AMROBA INC

Revitalisation Proposals – Australia's General Aviation Sectors - 2015

Proposal 3: Adopting FAA Standards – Cessna SIDs

General

This proposal is based on supporting those aircraft registered operators that prefer to maintain their aircraft under the CAR Schedule 5 CASA Maintenance Schedule; and the repeal of the CASA mandated Cessna Supplemental Inspections Documents. Same conditions as under the FARs. This proposal, in conjunction with AMROBA Proposals 1 & 2, prescribes how safety standards can be maintained if the FAA approach is adopted.

Mandating the Cessna 100/200/300 Supplemental Inspections Documents (SID) for private, aerialwork and charter aircraft in this country will add an estimated (by MROs directly involved) fleet cost for Cessna owners exceeding $34M whereas the Federal Aviation Administration (FAA), European Aviation Safety Authority (EASA) and Transport Canada Aviation (TCA) have not mandated the Cessna SIDs for FAR Part 91 type operators. This proposal, based on our recommendations, supports the FAA approach for their type certificated aircraft.

CASA's lack of understanding of their own regulatory requirements for general aviation, their role in providing adequate advisory material and education to support the general aviation (GA) regulatory framework is at question. Is CASA a "regulator" that comprehends GA or is it essentially approaching their role with 'airline maintainer' and/or 'operator' or 'military' values? To most in GA it is obvious that many in CASA have not transitioned to being a regulator.

In AMROBA's opinion, the mandating of the Cessna SIDs and re-introduction of unique Australian maintenance related ADs, can only be based on CASA's lack of understanding of the intent of regulations, especially Civil Aviation Regulations (CAR) Schedules 5 & 6, confidence in maintenance inspection practices used in GA and, most importantly, the lack of clarity plus contradictory information in CASA's own advisory material.

The CARs includes a similar, but more stringent approach to GA requirements than the FARs, which supports the FAA "LAME" "inspection standards" for their type certificated aircraft in this category. These basic issues have been canvassed in AMROBA's Proposals 1 and 2. They need, to be appropriate, fairly minor machinery changes to correct. CASA rules and advisory material have a deficiency that needs urgent fixing – it is contradictory to the intent of CAR 42V & 2A.

Like FAA & TCA, Australia included in legislation for Class B aircraft, a capability to elect to use the CASA (Annual) Maintenance Schedule instead of the manufacturer's maintenance schedule. It also includes maintenance certification in Schedule 6.

The CASA Maintenance Schedule more than adequately inspects the areas covered by the Cessna 100/200/300 SIDs without the need to maintain airline type maintenance records and controlling systems.

The difference is the cost of administrating and implementing the SID requirements by requiring airline type maintenance records versus simplified maintenance records for Class B aircraft.

Cessna SIDs, when reviewed, make the assumption that their aircraft fly somewhere between 200 to 600 hours per annum. A fictitious figure for Australia GA aircraft.

CASA did not, and does not need to mandate, **they need to educate and to promulgate advisory material** that will clarify **how** the "annual" inspection tasks in the CASA Maintenance Schedule must be carried out to remain compliant with CAR42V/CAR2A.

Specific

Maintaining an aircraft to the CAR Schedule 5, *CASA Maintenance Schedule*, has always required the use of the manufacturer's instructions specifying **how** inspections/maintenance tasks are carried out. This is discussed in this Proposal.

Because current aviation regulatory standards do not separate 'inspection' from other maintenance actions, and the CASA promulgated inspection standards are deficient when compared internationally or with manufacturer instructions, it does not mean that general aviation AMO LAMEs performing periodic 'annual' inspections only inspect to CASA standards. **They are compelled by law to use the manufacturer's HOW instructions, including the SIDs inspection standards**.

Fortuitously, the far majority of AMO LAMEs still inspect aircraft to the "**depth necessary**" so that they can ascertain the aircraft as **'airworthy'** before they release it. "Airworthy" is discussed later in this proposal.

They also use manufacturer instructions specifying how to do those inspections, but, complying with a manufacturer recommended maintenance instructions **before a particular aircraft** requires this maintenance can sometimes reduce a component or structural element long term life by doing unnecessary maintenance.

In the US, research into ageing aircraft and new fatigue analysis has seen many manufacturers, especially those with liability concerns, develop additional inspection and maintenance requirements. The FARs however, exclude FAR Part 91 operators that use the FAR Part 43 annual inspection from the manufacturer schedules, including SID.

Why the FAA does this is included in this proposal.

SID is a manufacturer's "Special Inspection Document" which schedules certain specific ***recommended*** inspection requirements that are outside the manufacturer's regular ***recommended*** maintenance inspection schedule intervals. Cessna has published SIDs for its 100/200/300 series aircraft. The SIDs are additional to requirements that the FAA has approved in the airworthiness limitations sections (AWS) of the Cessna Instructions for Continuing Airworthiness (ICA), and are not subject to any FAA Airworthiness Directives (AD). Like the normal maintenance schedules, they are only **recommended**.

CASA does not seem to have an understanding of the importance and intent of CAR Schedules 5 & 6 that are basic to keeping GA viable and safe. Obviously, some may need to be educated on the intent of Civil Aviation Regulations (CAR) Schedules 5 & 6.

Without Schedule 5, it would have the same effect on GA as the loss of independent flight instructor licences had in the early 1990s. Pilot shortages – now aircraft shortage.

In those countries that have an annual inspection system similar to the FARs, Cessna SIDs for private operators are not, and should not be mandatory inspections but they do provide manufacturer **HOW** instructions that must be used in Australia.

This proposal supports the FAA approach and, alongside Proposal 1 & 2 recommendations, the same approach can be taken in Australia with better certainty that the SIDs inspection techniques will be used, see CAR42V, approved data.

This proposal, in conjunction to Proposal 2, Ageing Aircraft, will provide good justification to adopt the FAA non-mandating of SIDs for private & aerialwork aircraft and even charter operations, under Australia's regulatory requirements, as long as Proposal 1 recommendations are also implemented.

The FAA approach is a safe cost effective approach that can be adopted with improved clarity in Australia. Safety will not be reduced; safety will actually be improved for all general aviation aircraft operating on Schedule 5 Maintenance Schedule by providing "inspection standards" that comply with international standards.

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The Perceived Problem

Private, aerialwork and charter aircraft being maintained to CAR Schedule 5, CASA Maintenance Schedule, is perceived by many within CASA, and some in industry, as being a cheaper alternative, and a lower maintenance standard than the manufacturer's maintenance schedules, especially Cessna SIDs schedules, or a system of maintenance.

This is a total misconception. Irrespective to the maintenance schedule elected, CAR42V & 2A require manufacturer's instructions that specify **HOW** the maintenance is performed to be used when doing the maintenance. There is no 2 levels of maintenance inspection or maintenance standards – Cessna does not have 2 separate standards.

The real difference is the simplified maintenance records for GA aircraft in Schedule 6. These are similar to the same aircraft maintenance records required by the FARs except Schedule 6 is more specific than the FAR requirements for certifying maintenance and are based on past experience addressing safety matters.

On the other hand, many in the industry are totally disappointed in CASA making an unnecessary maintenance decision to mandate the Cessna SIDs and are forcing more GA aircraft to become hangar queens. This has not been a safety decision.

If an aircraft being maintained under Schedule 5 is not in an airworthy condition, then the AMO that has been maintaining the aircraft should be **educated** in the use of the manufacturer's maintenance instructions specifying how the inspection and maintenance tasks MUST be performed. The majority of AMOs are doing the right thing and should not be punished because of the odd one that may not be doing inspections/maintenance using the regulatory applicable maintenance instructions.

Misunderstanding GA Airworthiness & Maintenance

What CASA does not seem to understand is for GA to remain viable, regulatory imposts, administration and controls must be kept to a minimum to attract and retain owner-operators of private & aerialwork aircraft. This includes a proper understanding of the importance and intent of CAR Schedules 5 & 6, schedules that are highly essential to enable GA to remain viable and safe.

