AIRFRAME CORROSION

AMROBA has asked CASA to review regulatory responsibilities with regards to inspection standards applied under the current aviation requirements and also promulgated in CASA advisory material. This has come about due to the litigious society we live in where some registered operators put extreme pressure on our members to keep costs down and only perform maintenance to the regulatory minimum standards. The lack of legislative support to inspect aircraft to the depth where our members can feel comfortable that the aircraft is airworthy, excluding agricultural aircraft that CASA advisory material recognise suffer from corrosion, is not world best practice or at a level that prevents disputable claims by some registered operators.

CASA admits there is a systemic problem with the corrosion state of many older non airline aircraft airframes which we assert is because of inferior regulatory requirements that Australian maintenance personnel and organisations must comply with. No maintenance can be performed unless the register operator, [owner] operator or pilot in command 'authorises' maintenance personnel and/or organisations to carry out that maintenance. Registered operator's log book statements usually prescribe minimum routine maintenance requirements and that maintenance can only be done in accordance with approved maintenance data. Additional maintenance beyond what was authorised cannot be done without further authorisation to do the additional maintenance.

The current regulatory inspection requirements, introduced in 1991, shifted the responsibility for the depth of maintenance that was carried out at a "3-yearly major inspection" from the LAME/maintenance organisation to the registered operator. The regulatory change repealed the CAO requiring "disassembly" and now there is no "regulation" or "approved maintenance data" explaining that the aircraft must be disassembled to the degree necessary to perform the CASA or Manufacturers' Maintenance Schedule as is regulatory required under the FARs.

The loss of the same FAR provisions that were in the CAO in 1991 meant the same inspections carried out in Australia are now not done to the depth as would be done under the FARs. Disassembly is not currently required.

Nor can the industry currently use instructions from other National Aviation Authorities (NAA) specifying how maintenance is to be carried out unless the aircraft manufacturer lists the NAA issued data or is included in the registered operators log book statement. The vast majority of the current registered operators' log book statements do not require any "corrosion protection" requirements to 'authorise' maintenance personnel or organisation to perform this task.

> CAAP 42B-1(1): CASA Maintenance Schedule explains what "GENERAL CONDITION" inspection covers but it also states in the CAAP that "*the inspection should be conducted making extensive use of inspection panels, access doors, detachable fairings and fillets, using adequate lighting and, where necessary, inspection aids such as mirrors, torches, work stands, etc*. The CAAP also states that the periodic inspection shall be *a thorough functional and visual check of the nominated system, component, assembly and/or installation*.

This CAAP does not state that the aircraft *must be disassembled* to perform any inspection for [*excessive*] corrosion.

The CAAP also states that the "General Condition" inspection includes *freedom from excessive corrosion* – not freedom from corrosion.

However, most of these older aircraft are type certificated in the US by the FAA and the FARs prescribes a clear difference between 'routine' and 'detailed' inspections.

> The FARs specify:
> *Routine inspections* consist of visual examination or check of the appliances, the aircraft, and its components and systems, insofar as practicable without disassembly.
> *Detailed inspections* consist of a thorough examination of the appliances, the aircraft, and its components and systems, with such disassembly as is necessary. For the purposes of this subparagraph, the overhaul of a component or system is considered to be a detailed inspection.

A permanent regulatory fix would be to adopt the industry standards & terminology in US aircraft maintenance manuals and the FAR requirements for routine/detailed inspections so that aircraft can be properly inspected. CAAP 42B-1 accepts that corrosion exists by stating the general condition inspection will ensure "*freedom from excessive corrosion*". In other words, corrosion is acceptable if not excessive.

The FAA Aviation Maintenance Technician Handbook - explains corrosion prevention and inspection requirements that are more rigid but not regulatory requirements in Australia. FAA Technician Handbook - Chapter 6 or FAA AC 43-4A, Corrosion Control for Aircraft .

The lack of specifying that there needs to be '*disassembly as is necessary*', especially to do inspections, in regulatory requirements in Australia has meant maintenance personnel and organisations cannot legally perform maintenance to the same standards as required by the US regulatory system unless the maintainer can convince the registered operator that they need to disassemble the airframe to perform a 'detailed' inspection. Unless real safety of flight issues can be accepted by the registered operator, many opt to put off "unnecessary" maintenance until the next check.

It should not be a responsibility of maintenance personnel and maintenance organisations to set the standards.

Restricting the CASA periodic inspection to '*making use of extensive use of inspection panels, access doors, detachable fairings and fillets*' creates an industry inspection environment that falsely lowers the costs to the registered operator, when compared to the responsibilities placed on the LAME/maintenance organisation pre 1991. Over 2 decades of this regulatory environment limiting depth of inspections is a high contributory reason for the current CASA ageing aircraft education program.

