

Expertise and vigilance makes flying safer

By STEVE SWIFT, of the Airworthiness Branch, Department of Aviation.

ON SUNDAY, September 29, 1985, Bob Douglas had originally planned to spend a quiet day at home with his family. Instead he spent the day in his office studying the structure of the Britten-Norman Islander, a twin-engined aircraft capable of carrying 10 people.

The event which intervened was a crash of an Islander in remote, mountainous country in Papua New Guinea with the loss of three lives. First reports from the wreckage site indicated the aircraft had suffered a structural failure and broken up in flight. Bob's concern was that there were 22 similar aircraft operating in Australia.

At the request of the PNG Government, very early the next morning Bob left Canberra to assist the PNG team with the investigation. Bob was part of the team because of his many years of experience examining broken aircraft components.

After several days of being bitten by leeches and scratched by swordgrass, Bob's examination of the fractured surfaces told him the aircraft must have been thrown about violently in the air for its structure to fail. Bob was heartened that the cause appeared to be extraordinarily high flight loads, rather than metal fatigue, which he had at first feared.

As an airworthiness engineer, Bob is thankful that his family life is not interrupted very often. Despite the publicity associated with recent overseas accidents, major accidents in Australia are very rare. Even rarer are accidents resulting from problems with the aircraft itself. Australia has a first-class aviation safety record and this is in no small part due to the diligent efforts of Bob and the other airworthiness engineers who work with him at the Department of Aviation's Airworthiness Branch in Canberra and the regional offices of the Department. Their primary task is to ensure that every aircraft

you board in Australia will take you to your destination with safety.

Australia has a mandatory system of component-defect reporting and fortunately most aircraft problems are discovered during regular maintenance or special inspections devised by the Department's airworthiness engineers.

A good example of the effectiveness of this system was the recent discovery of cracks in the wing spar of a popular European light twin-engined aircraft. The spar is the major structural component in the wing. If it cracks right through the wing will almost certainly come off in flight.

One of these aircraft was undergoing major repair work after being damaged in a landing accident. Some cracks were discovered in the main wing spar even though the aircraft had flown for only 2,400 hours. According to the manufacturer, the spar should have been free from cracks until at least 11,000 hours.

The discovery of the cracks was reported to the Department of Aviation and portions of the spar were forwarded to the Airworthiness Branch Materials Evaluation Facility in Fyshwick.

Using powerful scanning electron microscopes, it was confirmed that the cracks were caused by metal fatigue and not the landing accident. The cracks also occurred in an area which seemed to indicate quality-control difficulties during manufacture.

The issue then became how many of the other 47 aircraft of this type in Australia were similarly affected?

Even though no other reports had been received from elsewhere in the world, the airworthiness engineers quickly sent off a telex to all operators and contacted the manufacturer. The Australian inspections showed that one in four aircraft had the

cracks. As a direct result of the Australian action, the manufacturer has now developed a repair program and advised operators throughout the world.

