

## Tech Manager's AUF Magazine Input on Amateur Built Matters – includes September 2001

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## January 99

Perhaps one of the most pressing issues at this time is the approval of inspectors. These are the people who perform the final inspection on the aeroplane and who determine the initial restrictions that might need to be applied. It is necessary to establish an Australia-wide network of these people, so if you qualify or know someone who does, we would be pleased to hear from you.

**Inspectors.** By CASA decree, inspectors must have both a CASA LAME licence on engines and airframes **AND** an AUF Level 2 authorisation. (Note that to have the LAME licence and the Level 2 means that they are current: ie the LAME Licence, renewable each 2 years must not have expired, similarly the Level 2 holder must be a current AUF member). Also by decree, these inspectors are not responsible for actually determining the airworthiness of the machine: the builder has responsibility for that. Somewhere in the administration of this new system, the task of the inspector is described as 'invigilating' certain actions by the applicant, eg watching while the applicant performs an inspection detailed in the Technical Manual.

As one who has come from a CASA background, one of the problems of the 'Technocrats' in Paul Middleton's story 'Gather around Kiddies' on page 15 of the last issue was who took final responsibility before that first flight.... and from my BASI days it then follows as to who can be sued for someone's loved ones being without a breadwinner. Indeed, I heard it said of the US experimental system, that the FAA inspector's role was to clearly identify the aircraft so that there was no doubt as to what the wreckage was! Hearsay aside, the purpose of the inspector is not to determine or guarantee airworthiness. That is your job. Think about it.

The concept, of course, is wonderful. It is already simplifying some of the detailed examination that once was necessary to register an aeroplane, and will give new life to some which could not quite meet the old weight limitations. Also, although the foregoing may have shades of gloom about it, there have been many very good aeroplanes produced under the experimental category. Being new to the system, I do not know how long it will be before the tech manual amendment reaches members, but in the interim, Paul Middleton's article on page 14 of the last issue is a very good summary. If you are pulling out one of Bruce Llewellyn's 'Dragons', do not hesitate to call the AUF Office for an advance copy to see what you are in for.

## February 99

A number of issues have arisen in the amateur built ultralight area (the 'experimental' area as some choose to call it) since its introduction early in October last year. All of those who read the December/January issue of Australian Ultralights will know that the new Technical Manual section which covers it, Section 3.3-1, was published on page 32. This was the complete document as it will be issued and is the actual reference document on my desk for responding to queries. If you didn't read it, you should do so before calling The Office because you may be able to answer your own questions - at least in part.

Then again, after years in bureaucracies, I have found that rules and regulations are not always correctly interpreted, because, although the words may be there for those who work with and understand them, it frequently takes several readings and close attention to phraseology by the public before they are fully appreciated and understood. This is the reason for companion advisory documents. Anyway, feel free to call because it has taken me a while to catch up with the niceties of the wording and the CASA intent.

Most of the following will deal with the 'Amateur Built for Christmas' article in the last issue (Dec/Jan 99) and the topics will be treated in the order they arise.

**FAA AC 90-89A.** Early in the article there was reference to FAA AC 90-89A and that it was available from the AUF. The document is a FAA publication titled "Amateur-Built Aircraft and Ultralight Flight Testing Handbook" and runs to about 100 pages. It is beyond our capabilities to obtain or produce as a document for distribution, so to ensure it is available to everyone, the document is being serialised in Australian Ultralights. If you have Internet access, it is about 800K in size and is downloadable from [www.faa.gov/avr/afs/acs/ac-cdx.htm](http://www.faa.gov/avr/afs/acs/ac-cdx.htm). The document is an excellent compendium of knowledge and advice as well as providing detail on procedure associated with the final phases of building an amateur built ultralight.

**Amateur Built Content.** The rules permit construction of Amateur Built Ultralights from kits: however, the rules state that the major portion of the aircraft must be fabricated and assembled by the builder. The major portion has been loosely defined as more than 50%. As a new chum to the chair, I have become aware that many kits are being built the field, but I have not yet found where many of

them have been assessed as being compliant with CASAs requirements. So, if you are building a new type of aeroplane from a kit or are building one that you have not checked out against the major portion rule, you continue at your own risk. Similarly, if you propose to produce or import kits, you should check this aspect before becoming committed.