Many of our older GA aircraft manufactured in the US were not very well corrosion-proofed during manufacture, so it's up to registered operators to keep their airframes corrosion-free. Regular application of corrosion preventive compounds can protect the parts of the airframes that the factory didn't.

The 1970s were very good years for general aviation. Manufacturers like Beech, Cessna, Mooney and Piper were assembling craft at a furious pace, delivering about 17,000 new GA aircraft in 1979 alone. Few foresaw that within a few years, demand for new GA aircraft would dry up almost completely -- due to massive changes to the U.S. tax code coupled with a nasty, double-dip US recession -- and production would fall off a cliff (to less than 1,000 new aircraft delivered in 1994). Fewer foresaw that by 2010, 20% of the aircraft on the CASA aircraft register would fly nil hours/ annum.
(*See BITRE supplied Chart at rear of this document*.)

Back in General Aviation's high production days, people bought aeroplanes much as they did cars. They bought them new, flew them for a few years, and then traded them for something bigger, faster or fancier. The aircraft manufacturers designed and built those aircraft in anticipation that they would have a useful life of 10 years or so. At the time, that was not an unreasonable prediction, but it turned out to be terribly wrong. When the production of new airplanes all but stopped in the '80s and '90s, owners had little choice but to keep flying their aircraft built in the '60s and '70s. As a result, the major share of aeroplanes in today's General Aviation fleet are 30 or 40 plus years old.

Corrosion has taken its toll on many of those aircraft. Because the manufacturers didn't expect them to remain in service more than a decade, most manufacturers didn't do a very thorough job of corrosion-proofing. Look inside the wings or tail cone or under the floorboards of most '60s- and '70s-vintage airplanes and you'll see mostly bare aluminium. Only the relative handful of aircraft that were ordered as floatplanes received internal corrosion-proofing (with zinc chromate primer).

The industry has learned from its errors. If you look at the new GA airplanes coming from Cessna, Cirrus, Diamond, Lancair, Mooney or Piper, you'll find the factories are paying a lot more attention to corrosion proofing these aircraft. Most of today's production aircraft will probably last as long as anyone wants to fly them.

But that's little consolation to those that own and fly older aircraft with little or no factory corrosion-proofing. It's up to the registered operator to make up for what the manufacturers failed to do 30 or 40 years ago.

Will our registered operator's voluntary pass responsibility to maintenance personnel and maintenance organisations to inspect aircraft corrosion by disassembling the aircraft as necessary to find the corrosion? We think not. 20% of the aircraft on the CASA register fly zero hours/annum – another issue. The only alternative is for CASA to apply the FAR standards of maintenance and amend the regulations to include the definition of *routine* and *detailed* inspection – corrosion inspection must always be a *detailed inspection* if the aircraft fleet is to be maintained to the same regulatory standards of the country of design/manufacture. 20 plus years of unique requirements have not been successful.

CAAP 42B-1(1), paragraphs 6.3 & 6.4, attached, was generated to stop the inspection environment of CAO 100.5.1, paragraph 3.3, major inspection, that stated:

> 'The persons certifying for completion of the major inspection in each licence category are to judge from experience and from maintenance records of the aircraft how far the aircraft should be disassembled and which aircraft components of the aircraft, if any, should be reconditioned at the major inspection.'

It is now time for CASA to reverse its 1991 policy and set inspection standards equivalent to the FARs so airworthy standards are equivalent to global standards.

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CAAP 42B-1(1): CASA Maintenance Schedule (May 2013)

5. Daily Inspection Schedule

5.1 The daily inspection is to be carried out, and certified, before the first flight on each day the aeroplane is operated.

5.2 The Daily Inspection Schedule has been prepared to cover various types of aeroplanes and refers to a number of different design features and types of construction. Only those items applicable to the aeroplane type being inspected are to be observed. It is not necessary to open inspection panels, other than those associated with engine oil or dipsticks for this inspection, but where the powerplant has quick access cowlings; it is recommended that use should be made of the increased accessibility to the engine in completing this inspection.

5.3 The person performing the daily inspection must be an appropriate person authorised to do so and must certify, in accordance with the approved system of certification, on the aeroplane's maintenance release for the completion of this inspection. Appropriate persons for daily inspections are:

- ☐ the pilot-in-command;
- ☐ a person holding a valid pilot licence endorsed for the aeroplane type;
- ☐ the holder of a valid appropriate aircraft maintenance engineer licence; or
- ☐ the holder of a valid appropriate maintenance authority covering the aeroplane being inspected.

6. Periodic Inspection Schedule

6.1. The replacement or overhaul of time-lifed components required in an Airworthiness Limitations Section of the aeroplane's maintenance manual and any special techniques required by the manufacturer or an Airworthiness Directive are required to be complied with. If it is clear from the terms of the manufacturer's requirement that the manufacturer considers compliance is optional, then that requirement is optional.