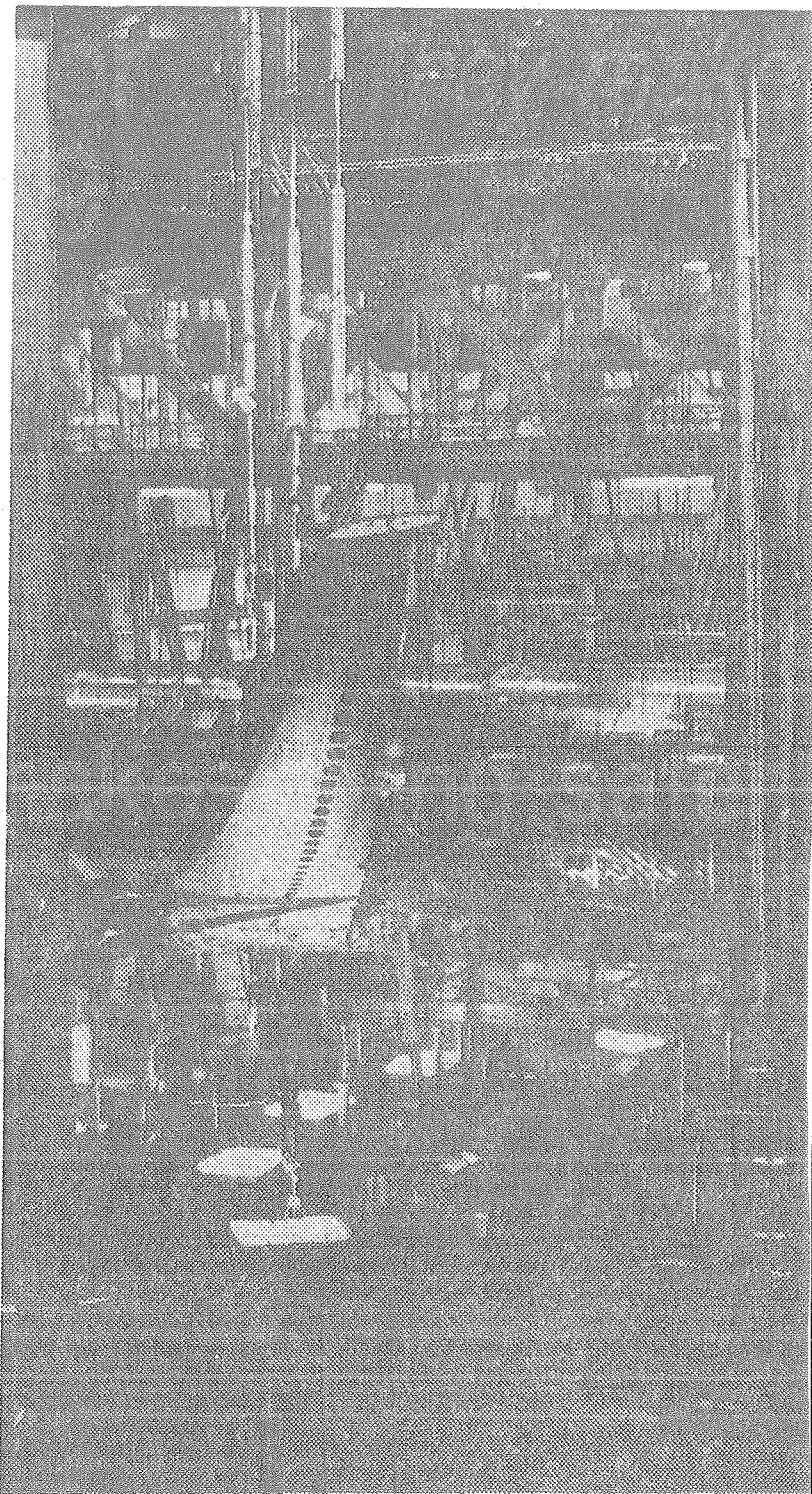
The airworthiness engineer's role is a responsible one. Most have had years of experience working for aircraft manufacturers, airlines and research establishments before joining the Department of Aviation. They also need to keep in touch with new aircraft technologies and, therefore, continue to attend training courses in Australia and overseas.

Because of the different specialist areas in aviation, the Airworthiness Branch includes separate sections such as Flight Performance, Fatigue, Structures, Mechanical Systems, Power Plants and Reliability. Some of the engineers are world-renowned and are often invited to speak at international conferences about their research into aircraft safety. Knowledge gained from research and service experience enable the airworthiness engineer to improve design standards to make aircraft safer.

The tragic Boeing 737 accident in Manchester recently has emphasised the need for closer consideration of the standards for emergency exits and fire-retardant cabin interiors and this is being investigated.

Before any new aircraft type can be registered in Australia, the safety aspects of its design are carefully scrutinised by the Department's airworthiness engineers. For some types of aircraft this may involve a visit to the manufacturer overseas to examine design data and witness the test program. Such is the respect for the department that one well known US manufacturer has consulted its engineers for advice on how best to carry out their fatigue testing.

So the next time you fly, spare a thought for Bob Douglas and his colleagues who help to ensure that your aircraft is fit to fly.



This picture should calm the nerves of those who have seen aircraft wings flexing. Note the extent of the bend in this Boeing 767 wing as it undergoes a static load test.