
Industry: CPG

Summary

Customer Challenge

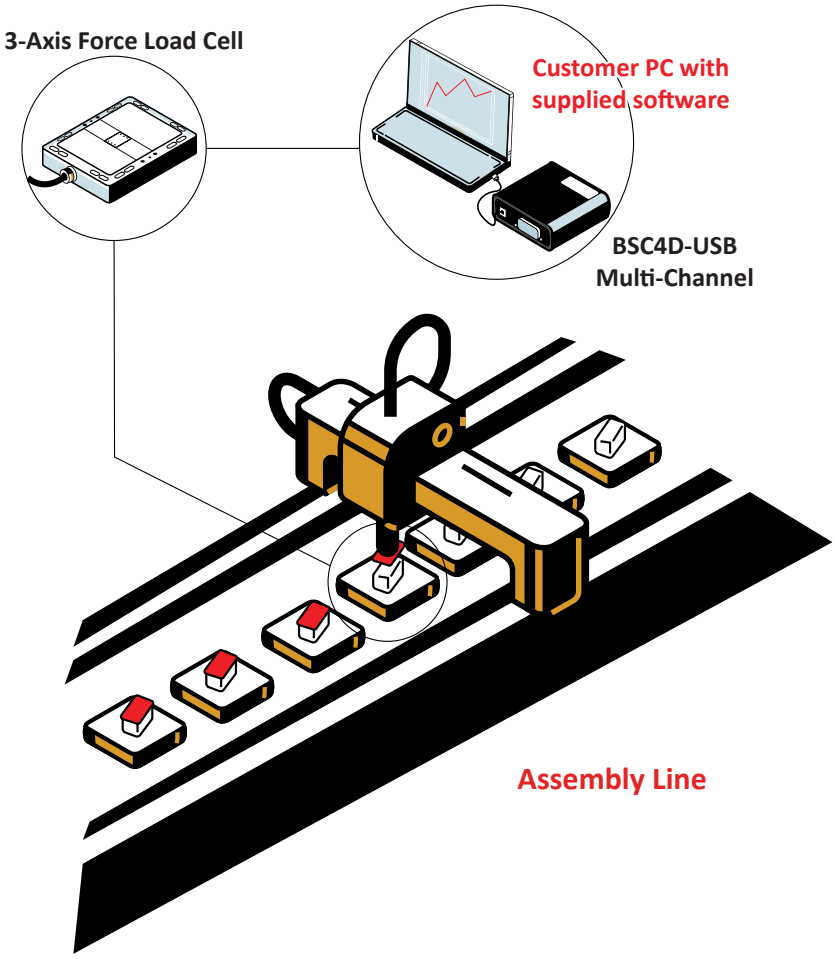
An ink manufacturer wants to ensure there is a proper seal between their ink cartridge caps and the cartridge body, in order for it to work effectively in their printers and for consumers buying it for themselves. A bad seal can cause leaks, clogging, and overall a poor performance for their printers.

Interface Solution

Interface's solution is to measure the pressure exerted on the cartridge cap by installing the 3A120 3-Axis Load cell under the plate during the automatic production line process. Results will be logged, graphed, and stored when the customer's PC or laptop is connected to the BSC4D Multi-Channel PC Interface Module with supplied BlueDAQ software.

Results

The ink manufacturer was able to determine the exact amount of force it took to seal their ink cartridge caps onto the cartridge bodies to prevent any leaks or clogging.



Materials

- 3A120 3-Axis Load cell
- BSC4D Multi-Channel PC Interface Module with supplied BlueDAQ software
- Customer PC or laptop

How It Works

1. The 3A120 3-Axis Force Load Cell is fixed under a plate on the assembly line.
2. On the assembly line, a robotic arm pushes the ink cartridge cap onto the ink cartridge body. The forces are measured by the 3-Axis Load cell.
3. Force results will be logged, graphed, and stored when the customer's PC or laptop is connected to the BSC4D Multi-Channel PC Interface Module with supplied BlueDAQ software.

Self Check Out Kiosk

Load Cell

Industry: CPG

Summary

Customer Challenge

A manufacturer wants to test their self check out kiosks. They want to ensure its weighing feature is functioning properly, with the right amount of sensitivity when future customers want to weigh products like fruits or vegetables. They need a system that measures the force it takes for the self check out kiosk, in order to activate a response for consumers.

Interface Solution

Interface suggests installing a SSB Load Beam Load Cells under the plate where items are weighed. When connected to the WTS-AM-1E Wireless Strain Bridge Transmitter Module, force results are wireless transmitted to the WTS-BS-6 Wireless Telemetry Dongle Base Station on the customer's PC. Data can be logged and graphed with included Log100 software.

Results

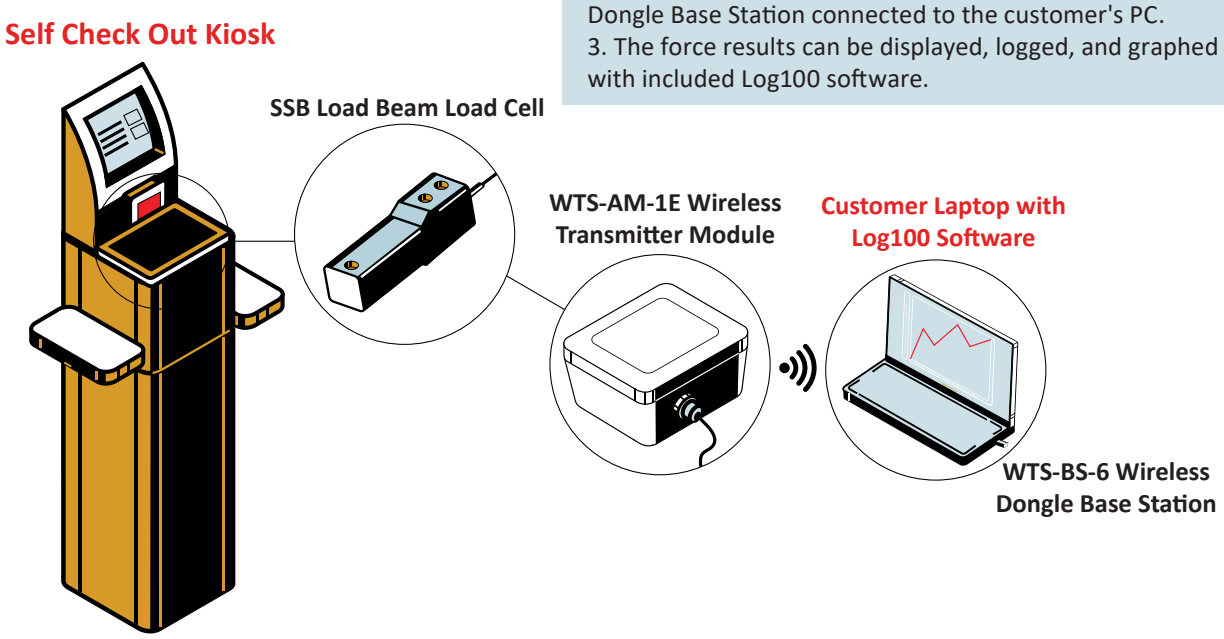
Interface's wireless force system successfully measured the amount of force it took for the self check out kiosk to react and ensure it is functioning properly.

Materials

- SSB Load Beam Load Cell
- WTS-AM-1E Wireless Strain Bridge Transmitter Module
- WTS-BS-6 Wireless Telemetry Dongle Base Station
- Log100 Software
- Customer PC or Laptop

How It Works

1. The SSB Load Beam Load Cell is installed under the weighing platform of the self check out kiosk. A load is put on top of the weighing platform, and the SSB measures the forces applied as the kiosk reacts to the load.
2. When connected to the to the WTS-AM-1E Wireless Strain Bridge Transmitter Module, the force results are wireless transmitted to the WTS-BS-6 Wireless Telemetry Dongle Base Station connected to the customer's PC.
3. The force results can be displayed, logged, and graphed with included Log100 software.



Smart Shoe Gait Analysis

Interface Mini™

Industry: CPG

Summary

Customer Challenge

A customer has created a smart shoe that will sensor and monitor a person's gait, or pattern of movement in real-time. Gait analysis monitors performance by athletes, by tracking and studying the human movement. Sensors are needed for the smart shoe in order to gather data on foot movements.

Interface Solution

Interface's LBM Compression Load Button Load Cell can be installed in the sole of the shoe. When connected to a WTS-AM-1E Wireless Strain Bridge Transmitter Module, the movement results is wirelessly transmitted to the customer's PC through the WTS-BS-6 Wireless Telemetry Dongle Base Station. With supplied Log100 software, gait results are measured, monitored, and recorded.

Results

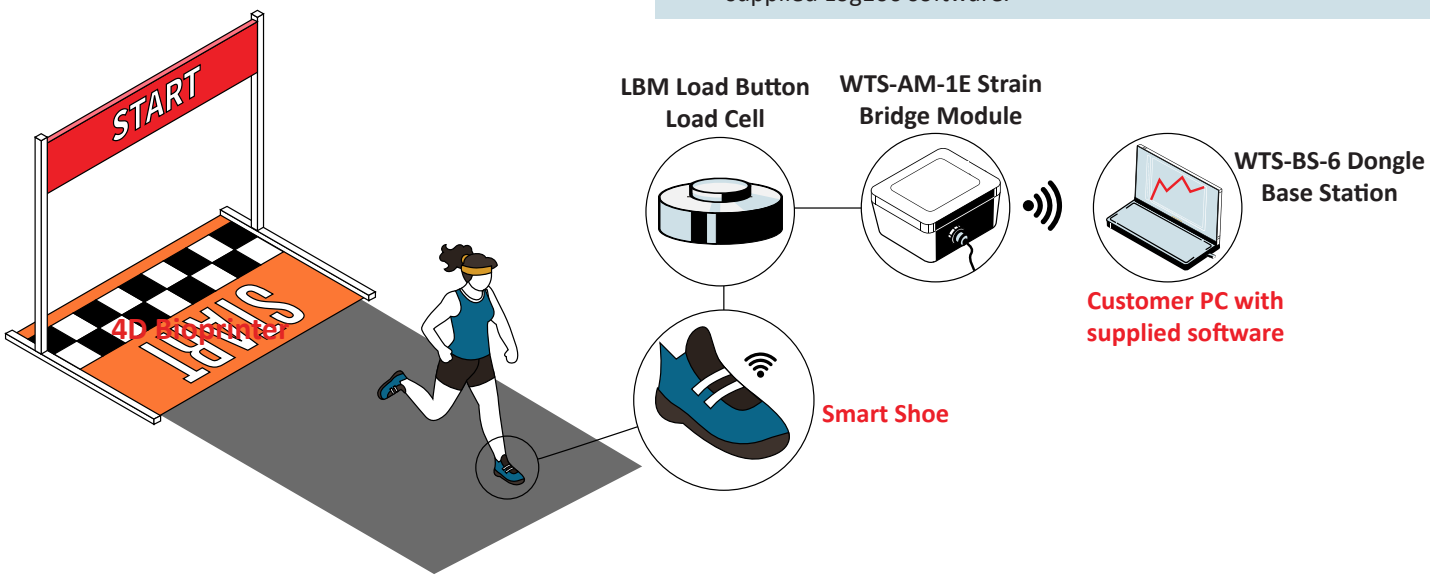
Interface's LBM Compression Load Button Load Cell successfully measured human movements such as balance, stride strength, foot pressure, and posture during the gait analysis.

Materials

- LBM Compression Load Button Load Cell
- WTS-AM-1E Wireless Strain Bridge Transmitter Module
- WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied Log100 software
- Customer PC or Laptop

How It Works

1. The LBM Compression Load Button Load Cell can be installed in the sole of the shoe. TheLBM is connected to a WTS-AM-1E Wireless Strain Bridge Transmitter Module.
2. An athlete wears the smart shoe containing the load cell. A study is conducted on the athlete's movements such as balance, stride, strength, foot pressure, and posture.
3. Data results are sent wirelessly to the customer's PC through the WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied Log100 software.



Smartwatch Force Testing
Multi-Axis

Industry: CPG

Summary

Customer Challenge

Smartwatches offer users a blend of convenience and innovation. Interaction forces for the user must be precise as different types of tasks are performed such as pressing, scrolling, and swiping. A force test is needed during the development stage of smartwatches, verifying and validating its interaction design for users.

Interface Solution

Interface's 3AR Series Round 3-Axis Load Cell is adept at measuring and capturing forces by the user's fingers across multiple axes (Fx, Fy, and Fx). Engineers will be able to determine and change sensitivity settings based on force results. Results are fed to the BX8-AS BlueDAQ Series Data Acquisition System and to the connected laptop where it is displayed with included BlueDAQ software.

Results

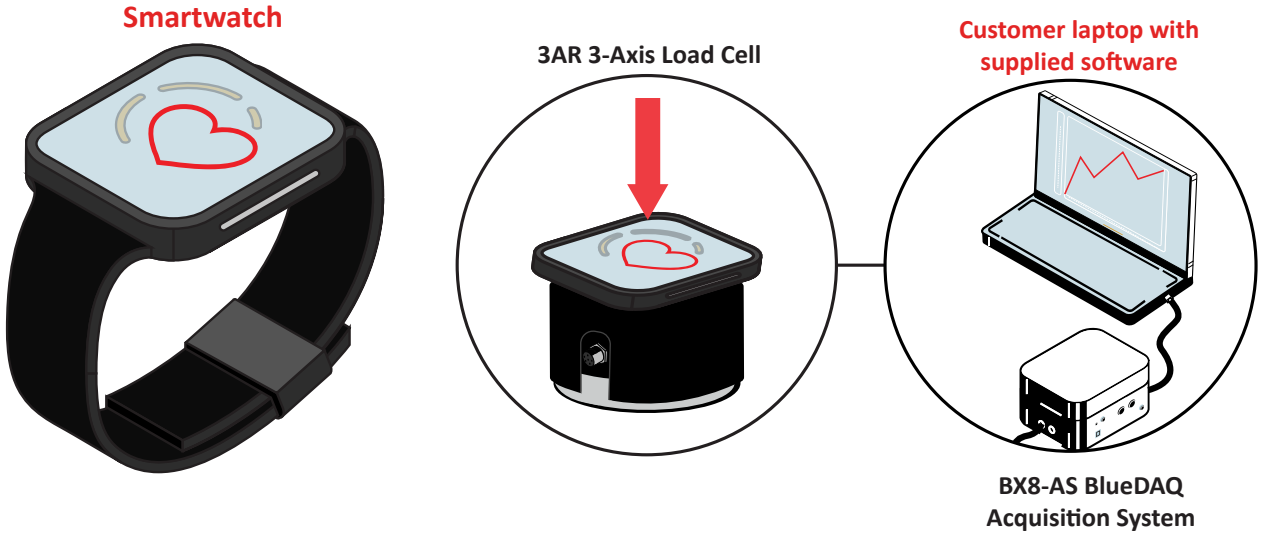
Interface's 3-Axis load cell successfully measured and captured the three axes (Fx, Fy, and Fx) during pressing, scrolling, and swiping tests during the smartwatch development stage.

Materials

- 3AR Series Round 3-Axis Load Cell
- BX8-AS BlueDAQ Series Data Acquisition System with supplied BlueDAQ software
- Smartwatch undergoing force test
- Customer's computer or laptop

How It Works

1. The smartwatch is placed on top of the 3AR Series Round 3-Axis Load Cell. Different types of force tests are conducted such as pressing, swiping, and scrolling.
2. The 3AR Series Round 3-Axis Load Cell captures the interaction forces across three axes (Fx, Fy, and Fx).
3. Data is captured and recorded through the BX8-AS BlueDAQ Series Data Acquisition System using supplied BlueDAQ software. Results are displayed when connected to the customer's computer.



Smartwatch Milling
Multi-Axis

Industry: CPG

Summary

Customer Challenge

Smartwatch milling is a precise manufacturing process where machines meticulously form parts of the smartwatch into a desired shape. In order to maintain precision and quality, forces of the milling machine must be monitored and controlled to produce consistent smartwatch components.

Interface Solution

Interface's 6AXX 6-Axis Load Cell can be installed into the milling machine. As the machine cuts and create smartwatch components, the multi-axis load cell collects data on six axes (Fx, Fy, Fz, Mx, My, Mz). When connected to the BX8-HD44 Data Acquisition, Data can be logged, graphed, and displayed when connected to a computer with supplied BlueDAQ software.

Results

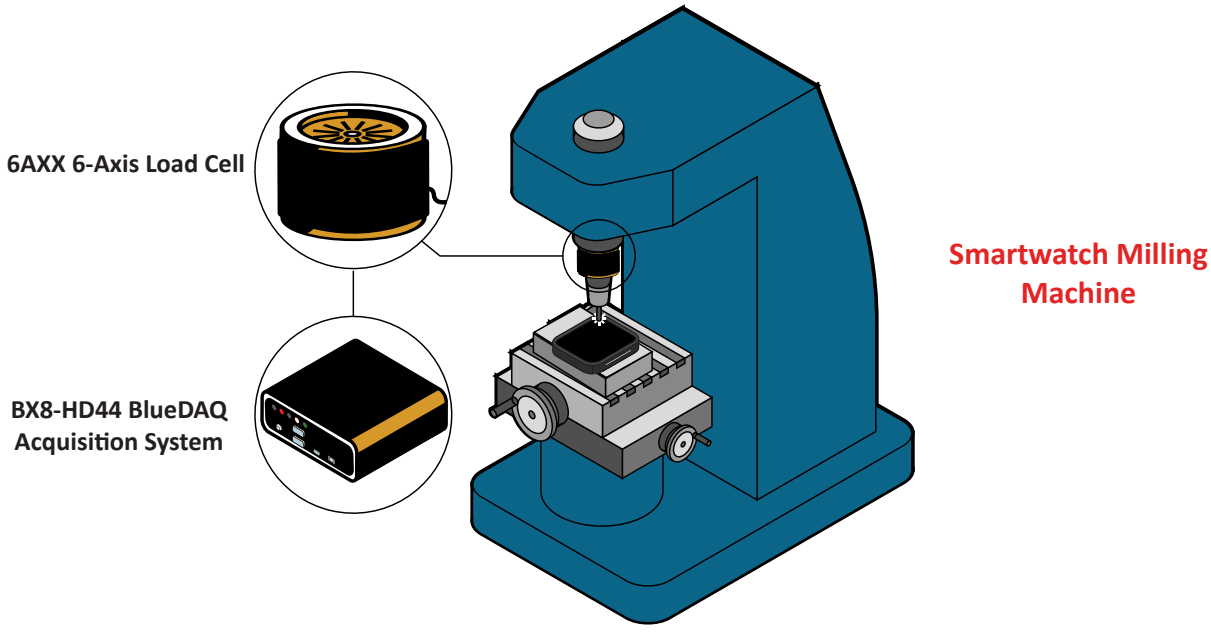
Interface's 6AXX 6-Axis Load Cell could measured and monitored all forces and torques (Fx, Fy, Fz, Mx, My, Mz) of the milling machine as it creates smartwatch components. The machine produces consistent and controlled smartwatch components.

Materials

- 6AXX 6-Axis Load Cell
- BX8-HD44 BlueDAQ Series Data Acquisition System with included BlueDAQ software
- Customer milling machine
- Customer computer or laptop

How It Works

1. The 6AXX 6-Axis Load Cell is installed in the milling machine.
2. The milling machine cuts and drills components of the smartwatch, and the load cell captures data on six axes (Fx, Fy, Fz, Mx, My, Mz).
3. When connected to the BX8-HD44 BlueDAQ Series Data Acquisition System forces can be monitored, logged, graphed, and displayed with supplied BlueDAQ software.



Snack Weighing and Packaging Machine

Interface Mini™

Industry: CPG

Summary

Customer Challenge

A snack manufacturing brand wants to weigh the amount of their snacks that is automatically dispersed into the bags during the packaging process. In this case, they want to weigh their potato chips being packaged. The company wants to ensure the potato chips are at the exact weight needed due to regulatory standards in order to be distributed out to consumers in the public.

Interface Solution

Interface's solution is to use multiple SPI Platform Scale Load Cells, and install it to the potato multi-head weigher and packaging machine. The SPI Platform Scale Load cells are installed inside of the mount that attaches the head weigher to the packaging machine. Force results from the potato chips are read by the load cells and sent to the ISG Isolated DIN Rail Mount Signal Conditioner, where the customer is able to control the automated production from their command center.

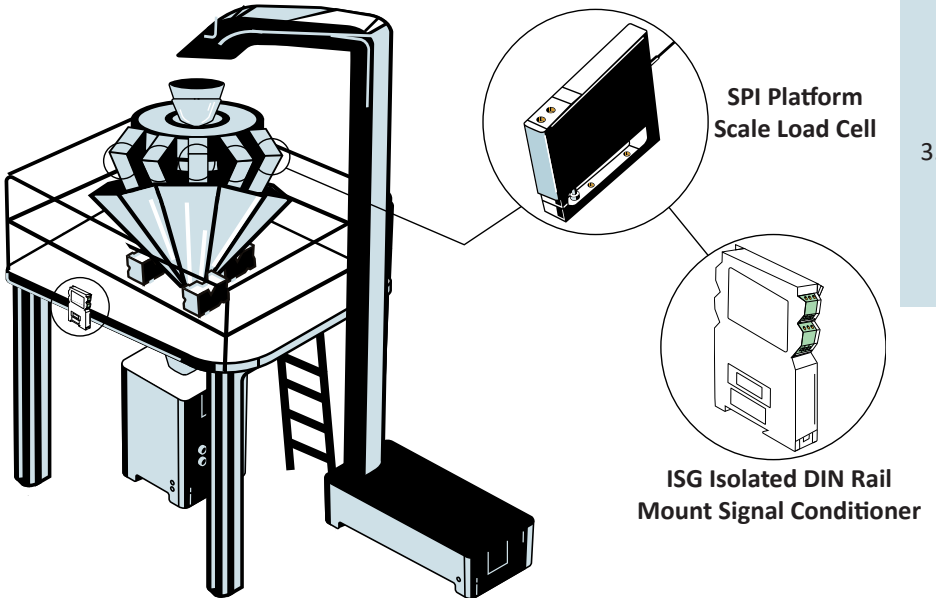
Results

The customer was able to determine the weight of the potato chips being distributed into their bags with highly accurate results. They also were able to control the automated production process with the provided instrumentation. They will use this same weighing method for other snacks that need to be packaged.

Materials

- Multiple SPI Platform Scale Load Cells
- ISG Isolated DIN Rail Mount Signal Conditioner

Snack Weighing and Packaging Machine



How It Works

1. Multiple SPI Platform Scale Load Cells are installed onto the insides of the head weighers of the packaging machines.
2. When potato chips are dispensed into the heads, the SPI Platform Scale Load Cells will measure the force applied to the head weighers, then the potato chips will be released and dispensed into the bag packaging process.
3. The force measurements can be read using the ISG Isolated DIN Rail Mount Signal Conditioner, where the customer is able to control the automatic production controls when connected to their command center.

Treadmill Force Measurement
Load Cell

Industry: CPG

Summary

Customer Challenge

A customer wants to measure the ground-reaction forces or GRF's during treadmill running. They want to measure and study the consumer's foot-strike patterns at different speeds. They also want to be able to record and graph the contact time, aerial time, and lower limb acceleration.

Interface Solution

Multiple of Interface's SSB Sealed Beam Load Cells can be installed under a metal platform, inside of the treadmill. The runner's foot-strike pattern data are picked up and displayed when the SSB's are connected to the JB104SS Junction Box. The total amount of force is displayed through the 480 Bidirectional Weigh Indicator.

Results

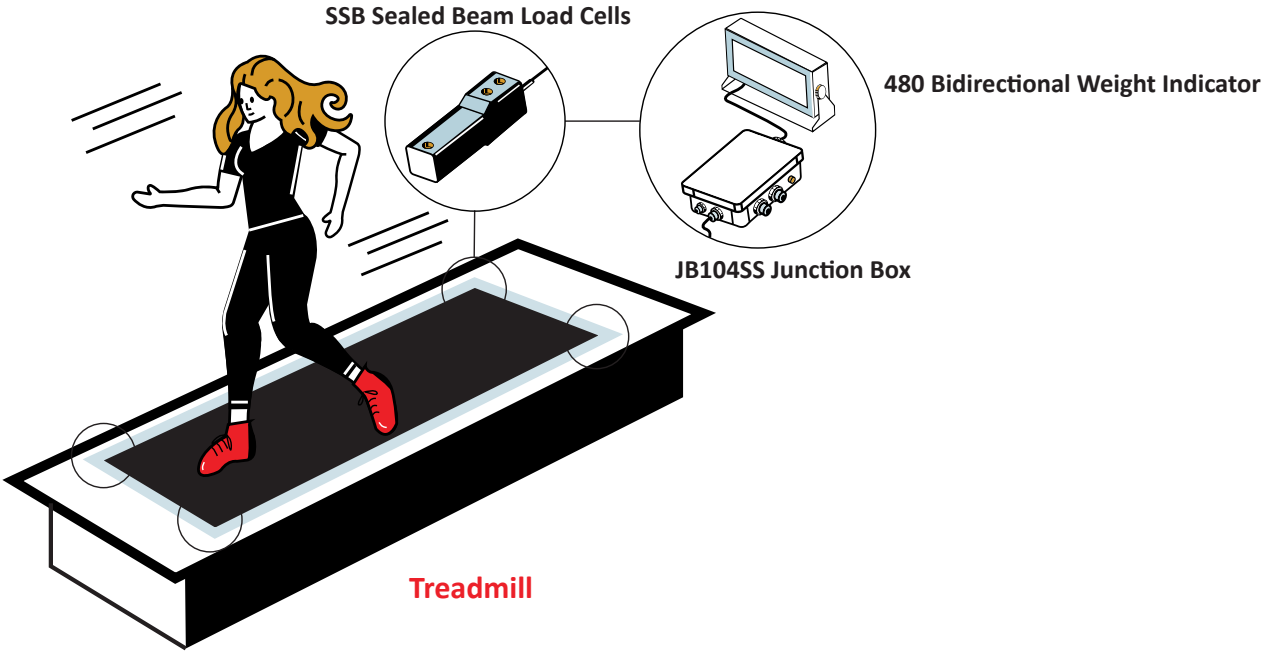
Interface's force solution system was able to help this customer measure the ground-force measurements of the runner on their treadmill test.

Materials

- Four SSB Sealed Beam Load Cells
- JB104SS Junction Box
- 480 Bidirectional Weight Indicator

How It Works

1. Four SSB Sealed Beam Load Cells are attached beneath a metal plate, which is then installed inside of the treadmill.
2. The runner runs on the treadmill at different speeds.
3. The runner's ground-force contact measurements are combined with the JBS104SS Junction box, and displayed through the 480 Bidirectional Weight Indicator.



Veterinary Weighing Scales

Load Cell and Interface Mini™

Industry: CPG

Summary

Customer Challenge

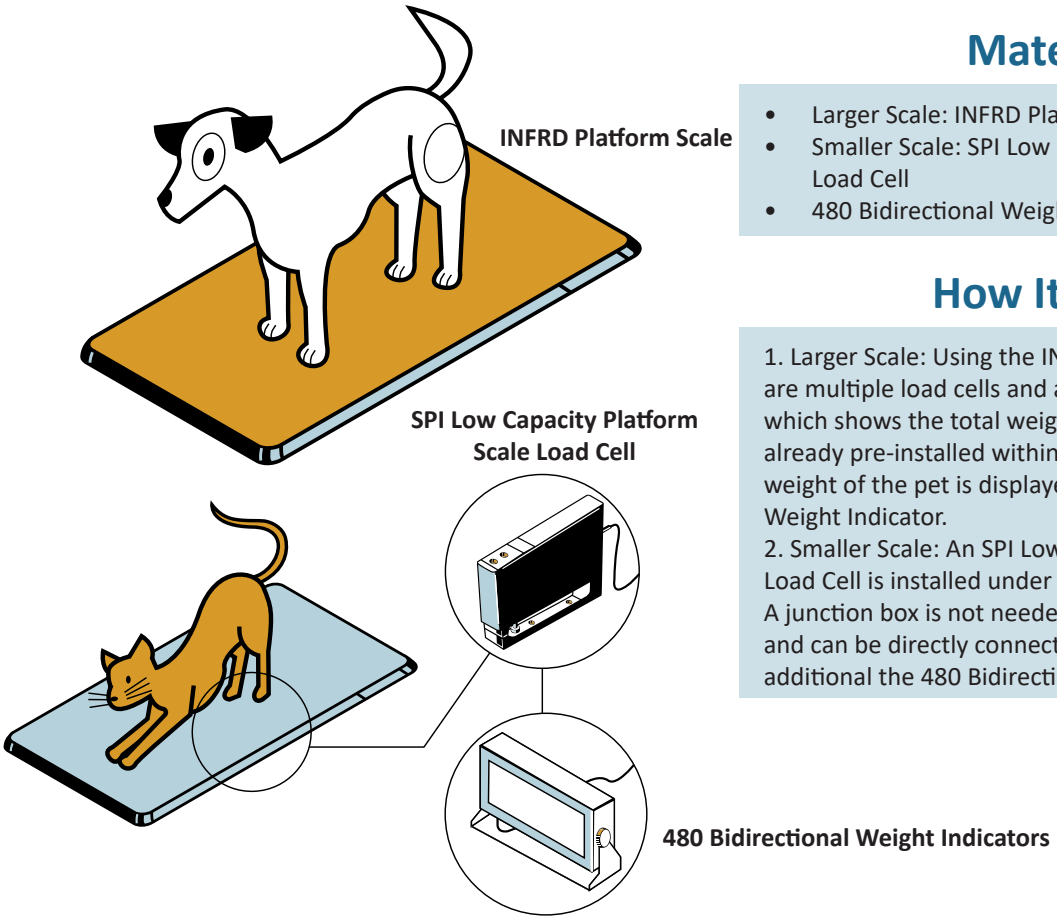
A manufacturer wants two weighing scales for consumers like veterinarians who want to weigh large and small animals.

Interface Solution

Interface suggests using two different solutions. For the smaller scale, Interface's SPI Low Capacity Platform Scale Load Cell would be perfect for smaller, and lighter animals. As for the larger scale, the INFRD Platform Scale with pre-installed load beams would work best. Both scales will need the 480 Bidirectional Weight Indicators to display the total weight of the animals being weighed.

Results

The veterinarian was able to easily and accurately weigh both large and small pets with both scales.



Materials

- Larger Scale: INFRD Platform Scale
- Smaller Scale: SPI Low Capacity Platform Scale Load Cell
- 480 Bidirectional Weight Indicators

How It Works

1. Larger Scale: Using the INFRD Platform Scale. There are multiple load cells and a JB104SS Junction Box, which shows the total weight of the load beams, already pre-installed within the platform. The total weight of the pet is displayed on the 480 Bidirectional Weight Indicator.
2. Smaller Scale: An SPI Low Capacity Platform Scale Load Cell is installed under a smaller metal plate. A junction box is not needed for the smaller scale, and can be directly connected and displayed to an additional the 480 Bidirectional Weight Indicator.

Water Bottle Dispensing and Weighing

Interface Mini™

Industry: CPG

Summary

Customer Challenge

A water bottle manufacturer wants to dispense the right amount of fluid into their bottles, and then weigh the water bottles to ensure it is at the labeled weight on their product packaging. This is both to minimize waste, but also to meet the standard requirements for consumers who will be purchasing their water bottles.

Interface Solution

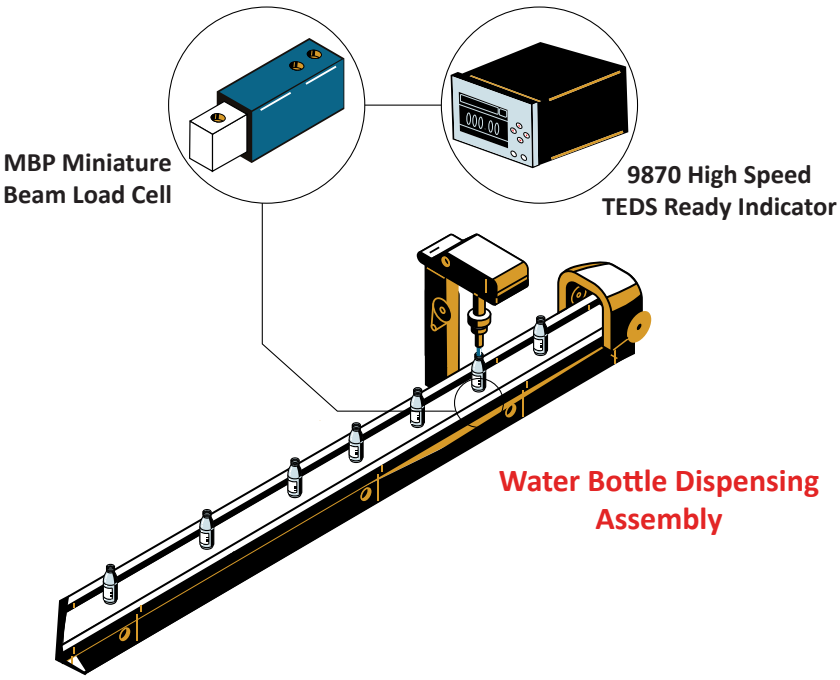
Interface suggests using the MBP Miniature Beam Load Cell, and attaching it under a plate or platform the water bottle is placed on while it is being filled with fluids. The force weight is measured by the MBP Miniature Beam Load Cell, and connected to the 9870 High Speed High Performance TEDS Ready Indicator where results are captures, displayed, and can be recorded by the customer based on their needs.

Results

The water bottle manufacturer received high accurate results of each water bottle being weighed in real time.

Materials

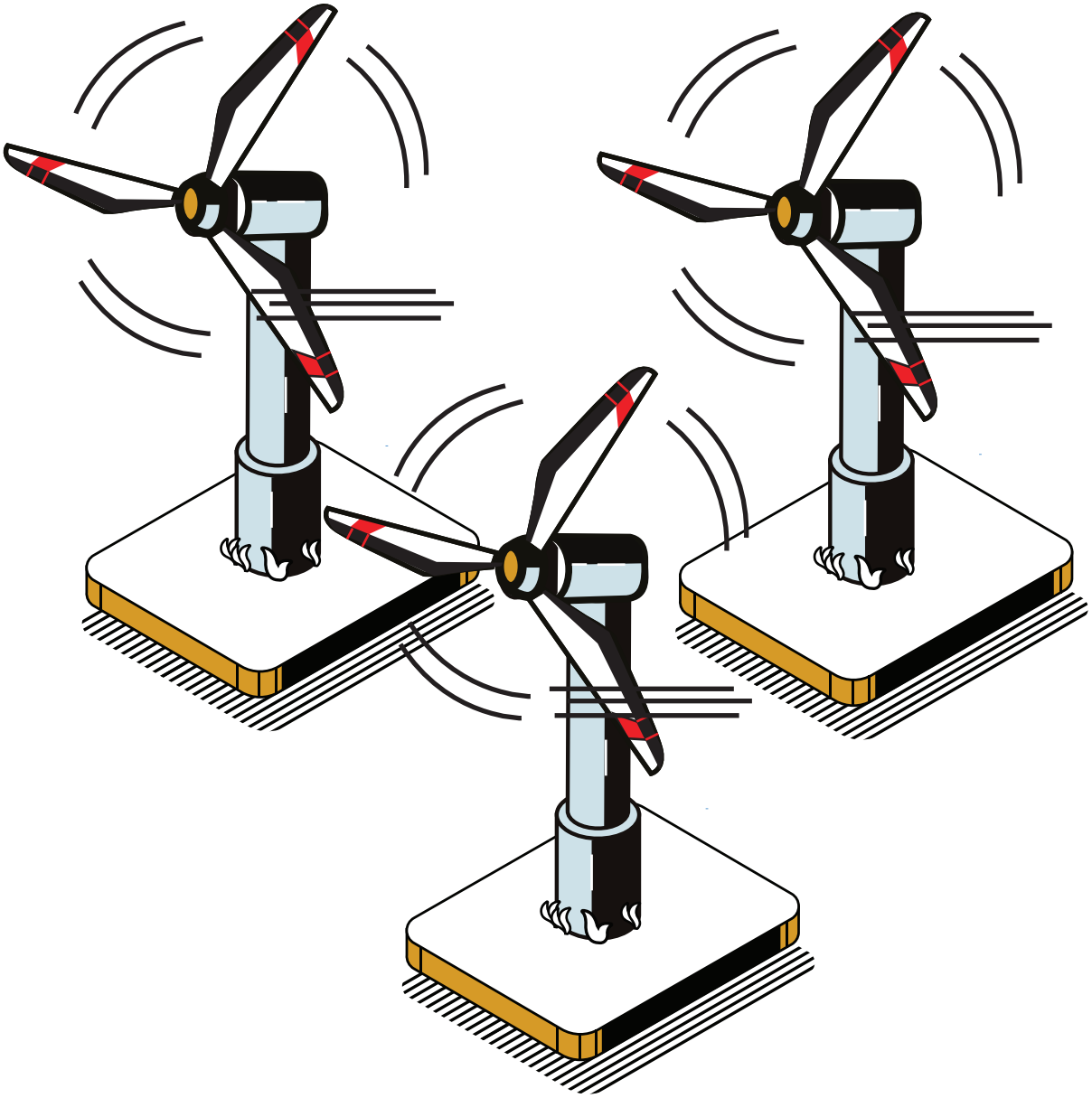
- MBP Miniature Beam Load Cell
- 9870 High Speed High Performance TEDS Ready Indicator
- Customer's Control System



How It Works

1. The MBP Miniature Beam Load Cell is installed under the mechanism that dispenses water into the water bottles, with a plate or platform on top.
2. After the fluid is dispensed into the water bottle, the MBP Miniature Beam Load Cell measures the forces applied.
3. Connected to the analog output of the customer's control center, the 9870 High Speed High Performance TEDS Ready Indicator will display and record highly accurate result.
4. If the bottle does not meet the standard weight requirements, the quality department will be notified that it needs to be quarantined and sent for review.

Energy



Crude Oil Weighing
Load Cells

Industry: Energy

Summary

Customer Challenge

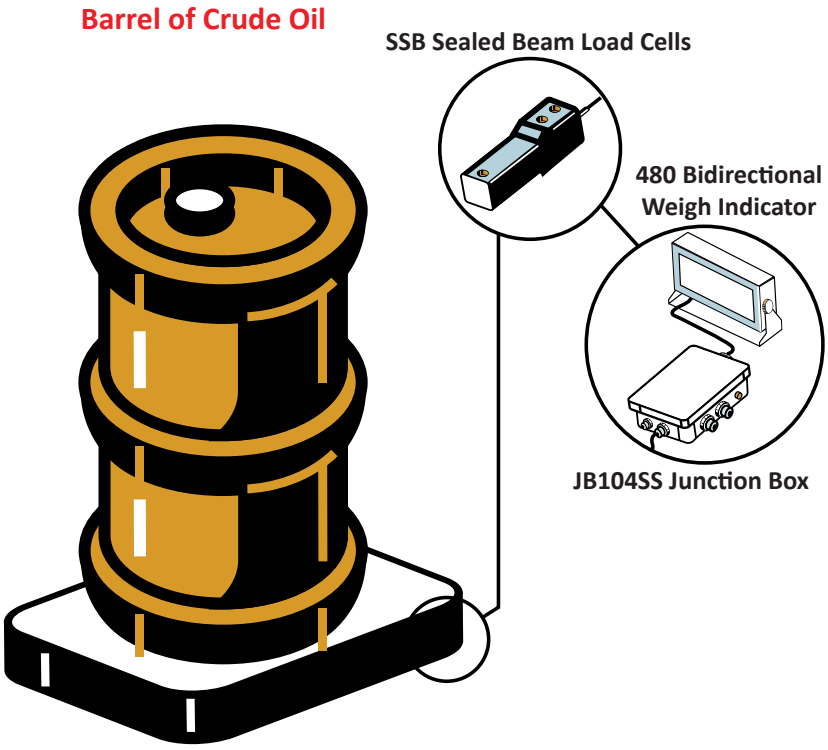
When oil is extracted from the ground, a refinement process follows to remove sediments and other impurities. After the filtering process, the crude oil needs to be weighed in order to be redistributed. A weighing system is needed to measure mass amounts of crude oil.

Interface Solution

Interface's solution is to bolt four SSB Sealed Beam Load Cells at the bottom of a metal platform. Barrels of crude oil are weighed, and the SSB Sealed Beam Load Cells will measure the force applied. With all four connected to JB104SS Junction Box, which is then connected to the 480 Bidirectional Weight Indicator, combined accurate weight results will be displayed.

Results

Interface's industrial weighing system accurately weighed the barrels of crude oil, so it can move onto the next process of distribution.



Materials

- Four SSB Sealed Beam Load Cells
- JB104SS Junction Box
- 480 Bidirectional Weight Indicator

How It Works

1. Four SSB Sealed Beam Load Cells are bolted to the bottom of a metal platform.
2. Barrels of crude oil are placed on the Interface's industrial scale, where it was weighed on the metal platform.
3. The multiple SSB's were wired together to a JB104SS Junction Box, which was then connected to the 480 Bidirectional Weight Indicator to measure the combined results of the four SSB Sealed Beam Load Cells.

Downhole Force Measurement
Load Cell

Industry: Energy

Summary

Customer Challenge

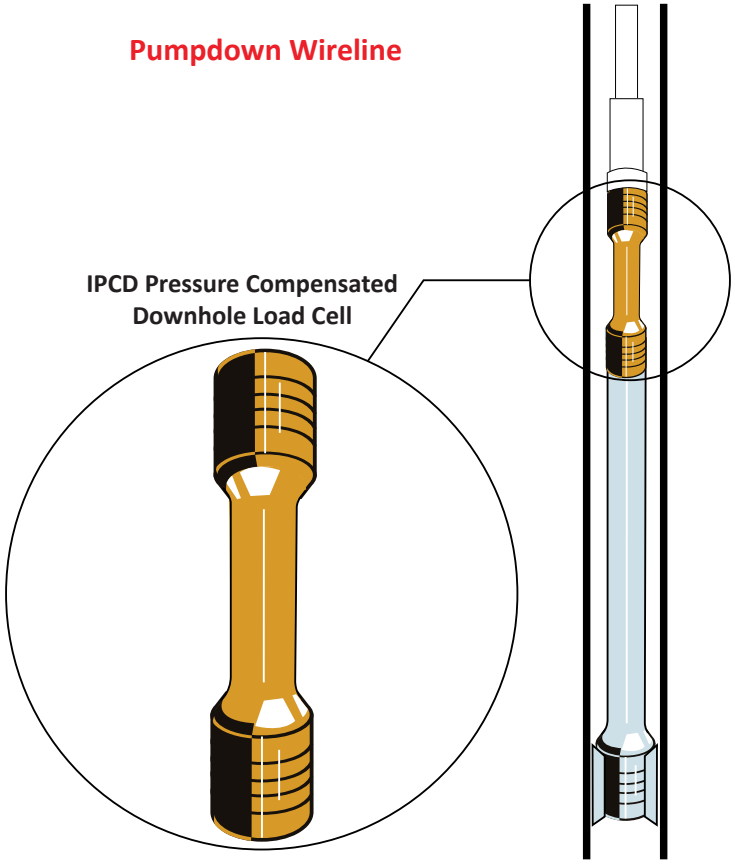
Deviated and lateral wells render topside measurements of little value. Successful pump down services require accurate tool string tension readings, downhole, at the source.

Interface Solution

The IPCD Pressure Compensated Downhole Load Cell is an accurate and reliable load cell that Interface has developed specifically for downhole tension and compression measurements in high temperate, high pressure well conditions. Featuring proprietary pressure and temperature compensation, precise tool string force measurements can be monitored real time through customer instrumentation.

Results

Customer was able to control pumping forces on the tool string with incredible accuracy. Regulating this process ensured service success without the risk of tool pump off, avoiding a devastating and expensive fishing operation.



How It Works

1. The IPCD Pressure Compensated Downhole Load Cell is integrated near the top of the tool string.
2. During pump down, the IPCD measures the tension between the cable head and the tool string.
3. Connected to the customer's instrumentation, actual cable head tension is closely monitored across any variation of temperature or pressure.

Materials

- IPCD Pressure Compensated Downhole Load Cell
- Customer Instrumentation

Electrolyzer and Fuel Cell Tie Rod Monitoring

Load Washer

Industry: Energy, OEM

Summary

Customer Challenge

Converting to renewable energy is one of the primary tools to fight climate change. Storage of energy is critical to make renewables work, and hydrogen, or its derivatives are a promising way to store power. Electrolyzers convert power to hydrogen, and fuel cells convert the hydrogen back to electricity. They are both made by stacking multiple anode and cathode plates and a membrane between each, and tie-rods hold them in place. A real-time monitoring system is needed to measure the tension of the tie rods in order to avoid costly preventive and unplanned maintenance shut downs.

Interface Solution

Interface suggests installing LWHP14 Precision Load Washer Load Cells connected to WTS-AM-1E Wireless Strain Bridge Transmitter Modules, under the bolts of the tightened tie rods. The WTS-AM-1E's are encased in a junction box enclosure. The LWHP's measure the tension between the plates from the tie rods, and the real-time results are transmitted wirelessly from the WTS-AM-1E's to the WTS-BS-6 Wireless Telemetry Dongle Base Station when connected to the customer's PC.

Results

Interface's load cell monitoring system successfully monitors the tie-rods tension in real time, thus preventing unnecessary costly preventive maintenance and unplanned shutdowns of the Electrolyzer.

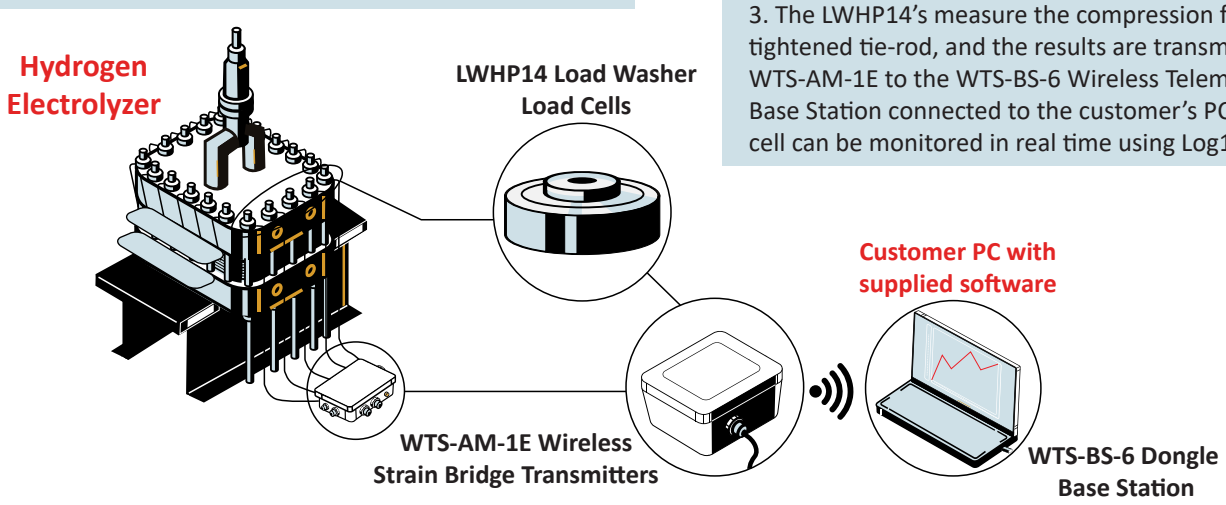
** This application note shows Interface base products. This true application used customized column load cells and instrumentation. Contact Interface team for a customized solution.*

Materials

- LWHP14 Precision Load Washer Load Cells
- WTS-AM-1E Wireless Strain Bridge Transmitter Modules in junction box enclosure
- WTS-BS-6 Wireless Telemetry Dongle Base Station
- Log100 Software
- Customer PC or Laptop

How It Works

1. LWHP14 Precision Load Washer Load Cells are installed under the bolts of tightened tie-rods around the Electrolyzer.
2. Each LWHP14 is connected to a WTS-AM-1E Wireless Strain Bridge Transmitter Module, which is all encased in a junction box.
3. The LWHP14's measure the compression forces from the tightened tie-rod, and the results are transmitted from the WTS-AM-1E to the WTS-BS-6 Wireless Telemetry Dongle Base Station connected to the customer's PC. Each load cell can be monitored in real time using Log100 software.



Fuel Pump Optimization - Rotary Torque

Torque Transducer

Industry: Energy, Industrial Automation

Summary

Customer Challenge

A nationally renowned race team was using a flow bench to measure fuel pump performance. They wanted to determine if they could reduce the power consumption of the pump by further analyzing the precise torque it produced.

Interface Solution

An Interface Model T25 High Speed Rotary Torque Transducer was integrated into the pump drive to directly measure the torque required to spin the pump.

Results

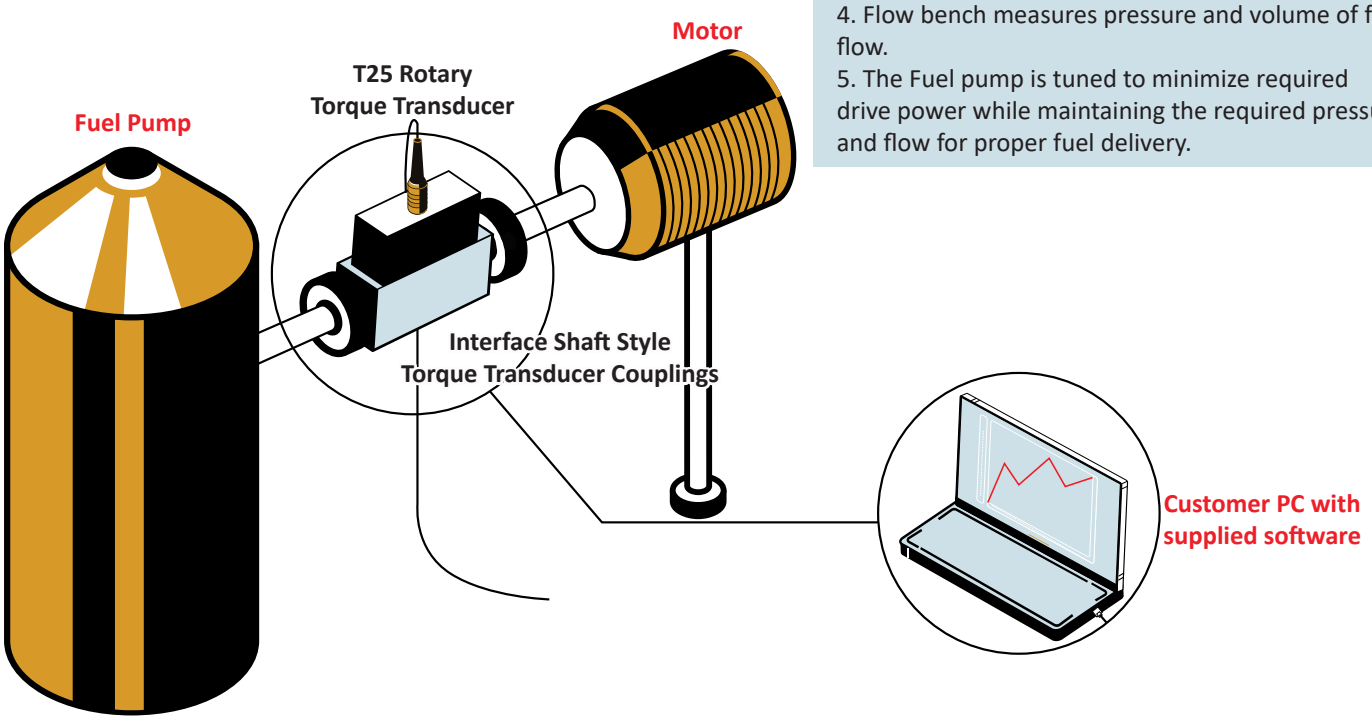
Using this data collected from the T25 in conjunction with the pressure and volume measurements of the fuel flow, the race team was able to characterize fuel pump performance vs. drive line torque, and then minimize the required drive power while maintaining the needed pressure and flow for efficient fuel delivery.

Materials

- T25 Rotary Torque Transducer with USB logging and graphing option
- Interface Shaft Style Torque Transducer Couplings

How It Works

1. The electric motor spins the fuel pump.
2. The Model T25 Rotary Torque Transducer measures the torque required to spin the pump
3. The data feeds to the PC Software for analysis. The software displays Torque, RPM & Horsepower.
4. Flow bench measures pressure and volume of fuel flow.
5. The Fuel pump is tuned to minimize required drive power while maintaining the required pressure and flow for proper fuel delivery.



Power Tongs in Oil Drilling
Load Cell

Industry: Energy

Summary

Customer Challenge

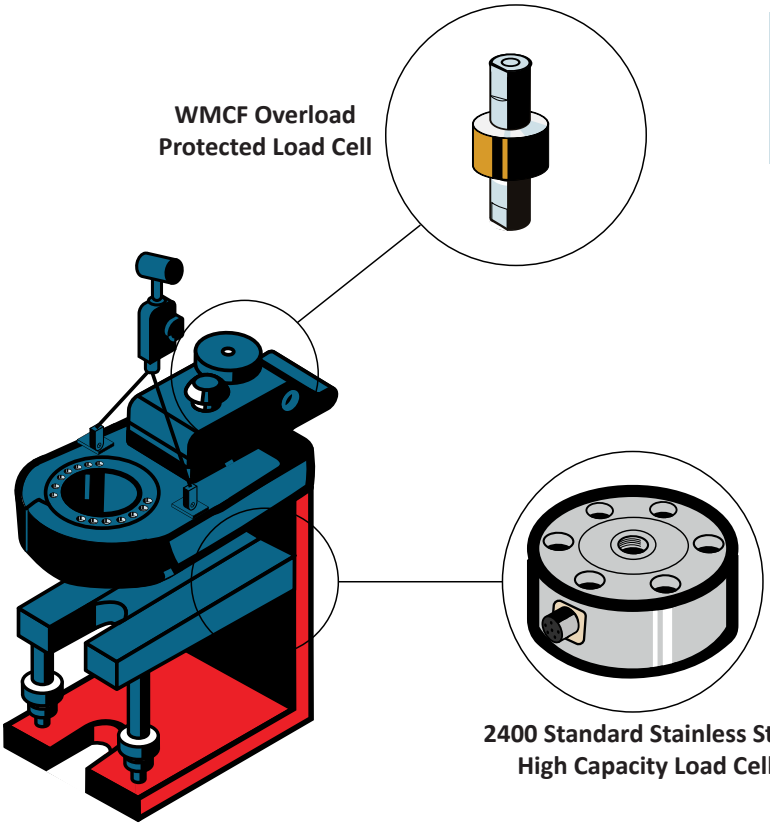
As with many oil and gas applications, the demand for digital or recorded traceability is ever increasing. A force and torque measurement system is needed to ensure there is an appropriate amount of torque applied to a power tong during the tightening and loosening of shaft connections during the drilling process.

Interface Solution

Interface's WMCF Overload Protected Sealed Stainless Steel Miniature Load Cell is attached to the hydraulic actuator that controls the clamping force of the tong on the drill string, thus increasing accuracy over hydraulic measurements. The 2400 High Capacity Standard Stainless Steel Load Cell is attached to the hydraulic actuator that controls the bottom tong's clamping force on the drill string.

Results

Interface's force sensors accurately monitored the motor of the power tong's tightening mechanism, ensuring it tightens during operation at the right amount of force. It also successfully measured the force of the hydraulic actuator controlling the tong's clamping force.



Materials

- WMCF Overload Protected Sealed Stainless Steel Miniature Load Cell with Female Threads
- 2400 High Capacity Standard Stainless Steel Load Cell
- Power tongs

How It Works

The WMCF Overload Protected Sealed Stainless Steel Miniature Load Cell is attached to the motor regulating over tightening or under tightening the drill string. The 2400 High Capacity Standard Stainless Steel Load Cell is attached to the hydraulic actuator that controls the bottom tong's clamping force on the drill string.

Note: The 2400 series have a hermetic seal. They're not ATEX rated so we don't need a note for this.

Solar Panel Strength Testing

Load Cells

Industry: Energy

Summary

Customer Challenge

A solar panel manufacturer wants to test the strength and durability of their solar panels. Solar panels should be able to withstand objects and other debris flying 50 mph during storms and other kinds of weather.

Interface Solution

Interface suggests installing four SSB Load Beam Load Cells to the bottom four corners of the customer's solar panels, connected to a JB104SS Junction Box and a WTS-AM-1E Wireless Strain Bridge Transmitter Module. Drop tests of items with different weights are conducted, and the maximum load capacity has been reached, the results can be displayed, graphed, and recorded with the WTS-BS-4 Wireless Base Station connected to the customer's PC.

Results

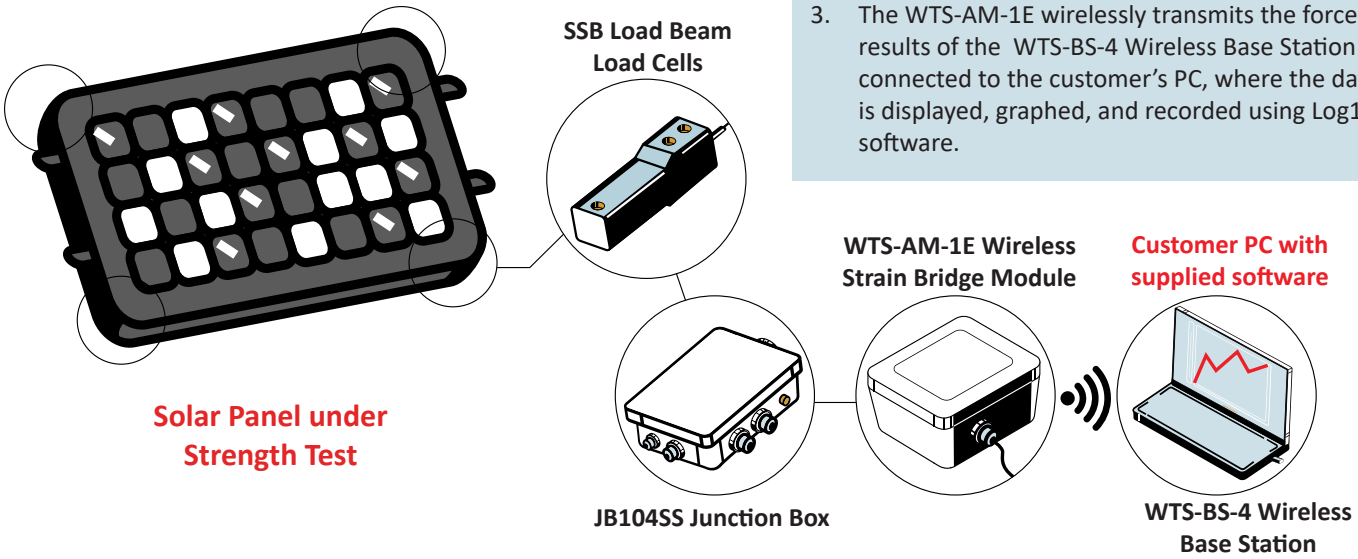
Interface's SSB Load Beam Load Cells successfully measured the amounts of force their customer's solar panels were able to take during their drop test.

Materials

- Four SSB Sealed Beam Load Cells
- JB104SS 4-Channel Stainless Steel Junction Box
- WTS-AM-1E Wireless Strain Bridge Transmitter Module
- WTS-BS-4 Wireless Base Station with Log100 Software
- Customer PC or Laptop

How It Works

1. Four SSB Load Beam Load Cells are installed under the four corners of the customer's solar panels being tested. The load cells are connected to a JB104SS 4-Channel Stainless Steel Junction Box, which is then connected to a single WTS-AM-1E Wireless Strain Bridge Transmitter Module
2. Different objects are dropped onto the solar panels with different weights, or, at different speeds.
3. The WTS-AM-1E wirelessly transmits the force results of the WTS-BS-4 Wireless Base Station connected to the customer's PC, where the data is displayed, graphed, and recorded using Log100 software.



Top Drive
Load Pin

Industry: Energy

Summary

Customer Challenge

A top drive drill is used in the oil and gas industry. It's a large motorized drill that allows for the rotation of the drill string from the top of the drilling mast. Load pins are needed to suspend the top drive in a more accurate way of measuring weight on the bit, since it is installed between the traveling block and the top drive. This means the rope reeving the hoist has no influence on the accuracy.

Interface Solution

Interface suggests using their ILMP Standard Stainless Steel Load Pin for this top drive application. The ILMP is installed at the traveling block, and during drilling operations, the ILMP will detect the force or weight of the top drive. Force results are monitored and displayed for the customer using the 920i Programmable Weight Indicator and Controller.

Results

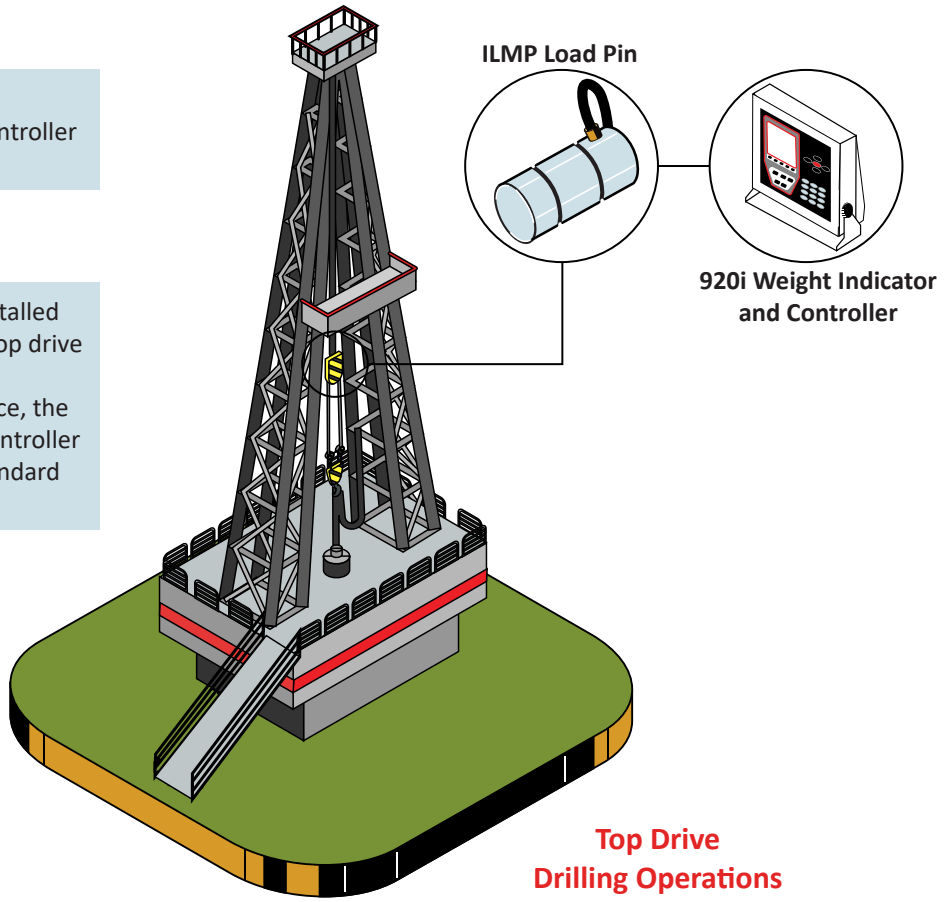
Interface's ILMP Standard Stainless Steel Load Pin successfully monitored the top drive drill during drilling operations.

Materials

- ILMP Standard Stainless Steel Load Pin
- 920i Programmable Weight Indicator and Controller
- Top drive drill

How It Works

1. ILMP Standard Stainless Steel Load Pin in installed at the traveling block, used to suspend the top drive drill.
2. As the top drive drilling operations commence, the 920i Programmable Weight Indicator and Controller displays the forces detected by the ILMP Standard Stainless Steel Load Pin.



Top Drive
Drilling Operations

Vessel Weighing
Load Cells

Industry: Energy, Weighing

Summary

Customer Challenge

Vessel weighing refers to the process of measuring the weight of vessels, containers, or storage tanks. An accurate weighing system is needed for safety, quality control, and optimizing various processes within the operations.

Interface Solution

Interface's A4200 and A4600 WeighCheck™ Load Cells are installed under the vessel. The vessel with its contents is weighed, and the results are summed and displayed using the 1280 Programmable Weight Indicator and Controller.

Results

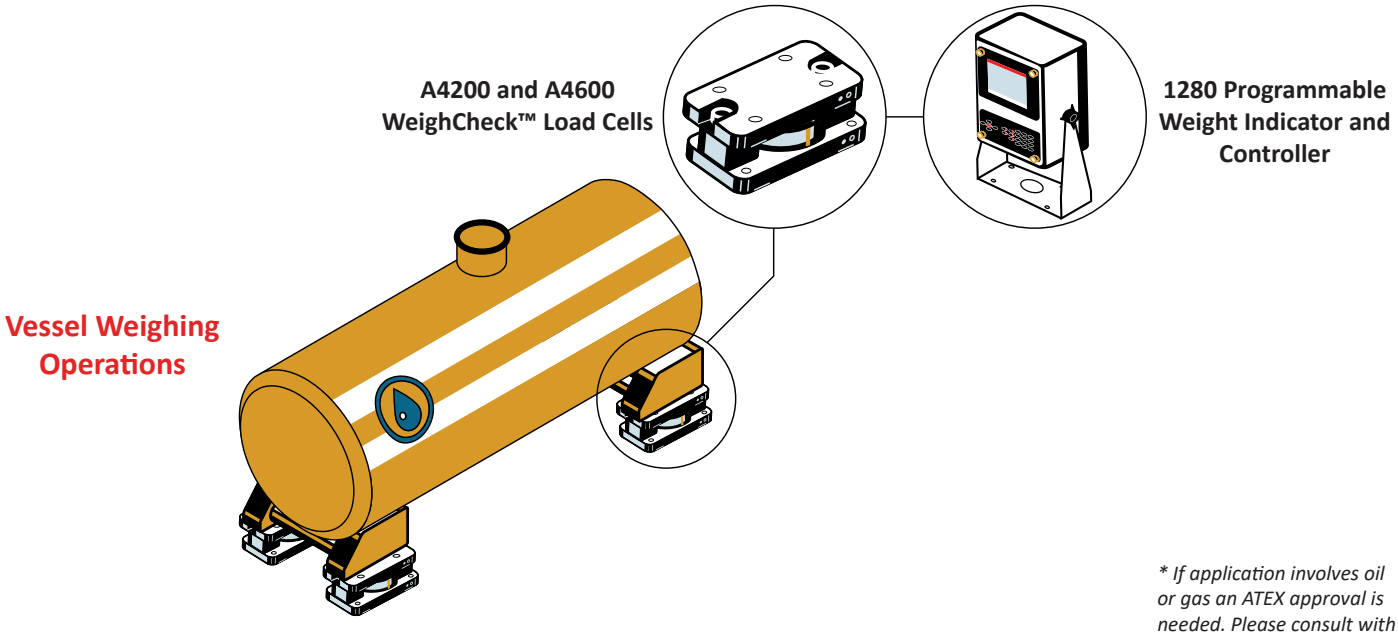
The vessel is accurately weighed and monitored with Interface's load cell and weight indicator instrumentation.

Materials

- A4200 and A4600 WeighCheck™ Load Cells
- 1280 Programmable Weight Indicator and Controller
- Setup & Scaling of Load Cells and Instrument by Interface
- Customer vessel being weighed

How It Works

1. The A4200 and A4600 WeighCheck™ Load Cells are installed under the vessel that needs to be weighed. The 1280 Programmable Weight Indicator and Controller is connected.
2. The vessel is weighed.
3. The results are summed and displayed on the 1280 Programmable Weight Indicator and Controller.



** If application involves oil or gas an ATEX approval is needed. Please consult with our team for more information.*

Wave Energy Generator
Load Cell

Industry: Energy

Summary

Customer Challenge

A scientist has been tasked to create electricity by using the energy that is generated by ocean waves.

Interface Solution

As electricity is generated by ocean waves, an Interface load cell will measure tether line tension using a submersible 3200 Hermetically Sealed LowProfile® Precision Stainless Load Cell. The mooring line was attached to the load cell base and the platform generator was connected to the load cell hub. This measured the forces that were generated by the ocean waves and data was later analyzed by the customer's Data Acquisition System (DAQ).

Results

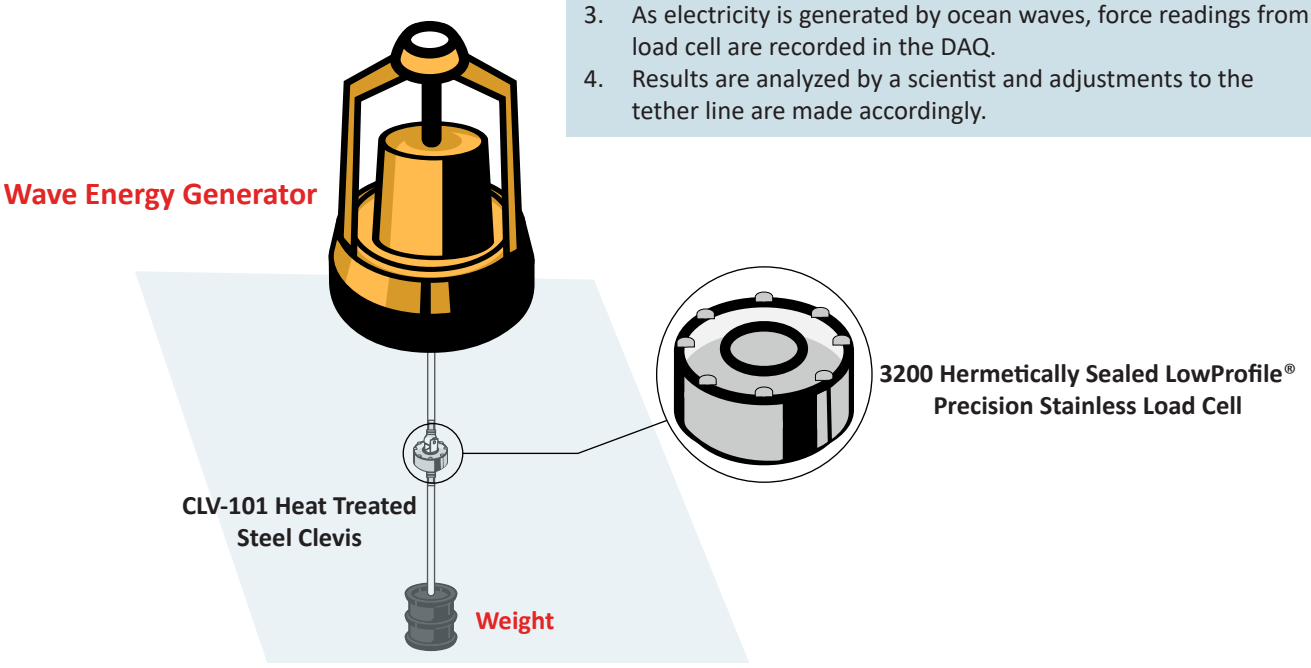
Scientists used force data to make adjustments to tether line. Also, if tether line breaks free, the scientist can be notified immediately to reattach the tether line.

Materials

- 3200 Hermetically Sealed LowProfile® Precision Stainless Load Cell
- CLV-101 Heat Treated Steel Clevis

How It Works

1. 3200 Hermetically Sealed LowProfile® Precision Stainless Load Cell is connected between a mooring line on the sea floor and a wave energy generator platform.
2. Load cell cable is connected to customer's DAQ.
3. As electricity is generated by ocean waves, force readings from load cell are recorded in the DAQ.
4. Results are analyzed by a scientist and adjustments to the tether line are made accordingly.



Wind Turbine Bolt Monitoring
Load Washer

Industry: Energy

Summary

Customer Challenge

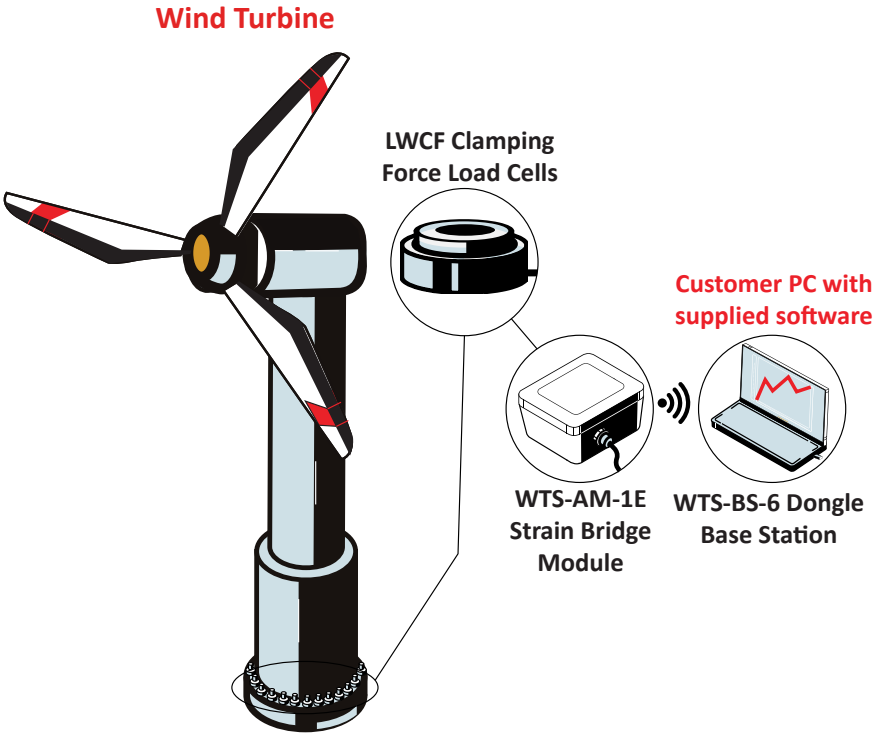
More than 6,000 bolts are used in the assembly for wind turbines. Regular inspections are both costly and time consuming. The customer wants to monitor the bolts to ensure safety and optimal operation, but with a new quick , less expensive, and easy solution.

Interface Solution

Interface's solution is to pair multiple LWCF Clamping Force Load Cells with the wind turbine's bolts around the base of the turbine's pillar. The load cells are installed under each bolt, thus measuring the compression forces. Each LWCF load cell is then each connected to a WTS-AM-1E Wireless Strain Bridge Transmitter Module. The load cells will measure the compression forces from the bolts, and the real-time results are transmitted wirelessly from the WTS-AM-1E's to the WTS-BS-6 Wireless Telemetry Dongle Base Station when connected to the customer's PC. Real-time results from the LWCF's are displayed using provided Log100 Software.

Results

Interface's load cell monitoring system successfully monitors the compression forces of the wind turbine's bolts in real time.



How It Works

1. Multiple LWCF Clamping Force Load Cells are installed under the bolts attached to the base of the wind turbine.
2. Each LWCF is connected to a WTS-AM-1E Wireless Strain Bridge Transmitter Module.
3. The LWCF's measure the compression forces from the tightened bolts, and the results are transmitted from the WTS-AM-1E to the WTS-BS-6 Wireless Telemetry Dongle Base Station connected to the customer's PC. Each load cell can be monitored in real time using Log100 software.

Materials

- LWCF Clamping Force Load Cells
- WTS-AM-1E Wireless Strain Bridge Transmitter Modules
- WTS-BS-6 Wireless Telemetry Dongle Base Station
- Log100 Software
- Customer PC or Laptop

Windmill Energy
Torque Transducer
Industry: Energy

Summary

Customer Challenge

Customer wants to improve the performance of a windmill by adjusting the blade pitch and measuring the torque generated as power ramps are studied.

Interface Solution

Interface's T2 is coupled between windmill blade propeller and electric generator. Information will be sent to customer's Data Acquisition System (DAQ).

