Data – It's Called "Acceptable" for a Reason

The peril of not using acceptable technical data in aircraft maintenance is illustrated by the incorrect repair that was responsible for the world's deadliest single-aircraft accident.

In 1985, a Japan Airlines Boeing 747 ploughed into a mountain near Tokyo, killing 520 people.

Seven years earlier, a tail strike on the aircraft at Osaka International Airport damaged the aircraft's rear pressure bulkhead. The subsequent repair did not conform to the manufacturer's approved repair instructions. That reduced the resistance of the repaired part to metal fatigue.

The incorrectly-repaired bulkhead exploded 32 minutes before the 1985 crash, causing pressurised air to rush out of the cabin and blow the vertical stabiliser off the aircraft, severing all four hydraulic lines, and in turn, causing loss of control of the elevator and rudder systems.

At the other end of the spectrum is this example from CAA's Aviation Safety Adviser Bob Jelley:

"A fabric wing Piper was found to have cracking in the false spar angle and it should have been a simple minor repair.

"The fabric needed to be peeled away, and a length of doubler twice its width used, with the same or next heavier gauge of repair material and the same material spec.

"FAA AC43.13-1B has the appropriate acceptable technical data for such a minor repair.

"But the repair that actually took place just made the problem worse.

"Too much material was used, and the repair was so strong locally, the resulting loads were promptly transferred to the area adjacent to the ends of the doubler, resulting in the false spar cracking at each end of the repair.

"As outlined in the FAA Advisory Circular – which is just one of the sources of acceptable technical data listed in Appendix D to Part 21 and required by rule 43.53 – one doubler of the appropriate gauge would have been sufficient for an effective repair.

"Not only did the repairer not use acceptable technical data, I don't think they really appreciated the strength requirements of what they were trying to achieve," says Bob.

CAA's Aviation Examiner of Maintenance Engineering, Rick Ellis, says it would be rare for a regular maintenance provider not to have a copy of AC43.13-1B *Acceptable Methods, Techniques, and Practices – Aircraft Inspection and Repair* in their library.

"There was really no excuse for getting it wrong because in the example, all the acceptable technical data was available to get it right the first time."

Photo courtesy of Howard Chaloner

A Japan Airlines Boeing 747SR-46 taking off from Haneda International Airport in Tokyo.

Bob says, "The trouble is people feel under the hammer to get things done quickly and they take shortcuts.

"But as a very experienced colleague of mine used to say, 'We never have time to do it right, but we always have time to do it twice!'"

Apart from the obvious safety considerations, a botched repair is also a breach of the Civil Aviation Rules.

Included in rule 43.53 *Performance of Maintenance* is the following:

A person performing maintenance on an aircraft or component must use –

» methods, techniques, and practices that are specified in the instructions for continued airworthiness issued for the aircraft or component; or

» equivalent methods, techniques, and practices that are acceptable to the Director.

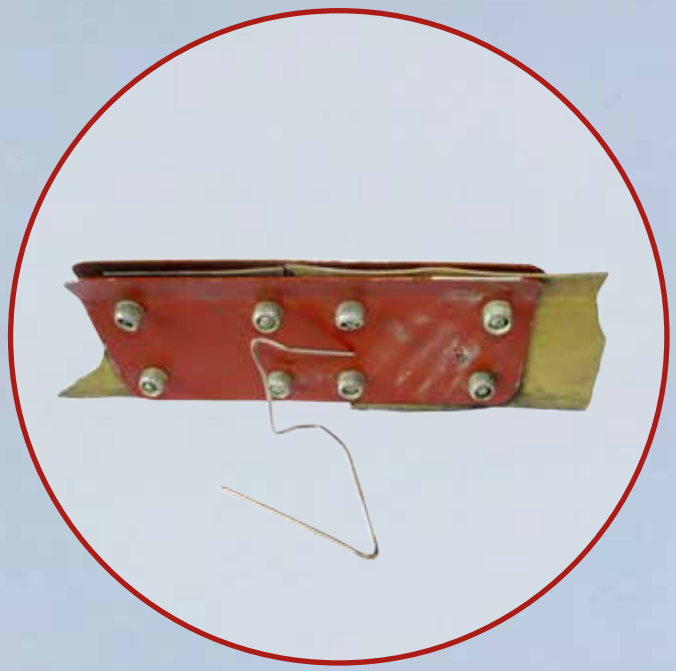
Rick Ellis says that in a situation where there are no specific manufacturers' repair instructions, Part 21, Appendix D, is the correct place to look for information relating to the Certification of Products and Parts.

"It lists specific acceptable technical data and the appropriate conditions to which that data is applicable."

Bob Jelley says a LAME or aircraft tradesman might be a little complacent about Part 21, Appendix D, because they feel like they know it so well they don't even need to look.

"But repairs done in accordance with a good idea and not to acceptable technical data could have potentially dangerous consequences."

Advisory Circular AC43-9 provides further guidance on acceptable technical data and the process for approval of data that is not yet acceptable. ■



It should have been a minor repair using Acceptable Technical Data. But too much material was used and it resulted in the false spar cracking at each end of the pair.

Acceptance of Foreign STCs

Part 21 Appendix D lists Supplemental Type Certificates of several countries as being acceptable technical data, but only if certain conditions that are listed in the Appendix are met.

The most common trap is the condition that states STCs must be supplemental to the Type Certificate (TC) used for Type Acceptance in New Zealand. Countries like the USA and Canada issue their own TCs for imported aircraft, unlike New Zealand, so their STCs are supplemental to their own TCs. This may not be the same TC that has been Type Accepted in New Zealand, as CAA policy is to Type Accept the TC of the State of Design.

So a Canadian STC on a US State-of-Design aircraft may not be acceptable technical data.

Also, at present, there is no blanket approval of EASA STCs.

What to do if you have an STC like that which is not automatically acceptable data? You can apply to the CAA to have the data accepted under the provision of rule 21.503(a). The CAA publishes a list on its web site of data that's been accepted in this manner. Go to www.caa.govt.nz, "Aircraft – Acceptable Technical Data".