Basically, as has been the standard in Australia and North America for many decades, all aircraft must be annually (pre 1991 – 3 year major) inspected to a generic standard applied by regulatory requirement. Pre 1991, these 3 year periodic inspections were contained in CAO 100.5.1, Appendix 4; post 1991, they became a periodic (annual) contained in Schedule 5. Both were designed on FAR Part 43, Appendix D.

It makes common sense to maintain aircraft certificated by the FAA to the same standards as those required by the FAA. Their safety record is better than ours in this sector and they average a lot more hours/annum than the same aircraft do in Australia.

Schedule 5 provides a generic inspection and maintenance system that, if done properly annually, will continue to provide safe aircraft. A registered operator can opt to use the manufacturers' maintenance schedules, progressive maintenance program or have a system of maintenance approved under the CARs and FARs.

Schedule 5, carried out in accordance with the applicable approved maintenance data, can maintain ageing aircraft as well as, if not better, than the manufacturer's schedules without maintaining a highly complex maintenance record system.

This is fundamentally the reason why GA can remain viable – adding airline type record keeping to non-commercial pax operators is over controlling GA.

In reality, if the regulatory system is understood, CAR42V requires Schedule 5 tasks to be carried out using the same recommended manufacturer instructions that specify **HOW** to perform the inspection or maintenance that are contained in the manufacturer instructions. Manufacturer instructions include MM, SB, SL, etc.

It is fundamental to the viability of GA that the maintenance record keeping system is simplified so that it maintains basic records only. Increasing record keeping costs to the level used in airline operations will only mean a decline in GA participants.

Schedule 5 tasks, like the FAR Part 43 Appendix D *Annual Inspection*, generically addresses all the inspection areas raised in the Cessna SIDs schedules and requires these areas to be inspected annually whereas the Cessna SID schedules has some areas on a 5 or 10 year cycle. The FAA took that into consideration when they did not mandate the Cessna mandate – like EASA and TCA.

It can be argued that Schedule 5, done in accordance with (CAR42V) the Cessna SID inspection criteria, is more onerous. It is why the "*disassemble as necessary*" must be added to Schedule 5, paragraph 2.7.

Unlike the US "annual inspection" (inspection only), the CASA Maintenance Schedule includes inspection and maintenance tasks and, again unlike the US annual inspection, the inspection and maintenance tasks must be carried out in accordance with "approved maintenance data" (CAR42V & 2A.

> When an approved maintenance organisation (AMO), carries out the CASA Maintenance Schedule 5 inspections tasks, the LAME **must use the 'inspection criteria' detailed in** the applicable Cessna Supplemental Inspection Number (SIN) – these SINs are the approved maintenance data (manufacturer maintenance instructions), under CAR42V/CAR2A, specifying **how** the CASA Maintenance Schedule tasks are to be performed.

Obviously, *some* may need to be educated on the intent of CAR Schedules 5 & 6.

Inspection Concerns – Causal Reason

The repealing (1991) of "inspection" by a LAME, or LAMEs, to determine aircraft and/or aeronautical products as "airworthy" is the causal reason why CASA are concerned with ageing aircraft, why they feel the need to issue unique ADs and mandate maintenance not mandated by the NAAs responsible for the aircraft/product type certificate. AMROBA has recommended in Proposals 1 & 2 the return of compatible inspection standards.

Setting the Foundations

The foundations of general aviation safety, in the continuing airworthiness and maintenance characteristics, is reliant on a fundamentally cost effective safety system that places **clear responsibility on the person performing inspections**, whether employed or not employed by an approved maintenance organisation (AMO), **to inspect so he/she can determine the aircraft, parts of the aircraft or systems are airworthy**.

On aircraft, AMROBA recommends that all safety critical items or processes that need inspecting, should be inspected by a LAME. Non safety critical items and processes should be inspected and signed by the employer appointed qualified AMEs.

This needs to be clarified, understood and implemented in promulgated standards, as it is a basic foundation block of good maintenance practices especially if owners elect to use the CASA Maintenance Schedule that is CASA's version of:

- the FAR Part 43 Annual Inspection; &
- TCA Standard 625 Appendix B.

The CAA(UK) *CAP 766 Light Aircraft Maintenance Programme – Aeroplanes* & *CAP 412 Light Aircraft Maintenance Schedule – Helicopters* are similar to the FAA/TCA inspections but lists structural inspections based on flying hours without any calendar period. This approach is not supported by AMROBA.

AMROBA Proposal 1 recommended recognition of the ICAO privileges for the Australian LAME and to clearly specify the scope of each LAME rating.

AMROBA Proposal 2 recommends reinstatement of proper inspection standards that had diminished under regulatory changes introduced since 1988.

AMROBA Proposal 3 is based on both the above recommendations being adopted and implemented so CASA and government can have confidence that all aircraft, including Cessna aircraft, are inspected to the depth necessary by an AMO, employing appropriately rated LAME(s), each year and that (each) LAMEs will certify that the aircraft, parts of the aircraft or systems being inspected, as airworthy. This is an important concept to be understood so that the FAA approach can once more be applied to general aviation in Australia.

Airworthy

*Note: CASR Part42: An aircraft is **airworthy** if it is in a state that conforms with its approved design and is in a condition for safe operation.*
('approved design' includes aircraft TC, STC and other applicable approved modification design data.)

*Note: **Annex 8: Airworthy. The status of an aircraft, engine, propeller or part when it conforms to its approved design and is in a condition for safe operation.***

NB: The "status" of an aircraft, **or part of an aircraft**, is very different to the narrow version of an aircraft used by Part 42. All definitions and meanings should be adopted word for word from ICAO when they exist.

Setting the Inspection Standard

The ICAO Annex 8 definition of "airworthy" should be in the Civil Aviation Safety Regulations Dictionary; it is so fundamental to implementing international standards for all aircraft and aircraft component inspections and maintenance.

Manufacturer's recommended maintenance schedules: unless mandated by ADs, contained in the Airworthiness Limitations Section of the manual, or regulatory required to be taken into consideration by a commercial operator, are exactly what they state – **recommended**. Even when developing a system of maintenance, they do not become mandatory; but they need to be taken into consideration. This means items may not even be included, with proper justification, in an approved system of maintenance. In many cases, manufacturer's recommend maintenance actions are conservative whereas a more cost effective approach may include an on-condition inspection that safely prolongs the life of the item past the "**recommended**" maintenance action required.

Adopting AMROBA Proposal 2 inspection standards, comparable to the international inspection standards used by the FAA, TCA and EASA NAAs, will return Australian aviation inspection standards to acceptable international standards. Returning the LAME to inspect aircraft and products as "airworthy" will further improve safety levels.

NAA Responsible Safety Levels

Obviously the FAA "annual" inspection standards are keeping these same private and aerialwork Cessna aircraft, and others types not subjected to manufacturer's supplementary recommended inspections, flying safely in the United States. TCA has the same basic "annual" inspection standards and Cessna's enjoy similar safety levels in Canada. EASA has taken the same approach in Europe.

The 3 major regulators in the world, requiring international inspections standards be used by the LAME to certify the aircraft, parts of the aircraft or aircraft system as "airworthy", are satisfied that Cessna aircraft used in non-commercial operations are safely maintained utilising their specified "annual" inspections.

Adopting AMROBA Proposal 1 & 2 will once again apply similar inspection standards to general aviation in Australia with the resultant safety levels enjoyed in those countries. Unique Australian ADs will be able to be repealed. Safety will be improved.

Unique Requirements

EASA states: The FAA and CASA has identified a number of SID items as ADs already.

AMROBA asks: Were CASA unique ADs based on mandating a Cessna recommended maintenance instruction?

- If based on Australian problems, did not this raise concerns within CASA that the **inspection standards**, or lack of, promulgated by CASA in advisory material contradicts CAR 42V manufacturer instructions?
- Is CASA's contradictory advisory material not providing the right safety outcomes?
- Who physically performed the aircraft inspections?

Or were these CASA ADs left over from pre CASR Part 39 days where CASA raised ADs to apply maintenance actions based on internal analysis by CASA personnel of manufacturer data? Most were not raised to address safety concerns within the Australian aircraft fleet, but to mandate mainly structural maintenance tasks from manufacturer supplemental maintenance data.