Results

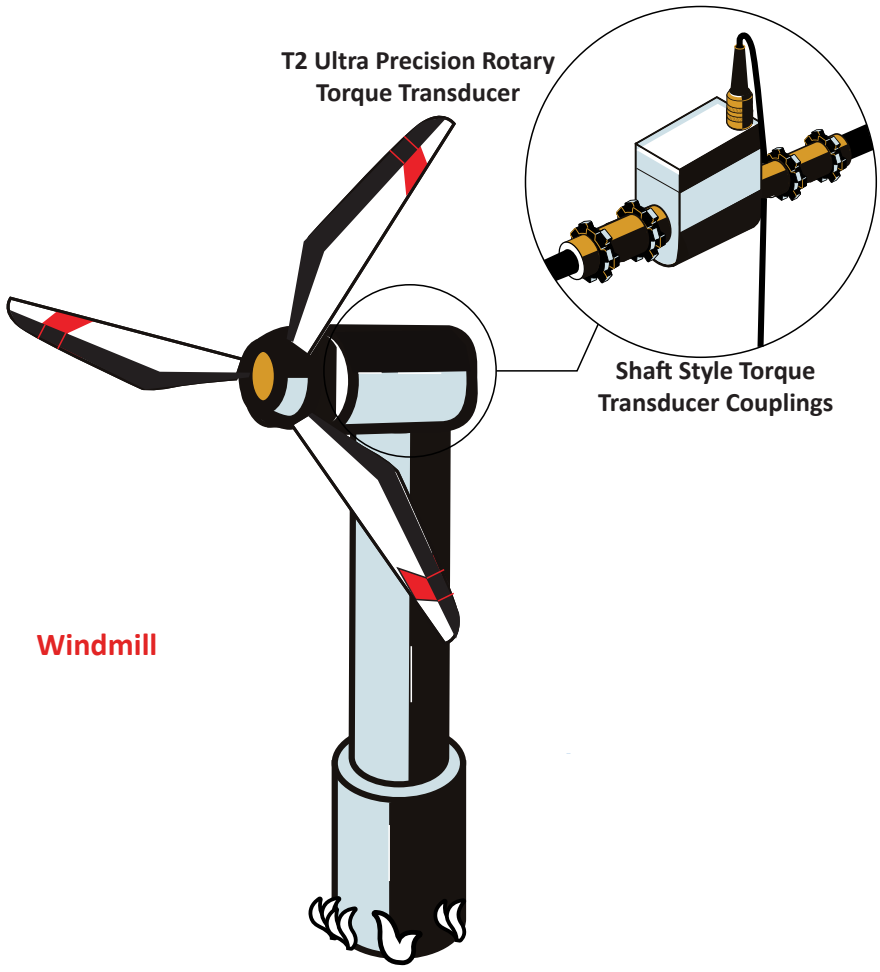
Customer was able to use torque data to determine the optimal blade pitch for the windmill. The windmill will generate more power and with less stress on the bearings.

Materials

- T2 Ultra Precision Rotary Torque Transducer
- Interface Shaft Style Torque Transducer Couplings

How It Works

1. T2 Torque Transducer is installed between windmill propeller and electric generator using Interface torque couplings.
2. T2 is connected customer's DAQ.
3. Tests are performed and torque data is logged into customer's DAQ.
4. Results are examined by customer and optimal blade pitch is determined.



Wireline Pump Down
Load Cell

Industry: Energy

Summary

Customer Challenge

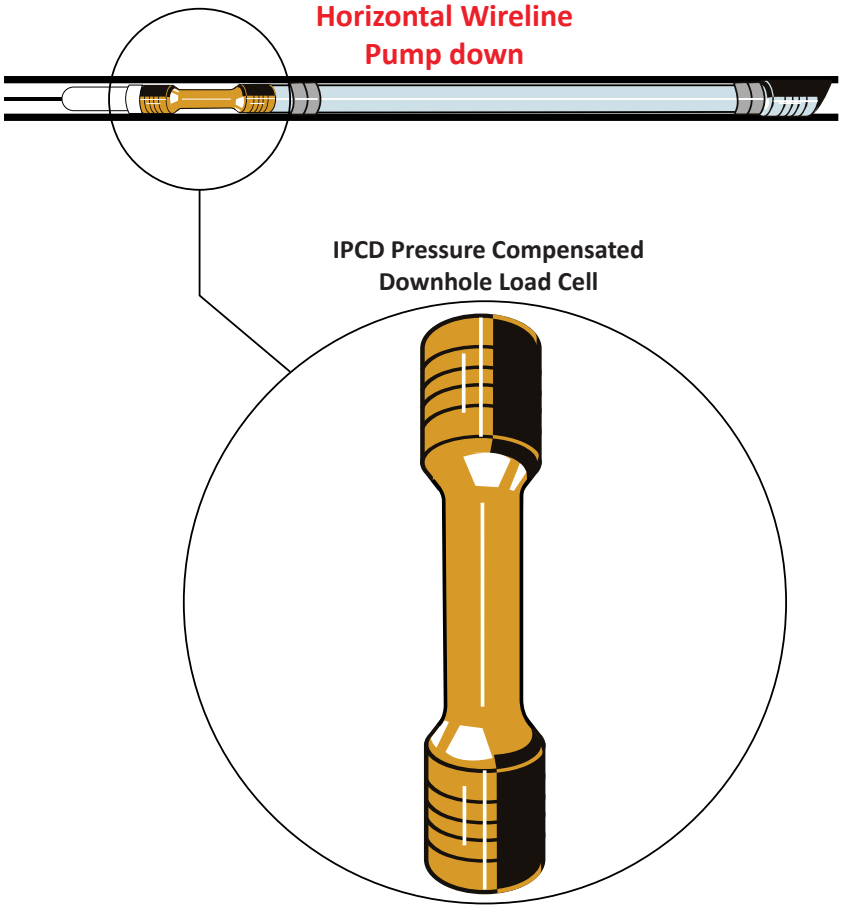
Pump down operation is used for horizontal wells in the oil field. Fluid is pumped to push tools down deviated or horizontal wells. Operations could include plug setting, and perforation. Accurate tool string tension readings are required for this downhole procedure.

Interface Solution

The IPCD Pressure Compensated Downhole Load Cell is an accurate and superior load cell over wet or hydraulically compensated load cell options. Featuring proprietary pressure and temperature compensation, offering precise and real-time tool string force measurements.

Results

Customer was able to carefully regulate tension forces on the toolstring during the pump down procedure, avoiding expensive pump off tool separation.



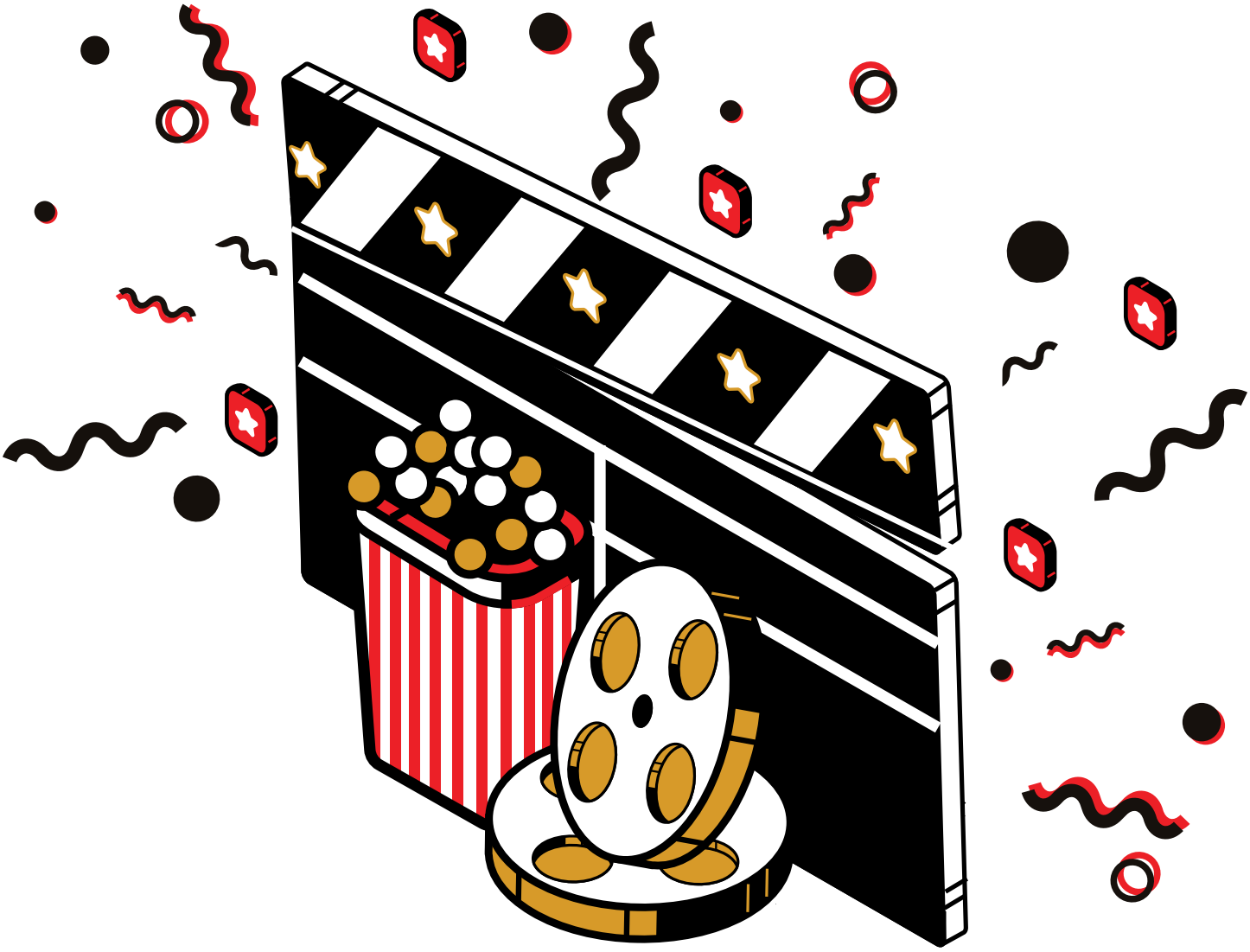
How It Works

1. The IPCD Pressure Compensated Downhole Load Cell is attached at the top of the tool string.
2. During pump down, the IPCD measures the tension between the cable head and the tool string.
3. Connected to the customer's instrumentation, actual cable head tension is closely monitored during the pumpdown process.

Materials

- IPCD Pressure Compensated Downhole Load Cell
- Customer Instrumentation

Entertainment



Aerial Arts Rig
Multi-Axis

Industry: Entertainment

Summary

Customer Challenge

An aerialist needs to measure how heavy they are on their aerial arts rig to ensure it can hold them during their performance. They want to ensure they rig will be stable, and will not reach the load limit.

Interface Solution

Interface's 6A80 Series 6-Axis Standard Capacity Load Cell is fitted with a rod end bearing and attached to the top aerial rig with a type of swivel mount. It is also connected to the BX6-BT Portable 6-Channel High Speed Bluetooth Data Logger. The aerialist performer hangs from the rig, and their weight load results are sent to the BX6-BT Portable 6-Channel High Speed Bluetooth Data Logger and stored on an SD card. Results can also be wirelessly transmitted to the Bluetooth of the customer's PC and displayed with BlueDAQ software.

Results

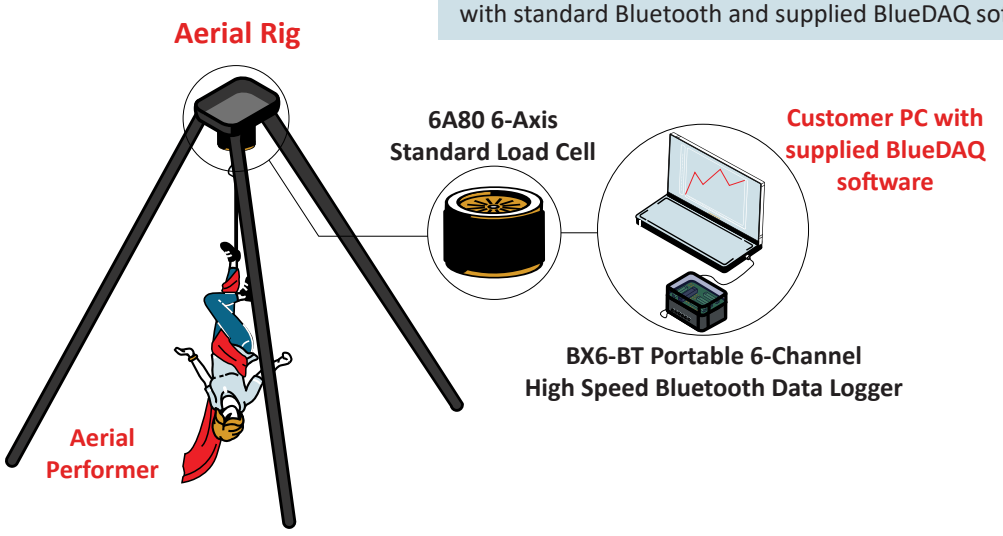
The aerialist was able to determine if their aerial arts rig was able to hold their weight during a performance with Interface's force measurement system.

Materials

- 6A80 Series 6-Axis Standard Capacity Load Cell
- Rod end bearing
- BX6-BT Portable 6-Channel High Speed Bluetooth Data Logger with SD card
- BlueDAQ Software
- Customer PC or Laptop
- Customer's aerial rig

How It Works

1. The 6A80 Series 6-Axis Standard Capacity Load Cell is fitted with a rod end bearing and attached to the top aerial rig with a type of swivel mount. It is also connected to the BX6-BT Portable 6-Channel High Speed Bluetooth Data Logger.
2. The performer hangs from their aerial rig, and their weight is captured with BX6-BT Portable 6-Channel High Speed Bluetooth Data Logger, which is saved on an SD card. The results can also be wirelessly transmitted to the customer's PC with standard Bluetooth and supplied BlueDAQ software.



Animatronics
Torque Transducer
Industry: Entertainment

Summary

Customer Challenge

Animatronics are used throughout different applications in the entertainment industry. From amusement and theme parks, to movie sets. Animatronics need to be tested to ensure proper functionality when they move, therefore the torque of the limbs must be tested.

Interface Solution

Interface's MRTP Miniature Overload Protected Flange Style Reaction Torque Transducers can be connected to the servo motors in the limbs of the animatronics that make it move. The customer monitoring the animatronics can view torque results on their PC when the transducers are connected to the BX8-AS BlueDAQ Series Data Acquisition with Industrial Enclosure.

Results

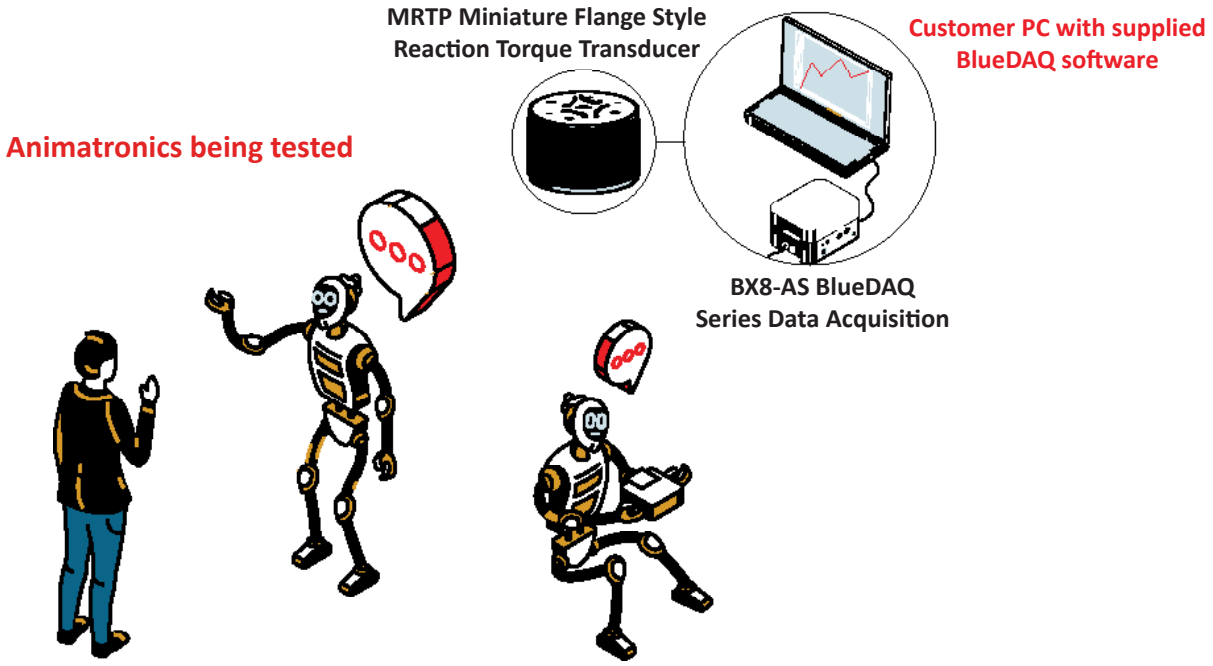
Interface's MRTP torque transducer successfully measured the torque of the servo motors used to move the limbs of the animatronics.

Materials

- MRTP Miniature Overload Protected Flange Style Reaction Torque Transducers
- BX8-AS BlueDAQ Series Data Acquisition with Industrial Enclosure and included BlueDAQ software
- Animatronics being tested
- Customer PC or Laptop

How It Works

1. The MRTP Miniature Overload Protected Flange Style Reaction Torque Transducers are attached to the servo motors inside of the limbs of the animatronic body.
2. The BX8-AS BlueDAQ Series Data Acquisition will collect the torque results, where it can be displayed when connected to the customer's PC with supplied BlueDAQ software.



Bluetooth® Show Booth Monitoring

Load Shackles and Bluetooth® Telemetry System

Industry: Entertainment

Summary

Customer Challenge

Every year, auto test shows use different displays and show booths to show off the world's newest innovative vehicles. Some displays are more complex than others, but the cars need to be displayed in the best light. A wireless monitoring system to monitor the different components that are attached to the truss above the show booth, holding both light fixtures and video screens.

Interface Solution

Interface suggests installing multiple WTSSHK-B-JR Wireless Crosby™ Bow Load Shackles connected to Bluetooth® Telemetry System, to the truss hanging above the auto show booth. The load shackles force load data will wirelessly transmit directly to the customer's phone through the BTS Toolkit Mobile App.

Results

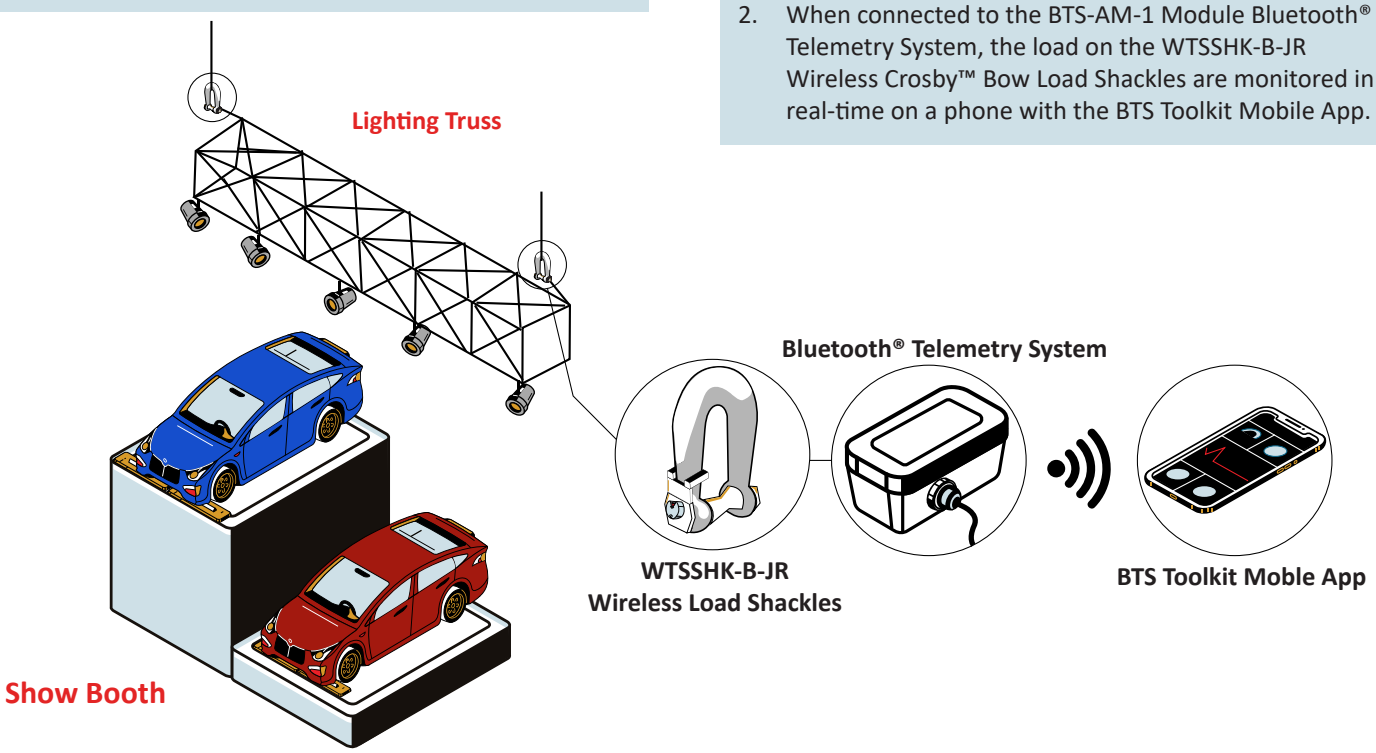
Interface's wireless load shackles and BTS Bluetooth® Telemetry System were the perfect system to monitor the load of the truss hanging above the auto show booth.

Materials

- WTSSHK-B-JR Wireless Crosby™ Bow Load Shackles
- BTS-AM-1 Module Bluetooth® Telemetry System
- BTS Toolkit Mobile App for iPhone or Android devices

How It Works

1. Multiple WTSSHK-B-JR Wireless Crosby™ Bow Load Shackles are attached to the lighting truss that is right above the vehicle's show booth.
2. When connected to the BTS-AM-1 Module Bluetooth® Telemetry System, the load on the WTSSHK-B-JR Wireless Crosby™ Bow Load Shackles are monitored in real-time on a phone with the BTS Toolkit Mobile App.



Claw Machine Strength
Interface Mini™

Industry: Entertainment

Summary

Customer Challenge

Manufacturers for claw machines need to measure the force strength of their claws. They need to see the force measurements in order to program their claws grip strength.

Interface Solution

Interface's ConvexBT Load Cells are installed on the fingers of the claw machine, each connected to WTS-AM-1E Wireless Strain Bridge Transmitter Modules. After a grip test is done, the force results are wirelessly transmitted to the customer's computer where it can displayed, logged, and graphed when connected to the WTS-BS-6 Wireless Telemetry Dongle Base Station. It will also have supplied Log100 software.

Results

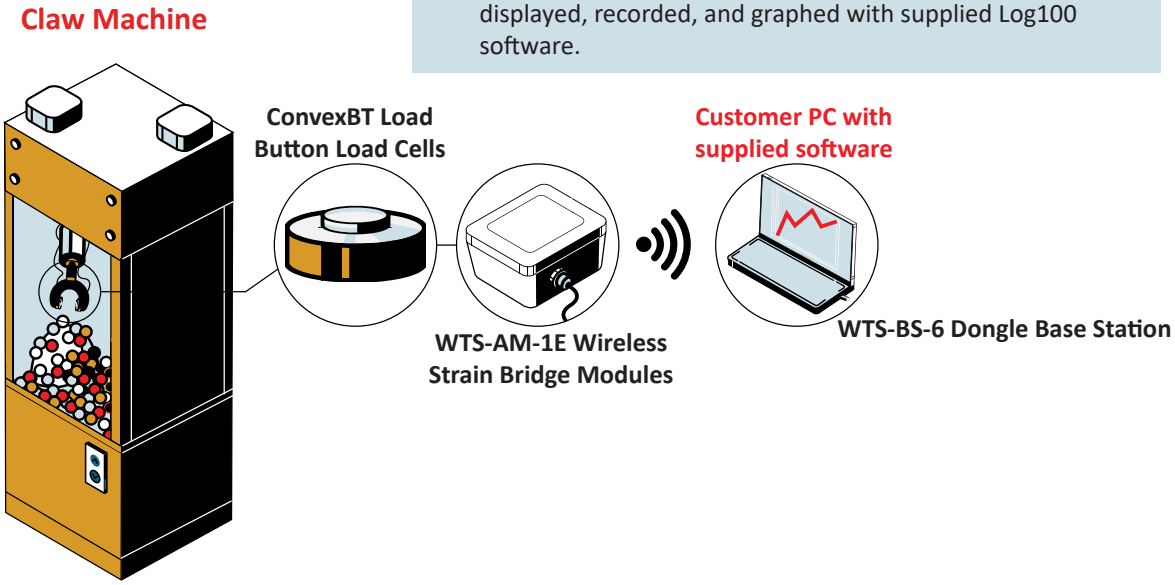
The manufacturers for their claw machines were able to determine the strength of the claw grip, thus were able to program the strength of the claw.

Materials

- ConvexBT Load Button Load Cell
- WTS-AM-1E Wireless Strain Bridge Transmitter Module
- WTS-BS-6 Wireless Telemetry Dongle Base Station
- Supplied Log100 Software
- Customer PC or Laptop

How It Works

1. ConvexBT Load Button Load Cells are attached to the fingers of the claw. The load cells are also connected to WTS-AM-1E Wireless Strain Bridge Transmitter Modules.
2. A grip test is done on the claw, and the load cells capture the amount of force used.
3. The force results are wirelessly transmitted to the WTS-BS-6 Wireless Telemetry Dongle Base Station, where results are displayed, recorded, and graphed with supplied Log100 software.



Customized Light Fixture System
Load Shackles
Industry: Entertainment

Summary

Customer Challenge

Complex lighting fixtures in hotels or artistic installations need to be properly installed and monitored for safety reasons. The weight of heavy lighting fixtures can affect the structural integrity it is mounted on, causing it to weaken and possible cause accidents or other damage. A weight monitoring system is needed for these kinds of applications.

Interface Solution

Interface suggests installing multiple WTSSHK-B-JR Wireless Crosby™ Bow Load Shackles to rig system on the ceiling, with integrated Wireless Strain Bridge Transmitter Modules. The load shackles will wirelessly transmit the light fixtures weight to the WTS-BS-4 Wireless Base Station with USB Interface in Industrial Enclosure connected to the customer's PC. Results of all load cell points or individual points can be wirelessly transmitted and displayed through a customer computer with Log 100 software, or using the WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters.

Results

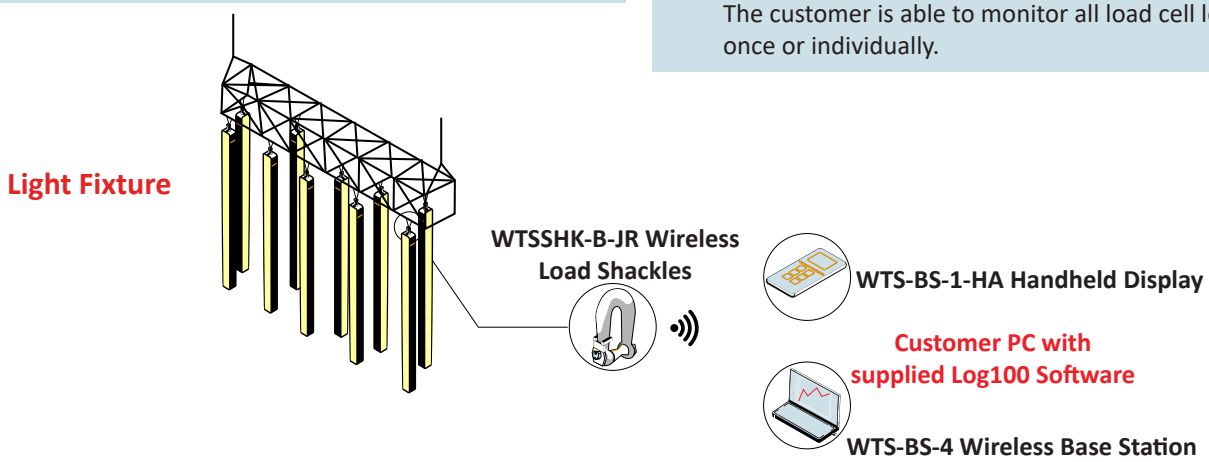
Interface's wireless load shackles successfully monitored the multiple loads of each of the light fixtures at once or individually. This created a safe and secure environment.

Materials

- WTSSHK-B-JR Wireless Crosby™ Bow Load Shackles with integrated Wireless Strain Bridge Transmitter Modules
- WTS-BS-4 Wireless Base Station with USB Interface in Industrial Enclosure
- Supplied Log100 software
- WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters
- Customer PC or Laptop

How It Works

1. Multiple WTSSHK-B-JR Wireless Crosby™ Bow Load Shackles are installed on the lighting system.
2. Heavy lighting fixtures are attached to the shackles, which collect the load data.
3. The shackles collect the force data, where it is wirelessly transmitted and displayed on the customer's computer with Log 100 software, or using the WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters. The customer is able to monitor all load cell locations at once or individually.



Drone Fireworks

Interface Mini™

Industry: Entertainment

Summary

Customer Challenge

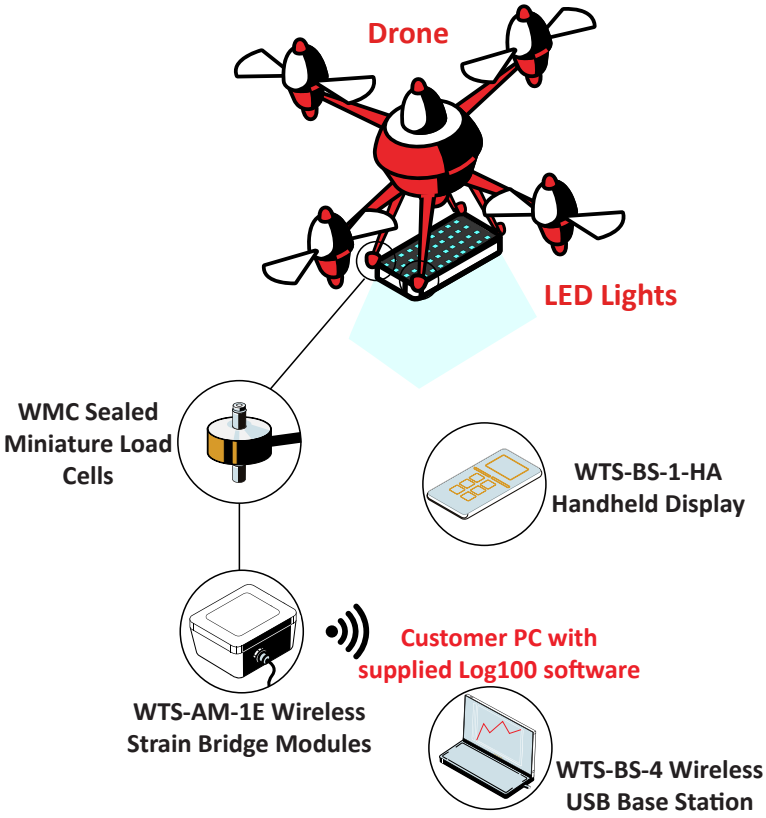
Drone fireworks have become increasingly popular in recent years. During drone firework and light shows, drones are equipped with LED lights, flying in synchronized patterns to create displays in the night sky. A force measuring and monitoring system is needed for the weight of the LED or the forces generated by fireworks explosions.

Interface Solution

Four Interface WMC Sealed Stainless Steel Miniature Load Cells are installed to the necessary propeller motors measure the attached LED lights. Each are connected to a WTS-AM-1E Wireless Strain Bridge Transmitter Modules. The WMC's measure the weight of the LED lights to monitor weight shifting or any uneven weight distributions. Data results are wirelessly transmitted directly to the customer's laptop through the WTS-BS-4 Wireless Base Station, or to the WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters

Results

The four WMC load cells accurately measured and monitored the weight of the attached LED light and maintained stability of the propeller motors to when the drone was in air performing the fireworks show.



Materials

- Four WMC Sealed Stainless Steel Miniature Load Cells
- Four WTS-AM-1E Wireless Strain Bridge Transmitter Modules with Log100 software
- WTS-BS-4 Wireless Base Station with USB Interface in Industrial Enclosure
- WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters
- Customer PC

How It Works

1. The drone's legs that carry the LED light are each fitted with a WMC Sealed Stainless Steel Miniature Load Cell. Each are connected to a WTS-AM-1E Wireless Strain Bridge Transmitter Modules. The load cells detect any uneven weight distribution and communicate with the individual propeller motors to increase RPM's and balance the weight accordingly.
2. Data results are wirelessly transmitted directly to the customer's laptop through the WTS-BS-4 Wireless Base Station, or to the WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters.

Drone Videography

Interface Mini™

Industry: Entertainment

Summary

Customer Challenge

A videographer wants to ensure the propeller motors compensate for weight shifting or uneven weight distribution of the video camera being attached when they film landscapes and other aerial shots.

Interface Solution

Four Interface WMC Sealed Stainless Steel Miniature Load Cells are installed to the necessary propeller motors to compensate for an uneven weight load. The WMC's measure the weight of the film camera attached and detect weight shifting or uneven weight distribution of the video camera.

Results

The four WMC load cells accurately measured the payload weight and maintained stability of the propeller motors to when the drone was in air with the attached film camera. This information, was communicated to the drones on-board processor for monitoring and recording this information during flight.

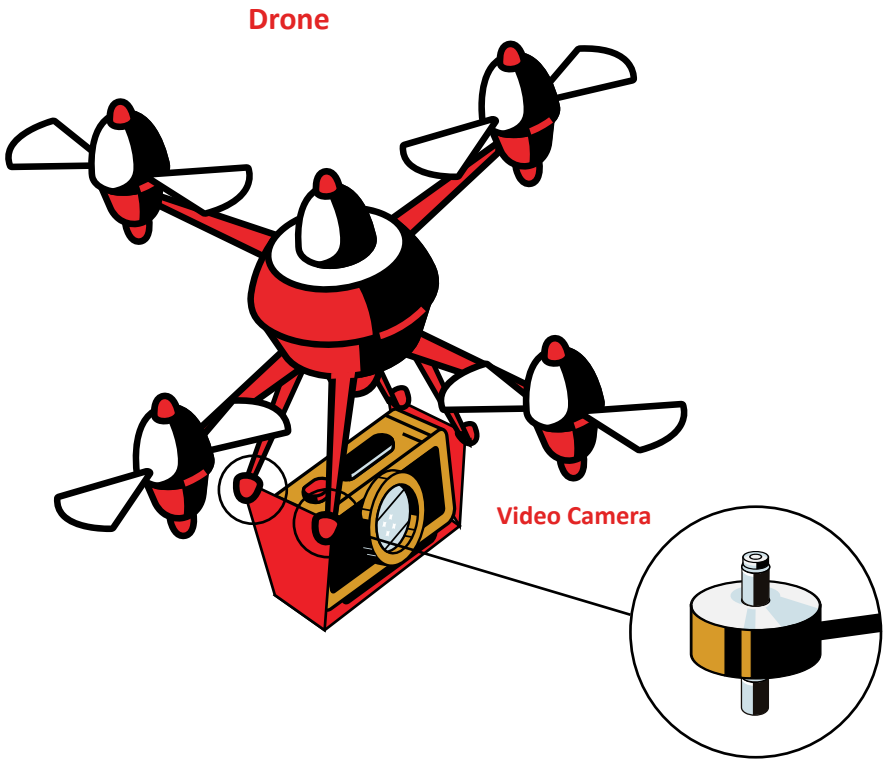
Materials

Interface Solution

- Four Interface WMC Sealed Stainless Steel Miniature Load Cells

How It Works

The four WMC Sealed Stainless Steel Miniature Load Cells are connected independently to each of the four landing gear legs. Once connected to the drone's processor, weight of payload is immediately communicated and stored, as well as detecting uneven weight distribution communicating with the individual propeller motors to increase the RPM's and balance the weight.



WMC Sealed Stainless Steel Miniature Load Cells

Entertainment LED Screens

Load Button Load Cells and WTS Wireless Telemetry System

Industry: Entertainment

Summary

Customer Challenge

A customer constructing a huge venue wants to weigh their very large LED screens. They want to measure the force of the structure that is supporting the screens, to ensure stability and structural integrity.

Interface Solution

Interface suggests their LW General Purpose Load Washer Load Cells being assembled within rods that are part of the support structure. The LED screen hangs off the structure, which connects to the rods. The compression forces applied to the rod will be measured by the LW's installed in between. The load washers are paired with WTS-AM-1E Wireless Strain Bridge Transmitter Modules, where the force results are wirelessly transmitted to both the WTS-BS-1 Wireless Handheld Display for Unlimited Transmitters and the WTS-BS-4 Wireless Base Stations with included Log100 software.

Results

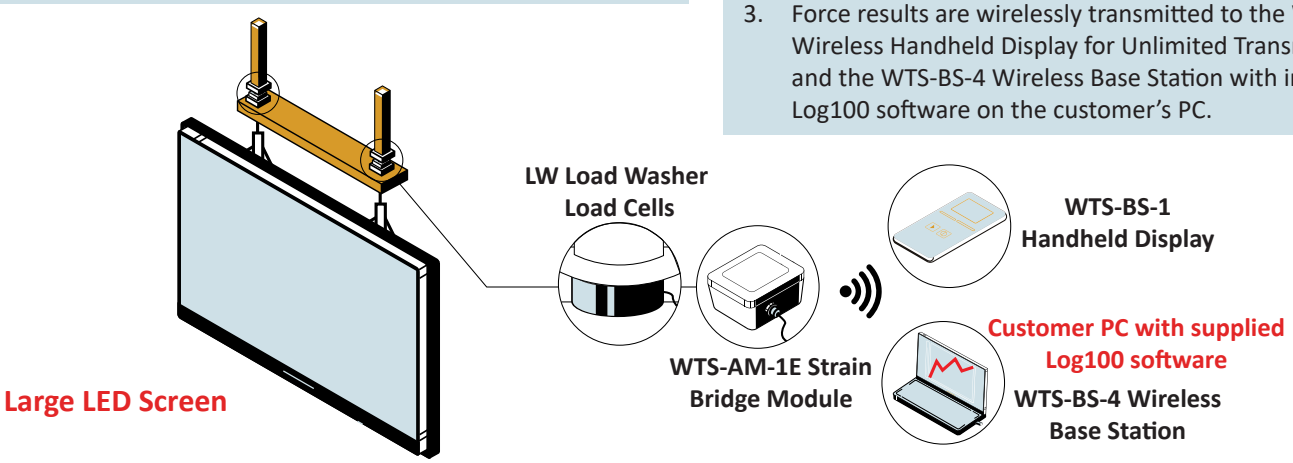
Interface's wireless load washer system successfully weighed the forces of the large LED screen for the customer's new venue.

Materials

- LW General Purpose Load Washer Load Cells
- WTS-AM-1E Wireless Strain Bridge Transmitter Modules
- WTS-BS-1 Wireless Handheld Display for Unlimited Transmitters
- WTS-BS-4 Wireless Base Station with USB Interface in Industrial Enclosure
- Customer PC or Laptop with supplied Log100 Software

How It Works

1. Hundreds of LW General Purpose Load Washer Load Cells are installed within the LED screen's rod structure. The LW's are paired with WTS-AM-1E Wireless Strain Bridge Transmitter Modules.
2. As the LED screen hangs off the support structure, the LW's measure the compression forces from the rods sustaining it.
3. Force results are wirelessly transmitted to the WTS-BS-1 Wireless Handheld Display for Unlimited Transmitters, and the WTS-BS-4 Wireless Base Station with included Log100 software on the customer's PC.



Gaming Simulation Brake Pedal

Interface Mini™

Industry: Entertainment

Summary

Customer Challenge

A gaming company wants to switch from the standard racing pedals, to a load cell based pedal system for their racing simulation game. Compared to the standard racing simulation pedals, load cell pedals are more advanced and offer more accurate results. They want a wireless system that will measure the strength of the pressure received by the pedals that will detect the perfect amount of braking power for future gamers.

Interface Solution

Interface's BPL Pedal Load Cell can be installed onto the gaming brake pedal to measure the force applied when someone puts their foot on it. Forces are measured and recorded using the WTS-AM-1E Wireless Strain Bridge Transmitter Modules, where data is transmitted to the WTS-BS-6 Dongle Base Station when connected to the customer's PC or laptop.

Results

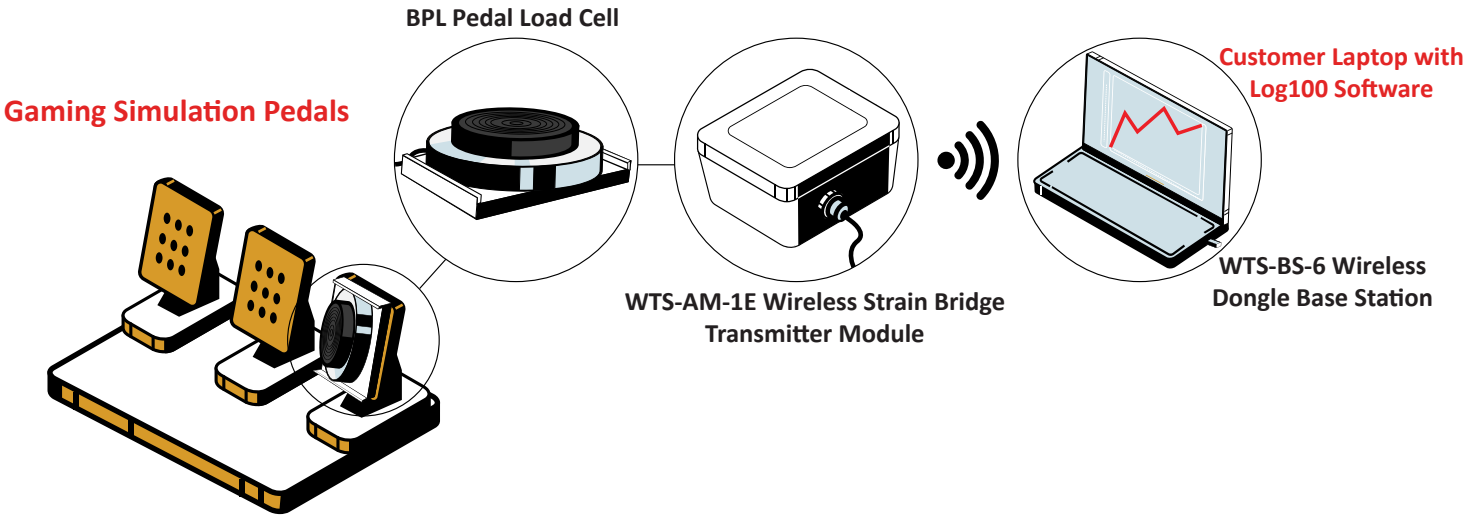
Interface's BPL Pedal Load Cell measured and recorded the pedal forces applied to their racing gaming brake pedals. In comparison to traditional simulation pedals that measure the distance of the pedals when pressed, Interface's load cell pedal system provided a more realistic experience for gamers.

Materials

- BPL Pedal Load Cell
- WTS-AM-1E Wireless Strain Bridge Transmitter Module
- WTS-BS-6 Wireless Telemetry Dongle Base Station
- Log100 Software
- Customer PC or Laptop

How It Works

1. The BPL Pedal Load Cell is installed onto the gaming brake pedal, and is connected to the WTS-AM-1E Wireless Strain Bridge Transmitter Module.
2. The BPL Pedal Load Cell measure the forces applied by the gamer when they put pressure onto the brake pedal.
3. The force results are wireless transmitted to the customer's laptop through the WTS-BS-6 Wireless telemetry Dongle Base Station. The customer was able to log, graph and record using the supplied Log100 Software.



Multi Stage Load Monitoring
Wireless Telemetry System
Industry: Entertainment

Summary

Customer Challenge

Concert venues both indoor and outdoor use multiple stages allowing simultaneous shows and acts to occur. Monitoring the loads per stage is a necessity to ensure the stability of the stage structures, along with safety of all working personnel.

Interface Solution

Interface's WTS 1200 Standard Precision LowProfile™ Wireless Load Cells can be installed at multiple points within multiple stages. When connected to the WTS Wireless Telemetry System, results of all load points can be wirelessly transmitted and displayed through a customer computer with Log 100 software, or using the WTS-BS-1 Wireless Handheld Display for Unlimited Transmitters.

Results

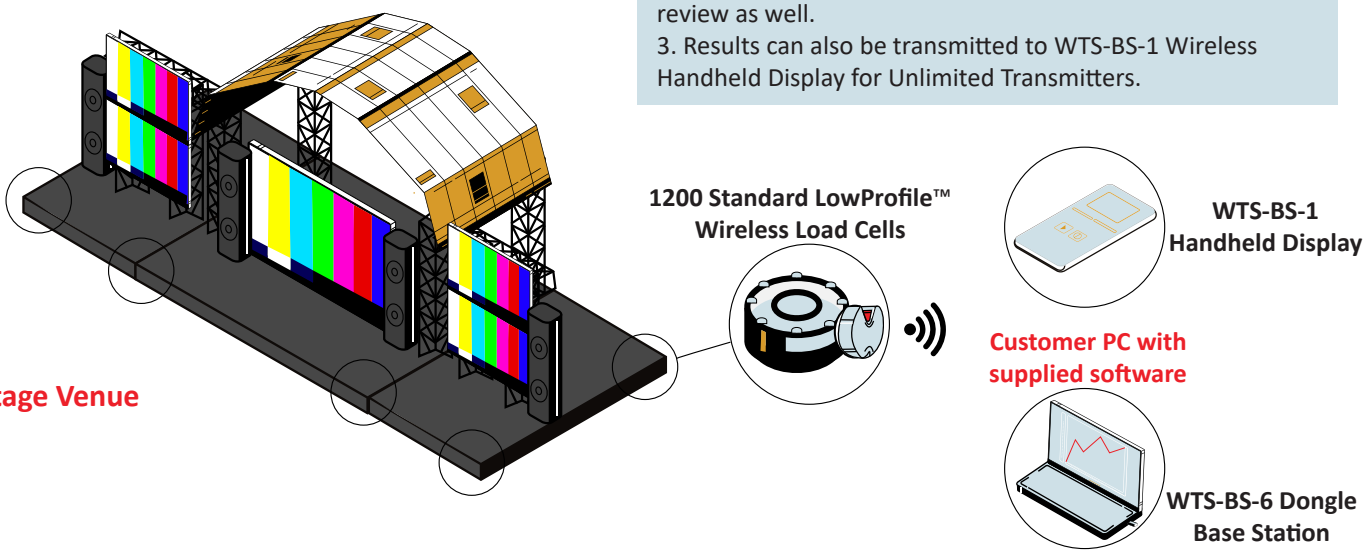
Interface's load cells and WTS Wireless Telemetry System successfully achieved the customer's need to monitor the loads implemented on their multi stage venue.

Materials

- Multiple WTS 1200 Standard Precision LowProfile™ Wireless Load Cells with integrated wireless acquisition module
- WTS-BS-6 Wireless Telemetry Dongle Base Station
- WTS-BS-1 Wireless Handheld Display for Unlimited Transmitters
- Supplied Log100 Software
- Customer PC or Laptop

How It Works

1. Numerous stages are equipped with multiple WTS 1200 Standard Precision LowProfile™ Wireless Load Cells.
2. The load cells have an integrated Wireless Strain Bridge Transmitter Module, the force measurements from all load points, so the force is wirelessly transmitted to the WTS-BS-6 Wireless Telemetry Dongle Base Station and conveniently displayed on the customer's PC. Additionally, the system allows for the configuration of colored alarms to alert the user in case of force overload. Results can also be logged for review as well.
3. Results can also be transmitted to WTS-BS-1 Wireless Handheld Display for Unlimited Transmitters.



Outdoor Festival Wind Monitoring
Wireless Telemetry System

Industry: Entertainment

Summary

Customer Challenge

An outdoor festival is occurring in a large outdoor venue for multiple days. Outdoor stages pose a risk towards high wind speeds, which need to be monitored in case a storm passes through. This is to ensure safety for all personnel on site of the festival to avoid any accidents.

Interface Solution

Interface suggests installing the WTS-WSS Wireless Wind Speed Transmitter Module on the outdoor stage. Wind speed results are wirelessly transmitted to the customer's PC through WTS-BS-4 Wireless Base Station with USB Interface in Industrial Enclosure. It can also be transmitted to the WTS-BS-1 Wireless Handheld Display for Unlimited Transmitters Data can be displayed, logged, and graphed with supplied Log100 software.

Results

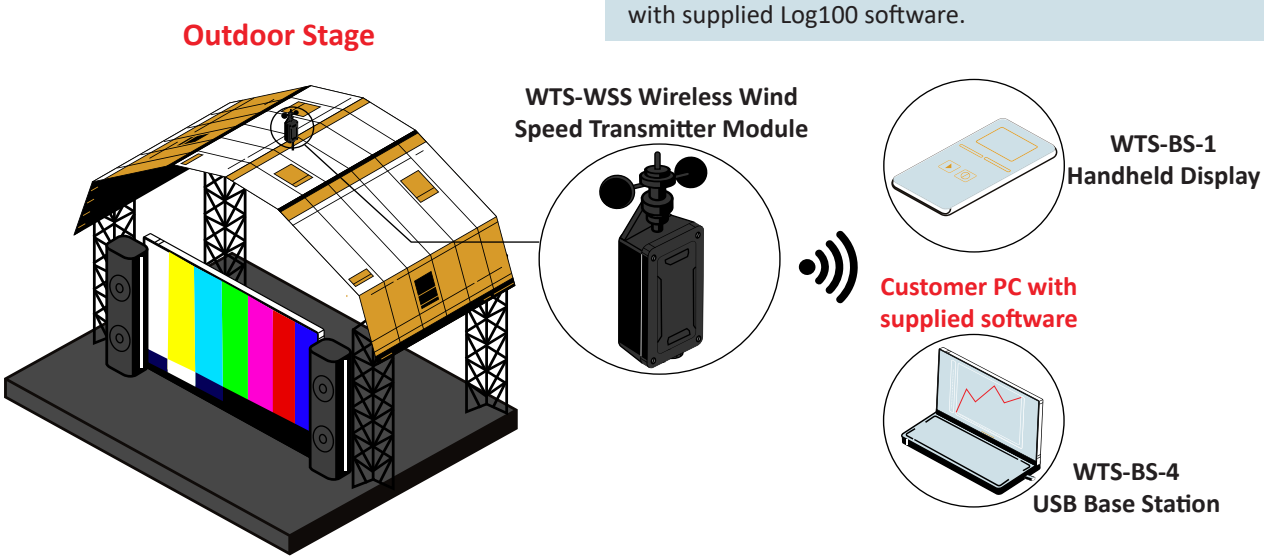
Interface's WTS-WSS Wireless Wind Speed Transmitter Module combined with Interface's Wireless Telemetry System was perfect to monitor the wind speed during the outdoor festival.

Materials

- WTS-WSS Wireless Wind Speed Transmitter Module
- WTS-BS-4 Wireless Base Station with USB Interface in Industrial Enclosure with included Log100 Software
- WTS-BS-1 Wireless Handheld Display for Unlimited Transmitters
- Customer Laptop

How It Works

1. The WTS-WSS Wireless Wind Speed Transmitter Module is installed to the outdoor festival stage.
2. The WTS-WSS captures the wind speeds wirelessly transmits it to the customer's PC through the WTS-BS-4 Wireless Base Station with USB Interface in Industrial Enclosure. Customer's also have the option of using the WTS-BS-1 Wireless Handheld Display for Unlimited Transmitters. Results are displayed, graphed, and recorded with supplied Log100 software.



Performance Structural Loading

Load Shackles and WTS Wireless Telemetry System

Industry: Entertainment

Summary

Customer Challenge

Performers and entertainers have special stages built to perform in concerts for their fans. From largest sports events half-time shows to other complex staging, a force measurement system is needed to ensure the safety for all performers, equipment, and scenery on stage. The stage needs to hold all weight, and also maintain during dynamic movements, such as performers walking on stage.

Interface Solution

Interface's A4200 Zinc Plated or A4600 Stainless Steel Weigh-check Load Cells paired with the 1280 Programmable Weight Indicator and Controller is able to measure the individual loads on each load cell, or the entire weight of the performance stage. Results from the 1280 Programmable Weight Indicator and Controller was sent to the customer's control center.

Results

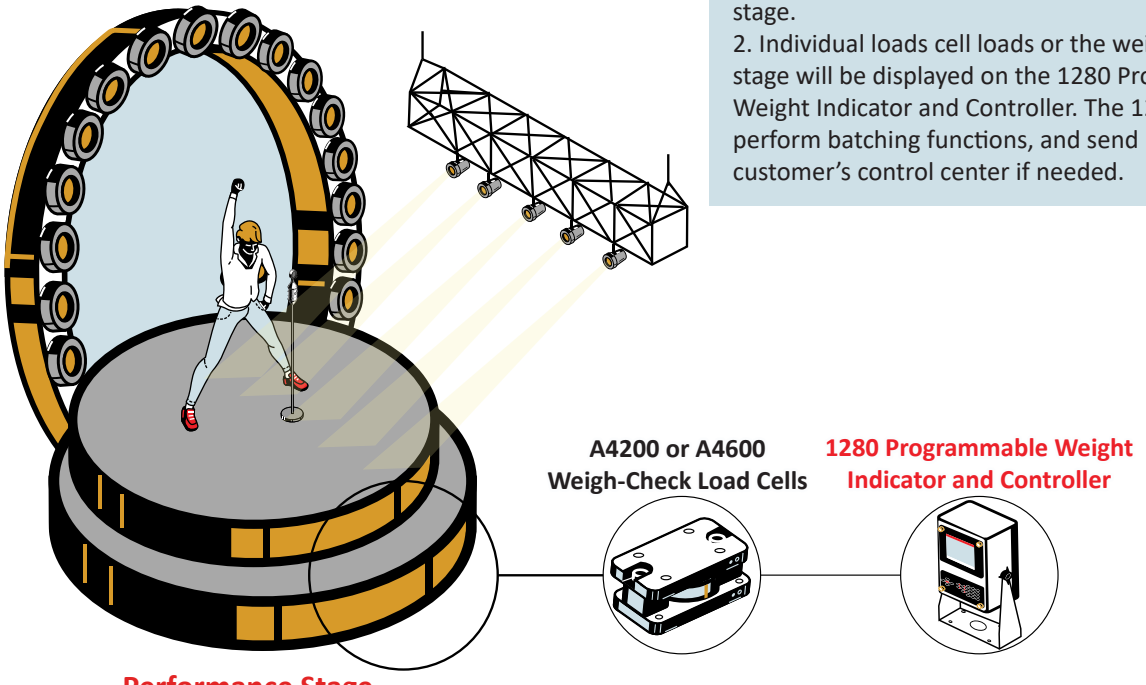
Using Interface's A4200 Zinc Plated or A4600 Stainless Steel Weigh-check Load Cells as a customizable solution, the customer was able to monitor and weigh the performance stage.

Materials

- A4200 or A4600 Weigh-Check Load Cells
- 1280 Programmable Weight Indicator and Controller

How It Works

1. The A4200 or A4600 Weigh-Check Load Cells are installed under the stage. The Weigh-Check Load Cell will measure the all load and dynamic loads on the stage.
2. Individual loads cell loads or the weight of the entire stage will be displayed on the 1280 Programmable Weight Indicator and Controller. The 1280 can also perform batching functions, and send results to the customer's control center if needed.



Pickleball Racket Core Assembly

Multi-Axis

Industry: Entertainment, Test and Measurement

Summary

Customer Challenge

A pickleball manufacturing company needs a force sensor during their assembly process. They need to measure the right amount of force it takes to press their pickle ball rackets core together, materials made of aluminum, polymer, Nomex, carbon fiber, fiber glass, foam and more.

Interface Solution

Interface's suggests installing their 3AXX 3-Axis Force Load Cell into the industrial press machine where the pickleball racket's materials are pressed together. When connected to WTS-AM-1E Wireless Strain Bridge Transmitter Modules, wireless results are transmitted to the customer's computer through the WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied Log100 Software, or using the WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters.

Results

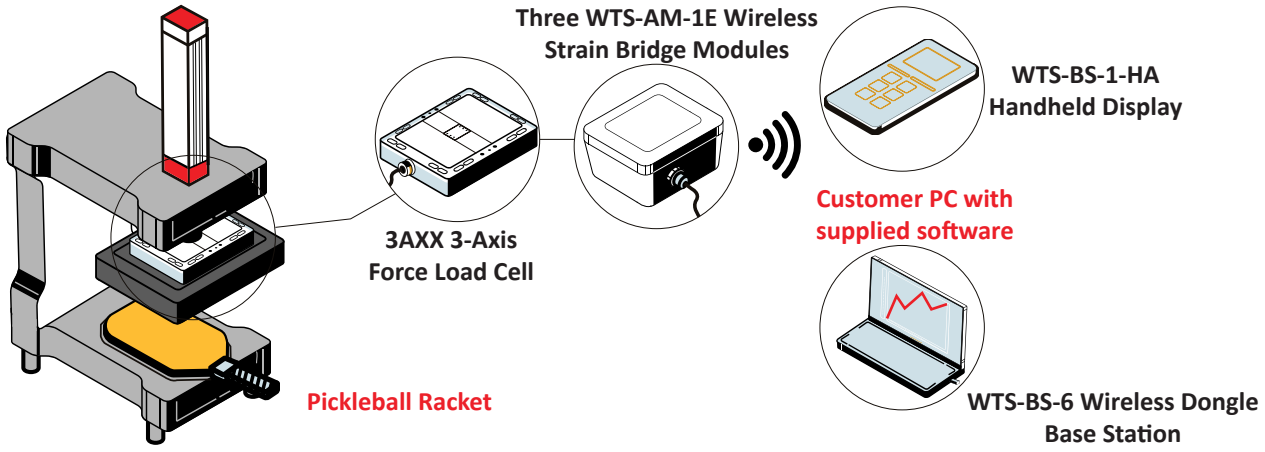
The customer was able to determine the different amount of force it took to assemble their pickleball rackets core during the manufacturing process.

Materials

- 3AXX 3-Axis Force Load Cell
- Three WTS-AM-1E Wireless Strain Bridge Transmitter Module, for each axis
- WTS-BS-6 Wireless Telemetry Dongle Base Station with Log100 Software
- WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters
- Customer PC or Laptop

How It Works

1. The 3AXX 3-Axis Force Load Cell is installed into the industrial press machine. It is also connected to three WTS-AM-1E Wireless Strain Bridge Transmitter Modules, one for each axis.
2. The pickleball racket is inserted, and the racket is pressed.
3. The force results are then wirelessly transmitted to the customer computer using the WTS-BS-6 Wireless Telemetry Dongle Base Station, where the customer is able to display, graph, and record the results using supplied Log100 software, or using the WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters.



Theater Rigging System

Load Shackles and WTS Wireless Telemetry System

Industry: Entertainment

Summary

Customer Challenge

To prevent cable tangling, a theater needs a wireless system to monitor multiple load cells at once during stage rigging activities. They want to monitor multiple locations of the load cells at once or individually, especially when equipment and loads such as curtains are being rigged on stage.

Interface Solution

Interface suggests installing multiple WTSSHK-B-JR Wireless Crosby™ Bow Load Shackles to the stage's rigging system, with integrated Wireless Strain Bridge Transmitter Modules. When a load is implemented, the load shackles will wirelessly transmit the data to the WTS-BS-4 Wireless Base Station with USB Interface in Industrial Enclosure connected to the customer's PC. Results of all load cell points or individual points can be wirelessly transmitted and displayed through a customer computer with Log 100 software, or using the WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters.

Results

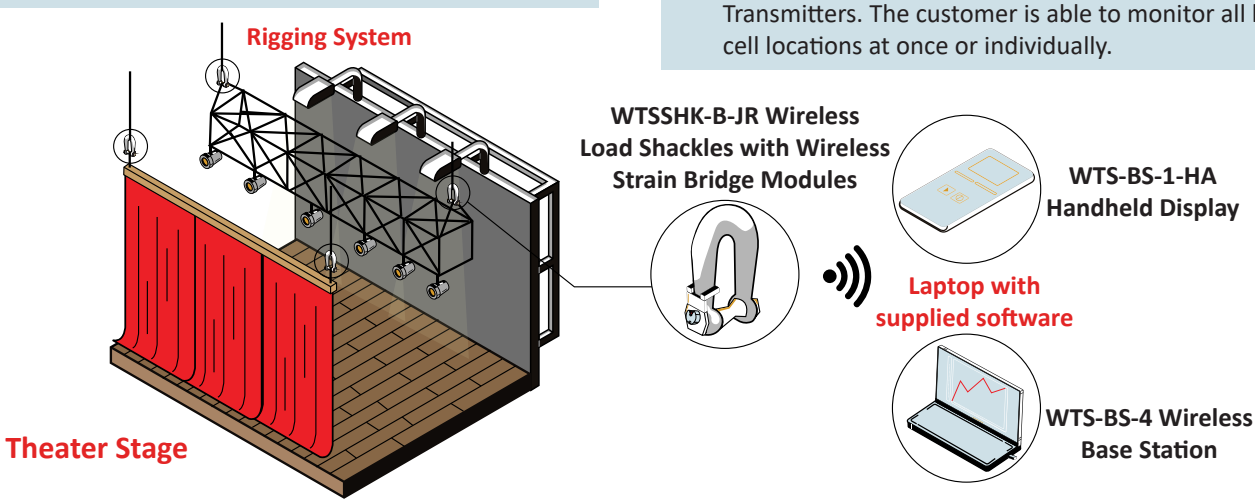
Interface's load cells and WTS Wireless Telemetry System successfully achieved the customer's need to monitor the multiple load cells at once or individually- especially during different stage rigging activities.

Materials

- WTSSHK-B-JR Wireless Crosby™ Bow Load Shackles with integrated Wireless Strain Bridge Transmitter Modules
- WTS-BS-4 Wireless Base Station with USB Interface in Industrial Enclosure
- Supplied Log100 software
- WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters
- Customer PC or Laptop

How It Works

1. Multiple WTSSHK-B-JR Wireless Crosby™ Bow Load Shackles are installed on the theater's rigging system.
2. Loads such as curtains or lighting fixtures are rigged onto the theater's stage.
3. The load shackles collect the force data, where it is wirelessly transmitted and displayed on the customer's computer with Log 100 software, or using the WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters. The customer is able to monitor all load cell locations at once or individually.



Touchscreen Force Testing
S-Type
Industry: Entertainment

Summary

Customer Challenge

Touchscreen Kiosks used in restaurants, businesses, and entertainment venues all need various tests to be performed to ensure functionality and sensitivity. One of those tests are force tests that touchscreens manufacturers must complete before putting their products out on the market.

Interface Solution

Interface's SMTM Micro S-Type Load Cell is installed the customer's force testing machine. The touchscreen is laid flat under the machine, and force tests are conducted in different locations of the touchscreen. With supplied BlueDAQ software, results are captured and reviewed using the 9330 Battery Powered High Speed Data Logging Indicator through an SD card.

Results

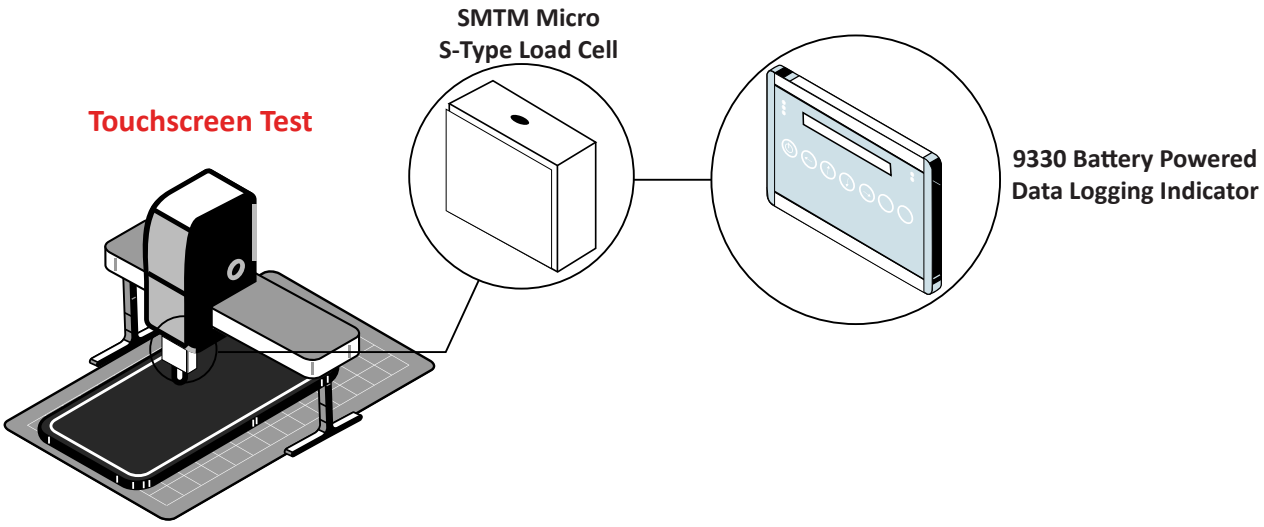
The SMTM Micro S-Type Load Cell was able to measure the forces applied to the touchscreens during the testing process. Thus, successfully measuring the amount of force it takes to make the touchscreen create a response, and ready to go out into the market.

Materials

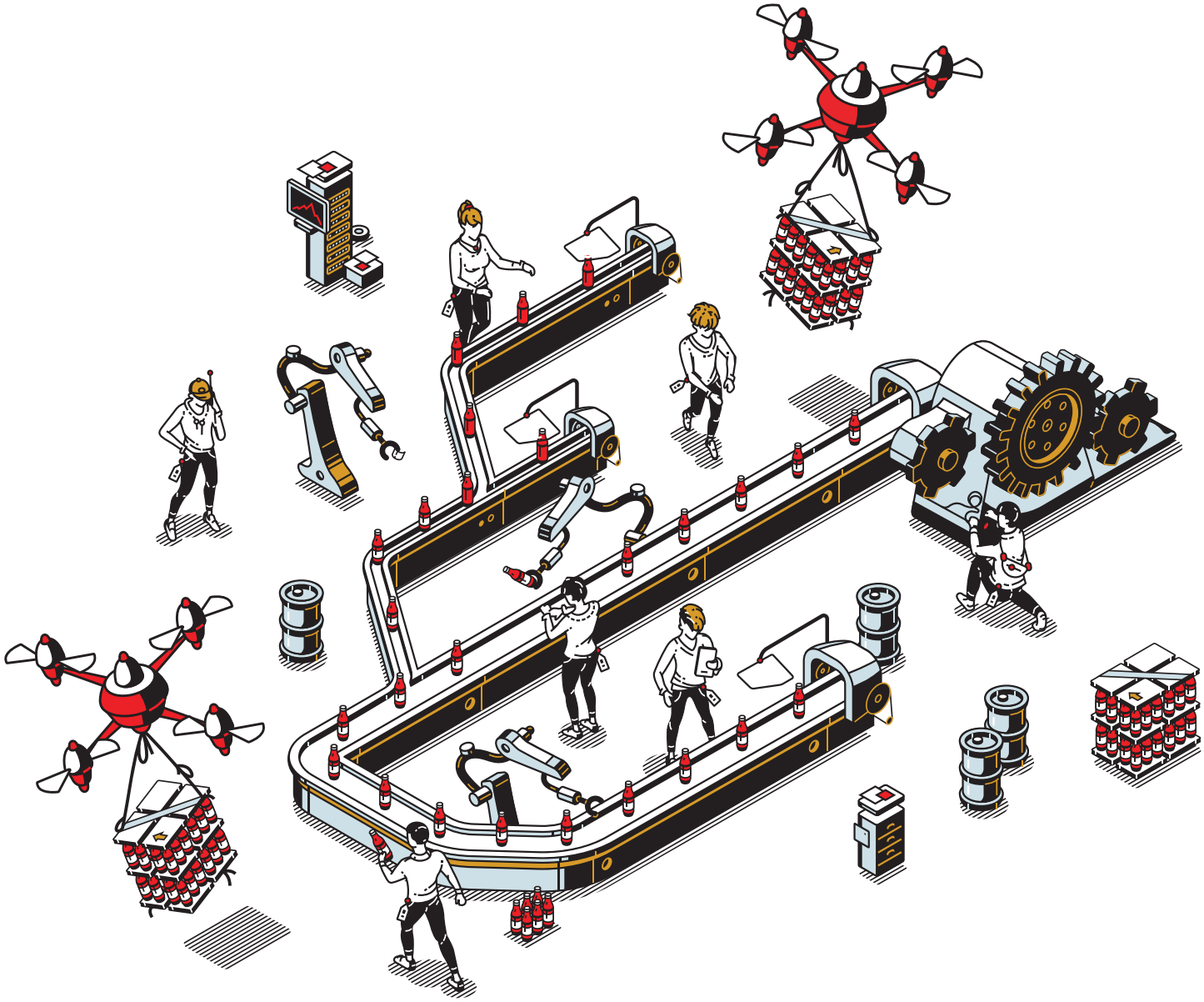
- SMTM Micro S-Type Load Cell
- 9330 Battery Powered High Speed Data Logging Indicator
- BlueDAQ Software
- Customer's touchscreen
- Customer testing machine
- Customer PC or SD card

How It Works

1. The SMTM Micro S-Type Load Cell is installed in the customer's force testing machine.
2. Multiple force tests are conducted all over the touchscreen until a reaction is shown.
3. Force measurements are captured with supplied BlueDAQ software through the 9330 Battery Powered High Speed Data Logging Indicator on an SD card. Results can be displayed directly when data is downloaded from the SD card to the customer's PC.



Industrial Automation



6-Axis Force Plate Robotic Arm

Multi-Axis

Industry: Industrial Automation

Summary

Customer Challenge

A customer wants to measure the reaction forces of their robotic arm for safety purposes. The reaction loads occur at the robotic arm's base, therefore, they need a force measurement system at the base of the robotic arm.

Interface Solution

Interface suggests using their force plate option to install at the base of the robotic arm. Four 3-Axis Force Load Cells are installed between two force plates, then installed at the bottom of the arm. This creates one large 6-Axis Force Plate. The sensors force data is recorded and displayed through the two BX8 Multi-Channel Bridge Amplifier and Data Acquisition Systems onto the customer's PC or laptop.

Results

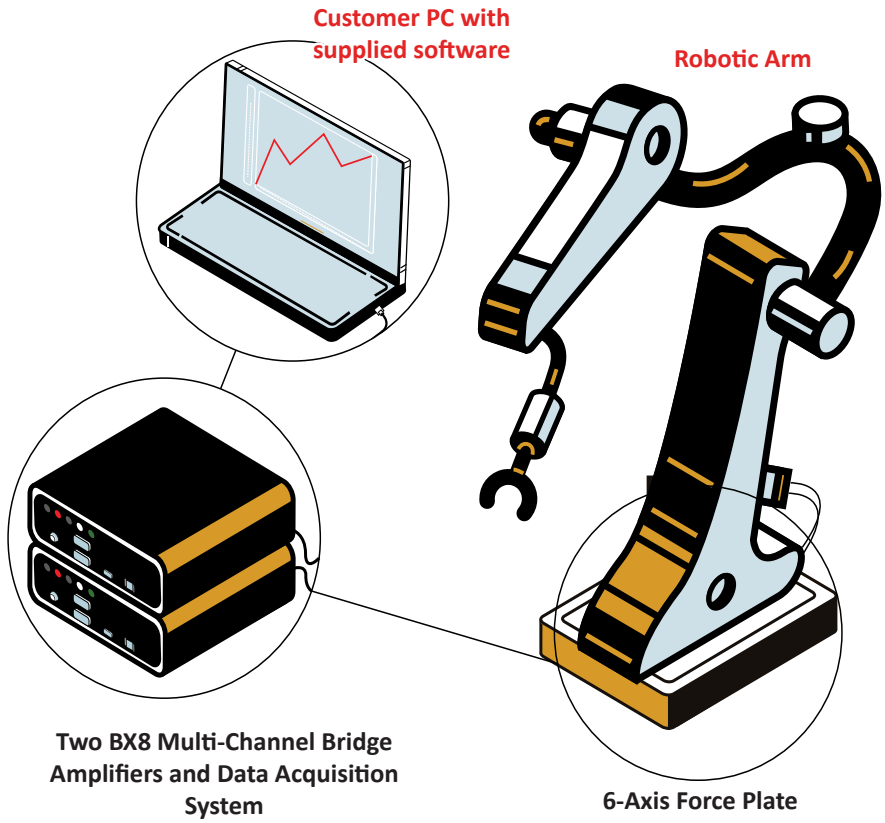
Interface's 6-Axis Force Plate was able to successfully measure the reaction forces of the customer's robotic arm.

Materials

- Four 3-Axis Force Load Cells
- Mounting Plates
- Two BX8 Multi-Channel Bridge Amplifier and Data Acquisition System with supplied software
- Robotic Arm
- Customer's PC or Laptop

How It Works

1. Four 3-Axis Force Load Cells (creating one 6-Axis Force Plate) are installed between two metal plates, creating a force plate option.
2. The 6-Axis Force Plate is installed at the base of the robotic arm.
3. Reaction forces from the robotic arm are measured and recorded using the two BX8 Multi-Channel Bridge Amplifier and Data Acquisition Modules which can then be logged, graphed, and displayed on the customer's PC or laptop when connected.



Bolt Fastening-Force
Load Washer

Industry: Industrial Automation, Test and Measurement

Summary

Customer Challenge

Over-tightening bolts during installation can cause damage to the objects being installed.

Interface Solution

Using Interface's LWCF Clamping Force Load Cell along with Interface's INF-USB3 Universal Serial Bus Single Channel PC Interface Module can provide a solution that monitors the force being applied during bolt tightening.

Results

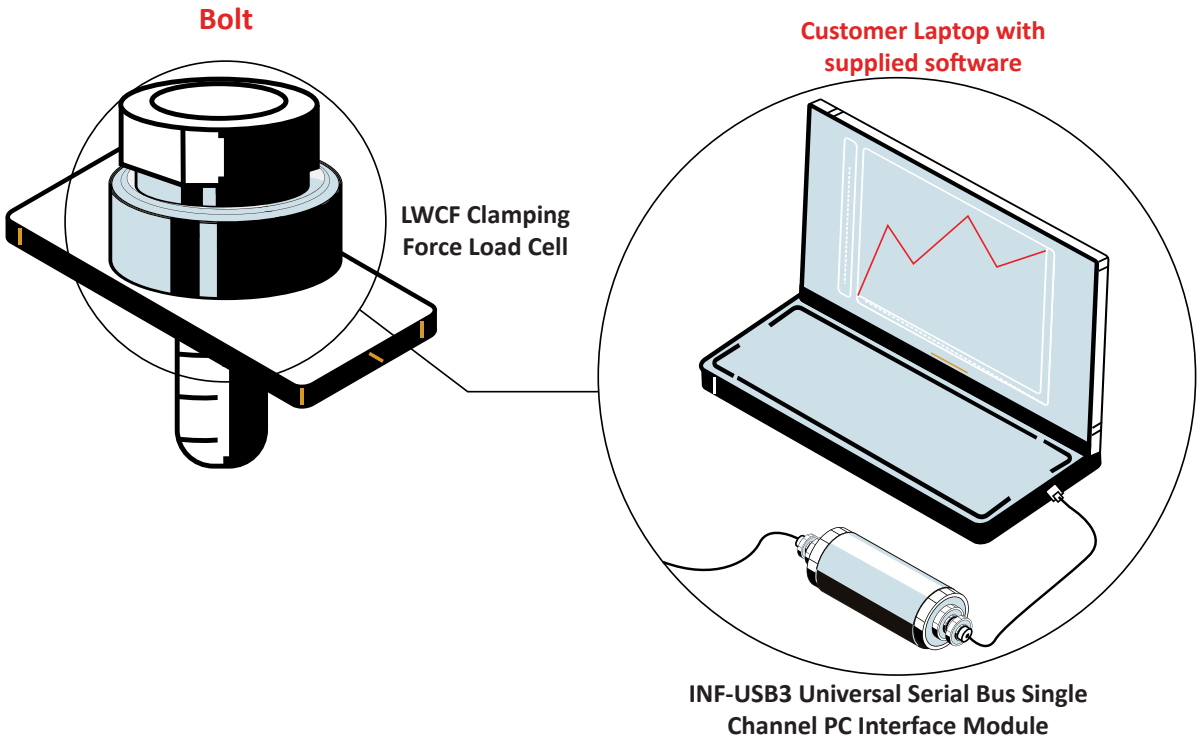
Bolts are tightened to the correct force targets and objects are installed undamaged.

Materials

- LWCF Clamping Force Load Cell
- INF-USB3 Universal Serial Bus Single Channel PC Interface Module with supplied logging and graphing software
- Customer supplied bolt and nut

How It Works

1. The LWCF Clamping Force Load Cell is installed between the bolt head and nut. The load cell will measure the load as torque is applied to the nut.
2. Using the INF-USB3 Universal Serial Bus Single Channel PC Interface Module, force readings from the load cell will be displayed, logged, and graphed directly into the PC.



Candy Stamp Force Testing
Load Cell

Industry: Industrial Automation

Summary

Customer Challenge

Manufacturers of hard shell candies often stamp text or logos on the candy shells. Stamping too hard breaks the candy shell. Stamping too light results in an uneven or incomplete imprint.

Interface Solution

A test apparatus uses an Interface Model WMC Mini Load Cell attached to hydraulic actuators to measure the compression force required.

Results

Engineers determine specific force needed to properly apply the imprint without breaking the candy shell.