Another issue that is being raised with regard to amateur building is that of restoration and modification. Queries have been received from a number of people who have virtually rebuilt or propose to rebuild aircraft that have been damaged or deteriorated to the extent that the work involved to restore them could well have exceeded the original construction effort. Some of these aircraft had been factory built. Unfortunately, as the orders are written at present, factory built aircraft are not recognised under the Amateur Built classification and restoration effort is similarly not recognised.

Then there are the cases where I have been queried on acceptability of factory built aircraft which have been modified or are being considered for modification by builders with what must be in excess of 50% of the manufacturing content. The quick answer to all of these is that they do not qualify at present. While the outcome of all of the above might not be successful, CASA has not dismissed the issue as being out of hand and some, for example extensive restoration, may be accepted in the future – but work is needed to achieve this. Don't hold your breath while waiting though.

**Advising the AUF of Commencement of Construction.** The main need to advise the AUF of the commencement of construction is to ensure that there is no misunderstanding of the system before you spend money and time to get started. My normal actions are to query the MTOW,  $V_{so}$ , and if a kit is involved, details of the kit and to discuss the project in general including the availability of inspectors and ultralight expertise in the area. This should prevent people embarking on illegal projects and may assist in enlisting LAMEs in the area to become inspectors.

**Documentation.** The article refers to an AUF logbook being required for the project. There is no specific AUF logbook for this purpose, and any system of record is satisfactory if it can be properly and neatly maintained. Besides being a record of construction for airworthiness purposes such as providing histories of inspections and procedures, it becomes a record of time spent on the various stages of construction and might be called upon to verify builder content.

### Registration

Provisional registration can be applied for at any stage of construction if desired, although there is no technical reason for doing so. I am sternly advised by the managers of the registration system that specific numbers can no longer be reserved due to the new computer system. Cost for allocating a registration number (for, say applying to an aircraft during the finishing stages) is \$35.

Final registration can only be obtained once the pre-flight final inspection has been signed off by the Authorised Person and the sign-off document is presented along with the application form.

**Pre-Flight Final Inspection Inspector.** The pre-flight final inspection is done by the builder, supervised by an Authorised Person. This Authorised Person is required by the CASA to be a current CASA LAME with airframe and engine ratings who *also* holds an AUF Level 2 Maintenance Authority and is financial member of the AUF. Many people take several repetitions of this to finally accept what is required by the CASA, so I repeat it again: This Authorised Person is required by the CASA to be a current CASA LAME with airframe and engine ratings who *also* holds an AUF Level 2 Maintenance Authority and is a financial member of the AUF.

Still not accepting the legal word, members then query whether a LAME and a Level 2, two different people, can perform it together – and the answer is NO!. Also, Reg 35 Engineers are not mentioned by the CASA in the instrument of authorisation, so, for the time being they are not able to perform the function. This seems strange if not sad, particularly, when, say a Reg 35 who designed an aircraft cannot clear his own design. CASA has been contacted on this, they understand the position and this situation will change.

The AUF is trying to arrange as broad a coverage of inspectors as possible, so if you know of any 'worthy' LAMEs in your vicinity who would not mind joining the AUF and applying for a Level 2 Maintenance Authority, could you please have them contact the AUF here in Canberra.

### March 99

**The Amateur Built Category** The most topical thing this month remains the Amateur Built Ultralight. As at the time of writing, there are 12 field inspectors: 3 in NSW, 2 in SA, 2 in Vic, and 5 in Qld. Until now, these have handled requirements: however, they are still spread very thinly and the AUF would be grateful to hear from Level 2s who are LAMEs or from anyone who might know a LAME who would undertake the

role. The main problem is in areas away from the capital cities.

The guiding document for the whole process has been the amendment to Section 3.3 of the Technical Manual published in the Dec/Jan edition of the magazine. This really only explained the process of getting an aircraft cleared to fly: It did not cover anything beyond that apart from the area restrictions, ie 25 hours for a certificated engine and 40 hours for a non-certificated engine.