Fact: Unique ADs are not required if "international [maintenance] inspections" standards are adopted and the LAME is required to do all critical safety inspections.

Schedule 5 is the Right Inspection Schedule for GA

Annual (periodic) Inspection Includes:

When a qualified person is performing an inspection, all NAA promulgated airworthiness alerts (e.g. CASA AWBs, FAA Safety Alerts) and manufacturer's recommended maintenance instructions (MM, SB, SL, etc.) need to be taken into consideration by the LAME performing the inspection/maintenance task so the LAME can certify the aircraft as airworthy and safe for flight. If a defect is found, then the manufacturer's maintenance instructions must also be referred to so that rectification can be carried out. If there is no manufacturer data, or applicable NAA data, then there will be a need for engineering approval of the rectification process or repair.

In AMROBA's opinion, Schedule 5, *CASA Maintenance Schedule* is the right inspection schedule for all GA aircraft and Schedule 6 is the right maintenance certification system.

Does the CASA Maintenance Schedule need to be reviewed against the FAR annual inspections requirements? Would a comparison to TCA similar standards benefit?

AMROBA's opinion is that a review of CASA Schedule 5 inspection and maintenance tasks need to be conducted collaboratively with industry representatives every 8 to 10 years to maintain currency with mainly FAA international inspection standards.

In performing inspection tasks included in the CASA Maintenance Schedule, the LAME must use the CAR 2A "how to" instructions provided by the manufacturer when available.

This is a regulatory requirement specified in CAR 42V.

For example, Schedule 5,

- paragraphs 2(c), '*inspect the [mainplane & empennage] internal structures and spars'*;
- paragraph 3(e) *inspect the internal [fuselage] structure*;
- paragraph 2(g) *inspect the wing and empennage to fuselage attachments and surrounding structure* are some of the structural inspections aspects of Schedule 5.
- Other generic and specific inspection requirements actually cover all inspection requirements included in the Cessna SIDs in the same manner as FAR Part 43, annual inspection.

These Schedule 5 inspection tasks must be carried out in accordance with approved maintenance data – CAR 42V.

> **CAR 42V Maintenance: approved maintenance data**
>
> (1) A person carrying out maintenance on an Australian aircraft must ensure that the maintenance is carried out in accordance with the applicable provisions of the aircraft's approved maintenance data.

CAR 2A(2)(c) clarifies CAR 42V:

> (c) instructions, issued by the manufacturers of aircraft, aircraft components or aircraft materials, that specify **how** maintenance on the aircraft, components or materials is to be carried out; and

"that specify **how** maintenance is to be carried out"

SIDs, like other manufacturer instructions, specify "**how**" maintenance inspections are to be carried out and all manufacturer instructions specifying "**how**" an inspection or maintenance task is to be carried out must be followed even when performing a Schedule 5 Inspection or maintenance task.

The reduction in maintenance record keeping for a privately owned Cessna under Schedules 5 & 6, like their GA counterparts under the FARs, is very significant.

Also refer ***SID Assessment V Schedule 5*** later in this proposal.

Who is the NAA responsible for the Type Certificate?

Based on the number of Cessna ADs issued by CASA, one would think that CASA has responsibility for the type design and manufacturing oversight of these aircraft type certificates; or, there are many defects that suggests the Australian aircraft regulatory inspection standards are deficient.

If international inspections standards were in place, these ADs could and should be cancelled unless based on a real safety concern in the Australian Cessna aircraft fleet not caused by the current ineffective CASA documented inspection standards. Time for CASA to address the causal issue.

International Inspection Standards

EASA has made it clear that only the FAA ADs are applicable to Cessna aircraft in Europe and they have declared that SIDs are not mandatory for private operators in the EU. Australian Cessna ADs are not seen as mandatory by EASA.

What does this say about the relevance of CASA issued ADs globally?

Adopting AMROBA's proposed international inspection standards will lower administrative and maintenance costs to Cessna owners whilst improving the safety levels in general aviation.

EASA SIB No: 2014-01

*'At this time, the safety concern described in this SIB **is not considered to be an unsafe condition that would warrant Airworthiness Directive** (AD) action under Commission Regulation (EU) 748/2012, Part 21.A.3B.*

*In addition, a number of SID inspections are already subject to an AD, either in the United States or in Australia, as specified in Appendix 2 of this SIB. **The relevant FAA ADs are adopted by EASA**, under Commission Regulation (EU) No 748/2012 article 3, paragraph (1)(a)(iii).'*

Obviously, EASA does not see the need to mandate SIDs or CASA ADs.

EASA identified Cessna ADs are listed below. FAA issued 4, CASA issued 15:

Type/Model	Component	SID Task Nr.	Existing AD
All Types	Seat Rails	53-47-01	FAA AD 2011-10-09
150 and 152	Fin Attach Bracket	55-11-02	FAA AD 78-25-07
172	Lower Door Post	53-12-03	CASA AD/CESSNA 170/57
172	Horizontal Stabilizer Front Spar	55-11-01	CASA AD/CESSNA 170/59
172RG	MLG Retraction System	32-10-01	FAA AD 2001-06-06
177	Main Carry-Thru Spar	53-11-01	CASA AD/CESSNA 177/30
180, 182 and 185	Wing Rear Spar	57-11-01	CASA AD/CESSNA 180/15 CASA AD/CESSNA 185/2
180 and182	Aft Tailcone	55-30-02	CASA AD/CESSNA 180/31
180, 182 and 185	Vertical Fin Rear Spar	55-30-02	CASA AD/CESSNA 180/62 CASA AD/CESSNA 185/35
185	Engine Mount	71-20-01	CASA AD/CESSNA 185/12
188	Engine Mount	71-20-01	CASA AD/CESSNA 188/8
188	Aileron Control Cables	27-10-01	FAA AD 73-16-02
188	Wing Front and Rear Spar	57-11-01	CASA AD/CESSNA 188/22
188	Vertical Fin Rear Spar	55-30-01	CASA AD/CESSNA 188/36
206	Wing Rear Spar	57-11-01	CASA AD/CESSNA 206/3
206	Forward Door Post Bulkhead	53-30-02	CASA AD/CESSNA 206/48
206	Horizontal Stabilizer Front Spar	55-10-01	CASA AD/CESSNA 206/54

Some CASA ADs above have been cancelled – the rest should be cancelled.

EASA and the FAA have not mandated the Cessna SIDs to Part 91 operators.

US Aviation Industry Comments

Quote: "*In the USA, although Cessna enjoys General Aviation Revitalisation Act [GARA] protection from further liability in connection with these aircraft, Cessna has still issued SIDs and now an Airworthiness Limitation Section, neither of which are enforceable under FAA rules (although their impact is absolutely devastating in countries like Australia and New Zealand that don't enjoy the GARA protections that we do here in the US)*." Unquote.

Basically, in America, they cannot retrospectively enforce AWL. If it becomes an AWL then it is mandatory in our view. However, it is not the liability issues that concerns aircraft inspection.

Another quote: '*There has been a significant flow of these legacy Cessna aircraft (especially twins) from ANZ back to the US because SID compliance is so costly and is not required by the FAA but is by many other CAAs worldwide*.'

Transport Canada

Transport Canada has the same approach as the FAA. Their maintenance schedule is:

Standard 625 Appendix B - Maintenance Schedules – General Procedures

(1) The Maintenance Schedule includes:

(i) Part I - Scheduled Inspections for Aircraft other than Balloons

Transport Canada Communique:

> "For non-commercial owner/operators of small piston aircraft who are operating under Standard 625 Appendix B, however the ability to operate to the general annual inspection requirements of this appendix removes the requirement to perform the SID inspections. The Regulations state only the minimum requirements in order to comply however Transport Canada encourages all owners to assess manufacturer's recommendations for their aircraft".

Obviously the maturity of these 3 large NAAs view safety differently to CASA. AMROBA supports their approach which can be adopted in Australia with little change.

Recommendation – International Inspection Standards.