6.2. The engine inspection contained in this schedule is applicable only to piston engined aeroplanes. The schedules for the airframe, electrical, instrument and radio systems, however, may also be utilised for turbine powered aeroplanes.

6.3. The inspection required by this schedule shall be a thorough functional and visual check of the nominated system, component, assembly and/or installation. The inspection should be conducted making extensive use of inspection panels, access doors, detachable fairings and fillets, using adequate lighting and, where necessary, inspection aids such as mirrors, torches, work stands, etc. Surface cleaning of individual components may also be required. The condition of the nominated system, component, assembly and/or installation when so inspected shall be such as to maintain the continued airworthiness of the aeroplane.

6.4. All items are to be inspected for GENERAL CONDITION together with specific requirements where nominated.

6.5 The term GENERAL CONDITION includes, but is not limited to, the following:

- ☐ correct operation, full and free movement in the correct sense;
- ☐ correct rigging, alignment and tension;
- ☐ appropriate lubrication;
- ☐ correct fluid quantities or levels;
- ☐ correct air and/or nitrogen pressures;
- ☐ security, cleanliness;
- ☐ wear is within acceptable limits;
- ☐ no loose or missing fasteners;
- ☐ vents are free from obstruction;
- ☐ correct clearance;

- ☐ bonding straps correctly positioned, undamaged and secure;
- ☐ freedom from excessive:
  - o leakage;
  - o corrosion, deterioration of protective treatments;
  - o cracking and disbonds;
  - o deformation, wear, scoring, chafing, flat spots and fraying;
  - o obstruction or other obvious damage; or
  - o burning, arcing or heat damage; and
  - o that hoses are within inspection and testing periods.

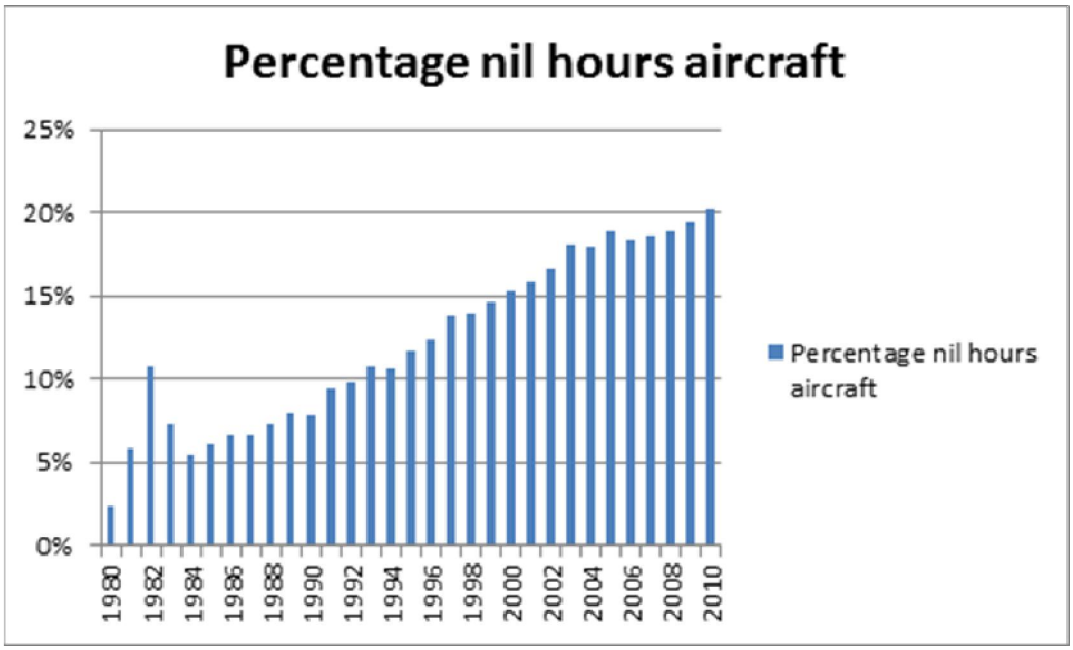
6.6 Special attention must be paid, in agricultural aeroplanes and seaplanes, to areas where corrosion may develop and propagate. The manufacturer's instructions should be referred to for guidance.

6.7 Except where otherwise approved or directed by CASA the procedures and limits prepared by the aeroplane manufacturer are to be used when performing an inspection required by this schedule.

6.8 It is highly recommended that an engine ground run be performed prior to carrying out the inspection.

Inoperative CASA Registered Aircraft

20% of aircraft currently on CASA's aircraft register, in 2010, flew zero hours. According to our BITRE request re aircraft with nil flying hours the following is from 1980-2010.



Data for 2011 will be available later in the year.

The data shows an increase in the percentage of nil hours aircraft over time.