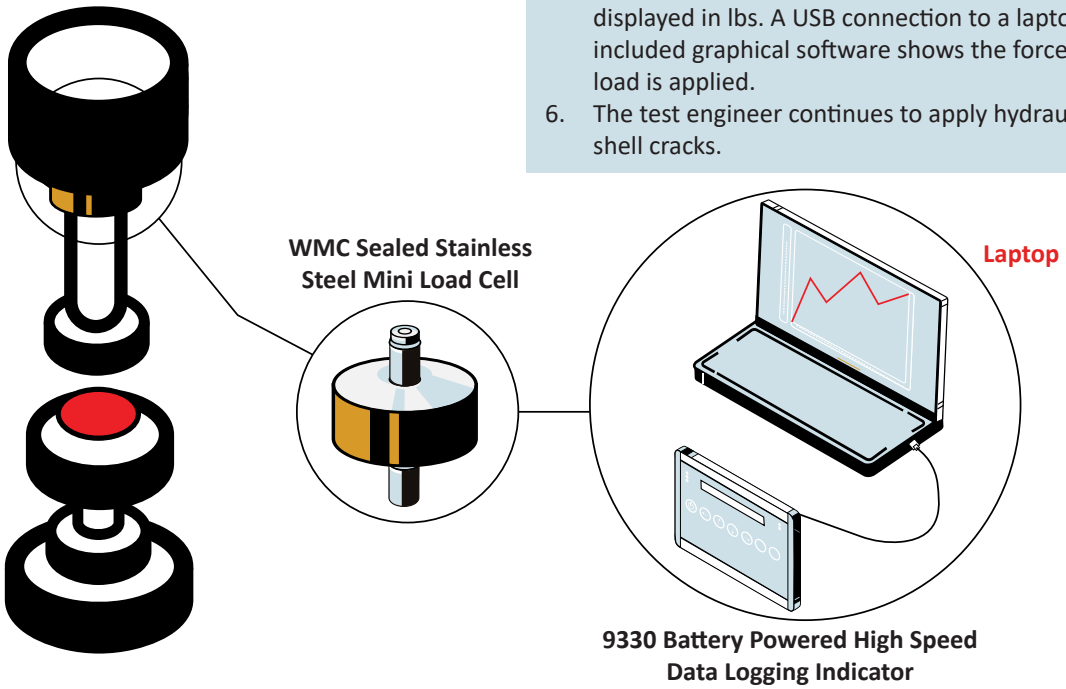
Materials

- WMC Sealed Stainless Steel Mini Load Cell
- 9330 Battery Powered High Speed Data Logging Indicator
- Customer PC or Laptop

How It Works

1. A hard shell candy is placed in a support under the test apparatus.
2. An Interface Model WMC Mini Load Cell is mounted between the hydraulic actuator and the candy being tested.
3. Force applied by the hydraulic actuator bends the top of the sealed load cell while the resistance from the candy bends the bottom of the load cell.
4. The two ends of the load compress toward the center where strain gages convert the applied force to an electrical signal.
5. Electrical signals are sent to the Interface Model 9330 and displayed in lbs. A USB connection to a laptop running the included graphical software shows the force profile as the load is applied.
6. The test engineer continues to apply hydraulic force until the shell cracks.

Candy Stamp Machine



Center of Gravity Testing for Robotics

Multi-Axis

Industry: Industrial Automation

Summary

Customer Challenge

The center of gravity represents the point where the entire weight of the robot can be considered to respond and act. It is a critical factor that determines the stability and balance of a robot, especially during operation.

Interface Solution

Interface suggests using their force plate option to install at the base of the robotic arm. Four 3-Axis Force Load Cells are installed between two force plates, then installed at the bottom of the robot. This creates one large 6-Axis Force Plate. The sensors force data is displayed and monitored with two BX8 Multi-Channel Bridge Amplifier and Data Acquisition Systems onto the customer's PC.

Results

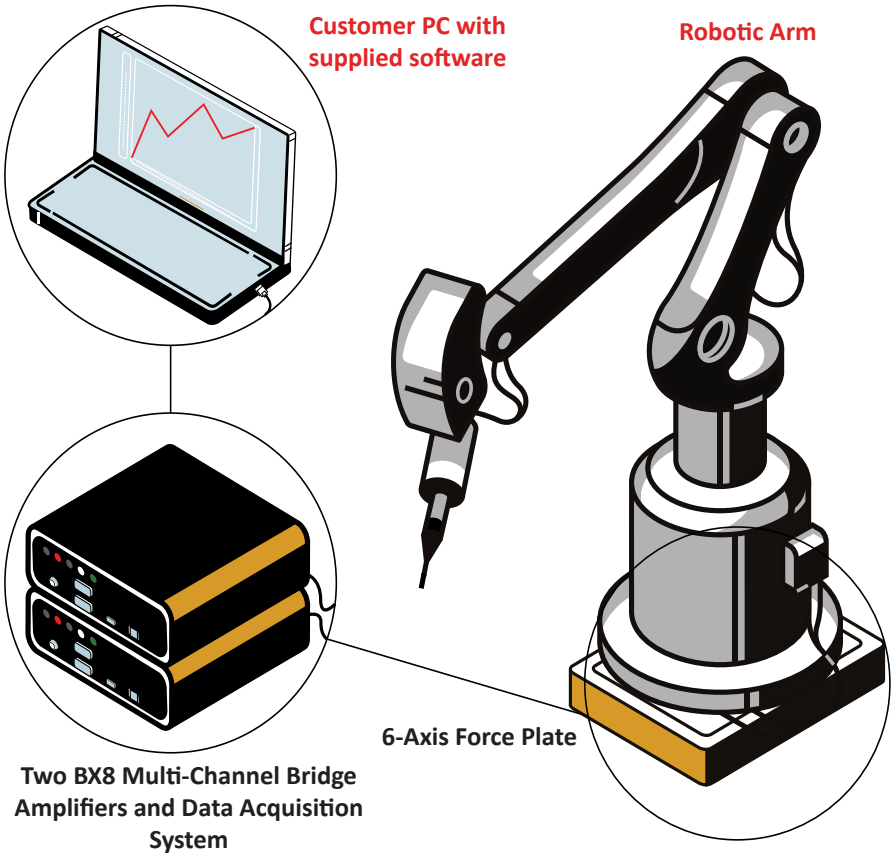
Interface's 6-Axis Force Plate was able to successfully measure the robot's center of gravity.

Materials

- Four 3-Axis Force Load Cells
- Mounting Plates
- Two BX8 Multi-Channel Bridge Amplifier and Data Acquisition System with supplied software
- Robotic Arm
- Customer's PC

How It Works

1. Four 3-Axis Force Load Cells (creating one 6-Axis Force Plate) are installed between two metal plates, creating a force plate option.
2. The 6-Axis Force Plate is installed at the base of the robotic arm.
3. Reaction forces from the robotic arm are measured and monitored using the two BX8 Multi-Channel Bridge Amplifier and Data Acquisition Module. The center of gravity is found, and data can be displayed and recorded on the customer's PC or laptop.



Chemical Reaction-Mixing Torque Transducer

Industry: Industrial Automation

Summary

Customer Challenge

An end product is made by mixing various raw materials together in a mixing tank. To ensure product quality and safety, it's important that the ingredients are mixed properly without under or over-mixing. To do this, the density and viscosity of the mixture must be continuously analyzed during the mixing process.

Interface Solution

Mount the mixing motor to the 5330 Hollow Flange Style Reaction Torque Sensor to measure mixing torque.

Results

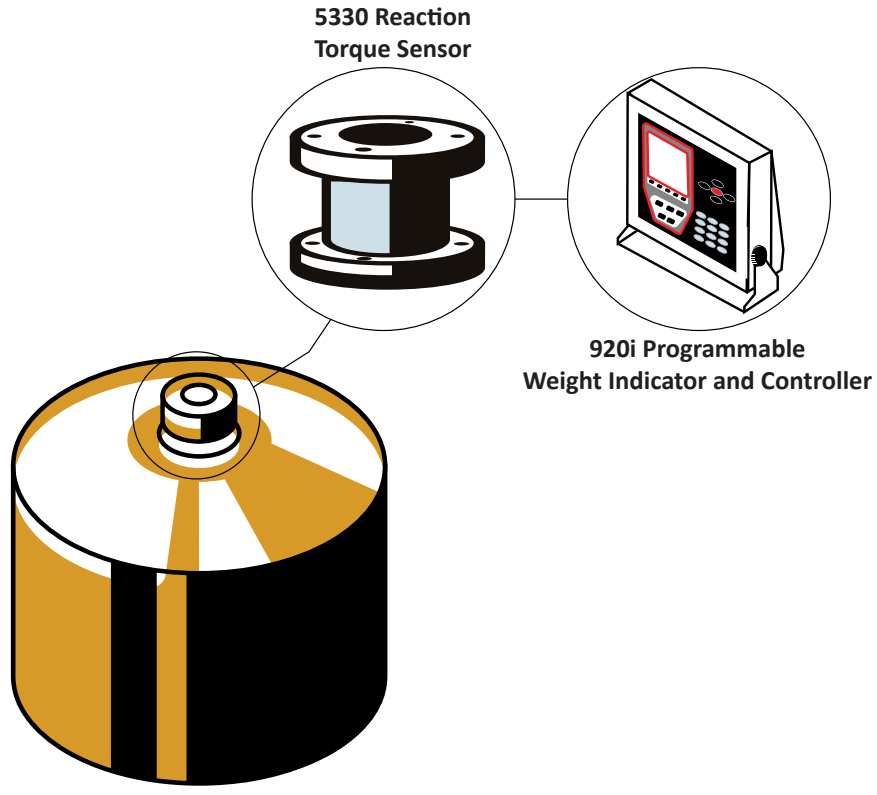
Customer is able to determine ideal density and viscosity based on torque measurements in order to monitor the ingredient mixing and maintain product quality and safety.

Materials

- 5330 Hollow Flange Style Reaction Torque Sensor
- 920i Programmable Weight Indicator and Controller

How It Works

1. The 5330 Hollow Flange Style Reaction Torque Sensor is mounted to the adapter plate between the mixing motor and the tank lid.
2. The motor shaft passes through the hollow sensor and mobilizes the mixer shaft and blades.
3. The sensor measures the torque and feeds information back to the 920i Programmable Weight Indicator and Controller.
4. Mixing speed and duration is controlled.



Cobot Arm
Torque Transducer

Industry: Industrial Automation

Summary

Customer Challenge

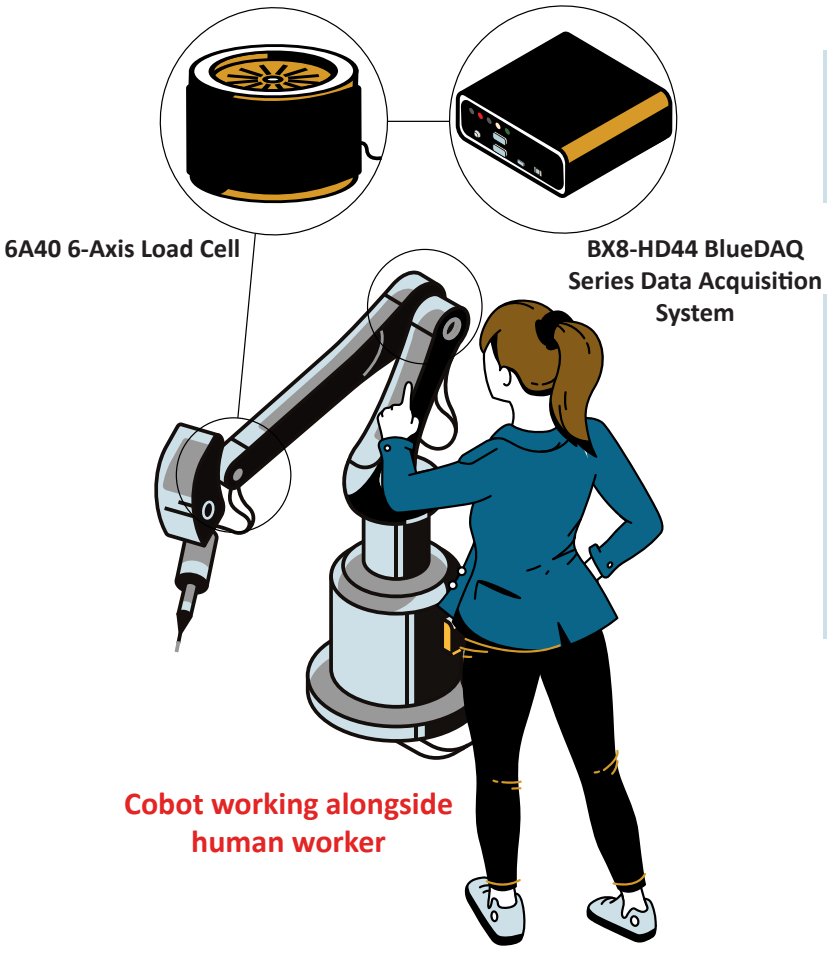
Collaborative robots, or cobots, are on the rise as they are more affordable, versatile, and user friendly along a range of different industries. However, as they are used to work alongside humans, the need for extensive safety measures need to be taken.

Interface Solution

Interface's Model 6A40A 6-Axis Load Cell can be installed at the head of the cobot to understand the amount of force and torque being applied during interactions with humans. These results can be logged, displayed, and measured when connected to Interface's BX8-HD44 BlueDAQ Series Data Acquisition System with included BlueDAQ software.

Results

The customer was able to detect any potential force or torque anamolies of the cobot, especially when working alongside a human worker during operations.



Cobot working alongside human worker

Materials

- 6A40 6-Axis Load Cell
- BX8-HD44 BlueDAQ Series Data Acquisition System with included BlueDAQ software
- Customer's robotic arm and control system

How It Works

1. The 6A40 6-Axis Load Cell is installed at the head of the cobot.
2. For data collection of force and torque measurements, the 6A40 6-Axis Load Cell interfaces with the BX8-HD44 BlueDAQ Series Data Acquisition System.
3. The customer connected the BX8's analog outputs to their control system. As a result, customer is able to log, display, and graph these measurements. The results are sent to the customer's control system via analog or digital output.

Cobot Palletizer
Torque Transducer
Industry: Industrial Automation

Summary

Customer Challenge

Collaborative robots, or cobots, are used for processing in manufacturing environments by stacking products or items onto pallets in an organized fashion either for storage, transportation, or distribution. A system is needed to measure the force and torque of the cobot arm as it picks up and lifts objects onto the pallet.

Interface Solution

Interface's Model 6A40A 6-Axis Load Cell can be installed between the robot flange and the robot's grabber mechanism. When connected to the BX8-HD44 Data Acquisition, the customer can receive force and torque measurements when connected to their control system using BlueDAQ sofware.

Results

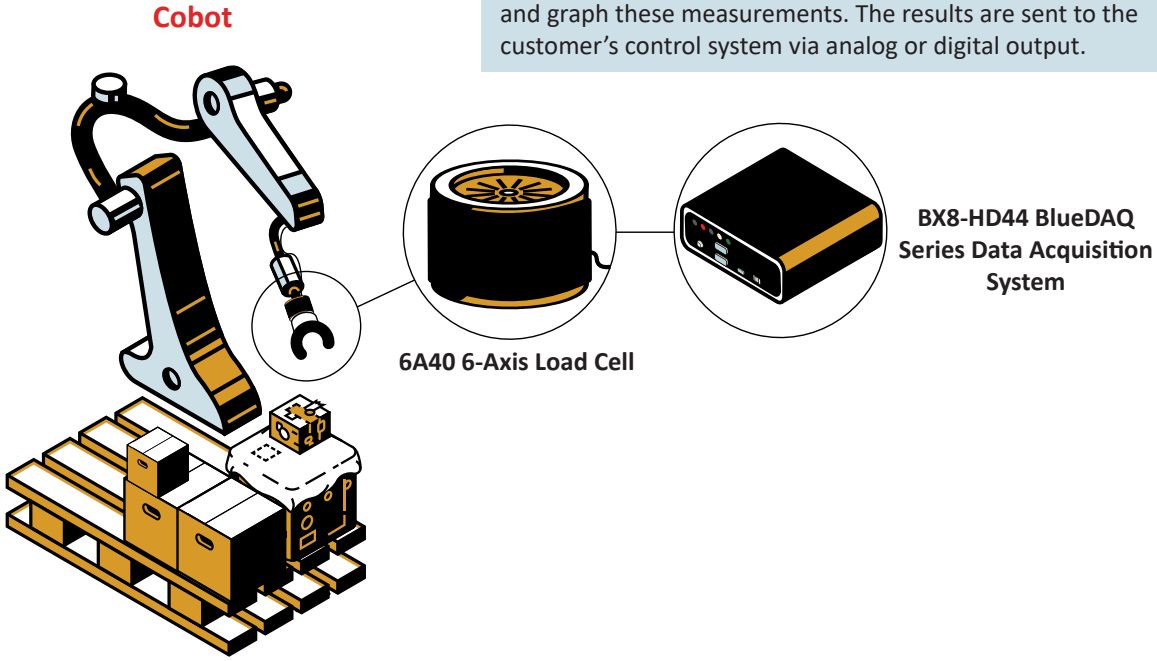
The 6A40-6 Axis Load Cell was able to measure all forces and torques (Fx, Fy, Fz, Mx, My, Mz) and the BXB-HD44 Data Acquisition was able to log, display, and graph these measurements while sending scaled analog output signals for these axes to the robot's control system.

Materials

- 6A40 6-Axis Load Cell
- BX8-HD44 BlueDAQ Series Data Acquisition System with included BlueDAQ software
- Customer's robotic arm and control system

How It Works

1. The 6A40 6-Axis Load Cell between robot flange and robot grabber.
2. 6A40 6-Axis Load Cell is connected to the BX8-HD44 BlueDAQ Series Data Acquisition System, which collects force and torque measurement data.
3. The customer connected the BX8's analog outputs to their control system. As a result, customer is able to log, display, and graph these measurements. The results are sent to the customer's control system via analog or digital output.



Commercial Food Processing
Load Cell

Industry: Industrial Automation

Summary

Customer Challenge

A food processing plant wants accurate results of their in-motion check weigher when food is weighted and processed down the belt. They want to ensure production line efficiency and food quality. The customer also wants real-time results of their food being weighed, and a load cell that can endure the food industry's grubby environment.

Interface Solution

Multiple of Interface's SPI High Capacity Platform Scale Load Cells can be installed in the customer's in-motion check weigher at the specific points where the food is weighed on the belt. The SPI High Capacity Platform Scale Load Cells delivers precise weighing results. When connected to the 920i Programmable Weight Indicator and Controller, will give the customer real time results of the weight of the food being processed. The 920i Programmable Weight Indicator and Controller can read up to four scale channels in real-time.

Results

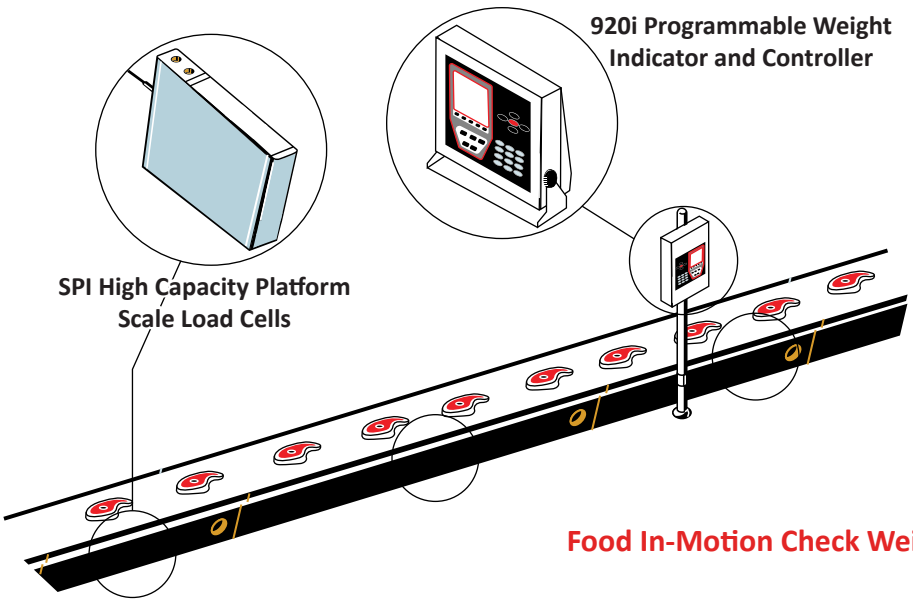
The customer got precise weighing results in real-time of the food being processed on their in-motion check weigher. They were also able to view all of the load cells in use simultaneously with Interface's instrumentation.

Materials

- SPI High Capacity Platform Scale Load Cells
- 920i Programmable Weight Indicator and Controller

How It Works

1. The SPI High Capacity Platform Scale Load Cells are installed under the weighing points of the customer's in-motion check weigher. As the food is transported across the belts, the SPI High Capacity Platform Scale Load Cells will measure its weight in real-time.
2. Force results are sent to the 920i Programmable Weight Indicator and Controller, where it can read all of the load cells simultaneously and in real-time.



Food In-Motion Check Weigher

Continuum Robot Testing
Multi-Axis

Industry: Industrial Automation, Medical and Healthcare

Summary

Customer Challenge

A continuum robot is a robotic arm that has a continuously curving design, that acts similarly to the trunk of an elephant. It is very maneuverable, and is used for tedious applications such as robotic surgery. A manufacturer needs force sensors during the testing process of their continuum robots.

Interface Solution

The 6A40 6-Axis Standard Capacity Load Cell is installed at the base of the bending segments of the continuum robot's arm. Push and pull rods are connected threaded through the arm multiple washers, and the load cell measures the forces of all axes when the continuum arm operates and moves.

Results

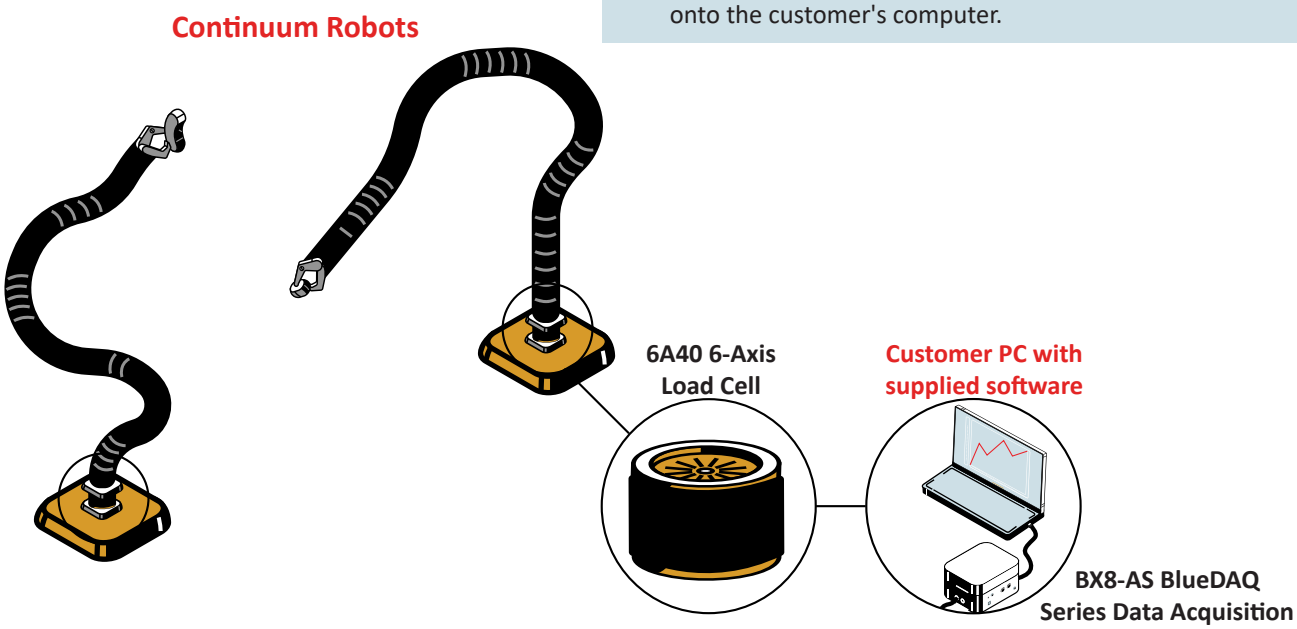
Interface's multi-axis load cell and instrumentation successfully tested the customer's continuum robotic arms.

Materials

- 6A40 6-Axis Standard Capacity Load Cell
- BX8-AS BlueDAQ Series Data Acquisition System with supplied software
- Customer computer
- Customer continuum arm undergoing test

How It Works

1. The 6A40 6-Axis Standard Capacity Load Cell is installed at the base of the continuum arm.
2. The BX8-AS BlueDAQ Series Data Acquisition System is connected to the 6A40 6-Axis load cell and the customer's PC Laptop.
3. As the continuum robotic arm undergoes a functionality test the load cell measures forces in all axes (Fx, Fy, Fz, Mx, My, Mz). The BX8-AS displays, logs, and graphs all measurements onto the customer's computer.



Drone Parcel Delivery

Interface Mini™

Industry: Industrial Automation

Summary

Customer Challenge

Rapid delivery of packages has now migrated to the use of "Delivery Drones". The Customer needs to weigh the payload of the package being delivered while the propeller motors compensate for weight shifting or uneven weight distribution of the package to lift and fly the package to its destination.

Interface Solution

Four Interface WMC Sealed Stainless Steel Miniature Load Cells are used to measure the weight of the payload and detect weight shifting or uneven weight distribution of the package which would signal the necessary propeller

Results

The four WMC load cells accurately measured the payload weight and maintained stability of the propeller motors to safely deliver the parcel. This information, was communicated to the drones on-board processor for monitoring and recording this information during flight.

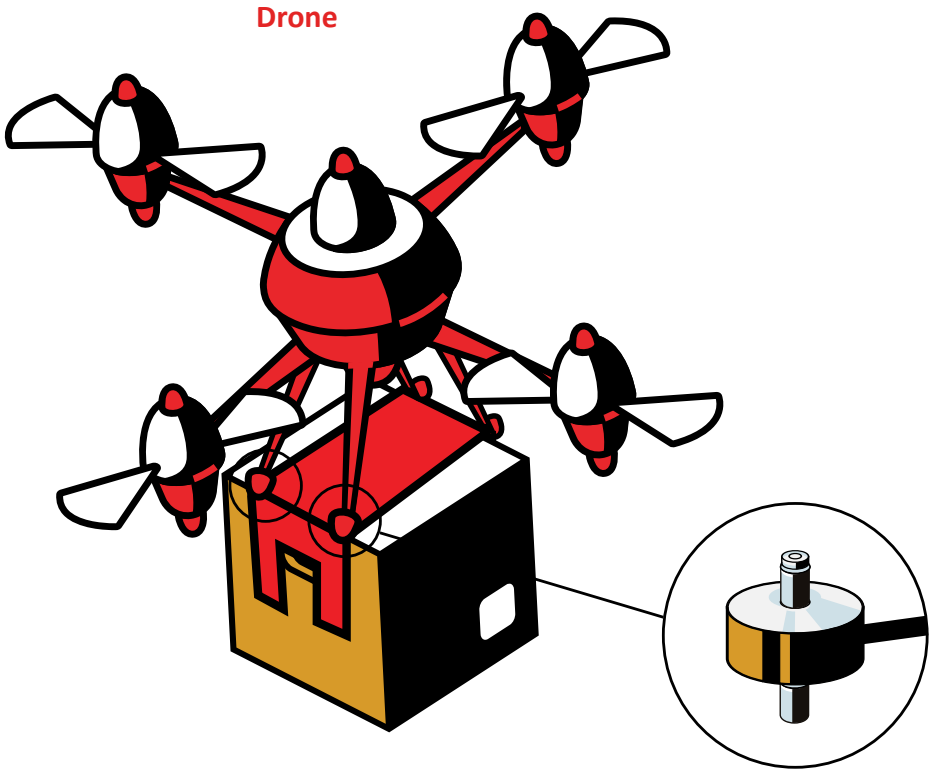
Materials

Interface Solution

- Four Interface WMC Sealed Stainless Steel Miniature Load Cells

How It Works

The four WMC Sealed Stainless Steel Miniature Load Cells are connected independently to each of the four landing gear legs. Once connected to the drone's processor, weight of payload is immediately communicated and stored, as well as detecting uneven weight distribution communicating with the individual propeller motors to increase the RPM's and balance the weight.



WMC Sealed Stainless Steel Miniature Load Cells

EduRobots
Torque Transducer
Industry: Industrial Automation

Summary

Customer Challenge

Education robots, or EduRobots, are robotic devices or systems designed to assist and enhance the learning experience for students. These robots are equipped with advanced technologies and artificial intelligence to facilitate a more immersive and effective learning environment. For humanoid EduRobots, testing is needed to ensure their limbs move properly.

Interface Solution

Interface's MRTP Miniature Overload Protected Flange Style Reaction Torque Transducers connects to the servo motors in the limbs of humanoid EduRobots. During the testing phases, the customer can view torque results on their PC when the transducers are connected to the BX8-AS BlueDAQ Series Data Acquisition with Industrial Enclosure.

Results

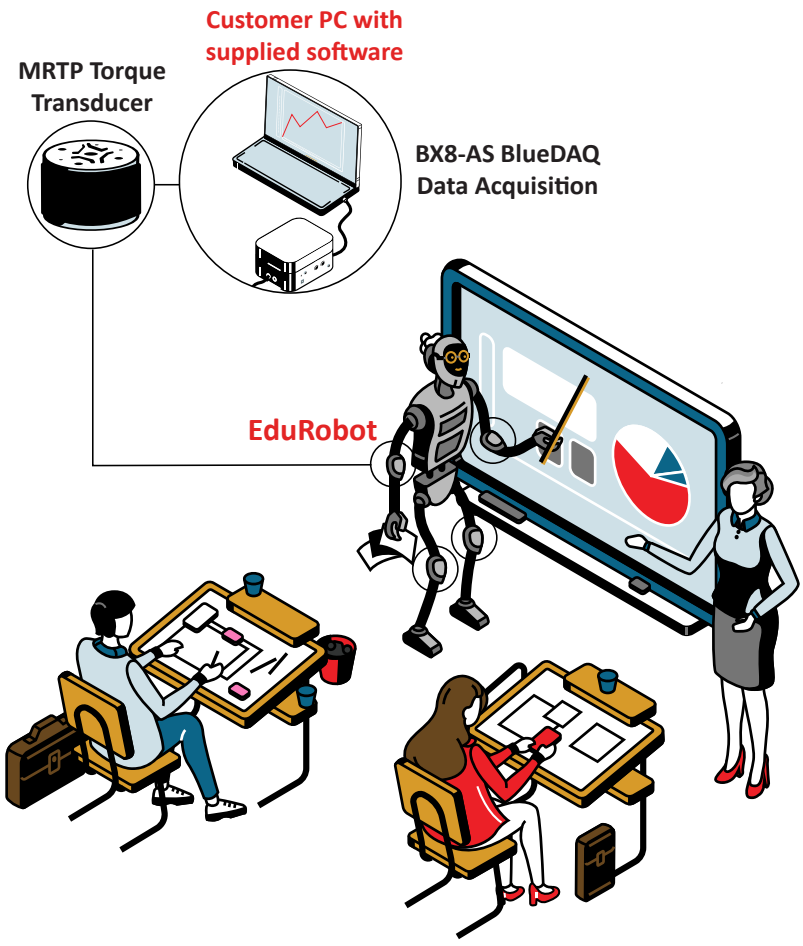
Interface's MRTP torque transducer successfully measured the torque of the servo motors used to move the limbs of the humanoid EduRobot.

Materials

- MRTP Miniature Overload Protected Flange Style Reaction Torque Transducers
- BX8-AS BlueDAQ Series Data Acquisition with Industrial Enclosure with included BlueDAQ software
- EduRobot under test
- Customer PC or Laptop

How It Works

1. The MRTP Miniature Overload Protected Flange Style Reaction Torque Transducers are attached to the servo motors inside of the limbs of the EduRobot's body.
2. The BX8-AS BlueDAQ Series Data Acquisition will collect the torque results, where it can be displayed when connected to the customer's PC with supplied BlueDAQ software.



Friction Testing
Multi-Axis

Industry: Industrial Automation, Test and Measurement

Summary

Customer Challenge

A testing laboratory was looking to replace two single axis load cells used in their friction testing machine with one sensor that could measure force on the x, y, and z axis simultaneously.

Interface Solution

An Interface Model 3A60 3-Axis load cell was installed on their existing machine with an Interface BSC4D-USB Multi-Channel PC Interface hooked directly to a PC laptop to monitor and log the data in real time.

Results

The testing laboratory was able to simplify their sensor set-up and improve their data collection, creating more value for their end customer.

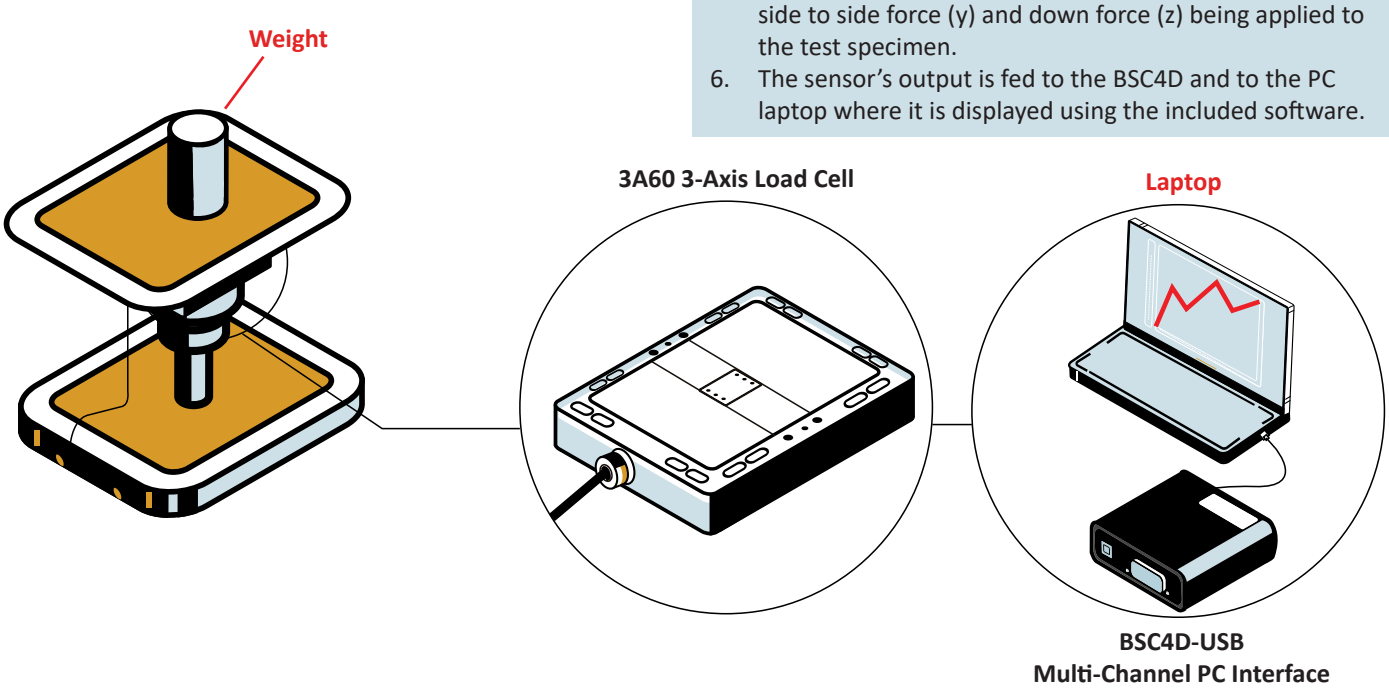
Materials

- 3A60 3-Axis Load Cell
- BSC4D-USB Multi-Channel PC Interface
- Module which includes BlueDAQ – display, graphing, and logging software
- Appropriate cabling

How It Works

1. The 3-Axis load cell is installed between the arm of the friction testing machine and the test specimen.
2. The BSC4D is installed between the 3-Axis load cell and the PC laptop.
3. Weights are placed on the top of the arm to create a down force.
4. The machine arm drags the test specimen across the material resting on the bed.
5. The 3-Axis load cell measures the forward/back force (x), side to side force (y) and down force (z) being applied to the test specimen.
6. The sensor's output is fed to the BSC4D and to the PC laptop where it is displayed using the included software.

Friction Testing Machine



Furniture Fatigue Cycle Testing

Load Cell

Industry: Industrial Automation

Summary

Customer Challenge

To meet safety protocols in relation to the manufacturing of various furniture products, fatigue testing, shock testing, and proof testing must be rigorously performed before diffusion into the marketplace. Force testing simulations on furniture products are critical in determining the posted max loads in order to protect manufacturers from liability due to damages that might result from the misuse of those products and overloading.

Interface Solution

Using an Interface Model SSMF Fatigue Rated S-Type Load Cell along with Interface Model 9890 Strain Gage, Load Cell, & mV/V Indicator provides a solution that measures the force being applied in fatigue cycle testing of a furniture product, in this case testing the rocking mechanism in an office chair. Unlike other similar load cells, the Model SSMF is fatigue rated making it highly suitable for fatigue testing. No fatigue failure of any fatigue-rated Interface load cell, used within it's ratings, has ever been reported.

Results

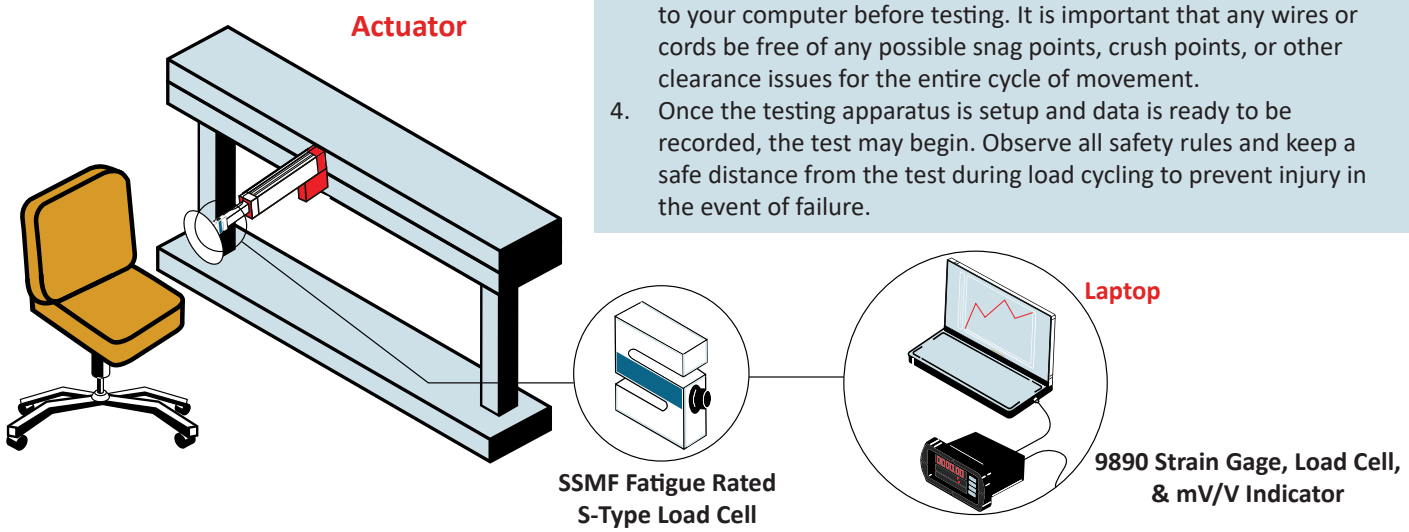
The furniture manufacturer was able to obtain accurate data about the rocking mechanism the office chair as it was fatigue cycled into failure. Adjustments were made to the design to improve the safety and life of the furniture, ensuring product quality and protecting the manufacturer from future liability.

Materials

- SSMF Fatigue Rated S-Type Load Cell
- 9890 Strain Gage, Load Cell, & mV/V Indicator, which comes standard with logging and configuration software

How It Works

1. Determine the feature on the product to be tested, and build an apparatus that will focus loads into that area.
2. Once the load applicators or cylinders are in place, install the SMF Fatigue Rated S-Type Load cell somewhere along the direct line of force between the cylinder and the load affected area.
3. To read the load forces, connect the 9890 to your load cell and to your computer before testing. It is important that any wires or cords be free of any possible snag points, crush points, or other clearance issues for the entire cycle of movement.
4. Once the testing apparatus is setup and data is ready to be recorded, the test may begin. Observe all safety rules and keep a safe distance from the test during load cycling to prevent injury in the event of failure.



Harness Durability Testing
Load Cell

Industry: Industrial Automation, Test and Measurement

Summary

Customer Challenge

Harnesses are often used to strap humans of various weights to safety equipment or sports gear. Harness manufacturers must determine load and durability factors for harnesses and their attachment points.

Interface Solution

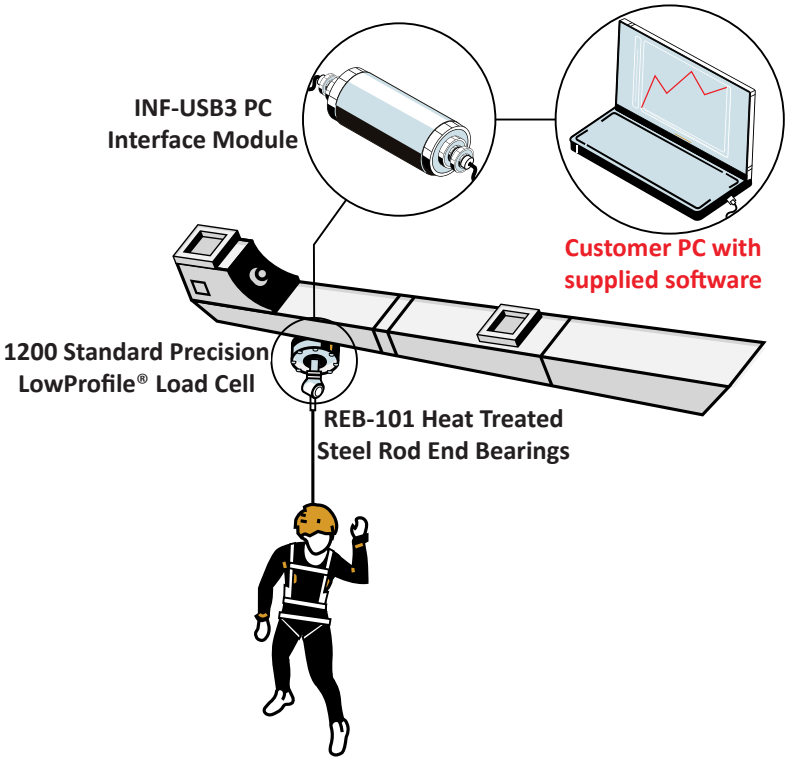
A drop test apparatus uses an Interface 1200 Standard Precision LowProfile® Load Cell attached to a cable and loaded harness. The loaded harness is dropped from a specified height to measure the force generated during sudden stop at maximum cable extension.

Results

Engineers determine the total force on the harness for various body weights dropped from maximum usage heights to set harness limits. Tests can be repeated numerous times to determine fatigue and durability limits.

Materials

- 1200 Standard Precision LowProfile® Load Cell
- REB-101 Heat Treated Steel Rod End Bearings
- INF-USB3 Universal Serial Bus Single Channel PC Interface Module with supplied software
- Customer PC or Laptop



How It Works

1. Test engineers place the harness to be tested on a dummy of known weight.
2. The loaded harness is attached to one end of a cable. Ideally this is the same type of cable used to attach the harness to the sports equipment or safety device. The other end of the cable is attached to the bottom of 1200 Standard Precision LowProfile® Load Cell is fitted with a rod end bearing.
3. The top of the 1200 attaches to the cross beam of a drop test apparatus, either directly or via another cable.
4. The loaded harness is winched to the top of the drop test apparatus, and then dropped. When the cable fully extends, the load cell measures initial and subsequent forces experienced as the loaded harness stops and bounces.
5. The load cell sends force measurement data to a laptop through an INF-USB3 Universal Serial Bus Single Channel PC Interface.

Industrial Fan
Load Cell

Industry: Industrial Automation

Summary

Customer Challenge

Blowers and fans are used in key industries such as mining, chemical plants, and power plants. A manufacturer of industrial fans needs fan bearing solution that can perform at high speeds and loads. They want to ensure the fan's functionality, therefore, ensuring its service life as well.

Interface Solution

Interface's PBLC2 Pillow Block Load Bearing Load Cells were installed on the industrial fan's drive shaft during the assembly process. This is to measure the forces that could be transferred through the fan shaft like out of balance conditions and bearing loads.

Results

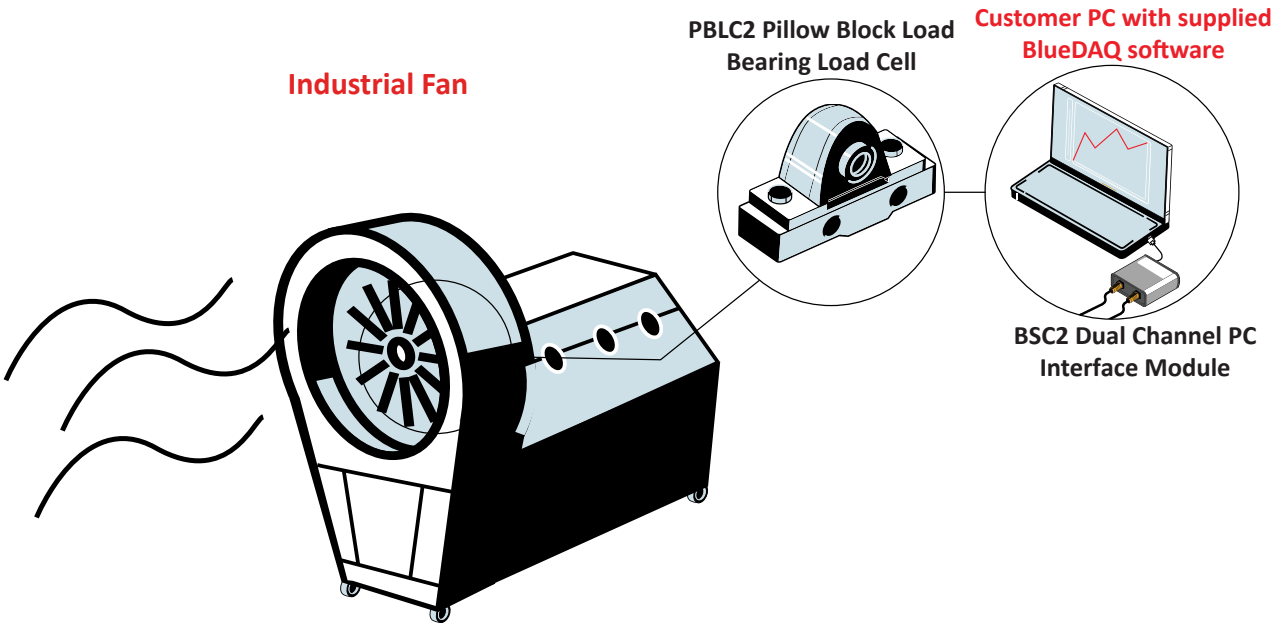
The PBLC2 Pillow Block Load Bearing Load Cells were the perfect solution for the assembly of the manufacturer's large industrial fans, producing high quality and trouble free fans.

Materials

- PBLC2 Pillow Block Load Bearing Load Cell
- BSC2 Dual Channel PC Interface Module with included BlueDAQ software
- Customer PC or Laptop

How It Works

1. Two PBLC2 Pillow Block Load Bearing Load Cells are installed on the industrial fans drive shaft, which is connected to a drive motor.
2. The motor is turned on, and the pillow block load bearings are tested to see if they are durable enough to hold high speeds and loads of the fan.
3. When connected to the BSC2 Dual Channel PC Interface Module, data is displayed, logged, and graphed on the customer's PC with supplied BlueDAQ software.



Industrial Robotic Arm
Multi-Axis

Industry: Industrial Automation

Summary

Customer Challenge

A manufacturer of a robot arm needs to measure force and torque when the arm picks up and places objects.

Interface Solution

Interface supplied Model 6A40A 6-Axis Load Cell with Model BX8-HD44 Data Acquisition Amplifier.

Results

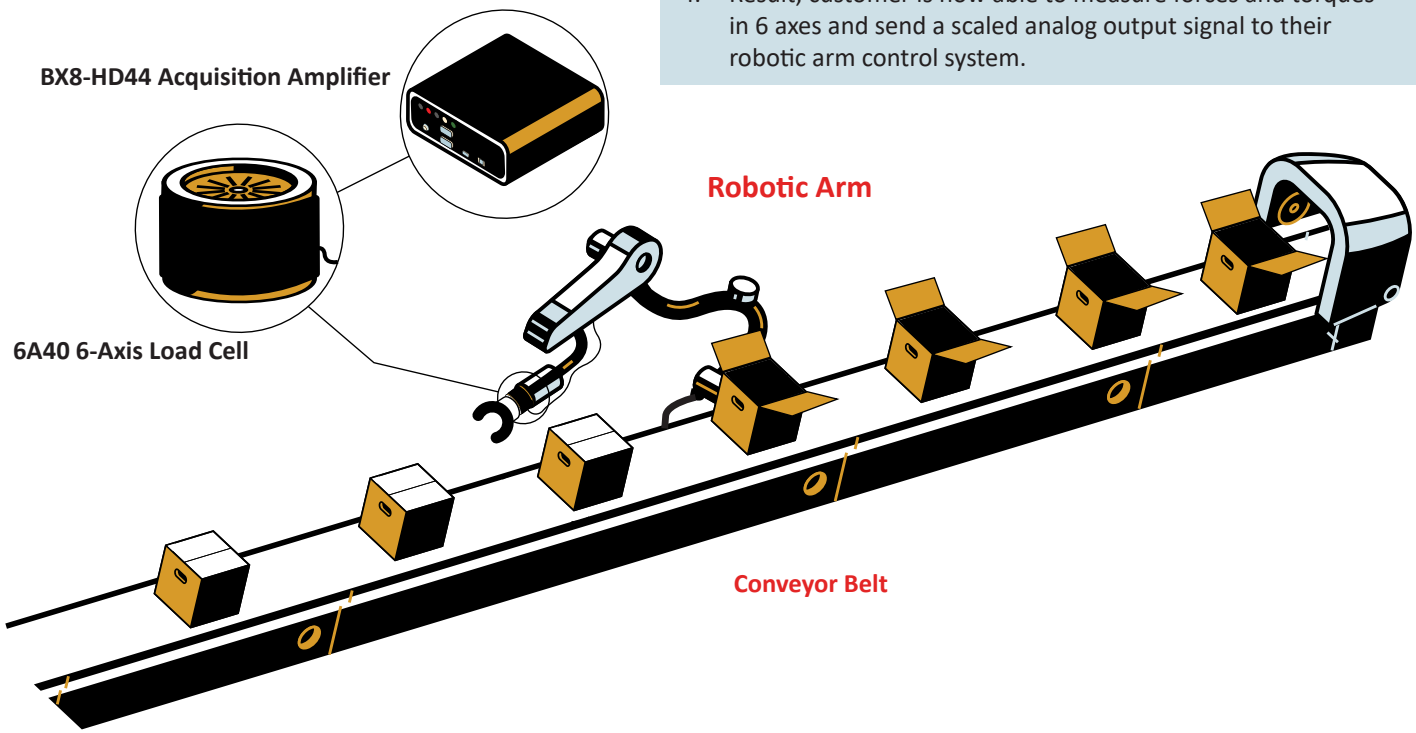
The 6A40-6 Axis Load Cell was able to measure all forces and torques (F_x, F_y, F_z, M_x, M_y, M_z) and the BXB-HD44 Data Acquisition/Amplifier was able to log, display, and graph these measurements while sending scaled analog output signals for these axes to the robot's control system

Materials

- 6A40 6-Axis Load Cell
- BX8-HD44 Data Acquisition Amplifier which includes BlueDAQ configuration, logging, display and graphing software
- Customer's robotic arm and control system

How It Works

1. Customer installed 6A40 6-Axis Load Cell between robot flange and robot grabber.
2. 6A40 6-Axis Load Cell was connected to BX8-HD44 Data Acquisition/Amplifier.
3. Customer connected analog outputs to their control system.
4. Result, customer is now able to measure forces and torques in 6 axes and send a scaled analog output signal to their robotic arm control system.



Lifting Heavy Objects
Wireless Telemetry System
Industry: Industrial Automation

Summary

Customer Challenge

Customer needs to use a crane to move heavy construction materials around the work site and need to monitor the weight of these objects as they are lifted.

Interface Solution

Interface Model WTSSHK-B Wireless Load Shackle are connected in crane load string to measure forces. Model WTS-BS-1-HA Battery Powered Handheld Display is used to wirelessly receive load information and display results.

Results

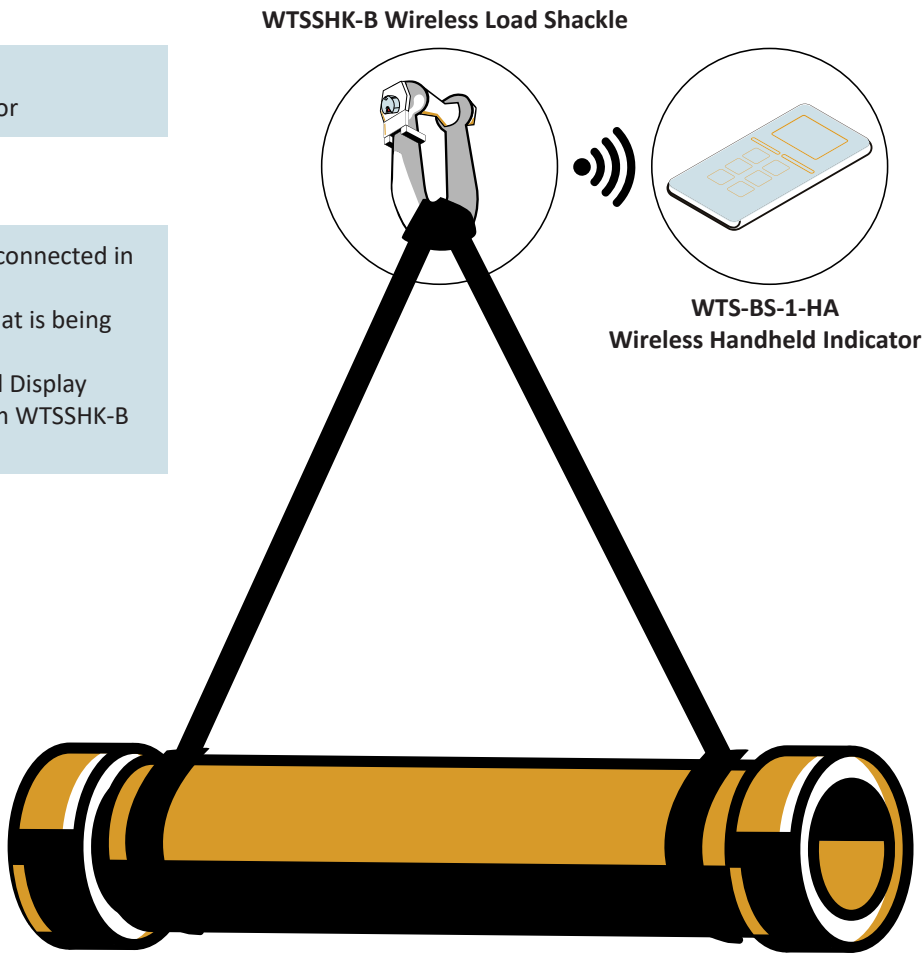
Customer is successfully lifting and reading weight (wirelessly) on a handheld display while material is being relocated.

Materials

- WTSSHK-B Wireless Load Shackle
- WTS-BS-1-HA Wireless Handheld Indicator

How It Works

1. The WTSSHK-B Wireless Load Shackle is connected in the load string of the crane.
2. Customer connects straps to the item that is being lifted and to the load shackle.
3. WTS-BS-1-HA Battery Powered Handheld Display will wirelessly display force readings from WTSSHK-B Wireless Load Shackle.



Roboforming
Multi-Axis

Industry: Industrial Automation, Manufacturing

Summary

Customer Challenge

Roboforming is a new manufacturing term where robotic systems form different materials. For instance, roboforming sheet metal, or robotic incremental sheet forming (RISF), is when a robot uses a forming tool to gradually shape a sheet of metal until its desired form. A force measurement system needs to be implemented in order to monitor and control the amount of force exerted on the roboforming tool.

Interface Solution

Interface's 6A40A 6-Axis Load Cell can be installed between the flange and the roboforming tool. When connected to the BX8-HD44 Data Acquisition, the customer can receive force and torque measurements when connected to their control system using BlueDAQ sofware.

Results

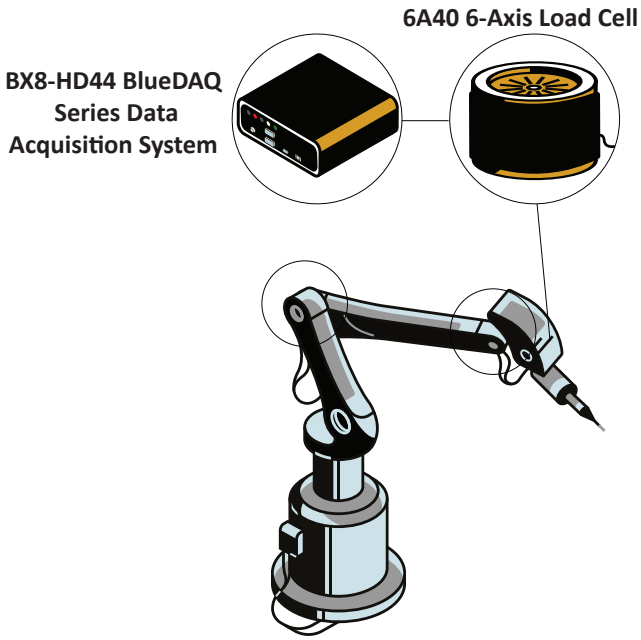
Interface's 6A40-6 Axis Load Cell was able to measure all forces and torques (Fx, Fy, Fz, Mx, My, Mz) and the BXB-HD44 Data Acquisition was able to log, display, and graph these measurements while sending scaled analog output signals for these axes to the robot's control system.

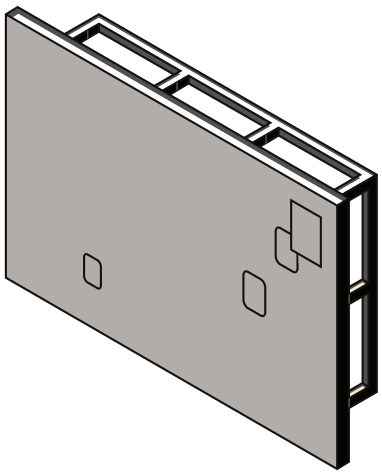
Materials

- 6A40 6-Axis Load Cell
- BX8-HD44 BlueDAQ Series Data Acquisition System with included BlueDAQ software
- Customer's robotic system

How It Works

1. The 6A40 6-Axis Load Cell is positioned between the flange and the roboforming tool on the robot.
2. 6A40 6-Axis Load Cell is linked to the BX8-HD44 BlueDAQ Series Data Acquisition System, which gathers force and torque measurement data.
3. The customer connects the BX8's analog outputs to their robotic control system. The customer is able to monitor, log, display, and graph these measurements. The results are sent to the customer's control system via analog or digital output.





Roboforming Operation

Robotic Arm

Load Button Load Cells

Industry: Industrial Automation

Summary

Customer Challenge

The customer needs to lift and move delicate objects, like a glass bottle, in an automated environment with a robotic arm without causing damage to the objects that are being lifted and moved.

Interface Solution

Two ConvexBT Load Button Load Cells are used in the grips of the robotic arm to measure the amount pressure being applying to the object it is lifting and moving. The DMA2 DIN Rail Mount Signal Conditioner converts the signal received from the two ConvexBT Load Button Load Cells from mV/V to volts to the PLC Controller which tells the robotic arm to stop clamping pressure when a specified amount of pressure is applied to the object.

Results

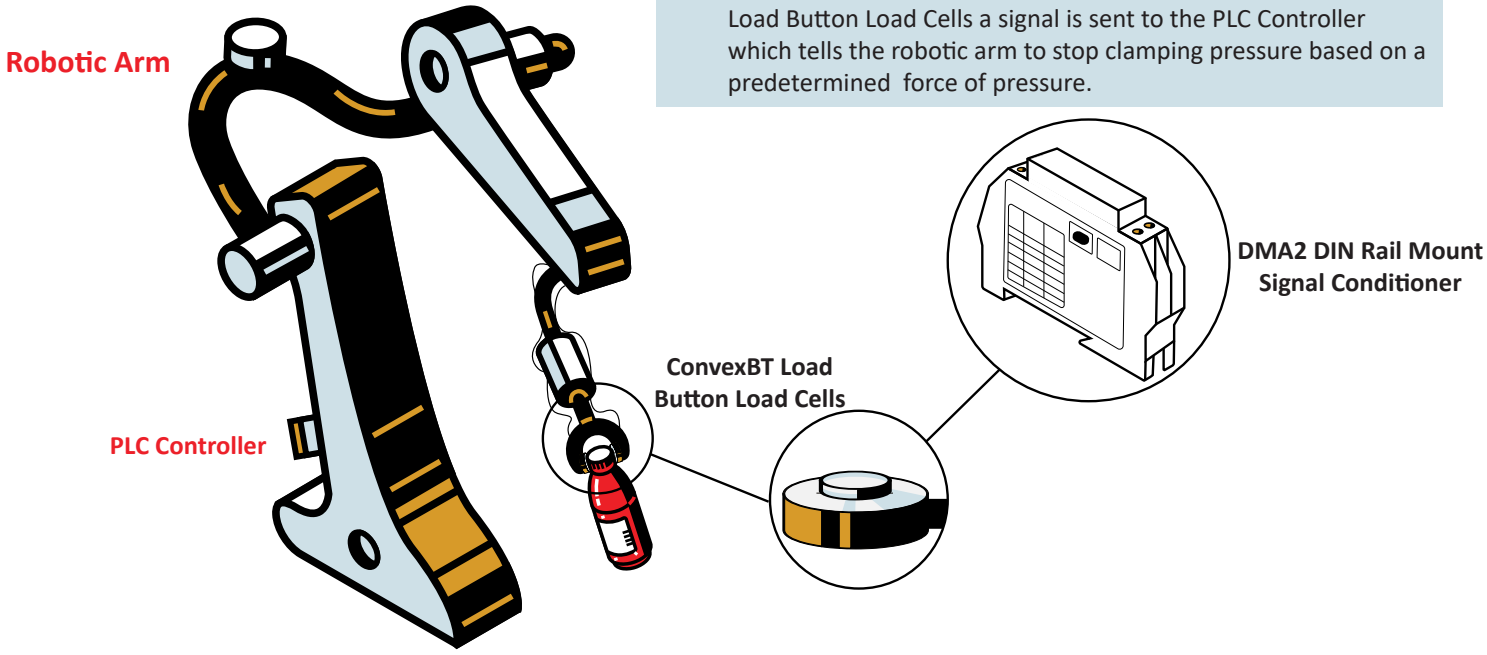
The two ConvexBT Load Button Load Cells accurately measured the amount of pressure applied to the object the robotic arm was lifting and moving without causing any harm or damage to the object.

Materials

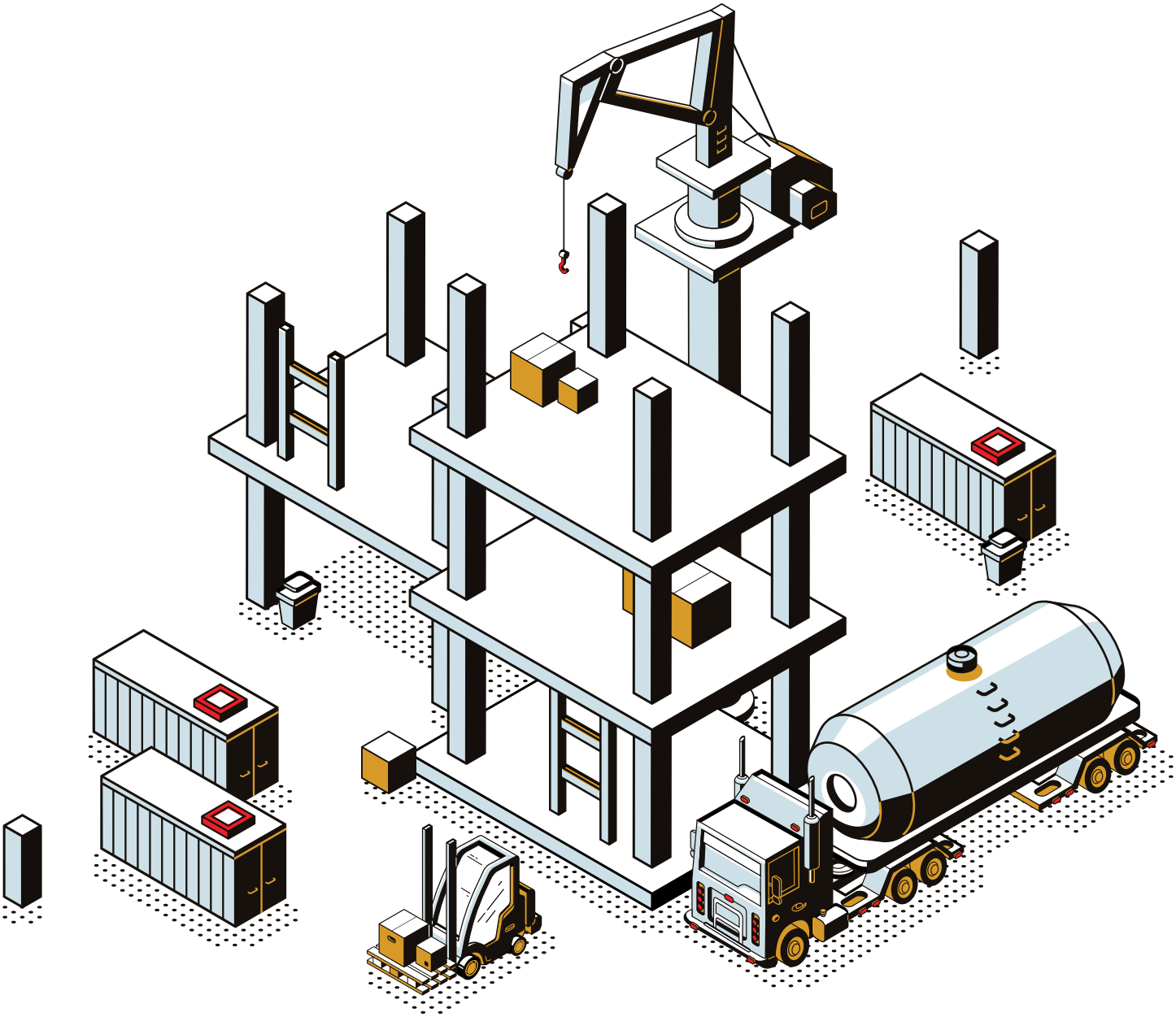
- Two ConvexBT Load Button Load Cells
- DMA2 DIN Rail Mount Signal Conditioner
- PLC Controller

How It Works

1. The two ConvexBT Load Button Load Cells are connected underneath a rubber grip pad on both sides of the robotic arms clamping device. When the rubber grips make contact with the object it is grabbing pressure is applied to both of the ConvexBT Load Button Load Cells a signal is sent to the PLC Controller which tells the robotic arm to stop clamping pressure based on a predetermined force of pressure.



Infrastructure



Aerial Lift Overload Control Load Cell

Industry: Infrastructure, Test and Measurement

Summary

Customer Challenge

A manufacturing company for aerial lifts wants to test its self-propelled boom lift to ensure it can operate at heavy capacities when in use, and at different angles. They want to prevent any accidents in case of a lifting overload, for the safety of any working individual who uses it.

Interface Solution

Interface's solution is to attach the 3A160 3-Axis Force Load Cell to the bottom of the bucket of the boom lift. The 3A160 3-Axis Force Load Cell gives high accuracy results, which can be displayed using the 920i Programmable Weight Indicator and Controller in real time.

Results

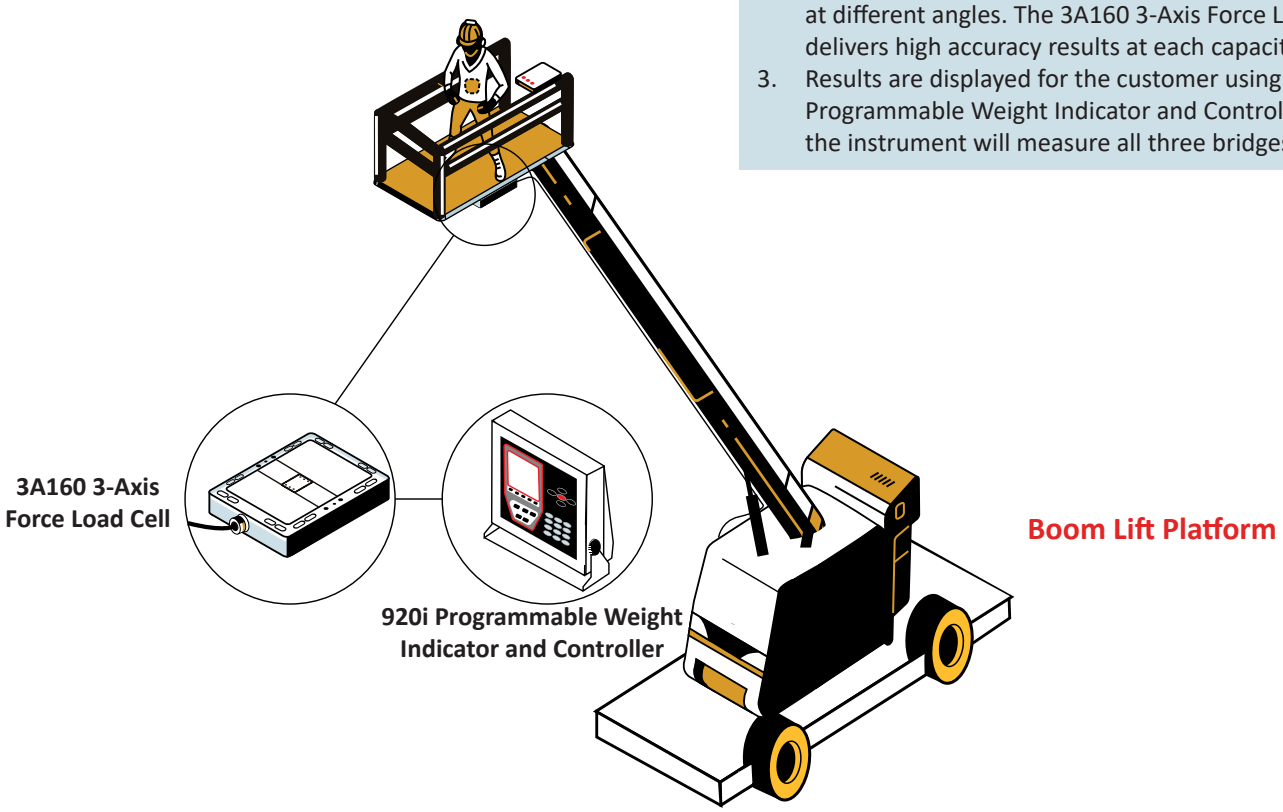
The manufacturing company tested their aerial boom lifts and determined it was safely operable when maximum capacities has been reached.

Materials

- 3A160 3-Axis Force Load Cell
- 920i Programmable Weight Indicator and Controller

How It Works

1. The 3A160 3-Axis Force Load Cell is installed where the lift's arm ends at the bottom of the boom lift's bucket.
2. Different loads are added inside the boom lift's bucket, at different angles. The 3A160 3-Axis Force Load Cell delivers high accuracy results at each capacity.
3. Results are displayed for the customer using the 920i Programmable Weight Indicator and Controller, where the instrument will measure all three bridges.



Bridge Construction Wind Monitoring

Wireless Telemetry System

Industry: Infrastructure

Summary

Customer Challenge

Wind monitoring is a necessary operation during bridge constructions. Strong winds can destroy a bridge under construction since it is a work in progress with poor structural design. Monitoring these winds in real time is much more accurate than using predicted weather forecasts,

Interface Solution

Interface suggests installing the WTS-WSS Wireless Wind Speed Transmitter Module on the highest point of construction, such as a crane. Wind speed results are wirelessly transmitted to the customer's PC through WTS-BS-4 Wireless Base Station with USB Interface in Industrial Enclosure. It can also be transmitted to the WTS-BS-1 Wireless Handheld Display for Unlimited Transmitters Data can be displayed, logged, and graphed with supplied Log100 software.

Results

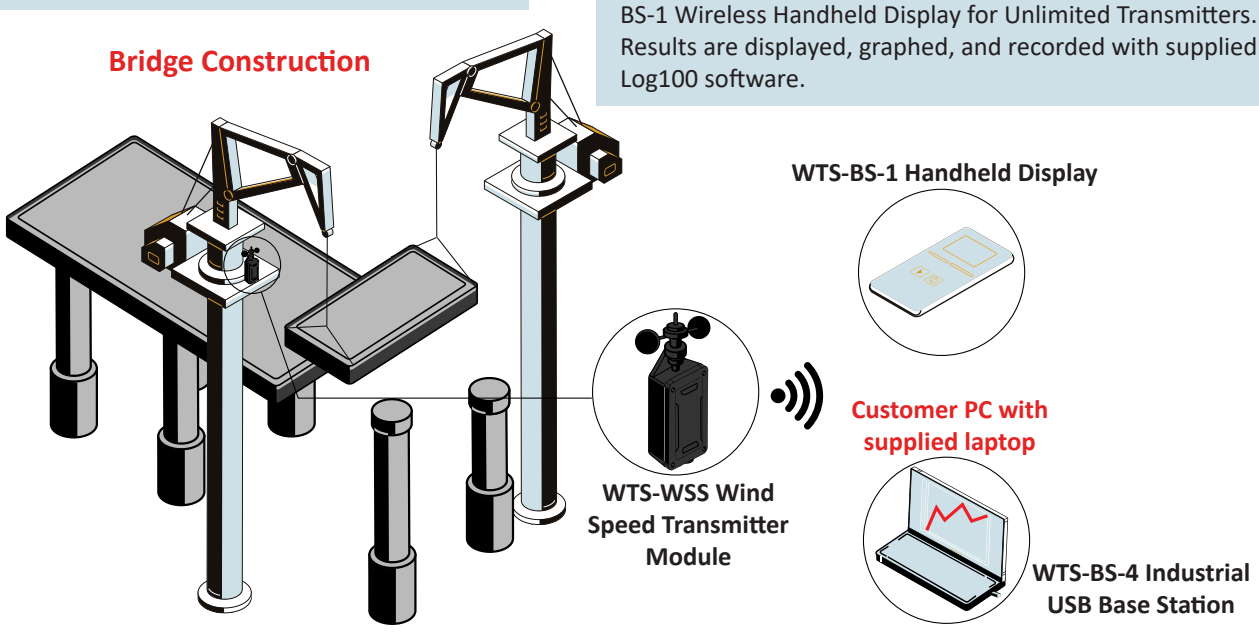
Interface's WTS-WSS Wireless Wind Speed Transmitter Module combined with Interface's Wireless Telemetry System was perfect to monitor the wind speed in real-time during the bridge's construction.

Materials

- WTS-WSS Wireless Wind Speed Transmitter Module
- WTS-BS-4 Wireless Base Station with USB Interface in Industrial Enclosure with included Log100 Software
- WTS-BS-1 Wireless Handheld Display for Unlimited Transmitters
- Customer Laptop

How It Works

1. The WTS-WSS Wireless Wind Speed Transmitter Module is installed to a crane during the bridge's construction.
2. The WTS-WSS captures the wind speeds wirelessly transmits it to the customer's PC through the WTS-BS-4 Wireless Base Station with USB Interface in Industrial Enclosure. Customer's also have the option of using the WTS-BS-1 Wireless Handheld Display for Unlimited Transmitters. Results are displayed, graphed, and recorded with supplied Log100 software.



Bridge Lifting and Positioning

Load Pins and Wireless Telemetry System

Industry: Lifting

Summary

Customer Challenge

New bridges on construction sites need to be carefully lifted and positioned to their final destination. This requires a load monitoring system in order to improve safety and ensure efficiency of the overall application.

Interface Solution

Interface suggests installing WTSLP Wireless Stainless Steel Load Pins in the cranes performing the lifting and positioning. Loads are monitored and data is wirelessly transmitted to the customer's PC through WTS-BS-4 Wireless Base Station with USB Interface in Industrial Enclosure. It can also be transmitted to the WTS-BS-1 Wireless Handheld Display for Unlimited Transmitters Data can be displayed, logged, and graphed with supplied Log100 software.