1. That recommendations contained in AMROBA Proposal 2 be implemented to provide the general aviation industry with aircraft inspection standards for the aviation industry.
2. That "inspection" criteria be based on inspecting to determine the aircraft, parts of the aircraft or aircraft system(s) as airworthy. i.e. airworthy as specified in Annex 8.
3. Setting regulatory international compatible LAME "inspection standards" is crucial to removing the current mandate to comply with the Cessna SIDs for privately operated Cessna aircraft.
4. Inspection must be regulatory separated from maintenance to provide clarity.

Cessna Supplemental Inspection Documents.

Australia was once respected globally for the condition of ex VH aircraft. Inspecting aircraft, aircraft systems, parts of aircraft post modifications as "airworthy" was a fundamental standard that underpinned our safety culture and reputation.

From a pure safety aspect, the only difference to the CAR Schedule 5, CASA Maintenance Schedule to the FAR Part 43 Annual Inspection is that Schedule 5 does not specify that the aircraft should be disassembled, to the depth necessary, to perform the periodic inspection every 12 months. Our recommended proposal to amend paragraph 2.7 will include the same requirement in other mature regulatory systems.

CASA has, for the first time, mandated fully the manufacturer's supplemental "recommended" maintenance schedules, produced by a general aviation aircraft manufacturer, without mandating the manufacturer's recommended maintenance schedules – thus imposing higher costs on Cessna private owners, using the CASA Maintenance Schedule, that are not imposed in the USA, Canada or EU countries. A return to unique Australian requirements. Reform has failed.

SID Inspections V Schedule 5

If AMROBA's proposals are accepted, can safety culture and reputation be assured?

To make this assessment, elements of the SID have been reviewed and the following are examples of SIDs structural element inspections under Schedule 5.

Cessna 182 – Manufacturers SID "how" instructions

One of the benefits of Schedule 5 is that the **how** instructions contained in Cessna Supplemental Inspections, if AMROBA's Proposal 2 is accepted and Schedule 5, paragraph 2.7 is amended accordingly, would supplement the proposed "**detailed inspection**" requiring "***disassembly as necessary***".

It is important for CASA to agree to include the words "***disassemble as necessary***", so that the AMO can inspect zonal areas based on time scales promulgated by aircraft manufacturers in data such as the Cessna SIDs.

The manufacturer's inspection periods requiring disassembly means the repetitive inspection requirements of the Supplemental Inspection Numbers (SIN) will 'control', to a large degree, the '*disassembly as necessary*' periods proposed by AMROBA in Proposal 2.

The following examples compares some of the structural Schedule 5 inspection tasks with the "**HOW**" SID *Supplemental Inspection Number* assists with the Schedule 5 task.

Cessna 182P SID comparison:

Example 1: Schedule 5, paragraph 2(c), '*inspect the [**mainplane** & empennage] internal structures and spars'.*

- This generic mainplane inspection will include the use of the manufacturer's **how** instruction contained in SIN: 57-11-01 to perform the internal inspection.
  - This SIN can lead to a more detailed inspection specified in the SIN if cracks or corrosion are found.
  - That additional inspection includes an eddy current inspection.
- The SIN inspection criteria is the applicable inspection standard.
- Schedule 5, like the manufacturer's schedule or the same task in a system of maintenance, all use the same inspection criteria.

Though SIN 57-11-01 has a repetitive inspection of 5 or 10 years, the CASA periodic inspection is done annually.

In this situation, Schedule 5 inspects this SIN area more regularly than under the SID requirements. For ageing aircraft, more regular zonal inspections is the safer option.

Example 2: Schedule 5, paragraph 2(c), '*inspect the [mainplane & **empennage**] internal structures and spars'.*

- This generic empennage inspection requires the use of SIN: 55-30-01 as the relevant manufacturer instruction **how** to do this inspection.
- This manufacturer inspection requires the rudder to be removed.
- SIN 55-30-01 has a 5 year repetitive inspection period.
- It also requires the use of a Boroscope.
- Using the "disassemble as necessary" provision will enable a more cost effective Schedule 5 to be carried out annually.

Example 3: Schedule 5, paragraph 3(e) "*inspect the internal **[fuselage]** structure".*

- This requires the use of Supplemental Inspection Number: 53-30-01 as the relevant manufacturer instruction **how** to do this inspection.
- The SIN requires the removal of the interior trim to inspect the structure.
- Once again, SIN 53-30-01 has a repetitive inspection of 5 or 10 years.
- However, the AMO would inspect known safety areas annually.

Example 4: Schedule 5, paragraphs 4(a), (b) & (c) require landing gear attachment inspection, structural members, side braces, compression members, oleo struts, etc, etc.

- This inspection requires the use of the manufacturer "**how"** instructions contained in Supplemental Inspection Numbers **32-13-01**, *Main Landing Gear Flat Spring Corrosion Inspection* or **32-13-02**, *Main Landing Gear Tubular Spring Corrosion Inspection and Main Landing Gear fitting Inspection* that have 5 or 10 year repetitive inspection periods.

Example 5: Schedule 5, paragraph 10 (d) '*inspect the engine mount frame'*; also has a Supplemental Inspection Number: 71-20-01 but this SIN only has to be carried out at engine overhaul. This is the same approach in general aviation.

As can be seen by the examples, if the AMO LAME uses the approved maintenance data to inspect the CAR Schedule 5 tasks, then there should be no safety concern.

Summary

If there is any concern that aircraft are not being inspected correctly, then CASA must adopt these proposals and educate the GA maintenance industry.

Because of CAR 42V, there is no difference in the inspection criteria used under CAR Schedule 5 or the Cessna SIDs individual SINs. The difference is in Schedule 6 certification and record keeping for Class B aircraft. Class B aircraft will continue to have certification for the Schedule 5 periodic (annual) inspections in accordance with Schedule 6, whilst an aircraft that has to comply with Cessna schedules will have very extensive maintenance records that require more costly administrative controls with no safety benefits.

Administrative Increase

1. Aircraft maintenance records – Cessna Operations 1.
    a. This is a very costly practice requiring annual certification of compliance with ALL Cessna promulgated documents – this is a commercial requirement that was not a requirement under current, and previous, regulatory requirements, it is not a safety requirement. This is stating compliance with a whole lot more than Schedule 5, AWLs and ADs.
    b. Many Service Letters, etc. may not be certified as complied with, as some are about aesthetics than safety. Many are not actual maintenance tasks but how instructions. Many are advisory information that were never certified in aircraft records.
    c. The cost to create such extensive maintenance records for Class B aircraft could take many days of research.
    d. In Australia, a maintenance record certification can be relied on by following certifiers but Cessna is requiring annual recertification.
    e. Current CAR requirements for maintenance records require compliance with all regulatory requirements pre issue of a maintenance release.
    f. Very costly to owners for no real safety benefit over current system.
2. Corrosion Protection and Control Program – Operations 2 – 6
    a. These are airline type control approach to CPCP
    b. Need high record maintenance
    c. Though corrosion protection is encouraged in GA, it has never been mandated
3. Supplemental Inspection Document – Operations 7 – 24
    a. Prescribes all the variables associated with Inspections.
    b. Repetitive actions associated different inspections
    c. Massive increase in aircraft record keeping.

Recommendation – SIDs

1. It is recommended that CASA rescind their mandating of the Cessna SID requirements for aircraft registered operators opting to use the CAR Schedule 5, CASA Maintenance Schedule in private and aerialwork operations.
2. This particular recommendation is based on clarification and implementing inspection standards spelt out in recommendations contained in AMROBA's Proposal 1 & 2.
3. That an industry/CASA team collaboratively work with CASA developing the appropriate advisory material and education needs.
4. That a collaborative industry/CASA "education" program be implemented to ensure all AMO/LAMEs understand how to use Schedule 5 & manufacturer instructions, including SIDs inspection criteria.
5. CASA field staff be tasked with assisting and educating the local AMOs to understand the proposed changes.

FAR Part 91-409 – annual inspection

The FAA, the NAA responsible for and regulatory oversight of the Cessna Type Design specify the details of the annual inspection in FAR Part 43.

§ 43.15 Additional performance rules for inspections.

