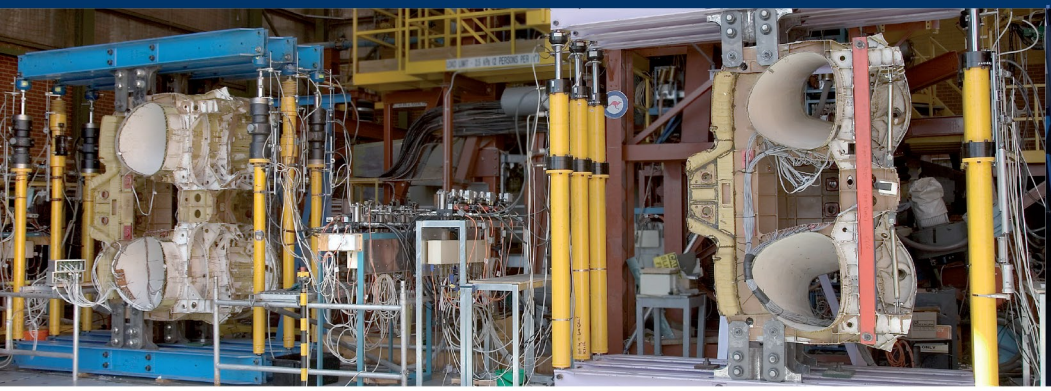
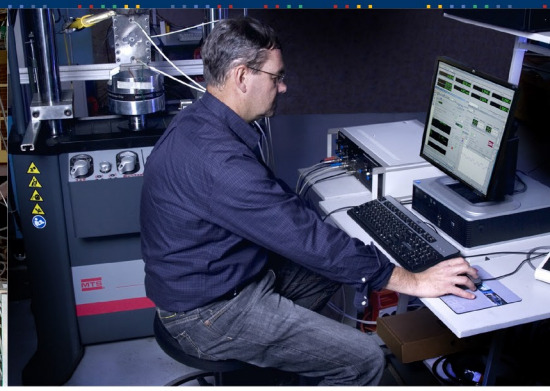
Australian Government
Department of Defence
Defence Science and
Technology Organisation





H A Wills Structures and Materials Test Centre

The Defence Science and Technology Organisation (DSTO) is the Australian Government's lead agency charged with applying science and technology to protect and defend Australia and its national interests. DSTO delivers expert, impartial advice and innovative solutions for Defence and other elements of national security.

The H A Wills Structures and Materials Test Centre houses three laboratories: the Fatigue and Fracture Laboratory, the Structural Test Laboratory and the Instrumentation Support Laboratory. Activities in these laboratories cover both air and maritime structures.

The Fatigue and Fracture Laboratory

The primary role of the Fatigue and Fracture Laboratory is to perform fatigue and static testing of specimens and components under spectrum or constant amplitude loading conditions. Properties that can be measured and monitored include applied load, displacement and fatigue crack growth. The Fatigue and Fracture Laboratory is the most comprehensive facility of its type in the Southern Hemisphere.

It houses 21 servo-hydraulic dynamic testing machines with load capacities ranging from 2kN to 2MN. The facility is widely utilised by DSTO for a range of purposes beyond traditional fatigue and fracture testing. One of the key roles of the laboratory is to assist accident investigations resulting from structural failure.

Specific tests being carried out at the Fatigue and Fracture Laboratory include:

- Fatigue testing in support of aircraft life extension programs.
- Generation of engineering data on materials used in new aircraft such as Joint Strike Fighter.
- Research into the properties of steels used in submarine construction.
- The effectiveness of life extension techniques such as cold working.
- The interaction of corrosion and fatigue.

Structural Test Laboratory

The primary role of the Structural Test Laboratory is to undertake structural tests on large articles, such as aircraft wings, fuselages and large components of maritime platforms. The tests require the construction of special rigs, with loads usually applied by servo-hydraulic actuators. DSTO's expertise in structural testing and integrity places them at the forefront of international research in this field.

Among the projects being undertaken at the Structural Test Laboratory are:

- Full scale fatigue testing of the Hawk Mk127 Lead-In Fighter as part of that aircraft's Australian Military Type Certification program.
- F/A-18 aircraft fuselage centre barrel testing as an aid to safely extending the viable life of the F/A-18 in Air Force service.
- Investigating the nature of flaw distributions in F/A-18 aircraft.
- F/A-18 aircraft outer wing static testing to examine the load carrying ability of the structure with internal damage.

Instrumentation Support Laboratory

The primary role of the Instrumentation Support Laboratory is to provide a range of electronic support to the Centre's testing programs. Such support includes control systems, data acquisition systems, and strain gauging of specimens. It also includes development and testing of sensors and machine controllers used in the Centre.

Main pictures: (top left) Both defence and commercial tasks are undertaken within the Structural Test Laboratory. Here, fatigue tests are being completed on the centre barrel of the F/A-18 aircraft for the RAAF (blue rig, left) and the US Navy (white rig, right). The Fatigue and Fracture Laboratory is the most comprehensive facility of its type in the Southern Hemisphere (top right).