

Aircraft Wing Fatigue Load Cell

Industry: Aerospace, Test and Measurement

Summary

Customer Need / 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 (1×10^8) 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

- Model 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.