(c) *Annual and 100-hour inspections.*

(1) Each person performing an annual or 100-hour inspection shall use a checklist while performing the inspection. The checklist may be of the person's own design, one provided by the manufacturer of the equipment being inspected or one obtained from another source. This checklist **must include the scope and detail of the items contained in appendix D** to this part and paragraph (b) of this section.

> Para (b) Each person maintaining or altering, or performing preventive maintenance, shall do that work in such a manner and use materials of such a quality, that the condition of the aircraft, airframe, aircraft engine, propeller, or appliance worked on will be at least equal to its original or properly altered condition (with regard to aerodynamic function, structural strength, resistance to vibration and deterioration, and other qualities affecting airworthiness).

(2) Each person approving a reciprocating-engine-powered aircraft for return to service after an annual or 100-hour inspection shall, before that approval, run the aircraft engine or engines to determine satisfactory performance in accordance with the manufacturer's recommendations of—

(i) Power output (static and idle r.p.m.);

(ii) Magnetos;

(iii) Fuel and oil pressure; and

(iv) Cylinder and oil temperature.

(3) Each person approving a turbine-engine-powered aircraft for return to service after an annual, 100-hour, or progressive inspection shall, before that approval, run the aircraft engine or engines to determine satisfactory performance in accordance with the manufacturer's recommendations.

Appendix D to Part 43—

Scope and Detail of Items (as Applicable to the Particular Aircraft) To Be Included in Annual and 100-Hour Inspections

(a) Each person performing an annual or 100-hour inspection shall, before that inspection, remove or open all necessary inspection plates, access doors, fairing, and cowling. He shall thoroughly clean the aircraft and aircraft engine.

(b) Each person performing an annual or 100-hour inspection shall inspect (where applicable) the following components of the fuselage and hull group:

(1) Fabric and skin—for deterioration, distortion, other evidence of failure, and defective or insecure attachment of fittings.

(2) Systems and components—for improper installation, apparent defects, and unsatisfactory operation.

(3) Envelope, gas bags, ballast tanks, and related parts—for poor condition.

(c) Each person performing an annual or 100-hour inspection shall inspect (where applicable) the following components of the cabin and cockpit group:

(1) Generally—for uncleanliness and loose equipment that might foul the controls.

(2) Seats and safety belts—for poor condition and apparent defects.

(3) Windows and windshields—for deterioration and breakage.

(4) Instruments—for poor condition, mounting, marking, and (where practicable) improper operation.

(5) Flight and engine controls—for improper installation and improper operation.

(6) Batteries—for improper installation and improper charge.

(7) All systems—for improper installation, poor general condition, apparent and obvious defects, and insecurity of attachment.

(d) Each person performing an annual or 100-hour inspection shall inspect (where applicable) components of the engine and nacelle group as follows:

(1) Engine section—for visual evidence of excessive oil, fuel, or hydraulic leaks, and sources of such leaks.

(2) Studs and nuts—for improper torquing and obvious defects.

(3) Internal engine—for cylinder compression and for metal particles or foreign matter on screens and sump drain plugs. If there is weak cylinder compression, for improper internal condition and improper internal tolerances.

(4) Engine mount—for cracks, looseness of mounting, and looseness of engine to mount.

(5) Flexible vibration dampeners—for poor condition and deterioration.

(6) Engine controls—for defects, improper travel, and improper safetying.

(7) Lines, hoses, and clamps—for leaks, improper condition and looseness.

(8) Exhaust stacks—for cracks, defects, and improper attachment.

(9) Accessories—for apparent defects in security of mounting.

(10) All systems—for improper installation, poor general condition, defects, and insecure attachment.

(11) Cowling—for cracks, and defects.

(e) Each person performing an annual or 100-hour inspection shall inspect (where applicable) the following components of the landing gear group:

(1) All units—for poor condition and insecurity of attachment.

(2) Shock absorbing devices—for improper oleo fluid level.

(3) Linkages, trusses, and members—for undue or excessive wear fatigue, and distortion.

(4) Retracting and locking mechanism—for improper operation.

(5) Hydraulic lines—for leakage.

(6) Electrical system—for chafing and improper operation of switches.

(7) Wheels—for cracks, defects, and condition of bearings.

(8) Tires—for wear and cuts.

(9) Brakes—for improper adjustment.

(10) Floats and skis—for insecure attachment and obvious or apparent defects.

(f) Each person performing an annual or 100-hour inspection shall inspect (where applicable) all components of the wing and center section assembly for poor general condition, fabric or skin deterioration, distortion, evidence of failure, and insecurity of attachment.

(g) Each person performing an annual or 100-hour inspection shall inspect (where applicable) all components and systems that make up the complete empennage assembly for poor general condition, fabric or skin deterioration, distortion, evidence of failure, insecure attachment, improper component installation, and improper component operation.

(h) Each person performing an annual or 100-hour inspection shall inspect (where applicable) the following components of the propeller group:

(1) Propeller assembly—for cracks, nicks, binds, and oil leakage.

(2) Bolts—for improper torquing and lack of safetying.

(3) Anti-icing devices—for improper operations and obvious defects.

(4) Control mechanisms—for improper operation, insecure mounting, and restricted travel.

(i) Each person performing an annual or 100-hour inspection shall inspect (where applicable) the following components of the radio group:

(1) Radio and electronic equipment—for improper installation and insecure mounting.

(2) Wiring and conduits—for improper routing, insecure mounting, and obvious defects.

(3) Bonding and shielding—for improper installation and poor condition.

(4) Antenna including trailing antenna—for poor condition, insecure mounting, and improper operation.

(j) Each person performing an annual or 100-hour inspection shall inspect (where applicable) each installed miscellaneous item that is not otherwise covered by this listing for improper installation and improper operation.

Note: The FAR places the responsibility on the IA to "disassemble as necessary" to perform the inspection where applicable. The IA also has to take into consideration SID inspection criteria.

CAR Schedule 5 – CASA Maintenance Schedule

A review of CASA Maintenance Schedule confirms that primary and secondary structures are inspected. The only uncertainty is paragraph 2.7 that should be amended as proposed to ensure aircraft are disassembled as necessary to perform the inspection.

To perform this Inspection, CAR 42V-CAR2A regulatory requires the AMO/LAME to use Approved Maintenance Data – SID SINs are but one source of approved maintenance data that is needed to perform the applicable inspection.

Using CAR42V/2A is mandatory but it conflicts with wording used by CASA in advisory material. This raises confusion within the industry.

Remove the word “general” from “general maintenance inspection”.

Part 2—Periodic inspection

2.1. Subject to paragraph 2.2, an inspection (in this Part called a ***periodic inspection***) must consist of the taking of the actions set out in the table at the end of this Part as applicable to the aircraft.

2.2 The holder of a certificate of registration for a class B aircraft may elect to have a section or sections of the periodic inspection carried out on the aircraft at a different time from the other sections.

2.3 **A periodic inspection must be carried out on a private aircraft within the period of 1 year** from:

(a) the day on which the aircraft’s current certificate of airworthiness was issued; or

(b) the day on which the most recent **general maintenance inspection** on the aircraft was completed;

whichever is the later.

2.4 Subject to paragraph 2.5, a periodic inspection must be carried out on a class B aircraft **that is not a private aircraft** within whichever of the following periods expires first:

(a) one year from:

(i) the day on which the aircraft’s current certificate of airworthiness was issued; or

(ii) the day on which the most recent general maintenance inspection on the aircraft was completed;

whichever is the later;

(b) the aircraft has been in service for 100 hours since:

(i) the aircraft’s current certificate of airworthiness was issued; or

(ii) the most recent **general maintenance inspection** on the aircraft was completed;

whichever occurred later.

