Structural tests and advice

Structural tests are an indispensable part of the development and certification of aircraft ensuring efficient and safe operation in service life. IABG tests and analyses complete aircraft structures and subsystems right down to the level of components and material tests regarding fatigue and strength. Our clients are manufacturers and operators to whom we provide support both in development and qualification, and also in life monitoring of their products.

Our test spectrum ranges from all categories of civil aircraft up to military fighter jets. The fatigue testing on the new Airbus A380 widebody is the most recent example of our performance capability.

In addition to our experimental installations and computer simulation facilities, we offer our clients the benefit of more than 40 years of experience and the unique combination of experiment and analysis. This makes IABG the Europe-wide leading testing and qualification provider for the aeronautical industry.

Advantages for IABG’s clients
- IABG’s competence as a prime contractor
- Deadline compliance and quality
- Promptness and flexibility
- Qualified specialist support in all phases of their programme
Performance portfolio

We offer our clients a wide range of services:

- **Fatigue tests**
  - Performance of fatigue tests on complete airframes, subsystems and components
  - Determination of service life
  - Investigations into damage tolerance characteristics, crack propagation and residual strength

- **Static load tests**
  - Performance of static loading tests on complete airframes, subsystems and components
  - Identification of stress and stress distributions
  - Determination of deformations, stiffness, fracture strength and fracture characteristics

- **CAE/CAD services**
  - Strength, stiffness
  - Flow simulation
  - Structural dynamics
  - Durable design, component optimisation
  - Non-linear structural dynamics
  - Acoustics/vibration
  - Multi-body simulation and system simulation

- **Material investigations**
  - Determination of material properties, material characterisation
  - Damage analyses and evaluations
  - Investigations into corrosion characteristics and wear

- **Technical/scientific consulting**
  - Structure optimisation
  - Lightweight design
  - Application of new materials
  - Certification support

- **Project management**
  - Project development and planning
  - Provision and construction of the complete test facilities
  - Test planning and test management
  - Test execution
  - Analysis and evaluation of results

- **Engineering**
  - Development of test concepts and programmes
  - Preparation of test specifications
  - Development of loading programmes
  - Development of overall test set-ups and of subsystems (hydraulics, pneumatics, measuring and control systems etc.)
Competencies

Major airframe tests performed to date, e.g.:
- All Airbus types (Airbus A300 until A340-600; A380-800 in preparation)
- Commuter aircraft (PC12)
- General aviation aircraft (EXTRA 400)
- Military aircraft (Tornado, Eurofighter)
- Helicopters

Examples of tested aeronautical components
- Crack propagation investigations on fuselage shells (Airbus A380)
- Swash and vibration tests on aircraft tank components (Do728)
- Qualification proof for freight loading system (Airbus A340-600)
- Structure test on supersonic fins (Eurofighter)
- Service life pressure tests of bulkheads (PC21)

Equipment in our test laboratories
- Approximately 550 hydraulic loading cylinders
- Central hydraulic supply units of 4,400 l/min at 280 bar and 6,000 l/min at 280 bar
- Pneumatic power unit of 100 m³/min at 3.2 bar
- Control systems for up to 450 channels
- Data acquisition systems with a total of more than 11,500 channels for static measurement of strains, displacements, pressures and temperatures
- Drop test bench
- Shakers, spring test benches
- Climatic chambers
- Multi-axis vibration test bench
- Total shop floor: 4,750 m² + 5,000 m²
- Crane hook height from 11 m to 23 m
- Anchor rail system on shop floor with a maximum load application of 200 kN/m in tensile and 300 kN/m in pressure
- Vertical clamping wall, 5x6 m
- Load application pit with rail system on five sides: 6x8x5 m

Full scale static test.