

# APPLICATION EXAMPLE MADE FOR SPEED

## THE APPLICATION

We believe that there's no better way of understanding our products than putting ourselves in our customers' shoes.

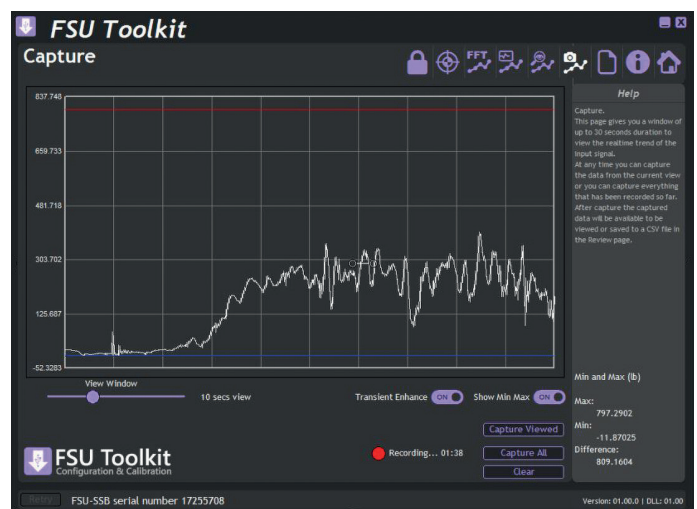
We saw an opportunity to do this when our MD bought a new bike. We wanted to confirm the magnitude of loads being transferred through the shock absorber of a prototype bike.

To complete the project, we took the Mantracourt Fast USB Strain Module and bundled it up with a custom load pin provided by **Hitec Sensors**.

Precision of the measurements was guaranteed by the high speed measurement of the FSU at 4800 sps and the unprecedented stability across temperature ranges of the **Micro-Measurements** strain gauge with shear single grid pattern used within the load pin.

## KEY BENEFITS

- ▶ High speed measurement at 4800 samples per second and 13 bit noise free resolution provided high accuracy results.
- ▶ Simple USB 'Plug and Measure' device allowed quick setup
- ▶ Powerful Toolkit software allowed real-time data analysis of the suspension testing



# THE PROJECT

# SHOCK ABSORBER LOAD TESTING

## THE APPLICATION

Required was a solution that would measure the increase in load as the bike went uphill to allow the company to adapt the suspension to the specifications of the user.

## THE CHALLENGE

There are three key elements that played an important role in the success of this project.

- ▾ Loads needed to be established with millisecond precision. Therefore, capturing the information at the highest rate possible was key in ensuring that no information was missed out.
- ▾ Due to the outdoor nature of the testing, the strain gauges in the pin needed to remain stable over a wide range of temperatures.
- ▾ The application required a bespoke design of the pin to fit the design of the mountain bike.

## THE SOLUTION

A load pin was attached to the suspension which was connected to the FSU device as shown in the image below. The FSU, in turn, was then connected to a PC held in the backpack of our cyclist.

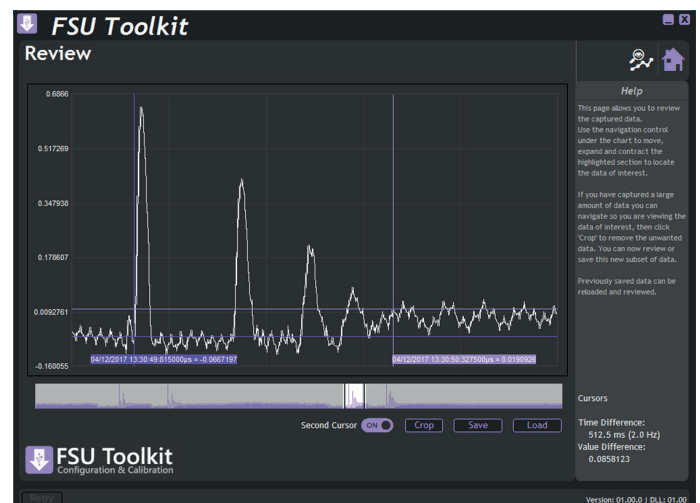
With this, we were able to see how the different damping settings affected the loading in the shock absorber. The fast measurement rate allowed detailed analysis.

## THE RESULTS

We used the high sampling rates of the FSU to analyse the effect of changing the damper settings.

We tested how the rebound speed of our bike's damper affects its shock absorption features after a 250 mm drop. Initially, we set our bike's oil damper to quick rebound for our first test.

Here is what we observed:



## OUR PARTNERS

# SHOCK ABSORBER LOAD TESTING

### ABOUT OUR PARTNERS

**Hitec Sensors** design load cells, force sensors, torque and pressure transducers which are incorporated into advanced, often custom applications in aerospace, medical, automotive industrial, energy, electronics, and other industries to support high-quality manufacturing and testing as well as operational safety.

**Micro-Measurements** is dedicated to the development, manufacture, and marketing of products for high-precision strain and stress measurement.

### MANTRACOURT PRODUCTS USED

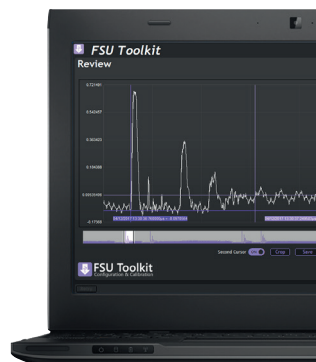
A complete system consists of one Mantracourt FSU-SSB. The device is connected to a laptop with a full version of Windows running a copy of the dedicated FSU toolkit. The software comes free of charge.



### FSU TOOLKIT

Easy to use, intuitive toolkit software for fast and painless set-up

- ▼ Connect in seconds
- ▼ Intuitive interface
- ▼ Configure, calibrate, modules management, data recording & review



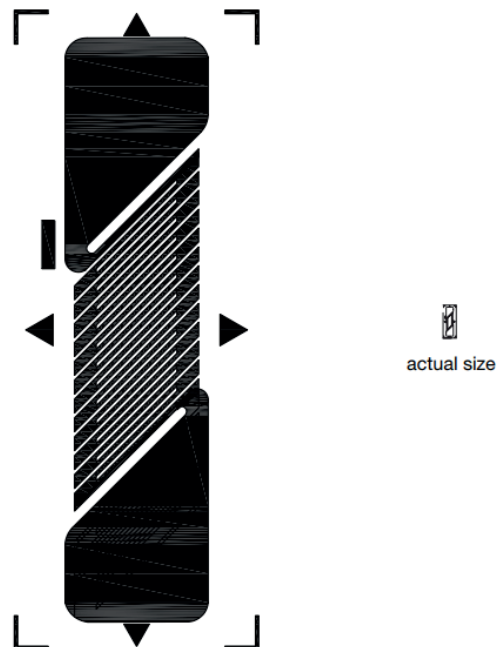
### HITEC SENSORS PRODUCTS USED

The FSU is connected to a bespoke load pin manufactured by Hitec Sensors.



### MICRO-MEASUREMENTS PRODUCTS USED

High Precision Strain Gauges from Micro-Measurements are used within the load pin.



4 x N5K-MC-S5033N-10C/DGE4M1 gauges