2.5 In spite of paragraph 2.4, if the holder of the certificate of registration for a class B aircraft **that is not a private aircraft** has elected under paragraph 2.2 to have the sections of the periodic inspection carried out on the aircraft at different times, the following provisions have effect:

(a) the first carrying out of each section of the periodic inspection on the aircraft after the election is made must be carried out within whichever of the following periods expires first:

(i) 18 months from:

(A) the day on which the aircraft's current certificate of airworthiness was issued; or

(B) the day on which the most recent general maintenance inspection on the aircraft was completed;

whichever is the later;

(ii) the aircraft has been in service for 150 hours since:

(A) the aircraft's current certificate of airworthiness was issued; or

(B) the most recent general maintenance inspection on the aircraft was completed;

whichever occurred later;

(b) each subsequent carrying out of each section of the periodic inspection must be carried out within whichever of the following periods expires first:

(i) the aircraft has been in service for 100 hours since the section concerned was most recently carried out on the aircraft;

(ii) 1 year from the day on which the section concerned was most recently carried out on the aircraft.

2.6 In this Part:

general maintenance inspection means a regular inspection and check of a class B aircraft, its systems and components that:

(a) is required by the aircraft's maintenance schedule to be carried out at regular intervals; and

(b) is not required to be carried out before the aircraft's first flight on each day on which the aircraft is flown.

private aircraft means an aircraft:

(a) that is a class B aircraft; and

(b) that has a maximum take off weight of 5700 kg or less; and

(c) that is only used in private operations by:

(i) the owner of the aircraft; or

(ii) a person to whom the owner has provided the aircraft without receiving any remuneration from the person.

2.7 Unless otherwise indicated in the table, where the table requires a thing to be inspected, the inspection is to be a thorough check made to determine whether the thing will continue to be airworthy until the next periodic inspection.

Para. 2.7 – amend as recommended in Proposal 2. CAR42V/2A conflicts with this terminology and what CASA explains as a "general maintenance inspection".

Table of actions included in a periodic inspection

Section 1 The airframe

(1) *Check* the external and internal required placards.

Note: Reference should be made to the aircraft flight manual and airworthiness directives for the required placards.

(2) *Take the following action* in relation to the **mainplane and empennage** (including canards) of the aircraft:

(a) inspect the skins for evidence of wrinkles, buckles, sheared or loose rivets, corrosion, disbonds and general damage;

(b) if the skin is fabric, check the strength of the fabric;

(c) inspect the **internal** structures and spars;
(d) inspect the lift struts, interplane struts, jury struts, spreaders, chafing discs and bracing wires;
(e) inspect the flight control surfaces, slats, spoilers, tabs, flaps, mass balance weight attachments, hinge brackets, tracks and rollers;
(f) inspect the flight control system bellcranks, push pull rods, torque tubes, cables, fairleads, turnbarrells and pulleys;
(g) inspect the wing and empennage to fuselage attachments and surrounding structure;
(h) lubricate as necessary.

(3) *Take the following action* in relation to the **fuselage**:
(a) inspect the fuselage skin for evidence of wrinkles, buckles, sheared or loose rivets, corrosion, disbonds and general damage;
(b) inspect the areas around cut-outs (such as windows and inspection apertures) for cracks and inspect the sealing and fit of all doors and emergency exits;
(c) inspect the interior;
(d) inspect the strength of the fabric covering on surfaces;
(e) inspect the **internal** structure;
(f) inspect the locks, latches and hinges of doors, canopy, windows which may be opened and direct vision windows;
(g) check that the windshields and windows are clean and free from crazing, cracking, discoloration, delamination and scratches;
(h) inspect the seats, seat attachments, seat adjustment mechanisms, seat stops, seat belts, safety harnesses and inertia reels;
(j) inspect the control wheels, control columns, rudder pedals, control levers, control system bellcranks, push pull rods, torque tubes and cables;
(k) operate all trim controls through the complete range of travel and check them for correct trim position indication;
(l) inspect the brake master cylinders, brake lines, reservoirs, parking brake linkage and mechanical brake system operating mechanisms;
(m) check the cabin fire extinguisher for correct charge, legibility of operating instructions and condition of locking pin or seal and ensure that the extinguisher has not reached its expiry date;
(n) inspect the heating and fresh air system ducting and outlets and the airflow control valves;
(p) inspect the emergency and flotation equipment and ensure that the equipment has not reached its expiry date;
(q) lubricate as necessary.

(4) *Jack the aircraft* so that the landing gear is clear of the ground and take the following action:
(a) inspect the undercarriage attachment to the airframe;
(b) inspect the structural members, drag and side braces, compression members, oleo struts, bracing struts and torque links;
(c) inspect the leaf or tube spring shock absorbing units and bungee rubber;
(d) inspect the flexible hoses;
(e) inspect the main wheels and tyres and the nose or tail wheels and tyres;
(f) clean the wheel bearings, check that they are free from scoring and brinelling, re-lubricate them, re-install them and adjust the bearing pre-load;
(g) inspect the brake linings or pads and the brake drums or discs;
(h) inspect the brake lines and flexible hoses;

(j) inspect the nosewheel or tailwheel steering mechanism and the shimmy dampener;

(k) inspect the landing gear retraction mechanism, the door and the door operating linkage;

(l) carry out an operational check of the landing gear and doors and ensure that the adjustment of downlocks, overcentre links, uplocks and spring tensions are within the manufacturer's specified limits;

(m) lubricate as necessary.

(5) *Take the following action* in relation to the fuel system:

(a) inspect the fuel tanks (where visible), lines, drains, vents, signs, filler caps, filler cap securing chains or cables, filler cap seals and scupper drains;

(b) inspect the fuel selector valves;

(c) inspect the fuel selector valve operating linkage.

(6) *Take the following action* in relation to the hydraulic system:

(a) remove, clean, and refit the hydraulic system filter element, or if it is unserviceable, install a new filter element;

(b) inspect the hydraulic system reservoirs, powerpack, accumulators, selector valves, hand pump, pipelines and flexible hoses.

(7) *Inspect* the anti-icing and de-icing systems.

(8) *Inspect* the air-conditioning evaporator, condenser and compressor and the air-conditioning ducting, pipelines and units.

(9) *Inspect* the pressurisation control system and indication system.

(10) *Take the following additional action* if the aircraft is used in agricultural operations:

(a) inspect the hopper, hopper lid and fasteners, baffles and internal braces;

(b) inspect the spreader, spreader gate and controls;

(c) inspect the spray pump fan, fan mount, fan brake, spray pump lines, booms and boom supports;

(d) inspect the emergency dump doors and dump controls.

(11) *Take the following additional action* if the aircraft is a seaplane:

(a) inspect the external covering and internal structure of the floats or hull;

(b) drain the bilge compartments, refit and re-lock the drain plugs;

(c) inspect the float attachment struts, bracing wires and attachment fittings;

(d) inspect the water rudders, water rudder attachments and water rudder controls, operate and check them for full and free movement in the correct sense and for correct locking;

(e) inspect the protective treatment and finish.

Section 2 The engine

(1) *Check* the external and internal required placards.

Note: Reference should be made to the aircraft flight manual and airworthiness directives for the required placards.

(2) *Take the following action* in relation to the cowls:

(a) remove, clean and inspect the cowls, cowl flaps and fastenings.

(3) *Inspect*, and record the compression of, each cylinder.

(4) *Take the following action* in relation to the engine oil system:

(a) drain the sump or tank and refit the plug and lockwire;

(b) drain the oil cooler and refit and secure the hose;

(c) either:

(i) remove, inspect, clean and refit the pressure filter and lockwire; or

(ii) remove, open and inspect the cartridge full flow filter and fit a new cartridge and lockwire;

(d) inspect the oil cooler, oil temperature control valves, oil tank and attachment fittings;

(e) inspect all oil lines, fittings, breather pipe and the oil cooler shutter;

(f) refill the sump or tank with the recommended grade and quantity of oil.

(5) *Take the following action* in relation to the ignition system:

(a) remove the spark plugs, clean and inspect them, check the spark plug electrode gap, test the spark plugs and renew them if required;

(b) inspect the spark plug high tension leads and ceramics;

(c) inspect the magneto housing;

(d) inspect the breaker compartment and cam follower;

(e) inspect the breaker points for serviceability and check the breaker points gap, magneto engine timing and synchronisation;

(f) inspect the switch and earth leads;

(g) refit and torque the spark plugs;

(h) refit the spark plug high tension leads.

