AWB 00-10 Issue 1 - Equivalency of tooling and test equipment

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The aim of this AWB

To provide guidance to maintenance organisations that have a need to use alternative test equipment or tooling during maintenance of aircraft or aeronautical products. This interim advice will eventually be expanded and incorporated as a CAAP or an AC.

Who should read this AWB

All persons associated with the maintenance and servicing of aircraft or aeronautical products.

Background

CASA has had a number of enquiries relating to the processes and procedures that should be followed to establish equivalency of alternative test equipment or tooling and the subsequent approval.

The use of highly specialised test equipment and tooling is often required to support the continued airworthiness of aircraft or aeronautical products to the manufacturer's specifications and tolerances. When the manufacturer provides or recommends specific equipment they may not condone any tooling or test equipment other than what they recommend. However if a substantiated claim supporting the use of alternate test equipment is provided to the aircraft or aeronautical product manufacturer they may support the application.

What is equivalency and how is it determined?

The term "equivalency" as used throughout this bulletin means functionally equivalent to that recommended by the aeronautical product or aircraft manufacturer. For determining equivalency, a comparison should be made between the technical specifications of the tooling or test equipment recommended by the manufacturer and those proposed by the maintenance organisation. The tooling or test equipment may look different, be made of different materials, be a different color, etc. However, as long as the tool or test equipment is functionally equivalent for the specific test or check, the tool may be

approved for use.

The level of accuracy should be equal to or greater than that recommended by the manufacturer.

A finding of equivalency can only be made based on an evaluation of the technical specifications and sometimes the demonstrated functionality of the proposed tooling or test equipment. The substantiation may include, but not be limited to data, drawings, specifications, instructions, photographs, templates, certificates, description of any software, the revision status of that software and reports. In the case of calibration equipment the substantiation should also include data sheets attesting to the accuracy. If calibration of equipment is involved, adequacy of a calibration system shall be established with documented procedures to evaluate the adequacy of that calibration and traceability to a National or International Standard.

It is emphasised that an engineering assessment of a finding of equivalency must be made by a person with appropriate skills or qualifications. An appropriate person may be a professional engineer with skills in the discipline related to the discipline that the assessment is required, however in some other aspects an instrumentation/electronic engineer, or a LAME may more appropriate. The proposed CASR Part 43 will require an Authorised Airworthiness Representative (AAR) to assess and/or approve any equivalency

What if the equivalent tooling or equipment requires the development of new instructions on "How to do the maintenance"

Assessment of the maintenance instructions may be required to determine the need for change as a result of using alternative equipment. The approval of work instructions can only be made based upon an evaluation of technical data. Typically the substantiation would contain a break down of the step by step instructions required by the manufacturer and the equivalent process proposed by the maintenance organisation. The substantiation may include, but not be limited to data, drawings, specifications, instructions, photographs, templates, certificates, description of any software, the revision status of that software and reports.

Approval process

Who approves alternate tooling and test equipment:?

There are two possible scenarios each requiring a different approval process and approval under different regulations.

The reference regulations are CAR 1988 regulation 2A and 42ZS.

The first scenario is where significant changes are made to either the type of test equipment or the processes for determining the conformity checks for a return to service, for example a aircraft component has a number of manual checks that requires repeated application of some test parameter with the results recorded on a check sheet. Technology has advanced sufficiently to have a computer apply the test parameter (new process including software) and a data logging device that records the result (new equipment including software).

In this case, the basic instructions that relate to how to do the testing and how the testing is interpreted to determine conformity has changed sufficiently. Both the equipment and the process should be assessed as new maintenance data. In this scenario both the changes are specifying significantly different processes and instructions and require approval as "approved maintenance data" under subregulation CAR 2A(4)

The second scenario is where minimal change is made to the equipment and processes for determining the conformity checks for a return to service. For example the test equipment or tooling may be very similar but provide an improved level of accuracy, as a consequence of the minimal change the instructions may have to be varied slightly. In this scenario the approval would be as a variation to maintenance data under CAR42ZS(1).

The person assessing the equivalency should:

Ensure that the limitations, parameters, and repeatability of the equipment are at least equivalent to that of the manufacturer's recommended equipment. This may include data from the manufacturer or another source of data used to manufacture the test equipment or tooling.
Consider a demonstration of the equipment and/or process.
The person assessing the data should ensure that the substantiation is adequate to satisfy and that he/she understands the data.

Where the tooling or test equipment is locally made from data provided by the equipment or aircraft manufacturer then no approval is required, however details should be recorded in a register indicating the source of the data that the tooling or test equipment was manufactured from.

Where the tooling or test equipment specified is of a generic type then the person performing the maintenance may make the assessment of the tooling or test equipment as equivalent , for example a digital inclinometer in place of a bubble type, a digital tyre pressure gauge in place of a analogue type (providing the range is correct), however a digital multimeter may not be suitable in place of an analogue meter.

Note: The application for approval under 1988 CAR 42ZS is made under CAR42R (1) which states "the holder of a Certificate of Registration may apply……." CASA is aware of the restriction of this interpretation, Maintenance Standards Branch is issuing a policy determination that for the purpose of this

regulation to include approved maintenance organisations.

Control of data

The equivalent tooling, test equipment and changed work instructions, after being approved is now considered approved data and as such should be included in the manufacturers maintenance manual as a "in house temporary revision", there should be a revision sheet that records any amendments to that equivalency.

Summary

To summarise the process:

1. Prepare a document that details the substantiation.
2. Ask the aircraft or aeronautical product manufacturer to support the use of the proposed alternate tooling or test equipment
3. Prepare and substantiate new work instructions if required
4. Carry out an engineering assessment
5. Have equivalents approved
6. Prepare temporary revision for CMM

NOTE: It is important to emphasise that the burden of demonstrating "equivalency" is borne by the maintenance organisation. To assist any application to a manufacturer similar documentation should be made available to the manufacturer as is available for an engineering assessment