Results

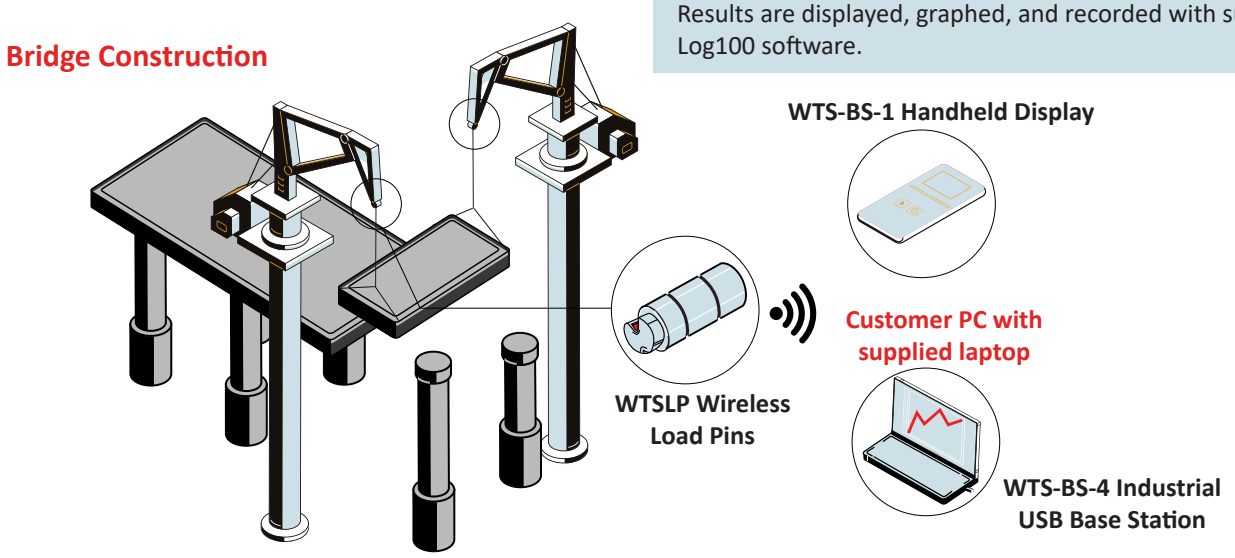
Interface's WTSLP Wireless Stainless Steel Load Pins paired with Interface's Wireless Telemetry System was the perfect monitoring system solution for lifting and positioning a bridge.

Materials

- WTSLP Wireless Stainless Steel Load Pins
- WTS-BS-4 Wireless Base Station with USB Interface in Industrial Enclosure with included Log100 Software
- WTS-BS-1 Wireless Handheld Display for Unlimited Transmitters
- Customer Laptop

How It Works

1. WTSLP Wireless Stainless Steel Load Pins are installed into the cranes that will lift the bridge pieces.
2. The WTSLP Wireless Stainless Steel Load Pins capture the bridge's load and wirelessly transmits it to the customer's PC through the WTS-BS-4 Wireless Base Station with USB Interface in Industrial Enclosure.
3. Customer's also have the option of using the WTS-BS-1 Wireless Handheld Display for Unlimited Transmitters. Results are displayed, graphed, and recorded with supplied Log100 software.



Bridge Seismic Force Monitoring Solution

Load Pin

Industry: Infrastructure

Summary

Customer Challenge

Customer would like to monitor seismic activity that occurs to a bridge by using force sensors and then continuously monitoring bridge forces before, during and after earthquakes occur. Customer would prefer a wireless solution so they would not need to run long cables on the bridge.

Interface Solution

Using Interface's WTSLP Load Pin custom made to fit their needs along Interface's WTS Wireless Telemetry System continuous force monitoring was able to take place without long cables.

Results

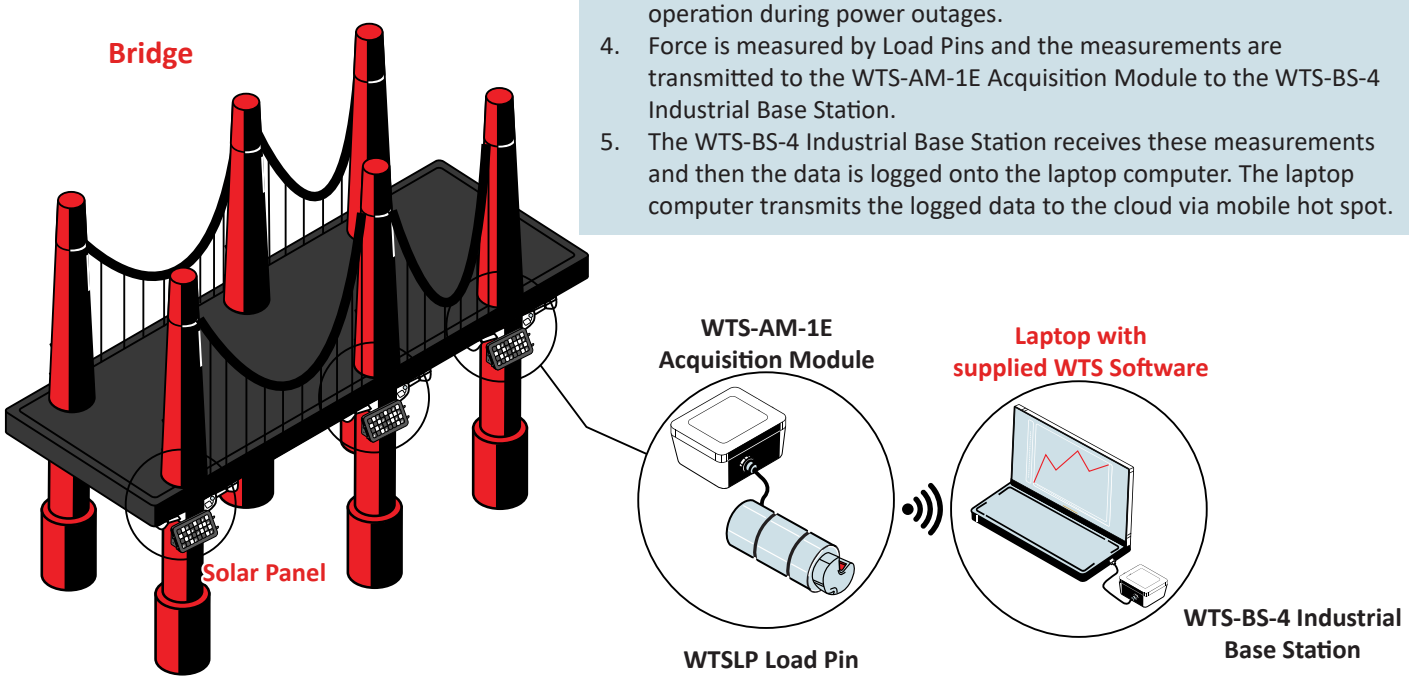
Customer was able to monitor continuous loads, log information to the cloud and review information.

Materials

- WTSLP Load Pin
- WTS-AM-1E Acquisition Module
- WTS-BS-4 Industrial Base Station
- Customer's Data Acquisition System
- PC computer with supplied WTS Software
- Solar Panel

How It Works

1. WTSLP Load Pins and the WTS-AM-1E Acquisition Module are installed onto the bridge. The WTS-AM-1E Acquisition Module is installed in a way that will be a clear line of site.
2. WTS-BS-4 Industrial Base Station is connected to the PC computer and installed up to 800 meters of the WTS-AM-1E Acquisition Module.
3. WTS-AM-1E Acquisition Module and Laptop Computer are also connected to a Solar Panel Backup System to ensure continuous operation during power outages.
4. Force is measured by Load Pins and the measurements are transmitted to the WTS-AM-1E Acquisition Module to the WTS-BS-4 Industrial Base Station.
5. The WTS-BS-4 Industrial Base Station receives these measurements and then the data is logged onto the laptop computer. The laptop computer transmits the logged data to the cloud via mobile hot spot.



Concrete Compression Testing

S-Type

Industry: Infrastructure

Summary

Customer Challenge

Testing the strength of concrete is essential for assessing the structural integrity and performance of concrete in various construction and infrastructure applications. A compression test is needed to ensure the concrete meets the specific strength requirements for structural use.

Interface Solution

Interface suggests using the 1101 Compression-Only Ultra Precision LowProfile™ Load Cell in the compression test frame. A sample of concrete will be placed in the test frame, and the concrete will be compressed. The measurements from the compression test are recorded using the INF-USB3 Universal Serial Bus Single Channel PC Interface Module and logged when attached to the customer's PC laptop or computer.

Results

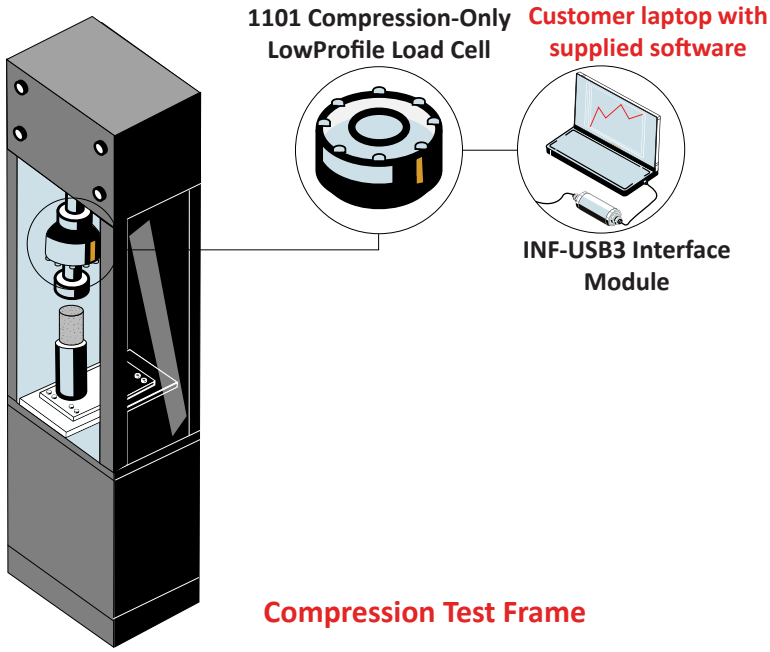
Interface's 1101 Compression-Only Ultra Precision LowProfile™ Load Cell and paired instrumentation successfully measured and recorded the forces during the concrete compression test.

Materials

- 1101 Compression-Only Ultra Precision LowProfile™ Load Cell
- INF-USB3 Universal Serial Bus Single Channel PC Interface Module with supplied software
- Customer PC or Laptop

How It Works

1. The 1101 Compression-Only Ultra Precision LowProfile™ Load Cell is installed into the compression test frame
2. A compression test is done onto a concrete sample. The 1101 Compression-Only Ultra Precision LowProfile™ Load Cell measures the forces of compression.
3. These measurements are recorded using the INF-USB3 Universal Serial Bus Single Channel PC Interface Module, which can be viewed and logged when attached to the customer's PC laptop or computer.



Compression Test Frame

Concrete Dam Flood Monitoring

Interface Mini™

Industry: Infrastructure

Summary

Customer Challenge

A customer wants to monitor and be notified if a concrete dam has reached high flooding levels.

Interface Solution

Interface's WMC Miniature Sealed Stainless Steel Load Cells with multiple WTS-AM-1E Wireless Acquisition Modules connected to them, are small in size and perfect for measuring tension and compression. Multiple WMC's can be installed around the arch of the dam, so when flooding occurs, the WMC can transmit data and notify the customer through one of our Wireless Telemetry Systems.

Results

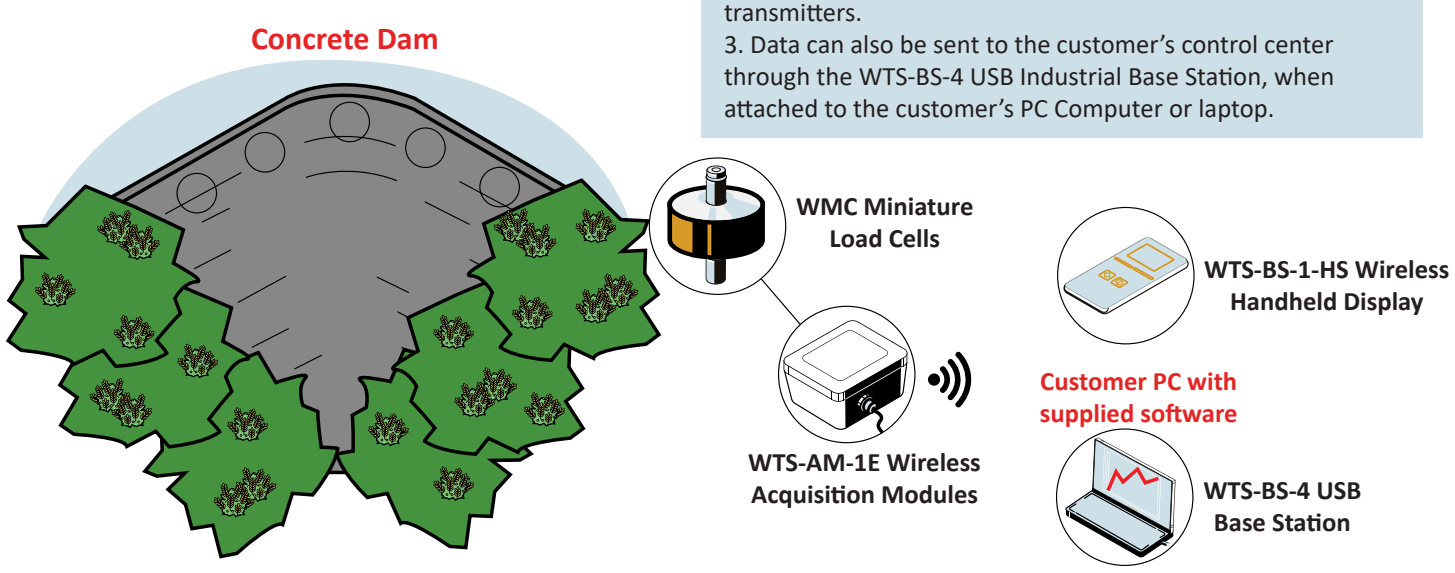
The customer was notified wirelessly when flood level became too high for the dam in their control center.

Materials

- WMC Miniature Sealed Stainless Steel Load Cells
- WTS-AM-1E Wireless Acquisition Modules
- WTS-BS-4 USB Industrial Base Station
- WTS-BS-1-HS Wireless Handheld Display for Single Transmitters
- Customer PC Computer or Laptop

How It Works

1. Multiple WMC Miniature Sealed Stainless Steel Load Cells with multiple WTS-AM-1E Wireless Acquisition Modules connected to them, are anchored to the concrete dam at the maximum height preferred.
2. If flooding occurs, the force from the water triggers the WMC's, and data is transmitted wirelessly to the customer's WTS-BS-1-HS Wireless Handheld Display for single transmitters.
3. Data can also be sent to the customer's control center through the WTS-BS-4 USB Industrial Base Station, when attached to the customer's PC Computer or laptop.



Dam Spillway Gate
Torque Transducer

Industry: Infrastructure

Summary

Customer Challenge

A dam spillway gate monitors and controls the flow of water from a reservoir. A monitoring system is needed to detect any potential malfunctions or failure from the gate, which could result in a disastrous release of water downstream.

Interface Solution

Interface's TSCF C-Face Flange Torque Transducer can directly measure the torque of the dam's motor connected to controlling the movement of the gates. The TSCF can detect any problems the motors may have when opening and closing the spillway gate. Results are read and monitored using the 9850 Torque Transducer and Load Cell Indicator.

Results

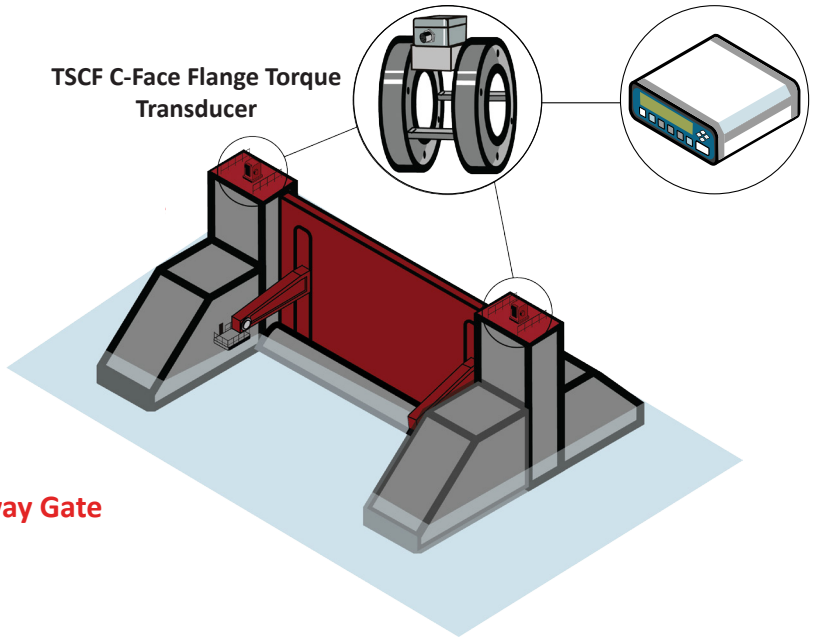
Interface's TSCF C-Face Flange Torque Transducer was the perfect monitoring solution of the dam spillway gates, ensuring the gates were functioning properly and efficiently.

Materials

- TSCF C-Face Flange Torque Transducer
- 9850 Torque Transducer and Load Cell Indicator

How It Works

1. The TSCF C-Face Flange Torque Transducer is installed and attached to the large motors that control the opening and closing of the dam spillway gates. The TSCF will monitor the torque of the motors, detecting any potential problems before an accident may occur.
2. Results are displayed and monitored using the 9850 Torque Transducer and Load Cell Indicator.



Gantry Crane Weighing
Load Pin

Industry: Lifting

Summary

Customer Challenge

Gantry cranes are used for a number of mobile and lifting applications within industrial or construction environments. A weighing system is needed to see if the gantry crane can handle lifting heavy containers or loads, preventing crane failure or accidents.

Interface Solution

Interface's WTSLP Wireless Stainless Steel Load Pins can be installed into the corners of the lifting mechanism of the gantry crane, where heavy loaded containers are lifted and moved. The force results are then wireless transmitted to both the WTS-BS-1-HS Wireless Handheld Display for Single Transmitters, or directly to the customer's PC with the WTS-BS-6 Wireless Telemetry Dongle Base Station.

Results

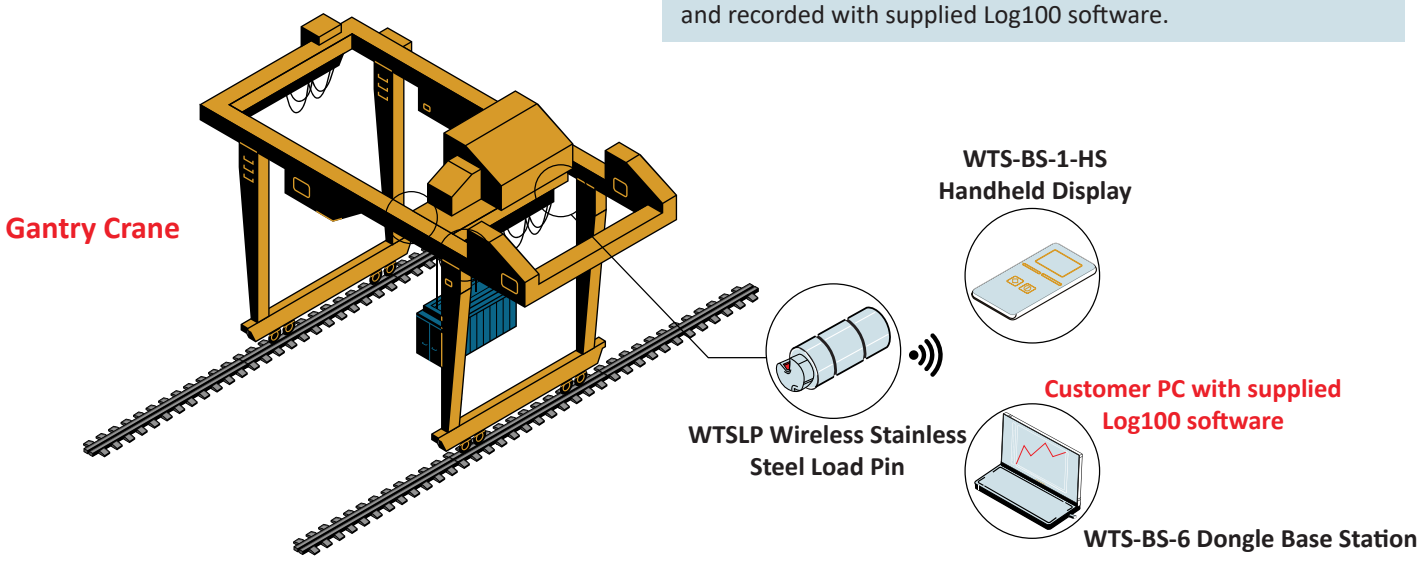
The customer was able to monitor the loads lifted from their gantry crane with Interface's Wireless Telemetry System, and determine whether or not their gantry crane was able to handle lifting heavy loads.

Materials

- Four WTSLP Wireless Stainless Steel Load Pin
- WTS-BS-1-HS Wireless Handheld Display for Single Transmitters
- WTS-BS-6 Wireless Telemetry Dongle Base Station
- Supplied Log100 software
- Customer PC

How It Works

1. The four WTSLP Wireless Stainless Steel Load Pin are installed at the our corners of the lifting mechanism of the gantry crane. A heavy load or container is lifted.
2. The WTSLP's wirelessly transmits the force data results to WTS-BS-1-HS Wireless Handheld Display for Single Transmitters, or directly to the customer's PC with the WTS-BS-6 Wireless Telemetry Dongle Base Station. Data can be logged, graphed, and recorded with supplied Log100 software.



Hydraulic Jacking System Testing
Load Cell

Industry: Infrastructure

Summary

Customer Challenge

A heavy lift company wants to test their hydraulic jacking system has the ability to lift heavy loads and objects, like a bridge during construction. They want to monitor the forces being applied to ensure the hydraulic jack is not only safe to use, but works well enough to avoid any potential structural issues. They also want the results in real-time.

Interface Solution

Interface's 1200 Standard High Capacity Load Cell can be attached in between the hydraulic jack and a heavy load. The 1200 Standard High Capacity Load Cell will measure the forces of the hydraulic jack as it lifts the load cell located in between the jack and the object. With the 9890 Strain Gage, Load Cell, & mV/V Indicator, the customer is also able to see the results in real-time.

Results

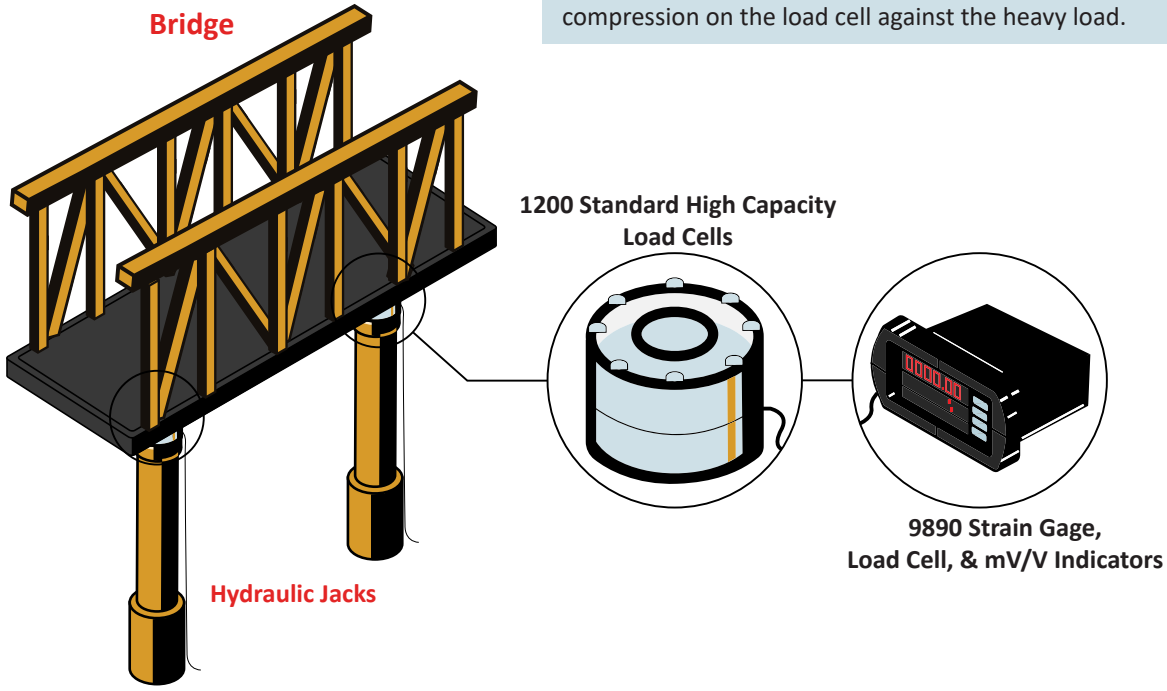
The heavy lift company tested their hydraulic jack, resulting in it being safe and functions properly to be sold. It also ensures buyers that the hydraulic jack system upholds its use of continuous heavy load lifting or moving, and maintains structural probity.

Materials

- 1200 Standard High Capacity Load Cell
- 9890 Strain Gage, Load Cell, & mV/V Indicator

How It Works

1. Multiple 1200 Standard High Capacity Load Cell's are located in between the hydraulic jack and a heavy lifting load.
2. The 1200's will be connected to its own 9890 Strain Gage, Load Cell, & mV/V Indicator to give accurate and real-time results of the forces from hydraulic jacking system when it puts compression on the load cell against the heavy load.



Hydropower Turbine Generator Monitoring

Torque Transducer

Industry: Infrastructure

Summary

Customer Challenge

A customer wants to monitor and detect any turbine generator faults in their hydroelectric power plant located on a river.

Interface Solution

Interface's solution is to use the T2 Ultra Precision Shaft Style Rotary Torque Transducer and attach it to the turbine generator with Interface's Shaft Style Torque Transducer Couplings. When water from the river pushes through the penstock to the outflow, it moves the turbine blades, creating electricity through the generator shaft. Torsion measurements can be graphed and logged with the 9850 Torque Transducer and Load Cell Indicator- catching any unusual fluctuations and vibrations.

Results

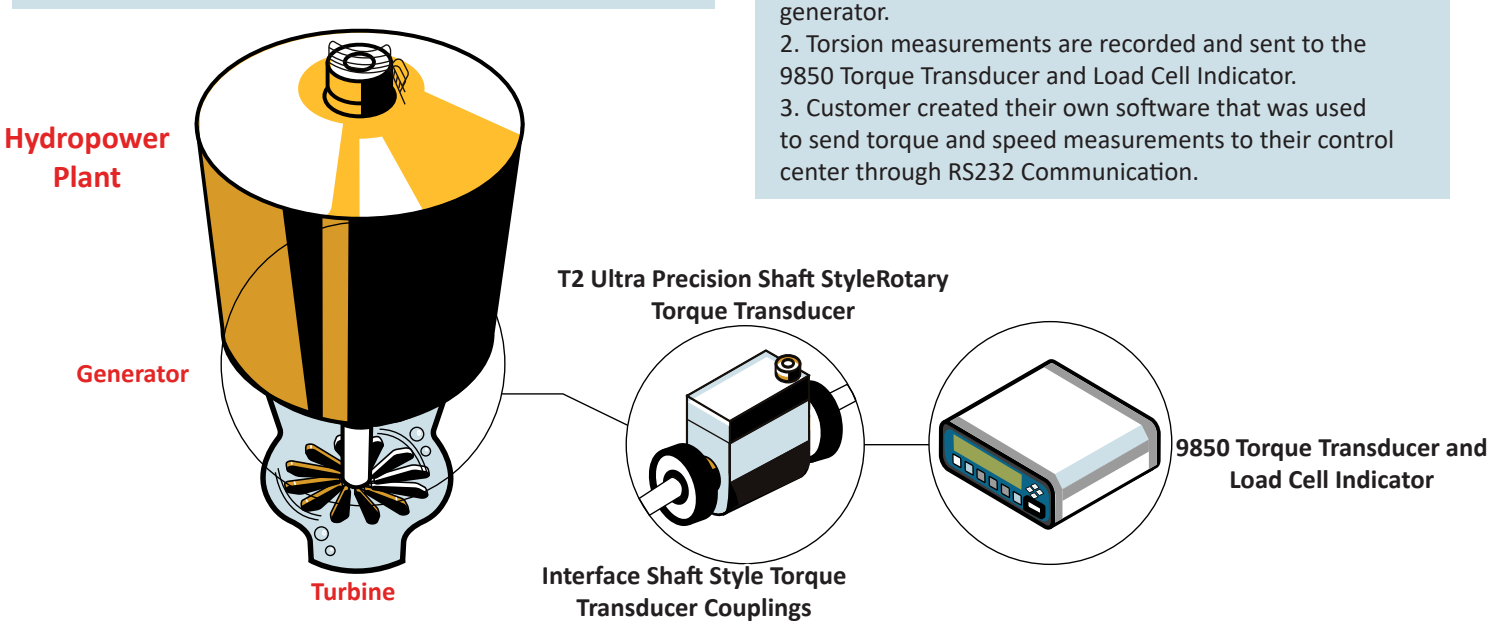
The customer was able to monitor, graph, and log the torque measurement results of the turbine generator.

Materials

- T2 Ultra Precision Shaft Style Rotary Torque Transducer
- Interface Shaft Style Torque Transducer Couplings
- 9850 Torque Transducer and Load Cell Indicator

How It Works

1. The T2 Ultra Precision Shaft Style Rotary Torque Transducer is installed with Interface's Shaft Style Torque Transducer Couplings onto the hydropower turbine generator.
2. Torsion measurements are recorded and sent to the 9850 Torque Transducer and Load Cell Indicator.
3. Customer created their own software that was used to send torque and speed measurements to their control center through RS232 Communication.



Jib Crane Tension Monitoring
Tension Load Link

Industry: Infrastructure

Summary

Customer Challenge

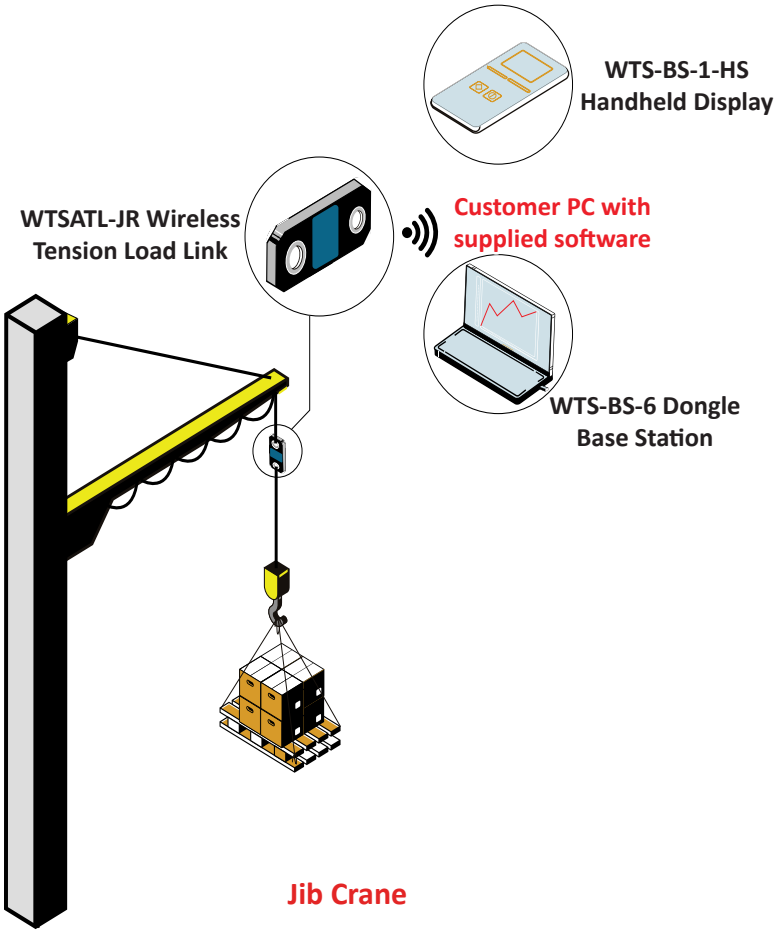
Jib cranes are used to move or carry heavy loads, as it is attached to a vertical mast or strong support structure. A tension monitoring system is needed to ensure the loads being lifted does not go over the jib crane's capacity.

Interface Solution

Interface's WTSATL-JR Aluminum Compact Wireless Tension Load Link can be attached to the cable of the jib crane. When a heavy load is place at the end of the jib crane, the force results are wirelessly transmitted to the WTS-BS-1-HS Wireless Handheld Display for Single Transmitters or displayed on the customer's PC through the WTS-BS-6 Wireless Telemetry Dongle Base Station.

Results

The customer was able to monitor the cable tension forces of the jib crane to ensure it did not reach its maximum capacity.



Materials

- WTSATL-JR Aluminum Compact Wireless Tension Load Link
- WTS-BS-1-HS Wireless Handheld Display for Single Transmitters
- WTS-BS-6 Wireless Telemetry Dongle Base Station
- Supplied Log100 software
- Jib Crane
- Customer PC

How It Works

1. The WTSATL-JR Aluminum Compact Wireless Tension Load Link is installed into the cable of the jib crane.
2. A heavy load is added, and the force measurements are monitored ensuring the crane does not max out its capacity and break.
3. The force results are wirelessly transmitted to WTS-BS-1-HS Wireless Handheld Display for single transmitters, or to the customer's PC through the WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied Log100 software. Data can be displayed, graphed, and logged.

Power Line Tension Testing

Interface Mini™

Industry: Infrastructure

Summary

Customer Challenge

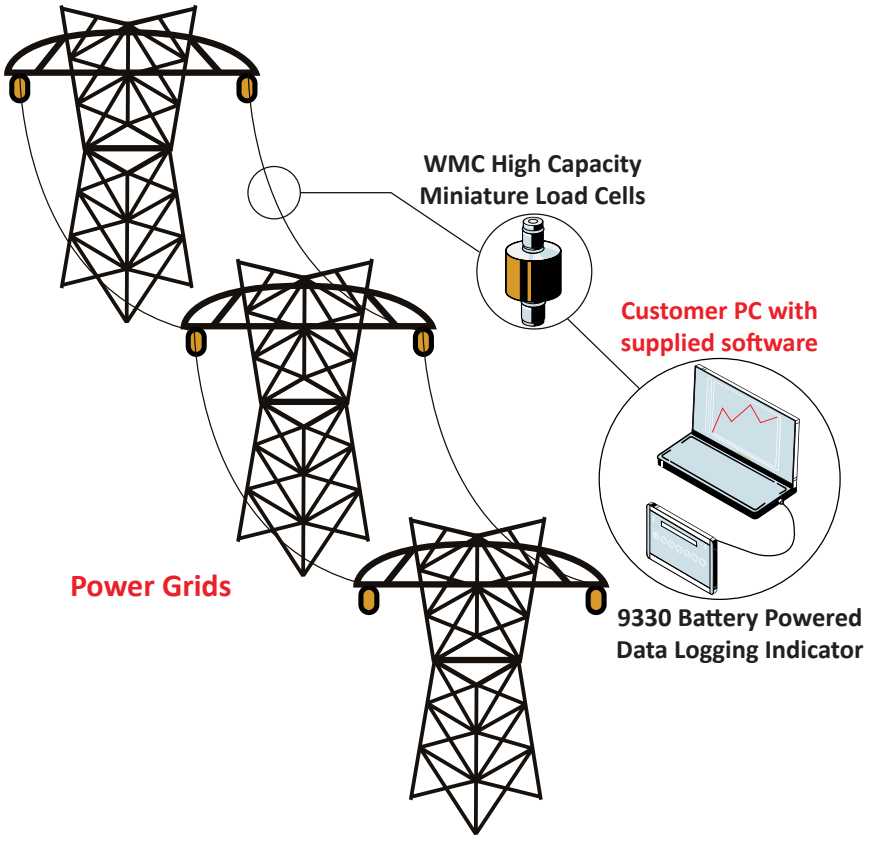
Power lines are a critical component of electrical infrastructure, responsible for transmitting electricity over vast distances. Ensuring the safety and reliability of them is of extreme importance. Power line maintenance is regularly tested and monitored, and an efficient monitoring system is needed.

Interface Solution

Interface recommends utilizing WMC Sealed High Capacity Stainless Steel Miniature Load Cells in conjunction with road end bearings to record cable tension forces during a maintenance procedure. The tension forces can be measured by the 9330 High Speed Data Logger from Interface, and the results can be displayed on the customer's PC or laptop.

Results

Interface's force measurement system successfully monitored the power lines and their cables during its maintenance operation.



Materials

- WMC Sealed High Capacity Stainless Steel Miniature Load Cells
- Rod End Bearings
- 9330 Battery Powered High Speed Data Logging Indicator with BlueDAQ software
- Customer PC

How It Works

1. Multiple WMC Sealed High Capacity Stainless Steel Miniature Load Cells are attached with rod end bearings to capture and monitor cable tension forces.
2. The forces from the WMC can be measured using the 9330 High Speed Data Logger, which then can be displayed through the customer's PC computer or laptop with supplied BlueDAQ software.

Reach Stacker
Load Pin

Industry: Infrastructure

Summary

Customer Challenge

A reach stacker is a vehicle used in shipping ports and container terminals to lift, move, and stack heavy containers. A force monitoring system is needed to ensure the safety of surrounding personnel, and if the reach stacker is capable of lifting heavy loads.

Interface Solution

Interface's WTSLP Wireless Stainless Steel Load Pins can be installed into the corners of the lifting mechanism of the reach stacker, where heavy loaded containers are lifted and moved. The force results are then wireless transmitted to both the WTS-BS-1-HS Wireless Handheld Display for Single Transmitters, or directly to the customer's PC with the WTS-BS-6 Wireless Telemetry Dongle Base Station.

Results

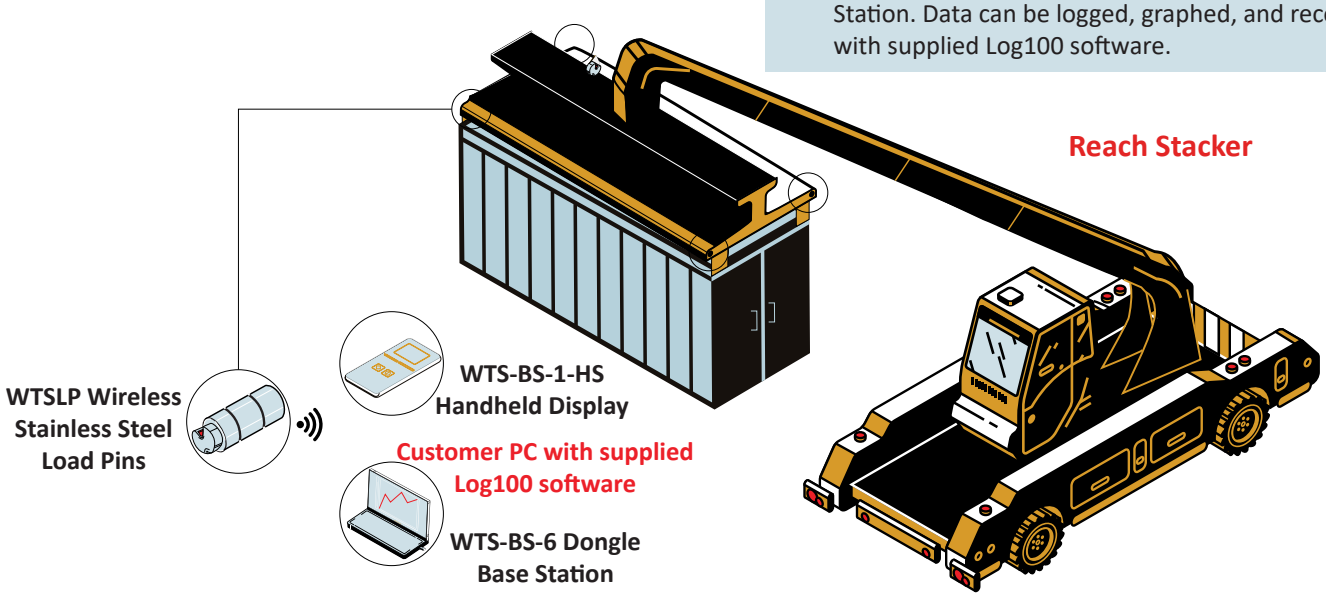
The customer was able to monitor their reach stacker with Interface's Wireless Telemetry System and ensure its ability to lift heavy loads at the shipping ports and terminals.

Materials

- Four WTSLP Wireless Stainless Steel Load Pin
- WTS-BS-1-HS Wireless Handheld Display for Single Transmitters
- WTS-BS-6 Wireless Telemetry Dongle Base Station
- Supplied Log100 software
- Customer PC

How It Works

1. The four WTSLP Wireless Stainless Steel Load Pin are installed at the our corners of the lifting mechanism of the reach stacker.
2. A heavy load or container is lifted.
3. The WTSLP's wirelessly transmits the force data results to TS-BS-1-HS Wireless Handheld Display for Single Transmitters, or directly to the customer's PC with the WTS-BS-6 Wireless Telemetry Dongle Base Station. Data can be logged, graphed, and recorded with supplied Log100 software.



Road Bridge Lift Monitoring
Load Pin

Industry: Infrastructure

Summary

Customer Challenge

Road bridges lifts are specially constructed on roads or highways that intersect with water bodies such as rivers, canals, or harbors, allowing navigation to continue unimpeded. A force sensor system is needed to ensure the structural integrity of the bridge along with safe operation.

Interface Solution

Interface suggests installing their LP Stainless Steel Load Pins within the pulley's of the pulley system of the bridge. When the bridge is lifted, the LP's will detect the force implemented. Results are displayed for the customer using the 920i Programmable Weight Indicator and Controller.

Results

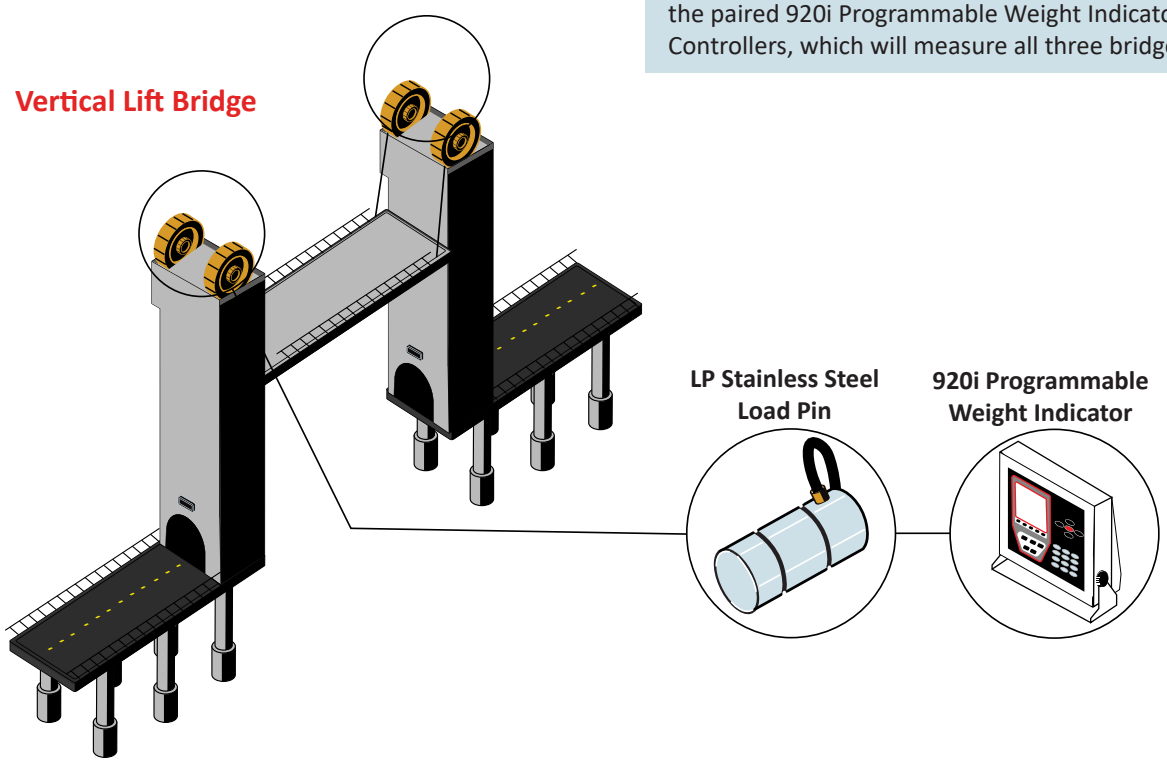
Interface's load pins and instrumentation successfully monitored the forces of the road bridge lift during its operation.

Materials

- Multiple LP Stainless Steel Load Pins
- Multiple 920i Programmable Weight Indicator and Controllers

How It Works

1. The LP Stainless Steel Load Pins are installed in the pulley's of the pulley system used to lift the vertical bridge.
2. Force data can be displayed when connected to the paired 920i Programmable Weight Indicator and Controllers, which will measure all three bridges.



Soil Compression Testing
Load Cell

Industry: Infrastructure

Summary

Customer Challenge

Soil compression testing, or soil compaction testing, is used to assess soil and if it is able to withstand external loads without cracking or deformation. This is especially needed for construction applications and other foundational design testing. A force measurement system is needed during this test.

Interface Solution

Interface suggests using the 2161 High Capacity Column Compression Only Load Cell for this application. The 2161 can be used in the large compression test frame, where it will compress a block of solidified soil. Force results during the test will be sent and displayed to the customer's control center when connected to the 9840 Calibration Grade Multi-Channel Load Cell Indicator.

Results

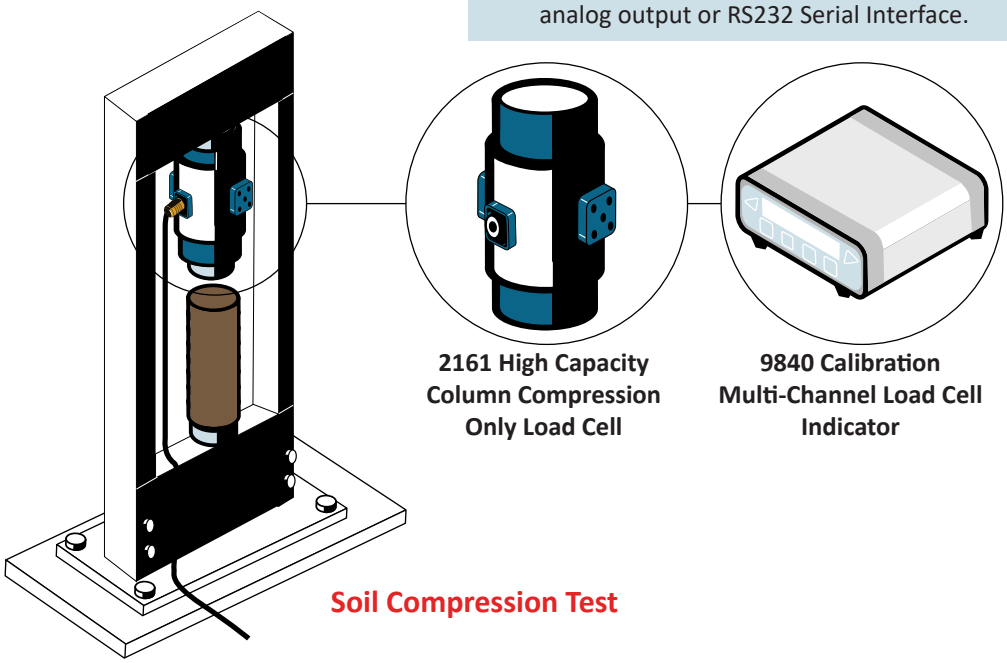
Interface's compression column load cell successfully measured the forces it took to deform a soil sample during the soil compression test.

Materials

- 2161 High Capacity Column Compression Only Load Cell
- 9840 Calibration Grade Multi-Channel Load Cell Indicator
- Soil Compression Test Frame

How It Works

1. The 2161 High Capacity Column Compression Only Load Cell is installed into the soil compression test frame.
2. A soil compression test is performed.
3. The compression results are displayed and reviewed when the 9840 Calibration Grade Multi-Channel Load Cell Indicator is connected to the customer's system though the analog output or RS232 Serial Interface.



2161 High Capacity Column Compression Only Load Cell

9840 Calibration Multi-Channel Load Cell Indicator

Soil Compression Test

Tunnel Boring Machine
Torque Transducers

Industry: Infrastructure

Summary

Customer Challenge

A tunnel boring machine, or TBM, is used to excavate tunnels whether for transportation, utilities, or mining. TBM's are designed to cut through rock and soil with a rotating cutter head. The torque of the cutting wheel needs to be monitored and tested to ensure it is working properly during excavation operations.

Interface Solution

Interface's T2 Ultra Precision Shaft Style Rotary Torque Transducers are attached to the cutter drives of the cutting wheel used to cut through material. When connected to the BX8-AS BlueDAQ Series Data Acquisition System, the customer can monitor the torque of the cutting wheel mechanism of the TBM when connected to the customer's computer with supplied BlueDAQ sofware.

Results

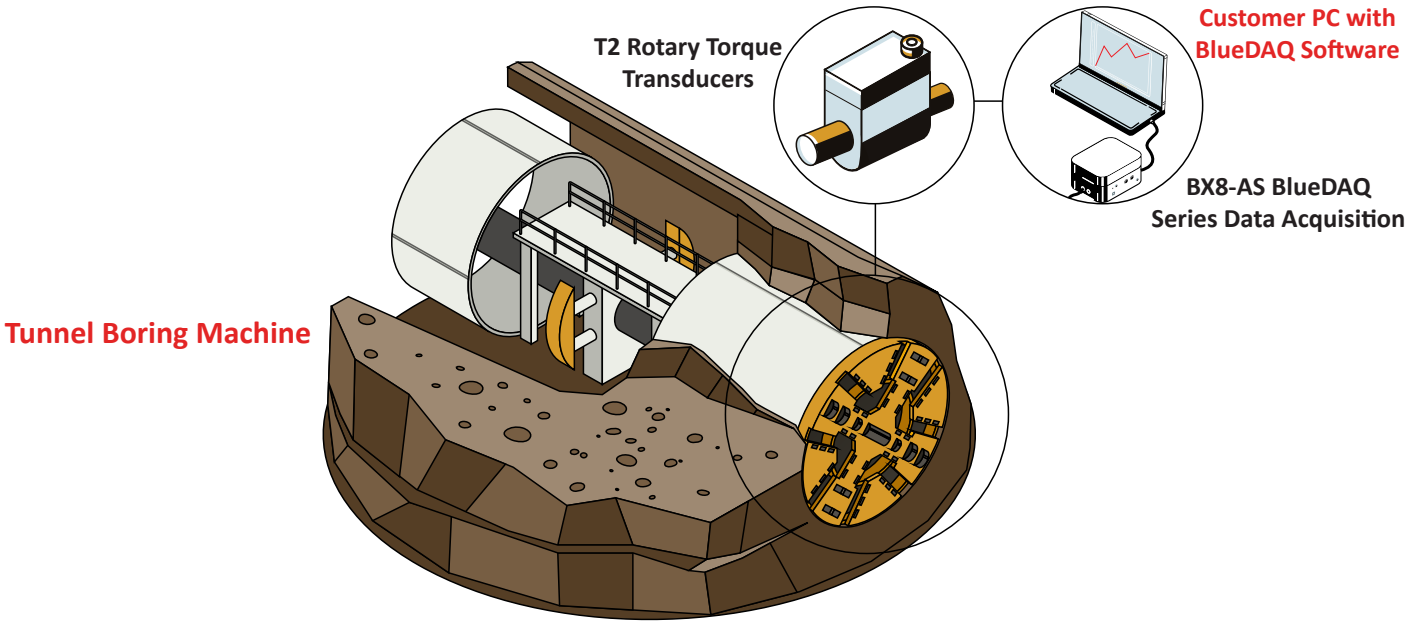
Interface's T2 Ultra Precision Shaft Style Rotary Torque Transducers successfully monitored the amount of torque exerted during the boring process.

Materials

- T2 Ultra Precision Shaft Style Rotary Torque Transducers
- BX8-AS BlueDAQ Series Data Acquisition System with Industrial Enclosure
- Supplied BlueDAQ software
- Customer PC

How It Works

1. T2 Ultra Precision Shaft Style Rotary Torque Transducers are attached to the cutter drives of the cutting wheel face of the tunnel boring machine.
2. The tunnel boring machine cuts through rock and material.
3. When connected to a computer, the BX8-AS BlueDAQ Series Data Acquisition System can monitor and display the results of the torque of the cutting wheel mechanism.



Wood Compression Testing
Load Cells

Industry: Infrastructure

Summary

Customer Challenge

Wood compression testing is used to test the strength, stiffness, and structural integrity of different types of wood This is necessary for different industries where wood is implemented such as in construction, furniture making, and other scenarios. A force measurement system is needed during the testing operations.

Interface Solution

The 1331 Compression Only Load Cell can be installed in the compression load frame. A wood compression test is conducted, and the force results are sent to the customer's computer using the INF-USB3 Universal Serial Bus Single Channel PC Interface Module.

Results

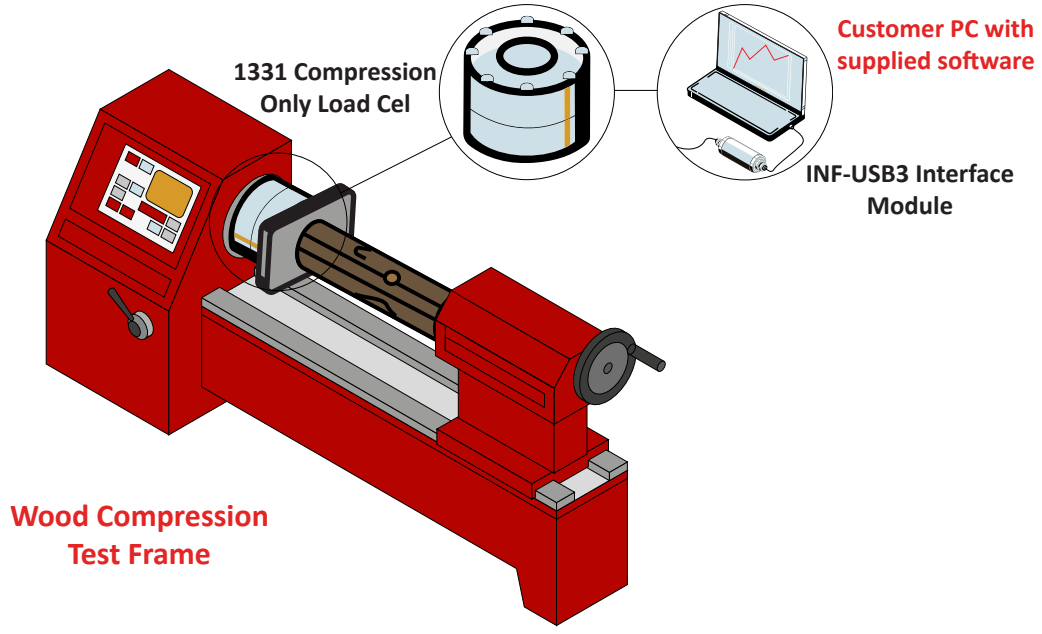
Interface's compression load cell successfully measured the compression forces of the wood being tested.

Materials

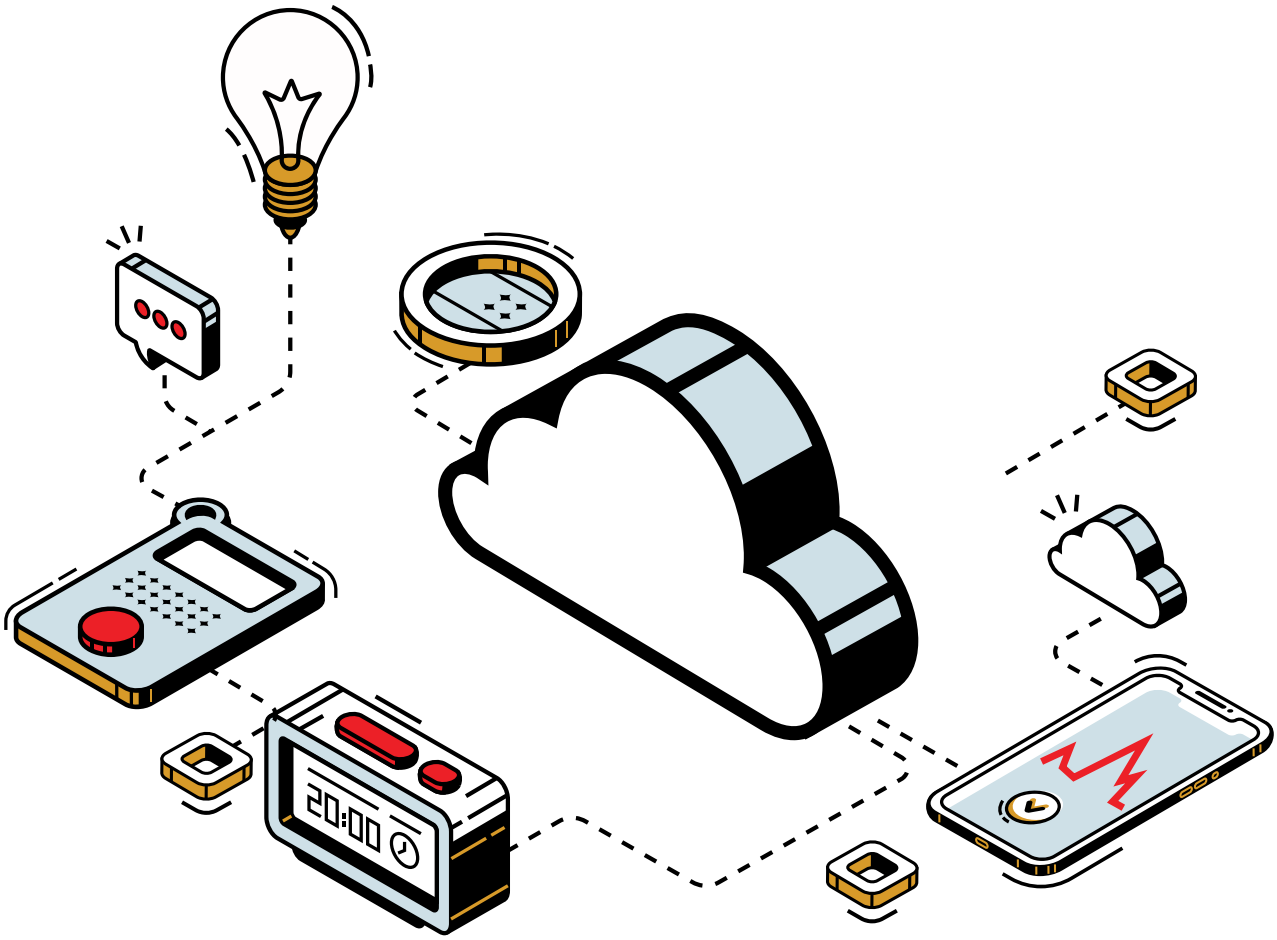
- 1331 Compression Only Load Cell
- INF-USB3 Universal Serial Bus Single Channel PC Interface Module with supplied software
- Customer computer
- Customer compression test frame

How It Works

1. The 1331 Compression Only Load Cell is installed into the wood compression test frame. A piece of wood is put under a compression test until failure.
2. The force results are sent through the INF-USB3 Universal Serial Bus Single Channel PC Interface Module to the customer's computer, where data can be displayed, graphed, and logged with supplied software.



Internet of Things



Beam Stress Test
Wireless Telemetry System
Industry: IoT

Summary

Customer Challenge

A customer wants to conduct stress tests on their beams to determine the peak force and the linear displacement reading until the point of failure.

Interface Solution

Interface's WTS 1200 Standard Precision LowProfile™ Wireless Load Cell is installed in the test rig. A hydraulic ram, with an installed LDVT sensor, pushes up onto the beam until it cracks or bends, and the WTS 1200 measures the forces. Data results are wirelessly transmitted to the WTS-BS-6 Wireless Telemetry Dongle Base Station when connected to the customer's PC. The WTS-AM-2 Wireless Voltage Sensor Transmitter can also transmit results from the LDVT sensor using Log100 software.

Results

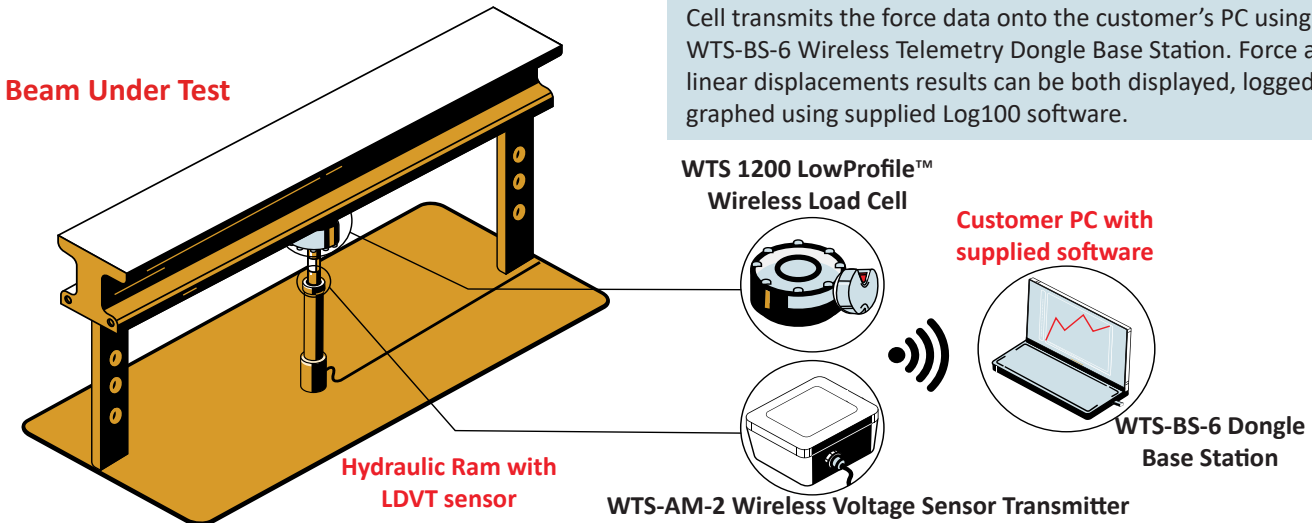
Interface's wireless telemetry system and products successfully graphed and logged the results of the beam's peak force and linear displacement during the customer's beam stress test.

Materials

- WTS 1200 Standard Precision LowProfile™ Wireless Load Cell
- WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied Log100 software
- WTS-AM-2 Wireless Voltage Sensor Transmitter
- Customer Beam and test rig
- Customer supplied LDVT sensor
- Customer PC or Laptop

How It Works

1. The WTS 1200 Standard Precision LowProfile™ Wireless Load Cell is installed under the beam being tested in the test rig.
2. A hydraulic ram pushes upwards onto the beam during the stress test. The WTS 1200 measures the amount of force it took for the beam to snap or bend.
3. The installed LDVT sensor within the ram measures its linear displacement, and results are transmitted when connected to the WTS-AM-2 Wireless Voltage Sensor Transmitter.
4. The WTS 1200 Standard Precision LowProfile™ Wireless Load Cell transmits the force data onto the customer's PC using the WTS-BS-6 Wireless Telemetry Dongle Base Station. Force and linear displacements results can be both displayed, logged, and graphed using supplied Log100 software.



Conveyor Belt Adhesion Test
S-Type

Industry: IoT, Test and Measurement

Summary

Customer Challenge

A customer wants to test the adhesion strength in between the many layers and textiles of a conveyor belt. They want to conduct a separation test from the rubber of the conveyor belt from the other layers. They would also like a wireless solution.

Interface Solution

Interface's SMA Miniature S-Type Load Cell is installed in the customer's tensile test load frame, where it measures the forces applied as the test is conducted and the layers are pulled and separated. When connected to the WTS-AM-1F Wireless Strain Bridge Transmitter Module, the data is wirelessly transmitted to WTS-BS-5 Wireless Analog Output Receiver Module with nV output. The WTS-BS-5 can then connect to the 9330 Battery Powered High Speed Data Logging Indicator to display, graph, and log the data with supplied BlueDAQ software.

Results

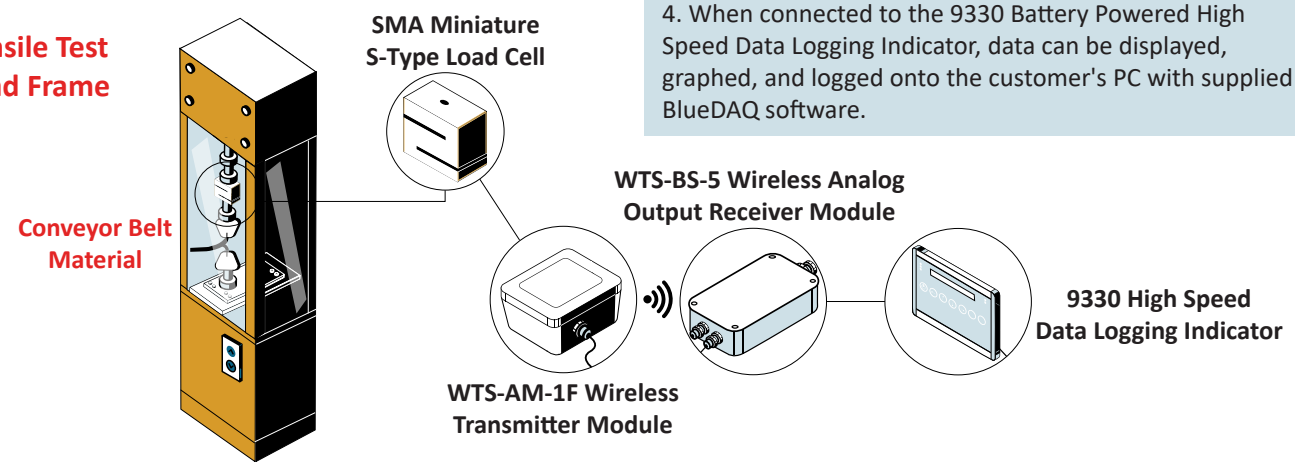
With Interface's force measurement system and solution, the customer was able to successfully test the strength of their adhesion applied onto their conveyor belts through their layer separation test.

Materials

- SMA Miniature S-Type Load Cell
- WTS-AM-1F Wireless Strain Bridge Transmitter Module
- WTS-BS-5 Wireless Analog Output Receiver Module
- 9330 Battery Powered High Speed Data Logging Indicator with supplied BlueDAQ software
- Customer tensile test load frame
- Customer PC or Laptop

How It Works

1. The SMA Miniature S-Type Load Cell is installed in the customer's test frame, and connected to a WTS-AM-1E Wireless Strain Bridge Transmitter Module.
2. A separation test of the conveyor belt's layers are conducted, and the SMA measures the forces.
3. The WTS-AM-1E Wireless Strain Bridge Transmitter Module transmits the force results to the WTS-BS-5 Wireless Analog Output Receiver Module with nV output.
4. When connected to the 9330 Battery Powered High Speed Data Logging Indicator, data can be displayed, graphed, and logged onto the customer's PC with supplied BlueDAQ software.



Smart Floors

Load Cell and WTS Wireless Telemetry System

Industry: IoT

Summary

Customer Challenge

Smart floors are upcoming high-tech floors that have sensors that detect movement, weight pressure and other data. Smart floors are starting to be used in senior living homes to detect falls from any patients. A force system is needed in order to measure the pressure on the smart floor.

Interface Solution

Interface suggests using multiple SSB Sealed Beam Load Cells, and installing it under the tiles of the smart floor. When someone walks on the smart flooring, data is captured and sent to WTS-AM-1E Wireless Strain Bridge Transmitter Modules. The force results are wirelessly transmitted and logged to the customer's PC using the WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied software.

Results

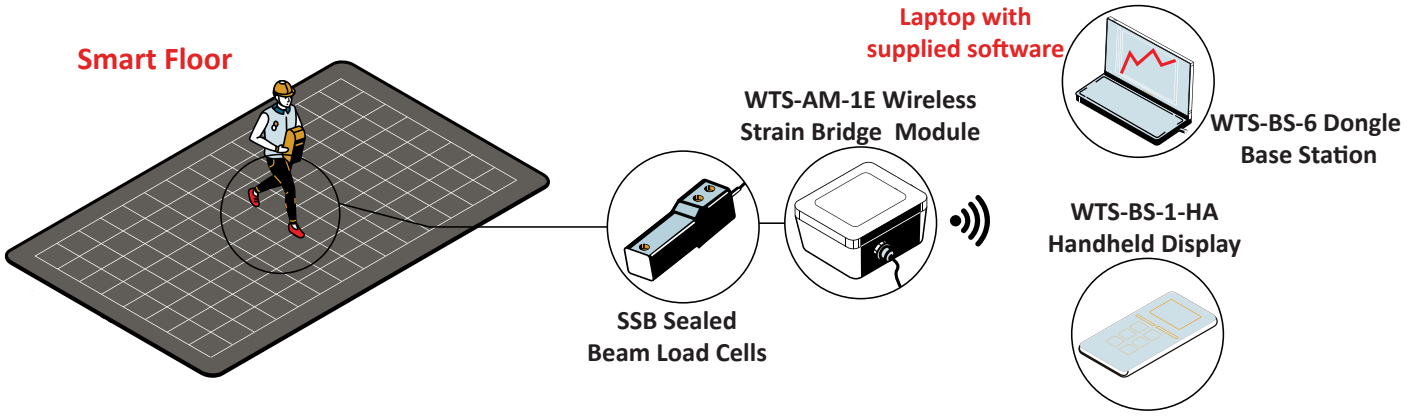
Interface's load cells and WTS Wirelessly Telemetry Systems successfully monitor the forces and weight of those walking on the smart flooring.

Materials

- SSB Sealed Beam Load Cells
- WTS-AM-1E Wireless Strain Bridge Transmitter Modules
- WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied Log100 software
- WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters
- Customer PC or Laptop

How It Works

1. SSB Sealed Beam Load Cells are attached to the WTS-AM-1E Wireless Strain Bridge Transmitter Modules, which are then installed underneath the tiles of the smart flooring.
2. When a person walks on the floor, the forces measurement is logged, graphed, and wirelessly transmitted from the WTS-AM-1E to the customer's PC using the WTS-BS-6 Wireless Telemetry Dongle Base Station with ssupplied software. Load cells can be viewed individually, or summed.
3. Results can also be transmitted to the WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters where each load cell can also be summed.



Smart Pallet Solution

Load Cell and WTS Wireless Telemetry System

Industry: IoT

Summary

Customer Challenge

A customer wants a pallet weighing solution in their warehouse to monitor their products and goods that come through day in and day out. They also want to be able to verify if any products are stolen based on the weight, and able able to determine pricing for their goods based on the weight. They would also like a smart, wireless solution.

Interface Solution

Interface suggests using multiple SSB Sealed Beam Load Cells, and installing it within the corners of the bottom pallet. Heavy loads are put onto the pallet, which is captured when connected to WTS-AM-1E Wireless Strain Bridge Transmitter Modules. The force results are wirelessly transmitted and logged to the customer's PC using the WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied software with supplied software.

Results

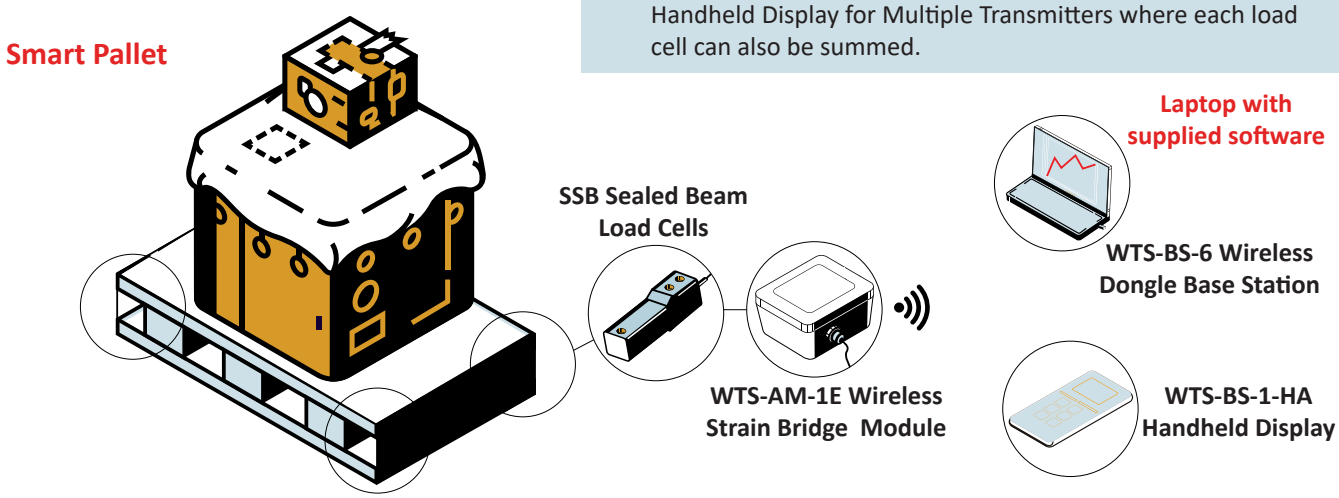
The customer was able to successfully monitor the weight of their pallets, thus monitoring their products and goods coming in and out of their facility on a daily basis.

Materials

- SSB Sealed Beam Load Cells
- WTS-AM-1E Wireless Strain Bridge Transmitter Modules
- WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied Log100 software
- WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters
- Customer PC or Laptop

How It Works

1. SSB Sealed Beam Load Cells are installed within the corners of the bottom pallet, and the SSB load cells are attached to the WTS-AM-1E Wireless Strain Bridge Transmitter Modules.
2. The weight measurement is logged and graphed and wirelessly transmitted from the WTS-AM-1E to the customer's PC using the WTS-BS-6 Wireless Telemetry Dongle Base Station and the supplied software. Load cells can be viewed individually, or summed.
3. Results can also be transmitted to the WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters where each load cell can also be summed.



Truck Weigh Bridge

Wireless Telemetry System

Industry: IoT

Summary

Customer Challenge

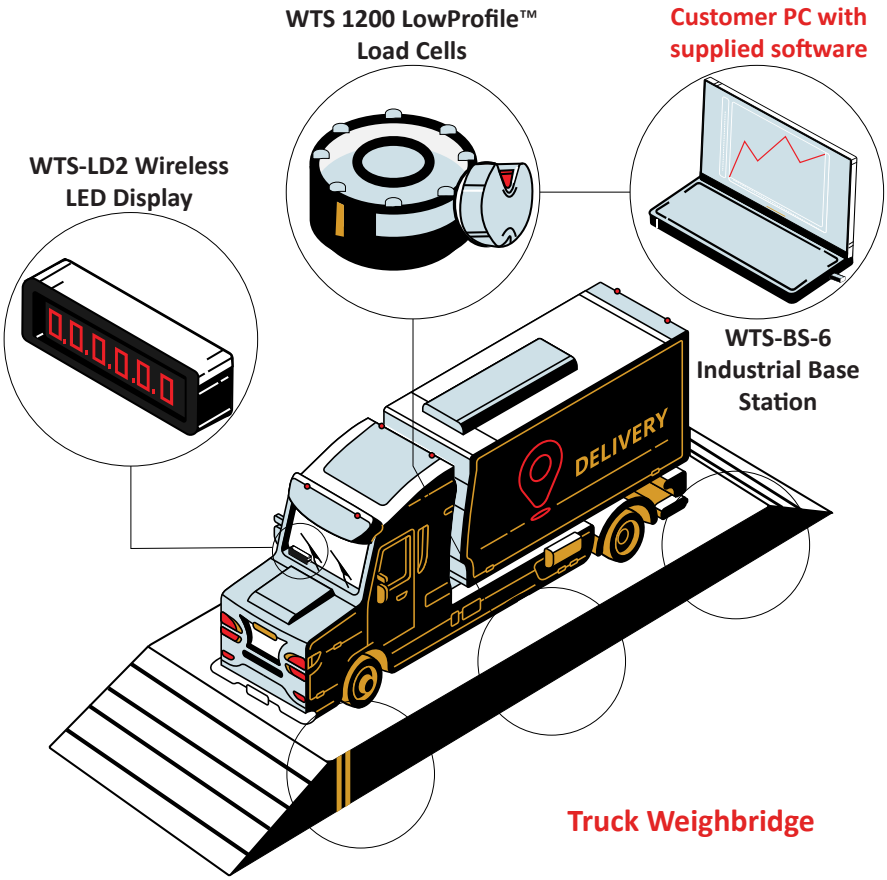
A customer owns a truck company and needs to record the weight or loads being carried by their trucks. They would like a wireless weighing bridge that is able to transmit, log, and display the results in real time.