(6) *Take the following action* in relation to the fuel system:

(a) place the fuel selector in the off position;

(b) remove, inspect, clean and refit the fuel strainers and screens and lockwire;

(c) drain and flush the carburettor fuel bowl and refit the plug and lockwire;

(d) inspect the carburettor or fuel injection components;

(e) inspect the throttle and mixture shafts;

(f) inspect all fuel lines and fittings;

(g) move the fuel selector from the off position;

(h) inspect the auxiliary fuel pump for operation;

(j) pressurise and purge the fuel system and inspect it for leaks.

(7) *Take the following action* in relation to the induction system:

(a) remove the air filters, clean them, inspect them and refit or renew them;

(b) inspect the hot and alternate air systems for the integrity of seals and for serviceability of valves, shafts, bearings, magnets and hinges;

(c) inspect the induction manifold and hoses.

(8) *Take the following action* in relation to the exhaust system:

(a) inspect the exhaust system;

(b) remove the muffler shroud, inspect the muffler and refit the shroud;

(c) inspect the muffler internally for security of baffle cones;

(d) inspect the cabin heat flexible hoses.

(9) *Take the following action* in relation to the engine cylinders and baffles:

(a) inspect the cylinder assemblies;

(b) inspect the cylinder base to the crankcase area;

(c) inspect the rocker covers;

(d) inspect the push rod housing seals.

(10) *Take the following action* in relation to the crankcase, accessory housing and firewall:

(a) inspect the engine for evidence of oil leakage;
(b) inspect the accessories and drive belts;
(c) inspect the engine mounts and engine mount bolts;
(d) inspect the engine mount frame;
(e) inspect the firewall, including seals and sealant.

(11) *Inspect the following controls* for full and free movement in the correct sense:

(a) throttle, mixture and propeller;
(b) alternate air and carburettor heat;
(c) engine bay fuel strainer controls;
(d) oil cooler shutter and cowl flap;
(e) turbocharger.

(12) *Take the following action* in relation to the propeller:

(a) inspect the propeller for static track;
(b) inspect the propeller hub, spinner and backplate;
(c) inspect the wooden propeller attachment bolts;
(d) inspect the blades;
(e) inspect the counterweights;
(f) lubricate the propeller hub;
(g) service the propeller hub with air.

(13) *Take the following action* in relation to the turbocharger:

(a) remove the heat shield and inspect the turbocharger housing for cracks and oil leaks from the inlet and outlet ports;
(b) inspect the compressor and turbine wheel;
(c) inspect the rotating assembly bearing for end float;
(d) inspect the turbocharger mount;
(e) inspect the transition assembly, the induction and exhaust components and the clamps;
(f) inspect the upper deck pressure manifold and hoses;
(g) lubricate the waste gate linkages and the butterfly valve;
(h) inspect the flexible oil lines;
(j) inspect the controllers and actuators;
(k) inspect the compressor by-pass door;
(m) refit the heat shield.

(14) *Take the following action* in relation to the refitting of the cowls:

(a) check that no tooling, rags or other foreign objects remain in the compartment;
(b) inspect the latches and fasteners for correct tension;
(c) inspect the inlet and cooling air ducting;
(d) inspect the landing and taxi light wiring;
(e) inspect the cowl flap linkage and engine drain lines.

(15) *Chock the wheels and check* the brake operation, then set the park brake, start the engine and take the following action to determine satisfactory performance in accordance with the manufacturer's recommendations:

(a) stabilise the engine temperatures and pressures;
(b) check the idle speed, mixture and the magneto switch operation at low engine revolutions per minute;
(c) check the carburettor heat or alternate air operation;
(d) check the gyro or vacuum pressure indication;
(e) inspect the generator or alternator;
(f) check any unusual engine vibration or noises;
(g) check the engine response to throttle application;
(h) check each magneto and propeller governor for operation;
(j) check the static engine revolutions per minute, manifold pressure and fuel flow;
(k) check the idle cut-off operation.

(16) *After taking the action described above*, remove the cowls, inspect the engine for oil, fuel or other fluid leaks, then replace the cowls.

Section 3 The electrical system

(1) *Check* the external and internal required placards.

Note: Reference should be made to the aircraft flight manual and airworthiness directives for the required placards.

(2) *Take the following action* in relation to the air-conditioning system:
(a) inspect the distribution system electrical components and interwiring;
(b) inspect the heating and temperature control system;
(c) inspect the freon system electrical components and interwiring;
(d) inspect the air cycle system electrical components and interwiring.

(3) *Take the following action* in relation to the electrical power:
(a) inspect the AC generation system (including the generator, invertor, regulator, interwiring, control relays and switching);
(b) inspect the AC distribution system;
(c) inspect the DC generation system (including the generator, regulator, transformer or rectifier units, interwiring, control relays and switches);
(d) inspect the DC distribution system (including the busses, circuit breakers or fuses, relays, switches and interwiring);
(e) inspect the starter generator;
(f) inspect the indication systems;
(g) inspect the batteries;
(h) inspect the external power system.

(4) *Take the following action* in relation to electrical equipment and furnishing:
(a) inspect the flight compartment (including any spare bulbs and fuses);
(b) inspect the passenger compartment (including any spare bulbs and fuses);
(c) inspect the buffet or galley electrical systems, the lavatory compartment electrical systems and the cargo compartment electrical systems.

(5) *Take the following action* in relation to the following fire protection systems:
(a) inspect the engine fire detection system;
(b) inspect any other fire and smoke detection systems;
(c) inspect the engine fire extinguishing system;
(d) inspect any other fire extinguishing systems.

(6) *Inspect* the electrical components and interwiring of the following flight control systems:
- (a) the trim and flap system;
- (b) the lift dump and spoiler system;
- (c) the lift augmenting system.

(7) *Inspect* the electrical components and interwiring of the fuel distribution and dump system.

(8) *Inspect* the electrical components and interwiring of the main and auxiliary hydraulic systems.

(9) *Inspect* the electrical components and interwiring of the following ice and rain protection systems:
- (a) the anti/de-ice systems;
- (b) the ice detection and indication systems.

(10) *Inspect* the systems and components that give audible or visual warnings.

(11) *Inspect* the electrical components and interwiring of the following landing gear systems:
- (a) the extension and retraction systems;
- (b) the wheels, brakes and anti-skid system;
- (c) the nose wheel steering system;
- (d) the position and warning system;
- (e) the anti-retract system.

(12) *Inspect* lights in or on the following areas:
- (a) the flight compartment, the passenger compartment and the cargo and service compartment;
- (b) the exterior and emergency systems.

(13) *Inspect* the electrical components and interwiring of pneumatic systems.

(14) *Inspect* the electrical or electronic control panels, equipment racks and junction boxes.

(15) *Inspect* the electrical components and interwiring of passenger, crew and cargo doors.

(16) *Inspect* the electrical components and interwiring of the propeller control and anti/de-ice systems.

(17) *Inspect* the electrical harnesses, excluding the ignition harness.

(18) *Inspect* the electrical components and interwiring of the engine fuel and engine control systems.

(19) *Take the following action* in relation to the ignition:
- (a) inspect the electrical power supplies;
- (b) inspect the booster coils, vibrator systems and high energy ignition systems;
- (c) inspect the switching, including by performing an insulation check of the magneto switch leads.

(20) *Inspect* the engine starting system.

Section 4 The instruments

(1) *Check* the external and internal required placards.

Note: Reference should be made to the aircraft flight manual and airworthiness directives for the required placards.

(2) *Take the following action* in relation to the auto-flight system:

(a) inspect the autopilot or the automatic flight control system, including the flight director and stability control augmentation;

(b) inspect the yaw damper system;

(c) inspect the speed-attitude correction system, including the auto-trim and mach-trim.

(3) *Inspect* the flight control surface indication systems.

(4) *Inspect* the fuel pressure and quantity indication systems.

(5) *Inspect* the hydraulic power indication system.

(6) *Inspect* the ice protection indication system.

