

HYDROFOIL TESTING IN WAVE TANK

INDUSTRIES: AUTOMOTIVE AND VEHICLE

SUMMARY

Customer Need / 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. A 3-Axis load cell is needed to read these forces. The Fz senses lift and the Fx and Fy sense the drag. Using a model BSC4-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 are having 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

Interface Products

- Model 3A120 3-Axis Load Cell
- BSC4-USB Multi-Channel, which includes BlueDAQ display, graphing, and logging software & PC Interface Module

Additional Materials

- Watercraft with hydrofoil boom
- PC Laptop

HOW IT WORKS

1. The 3-Axis load cell is fixed to the hull of the water craft.
2. The BSC4-USB is connected to the load cell.
3. The hydrofoil boom is attached to the 3-Axis load cell.
4. The 3-Axis 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 load cell naturally reacts to the lift and drag loads of the hydrofoil.
7. The data is logged and stored via the BSC4-USB on a PC laptop.