Interface Solution

Interface suggests installing multiple WTS 1200 LowProfile™ Load Cells under a weighing bridge. When a truck drives over it, the load cells will transmit the force results wirelessly to the WTS-BS-4 Industrial Base Station connected to the customer's PC with provided Log100 software. The WTS-LD2 Wireless Large LED Display can also display the weight inside for the driver to see in real time.

Results

The customer was able to measure, log, and graph the different loads their trucks carried wirelessly onto the weighbridge with success.



Materials

- WTS 1200 Standard Precision LowProfile™ Wireless Load Cells
- WTS-BS-4 USB Industrial Base Station
- WTS-LD2 Wireless Large LED Display
- WTS Toolkit and Log100 Software
- Customer PC or Laptop

How It Works

1. Multiple WTS 1200 Standard Precision LowProfile™ Wireless Load Cells are installed and mounted to the bottom of the truck weighbridge.
2. The load cells collect the force measurements and sum the total weight of the truck that is carrying a heavy load.
3. The data is transmitted to the customer's laptop through the WTS-BS-4 USB Industrial Base Station using the Log100 Software. The sum weight data can be logged, graphed, and sent to the cloud using the supplied software.
4. The WTS-LD2 Wireless Large LED Display can also display the weight inside of the vehicle for the driver to see in real time.

VR Omni Treadmill
Wireless Telemetry System

Industry: IoT

Summary

Customer Challenge

VR omni treadmills are a device used for immersive technology gaming, training, or other simulation purposes. VR omni treadmills need to be force tested and analyzed to ensure the treadmill is accurately picking up on movement by the user, and may need further calibration and adjustments.

Interface Solution

Interface suggests using SSB Sealed Beam Load Cells, and installing it in the VR treadmill. When someone walks or runs on the treadmill during a simulation test, data is captured and sent to WTS-AM-1E Wireless Strain Bridge Transmitter Modules. The force results are wirelessly transmitted and logged to the customer's PC using the WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied software.

Results

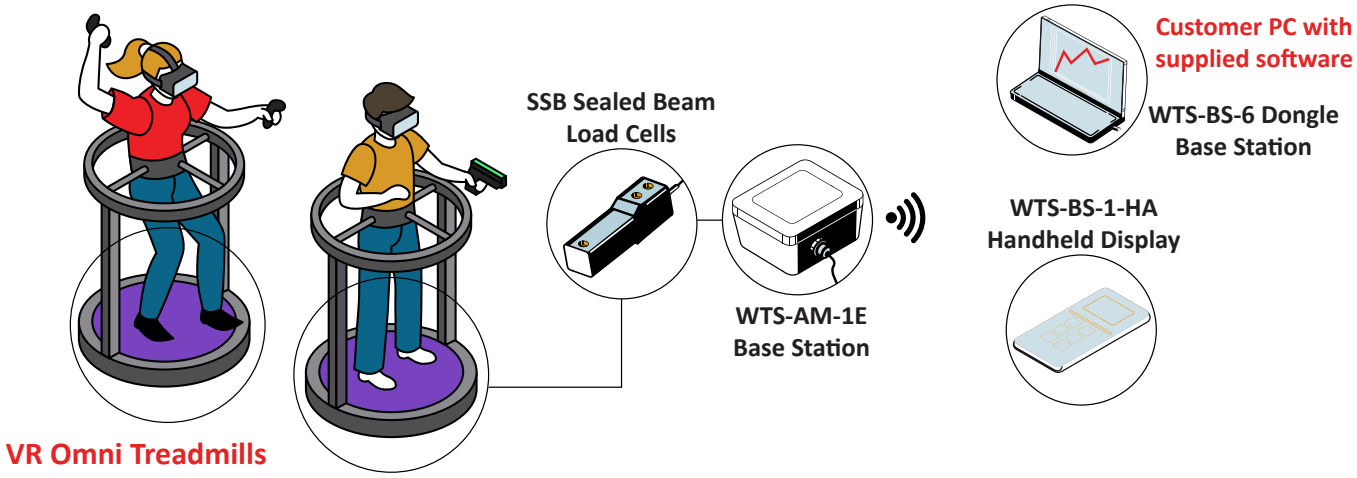
Interface's SSB Sealed Beam Load Cell and WTS Wirelessly Telemetry Systems successfully measured the forces of the VR omni treadmill when undergoing a force test.

Materials

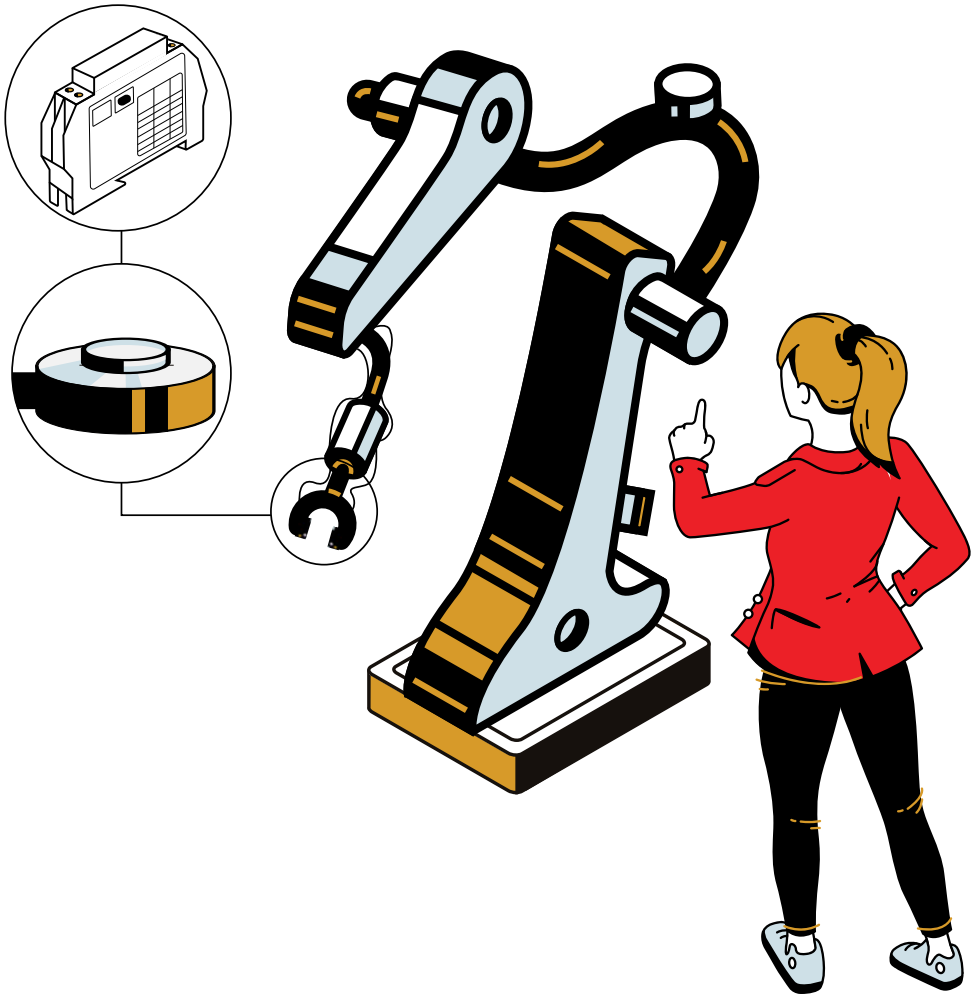
- SSB Sealed Beam Load Cells
- WTS-AM-1E Wireless Strain Bridge Transmitter Modules
- WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied Log100 software
- WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters
- Customer PC or Laptop
- VR Omni Treadmill under test

How It Works

1. SSB Sealed Beam Load Cells are attached to the WTS-AM-1E Wireless Strain Bridge Transmitter Modules, which are installed in the VR treadmill. An individual walks and runs on the VR treadmill during a simulation.
2. Forces measurements are logged, graphed, and wirelessly transmitted from the WTS-AM-1E to the customer's PC using the WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied software.
3. Results can also be transmitted to the WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters where each load cell can also be summed.



Manufacturing



Cobot Safety Programming
Multi-Axis and Interface Mini™

Industry: Manufacturing

Summary

Customer Challenge

Collaborative robots, or cobots, are offering more manufacturing operations in the industrial packaging industry. Protective cages or fences are no longer needed for safety purposes, but safety testing are still needed to ensure humans and robots can work alongside each other.

Interface Solution

Interface suggests installing a 6-Axis force plate under the cobot, and also two ConvexBT Load Button Load Cells in the pinchers of the cobot. If a human were to knock into the cobot, or have a limb stuck in the pincher, the cobot would sense the amount of force measured from the load cells and be programmed to stop immediately.

Results

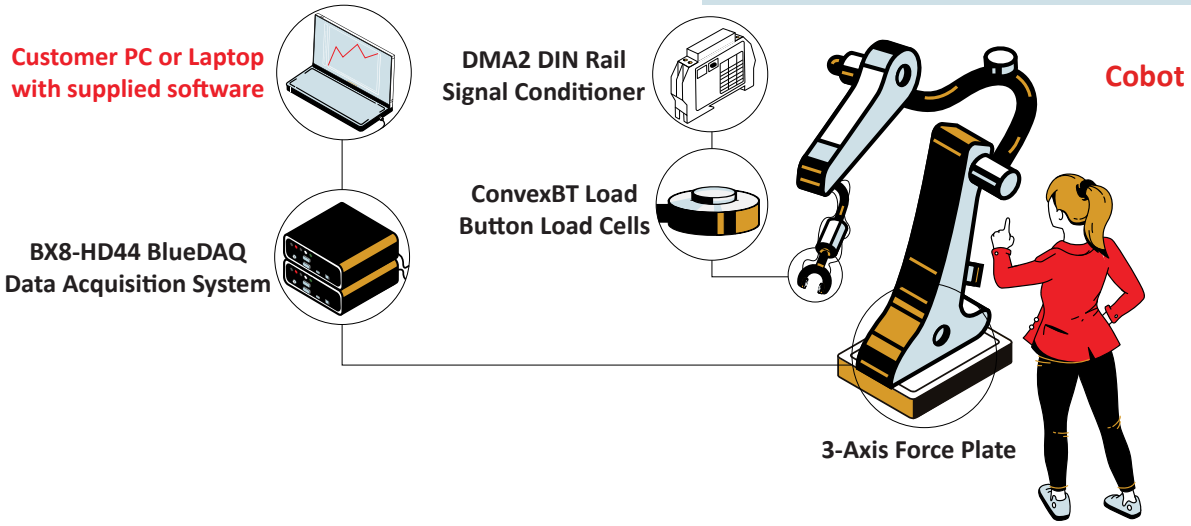
Interface's multi-axis force plate and miniature load cells were programmed and able to detect when a human interacted with the cobot, shutting it down for safety purposes.

Materials

- Four 3-Axis Force Load Cells
- Mounting Plates
- Two BX8 Multi-Channel Bridge Amplifier and Data Acquisition System with supplied software
- Two ConvexBT Load Button Load Cells
- DMA2 DIN Rail Mount Signal Conditioner
- PLC Controller
- Robotic Arm
- Customer's PC or Laptop

How It Works

1. Four 3-Axis Force Load Cells (creating one 6-Axis Force Plate) are installed between two metal plates at the base of the cobot.
2. The two ConvexBT Load Button Load Cells are connected to both sides of the cobot's clamping device.
3. Reaction forces from the robotic arm are measured and recorded using the two BX8 Multi-Channel Bridge Amplifier and Data Acquisition Modules. Data then be logged, graphed, and displayed on the customer's PC. Forces from the ConvexBT is sent to the DMA2, then signaled to the PLC controller, which is programmed to tell the cobot to stop clamping pressure.



Fabric Winding Machine
Load Pins

Industry: Manufacturing

Summary

Customer Challenge

In textile plants, fabric winding machines are used to wind large fabric rolls together. A force measurement system is needed in order to continuously monitor the tension of the fabric as it winds and unwinds in the machine.

Interface Solution

Interface's ILMP Load Pins can be replace the shaft holding the fabric roll of the machine. The load pins are able to measure the tension of the fabric while it winds or unwinds. Tension forces are measured using the BX8-AS BlueDAQ Series Data Acquisition System. Results can be monitored when connected to a PC or laptop with supplied BlueDAQ software.

Results

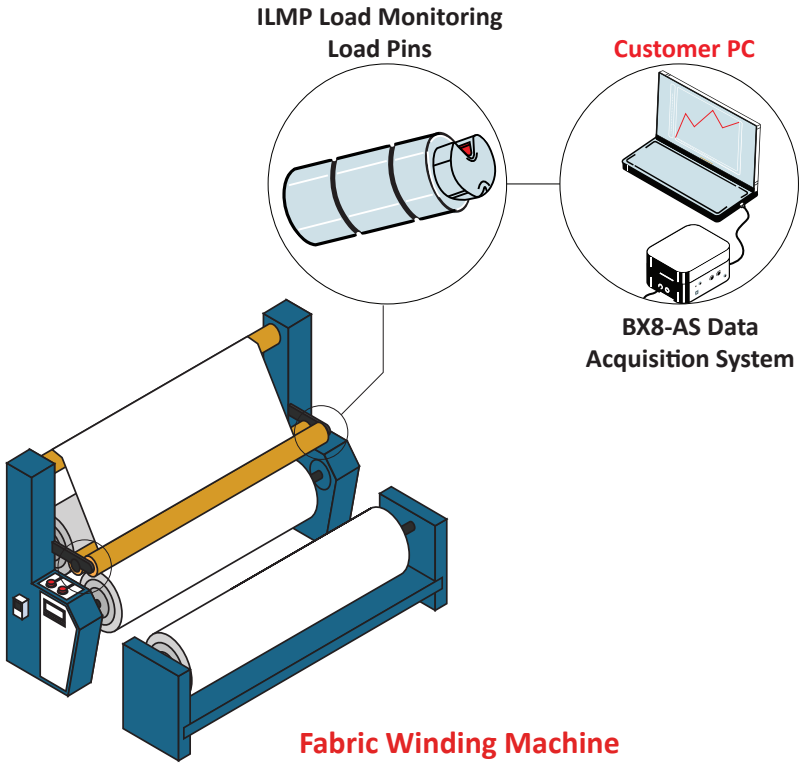
Interface's ILMP Stainless Steel Load Monitoring Load Pins were the perfect solution to monitor the tension of the fabric on the manufacturers fabric winding machine.

Materials

- ILMP Stainless Steel Load Monitoring Load Pins
- BX8-AS BlueDAQ Series Data Acquisition System with supplied BlueDAQ software
- Customer PC

How It Works

1. ILMP Load Pins are installed in the fabric winding machine's roller shafts. Each load pin is connected to the BX8-AS BlueDAQ Series Data Acquisition.
2. The BX8-AS BlueDAQ Series Data Acquisition collects the force readings where it can be displayed and monitored when conneced to the customer's computer with supplied BlueDAQ sofware.



Feed Roller System

Load Cell

Industry: Manufacturing

Summary

Customer Challenge

A customer has a feed roller system, and needs to monitor the forces of both ends of the rollers, in order to maintain a constant straight feed. They would also prefer a wireless system.

Interface Solution

Interface suggests installing Pillow Block Load Beam at both ends of the bottom roller to measure the forces being applied. The forces are measured when connected to WTS-AM-1E Wireless Strain Bridge Transmitter Module. The data is then transmitted wirelessly to the WTS-BS-6 Wireless Telemetry Dongle Base Station and the WTS-BS-1-HA Wireless Handheld Display for multiple transmitters, where data can be displayed, graphed, and logged on the customer's PC or laptop.

Results

The Pillow Block Load Beams installed at the bottom roller was able to measure and monitor the forces to maintain the straight feed by the rollers.

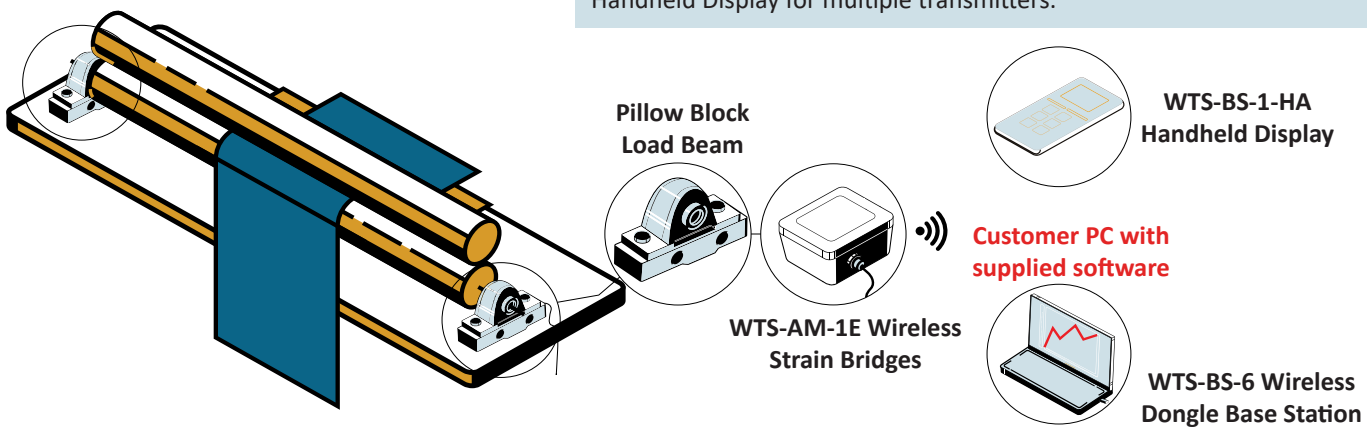
Materials

- Two Pillow Block Load Beams
- Two WTS-AM-1E Wireless Strain Bridge Transmitter Module
- WTS-BS-6 Wireless Telemetry Dongle Base Station
- WTS-BS-1-HA Wireless Handheld Display for multiple transmitters
- Log100 Software
- Customer PC or Laptop

How It Works

1. Two Pillow Block Load Beams are installed at the two ends of the bottom roller, and connected to two WTS-AM-1E Wireless Strain Bridge Transmitter Module.
2. As a material is fed into the roller system, the Pillow Block Load Beams measures the forces of the roller system to detect any imbalances in the roller system.
3. The data results are wirelessly transmitted from the WTS-AM-1E Wireless Strain Bridge Transmitter Module to the WTS-BS-6 Wireless Telemetry Dongle Base Station. Results can be displayed, graphed, and logged on the customer's PC with Log100 software, where alarms can also be set. It can also be displayed on the WTS-BS-1-HA Wireless Handheld Display for multiple transmitters.

Feed Roller System



Inventory Weighing
Load Cell

Industry: Manufacturing, Weighing

Summary

Customer Challenge

Effective management of inventory is crucial for all businesses. In situations where monitoring and managing stock from a distance is necessary, maintaining precise records can be a challenge. A weight-based inventory management system is needed in real time.

Interface Solution

Interface suggests installing MBI Overload Protected Miniature Beam Load Cells under each corner of the inventory shelves. A JB104SS 4-Channel Stainless Steel Junction Box is connected to each load cell, and to a WTS-AM-1E that wirelessly transmits the sum weight to the WTS-BS-1-HA Wireless Handheld Display for multiple transmitters, and the WTS-BS-6 Wireless Telemetry Dongle Base Station when connected to the customer's PC. Results can be displayed, logged, and graphed seen in real time.

Results

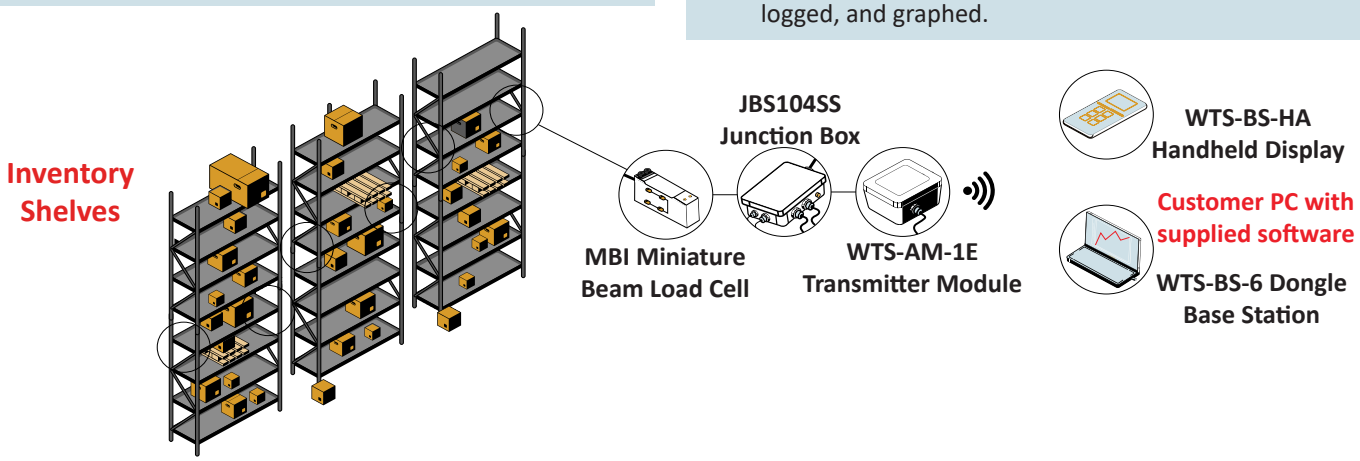
The customer effectively monitored and managed their inventory using Interface's force sensors. It also led to lead to reduced labor expenses and fewer errors, enhancing overall productivity.

Materials

- Multiple MBI Overload Protected Miniature Beam Load Cells
- JB104SS 4-Channel Stainless Steel Junction Box
- WTS-AM-1E Wireless Strain Bridge Transmitter Module
- WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied Log100 software
- WTS-BS-1-HA Wireless Handheld Display for multiple transmitters
- Customer PC or Laptop

How It Works

1. Multiple MBI Overload Protected Miniature Beam Load Cells are installed in each corner of the inventory shelves. Each load cell is connected to a JB104SS 4-Channel Stainless Steel Junction Box.
2. Boxes of items or inventory is placed on the shelving.
3. The WTS-AM-1E wirelessly transmit the sum weight to both the WTS-BS-1-HA Wireless Handheld Display for multiple transmitters and the WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied Log100 software on the customer's PC. Data can be displayed, logged, and graphed.



Material Tensile Testing
Load Cell

Industry: Manufacturing

Summary

Customer Challenge

A customer wants to conduct a tensile force test on different samples and materials until failure. Materials include plastic, steel, or woven fabric. They want to measure tensile strength, yield strength, and yield stress.

Interface Solution

Interface's 1200 Standard Precision LowProfile™ Load Cell is installed into the customer's test frame. The tensile test is conducted, and force results captured by the load cell and extensometer are synced through the SI-USB4 4 Channel USB Interface Module. These results can be displayed on the customer's PC with supplied software.

Results

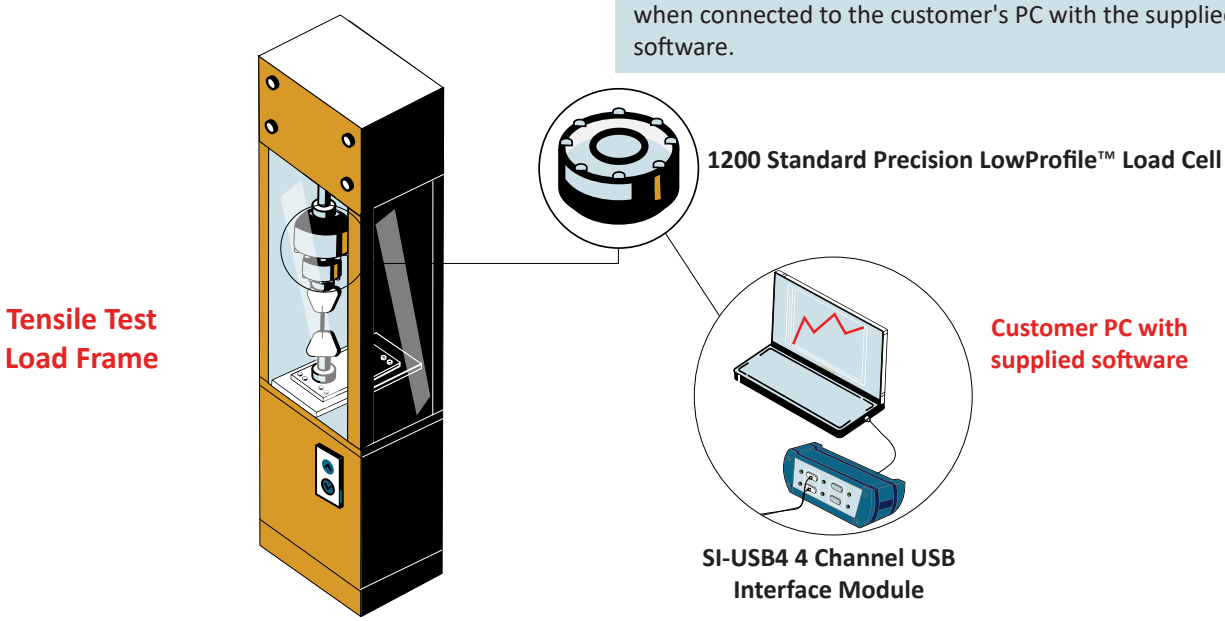
With Interface's force products, the customer was able to determine the tensile strength, yield strength, and yield stress of a variety of different materials.

Materials

- 1200 Standard Precision LowProfile™ Load Cell
- SI-USB4 4 Channel USB Interface Module with supplied software
- Extensometer (optional)
- Grips
- Customer tensile test load frame
- Customer PC or Laptop

How It Works

1. The 1200 Standard Precision LowProfile™ Load Cell is installed into the customer's tensile test load frame.
2. Different samples are tested and the force data is collected. The SI-USB4 has two, three, and four channels, so data from the extensometer can also be captured and synced together.
3. The data collection is captured by the SI-USB4 4 Channel USB Interface Module, and can be displayed when connected to the customer's PC with the supplied software.



Metal Bending Force
Wireless Telemetry System

Industry: Manufacturing

Summary

Customer Challenge

A customer wants to know how much force it takes to bend different grades of steel metal. They use their metal bending machine to create different metal hardwares, and would like to record the amounts of force it takes to bend the metal used for their projects.

Interface Solution

Interface suggests using a wireless method so cables do not interfere with the machine. The WTS 1200 Standard Precision LowProfile® Wireless Load Cell can be attached to the head of the hydraulic operated steel bender. Results will wirelessly transmit to the customers PC through the WTS-BS-4 Wireless Base Station with USB Interface, where data can be displayed, logged, and graphed with supplied Log100 software.

Results

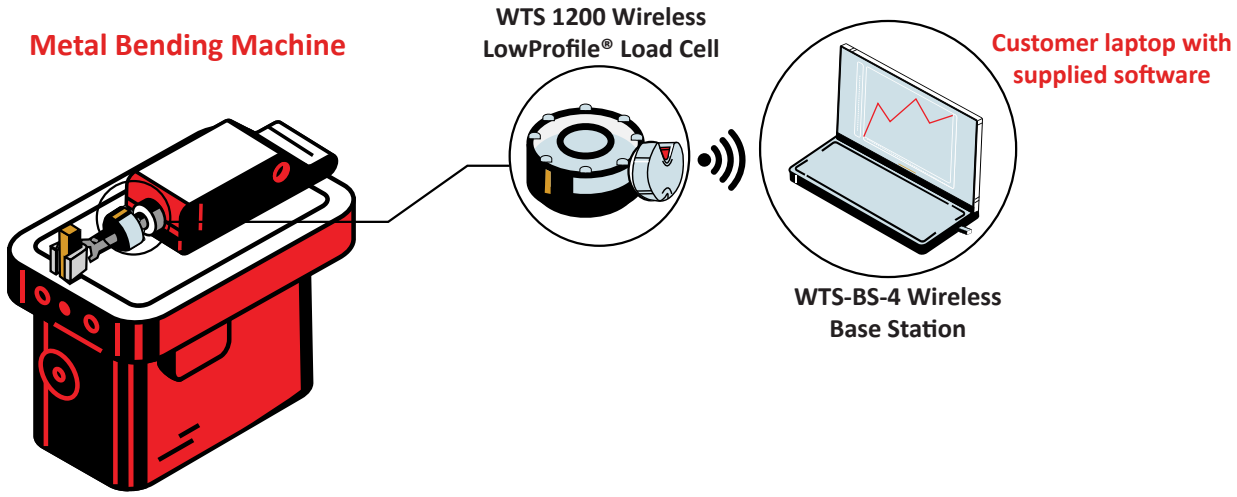
The customer was able to record the force results of his metal bending machine with Interface's Wireless Telemetry System.

Materials

- WTS 1200 Standard Precision LowProfile® Wireless Load Cell
- WTS-BS-4 Wireless Base Station with USB Interface in Industrial Enclosure with Log100 software
- Customer hydraulic metal bending machine
- Customer PC or Laptop

How It Works

1. The WTS 1200 Standard Precision LowProfile® Wireless Load Cell is installed onto the actuator portion of the metal bender.
2. The machine bends different kinds of steel, and the load cell captures the forces.
3. Force data is wirelessly transmitted directly to the customer's PC through the WTS-BS-4 Wireless Base Station with USB Interface using supplied Log100 software. Results are displayed, recorded, and graphed.



Metal Press Cutting Machine
Multi-Axis

Industry: Manufacturing

Summary

Customer Challenge

A customer wants to test the amount of force it takes to cut through different thickness's of metal on their metal press cutting machine. They want to ensure their metal press cutting machine is working properly, and also its maximum limitation.

Interface Solution

Interface's suggests installing their 3AXX 3-Axis Force Load Cell underneath the plate where pieces of metal are placed to be cut, or punched holes in. When connected to the WTS-AM-1E Wireless Strain Bridge Transmitter Module, the force results of different metals being cut will be displayed, graphed, and recorded on the customer's PC.

Results

The customer was able to determine the different amount of forces it took for their metal press cutting machine to cut through different types and thicknesses of metal.

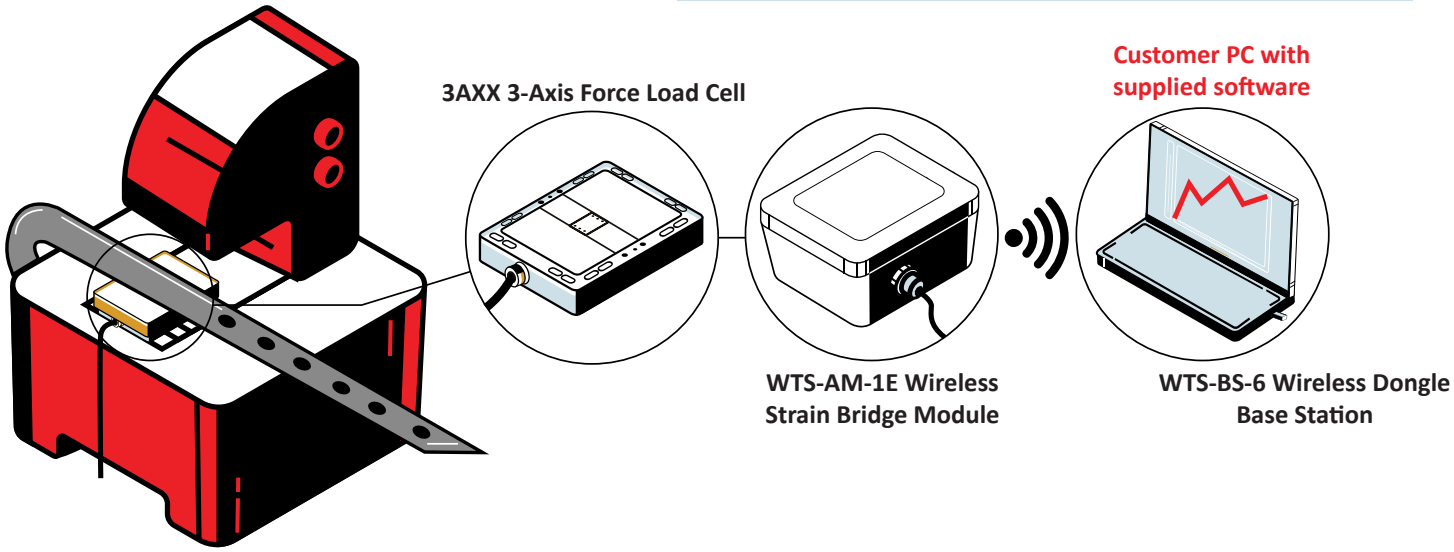
Materials

- 3AXX 3-Axis Force Load Cell
- WTS-AM-1E Wireless Strain Bridge Transmitter Module
- WTS-BS-6 Wireless Telemetry Dongle Base Station with Log100 Software
- Customer PC or Laptop

How It Works

1. The 3AXX 3-Axis Force Load Cell is placed underneath the metal machine's plate. It is also connected to the WTS-AM-1E Wireless Strain Bridge Transmitter Module.
2. Different types of metals and thickness's are tested through the metal press cutting machine.
3. The force results are then wirelessly transmitted to the customer computer using the WTS-BS-6 Wireless Telemetry Dongle Base Station, where the customer is able to display, graph, and record the results using supplied Log100 software.

Metal Press Cutting Machine



Press Load Monitoring
Load Cell

Industry: Manufacturing

Summary

Customer Challenge

Press forming is a method to deform different materials. For instance, materials such as steel can be bent, stretched, or formed into shapes. A force measurement solution is required to monitor the forces being applied by the press forming machine. This ensures quality control and traceability during the production process.

Interface Solution

For large press forming machines, Interface recommends installing the 1000 High Capacity Fatigue-Rated LowProfile™ Load Cell. When the material is placed under the punch plate to form a shape, the force applied is measured by the 1000. The force results captured is sent to the INF-USB3 Universal Serial Bus Single Channel PC Interface Module, where results can be graphed and logged on the customer's PC with provided software.

Results

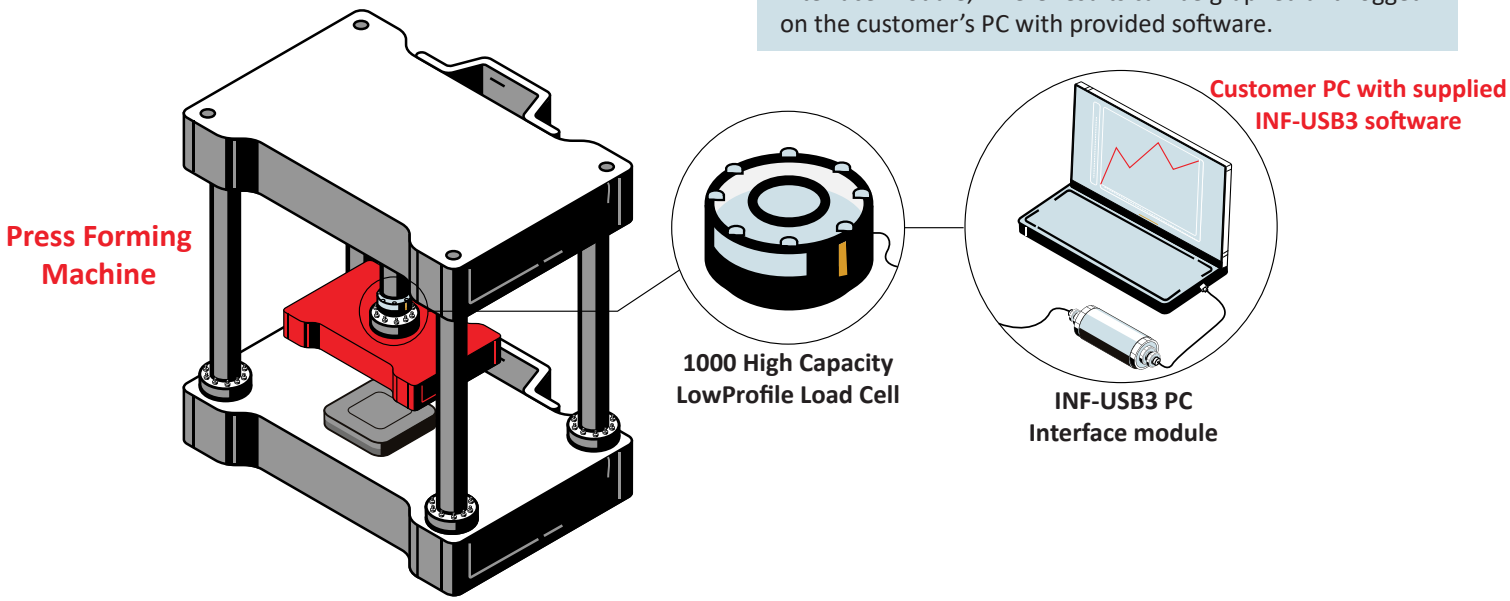
Interface's force measurement products and instrumentation accurately monitored and logged the force results of the press force machine, ensuring zero-error production performance.

Materials

- 1000 High Capacity Fatigue-Rated LowProfile™ Load Cell
- INF-USB3 Universal Serial Bus Single Channel PC Interface Module
- Customer press forming machine
- Customer's PC or Laptop

How It Works

1. Interface's 1000 High Capacity Fatigue-Rated LowProfile™ Load Cell is installed in the press forming machine, within the punch plate.
2. A material is placed under the force plate to form a shape.
3. Force results are captured by the 1000 load cell, and sent to the INF-USB3 Universal Serial Bus Single Channel PC Interface Module, where results can be graphed and logged on the customer's PC with provided software.



Robotic Grinding and Polishing

Multi-Axis

Industry: Manufacturing

Summary

Customer Challenge

Robotic grinding and polishing are commonly used in manufacturing for industrial applications. Robots or cobots are programmed to grind and polish on different materials and surfaces. A force measurement system needs to be implemented in order to monitor and control the amount of force exerted on to the grinding workpiece.

Interface Solution

Interface's Model 6A40A 6-Axis Load Cell can be installed between the flange and the grinding tool. When connected to the BX8-HD44 Data Acquisition, the customer can receive force and torque measurements when connected to their control system using BlueDAQ sofware.

Results

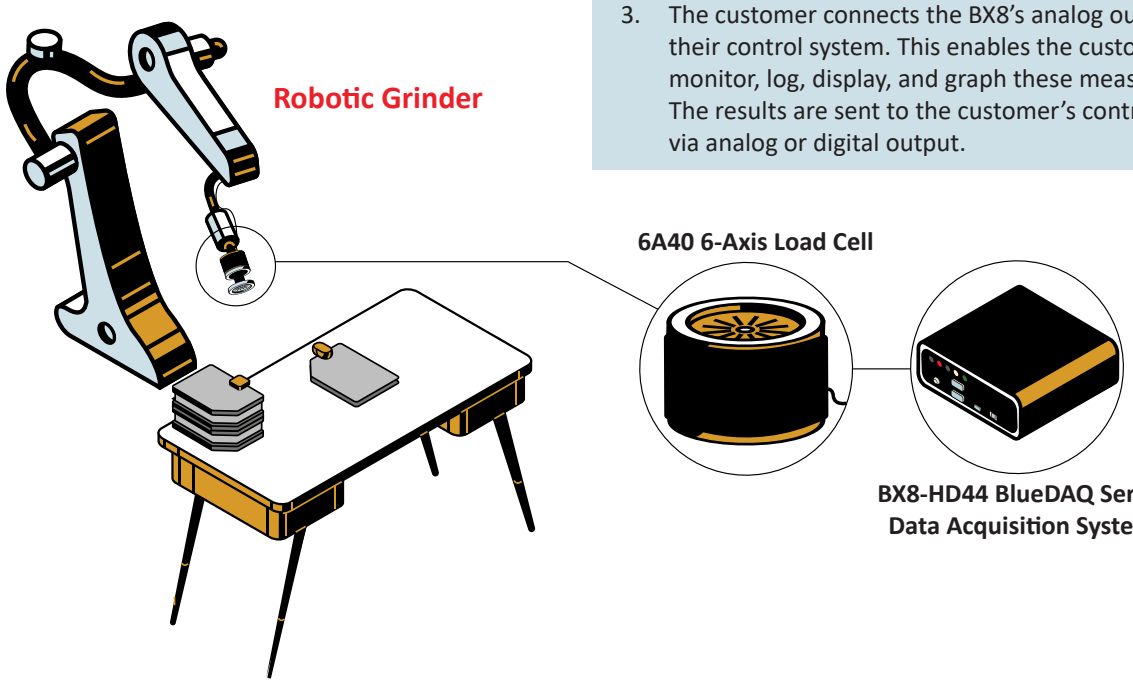
The 6A40-6 Axis Load Cell was able to measure all forces and torques (Fx, Fy, Fz, Mx, My, Mz) and the BXB-HD44 Data Acquisition was able to log, display, and graph these measurements while sending scaled analog output signals for these axes to the robot's control system.

Materials

- 6A40 6-Axis Load Cell
- BX8-HD44 BlueDAQ Series Data Acquisition System with included BlueDAQ software
- Customer's robotic arm and control system

How It Works

1. The 6A40 6-Axis Load Cell is positioned between the flange and the grinder.
2. 6A40 6-Axis Load Cell is linked to the BX8-HD44 BlueDAQ Series Data Acquisition System, which gathers force and torque measurement data.
3. The customer connects the BX8's analog outputs to their control system. This enables the customer to monitor, log, display, and graph these measurements. The results are sent to the customer's control system via analog or digital output.



Rubber Injection Molding
Load Cells

Industry: Manufacturing

Summary

Customer Challenge

Rubber injection molding is a process where rubber parts are produced by injecting hot rubber material into a mold cavity, and pressed to form a shape. A force measurement system is needed in the press machine to measure and monitor the force exerted during the injection molding process.

Interface Solution

Interface's 2161 High Capacity Column Compression Only Load Cell installed into the rubber molding machine, where it will compress molten rubber into a shape. Force results during the test will be sent and displayed to the customer's control center when connected to the 9840 Calibration Grade Multi-Channel Load Cell Indicator.

Results

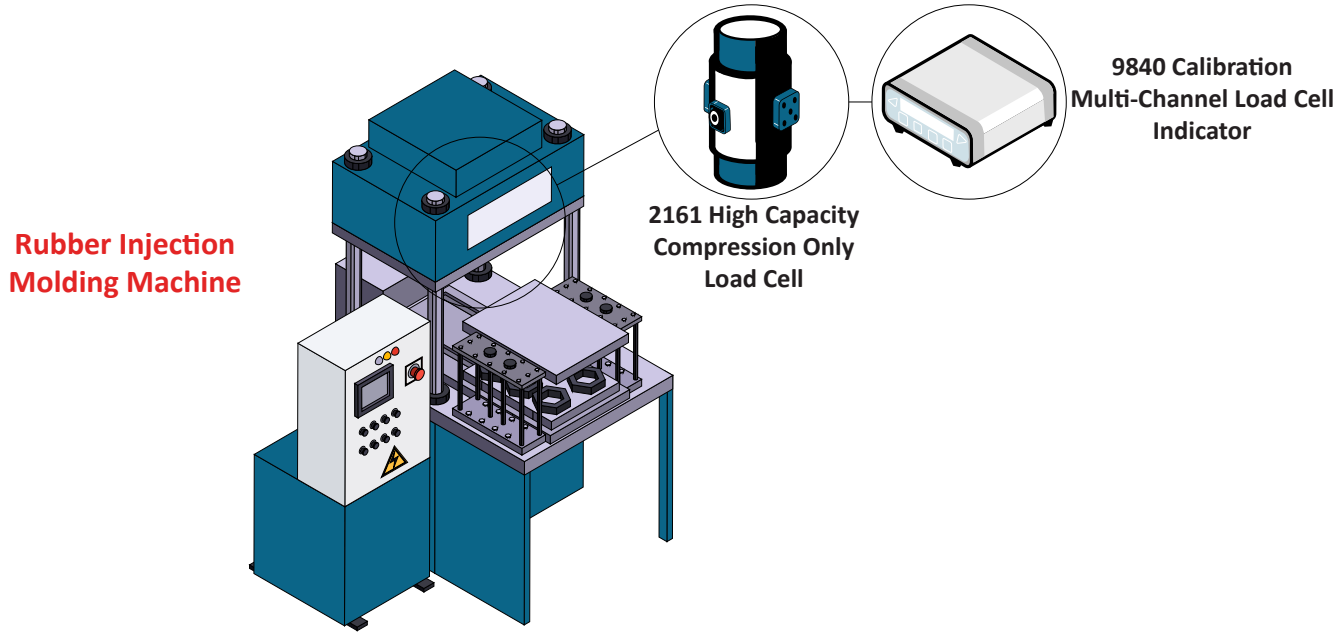
Interface's compression column load cell successfully measured and monitored the forces exerted during the rubber injection molding process.

Materials

- 2161 High Capacity Column Compression Only Load Cell
- 9840 Calibration Grade Multi-Channel Load Cell Indicator
- Customer rubber molding machine

How It Works

1. The 2161 High Capacity Column Compression Only Load Cell is installed into the rubber molding machine.
2. Molten rubber is injected into the machine, and pressed into a shape.
3. The compression results are displayed and reviewed when the 9840 Calibration Grade Multi-Channel Load Cell Indicator is connected to the customer's system though the analog output or RS232 Serial Interface.



Weave Loom Efficiency
Load Pin

Industry: Manufacturing

Summary

Customer Challenge

A weaving loom machine is a device used to create woven fabric by interlacing threads or yarns at right angles to each other. A real-time tension monitoring system is needed to ensure the tension of the material is perfect in order to create optimal weave efficiency.

Interface Solution

Instead of the traditional beam, Interface suggests integrating their WTSLP Wireless Stainless Steel Load pins into the beam. The WTSLP's captures the tension results in real-time, and sends the data to the customer's PC through the WTS-BS-4 Industrial USB Base Station with supplied Log100 software.

Results

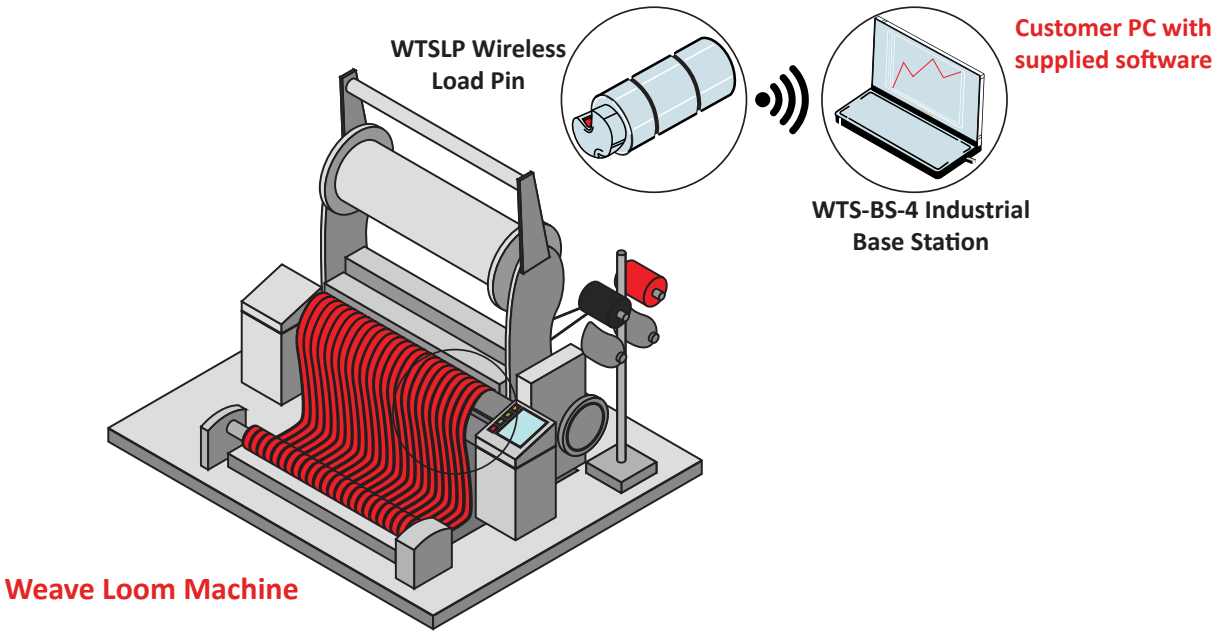
Interface's custom WTSLP Wireless Stainless Steel Load Pins successfully measured the weave loom machine's fabric tension.

Materials

- WTSLP Wireless Stainless Steel Load Pins
- WTS-BS-1-HS Handheld Display for Single Transmitters
- WTS-BS-4 Industrial USB Base Station with Log100 software
- Customer PC

How It Works

1. Interface's custom WTSLP Wireless Stainless Steel Load Pins are integrated into the beam used in the weave loom machine.
2. The WTSLP's measure the tension from the beam and wirelessly transmit the data to the customer's PC through the WTS-BS-4 Industrial USB Base Station. Data is displayed, logged, and graphed with supplied Log100 software.



Yarn Tension Monitoring
Interface™ Mini

Industry: Manufacturing

Summary

Customer Challenge

In textile manufacturing, consistent tension levels of yarn is needed during production. Yarn undergoes many different manufacturing processes such as spinning, weaving, knitting, and winding, and quality control is crucial to produce high quality textile products. A tension monitoring system is needed.

Interface Solution

Interface's SML Low Height Load Cells can monitor the force of the individual yarn strings on the track wheel. SML's are attached to a clevis, which is then attached to a track wheel that holds the yarn in the machine. When yarn tension is loose, misaligned, or misplaced, the SML detects the lack of force and and an alarm notifies the customer when connected to the BX8-AS BlueDAQ Series Data Acquisition System. Results can be monitored when connected to a PC or laptop with supplied BlueDAQ software.

Results

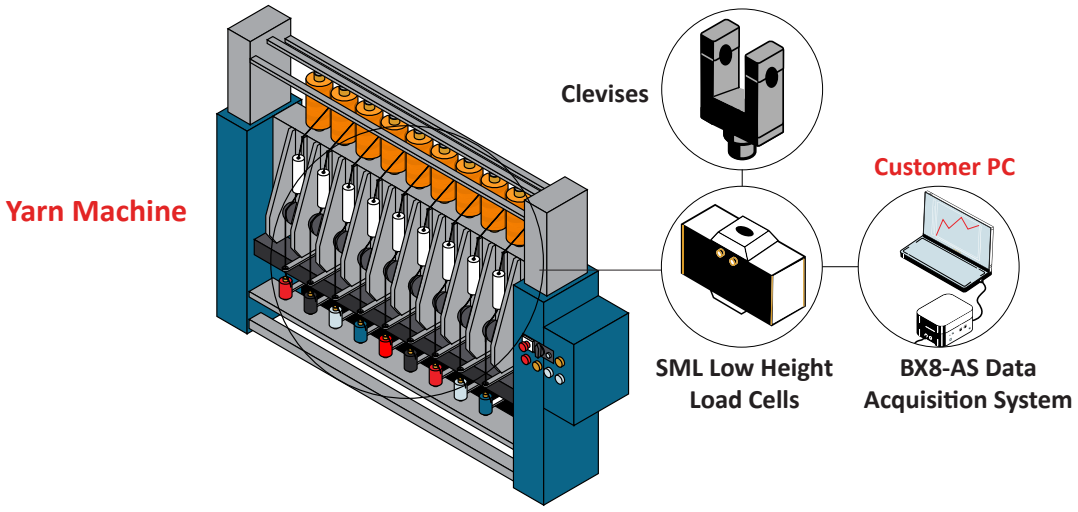
Interface's miniature load cells and clevises successfully monitored the tension of the individual yarn strings, and notified the customer of any lack of tension or misalignments.

Materials

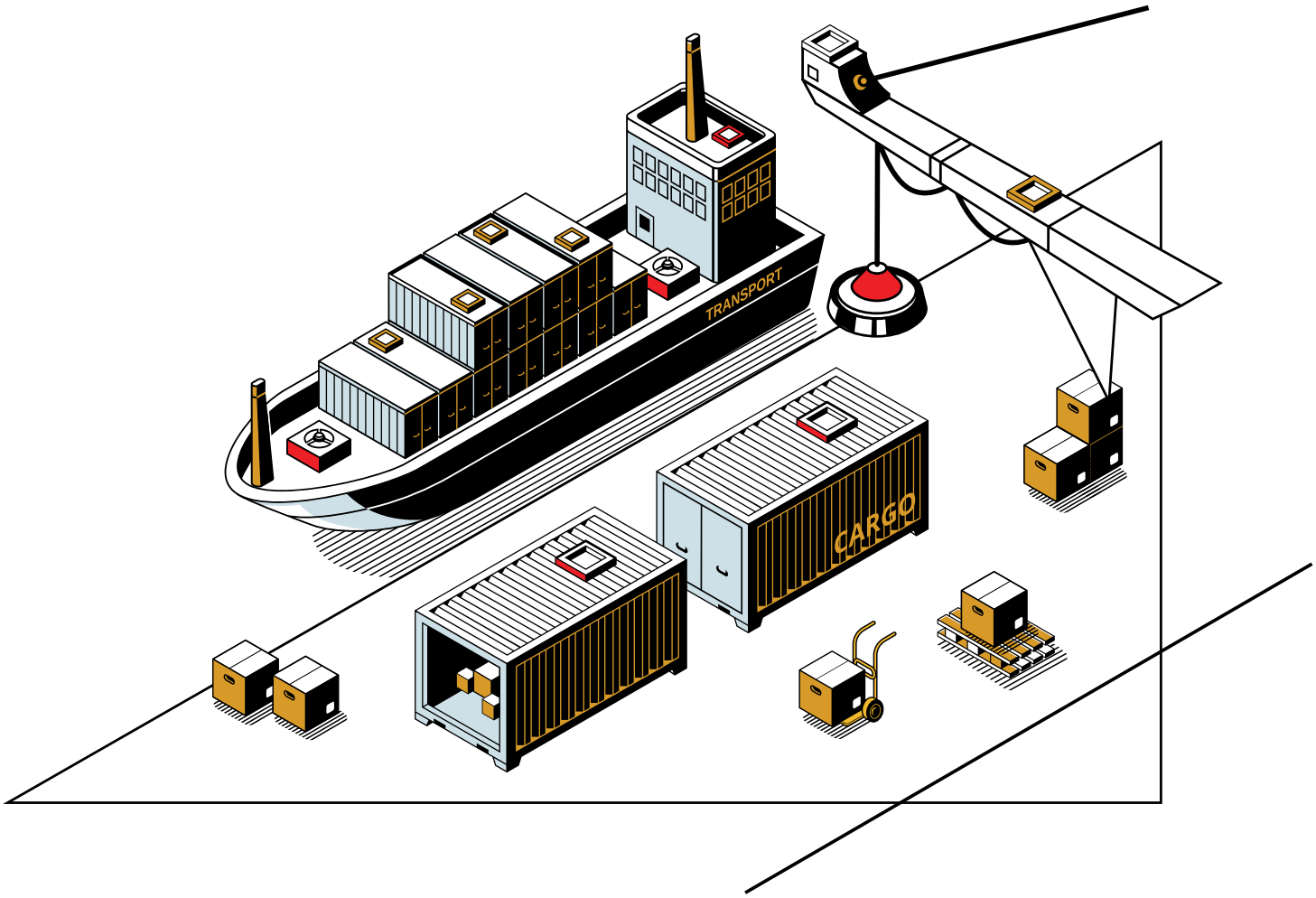
- Multiple SML Low Height Load Cells
- Multiple Clevises
- One BX8-AS BlueDAQ Series Data Acquisition System per eight SML's
- Supplied BlueDAQ software
- Customer PC

How It Works

1. Multiple SML Low Height Load Cells are attached to clevises, and installed into the yarn machine. A track roller is attached onto the clevis, where the yarn string safely stays on. When a yarn string loses tension or is misplaced, the SML's will detect the lack of force.
2. The BX8-AS BlueDAQ Series Data Acquisition collects the force readings where it can be displayed and monitored when conneced to the customer's computer with supplied BlueDAQ sofware. Eight SML's can be paired with one BX8.



Maritime



Aquafarming Fish Weighing Load Shackles

Industry: Maritime

Summary

Customer Challenge

An aquaculture company needs a weighing system when collecting the fish from aquafarming cages. When the fish is ready to be collected from the aquafarming cages, they can ensure the wire rope is strong enough to carry the load.

Interface Solution

Interface's WTSSHK-B Wireless Crosby™ Bow Load Shackle is installed between the end of the cable, and the fishing net of the boat collecting fish. The load shackle will weigh the net of fish when collected out of the fish farm. Data is wirelessly transmitted to the customer's computer using the WTS-BS-4 Wireless Base Station with USB Industrial Enclosure. Data is displayed, graphed and logged with supplied Log100 software.

Results

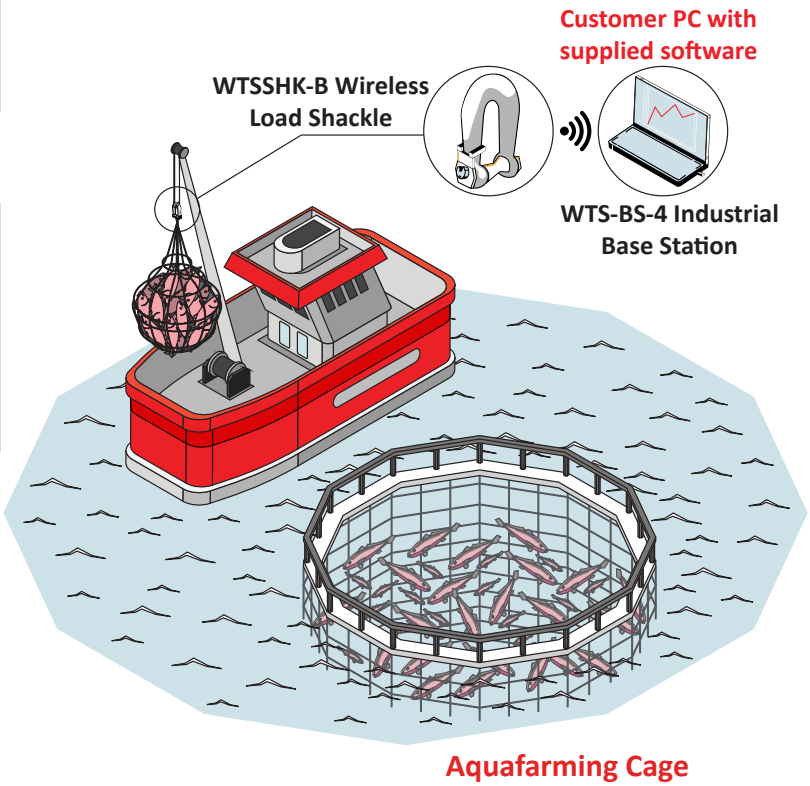
The customer was able to weigh the net of fish being collected out of the aquafarming cages using Interface's WTSSHK-B Wireless Crosby™ Bow Load Shackle.

Materials

- WTSSHK-B Wireless Crosby™ Bow Load Shackle
- WTS-BS-4 Wireless Base Station with USB Industrial Enclosure with supplied Log100 Software
- Customer PC
- Customer's aquafarming cages

How It Works

1. The WTSSHK-B Wireless Crosby™ Bow Load Shackle is installed between the end of the cable, and the fishing net of the boat collecting fish.
2. Data is collected and the weight is wirelessly transmitted to the customer's PC through the WTS-BS-4 Wireless Base Station. The data is displayed, graphed, and logged using supplied Log100 software.



Aquafarming Mooring System
Load Shackles
Industry: Maritime

Summary

Customer Challenge

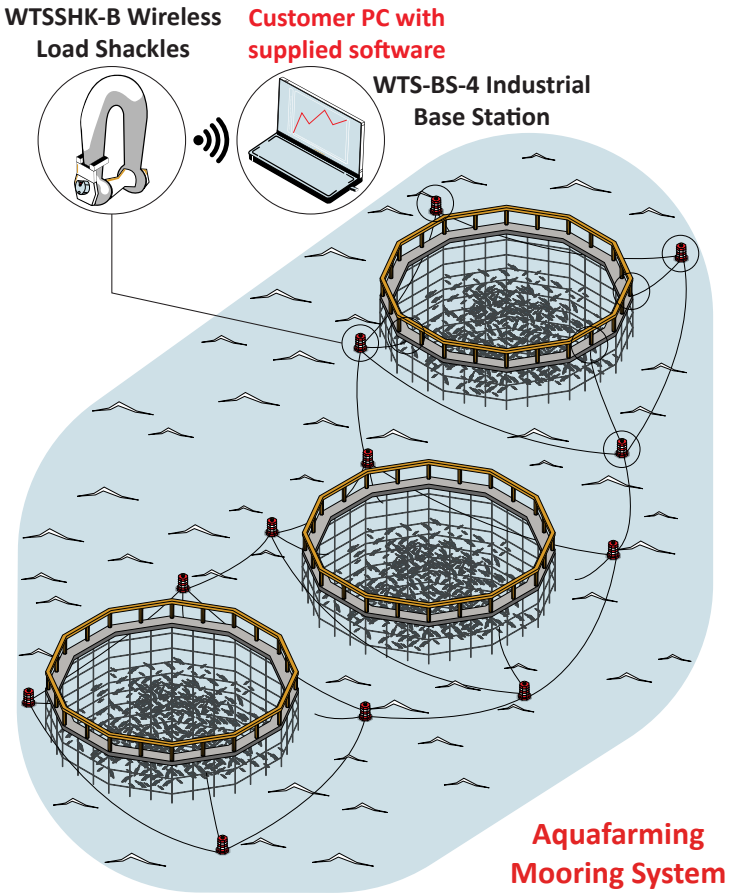
An aquafarming mooring system is a mooring structure used to secure fish cages or pens in an open body of water. This system usually consists of anchors, lines, and buoys to keep the fish farms in place despite waves or other disturbances. It is integral to monitor and keep a mooring system in place for the fish farming operations to be successful.

Interface Solution

Interface's WTSSHK-B Wireless Crosby™ Bow Load Shackle are submersible, and can be attached to the mooring lines connected to buoys and the fish farming structure. The mooring line system can be monitored as the shackles will wireless transmit data to the customer's PC through the WTS-BS-4 Wireless Base Station with supplied Log100 software.

Results

Interace's submersible and wireless load shackles were the perfect solution to monitor the aquafarming mooring lines system.



Materials

- Multiple WTSSHK-B Wireless Crosby™ Bow Load Shackle
- WTS-BS-4 Wireless Base Station with USB Industrial Enclosure with supplied Log100 Software
- Customer PC
- Customer's aquafarming cages

How It Works

1. Multiple WTSSHK-B Wireless Crosby™ Bow Load Shackle are installed to the aquafarming mooring line system.
2. Data is wirelessly transmitted to the customer's PC through the WTS-BS-4 Wireless Base Station. The data is displayed, graphed, and logged using supplied Log100 software.

Boat Hoist

Load Shackles and Wireless Telemetry System

Industry: Maritime

Summary

Customer Challenge

A customer needs a boat hoist system in order to lift boats out of water for maintenance purposes. They would like a wireless solution in order to monitor the forces being applied through the hoist system.

Interface Solution

Interface suggests using multiple WTSSHK-B Wireless Crosby™ Bow Load Shackles at the pick up points of the hoist mechanism. Data results of the individual loading points and total weight can be transmitted wirelessly to the WTS-BS-4 Industrial USB Base Station when connected to a PC or laptop with supplied Log100 software.

Results

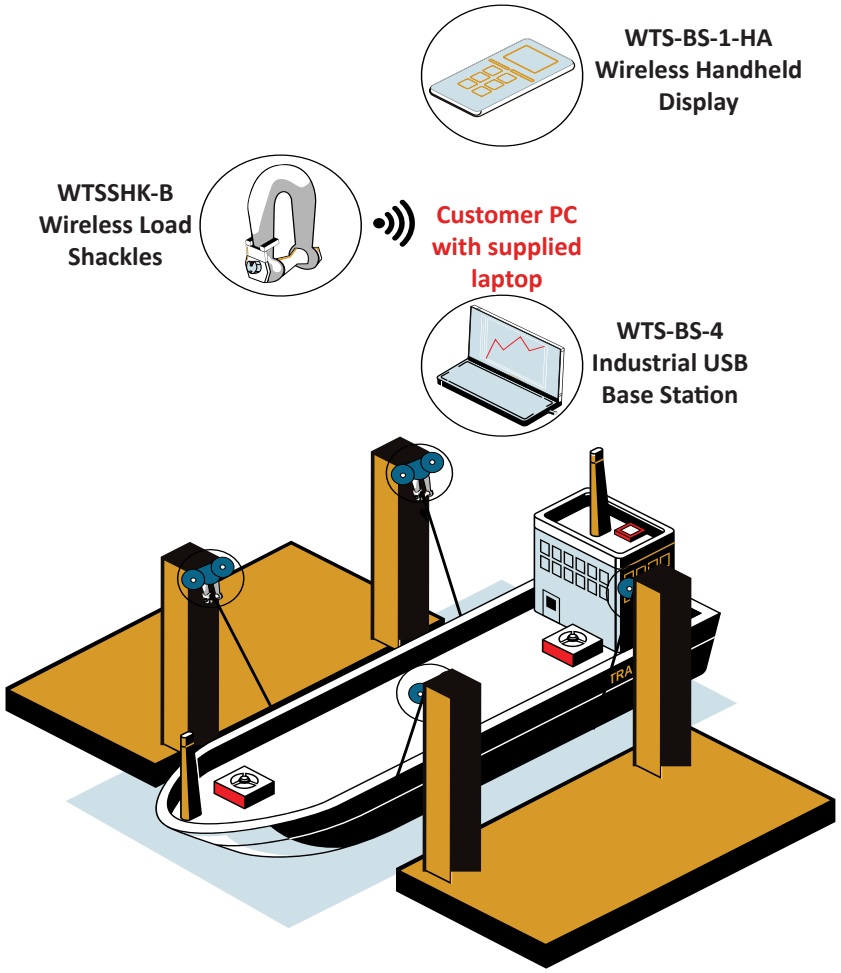
Interface's wireless system and solution successfully measured the weight of the boat and ensured it would be safely lifted out of the water.

Materials

- WTSSHK-B Wireless Crosby™ Bow Load Shackles
- WTS-BS-4 Industrial USB Base Station with supplied Log100 software
- WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters
- Customer PC or Laptop

How It Works

1. Multiple WTSSHK-B Wireless Crosby™ Bow Load Shackles are installed to the boat hoist mechanism.
2. The boat is lifted out of the water, and the force measurements are wirelessly transmitted to the WTS-BS-4 Industrial USB Base Station. The customer can measure the individual loading points and total weight.
3. When connected to a PC or laptop, force data can be logged and graphed with Log100 supplied software. Loads can also be seen using the WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters.



Catenary Mooring System
Load Shackles

Industry: Maritime

Summary

Customer Challenge

A customer has a catenary mooring system, which is used for a variety of offshore applications. They need to ensure the anchors and chains are securely locked to the node. They need to measure the strength and fatigue of the main node the chains and anchors attach to, so they do not risk any mooring lines breaking or the node being damaged.

Interface Solution

Depending on how many points there are on the node, Interface's special submersible ISHK-B Bow Type Crosby™ Cabled Load Shackles are attached to the node. The chains and anchors are then attached to the shackles. The shackles measure the forces implemented by the chains and anchors, and results are displayed, logged, and graphed using the 9325-1 Portable Sensor Display. This instrument also comes with supplied software to connect to the customer's PC.

Results

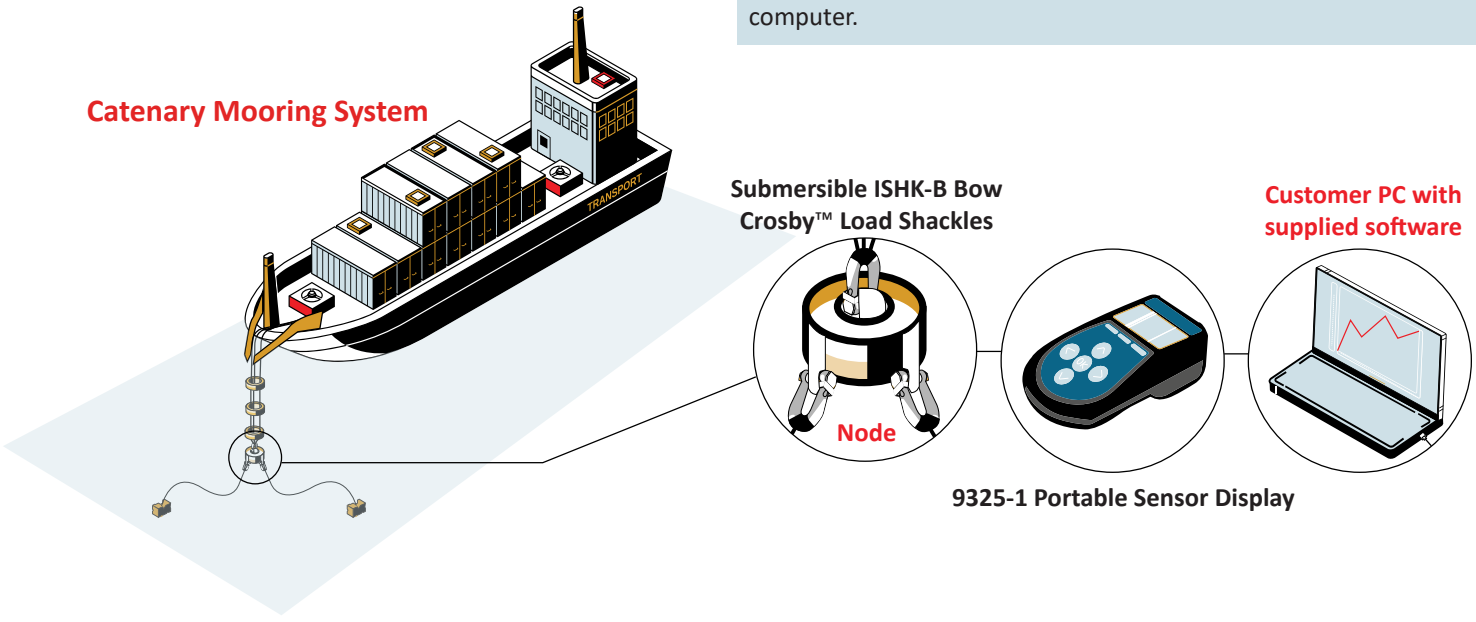
Interface's submersible shackles and instrumentation helped verify the tensions of the anchors and chains attached to the node of their catenary mooring system.

Materials

- Submersible ISHK-B Bow Type Crosby™ Cabled Load Shackles
- 9325-1 Portable Sensor Display with supplied software
- Customer PC or Laptop

How It Works

1. The submersible ISHK-B Bow Type Crosby™ Cabled Load Shackles are attached to the node of the catenary mooring system. The chains and anchors are then attached to the shackles.
2. When the anchors are let loose, thus causing tension on the chains attached to the shackles, force measurements are read using the 9325-1 Portable Sensor Display. With the supplied software, results can be logged and graphed to the customer's computer.



Crane Block Safety Check
Load Pin

Industry: Maritime

Summary

Customer Challenge

A customer wants a system to detect if their crane block can lift heavy loads securely, in order to keep working conditions and personnel safe. If lifting capacities are exceeded, the customer wants a system to alarm them in real-time.

Interface Solution

Interface's WTSLP Wireless Stainless Steel Load Pin can replace the existing load bearing pin in the crane block in order to measure the force being applied by the heavy load. Data will be transmitted and displayed through both the WTS-BS-4 USB Base Station (when paired with the customer's supplied PC computer or laptop) and the WTS-BS-1-HA Wireless Handheld for real-time results. The WTS-RM1 Wireless Relay Output Receiver Module will also trigger an alarm when maximum capacity has been reached.

Results

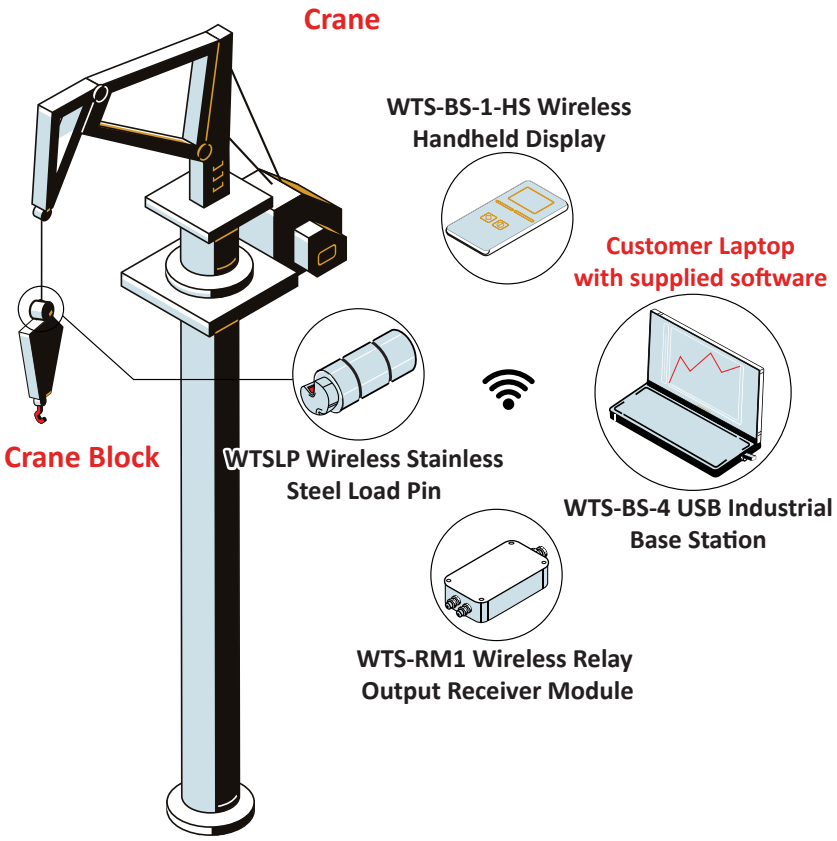
The WTSLP Wireless Stainless Steel Load Pin, combined with the WTS products, was able to measure and determine force applied the moment a heavy load is lifted. The results were transmitted wirelessly, and ensured the customer whether or not the crane block was safely operational during production.

Materials

- WTSLP Wireless Stainless Steel Load Pin
- WTS-RM1 Wireless Relay Output Receiver Module
- WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters
- WTS-BS-4 USB Industrial Base Station
- WTS Toolkit Software & Log100 Software Included
- Customer PC or Laptop

How It Works

1. WTSLP Wireless Stainless Steel Load Pin is installed, replacing the normal load bearing pin on the block of the crane. A heavy load is added to the end of the block.
2. The WTS-RM1 Wireless Relay Output Receiver Module captures the data transmitted from the WTSLP Wireless Stainless Steel Load Pin and uses this to trigger and alarm when the setpoint is reached. Simultaneously, these transmitted force readings are displayed in real-time to the customer through the WTS-BS-1-HA Wireless Handheld Display or the WTS-BS-4 USB Base Station (connected to the customer's PC computer or laptop).



Crane Capacity Verification
Tension Load Link
Industry: Maritime

Summary

Customer Challenge

A customer wants to verify that their crane is strong enough to safely lift a heavy load, at it's rated maximum load capacity. A wireless solution is needed to avoid long cables, and to have a faster installation time.

Interface Solution

Interface's Model WTSATL-JR Aluminum Compact Wireless Tension Load Link can measure the load's maximum capacity. The WTS-RM1 Wireless Relay Output Receiver Modules also can trigger an alarm that can be set when the maximum capacity of weight/force has been reached. The data is transmitted and can be reviewed with the WTS-BS-1-HS Wireless Handheld Display, or on the customer's PC.

