

AIRCRAFT WING FATIGUE TESTING

INDUSTRIES: 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 is being achieved.

Interface Solution

- During fatigue tests, Interface Model 1248 Standard Precision Flange LowProfile™ Load Cells are installed inline 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 (1x10⁸) 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

Interface Products

- Model 1248 Standard Precision Flange - LowProfile Load Cell in 500 kN capacity
- Optional Connector Protector
- Model 9840 Load Cell Indicator – One for each load cell to record output

Additional Materials

- Customer has the option to use their own system with outputs of mV/V, V or mA, in place of the Model 9840.
- Hydraulic testing bed with cylinders

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.
3. Interface's Model 9840 Load Cell Indicator 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.