(7) *Take the following action* in relation to indicating and recording systems:

(a) inspect the instrument and control panels;

(b) inspect the independent instrument systems, including the inclinometers, indicators and clocks;

(c) inspect the recorders, including the flight data recorders, performance or maintenance recorders.

(8) *Take the following action* in relation to navigation systems:

(a) inspect the flight environment data system, including:

(i) the central air data system; and

(ii) the pitot/static system, including instruments; and

(iii) the stall warning system;

(b) inspect the attitude and direction systems, including:

(i) the magnetic compass; and

(ii) the vertical attitude gyro system; and

(iii) the directional gyro system, including the magnetic referenced systems; and

(iv) the electronic flight instrument system and multi-function displays;

(c) inspect the independent position determining systems, including:

(i) the inertial navigation and reference systems; and

(ii) the ground proximity warning systems;

(d) inspect the flight management system, including the flight management and performance management systems.

(9) *Take the following action* in relation to oxygen systems:

(a) inspect the crew, passenger and portable systems;

(b) inspect the indicating systems.

(10) *Inspect* the pneumatic indicating systems, including the pressure gauge and warning indicators.

(11) *Take the following action* in relation to the instrument pressure or vacuum system:

(a) inspect the distribution system, including the filters, manifolds, regulating valves, check valves and plumbing;

(b) inspect the indicating system, including the pressure gauge and warning system.

(12) *Inspect* the engine indicating systems, including fuel flow, temperature and pressure.

(13) *Take the following action* in relation to the engine indicating systems:

(a) inspect the power indicating system;

(b) inspect the temperature indication system;

(c) inspect the integrated engine instrument system.

(14) *Inspect* the oil indicating systems, including quantity, pressure and temperature.

(15) *Inspect* the water injection indicating system.

Section 5 The radio system

(1) *Check* the interior and exterior required placards including frequency charts.

Note: Reference should be made to the aircraft flight manual and airworthiness directives for the required placards.

(2) *Take the following action* in relation to communication and navigation systems:

(a) inspect the accessible interwiring, plugs and sockets;

(b) inspect the microphones, headsets and cords;

(c) inspect the fuses for adequacy of spares;

(d) inspect the antennae and antenna insulators;

(e) inspect the Emergency Location Transmitter/Crash Location Beacon batteries for electrolyte leakage and check that the battery life has not expired;

(f) inspect the removable units, mounting racks, vibration isolators and bonding straps;

(g) inspect the switches and controllers;

(h) inspect the radio panel lamps for adequate illumination;

(j) inspect the radio indicators for legibility.

(3) *Take the following additional action* in relation to communication systems in aircraft equipped for I.F.R. flight:

(a) inspect the HF communication system, including for correct performance by communication with ground stations or by other means;

(b) inspect the VHF communication system, including for correct performance by communication with ground stations or by other means;

(c) inspect the audio system, including for correct operation of all distribution and amplifying systems in all modes of operation.

(4) *Take the following action* in relation to navigation systems in aircraft equipped for I.F.R. flight:

(a) check the ADF system for accuracy and correct performance in all modes of operation within the limits specified in section 108.34 of the Civil Aviation Orders;

(b) check the VOR system for correct performance within the limits specified in section 108.34 of the Civil Aviation Orders;

(c) check the localiser system for correct performance within the limits specified in section 108.34 of the Civil Aviation Orders;

(d) check the glideslope system for correct performance within the limits specified in section 108.34 of the Civil Aviation Orders;

(e) check the marker system for correct performance in all modes: an approved simulator may be used for these tests;
(f) inspect the DME system;
(g) inspect the Omega/VLF system;
(h) inspect the Doppler navigation system;
(j) inspect the weather radar system;
(k) check the ATC transponder system for correct performance in all modes using the self test facility: select code 0101 for this test;
(l) inspect the radio altimeter system;
(m) inspect the ground proximity warning system; and
(n) inspect the electronic flight instrument system.

Part 3—Post inspection check

3.1 On completion of each section of the inspection, check to ensure that all tools, maintenance equipment or rags have been removed from the aircraft and all panel, access doors, detachable fairings and fillets have been correctly secured.

(LAME Stage Inspections before close-ups)

History of Reform

One of the purposes of regulatory reform that started back in the late 1980s was to reduce unique Australian requirements and adopt the country of design requirements for the continuing airworthiness of aircraft manufactured in other mature aviation countries.

Australia was not alone in taking this approach as many other mature NAAs like the CAA(UK), during 1990s and 2000s, cancelled many unique ADs, some were based on Australia's unique fatigue based ADs, which were not based on the NAA responsible for the type certificate's mandatory requirements. (Annex 8).

Refer CAA (UK) Info Alert 2007/02:

> The CAA has recently removed all fatigue related Airworthiness Directives (AD) associated with non-UK built aircraft. These ADs were mandated solely within the UK after EASA had taken responsibility for the airworthiness of those types. The CAA publication *CAP 747 Mandatory Requirements for Airworthiness*, which contains these ADs, will be amended to remove the 34 fatigue related items. Aircraft affected include Cessna, Piper, Raytheon (Beech) and B747.

EASA did not re-issue these unique ADs, relying on the FAA to issue and circulate mandatory information to all nations with their aircraft on their register.

Unlike EASA and the FAA that issue Type Certificates mainly based on the other's Type Certificate, Australia, like New Zealand and many other NAAs, issue *Type Acceptance Certificates* validating the EASA or FAA, for example, Type Certificates. In other words, the design and manufacturing regulatory oversight responsibility remains with the NAA responsible for the Type Certificate. This was done to reduce duplication.

Type acceptance is a very straightforward process involving validation of a foreign type certificate. However, any proposed change to a type acceptance certificate should be treated as an application for a new type certificate. This is because there is no holder of the type acceptance certificate and the only reason a change would likely to be required by CASA is to add an additional model to an existing type acceptance certificate.

A consequence of the type acceptance certificate approach, was a commitment that all discrepancy reports affecting the design or manufacture were to be copied to the NAA [and manufacturer] responsible for the type design, thus enabling them to capture a world-wide deficiency database so these type certificate holders could fulfil their obligations as a type certificate holder. Complies with provisions of Annex 8.

The real reason for this approach was simple – it safely and cost effectively met Australia's obligations under the Convention and Annexes, specifically Annex 8. Australia accepted that mature NAAs were and should be responsible for their type certificated products and their type certificate holders have international obligations for providing continuing airworthiness instructions and mandatory information. It was also the basis of introducing Type Acceptance Certificates under CASR Part 21.

What is missing to implement a safe and cost effective system is the failure to implement a FAR based maintenance regulatory system based on the applicable FARs associated with general aviation.

CASR Part 43, based on FAR Part 43 and FAR Part 91.409 must be revived under the regulatory development process for the survival of general aviation.

Outcome Proposal 3:

It is envisaged that by adopting the recommendations in this Proposal and the recommendations in Proposals 1 & 2, Australia will have a similar system to the FAA system for FAA type-certificated aircraft.

This will enable the lower costs of proposed airline type complex maintenance records system being replaced with the generic maintenance record system associated with CAR Schedules 5 & 6. This system is very similar to the FAA system under FAR Part 43. Maintaining an aircraft maintenance record system for these types of aircraft similar to what is recorded under the FAR system will assist registered operators if the aircraft is sold back into the US market.

The SIDs have repetitive detailed inspections at various calendar periods, therefore enabling the AMO/LAME to disassemble as necessary to ensure that these detailed inspections are performed at similar calendar periods.

The saving in costs will make the difference between many of these aircraft flying or becoming hangar queens. The CAR Schedule 6 controlled maintenance records are adequate as in the FAR annual inspection records.

It will also ensure that any aircraft that is maintained under Schedule 5 will need a complete baseline inspection/maintenance to transition into passenger carrying commercial operations. This is exactly the same requirement as in the FARs that specify a complete baseline inspection to place an aircraft into a manufacturer's progressive maintenance program or a system of maintenance.

This proposal benefits the private owner whilst still ensuring the aircraft is safe to fly.

The outcome is that many registered operators may start flying the aircraft, especially twin engined aircraft. At the least, there will be a higher utilisation of aircraft.

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