Results

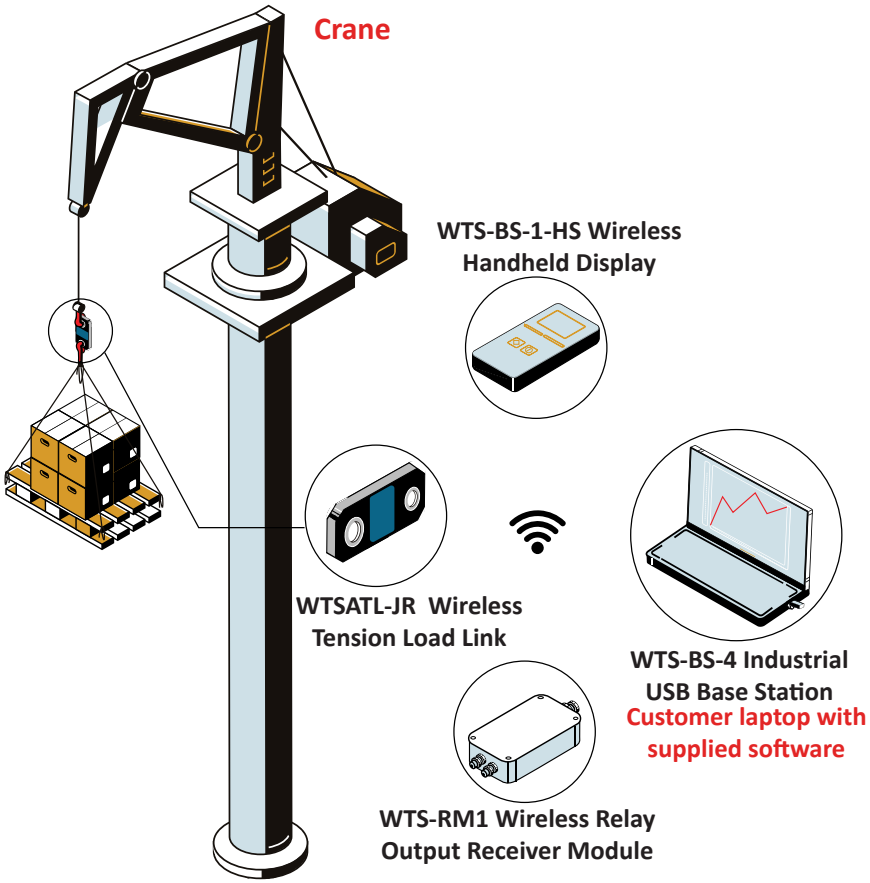
Customer was able to verify if the crane is safe and functional enough to lift it's working load limit (WLL) or safe working load (SWL) capacity. The data is transmitted and logged to the customer's PC or laptop, or to a handheld device in real-time.

Materials

- WTSATL-JR Aluminum Compact Wireless Tension Load Link
- WTS-RM1 Wireless Relay Output Receiver Module
- WTS-BS-1-HS Wireless Handheld Display for Single Transmitters
- WTS-BS-4 Industrial USB Base Station
- WTS Toolkit Software & Log100 Software Included
- Customer PC or Laptop

How It Works

1. The WTSATL-JR Aluminum Compact Wireless Tension Load Link is installed on the crane, lifting an item that maxes out to the crane's working load limit (WLL).
2. The WTSATL-JR transmits data to the WTS-RM1 Wireless Relay Output Receiver Module and can trigger an alarm when the capacity has been reached. Information is also transmitted both to the laptop (through the WTS-BS-4 USB Base Station) and the WTS-BS-1-HS Wireless Handheld Display for single transmitters in real-time.



Crane Force Regulation
Load Pin

Industry: Maritime

Summary

Customer Challenge

Customer wants to regulate the maximum amount of heavy loads being lifted, so that production time can be both safe for workers and efficient. The customer wants to complete lifting duties faster and with little or no expense. A wireless solution is preferred, so that there would be no long cable interference during production.

Interface Solution

With Interface Inc. WTSLP Wireless Stainless Steel Load Pin, this product can be custom made to be used for any and all types of cranes. It is also great for lifting both short and long distances. Paired with the WTS Wireless Telemetry System, force is measured and logged.

Results

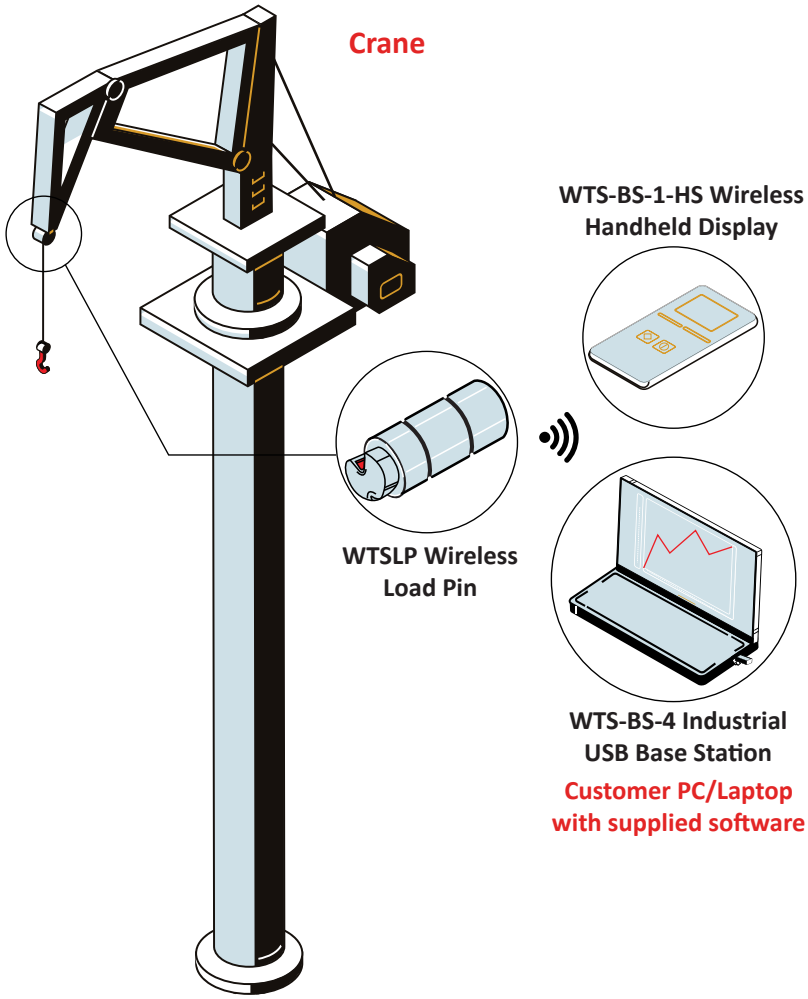
Customer was able to monitor the continuous force from the crane, and gather information on loads being lifted. Data is transmitted and logged to the customer's PC/laptop and is available to be reviewed.

Materials

- WTSLP Wireless Load Pin
- WTS-BS-4 Industrial USB Base Station
- WTS-BS-1-HS Wireless Handheld Display for Single Transmitters
- WTS Toolkit Software & Log100 Software Included
- Customer PC/Laptop

How It Works

1. The WTSLP Wireless Load Pin is installed at the turning block of the crane.
2. WTS-BS-4 Industrial USB Base Station is connected to the customers PC Computer/laptop via USB port. The WTSLP can wirelessly transmit information up to 600 meters in distance to both the laptop or the WTS-BS-1-HS Wireless Handheld Display for single transmitters.
3. The USB Base Station receives force measurements, and the data is logged onto the laptop computer.



Commercial Fishing Wire Rope Testing

Tension Load Link

Industry: Maritime

Summary

Customer Challenge

A commercial fishing owner wants to measure the force tension of the wire fishing rope connected to the fishing cage or net when their vessel goes to catch. They want to ensure the wire rope is strong enough and safe enough to hold the maximum capacity of fish caught in the cage or net.

Interface Solution

Interface's WTSTL Wireless Tension Load Link was attached between the end of the cable, and the end that hooks onto the fishing net. This tension link will be able to measure the forces of the full net of fish, or, a heavy load at maximum capacities. The data information can be transmitted to both the WTS-BS-1-HS Handheld Display for Single Transmitters, or to the customers computer laptop through the WTS-BS-4 USB Industrial Base Station.

Results

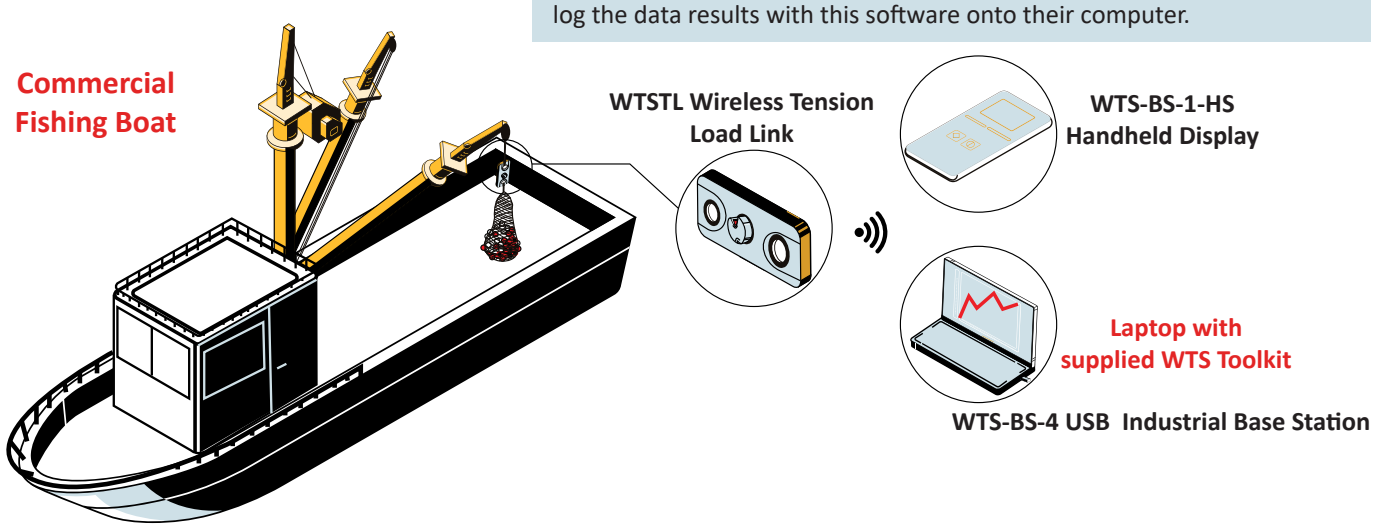
The customer was able to determine if the fishing cable on their vessel was strong enough to hold the fish cage or net at maximum capacity when out catching.

Materials

- WTSTL Wireless Tension Load Link
- WTS-BS-1-HS Handheld Display for Single Transmitters
- WTS-BS-4 USB Industrial Base Station
- WTS Toolkit (graphing, logging, and set up software, included with WTS-BS-4)
- Customer PC Computer or Laptop

How It Works

1. The WTSTL Wireless Tension Load Link is attached at the end of the wire fishing rope.
2. A heavy load that reaches maximum capacity for the wire rope, was added to the end of the WTSTL Wireless Tension Load Link.
3. Force measurements are transmitted to the WTS-BS-1-HS Handheld Digital Display for Single Transmitters and to the customers computer or laptop through the WTS-BS-4 USB Industrial Base Station. With the WTS Toolkit (included with the WTS-BS-4) the customer is able to graph and log the data results with this software onto their computer.



Floating Wind Turbine Monitoring
Load Shackle

Industry: Maritime

Summary

Customer Challenge

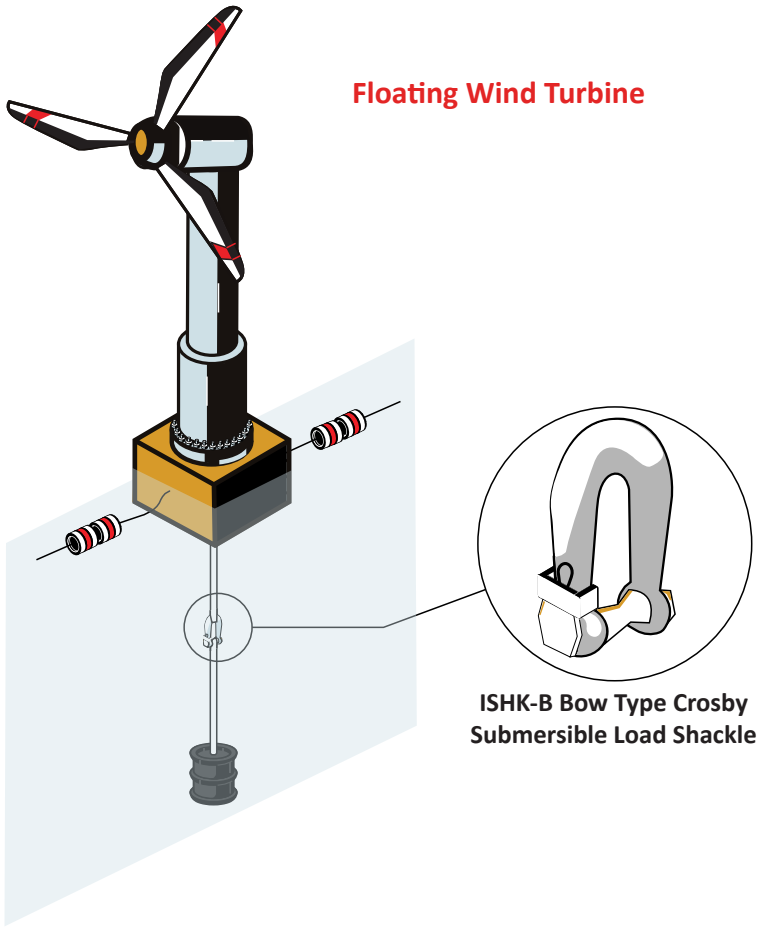
Floating or offshore wind turbines are being created to generate electricity at depths where normal turbines cannot. A customer would like to measure the tension of the mooring line of each of their turbines on their floating wind farm. They want to monitor the tension of the mooring line that keeps the turbine in place, in order to detect crack initiation or potential fractures.

Interface Solution

Interface's ISHK-B Bow Type Crosby™ Submersible Load Shackle Load Cell can be attached to the floating wind turbine's mooring line, which is attached to an anchor. With customer instrumentation, the customer is able to monitor the force tension of the mooring line based on the force results captured by the load cell.

Results

The floating wind farm was completely monitored by Interface's submersible force measurement solution system.



Floating Wind Turbine

ISHK-B Bow Type Crosby
Submersible Load Shackle

Materials

- ISHK-B Bow Type Crosby™ Submersible Load Shackle Load Cell
- Customer Instrumentation
- Customer PC or Laptop

How It Works

1. The ISHK-B Bow Type Crosby™ Submersible Load Shackle Load Cell is attached to the floating wind turbine's mooring line.
2. The ISHK-B Bow Type Crosby™ Submersible Load Shackle Load Cell captures force tension of the mooring line.
3. Force results are sent to the customer's instrumentation for monitoring.

Hydrofoil Testing in Wave Tank
Load Cell

Industry: Maritime

Summary

Customer Challenge

Hydrofoil design is a delicate balance between performance and complexity. Finding the right shape without using overly complex angles to achieve the desired amount of lift is crucial when designing a successful hydrofoil. Once an engineer's concepts are ready for testing, using the best force measurement equipment is required to sense the subtle differences between hydrofoil designs.

Interface Solution

Lift and drag are the most important characteristics of a hydrofoil. The 3A120 3-Axis Force Load Cell is needed to read these forces. The Fz senses lift and the Fx and Fy sense the drag. Using the BSC4D-USB bridge amplifier increases the visibility of the load cells output signals.

Results

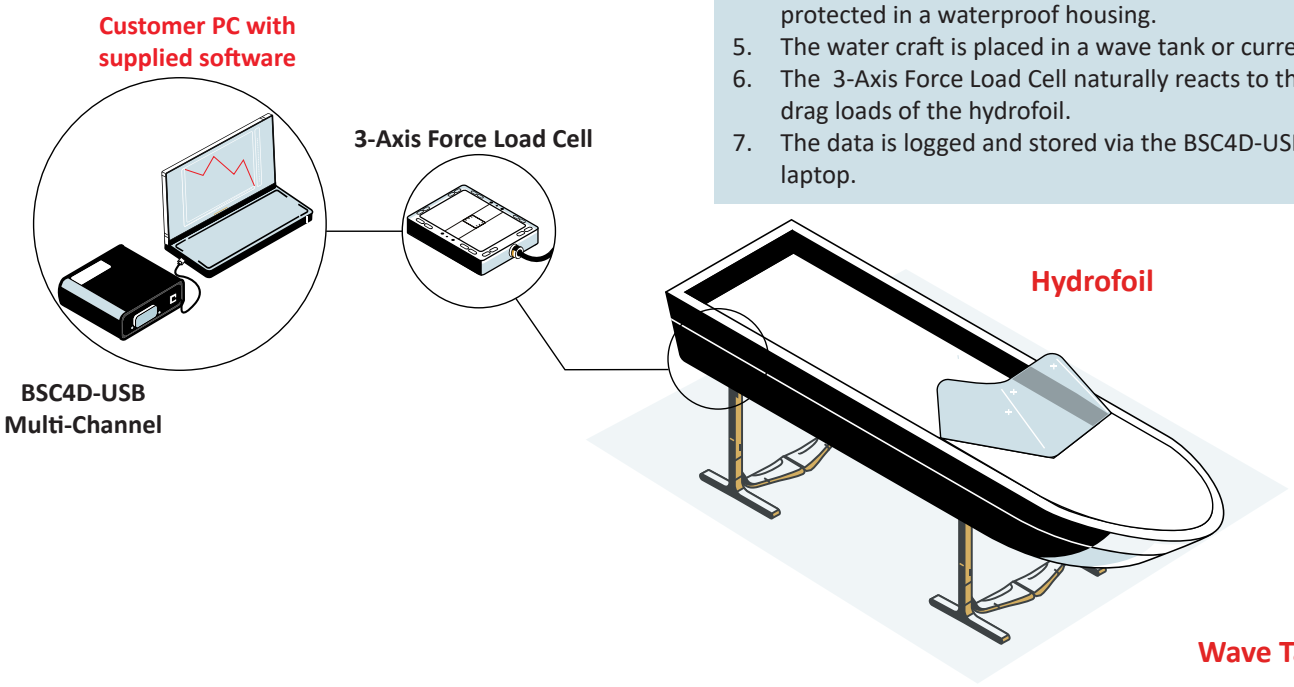
When using the load cell and bridge amplifier, the engineers are able to record the real world lift and drag forces the hydrofoils apply to on the water craft. This data allows a more in-depth comparison of proposed hydrofoil designs to find the best model for the job.

Materials

- 3A120 3-Axis Force Load Cell
- BSC4D-USB Multi-Channel, which includes BlueDAQ display, graphing, and logging software and PC Interface Module

How It Works

1. The 3A120 3-Axis Force Load Cell is fixed to the hull of the water craft.
2. The BSC4D-USB is connected to the load cell.
3. The hydrofoil boom is attached to the 3-Axis Force Load Cell.
4. The 3-Axis Force Load Cell and bridge amplifier are protected in a waterproof housing.
5. The water craft is placed in a wave tank or current simulator.
6. The 3-Axis Force Load Cell naturally reacts to the lift and drag loads of the hydrofoil.
7. The data is logged and stored via the BSC4D-USB on a PC laptop.



Mooring Line Tension Testing

Tension Load Link

Industry: Maritime

Summary

Customer Challenge

Due to the changing weather conditions, mooring cable lines undergo wear and tear. A customer wants to ensure all mooring lines for ships or vessels are securely locked at the same loading tension, so that they do not risk the mooring lines to breaking or causing damage.

Interface Solution

Interface's WTSTL Wireless Tension Load Links can be attached to each mooring cable while in use. Results are sent to the customers through the WTS-BS-4 USB Industrial Base Station when connected to the customer's supplied PC computer or laptop. Data can also be transmitted to the WTS-BS-1-HA Handheld Display for Multiple Transmitters, giving the customer the option to view multiple mooring cable line tensions.

Results

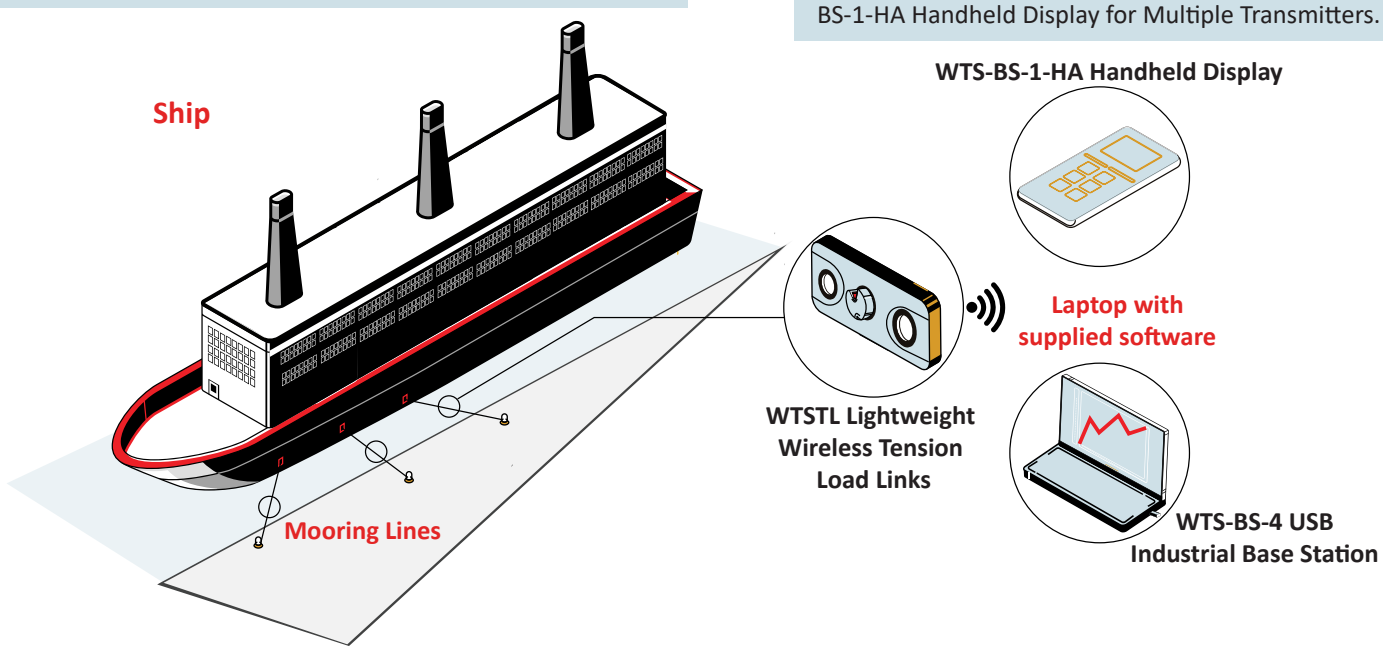
The customer was able to verify the tensions to multiple mooring cable lines. Thus, their ship being safely docked.

Materials

- WTSTL Wireless Tension Load Links
- WTS-BS-4 USB Industrial Base Station
- WTS-BS-1-HA Handheld Display for Multiple Transmitters
- WTS Toolkit and Log100 Software
- Customer PC or Laptop

How It Works

1. The WTSTL Wireless Tension Load Link are attached to all mooring cables being tested.
2. Force measurements are transmitted wirelessly in realtime to the customer's PC or laptop through the WTS-BS-4 USB Industrial Base Station, or to the WTS-BS-1-HA Handheld Display for Multiple Transmitters.



Mooring Quick Release Hooks (QRH)

Load Pin

Industry: Maritime

Summary

Customer Challenge

A customer wants to test the strength of the cable line used in the hoist of their A customer wants to test their Quick Release Hook (QRH) system when their vessels are docked. They want to ensure the mooring lines are secured, but also, the quick release hooks are able to be easily and safely released.

Interface Solution

Interface's WTSLP Stainless Steel Load Pin can be installed into the quick release hook, where forces from the mooring lines can be measured and displayed when paired with the WTS-BS-4 USB Industrial Base Station. The load tension forces are displayed in real-time on the customers PC or laptop. The WTS-RM1 Wireless Relay Output Receiver Module alarm can also be triggered for the customer when maximum safety work load capacities have been reached or are overloaded.

Results

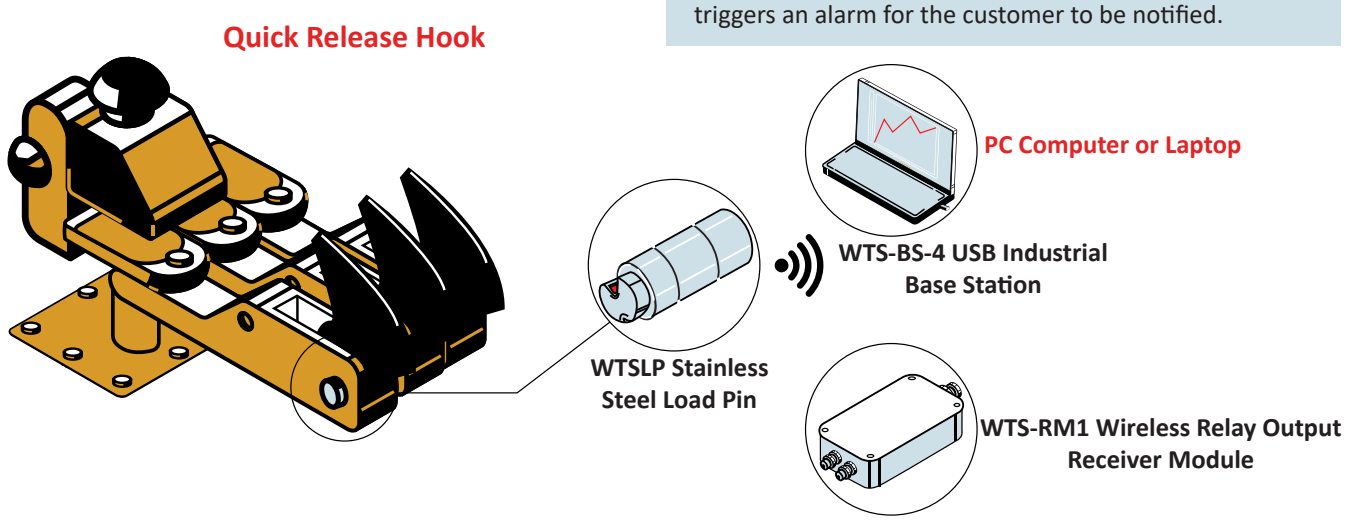
The customer was able to determine if their quick release hooks worked effectively within the safe working limit specifications, and was aware of any potential overload situations.

Materials

- WTSLP Stainless Steel Load Pin
- WTS-RM1 Wireless Relay Output Receiver Module
- WTS-BS-4 USB Industrial Base Station
- WTS Toolkit (graphing, logging, and set up software, included with WTS-BS-4)
- Customer PC Computer or Laptop

How It Works

1. The WTSLP Stainless Steel Load Pin is installed in the quick release hook.
2. Forces are measured and recorded using the WTS-BS-4 USB Industrial Base Station, and results are displayed on the customers PC computer or laptop.
3. When maximum capacities have been reached, the WTS-RM1 Wireless Relay Output Receiver Module triggers an alarm for the customer to be notified.



Tugboat Towing Cable Monitoring
Tension Link
Industry: Maritime

Summary

Customer Challenge

Tugboats are specialized vessels created for towing other ships or floating structures. These boats rely on cables or ropes to perform their towing tasks, but need to be tested and monitored to ensure safety and efficient towing operations.

Interface Solution

The WTSTL Wireless Tension Link Load Cell is attached to the cable of the tugboat used for towing operations. Force measurements are monitored and wirelessly transmitted to the WTS-BS-1-HS Handheld Display for Single Transmitters, or on the customers laptop through the WTS-BS-4 USB Industrial Base Station with USB enclosure using provided Log100 software.

Results

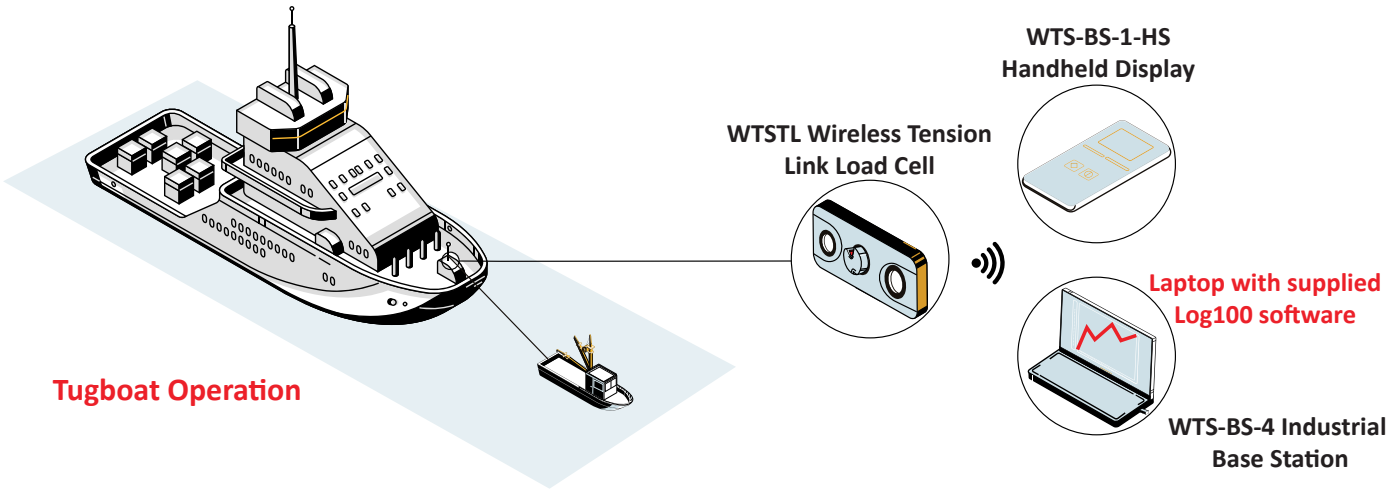
The customer as able to monitor the forces applied on the cables of their tugboats, ensuring it was strong enough to use. Thus minimizing the risk of accidents or damage.

Materials

- WTSTL Wireless Tension Link Load Cell
- WTS-BS-1-HS Handheld Display for Single Transmitters
- WTS-BS-4 USB Industrial Base Station with USB enclosure, included Log100 software
- Customer PC or Laptop

How It Works

1. The WTSTL Wireless Tension Link Load Cell is attached at the end of the cable attached to the tugboat, monitoring its forces.
2. Force measurements are transmitted to the WTS-BS-1-HS Handheld Digital Display for Single Transmitters and to the customer's laptop through the WTS-BS-4 USB Industrial Base Station. With Log100 software, the customer is able to monitor, graph, and log the data results with this software onto their computer.



WTS Yacht Rigging Inspection
Load Shackle

Industry: Maritime

Summary

Customer Challenge

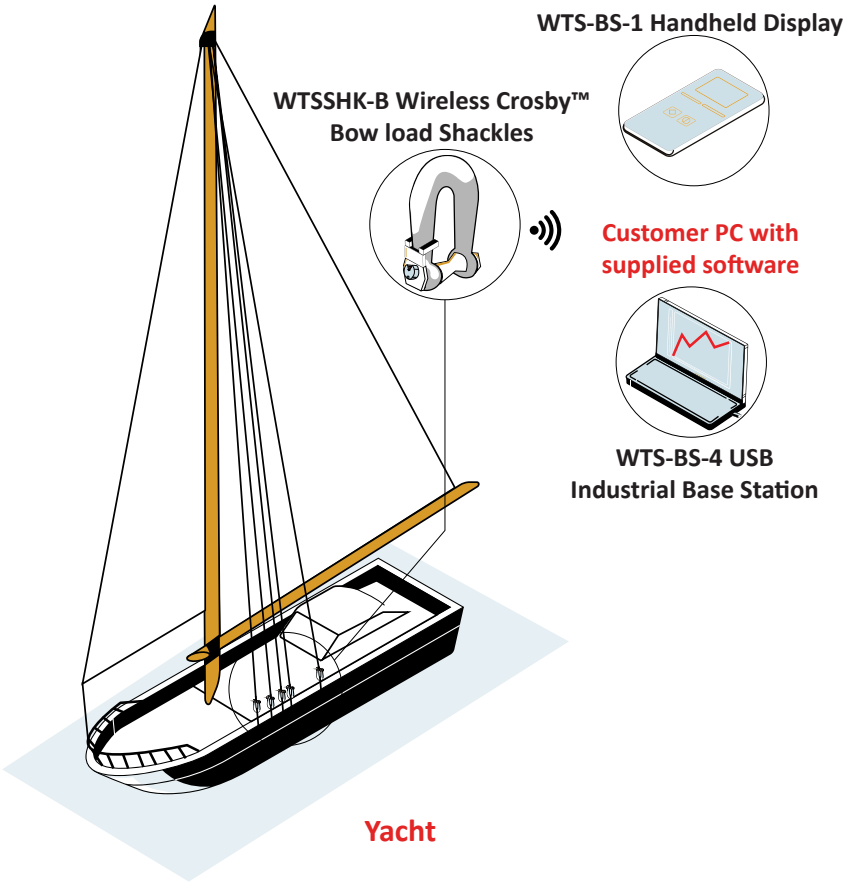
A customer wants to have a complete rigging inspection to make sure the mast, still lines, and all movable hoisting lines are functional and meet the proper specifications for sailing. The customer wants to test the tension of the forestay, shroud, and backstay cables. They also want to test the tension of the movable lines when sailing.

Interface Solution

With Interface, Inc's WTSSHK-B Wireless Crosby™ Bow Load Shackle paired with the WTS-BS-1 Wireless Handheld Display for Unlimited Transmitters, the customer can switch and view between multiple shackles being tested. The WTS-BS-4 USB Industrial Base Station can also be attached to the customer's PC/Laptop to display realtime measurements from the shackles and log data.

Results

The customer was able to conduct both a running and standing rigging inspection of their ship or vessel, and was able to determine if all lines were functional and met safety standards.



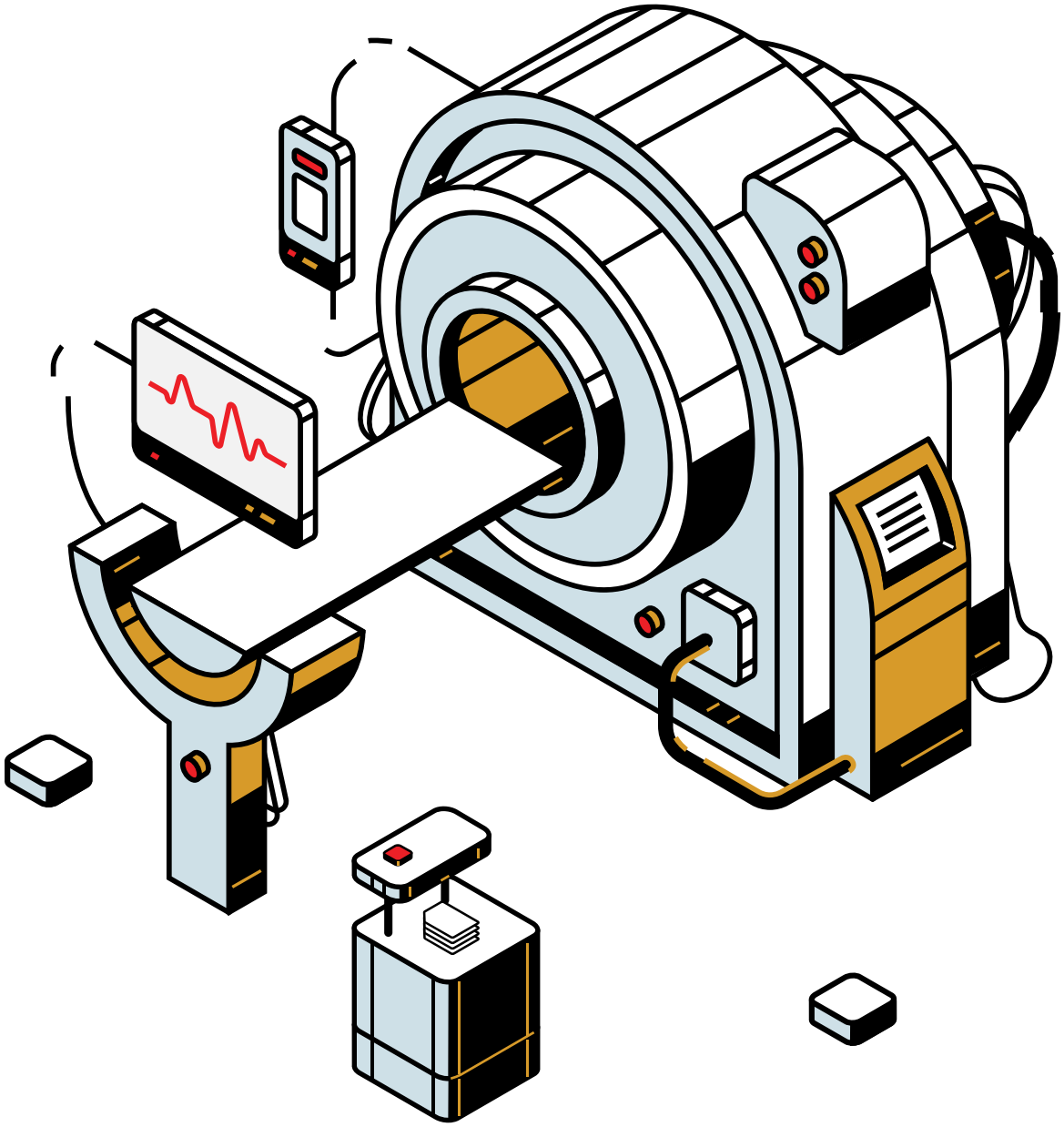
How It Works

1. WTSSHK-B Wireless Crosby™ Bow Load Shackles are attached to the vessels forestay, shroud, and backstay cables.
2. The measurement at a is transmitted wirelessly to the WTS-BS-1 Wireless Handheld Display for Unlimited Transmitters, where the customer is able to view all results of all shackles in realtime.
3. The WTSSHK-B Wireless Crosby™ Bow Load Shackles also transmit information to the WTS-BS-4 USB Industrial Base Station, attached to the customer's PC/Laptop for realtime results.

Materials

- WTSSHK-B Wireless Crosby™ Bow Load Shackles
- WTS-BS-4 USB Industrial Base Station
- WTS-BS-1 Handheld Display for Unlimited Transmitters
- WTS Toolkit & Log100 Software
- Customer supplied PC/Laptop

Medical and Healthcare



4D Bioprinting
Interface Mini™

Industry: Medical and Healthcare

Summary

Customer Challenge

During medical R&D, load cells used in medical device prototypes can detect pressure or tension within the printed construct. 4D printing for bioprinting utilizes 3D printing techniques to create functional structures. Forces and stresses need to be measured during the printing processes.

Interface Solution

Interface's SuperSC S-Type Miniature Load Cell has a high force in a compact design, and can easily record forces of the printhead during printing process. To record and analyze the load cell's force data, utilize a data logger, such as Interface's 9330 Battery Powered High-Speed Data Logging Indicator with a USB port and software. Measuring forces can provide valuable data on the material's behavior during printing to identify swelling or degradation.

Results

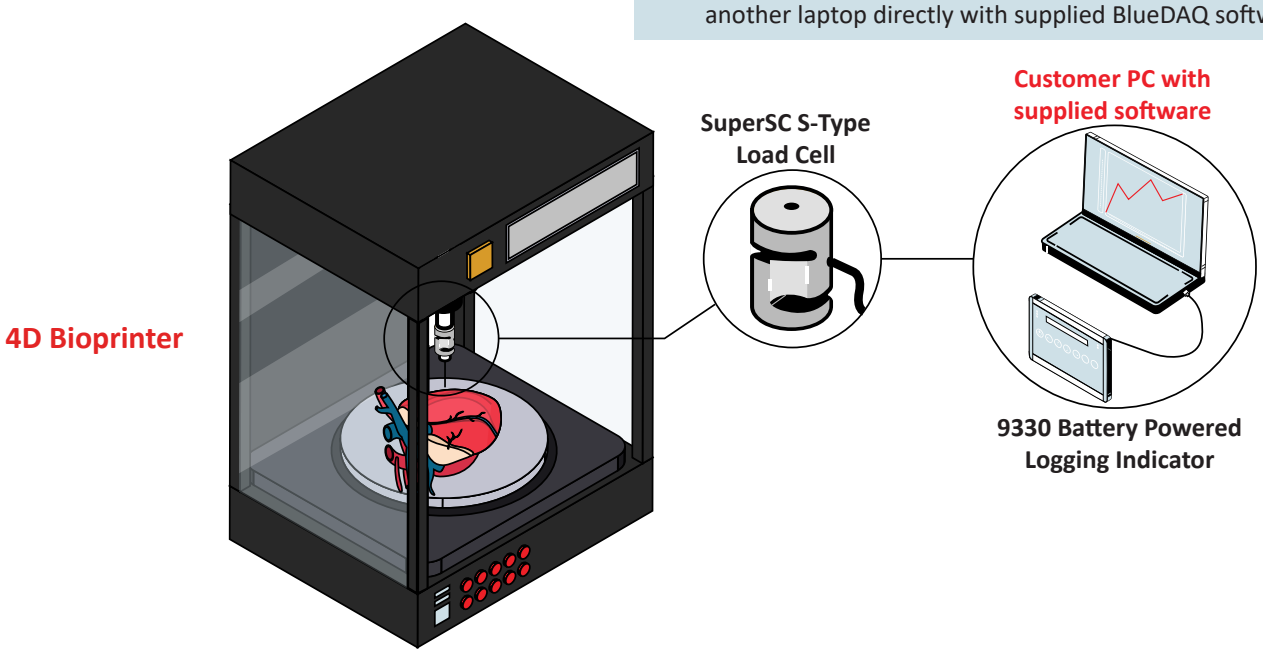
Interface's load cells offer valuable sensor devices for researchers developing 4D-printed medical devices. By measuring forces and stresses, they provide insights into the material's behavior, enabling the optimization of biocompatible implants with desired functionalities.

Materials

- SuperSC S-Type Miniature Load Cell
- 9330 Battery Powered High-Speed Data Logging Indicator with supplied BlueDAQ software
- Customer 4D Bioprinter
- Customer computer

How It Works

1. The SuperSC S-Type Miniature Load Cell is installed into the 4D Bioprinter's printhead. The miniature load cell will be able to monitor and regulate the force applied when extruding bio-ink material.
2. The load feedback is captured using the 9330 Battery Powered High Speed Data Logging Indicator through an SD card, or a another laptop directly with supplied BlueDAQ software.



Ball and Socket Prosthetic Multi-Axis

Industry: Medical and Healthcare

Summary

Customer Challenge

A medical device manufacturer was developing a new design for an artificial hip joint, and needed to validate load consistency, and the durability of their design.

Interface Solution

A Model 6A40B 6A Series 6-Axis Standard Capacity Load Cell was mounted to the manufacturer's test machine, where loads were applied to simulate actual use. A Model BX8-AS BlueDAQ Series Data Acquisition System was connected to the sensor to collect data.

Results

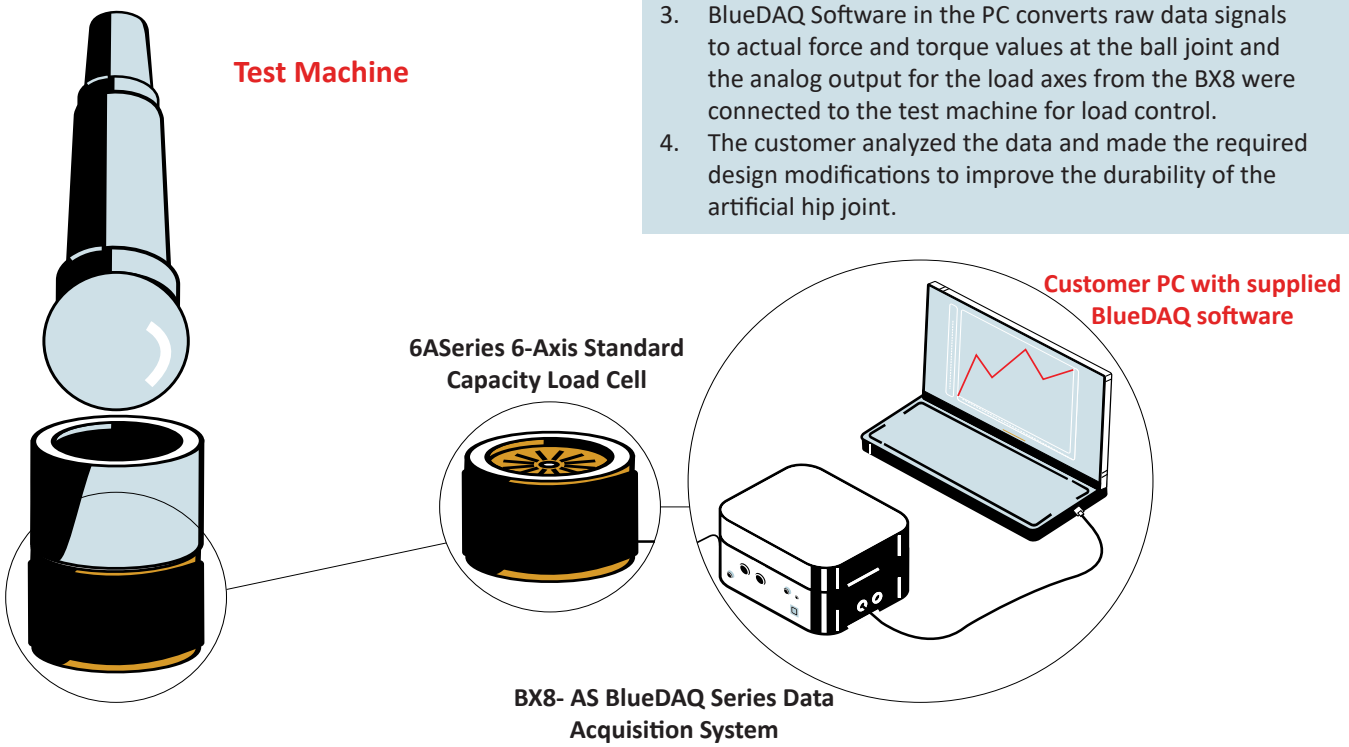
After analyzing the data the manufacturer was able to improve the durability of their design.

Materials

- 6A Series 6-Axis Standard Capacity Load Cell
- BX8- AS BlueDAQ Series Data Acquisition System with Industrial Enclosure
- Customer PC for data logging and analysis

How It Works

1. A test profile was set and the loads monitored and fed back into the test machine to control the loads.
2. The output of the 6-Axis sensor was connected to the BX8-AS BlueDAQ Series Data Acquisition System with Industrial Enclosure which was connected via USB cable to the PC.
3. BlueDAQ Software in the PC converts raw data signals to actual force and torque values at the ball joint and the analog output for the load axes from the BX8 were connected to the test machine for load control.
4. The customer analyzed the data and made the required design modifications to improve the durability of the artificial hip joint.



DNA Replication
Interface Mini™
Industry: Medical and Healthcare

Summary

Customer Challenge

DNA replication, or DNA synthesis, is the process of a cell making an identical copy of its DNA. This biological process is essential for cell division, growth, and the transmission of genetic information. A scientist needs monitor the fluid flow dispensed.

Interface Solution

Interface's SMTM Micro S-Type Load Cells are placed in the column where fluids from the synthesizer are dispensed. The SMTM's can regulate how much fluid is being dispensed for the sequence to be completed. The measurements are captured using the 9330 Battery Powered High Speed Data Logging Indicator through an SD card, or directly on a laptop with supplied BlueDAQ software.

Results

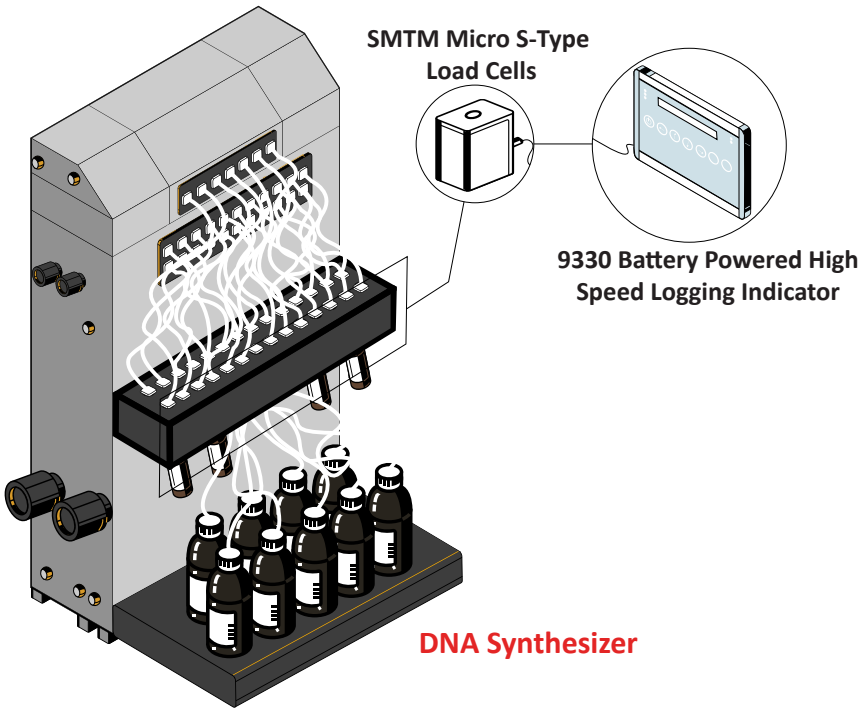
Interface's miniature load cell and instrumentation was able to successfully monitor the fluid being dispensed in the DNA synthesizer.

Materials

- SMTM Micro S-Type Load Cells
- 9330 Battery Powered High Speed Data Logging Indicator
- BlueDAQ Software
- DNA Synthesizer

How It Works

1. Multiple SMTM Micro S-Type Load Cells are placed under each of the DNA capsules of in the socket plate.
2. When connected to the 9330 Battery Powered High Speed Data Logging Indicator, force results can be captured on the SD card or directly on the customer's laptop with supplied BlueDAQ software for data analysis and review.



Hospital Bed Weighing
Load Cell

Industry: Medical and Healthcare

Summary

Customer Challenge

There are some cases in hospitals and other medical environments where patients are immobile. Those who work in this field need a solution to weigh their patients while they remain in their hospital beds.

Interface Solution

Interface's solution is to install their SSB Sealed Beam Load Cells within the frame of the hospital bed. The SSB load cells outputs are matched to each other (+/- 0.1%) and connected to the hospital bed controller system. The patients weight results are summed and displayed on the controller system.

Results

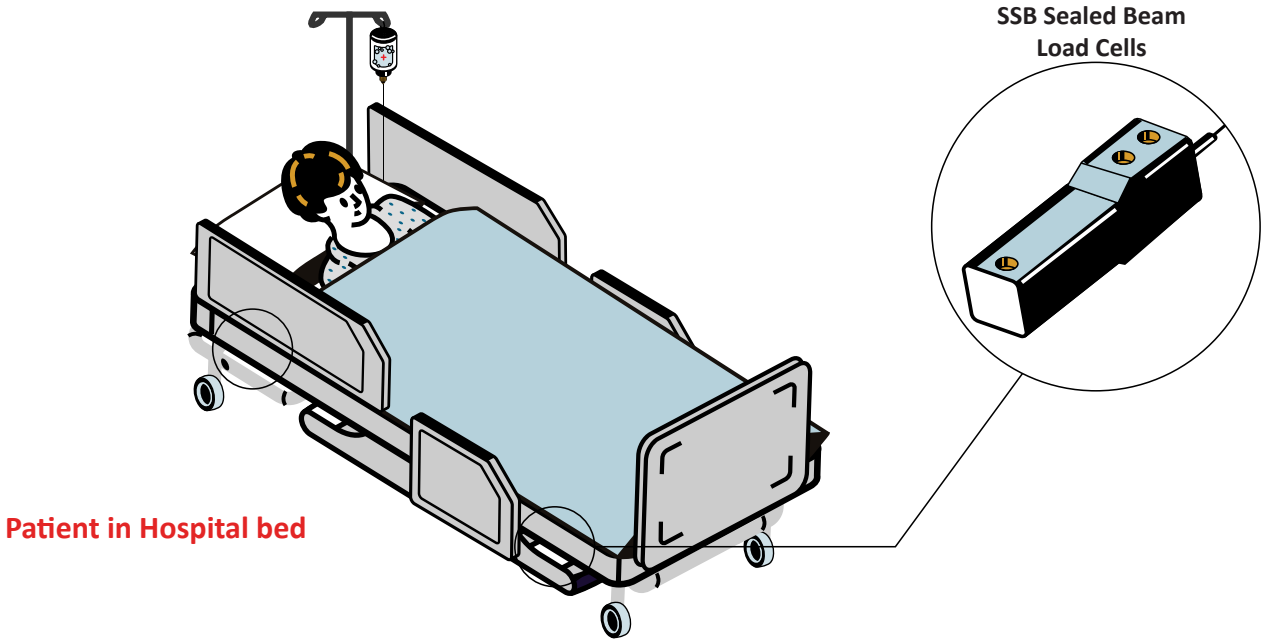
The weight of immobile patients were captured using Interface's beam load cells.

Materials

- SSB Sealed Beam Load Cells
- Patient in hospital bed to be weighed
- Customer's control system

How It Works

1. SSB Sealed Beam Load Cells are installed inside of the hospital bed's frame. The patient is weighed.
2. The he SSB load cells outputs are matched to each other (+/- 0.1%) and connected to the hospital bed controller system. The weight of the immobile patient is signaled, summed, and displayed.



Interventional Guidewire Quality Inspection

Torque Transducer

Industry: Medical and Healthcare

Summary

Customer Challenge

A medical device manufacturing company needs to do quality checks on threaded ends of their interventional guidewire devices. The threaded end of the guidewire contains an extremely small 000-120 thread that needs to be tested with go and no-go gauges in order to see if it will mate with other critical sub assemblies. Previously, the gages were manually threaded on and results and performance were poor due to the "human element". The manufacturing company requests a custom made turnkey test stand designed for this specific request, that is both inexpensive and flexible for varying lengths and models of guidewires.

Interface Solution

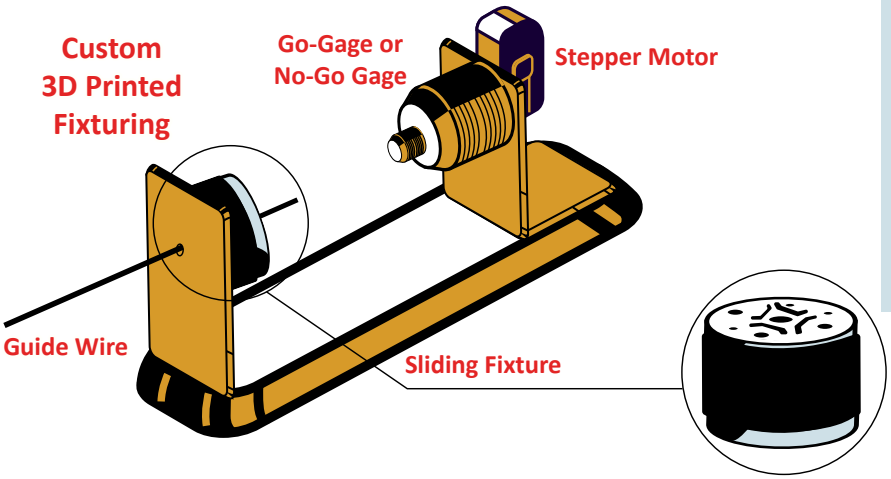
Interface suggests a system where the customer can axially load and insert the guidewire through the MRT Miniature Flange Style Reaction Torque Transducer, secure it, and use an automated stepper motor on a slide base to test the thread quality. When in use, the MRT measures the torque magnitudes of both no-go and go gauges which indicate quality of the threaded guidewire.

Results

The manufacturing company was able to test the quality of their guidewire threads for the different lengths and sizes produced. Data of the quality tests are recorded, logged, and saved on their PC computer using a specified third party data logger.

Materials

- MRT Miniature Flange Style Reaction Torque Transducer
- Custom designed and 3D Printed Tooling
- 3rd Party Data Logger
- Customer supplied PC or Laptop



MRT Miniature Flange Style Reaction Torque Transducer

How It Works

1. The MRT Miniature Flange Style Reaction Torque Transducer is attached to a 3D printed fixturing assembly, which is installed on the test stand base.
2. The guidewire is fed through the torque sensor and secured to it with additional custom 3D printed tooling.
3. A go-gauge or no-go gauge attached to a stepper motor is moved into position on the sliding base.
4. The program automatically actuates the motor per an onboard program, measuring torque magnitudes by the go/no-go gages and MRT sensor.
5. The data provided to the customer allows inferences to be made of good and bad thread quality, ultimately helping quality control.

Medical Bag Weighing
Load Cell

Industry: Medical and Healthcare

Summary

Customer Challenge

It is important to monitor the amount of material in a medical bag. Medical staff needs to know if a medical bag is empty or if the dispensing tubes are blocked. Force measurements can track this.

Interface Solution

Using Interface Model MB Miniature Beam or MBP Miniature Beam with built-in overload protection combined with Interface instrumentation, force readings can be captured, displayed and stored for this need.

Results

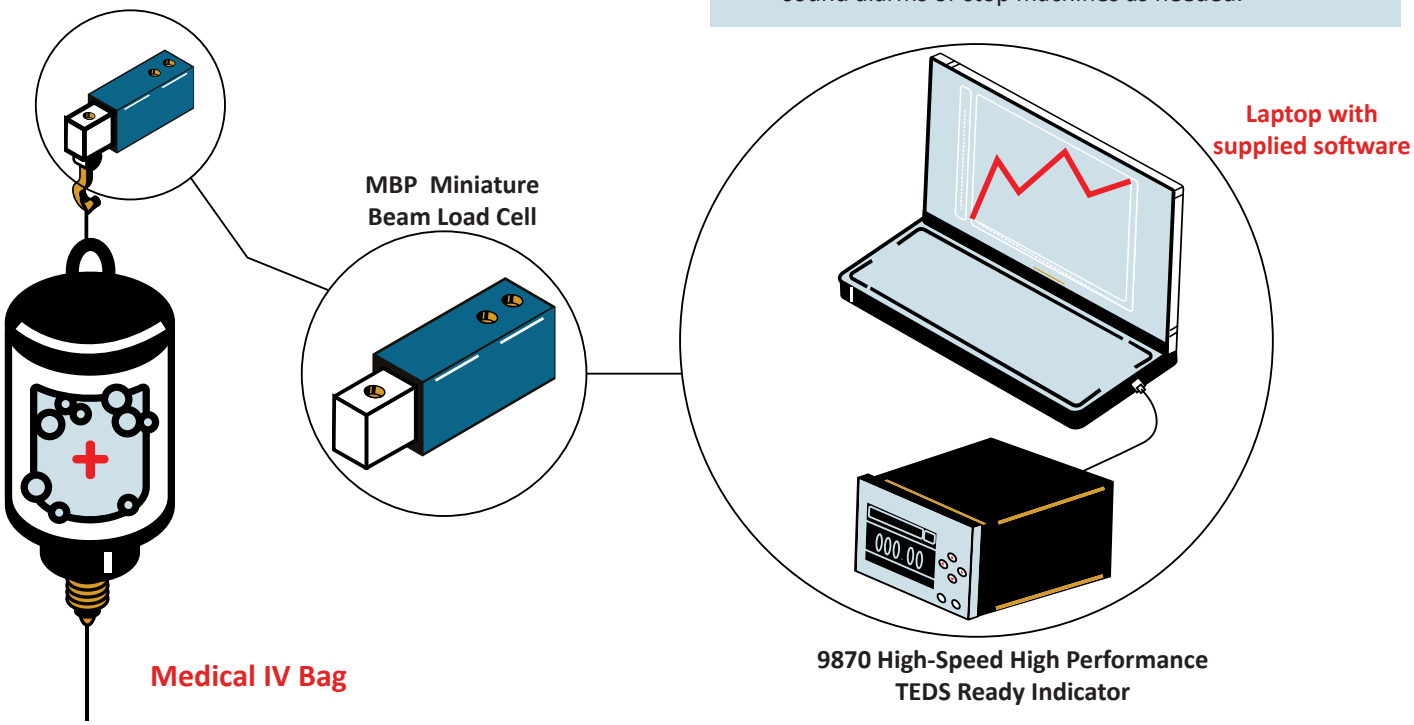
Health Professionals can review and monitor medical bag weights to ensure medicine is properly dispensed and bag is replaced when empty.

Materials

- MBP Miniature Beam Load Cell
- 9870 High-Speed High Performance TEDS Ready Indicator

How It Works

1. Model MBP Miniature Beam Load Cells are installed between the medical bag and support structure. The load cell will measure the medical bag weight that is hanging from it.
2. Using Model 9870 High-Speed High Performance TEDS Ready Indicator, weight readings will display on a local indicator and can trigger open collector outputs to sound alarms or stop machines as needed.



Patient Hoyer Lift
Wireless Telemetry System
Industry: Medical and Healthcare

Summary

Customer Challenge

In the medical field, sometimes it is necessary to weigh or transfer patients who are disabled and cannot walk. A hoyer lift is used to move patients around. A manufacturer would like a force system in order to weight disabled patients, but also to see the maximum weight it can hold.

Interface Solution

Interface's WTS 1200 Standard Precision LowProfile® Wireless Load Cell is attached to the top of the hoyer lift. The force results are wirelessly transmitted to the medical personal's computer or laptop through the WTS-BS-6 Wireless Telemetry Dongle Base Station.

Results

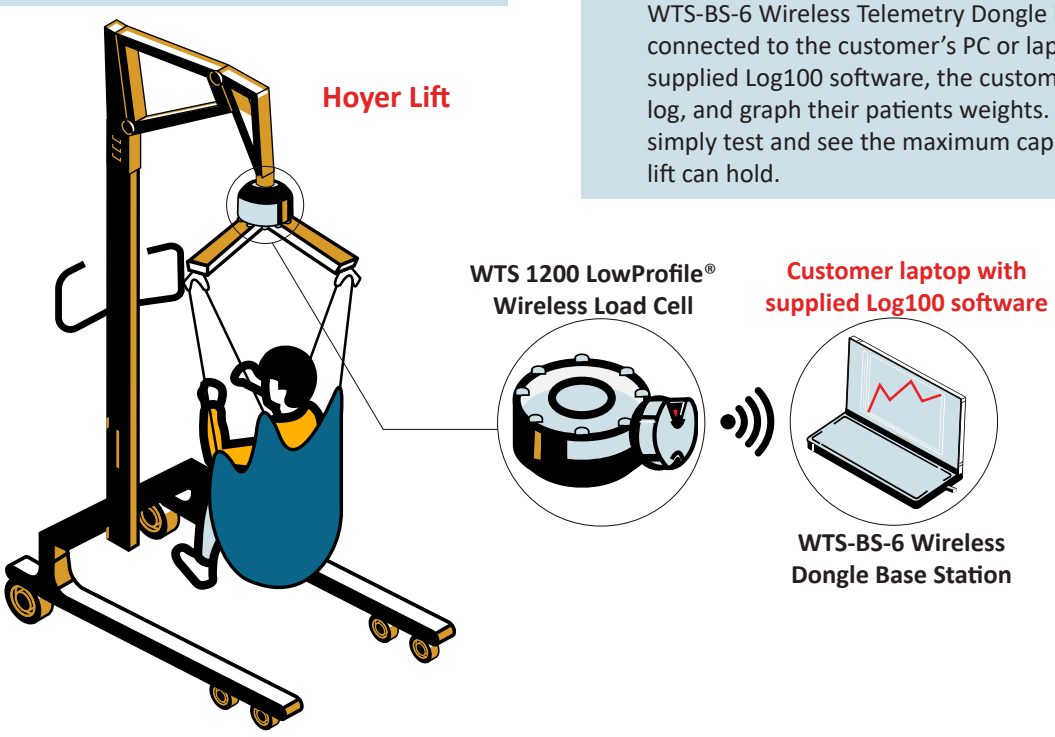
Interface's wireless force system was able to measure the amount of weight a patient was, while also clarifying the maximum capacity the hoyer lift can hold.

Materials

- WTS 1200 Standard Precision LowProfile® Wireless Load Cell
- WTS-BS-6 Wireless Telemetry Dongle Base Station included with Log100 Software
- Customer PC or Laptop

How It Works

1. The WTS 1200 Standard Precision LowProfile® Wireless Load Cell is attached to the top of the hoyer lift.
2. A patient or load is put into the sling of the hoyer lift. Force results are captured by the WTS 1200.
3. Force results are wirelessly transmitted to the WTS-BS-6 Wireless Telemetry Dongle Base Station connected to the customer's PC or laptop. With supplied Log100 software, the customer can display, log, and graph their patients weights. Or they can simply test and see the maximum capacity their hoyer lift can hold.



Prosthetic Foot Performance
Multi-Axis

Industry: Medical and Healthcare

Summary

Customer Challenge

Customer would like to know how a prosthetic foot responds as it is loaded during different stances.

Interface Solution

Interface's 3A120 3-Axis Load Cell was installed between the leg socket and the prosthetic foot. The 3A120 was then connected to the BSC4D Multi-Channel Bridge Amplifier and PC Interface Module.

Results

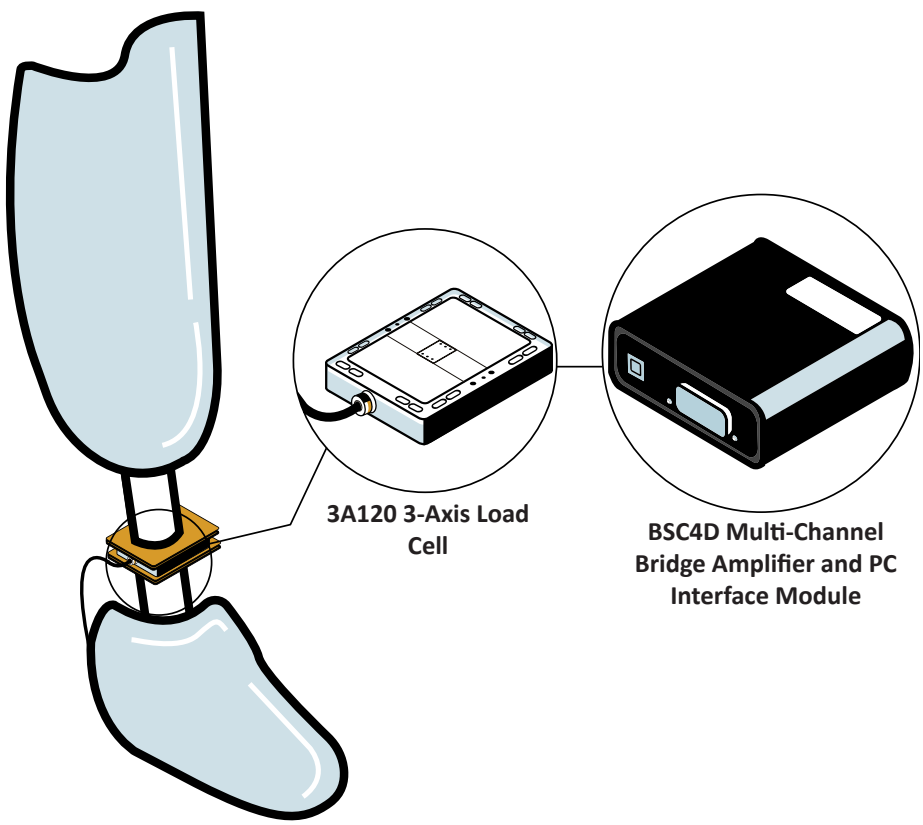
Data was logged for X, Y, and Z axis. Customer was able to review the results and identify premature foot flat and dead spots during foot's use. They can now make improvements to the design.

Materials

- 3A120 3-Axis Load Cell
- BSC4D Multi-Channel Bridge Amplifier and PC Interface Module
- Prosthetic foot

How It Works

1. Install the 3A120 into prosthetic foot load stream.
2. Connect to the BSC4D Multi-Channel Bridge Amplifier and PC Interface Module.
3. Review X, Y and Z force measurements to determine foot flat and dead spots.



Prosthetic Foot

Prosthetics Load and Fatigue Testing

Load Cell

Industry: Medical and Healthcare, Test and Measurement

Summary

Customer Challenge

Prosthetic limbs must be tested for extreme loading that can occur during falls, accidents, and sports movements. Fatigue testing of prosthetic components determines the expected lifespan of the components under normal usage.

Interface Solution

A static load test apparatus uses SSMF Fatigue Rated S-type Load Cell attached to hydraulic actuators to apply and measure loads. A fatigue testing machine uses SSMF Fatigue Rated S-type Load Cell to apply and measure cyclic loads.

Results

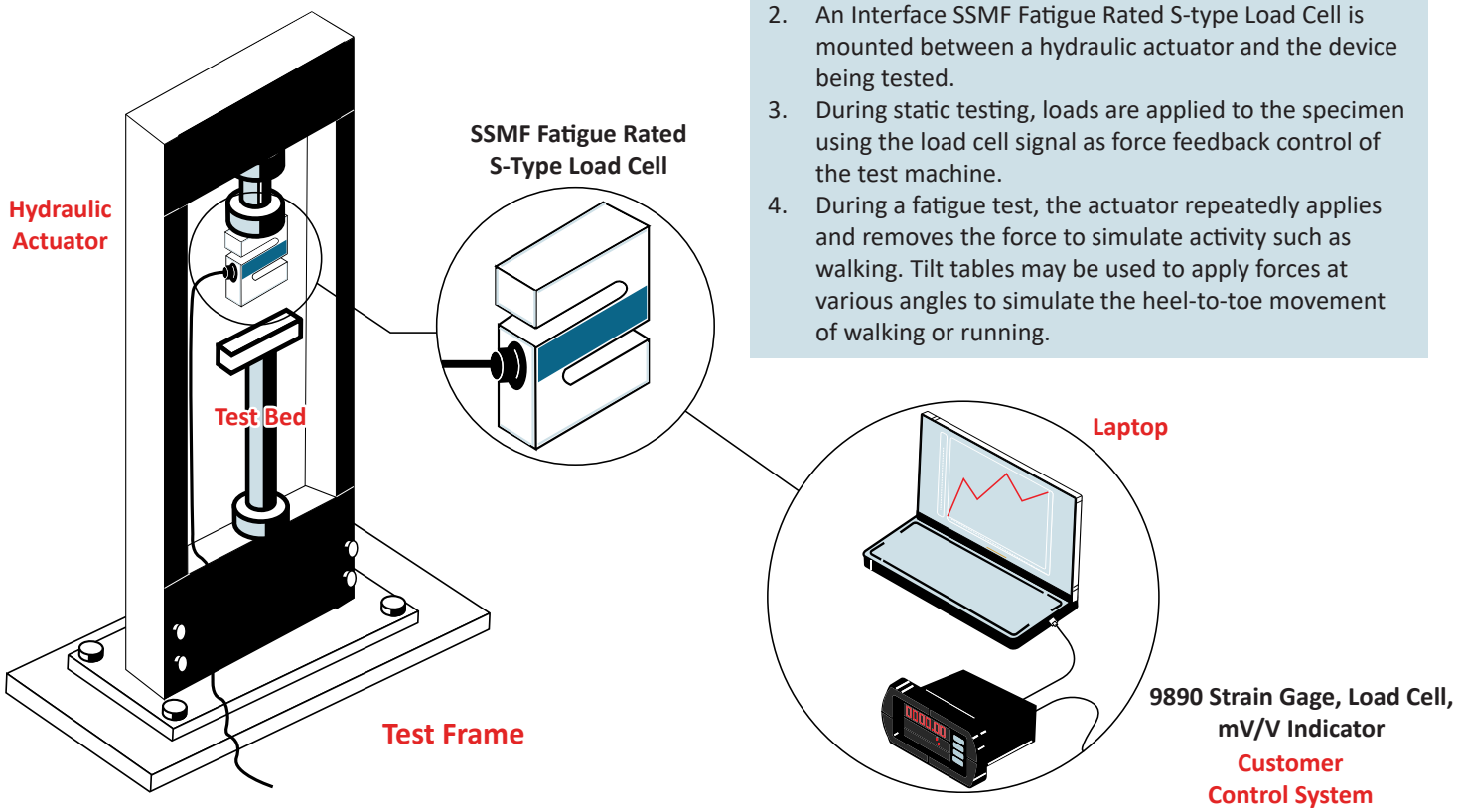
Engineers determine whether prosthetic materials and designs will withstand the rigors of daily use and occasional highload situations.

Materials

- SSMF Fatigue Rated S-type Load Cell
- 9890 Strain Gage, Load CEll, mV/V Indicator with Logging Software and Analog Output

How It Works

1. Various configurations of compression and tension test machines can be used depending on the type of prosthetic device being tested. Often the same machine can be used for static and fatigue testing.
2. An Interface SSMF Fatigue Rated S-type Load Cell is mounted between a hydraulic actuator and the device being tested.
3. During static testing, loads are applied to the specimen using the load cell signal as force feedback control of the test machine.
4. During a fatigue test, the actuator repeatedly applies and removes the force to simulate activity such as walking. Tilt tables may be used to apply forces at various angles to simulate the heel-to-toe movement of walking or running.



Radiosurgery Robot
Multi-Axis

Industry: Medical and Healthcare

Summary

Customer Challenge

Radiosurgery is a medical procedure that uses targeted radiation to remove cancerous tumors or masses in the body. Radiosurgery robots are used to target theses abnormalities and deliver radiation through a minimally invasive way, with high precision and accuracy. Load cells are needed to test and calibrate the robotic arm before affecting a patient.

Interface Solution

Interface's 6A40A 6-Axis Load Cell can be installed at the joints of the radiosurgery robot. The amount of force and torque exerted must be monitored in order to ensure each joint can handle the precise movements and loads without failing. These results can be logged, displayed, and measured when connected to Interface's BX8-HD44 BlueDAQ Series Data Acquisition System with included BlueDAQ software.

Results

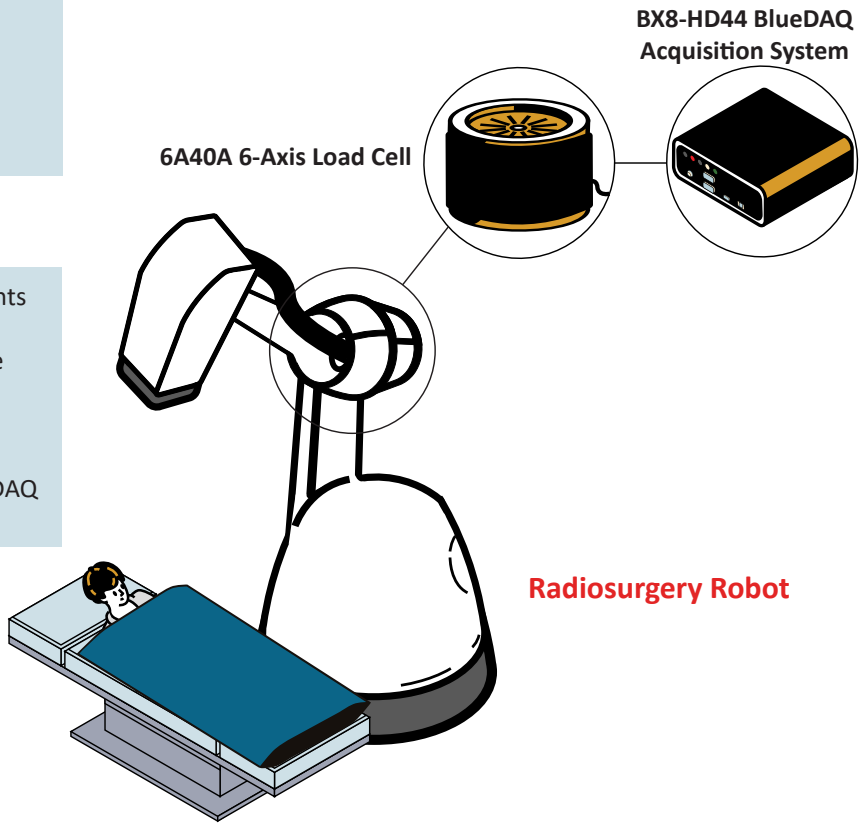
The customer was able to test and monitor the radiosurgery robot with Interface's multi-axis load cell, ensuring it was able to handle precise movements before being used in surgery.

Materials

- 6A40A 6-Axis Load Cell
- BX8-HD44 BlueDAQ Series Data Acquisition System with included BlueDAQ software
- Customer's radiosurgery robotic arm and control system

How It Works

1. The 6A40A 6-Axis Load Cell is installed into the joints of the radiosurgery robot.
2. A movement test is done, and the force and torque measurements are captured and monitored.
3. Test results are displayed, logged, and measured when connected to Interface's BX8-HD44 BlueDAQ Series Data Acquisition System with included BlueDAQ software.



Specimen Research
S-Type
Industry: Medical and Healthcare

Summary

Customer Challenge

In the medical industry, medical experts need the best equipment during research of multiple specimens. In this case, a medical researcher needs to monitor the load force of their linear actuator that uses a needle to collect material from the desired specimen.

Interface Solution

Interface's SuperSC S-Type Miniature Load Cell can easily be installed into the linear test stand. A needle with a gripper on the end is installed on the lower end of the SuperSC. As the needle is pushed to collect material of the specimen, the load feedback is captured using the 9330 Battery Powered High Speed Data Logging Indicator through an SD card, or a another laptop directly.

Results

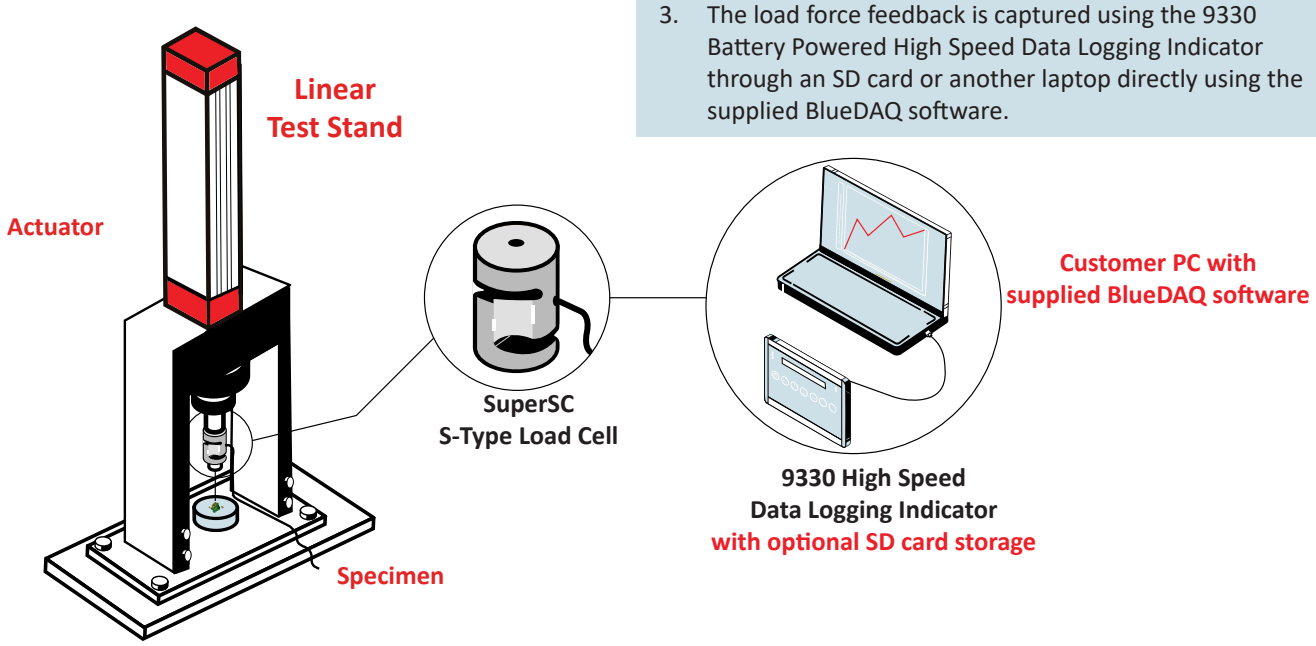
The medical researcher was able to monitor the force being applied of their linear test stand while collecting material from the specimen.

Materials

- SuperSC S-Type Miniature Load Cell
- 9330 Battery Powered High Speed Data Logging Indicator
- BlueDAQ Software
- Customer Linear Test Stand

How It Works

1. The SuperSC S-Type Miniature Load Cell is installed into the medical linear test stand and a needle with a gripper on the end is installed on the lower end of the SuperSC.
2. The linear test stand drives the needle into the specimen being researched in order to collect material to be tested.
3. The load force feedback is captured using the 9330 Battery Powered High Speed Data Logging Indicator through an SD card or another laptop directly using the supplied BlueDAQ software.



Stent and Catheter Testing
Load Cell

Industry: Medical and Healthcare, Test and Measurement

Summary

Customer Challenge

Customer needs to apply known forces to stent and catheters to ensure they pass all necessary strength and flexibility testing.

Interface Solution

Model MBP Overload Protected Beam Miniature Load Cell is placed behind the guide wire for the stent or catheter. The motor will spin the linear drive and push the load cell and guide the wire through the testing maze. Model MBP Overload Protected Beam Miniature Load Cell is connected to Model DIG-USB PC Interface Module. All forces are measured and stored on PC.

Results

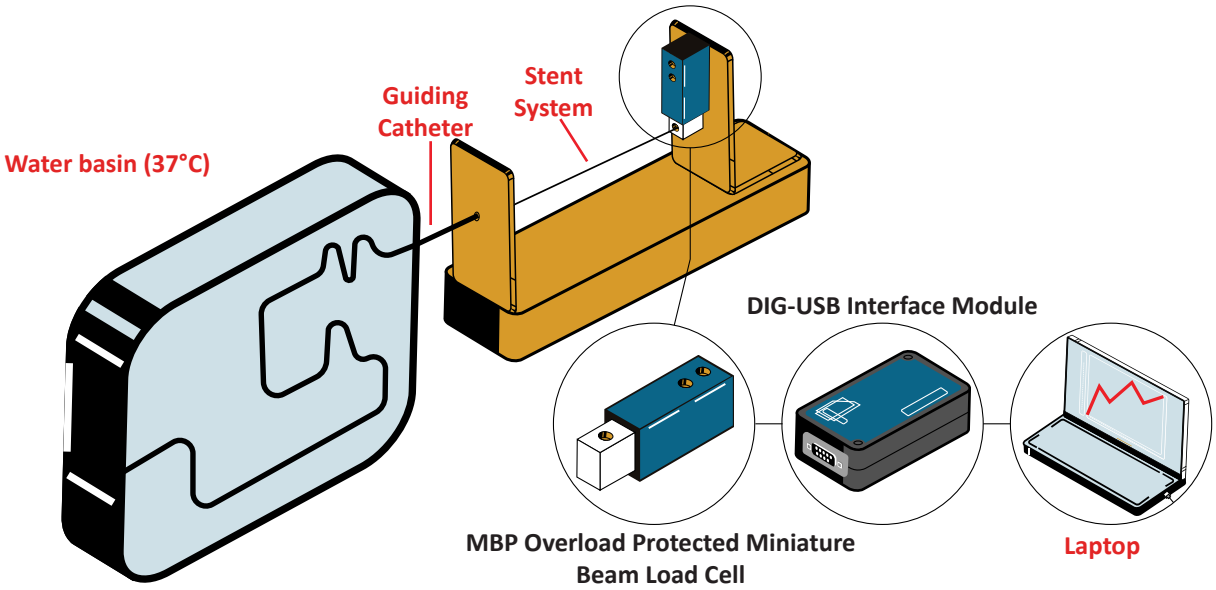
Customer was able to perform required testing and log to PC, followed by being able to review results and take actions as needed.

Materials

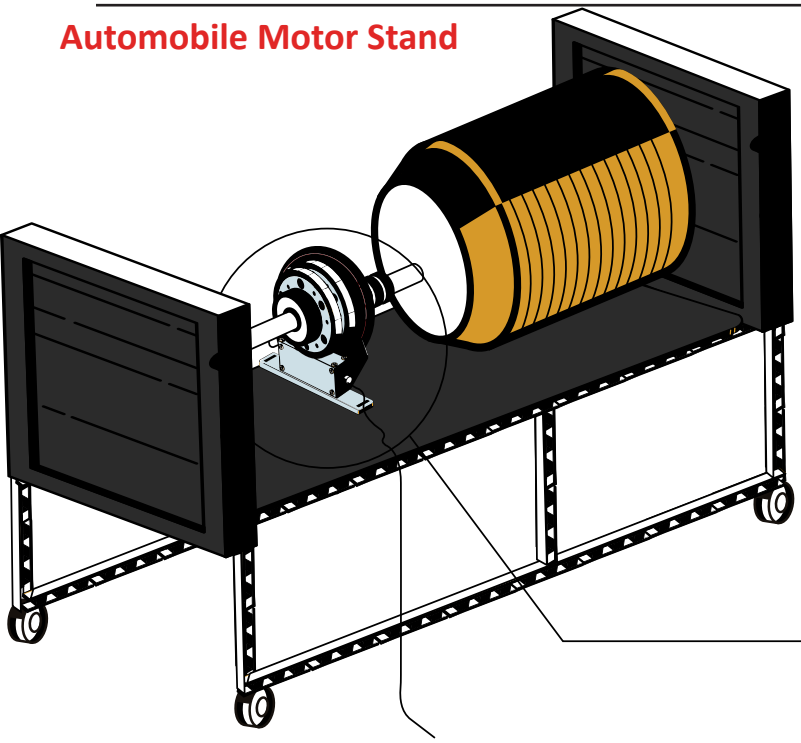
- MBP Overload Protected Beam Miniature Load Cell
- DIG-USB PC Interface Module
- Interconnect cable

How It Works

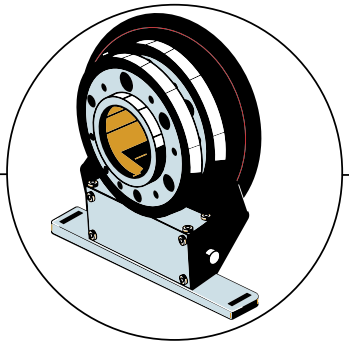
1. Install the MBP Overload Protected Beam Miniature Load Cell onto linear guide.
2. Connect the MBP Overload Protected Beam Miniature Load Cell to the DIG-USB PC Interface Module.
3. Connect the DIG-USB to customer's PC.
4. Forces measured by the MBP Overload Protected Beam Miniature Load Cell will be displayed and logged onto customer's PC.



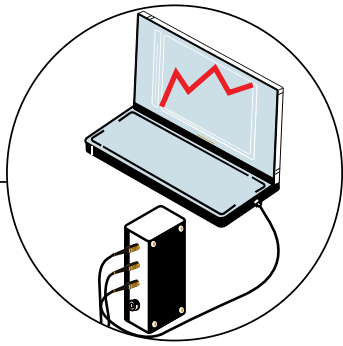
Automobile Motor Stand



AxialTQ Flange Style
Rotary Torque Transducer



Laptop with
software



AxialTQ Output Module

Syringe Needle Twist Force Torque Transducer

Industry: Medical and Healthcare

Summary

Customer Challenge

A syringe needle manufacturer uses robotic arms to assemble syringes. The robot arm picks up and places the plunger of the syringe into the syringe body, and a special assembly workstation twists the two parts together. The manufacturer needs a torque system to measure the amount of torque it would take.

Interface Solution

Interface's T2 Ultra Precision Rotary Torque Transducer can be installed into the syringe assembly workstation that twists the syringe body and plunger together. The syringe body is placed into the assembly work station where it is locked. The robot arm attaches the plunger to the syringe body. The assembly workstation's twisting mechanism then twists the two parts of the syringe together.

Results

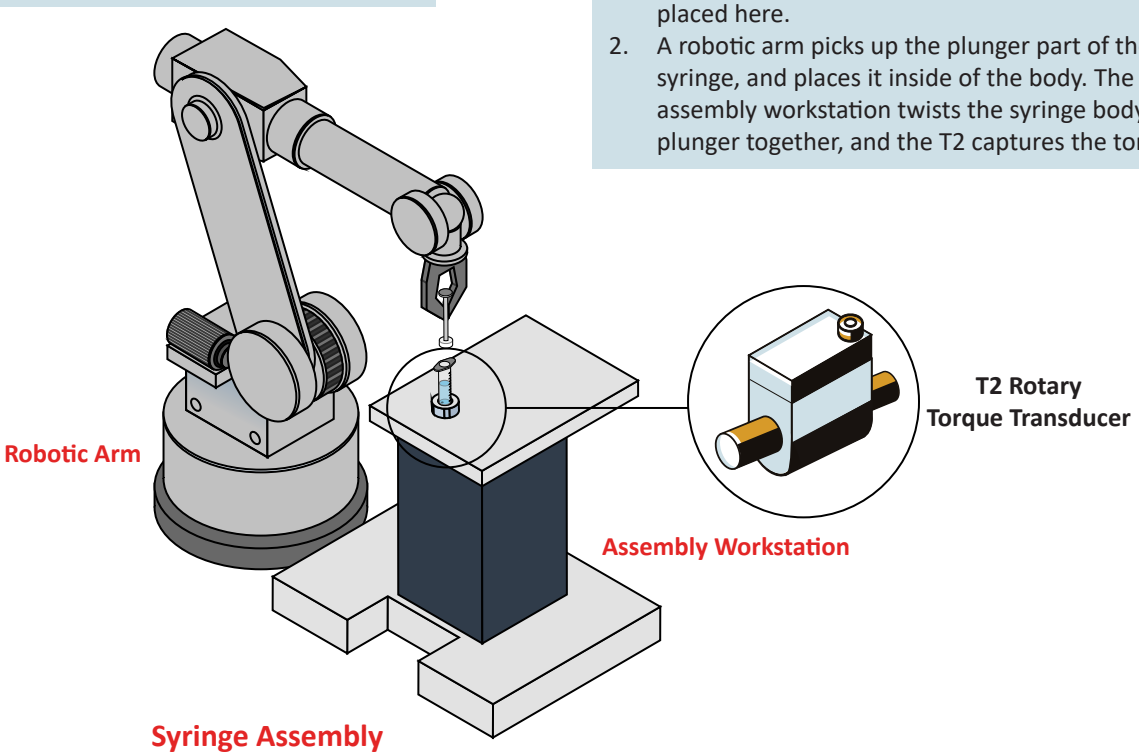
Interface's T2 Ultra Precision Rotary Torque Transducer successfully measured the amount of torque it took to twist the parts of the syringe together.

Materials

- T2 Ultra Precision Rotary Torque Transducer
- Syringe twisting workstation
- Robotic arm

How It Works

1. The T2 Ultra Precision Rotary Torque Transducer is installed into the twisting mechanism in the assembly workstation. The body of a syringe is placed here.
2. A robotic arm picks up the plunger part of the syringe, and places it inside of the body. The assembly workstation twists the syringe body and plunger together, and the T2 captures the torque.



Syringe Plunger Force Measurement

S-Type

Industry: Medical and Healthcare

Summary

Customer Challenge

A manufacturer of syringes needed to measure the force required to dispense liquid from a syringe and ensure their product is within ISO guidelines.

Interface Solution

Interface supplied Model SMT Overload Protected S-Type Load Cell coupled with Model 9325 Portable Sensor Display. This product was implemented into the customer's test frame for syringe testing.

Results

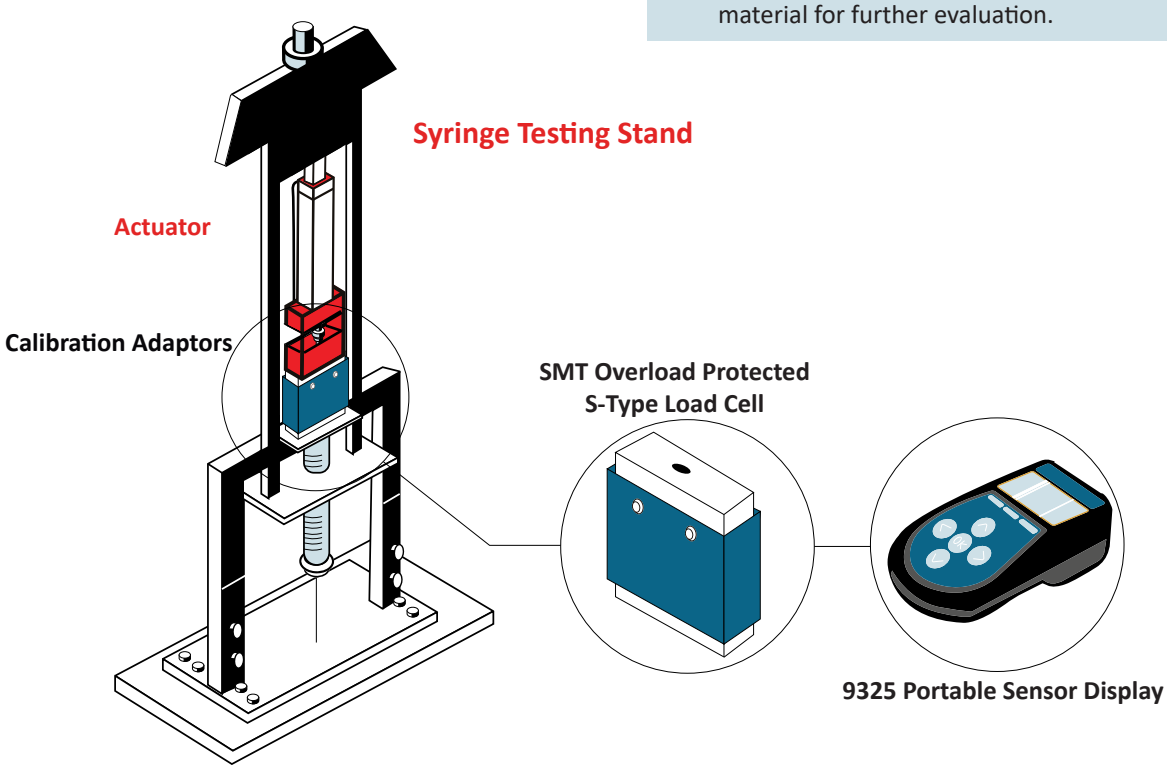
As the customer's load frame applied to the force of the syringe, Model SMT Overload Protected S-Type Load Cell measured the force applied to dispense this material. Model 9325 Portable Sensor Display showed all measured forces and captured the peak values.

Materials

- SMT Overload Protected S-Type Load Cell
- 9325 Portable Sensor Display
- Customer supplied calibration adaptors and calibration frame

How It Works

1. SMT Overload Protected S-Type Load Cell measure the forces applied to dispense this material.
2. 9325 Portable Sensor Display shows all measured forces.
3. The 9325 captures the peak values used to dispense this material for further evaluation.



Tablet Forming Machine Optimization

Load Cell

Industry: Medical and Healthcare

Summary

Customer Challenge

A pharmaceutical tablet producer wanted to monitor the forces applied by the tablet forming machine in an effort to understand the relationship between raw material, die set, forming force, and motor cycle speed. The goal was to improve productivity and efficiency of the tablet forming process, while reducing losses (i.e. cracked tablets or voids) by adding a dimension of feedback that could be used to assign specific press adjustment criterion for given inputs.

Interface Solution

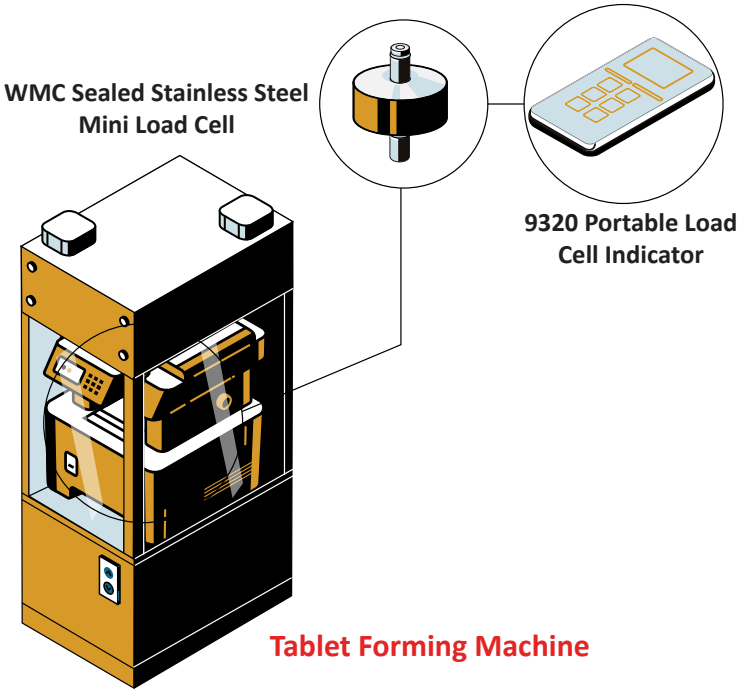
An Interface Model WMC Sealed Stainless Steel Mini Load Cell (10K lbf Capacity) was mounted in the section of the downward press bar. The machine was modified to accomplish this. The load cell was then connected to a Model 9320 Portable Load Cell Indicator to collect the needed data.

Results

After analyzing the data, the tablet producer was able to quantify adjustment levels by monitoring which forces produced the most optimal results for a given cycle speed, die set, and raw material. Productivity and efficiency was greatly improved by the enhancement of the data feedback.

Materials

- WMC Sealed Stainless Steel Mini Load Cell.
- 9320 Portable Load Cell Indicator.



How It Works

1. The customer made a custom fixture that allowed for the mounting of the WMC Sealed Stainless Steel Mini Load Cell between the downward press bar and the tablet, replacing a section of that downward press bar.
2. The output of the load cell was connected to the 9320 Portable Load Cell Indicator and set aside so that the cable did not interfere with the cycle and no snagging would occur. A cable tie was used to stow aside the cable and to ensure there was enough clearance for the entire cycle.
3. The customer then set out to establish a data correlation between the press forces for tablet forming and the outcome of the tablet itself for given raw materials, die sets, and speeds. Any variation in those variables warranted the possibility of a different optimal force.
4. The customer was then able to produce a set of guidelines to adjust the press force for the given inputs (raw materials, die sets, and speeds). These guidelines, when followed, increased productivity and efficiency while reducing losses by being able to calibrate the force.

Tablet Machine Hardness Tester Calibration

Interface Mini™

Industry: Medical and Healthcare

Summary

Customer Challenge

A customer wants to conduct a tablet hardness tester calibration in their tablet machine. The customer needs a load cell that specifically lays and measures the forces horizontally, due to the horizontal lay out of the tablet machine.

Interface Solution

Interface's MCC Miniature Compression Load Cell can measure forces on its side, with a small cable exit that attaches to the customer's tablet machine. This measures the force applied to the hardness testing mechanism inside of the machine. The BlueDAQ software included also records the results and compares it to the reference load cell. Data is sent to the 9330 Battery Powered High Speed Data Logging Indicator for the customer to view, log, and graph the results.

Results

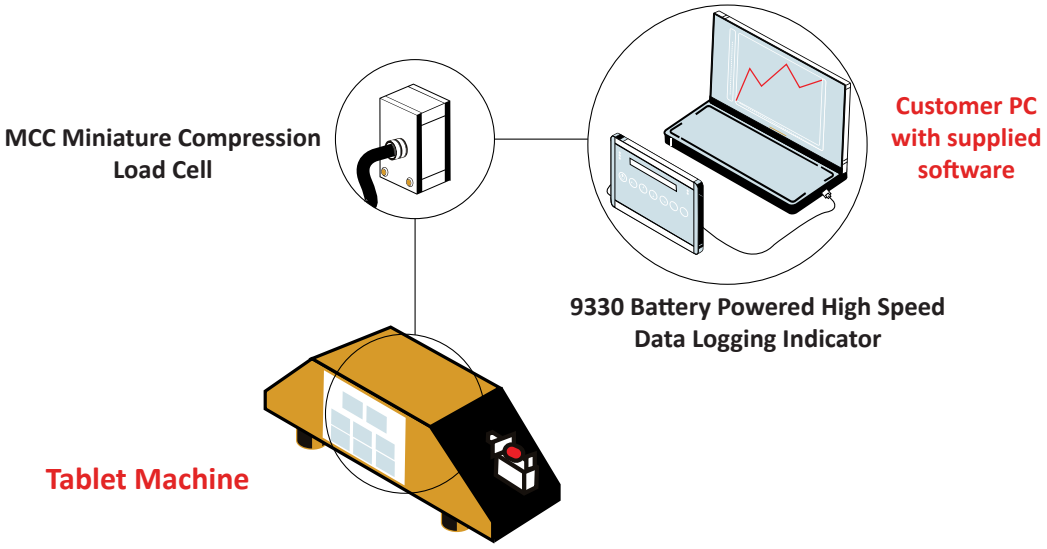
The customer successfully was able verify and calibrate the tablet machine's hardness tester in order to conduct accurate hardness testing on tablets. Compared to other load cells, Interface's MCC Miniature Compression Load Cell was perfect due to its small size, and convenient to measure the forces on its side.

Materials

- MCC Miniature Compression Load Cell
- 9330 Battery Powered High Speed Data Logging Indicator
- BlueDAQ Software included with instrument purchase
- Customer's PC or Laptop

How It Works

1. The MCC Miniature Compression Load Cell is connected to the hardness testing mechanism inside of the tablet machine.
2. Calibration results are sent to the 9330 Battery Powered High Speed Data Logging Indicator, where data is logged and graphed.
3. Data is processed using BlueDAQ Software, which stores and logs data in the customer's PC computer or laptop.



Tablet Hardness Testing

Interface Mini™

Industry: Medical and Healthcare

Summary

Customer Challenge

A pharmaceutical tablet producer wanted to test and monitor the hardness of the tablets being created in their tablet forming machine.

Interface Solution

Interface's SML Low Height S-Type Load Cell was mounted to the hardness device inside the tablet forming machine. The SML Low Height S-Type Load Cell was then connected to the 9870 High-Speed High Performance TEDS Ready Indicator to record the force measurements.

Results

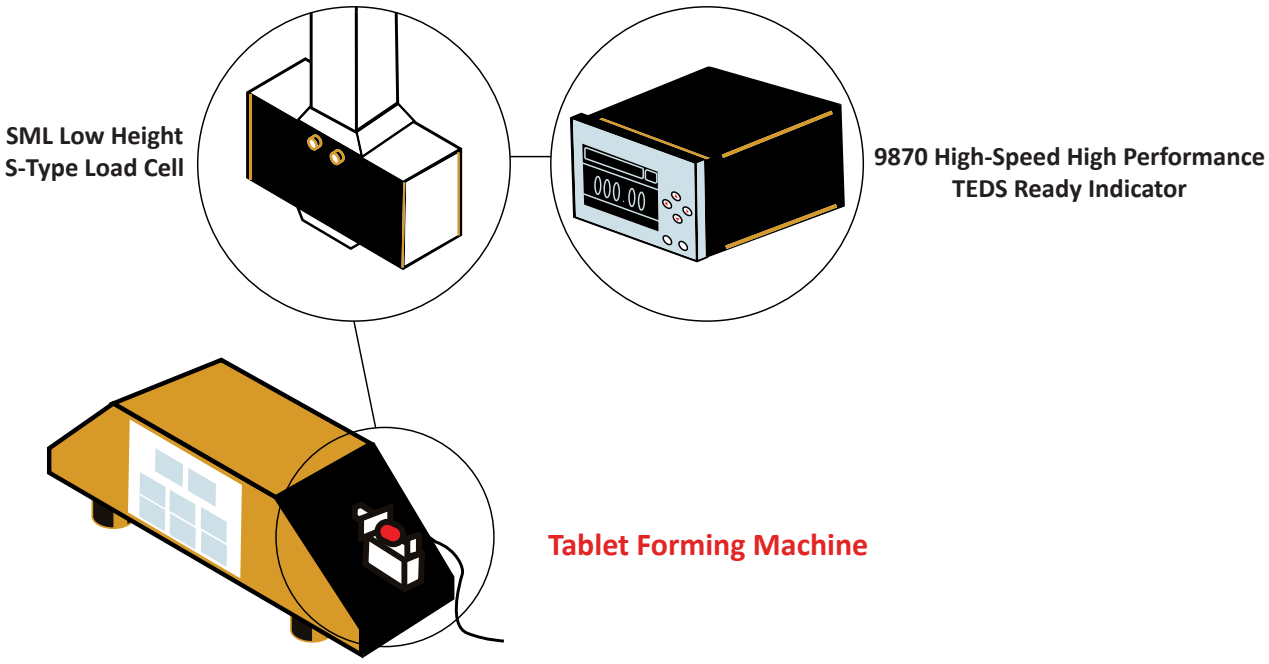
The tablet producer was able to verify and test the specific hardness needed for their tablets being produced by their tablet forming machine.

Materials

- SML Low Height S-Type Load Cell
- 9870 High-Speed High Performance TEDS Ready Indicator

How It Works

1. The SML Low Height S-Type Load cell was customized to fit into the hardness testing device inside the tablet forming machine.
2. The output of the SML was connected to the 9870 High-Speed High Performance TEDS Ready Indicator.
3. The customer was able to calibrate and clarify the specified hardness for the tablets being formed.



Treadmill Rehabilitation

Interface Mini™

Industry: Medical and Healthcare

Summary

Customer Challenge

A medical company wants a force measurement system for their experimental rehabilitation treadmill for patients that have pelvic mobility difficulties. For example, patients who have had a strokes tend to have difficulty walking. They want to measure the forces applied on the pelvis when the patient is walking on the treadmill and catch any pelvic deviations.

Interface Solution

The rehabilitation treadmill has a special harness with two actuators on either side of the patient when in use. Interface suggests installing their Two WMC Sealed Stainless Steel Miniature Load Cells to the actuators, which will measure the forces applied on the pelvis of the patient. Force results can be measured using the SI-USB4 4-Channel USB Interface Module, which can also be graphed and logged on the customer's computer with supplied VS3 software.

Results

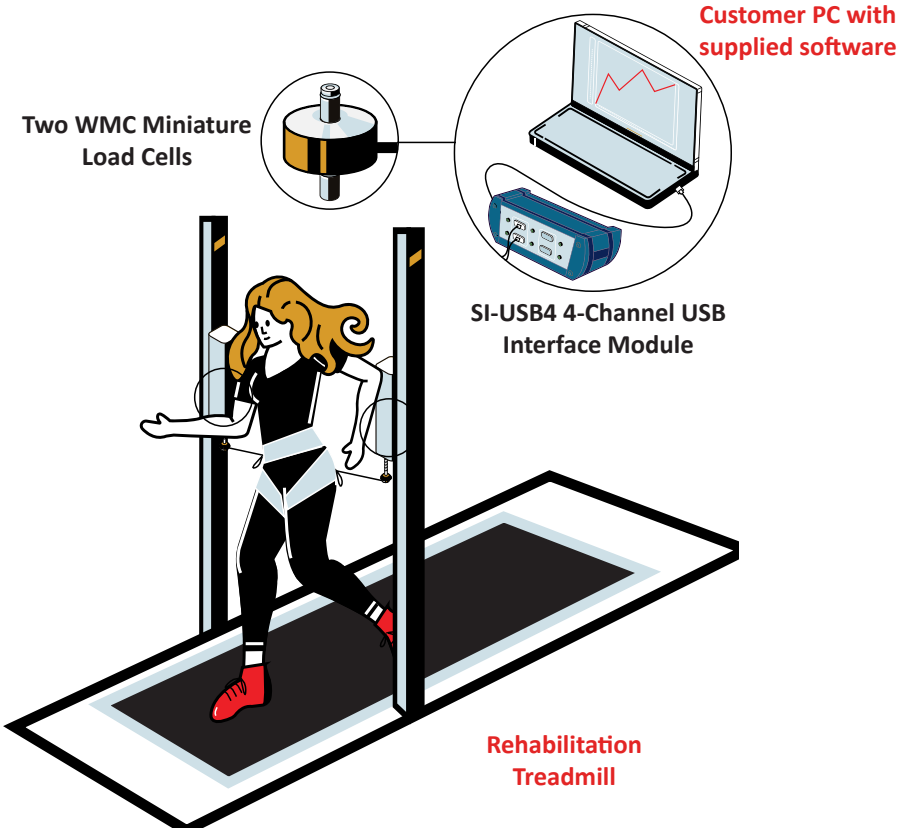
The medical company was able to catch different pelvic deviations in their experimental rehabilitation treadmill using Interface's force measurement system.

Materials

- Two WMC Sealed Stainless Steel Miniature Load Cells
- SI-USB4 4-Channel USB Interface Module with included VS3 Software
- Customer PC or Laptop

How It Works

1. Two WMC Sealed Stainless Steel Miniature Load Cells are installed into the actuators on either side of the treadmill's special harness.
2. When a patient starts to walk, the WMC Load Cells measure the lateral forces implemented by the patient when in movement.
3. Force measurement results are graphed and logged when connected to the SI-USB4 4-Channel USB Interface Module with supplied software, onto the customer's PC.



Vascular Clamp Force
Load Button

Industry: Medical and Healthcare

Summary

Customer Challenge

Customer wants to examine different types of vascular clamps to see which types will generate the best clamping force of surgery.

Interface Solution

Interface Model Battery Powered High Speed Data Logging Indicator and ConvexBT Load Button Load Cell were used to record the force measurements of these different clamps.

Results

Customer was able to compare three different types of clamps and determine the best one to use during surgery.

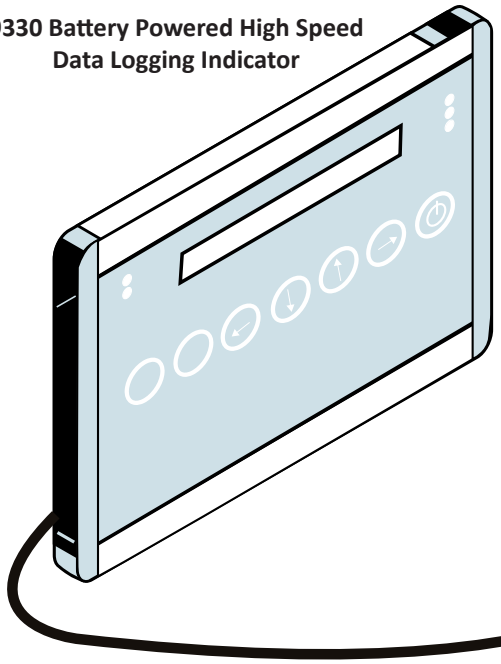
Materials

- 9330 Battery Powered High Speed Data Logging Indicator
- ConvexBT Load Button load Cell
- Vascular clamps
- Load cell mounting hardware

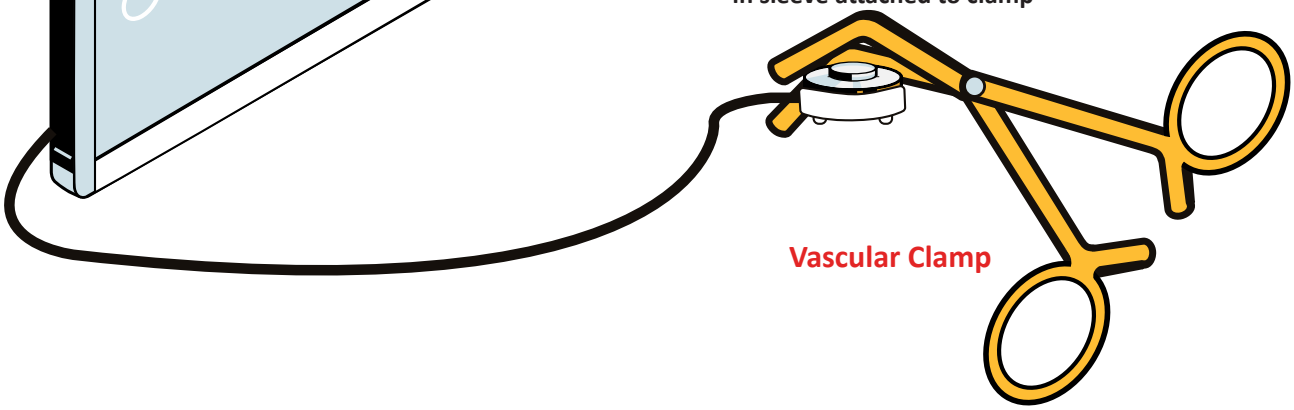
How It Works

1. The ConvexBT Load Button load Cell is mounted to the jaw of the vascular clamp (this will require customer supplied fixtures).
2. 9330 Battery Powered High Speed Data Logging Indicator is connected to the ConvexBT.
3. Customer performs required tests and data is stored to SD card (can be stored directly to PC as well).
4. Customer downloads logging information from SD card to PC (if not directly logged to PC).
5. Customer evaluates results by reviewing logged data using a PC computer.

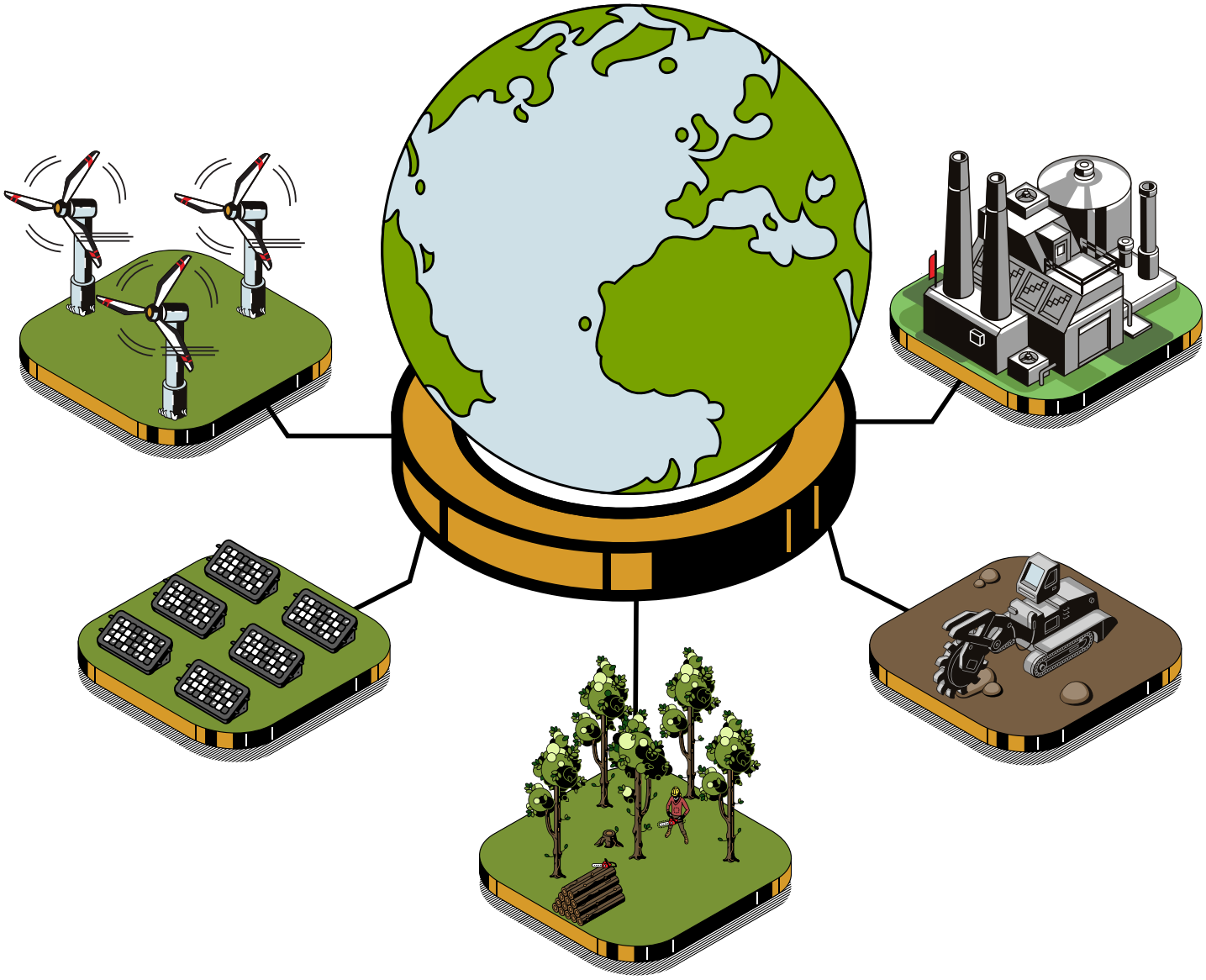
9330 Battery Powered High Speed Data Logging Indicator



ConvexBT Load Button Load Cell in sleeve attached to clamp



Natural Resources



Biomass Handling
Interface Mini™

Industry: Natural Resources

Summary

Customer Challenge

Biomass refers to natural resources that can be used as renewable energy. In the forestry industry, wood, branches, twigs, logs, and leaves can all be converted into a renewable form used for heating or power generation. A weighing system is needed to measure forestry biomass to ensure consistent processing.

Interface Solution

Interface suggests using the PBLC Pillow Block Load Bearing Load Cells on the conveyor belts that are used to transfer biomass chips and other wood agriculture in forestry. The PBLC's measure and monitor the force of the conveyor belt, while preventing misalignment. When connected to the 920i Programmable Weight Indicator and Controller, the customer can see the total weight of the biomass being transported.

Results

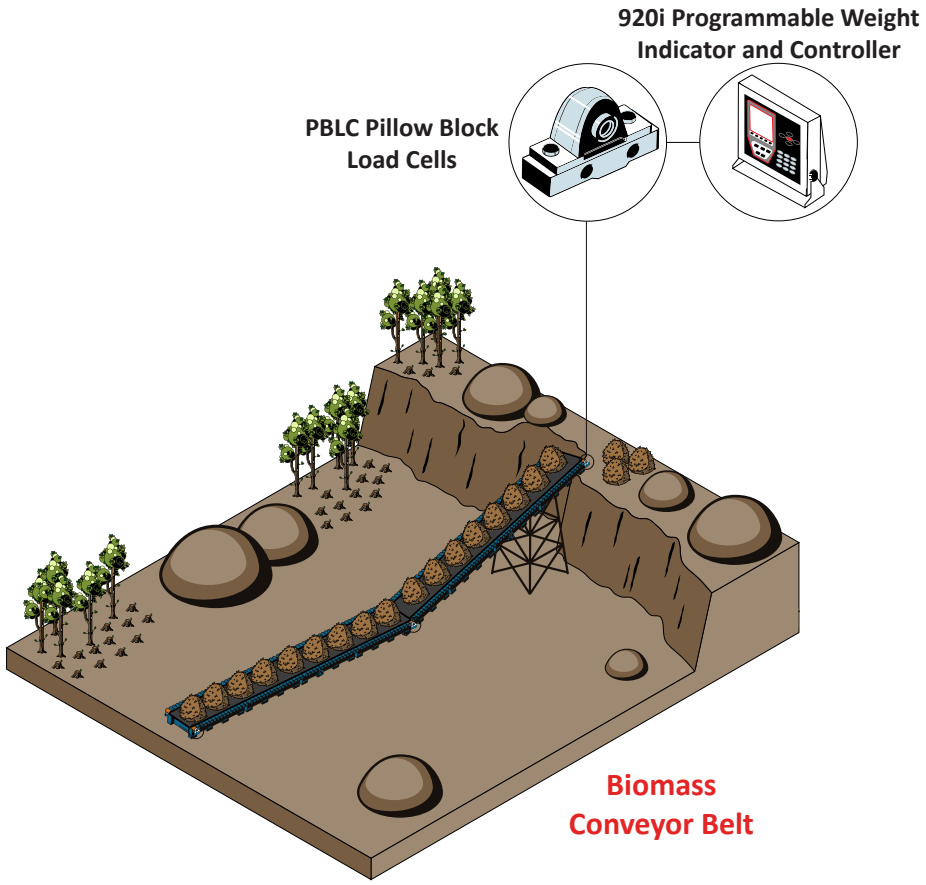
The PBLC Pillow Block Load Cells successfully maintained the proper alignment of the conveyor belt for the biomass wood chips being transported, while also monitoring the forces being implemented.

Materials

- PBLC Pillow Block Load Bearing Load Cella
- 920i Programmable Weight Indicator and Controller

How It Works

1. The PBLC Pillow Block Load Bearing Load Cells are installed at the wheels at each end of the conveyor belt.
2. When connected to the 920i Programmable Weight Indicator and Controller, the customer can see the weight for every pillow block or the total weight of the biomass being transported.
3. The PBLC Pillow Block Load Bearing Load Cells also maintain the proper alignment of the conveyor belts, reducing damage or malfunctions during operations. The 920i can communicate to the customer's control center via RS232 if an possible error is detected.



Cable Logging Monitoring
Tension Load Link

Industry: Natural Resources

Summary

Customer Challenge

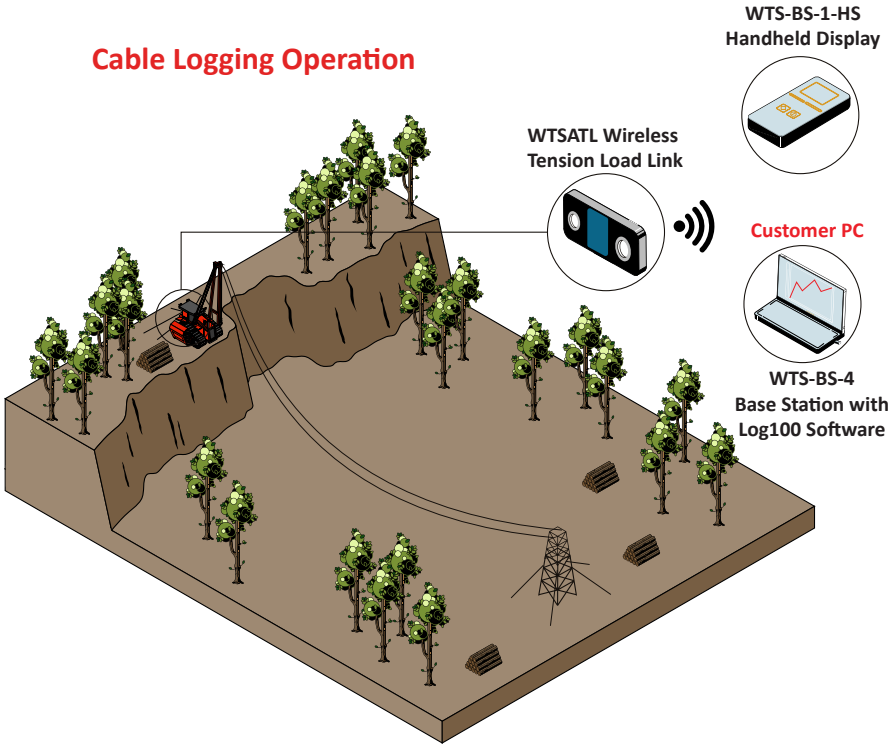
In cable logging systems, the tension of the cables need to be monitored to maintain a safe working environment, and prevent any potential equipment damage. A system is needed to monitor the tension of the cables.

Interface Solution

Interface's WTSATL Lightweight Aluminum Wireless Tension Load Link is attached to the cables of the logging yarder, where tension forces are monitored. Force measurements are transmitted to the WTS-BS-1-HS Handheld Digital Display for Single Transmitters and to the customers computer or laptop through the WTS-BS-4 USB Industrial Base Station. With the WTS Log100 Software,the customer is able to graph and log the data results with this software onto their computer.

Results

The logging company was able to monitor the tension of their cables on the logging yarder during logging operations to ensure a safe working environment.



Materials

- WTSATL Lightweight Aluminum Wireless Tension Load Link
- WTS-BS-1-HS Handheld Display for Single Transmitters
- WTS-BS-4 USB Industrial Base Station
- WTS Log100 Software (graphing and logging software, included with WTS-BS-4)
- Customer PC or Laptop

How It Works

1. The WTSATL Lightweight Aluminum Wireless Tension Load Link is attached to the cable line on the yarder.
2. Tension results are measured and monitored using the WTS-BS-1-HS Handheld Digital Display for Single Transmitters.
3. The customer can also graphic and log the results with included Log100 software onto their computer.

Geothermal Well Drilling
Load Cell

Industry: Natural Resources

Summary

Customer Challenge

Geothermal energy is the heat derived from the Earth's interior, harnessed for various applications such as electricity generation and heating by utilizing the natural heat reservoirs found beneath the Earth's surface. A customer has a conventional geothermal system and needs to drill a deep well into the Earth in order to tap into its natural heat reservoirs.

Interface Solution

Interface's IPCD Pressure Compensated Downhole Load Cell is a highly accurate load cell that was developed specifically for downhole tension and compression measurements in high temperature, high pressure well conditions, such as drilling to build or develop geothermal infrastructure. Precise tool string force measurements can be monitored real time through customer instrumentation.

Results

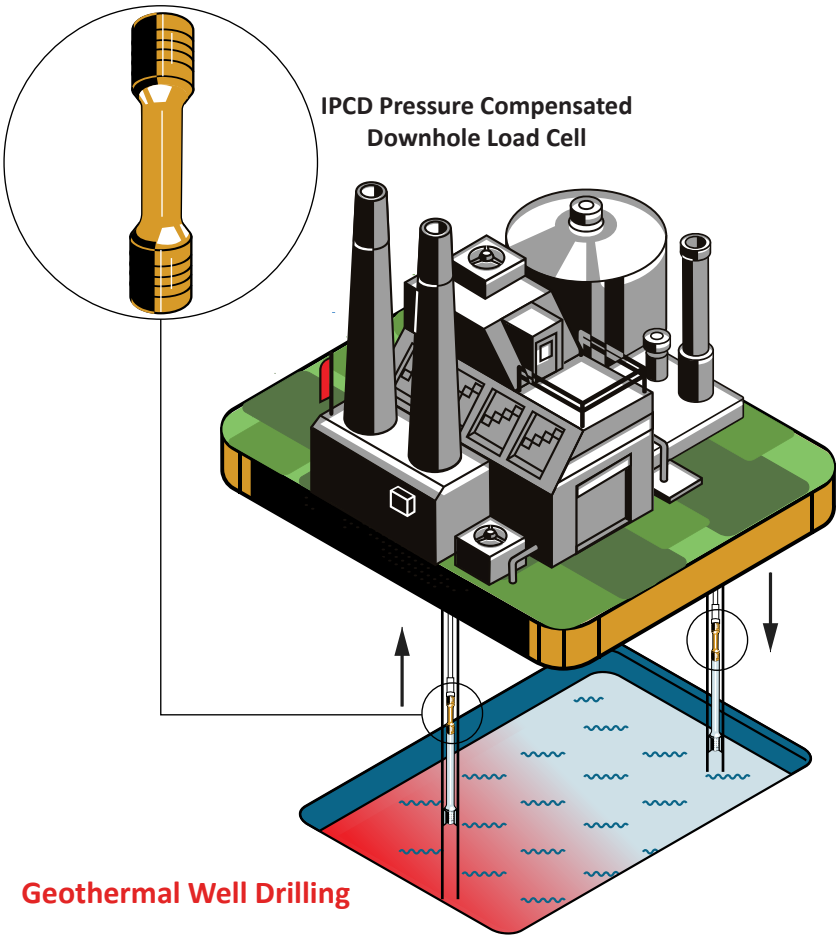
The customer effectively managed forces on the toolstring throughout the well drilling process, thereby preventing costly tool separation or damage.

Materials

- IPCD Pressure Compensated Downhole Load Cell
- Customer Instrumentation

How It Works

1. The IPCD Pressure Compensated Downhole Load Cell is attached at the top of the tool string.
2. During the well drilling, the IPCD measures the forces between the cable head and the tool string.
3. Connected to the customer's instrumentation, actual cable head tension is closely monitored during drilling process to access geothermal energy.
4. Interface's proprietary and maintenance free dry pressure compensation technology minimizes measurement errors from pressure effect.



Geothermal Well Drilling

Mining Tank Weighing
Load Cell

Industry: Natural Resources

Summary

Customer Challenge

During mining operations, a mining tank needs to be weighing in order to maintain the quality of the mining processes. The weight needs to be monitored and controlled during mixing, dosing, or the blending of different materials.

Interface Solution

Interface suggests sing Interface's WSSCLC-Mount Weighing Assembly Load Cells, paired with 1280 Programmable Weight Indicator and Controller, the customer is able to monitor the amount of content by weight in the mining tank. This system precisely measures the amount of material being added or removed during operations.

Results

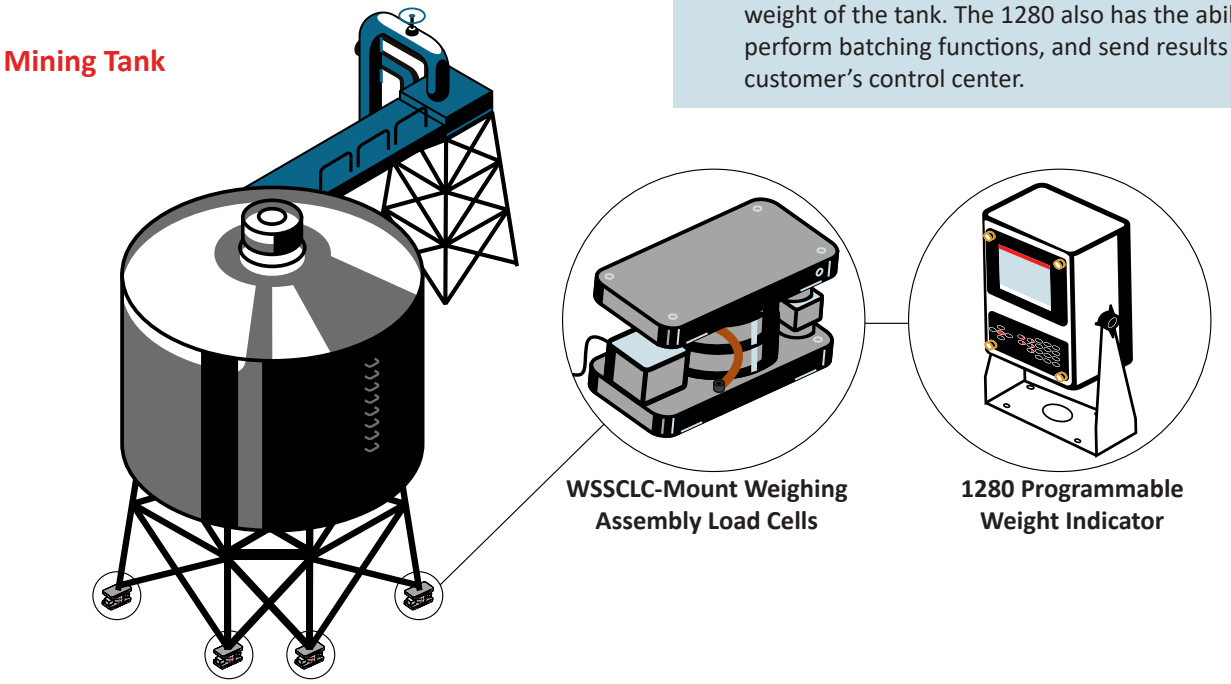
The customer was provided a customizable solution to monitor and weigh their mining tanks during mining operations. Results from the 1280 Programmable Weight Indicator and Controller was sent to the customer's control center.

Materials

- WSSCLC-Mount Weighing Assembly Load Cells
- 1280 Programmable Weight Indicator and Controller
- Customer's control center

How It Works

1. WSSCLC-Mount Weighing Assembly Load Cells are installed under the legs of the mining tank. The Weigh-Check Load Cell will measure and monitor the loads as different mined material is loaded in or out of the tank.
2. Weight measurements will be displayed on the 1280 Programmable Weight Indicator and Controller, showing the weight for each leg and corresponding to the total weight of the tank. The 1280 also has the ability to perform batching functions, and send results to the customer's control center.



Proppant Crush Test
Load Cell

Industry: Natural Resources

Summary

Customer Challenge

Proppant crush tests are conducted to test the resistance of the proppants that are used during hydraulic fracturing operations. The test is done to determine the degradation characteristics of proppants crushed at a specific forces.

Interface Solution

Interface's 1101 Compression-Only Ultra Precision LowProfile™ Load Cell is installed into the servo controlled load test frame. A stress load is applied to the crush cell, and the 1101 captures the force data. Data is displayed, graphed, and logged on the customer's computer when connected to the INF-USB3 Universal Serial Bus Single Channel PC Interface Module.

Results

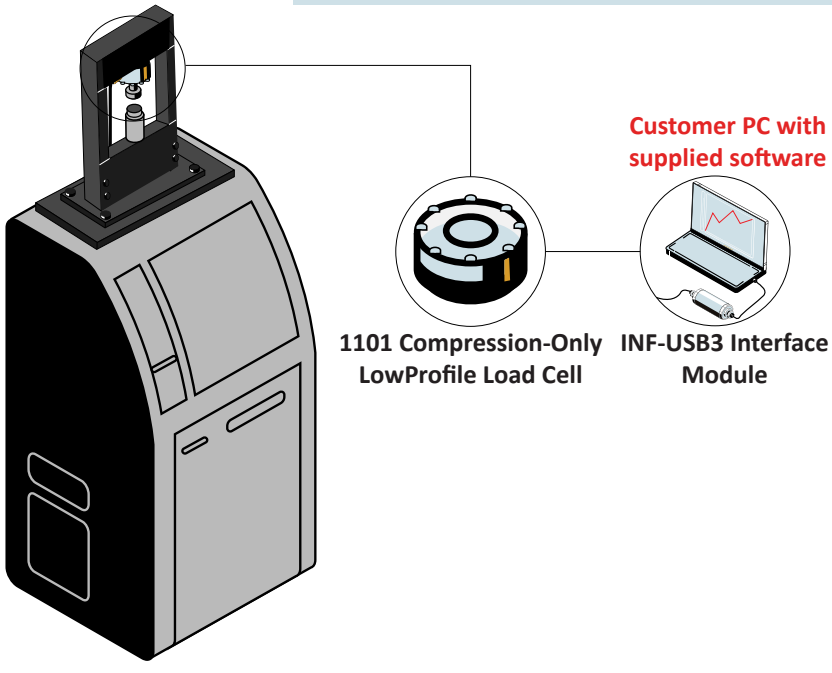
Interface's 1101 Compression-Only Ultra Precision LowProfile™ Load Cell successfully captured the force data during the proppant crush test experiment, and determined the proppant's degradation characteristics at different forces applied.

Materials

- 1101 Compression-Only Ultra Precision LowProfile™ Load Cell
- INF-USB3 Universal Serial Bus Single Channel PC Interface Module with supplied software
- Customer PC or Laptop
- Customer proppant crush test frame

How It Works

1. 1101 Compression-Only Ultra Precision LowProfile™ Load Cell is installed into the proppant crush test load frame. Different loads are applied to the crush cell.
2. The data is captured and displayed on the customer's computer when connected to the INF-USB3 Universal Serial Bus Single Channel PC Interface Module. Data can be logged and graphed with supplied software.



Proppant Silo System

Interface Mini™

Industry: Energy

Summary

Customer Challenge

A proppant silo system stores proppants such as sand, ceramic, or other materials. From the silo it is then transported to the well site. A force system is needed to measure the amout of proppant that needs to be transferred out of the silos to the well-bore site.

Interface Solution

Interface suggests using the PBLC Pillow Block Load Bearing Load Cells on the conveyor belts that are used to transfer the proppant from silos into a transfer truck. The PBLC's measure and monitor the force of the conveyor belt, while preventing misalignment. When connected to the 920i Programmable Weight Indicator and Controller, the customer can see the total weight of proppant being transported.

Results

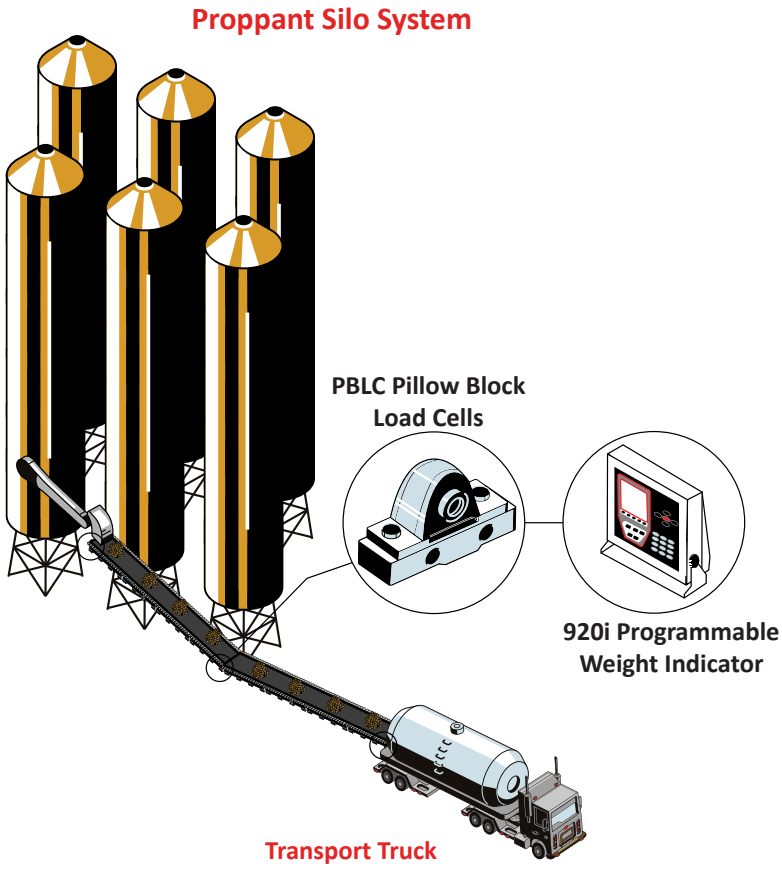
When connected to the 920i Programmable Weight Indicator and Controller, the customer can see the total weight of the proppant being transported.

Materials

- PBLC Pillow Block Load Bearing Load Cells
- 920i Programmable Weight Indicator and Controller

How It Works

1. The PBLC Pillow Block Load Bearing Load Cells are installed at the wheels at each end of the conveyor belt.
2. When connected to the 920i Programmable Weight Indicator and Controller, the customer can see the weight for every pillow block or the total weight of proppant being transported.



Quarrying Conveyor Belt Scale
S-Type

Industry: Natural Resources

Summary

Customer Challenge

A quarrying belt scale is used to measure the flow rate and monitor the total quantity of material transported on conveyor belts in quarrying and mining operations. Materials such as gravel, sand, or minerals is processed into stockpiling areas. Force sensors need to be implemented into the belt to be monitored in real-time.

Interface Solution

Interface suggests installing multiple SSMF Fatigue-Rated S-Type Load Cells within the conveyor belt. The SSMF is the perfect load cell for easy replacements without disrupting the alignment of the conveyor belt. The SSMF measures and monitors the weight of the materials being transported. The results will be captured by the WTS-AM-1E and transmitted to the customer's PC using the WTS-BS-6 Wireless Telemetry Dongle Base Station.

Results

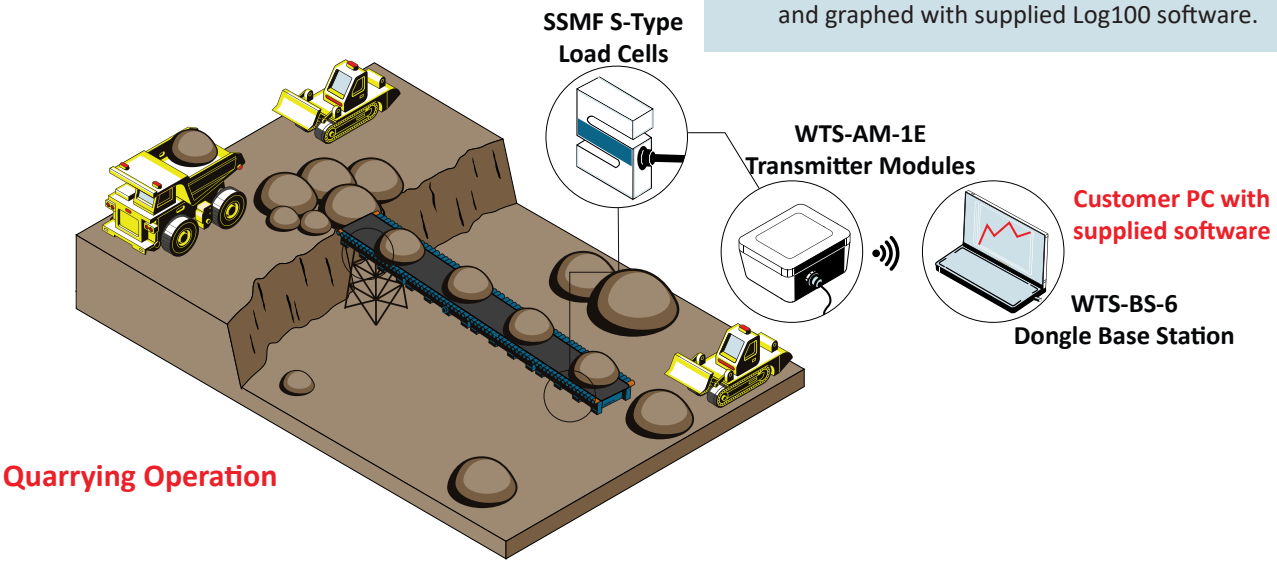
The customer was able to monitor and measure the material being transported on the quarrying conveyor belt using Interface's load cells.

Materials

- SSMF Fatigue-Rated S-Type Load Cells
- WTS-AM-1E Wireless Strain Bridge Transmitter Modules with Log100 software
- WTS-BS-6 Wireless Telemetry Dongle Base Station
- Customer PC or Laptop

How It Works

1. Multiple SSMF Fatigue-Rated S-Type Load Cells are installed within the quarrying belt, connected to WTS-AM-1E Wireless Strain Bridge Transmitter Modules.
2. The load cells capture the forces of the quarrying materials being transported.
3. The data is wirelessly transmitted to the customer's PC when connected to the WTS-BS-6 Wireless Telemetry Dongle Base Station. Data can be displayed, logged, and graphed with supplied Log100 software.



Timber Weighing and Harvesting
Load Cell

Industry: Natural Resources

Summary

Customer Challenge

A timber company needs a weighing system for sustainable forest management. They need to measure the amount of timber harvested. Weighing and monitoring harvested timber helps with resource monitoring, and contributes to the overall sustainability of the forestry industry.

Interface Solution

Interface suggests creating a truck weighing scale to weigh logging trucks both before and after the loaded timber. Multiple SSLP Stainless Steel LowProfile Universal Load Cells with WTS-BS-1E Wireless Transmitter Modules are installed under the weighing bridge. The load cells will transmit the force results wirelessly to the WTS-BS-4 Industrial Base Station connected to the customer's PC with provided Log100 software. The WTS-LD2 Wireless Large LED Display can also display the weight inside for the driver to see in real time. Results can also be viewed on the WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters.

Results

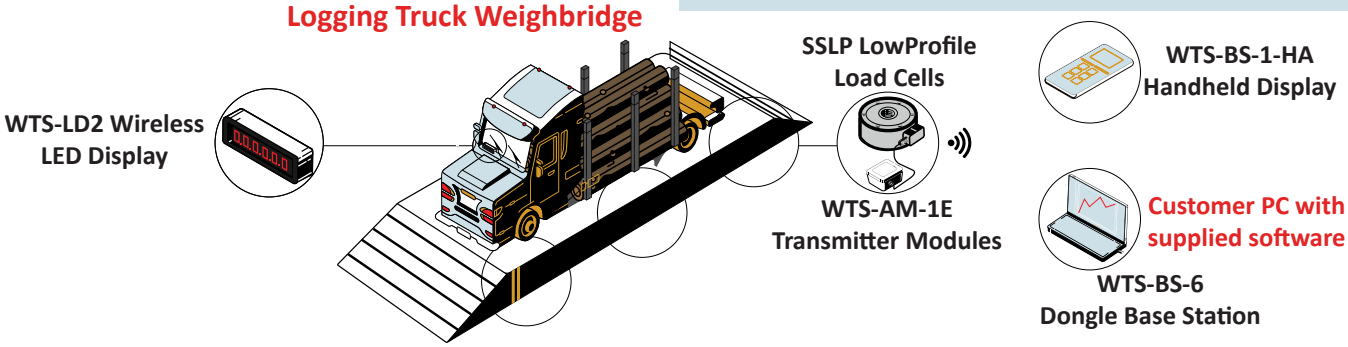
Interface's Wireless Telemetry System used in the logging truck weighbridge was highly accurate and efficient, creating better resource management and conservation.

Materials

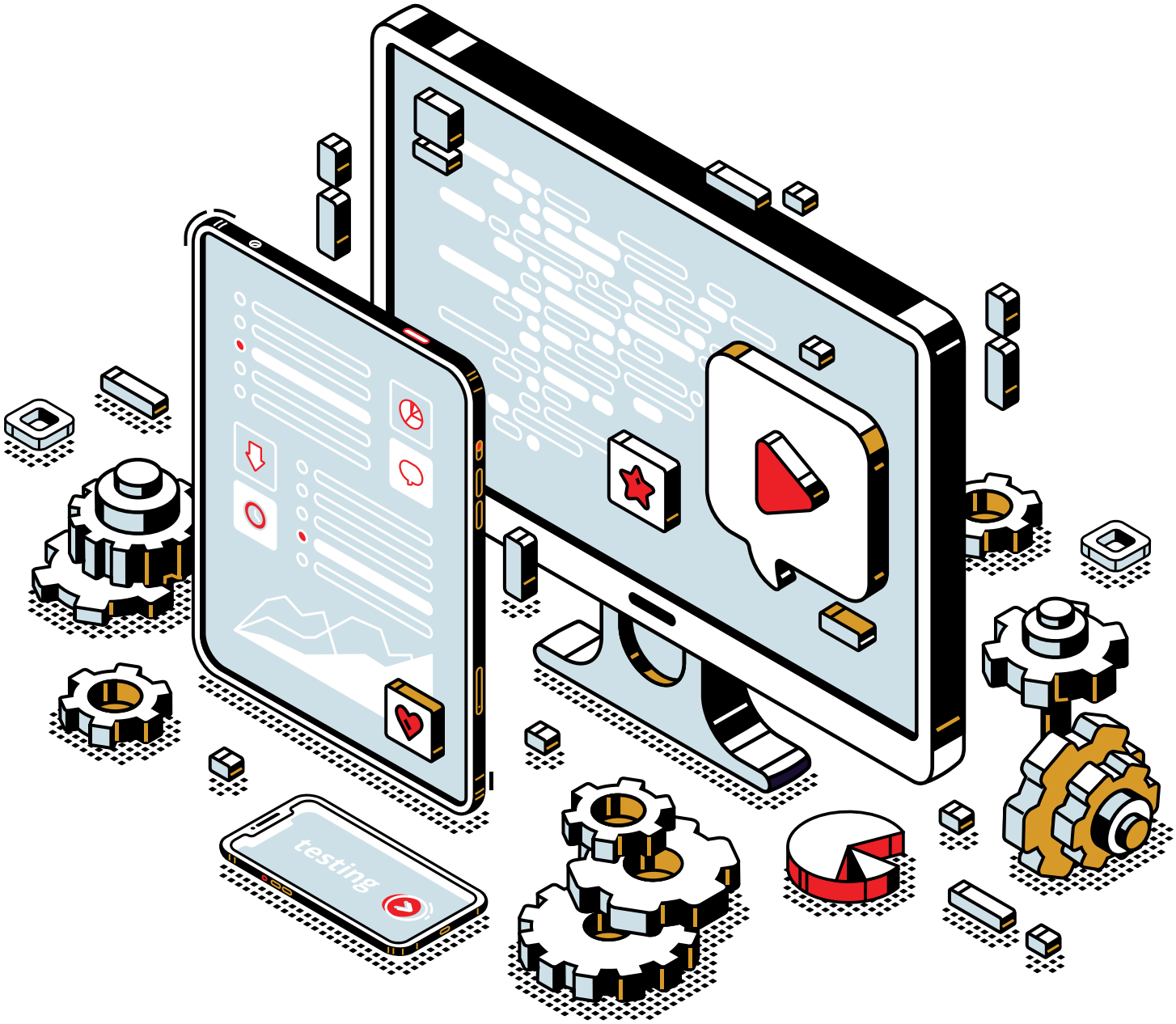
- SSLP Stainless Steel LowProfile Universal Load Cells
- WTS-BS-1E Wireless Strain Bridge Transmitter Module
- WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters
- WTS-LD2 Wireless Large LED Display
- WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters
- WTS Toolkit and Log100 Software
- Customer PC or Laptop

How It Works

1. Multiple SSLP Stainless Steel LowProfile Universal Load Cells with WTS-BS-1E Wireless Transmitter Modules are installed and mounted to the bottom of the truck weighbridge.
2. The load cells collect the force measurements and sum the total weight of the logging truck's timber load.
3. The data is wirelessly transmitted to the customer's laptop through the WTS-BS-6 Dongle Base Station using the Log100 Software. The sum weight data can be logged, graphed, and sent to the cloud using the supplied software. It can also be viewed on the WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters
4. The WTS-LD2 Wireless Large LED Display can also display the weight inside of the vehicle for the driver to see in real time.



Test and Measurement



6-Axis Load Cell Solutions
Multi-Axis

Industry: Test and Measurement

Summary

Customer Challenge

Customer needs a 6-Axis Load Cell System that can perform tests at a high sample rate and communicate this information via EtherCAT. In addition to this, the customer would like to connect this 6-Axis System to Ethernet so this same 6-Axis system can be used in a setup process that occurs from time to time with their industrial equipment.

Interface Solution

Interface suggests using Model BX8-HD44-EC High Speed Data Acquisition System with integrated EtherCAT protocol with Model 6AXX 6-Axis Load Cell. In addition to this, Interface suggests that they integrate a Raspberry Pi, with custom software, into the 6-Axis EtherCAT System to provide the Ethernet communication this customer needs for their equipment setup.

Results

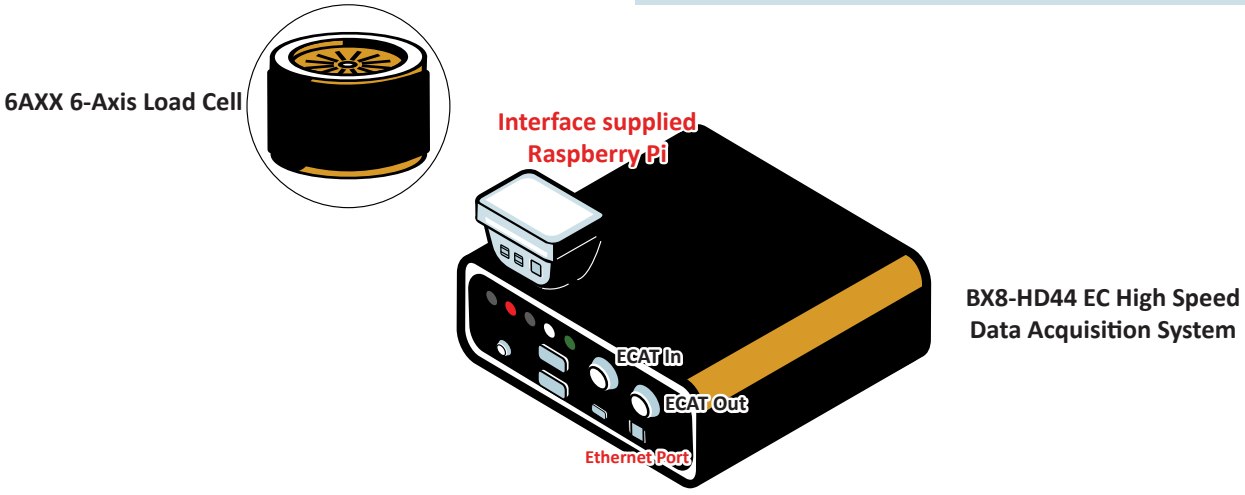
Interface's BX8-HD44-EC High Speed Data Acquisition Instrument with 6-Axis Load Cell and the integrated Raspberry Pi was able to take needed measurements and communicate them through EtherCAT protocol. In addition to this, the Raspberry Pi Ethernet solution was able to work successfully with the customers equipment and provide the setup solution they were looking for.

Materials

- BX8-HD44-EC High Speed Data Acquisition System with integrated EtherCAT protocol which comes standard with the BlueDAQ setup, logging and graphing software
- 6AXX 6-Axis Load Cell
- Interface Supplied Raspberry Pi with custom software
- Customers equipment

How It Works

1. The 6AXX 6-Axis Load Cell is installed into customers application.
2. The BX8-HD44-EC High Speed Data Acquisition Instrument with Raspberry Pi is connected to the customer's PC, EtherCAT Network and Ethernet Network.
3. Using software for both the BX8-HD44-EC and for the Raspberry Pi, customer successfully uses equipment to setup equipment, log and graph data as captured from the 6-Axis Load Cell System.



Aircraft Screwdriver Fastening Control

Torque Transducer

Industry: Test and Measurement

Summary

Customer Challenge

An airplane manufacturer needs a solution where they can control the torque when fastening screws on their airplane models. They do not want to create any damage to materials, or apply too much torque when plane components are being fastened together.

Interface Solution

Interface's Model T15 Hex Drive Rotary Torque Transducer can be attached to the fastening work bench, measuring and recording torque, rotational speed, and angle of the screwdriver. The LWCF Clamping Force Load Cell is installed, measuring the forces applied on the screw being fastened. Results are sent to the SI-USB4 4-channel USB Interface Module, which is connected to the customer's PC or laptop where data is logged, graphed, and displayed.

Results

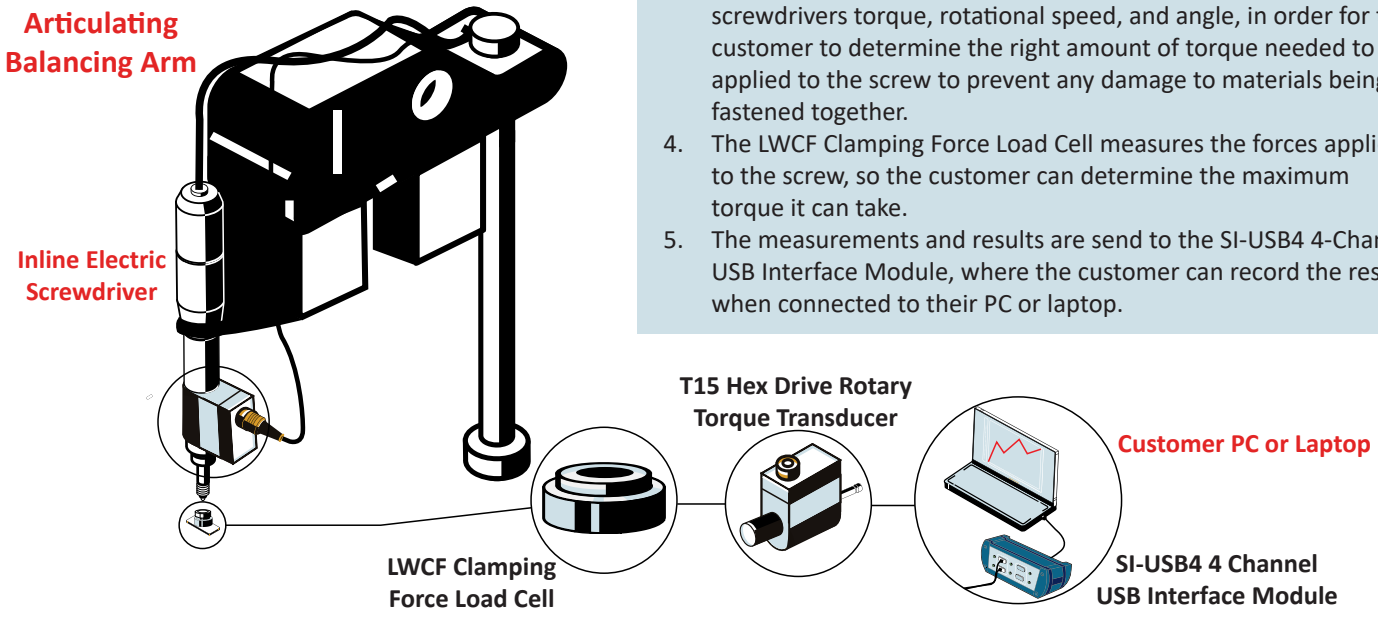
The airplane manufacturer was able to calibrate their screwdriver by measuring its torque, rotational speed, and angle, when attaching materials together for their airplane. They were also able to measure the forces being applied to the screw, to ensure it was not applying too much torque to the components.

Materials

- T15 Hex Drive Rotary Torque Transducer
- LWCF Clamping Force Load Cell
- SI-USB4 4-channel USB Interface Module
- Customer PC or Laptop

How It Works

1. The T15 Hex Drive Rotary Torque Transducer is attached to the screwdriver fastening bench.
2. The LWCF Clamping Force Load Cell is placed beneath the bolt head.
3. The T15 Hex Drive Rotary Torque Transducer measures the screwdrivers torque, rotational speed, and angle, in order for the customer to determine the right amount of torque needed to be applied to the screw to prevent any damage to materials being fastened together.
4. The LWCF Clamping Force Load Cell measures the forces applied to the screw, so the customer can determine the maximum torque it can take.
5. The measurements and results are send to the SI-USB4 4-Channel USB Interface Module, where the customer can record the results when connected to their PC or laptop.



Bolt Fastening Force and Torque

Load Washer and Torque Transducer

Industry: Test and Measurement, Industrial Automation

Summary

Customer Challenge

An Aerospace Company was working on a test plan that involved taking torque & compression measurements on fasteners with varying joint materials. The system required both high and low sampling rates, in addition to the capability of precisely measuring force and torque simultaneously. They required reliable accuracy and long-term stability. The test plan intended to provide verification of required force and torque specifications for fasteners, to ensure safety without compromising installation.

Interface Solution

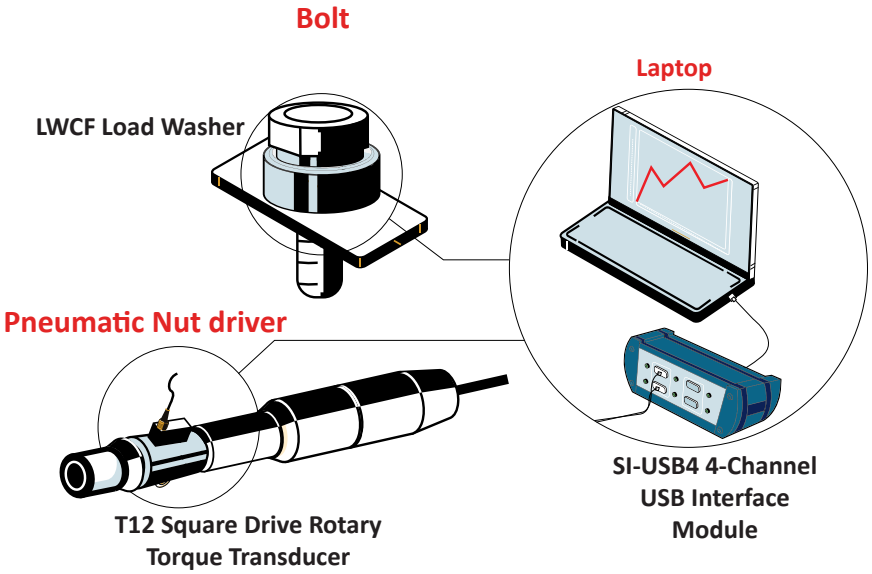
Using a Model LW or LWCF Load Washer in conjunction with a Model T12 Square Drive Rotary Torque Transducer, the customer was able to align force and torque measurements to desired levels. This was accomplished by combining the sensors with the high sample rate of the data logging and graphing capabilities of the SI-USB4 4-Channel USB Interface Module , capturing real-time force and torque levels for examination.

Results

The fasteners were tightened to the specified force and torque requirements and were safely installed without impairment to themselves or the joint material. The customer was able to measure the rapid event effectively and accurately.

Materials

- Model LW or LWCF Load Washer
- Rotary Torque Model T12
- SI-USB4 4-Channel USB Interface Module



How It Works

1. Interface's Model LW or LWCF Load Washer is installed between the bolt head and nut. The load washer will measure the load as torque is applied to the nut.
2. A Model T12 Square Drive Rotary Torque Transducer is installed in-line with the electric nut runner to measure applied torque within assembly.
3. Real time observation of the applied force and torque is provided by mating LW or LWCF Load Washer and Rotary Torque Transducer in parallel with SI-USB4 4-Channel USB Interface Module.
4. Accompanying software of Instrumentation enables customer logging and graphing of data. Excel compatible file then allows for further manipulation and analysis of this data.
5. Ultimately, the LW or LWCF Load Washer, Rotary Torque Transducer, and SI-USB4 Data Logging Instrumentation configuration offers End-user capability to accurately monitor applied load and rotational torque of tightened fasteners.

Garbage Truck On-Board Weighing

Load Cells

Industry: Test and Measurement

Summary

Customer Challenge

A garbage disposal company wants to test the load capacity of their garbage truck bins. They need a force measurement system that will show them when it has reached maximum capacity.

Interface Solution

Interface's solution is to customize four SSB Sealed Beam Load Cells under the garbage box body with customer required capacity installed on either side by the customer with truck manufacturers guidance. This insures they are following the transportation department's safety requirement and the manufacturer's. When trash continues to be piled inside the box body, it will push more force down onto the SSB Sealed Beam Load Cells. When maximum load capacity has been reached, the results can be reviewed and displayed when connected to the 4850 Battery Powered Bluetooth Weight Indicator in real time.

Results

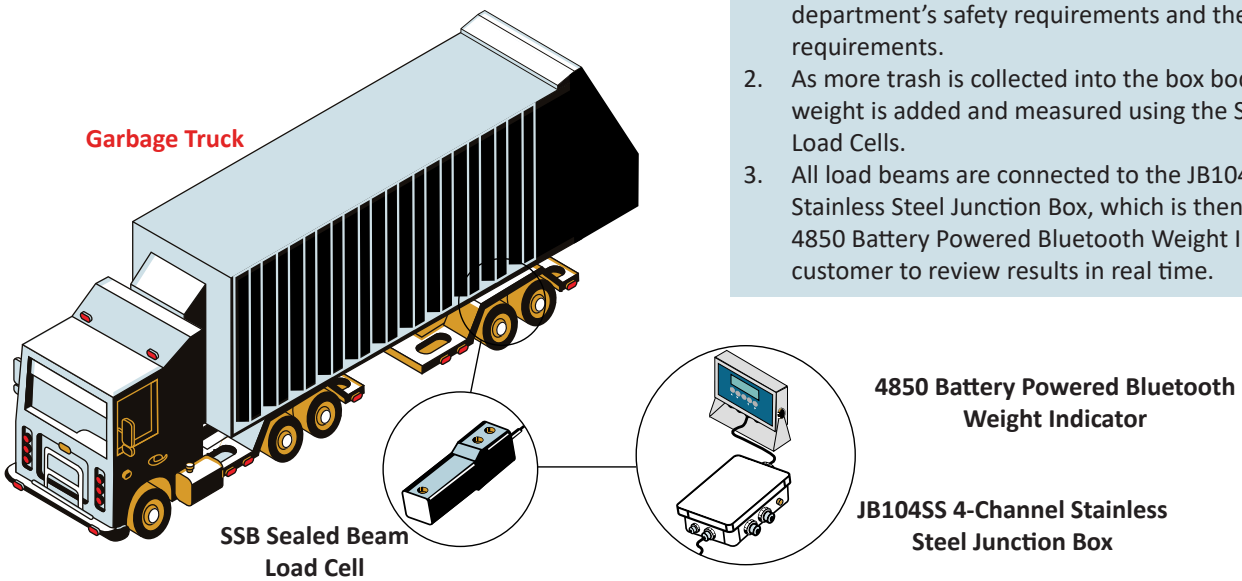
The customer was able to test the maximum load capacity of the garbage bin attached to the truck, so they know when to empty the truck's garbage at the transfer station.

Materials

- Four SSB Sealed Beam Load Cells
- JB104SS 4-Channel Stainless Steel Junction Box
- 4850 Battery Powered Bluetooth Weight Indicator

How It Works

1. The SSB Sealed Beam Load Cells are installed by the customer with their truck manufacturer's guidance to under the truck's garbage box body, on opposite sides. This insures they are following the transportation department's safety requirements and their manufacturer's requirements.
2. As more trash is collected into the box body, more force weight is added and measured using the SSB Sealed Beam Load Cells.
3. All load beams are connected to the JB104SS 4-Channel Stainless Steel Junction Box, which is then connected to the 4850 Battery Powered Bluetooth Weight Indicator for the customer to review results in real time.



Linear Test Stand
Load Cell

Industry: Test and Measurement

Summary

Customer Challenge

Customer would like to crush test a specimen in their linear stand. The customer would like to use force to determine when the deformation actually occurs.

Interface Solution

Interface provided Model 1210 Precision LowProfile® Load Cell with internal amplification of 0-10VDC Output.

Results

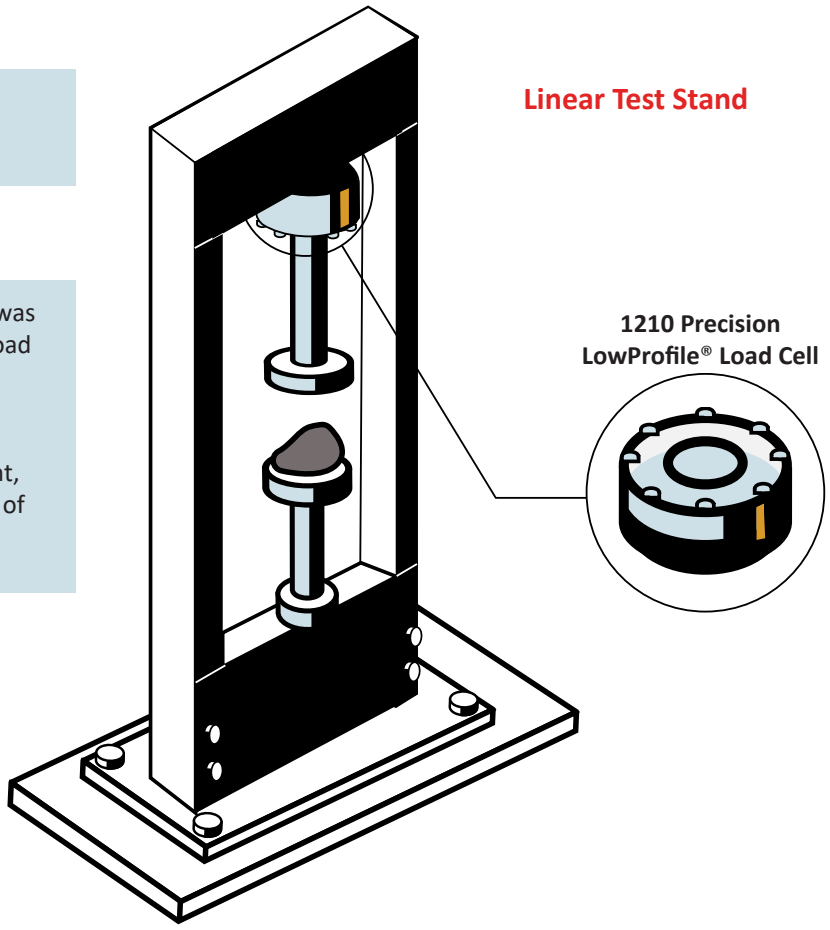
Amplified Model 1210 Precision LowProfile® Load Cell was installed into the load string of the customer's load frame and the scaled analog output from the load cell was connected to the customer's instrumentation. When the force levels reached the crushing point, the customer's software was able to read the output of the amplified load cell and record the value.

Materials

- 1210 Precision LowProfile® Load Cell
- Customer supplied linear test stand
- Customer's instrumentation

How It Works

1. Amplified 1210 Precision LowProfile® Load Cell was installed into the load string of the customer's load frame.
2. Scaled analog output from the load cell was connected to the customer's instrumentation.
3. When the force levels reached the crushing point, the customer's software was to read the output of the amplified load cell.
4. Customer's instrumentation recorded the value.



Material Tensile Testing
Load Cell

Industry: Test and Measurement

Summary

Customer Challenge

A customer wants to conduct a tensile force test on different samples and materials until failure. Materials include plastic, steel, or woven fabric. They want to measure tensile strength, yield strength, and yield stress.

Interface Solution

Interface's 1200 Standard Precision LowProfile™ Load Cell is installed into the customer's test frame. The tensile test is conducted, and force results captured by the load cell and extensometer are synced through the SI-USB4 4 Channel USB Interface Module. These results can be displayed on the customer's PC with supplied software.

Results

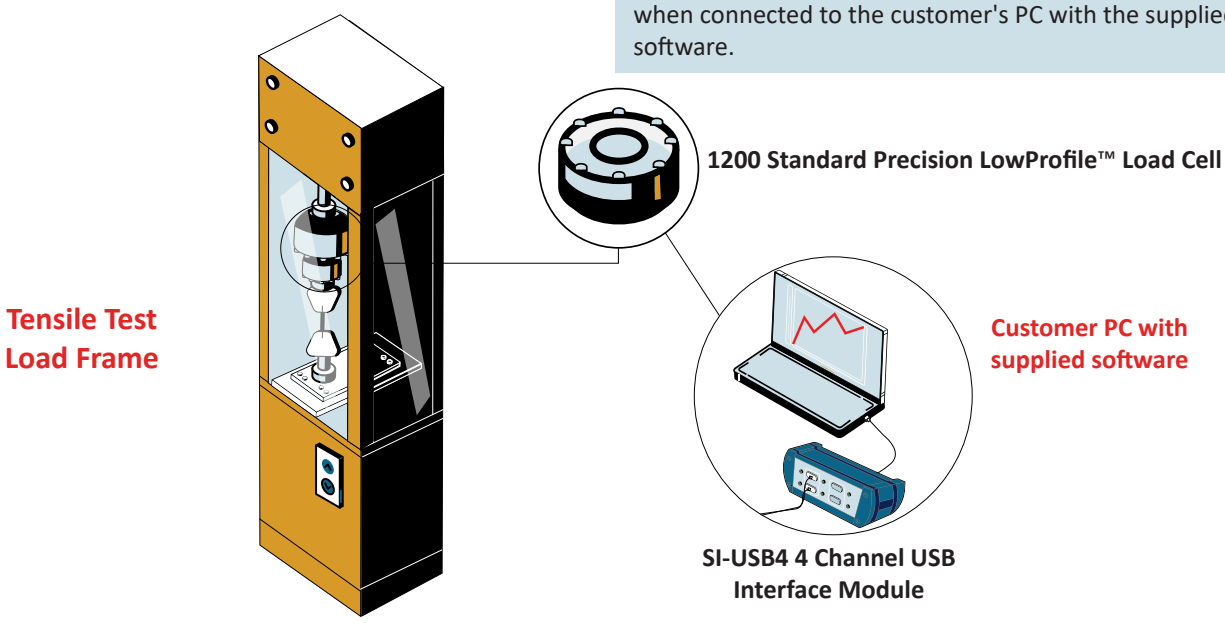
With Interface's force products, the customer was able to determine the tensile strength, yield strength, and yield stress of a variety of different materials.

Materials

- 1200 Standard Precision LowProfile™ Load Cell
- SI-USB4 4 Channel USB Interface Module with supplied software
- Extensometer (optional)
- Grips
- Customer tensile test load frame
- Customer PC or Laptop

How It Works

1. The 1200 Standard Precision LowProfile™ Load Cell is installed into the customer's tensile test load frame.
2. Different samples are tested and the force data is collected. The SI-USB4 has two, three, and four channels, so data from the extensometer can also be captured and synced together.
3. The data collection is captured by the SI-USB4 4 Channel USB Interface Module, and can be displayed when connected to the customer's PC with the supplied software.



Mobile Force System
Wireless Telemetry System

Industry: Test and Measurement

Summary

Customer Challenge

A customer wants a mobile measurement system that can perform force tests. They need a customizable portable system that can both withstand extreme temperatures and rough environments. They also need a system that has a rechargeable battery included.

Interface Solution

Interface's solution is to create a portable case with multiple WTS 1200 Standard Precision LowProfile™ Wireless Load Cells, 9812-WTS Wireless Panel Mount Display for Single Transmitters, and the WTS-BS-3E Wireless Base Station. This can connect to the tablet computer to view results. Multiple WTS-ANTE Telemetry Antennas can also extend wireless range. An inverter and rechargeable battery is also installed at the bottom of the foam case so the customer can charge on the go, using a wall outlet or vehicle power outlet.

Results

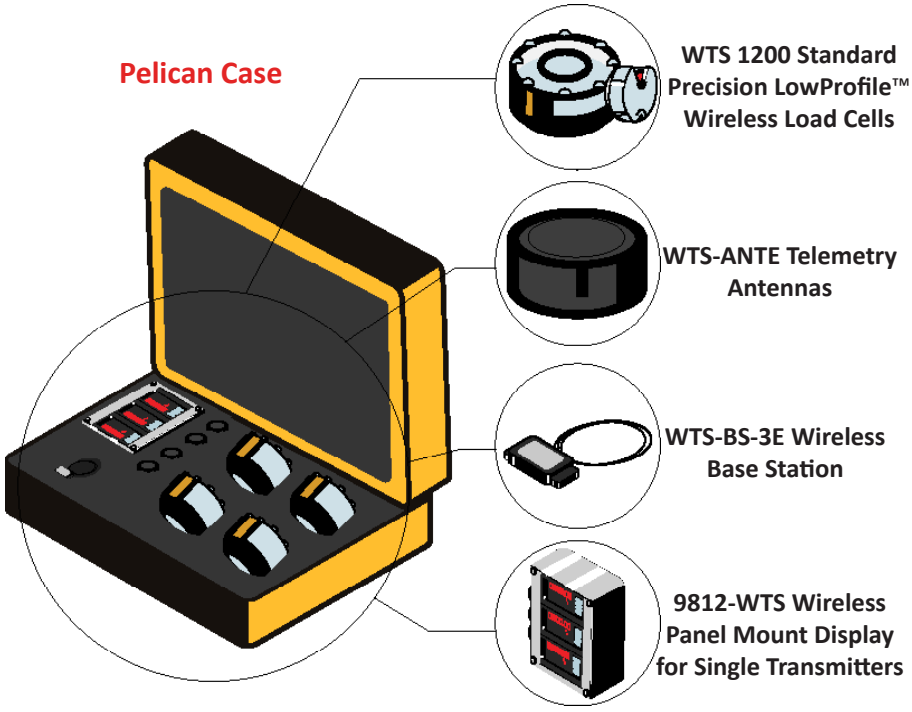
The customer was able to easily perform multiple force tests wirelessly in multiple different environments with Interface's customizable mobile portable system.

Materials

- WTS 1200 Standard Precision LowProfile™ Wireless Load Cells
- WTS-BS-3E Wireless Base Station
- 9812-WTS Wireless Panel Mount Display for Single Transmitters
- WTS-ANTE Telemetry Antennas
- Windows Based Tablet-Computer
- Custom made Pelican case with inverter and rechargeable battery pack

How It Works

1. The WTS 1200 Standard Precision LowProfile™ Wireless Load Cells and the 9812-WTS Wireless Panel Mount Display for Single Transmitters are installed safely in the custom made mobile case.
2. When ready for transport, the load cells can be removed and attached to perform force tests.
3. When all force measurements have been recorded, all load cells and instrumentation can be returned back into it's casing for further transport.



Peel Testing
Load Cell

Industry: Test and Measurement

Summary

Customer Challenge

A peel test measures the properties and strength of an adhesive bond. Peel tests involve applying a tensile force to a flexible substrate that is bound by an adhesive to either another flexible substrate. This can be tape, thin film, or rubber, or a rigid substrate such as metal, or rigid plastic. A force measurement system is required for the peel test.

Interface Solution

Interface's 1200 Standard Precision LowProfile™ Load Cell is installed into the peel test frame. The peel test is conducted, and force results captured by the load cell are sent and synced using the SI-USB4 4 Channel USB Interface Module. These results can be displayed on the customer's PC with supplied software.

Results

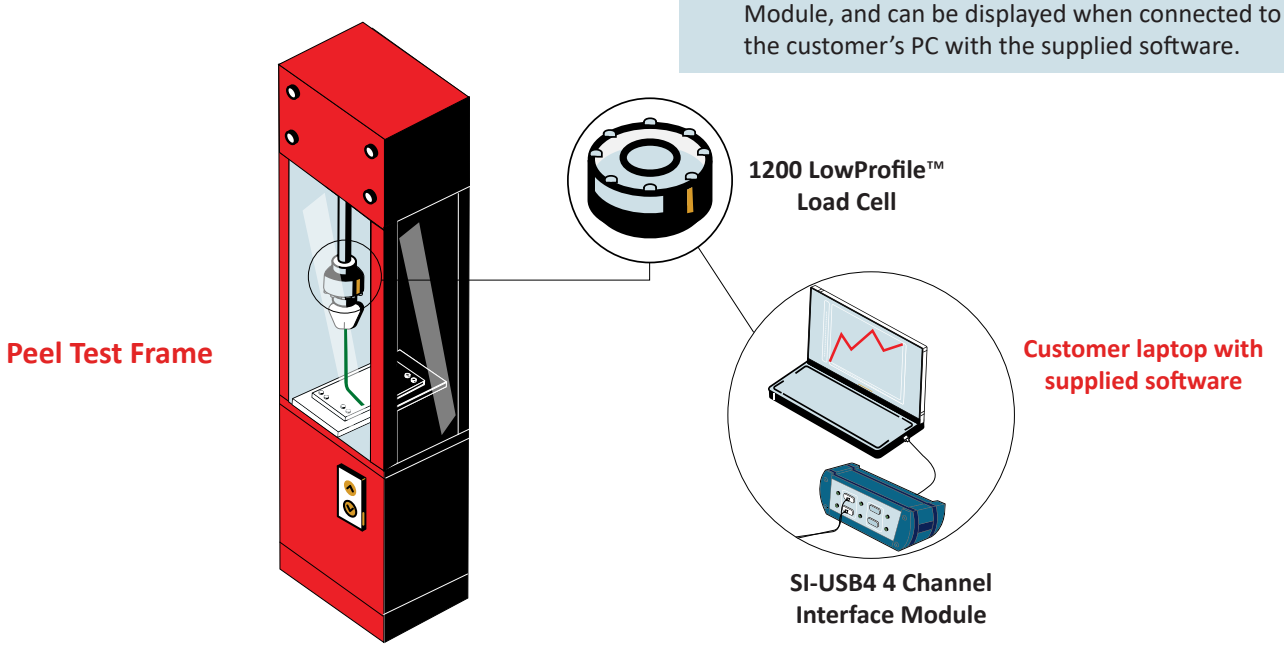
The peel test was properly conducted using Interface's low profile load cells. The customer was able to determine the strength of the adhesive bond being tested.

Materials

- 1200 Standard Precision LowProfile™ Load Cell
- SI-USB4 4 Channel USB Interface Module with supplied software
- Peel test frame
- Customer laptop

How It Works

1. The 1200 Standard Precision LowProfile™ Load Cell is installed into the customer's peel test frame.
2. The adhesive bond is applied to a substrate. The peel test is conducted.
3. The amount of force used during the peel test is captured by the SI-USB4 4 Channel USB Interface Module, and can be displayed when connected to the customer's PC with the supplied software.



PROVING THEORETICAL CUTTING FORCES OF ROTARY ULTRASONIC MACHINING

Multi-Axis

Industry: Test and Measurement

Summary

Customer Challenge

Rotary ultrasonic machining is a hybrid process that combines diamond grinding with ultrasonic machining to provide fast, high-quality drilling of many ceramic and glass applications. This new method has been theoretically proven using computer models. Rotary ultrasonic machining generates forces of a very small magnitude. To prove this theory, any load cell used for measurement must be sensitive, while at the same time retaining high structural stiffness within a compact, low-profile envelope.

Interface Solution

Interface's 3A120 3-Axis load cell is installed in the rotary ultrasonic machine to measure the forces being applied to a sample part. With clear signals and minimal crosstalk, the applied forces are recorded and stored using an the BSC4D Multi-Channel PC Interface Module.

Results

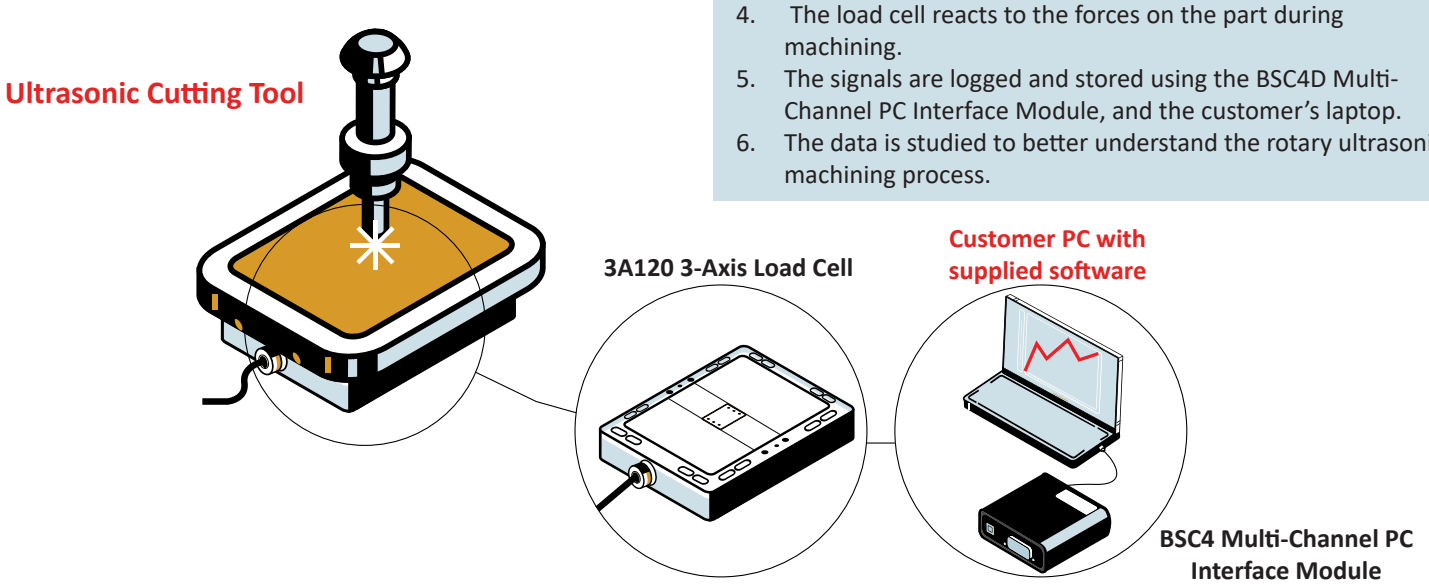
The 3-Axis load cell provides excellent data helping uncover the relationship between machine cutting parameters and the forces applied on the component. Using this knowledge the machining process can be reliably optimized for new materials and operations.

Materials

- 3A120 3-Axis Load Cell
- BSC4D Multi-Channel PC Interface Module
- Appropriate Cabling

How It Works

1. A 3A120 3-Axis load cell is installed on the cross slide of the machine.
2. The test material is fixed to the load ell.
3. The load machine runs its program on the part.
4. The load cell reacts to the forces on the part during machining.
5. The signals are logged and stored using the BSC4D Multi-Channel PC Interface Module, and the customer's laptop.
6. The data is studied to better understand the rotary ultrasonic machining process.



Sanding Machine Force Monitoring

Multi-Axis

Industry: Test and Measurement

Summary

Customer Challenge

A machining company that sells large sanding machines needs a force system to measure the z-axis of their machines. They want to measure the pressure feedback of their sanding machines, while maintaining the set amount of force as well. A force monitoring system is required to ensure their sanding machines are performing effectively.

Interface Solution

Interface's solution is to install the 3AXX 3-Axis Force Load Cell in between the sanding block and the sanding machine's head. Alongside Interface's BSC4A Multi-Channel Bridge Amplifier in conjunction with the customer's controls, the forces implemented on the 3-Axis load cell will be recorded for monitoring purposes.

Results

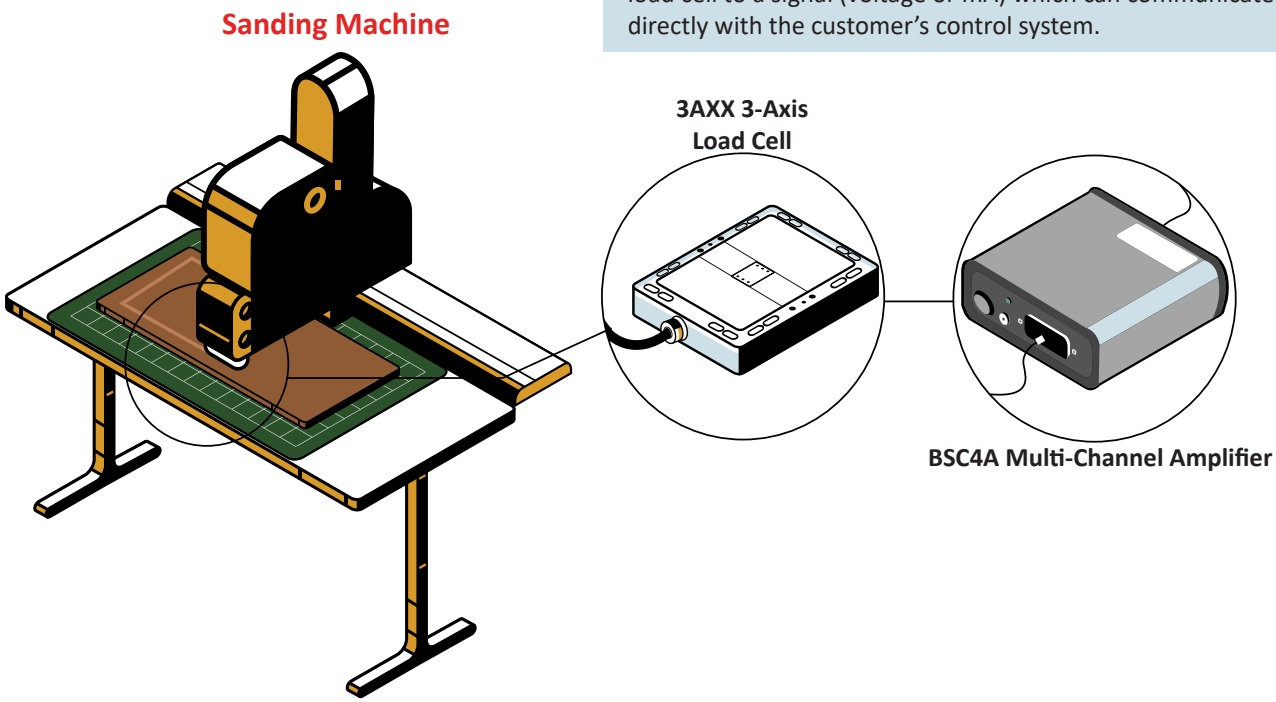
The customer's sanding machine was successfully able to monitor and maintain the pressure forces on their sanding machine with Interface's multi axis load cell.

Materials

- 3AXX 3-Axis Force Load Cell
- BSC4A Multi-Channel Bridge Amplifier
- Customer's controls
- Customer's sanding machine being tested

How It Works

1. The 3AXX 3-Axis Load Cell is installed between the sanding machine's sanding block and the head of the machine that will be putting pressure on the material being sanded.
2. When connected to the BSC4A Multi-Channel Bridge Amplifier, it will convert the mv/V signal from the 3-Axis load cell to a signal (voltage or mA) which can communicate directly with the customer's control system.



Spring Compression Testing
Multi-Axis

Industry: Test and Measurement

Summary

Customer Challenge

A customer wants to test the performance of their springs, but also the functionality of their spring test stand with a wireless solution.

Interface Solution

Interface suggests using one of their 5200XYZ 3-Axis Force Moment Load Cell,and installing it into the customer's spring compression frame. The 5200XYZ 3-Axis Force Moment Load Cell will measure the force compression of the spring, connect to multiple WTS-AM-1E Wireless Strain Bridge Transmitter Modules, which will display the information wirelessly to the 9812-WTS-AL4-3, and also triggers an alarm if needed.

Results

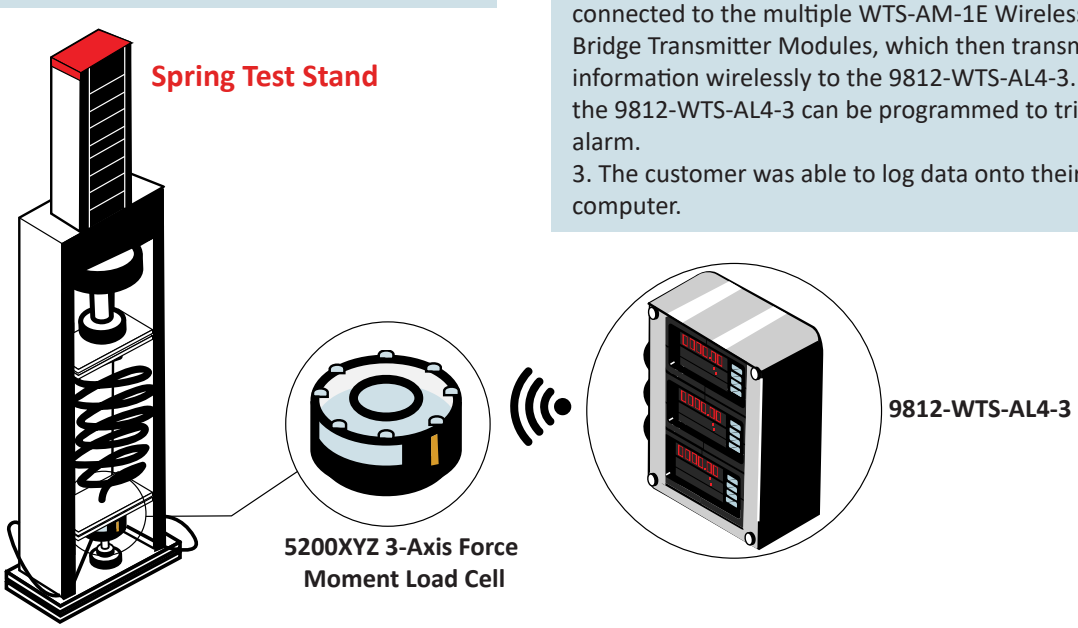
The customer was able to wirelessly get compression results on the spring being tested. They were also able to verify their spring compression test stand was working effectively.

Materials

- 5200XYZ 3-Axis Force Moment Load Cell
- WTS-AM-1E Wireless Strain Bridge Transmitter Module
- 9812-WTS-AL4-3
- Customer Spring Test Stand
- Customer PC or Laptop

How It Works

1. The 5200XYZ 3-Axis Force Moment Load cell is installed into the customer's spring compression frame, under the spring itself, containing 3 total outputs.
2. The spring was compressed, and force measurements read by the 5200XYZ 3-Axis Force Moment Load Cell is connected to the multiple WTS-AM-1E Wireless Strain Bridge Transmitter Modules, which then transmits output information wirelessly to the 9812-WTS-AL4-3. If needed, the 9812-WTS-AL4-3 can be programmed to trigger an alarm.
3. The customer was able to log data onto their PC computer.



Tank Weighing and Center of Gravity

Load Cell

Industry: Test and Measurement, Industrial Automation

Summary

Customer Challenge

A customer needs to monitor the amount of material in a tank by weight and locate the center of gravity.

Interface Solution

Using Interface's A4200 Zinc Plated or A4600 Stainless Steel Weigh-check Load Cells, along with Interface Instrumentation, Interface provided a solution that monitors the amount of material by weight in their tank while locating the Center of Gravity.

Results

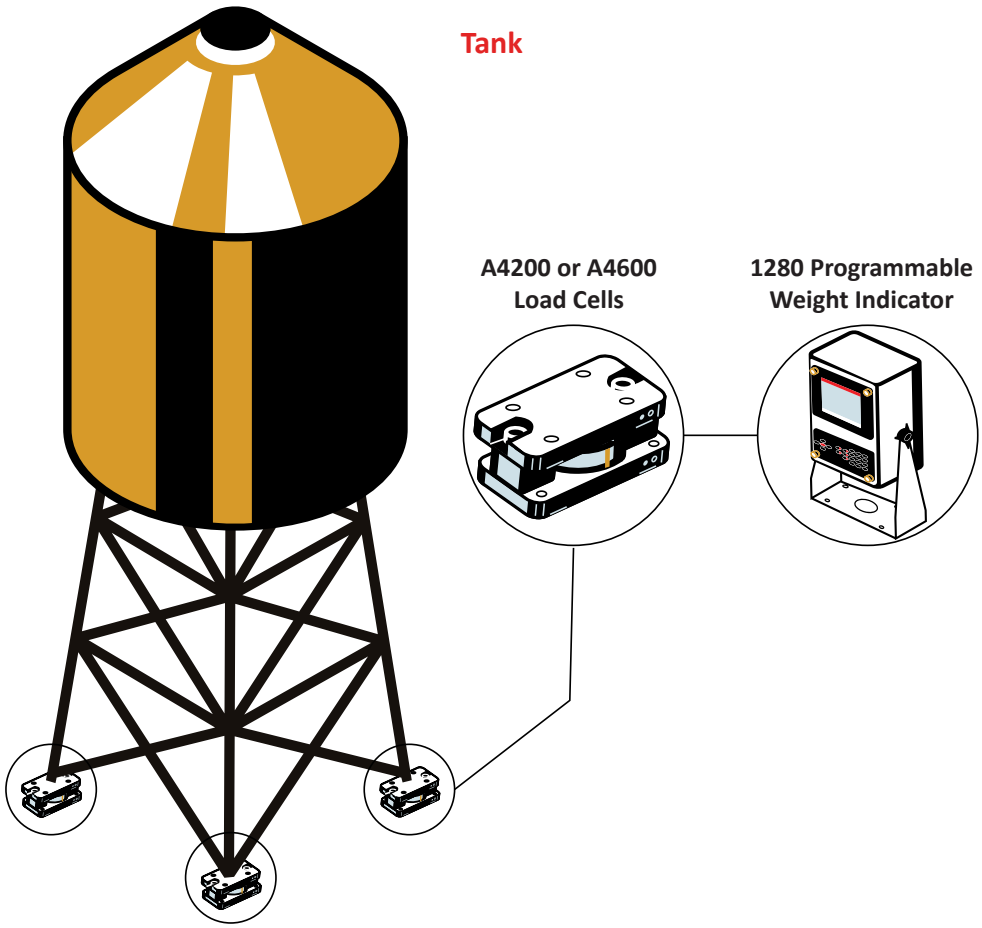
Tank weights are monitored so refilling, dispensing or emptying takes place safely while monitoring center of gravity.

Materials

- A4200 Zinc Plated or Model A4600 Stainless Steel Weigh-check Load Cells
- 1280 Programmable Weight Indicator and Controller
- Setup & Scaling of Load Cells Instrument by Interface

How It Works

1. A4200 or A4600 Weigh-check Load Cell is installed between the support arm of tank and support pedestal of tank. The Weigh-check Load Cell will measure the load as material is loaded into or unloaded out of the tank.
2. 1280 Programmable Weight Indicator and Controller will use weight measurements and display the weight for each leg and corresponding total weight.
3. 1280 Programmable Weight Indicator and Controller will use weight measurements in conjunction with programmed formula to calculate the relevant Center of Gravity.



Tensile Testing for 3D Materials

Load Cell

Industry: Test and Measurement

Summary

Customer Challenge

A customer wants to conduct a tensile force test on different 3D printing materials until failure. These different 3D printing materials being tested included PLA, PETG and ASA to see how it performed. The customer wanted to test the materials quality, strength, ductility, and stiffness.

Interface Solution

Interface's 1200 Standard Precision LowProfile™ Load Cell is installed into the customer's test frame. The tensile test is conducted, and force results captured by the load cell are synced through the INF-USB3 Universal Serial Bus Single Channel PC Interface Module. These results can be displayed on the customer's PC with supplied software.

Results

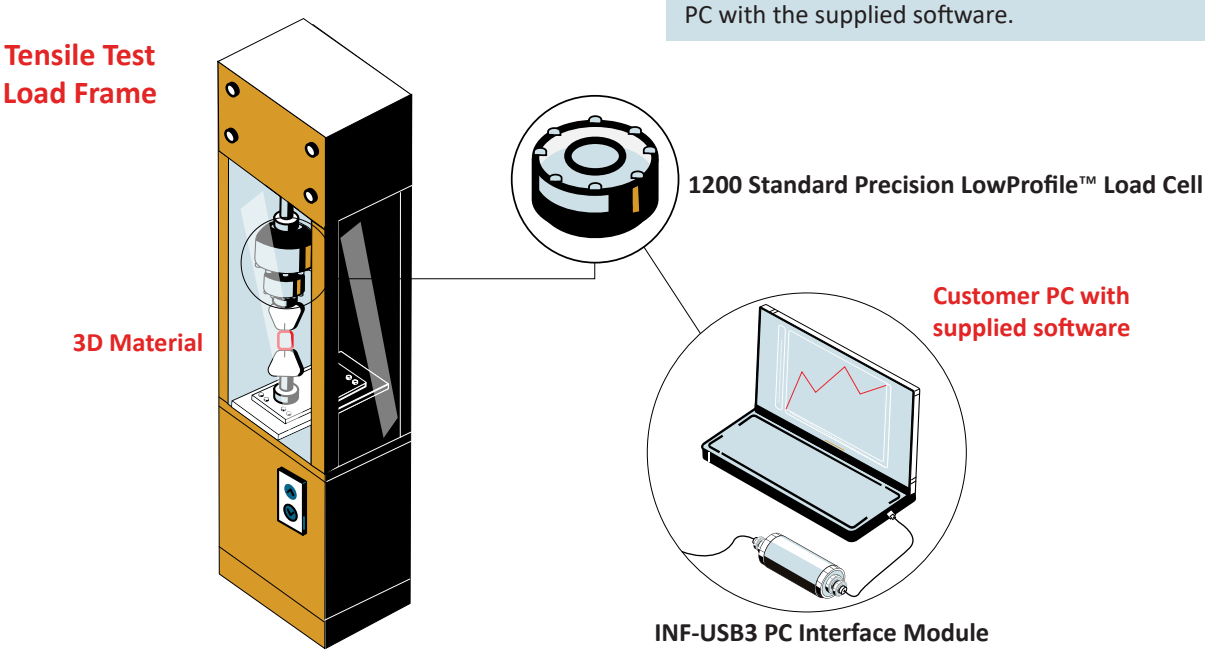
With Interface's force products, the customer was able to determine and test the different categories for each type of 3D printing materials.

Materials

- 1200 Standard Precision LowProfile™ Load Cell
- INF-USB3 Universal Serial Bus Single Channel PC Interface Module with supplied software
- Grips
- Customer tensile test load frame
- Customer PC or Laptop

How It Works

1. The 1200 Standard Precision LowProfile™ Load Cell is installed into the customer's tensile test load frame.
2. Different 3D material samples are tested and the force data is collected.
3. The data collection is captured by the INF-USB3 Universal Serial Bus Single Channel PC Interface Module, and can be displayed when connected to the customer's PC with the supplied software.



Torque Verification
Torque Transducer

Industry: Test and Measurement, Automotive and Vehicle

Summary

Customer Challenge

Customer wants to perform regular torque testing on his ratchet-type torque wrench while recording these values for future examination.

Interface Solution

Interface supplied TS15 Female Square Drive to Flange Style Reaction Torque Transducer with Model INF-USB3 PC Interface Module for the customer to use.

Results

Customer was able to easily insert their ratchet-type torque wrench into the TS15 Square Drive, perform their calibration checks and view the results while logging them to their PC Computer.

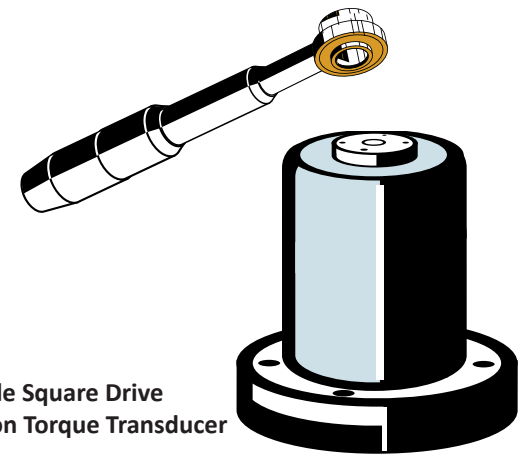
Materials

- TS15 Female Square Drive to Flange Style Reaction Torque Transducer
- INF-USB3 Universal Serial Bus Single Channel PC Interface Module with included configuration, display, graphing and logging software
- Customer supplied ratchet-type wrench

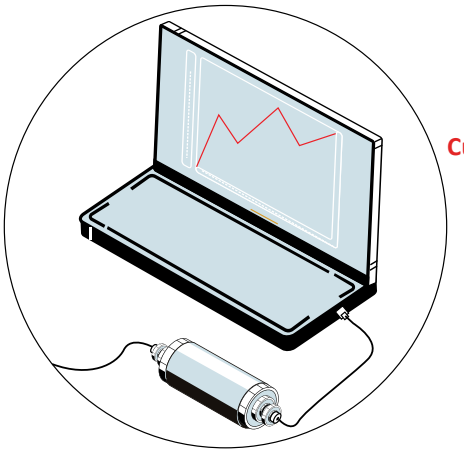
How It Works

1. Customer mounted the TS15 Female Square Drive to Flange Style Reaction Torque Transducer to work bench through flange.
2. Customer inserted the ratchet-type torque transducer into the TS15 Female Square Drive to Flange Style Reaction Torque Transducer.
3. Customer performs calibration checks and views the results while logging them to the PC Computer using the INF-USB3 Universal Serial Bus Single Channel PC Interface Module.

Ratchet-Type Wrench



TS15 Female Square Drive to Flange Reaction Torque Transducer



Customer Laptop

INF-USB3 Universal Serial Bus Single Channel PC Interface Module

Waste Management Container Weighing

Load Cell

Industry: Test and Measurement, Infrastructure

Summary

Customer Challenge

A waste management company wants to measure the capacity of their waste containers in order to know when it is time to dispose the waste.

Interface Solution

Interface's Model WTS 1200 Standard Precision LowProfile™ Wireless Load Cells can be installed at the bottom of each waste container leg to measure the sum weight of the container. The data is transmitted to the WTS-BS-4 USB Industrial Base Station with the supplied Log100 software.

Results

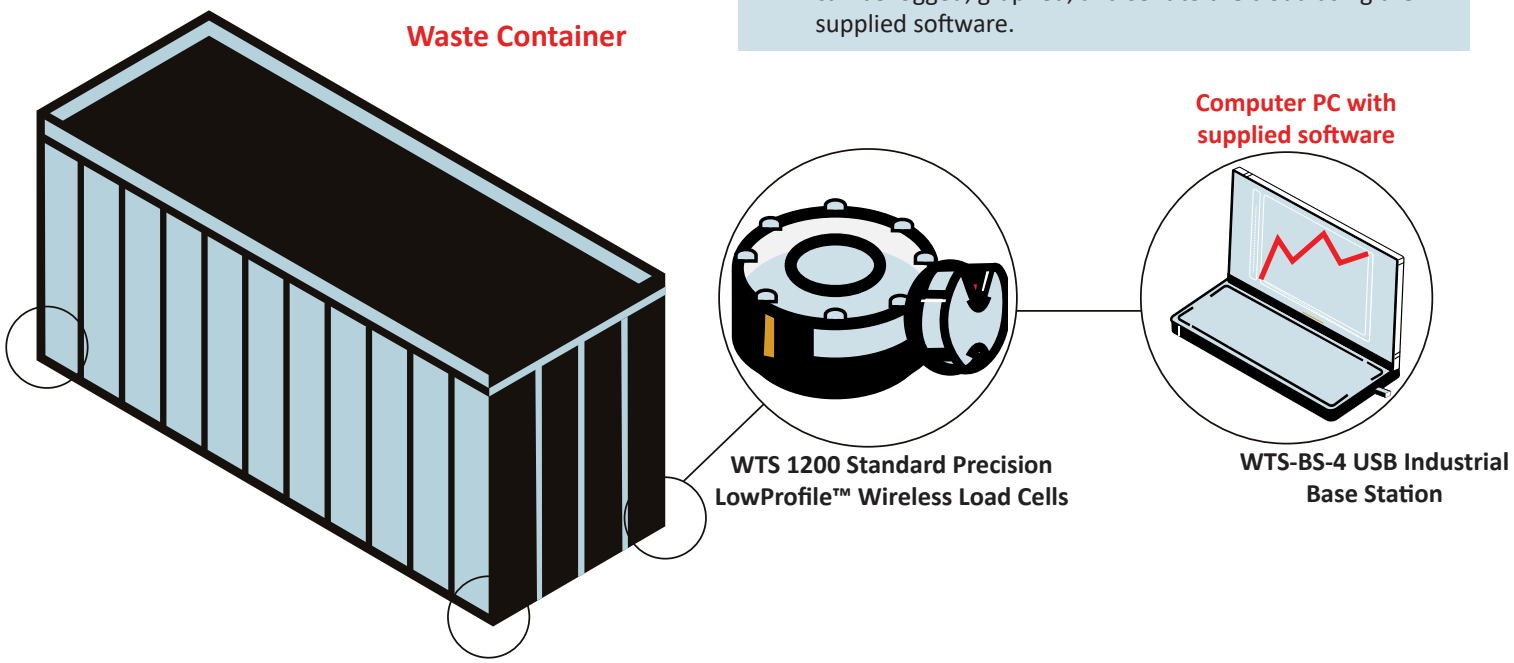
The customer was able to determine when their waste container was at full capacity in order to dispose of the waste, or to transfer it.

Materials

- Four WTS 1200 Standard Precision LowProfile™ Wireless Load Cells
- WTS Toolkit and Log100 Software
- WTS-BS-4 USB Industrial Base Station
- Computer PC or Laptop

How It Works

1. Four WTS 1200 Standard Precision LowProfile™ Wireless Load Cells are installed and mounted to the bottom of the waste container legs.
2. The load cells collect the force measurements and sum the total weight of the waste container. The data is transmitted to the customer's laptop through the WTS-BS-4 USB Industrial Base Station using the Log100 Software. Data can be logged, graphed, and sent to the cloud using the supplied software.



Verification Test Stand
Load Cell

Industry: Test and Measurement

Summary

Customer Challenge

Customer is looking for a way to verify if the load cell is in “good working order” for an upcoming test.

Interface Solution

Interface proposed a solution with the customer’s supplied verification load frame, Model 1210 Precision LowProfile® Load Cell, connected with Model SI-USB4 4-Channel USB Interface Module.

Results

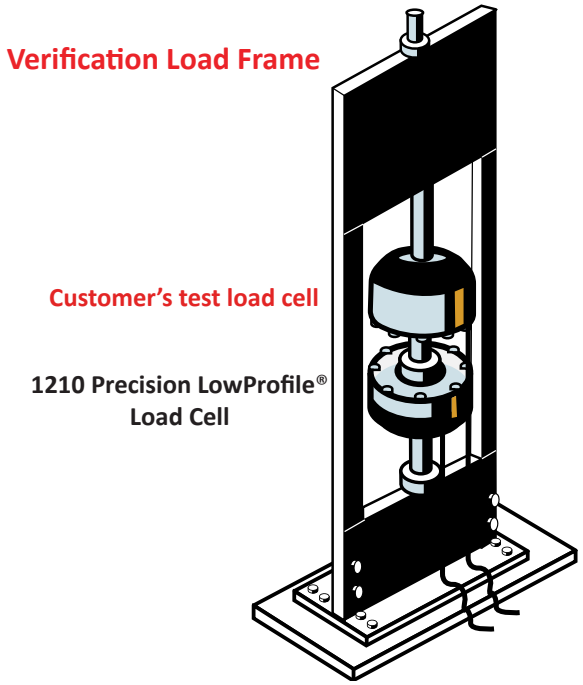
Customer installed their load cell and Model 1210 Precision LowProfile® Load cell into the verification load frame, and applied forces were displayed and recorded by Model SI-USB4 4-Channel USB Interface Module for review and record keeping on customer’s computer.

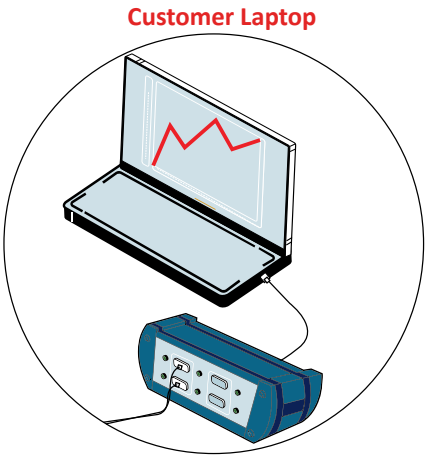
Materials

- 1210 Precision LowProfile® Load Cell
- SI-USB4 4-Channel USB Interface Module with included setup, logging, and graphing software
- Customer’s verification load frame
- Customer’s test load cell
- Customer’s supplied PC computer

How It Works

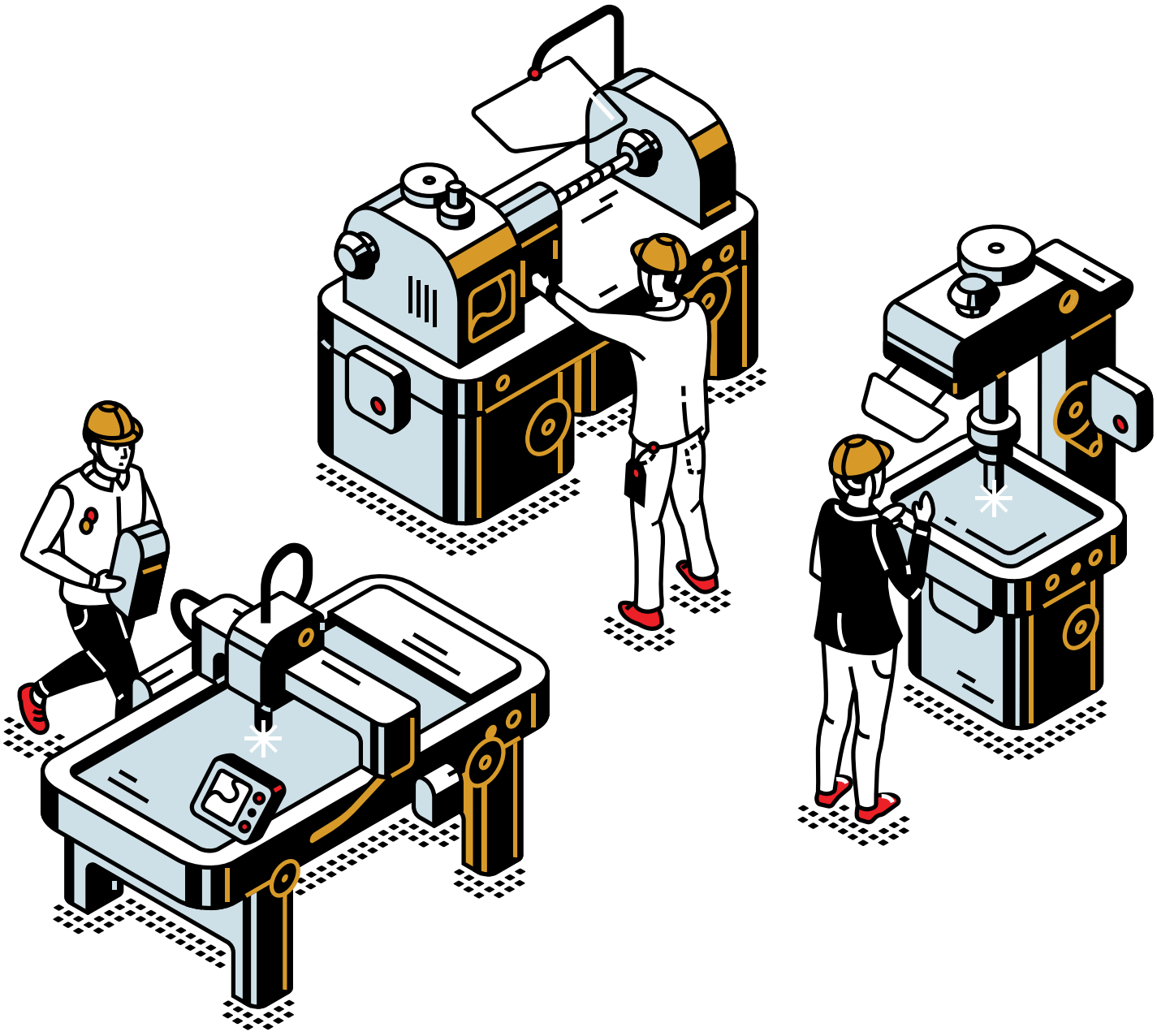
1. Customer installed their load cell to the customer’s verification load frame, connecting it to 1210 Precision LowProfile® Load Cell.
2. Customer applied the specific load by turning the manual actuator.
3. Applied forces were measured by the 1210 Precision LowProfile® Load Cell.
4. Results from the load cell under test and from the 1210 Precision LowProfile® Load cell were displayed and recorded by the SI-USB4 4-Channel USB Interface Module for review and record keeping on customer’s computer.





SI-USB4 4-Channel USB Interface Module

OEM



Electro-Hydraulic Actuator Force Test

Load Cell

Industry: OEM

Summary

Customer Challenge

A customer wants to monitor the forces applied on their electro-hydraulic actuators and conduct a quality test. Their actuators are usually in constrained environments, since their actuators suited for high force applications. For instance, hydraulic actuators installed on naval vessels.

Interface Solution

Interface suggests conducting a quality test using their 1200 High Capacity Standard Precision LowProfile™ Load Cell. The 1200 is installed in the test frame, where the electro-hydraulic cylinder's rod moves up and down when it is connected to a motor. The 1200 load cell measures the forces of the actuator in the load frame. Precise force results are captured using the 9840 Calibration Grade Multi-Channel Load Cell Indicator.

Results

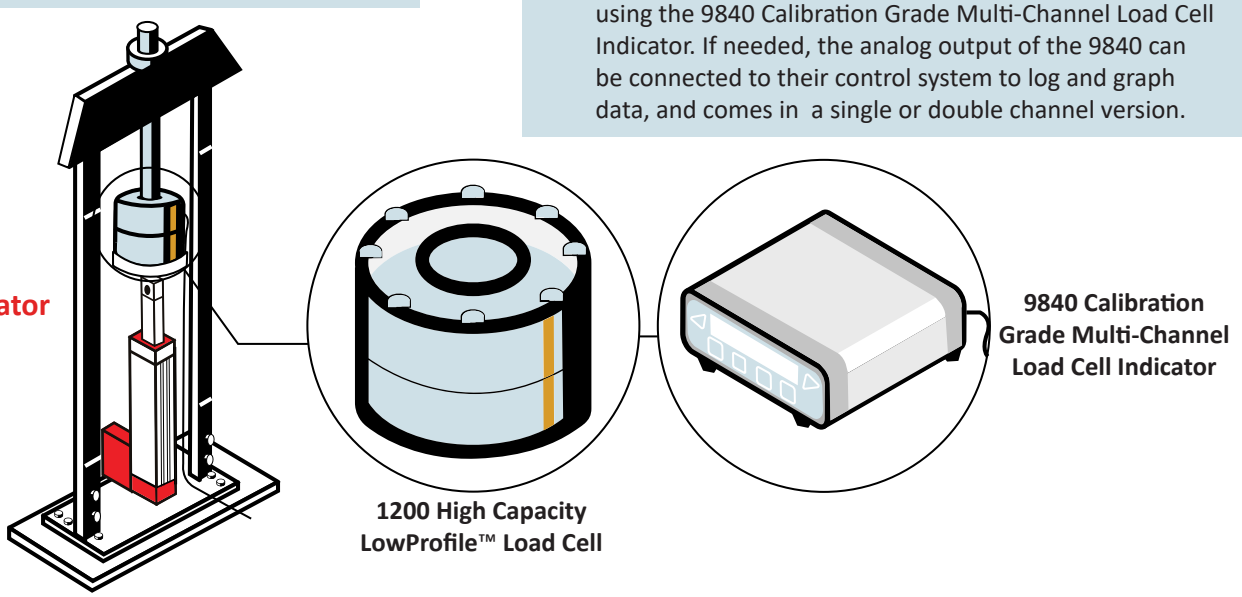
Interface's 1200 High Capacity Standard Precision LowProfile™ Load Cell successfully measured forces from the customer's electro-hydraulic actuator.

Materials

- 1200 High Capacity Standard Precision LowProfile™ Load Cell
- 9840 Calibration Grade Multi-Channel Load Cell Indicator
- Customer's electro-hydraulic actuator
- Customer's test frame

How It Works

1. The 1200 High Capacity Standard Precision LowProfile™ Load Cell is installed in the customer's test frame.
2. A motor is connected to the electro-hydraulic actuator, which sets off the internal hydraulic system in the actuator, thus moving the actuator rod up and down.
3. Force results are captured by the 1200 and displayed using the 9840 Calibration Grade Multi-Channel Load Cell Indicator. If needed, the analog output of the 9840 can be connected to their control system to log and graph data, and comes in a single or double channel version.



Pneumatic Actuator Seal Pressure Load Cell

Industry: OEM

Summary

Customer Challenge

A company wants to measure the contact pressure of their pneumatic actuator seals and its counterpart. Pneumatic actuators are essential in robotics and factory automation, especially when it is used in the applications such as motor controls. They want to ensure the pneumatic actuator's lip seal holds under different pressure loads.

Interface Solution

Interface suggests conducting a fatigue test using their 1200 Standard Precision LowProfile™ Load Cell. The 1200 is installed externally of the pneumatic actuator where different pressure loads are measured. The test is conducted until their pneumatic actuator is dismantled. Precise force results are captured using the 9840 Calibration Grade Multi-Channel Load Cell Indicator.

Results

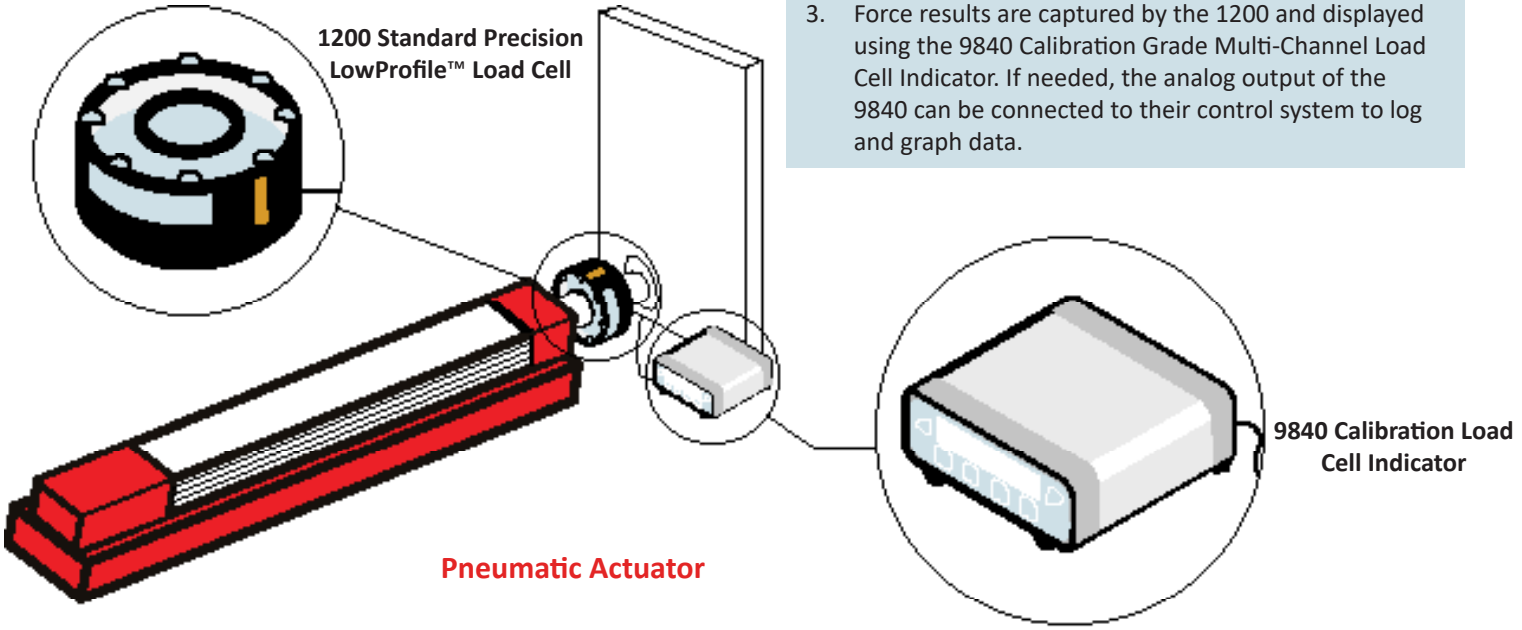
Interface's 1200 Standard Precision LowProfile™ Load Cell successfully measured the amount of force it took for the pneumatic actuator's seal to hold under different pressure loads.

Materials

- 1200 Standard Precision LowProfile™ Load Cell
- 9840 Calibration Grade Multi-Channel Load Cell Indicator
- Customer's pneumatic actuator
- Customer's static test rig

How It Works

1. The 1200 Standard Precision LowProfile™ Load Cell is installed to the external end of the piston on the pneumatic actuator.
2. A fatigue test is done on the actuator, where the different pressure loads are implemented.
3. Force results are captured by the 1200 and displayed using the 9840 Calibration Grade Multi-Channel Load Cell Indicator. If needed, the analog output of the 9840 can be connected to their control system to log and graph data.



PRV (Pressure Relief Valve) System Testing

Load Cell

Industry: OEM, Test and Measurement

Summary

Customer Challenge

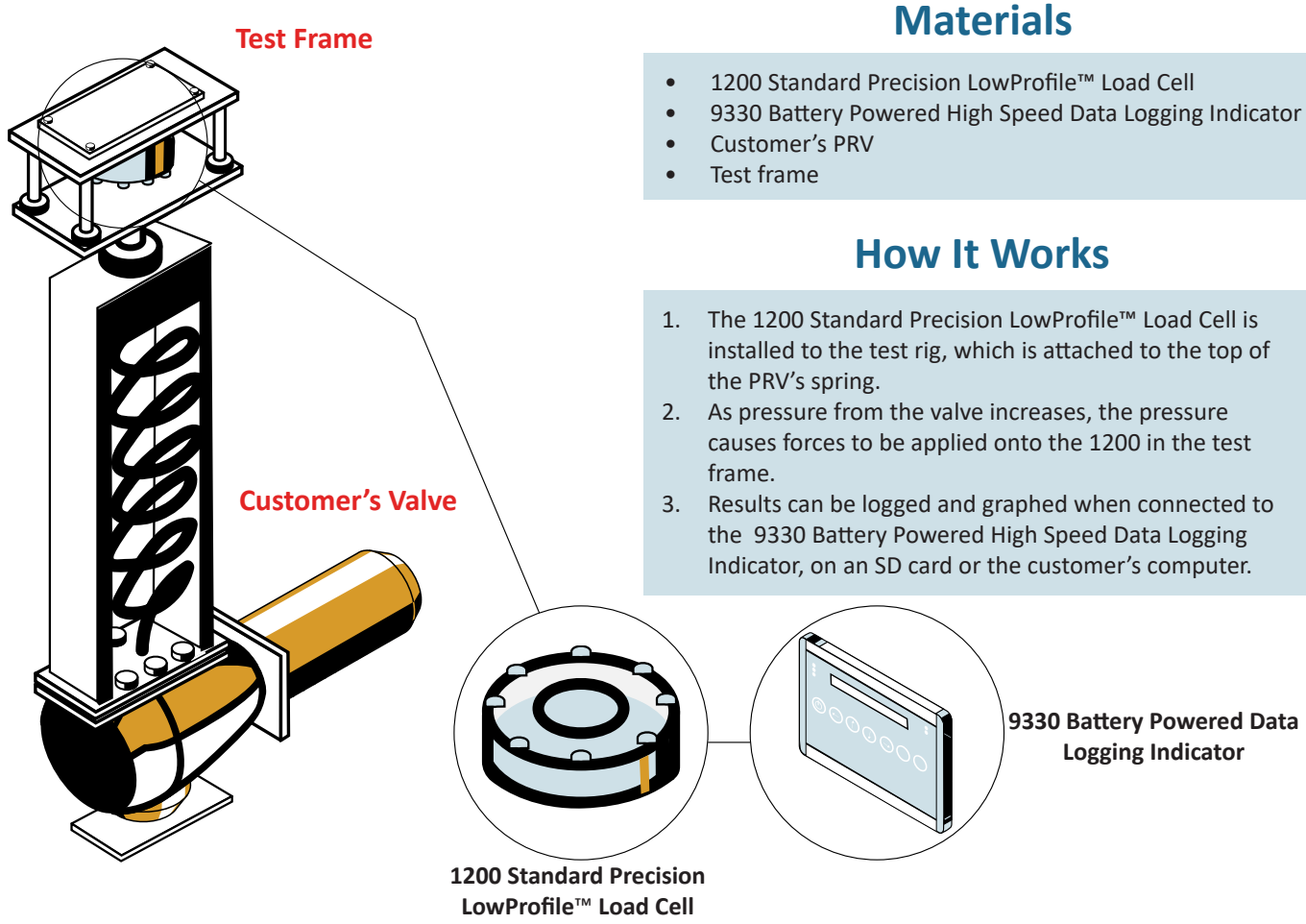
A manufacturer wants to conduct a PRV test, or pressure relief valve test, on their valve when under a full pressure load. This is to ensure safety and reliability for customers. They also wish to be able to record and graph the test results.

Interface Solution

Interface suggests installing their 1200 Standard Precision LowProfile™ Load Cell to a test frame on top of the pressure relief valve. As pressure is increased onto the spring in the valve, it pushes forces onto the load cell. Results can be recorded using the 9330 Battery Powered High Speed Data Logging Indicator

Results

The customer was able to successfully determined the exact amount of force it took for their valve to release when under a pressure load.



Materials

- 1200 Standard Precision LowProfile™ Load Cell
- 9330 Battery Powered High Speed Data Logging Indicator
- Customer's PRV
- Test frame

How It Works

1. The 1200 Standard Precision LowProfile™ Load Cell is installed to the test rig, which is attached to the top of the PRV's spring.
2. As pressure from the valve increases, the pressure causes forces to be applied onto the 1200 in the test frame.
3. Results can be logged and graphed when connected to the 9330 Battery Powered High Speed Data Logging Indicator, on an SD card or the customer's computer.

Robotic Surgery Force
Interface Mini™

Industry: OEM, Medical and Healthcare

Summary

Customer Challenge

A biomechanical medical company wants to test the force, torque, and tactile feedback from their robotic arm for invasive surgery. The surgeon's movements are mirrored by the robotic arm during surgery, and it is essential all haptic force feedback is measured to ensure safety during invasive surgery.

Interface Solution

A number of Interface's force and torque measurement products have ben used on this robotic arm. These include the ConvextBT Load Button Load Cell, SMTM Micro S-Type Load Cell, and the MRTP Miniature Overload Protected Flange Style Reaction Torque Transducer. Force results can be collected when connected to the BX8 8-Channel Data Acquisition and Amplifier, and viewed when attached to the a laptop.

Results

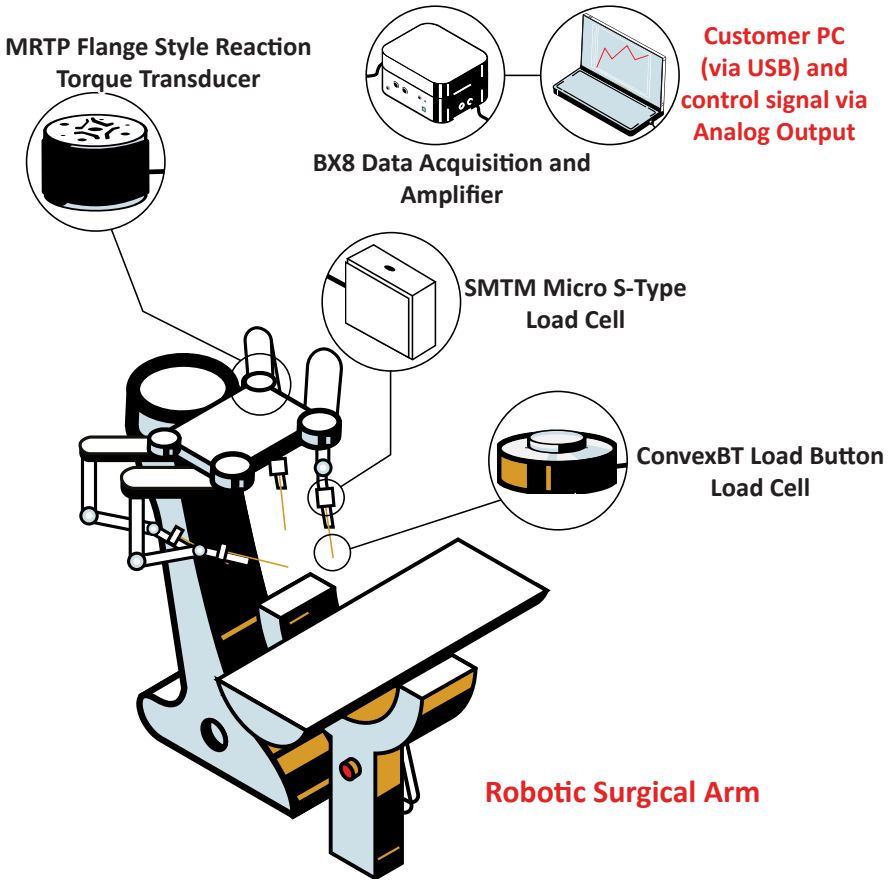
Each one of Interface's load cells or torque transducers played a part in the ensuring the safety and functionality of robotic arms during invasive surgery. The force feedback that was measured from the robotic arm ensured that the robot used the perfect amount of force when using surgical tools that create incisions during surgeries. It also measured the torque being produced, ensuring the robot arm was moving smoothly and at the right speeds.

Materials

- ConvextBT Load Button Load Cell
- SMTM Micto S-Type Load Cell
- MRTP Miniature Overload Protected Flange Style Reaction Torque Transducer
- BX8 8-Channel Data Acquisition and Amplifier with included BlueDAQ Software
- Customer's PC or laptop
- Robotic Arm

How It Works

ConvextBT Load Button Load Cell- Used to measure the force of specific surgical tools themselves, such as clamps and pinchers.
SMTM Micro S-Type Load Cell- Mounted at the tool attachment mechanism, can measure the exact forces being applied to surgical tools.
MRTP Miniature Overload Protected Flange Style Reaction Torque Transducer- Mounted between the robot arm's motor and joint, to measure the torque of the arm's movements.
BX8 8-Channel Data Acquisition System and Amplifier- Results from all three force sensors can be viewed and recorded using the BX8.



Interface is the world's trusted leader in technology, design and manufacturing of force measurement solutions.
Our clients include a "who's who" of the aerospace, automotive and vehicle, medical device, energy, industrial manufacturing, test and measurement industries.

Interface engineers around the world are empowered to create high-level tools and solutions that deliver consistent, high quality performance. These products include load cells, torque transducers, multi-axis sensors, wireless telemetry, instrumentation and calibration equipment.

Interface, Inc., was founded in 1968 and is a US-based, woman-owned technology manufacturing company headquartered in Scottsdale, Arizona.

Interface
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