**Description of the Aircraft.** Instances that are now arising are that unless the aircraft is of a known type, eg Jabiru, RANS, etc, the present arrangement does not provide any identifying information to the AUF. It is a situation similar to the early days of CAO 95.10, which ultimately led to the introduction of the CAO 95.10 Aircraft Data Sheet. Sometimes known as a 'Tech Data Package', the Aircraft Data Sheet is a comprehensive document providing enough data for any future technical assistance and when completed at times of change of ownership, if completed properly, it provides a record of modification. The 95.10 document also requires photographs – very helpful here in the Office (also in tracing those aircraft that do not carry registration markings) – and these are desirable for Amateur Built aircraft also. Subject to feedback from you readers, the Aircraft Data Sheet for amateur built aircraft appears to be a necessary requirement.

Those with a keen eye may note that the application form (as published in the Dec/Jan) issue seems to be more of an application for approval of an engine than for an aircraft. This is being rectified – although the Aircraft Data Sheet outlined above will solve this.

**$V_{so}$  and Maximum Take-Off Weight.** Rules is rules. The rules we operate by are government rules – legislation! The Tech Manual amendment and CAO 95.55 specify that the  $V_{so}$  (stall speed in the landing configuration) for the new category must not exceed 45 knots and that the maximum take-off weight (MTOW) does not exceed 544 kg (for an aeroplane other than a seaplane). These are the rules and failure to observe these can result in unpleasant things: like invalidating insurance and rendering ones-self liable to legal claims – not to mention action by CASA. It is also one of the tasks of the AUF to oversight compliance as best possible. At present there is no requirement in place to confirm these parameters when registering in the new category, so the AUF is considering introducing a requirement for them to be certified and submitted by the registered owner. This will probably be introduced as a task associated with the test flying phase.

**MTOW (Maximum Take-Off Weight).** The MTOW is related to empty weight, fuel capacity and the number of occupants that would be recorded in the Aircraft Data sheet discussed above. From this it would be obvious whether the aircraft can be legitimately operated as a two seater without limitation, or whether placards are required to limit the payload so that the aircraft weight does not exceed legal limits. Note that CAO 95.55 para 1.6 has formulae to determine minimum useful load and while this does not strictly apply to our aircraft, it will be used as one of the parameters affecting a decision. Some applications for registration are being received with cavalier statements just quoting the legal limits. If the aircraft is capable of more than 544 kg, it will need to be placarded (and this will be researched at the AUF Office as part of processing).

Another point to be aware of regarding MTOW are the airworthiness ramifications of increasing it. Under the Amateur Built concept, the builder alone is responsible for Airworthiness. Because the weight limit of the Amateur Built Ultralight has now been set by CASA at 544 kg, the AUF Office is receiving many queries and applications regarding increasing the MTOW of 95.10 aircraft from the current 300 kg MTOW to something above that. With aircraft that are provided with specifications, any consideration to increasing weight beyond the designer's/manufacture's specified values should be only be done with the greatest of care. Increasing the weight itself is one thing, but another very important matter is where the weight will be added and its effect on centre of gravity position and allowable range.

In the case of 101.28 aircraft that are currently limited to 480 kg under the pre October 1998 rules, MTOW cannot be increased unless the ABAA (CASA document specifying the aircraft) covers the proposed new weight. If an increase is required on a '28' aircraft and it is not covered by the ABAA, two avenues are available: one is to have the new value validated by a Reg 35 engineer, the other is to change the registration to '19' (sending a transfer fee) attach the warning placards that go with a '19' aircraft and assume your own airworthiness responsibility.

#### **Stall Speed in the Landing Configuration, $V_{so}$ .**

The  $V_{so}$  can only really be determined from a flight check. This makes the initial part of an Amateur Built project a little vague, because the  $V_{so}$  can only be an estimate during the building phase. Therefore, it must be established and submitted when the aircraft has flown. As you would have read in the Dec/Jan issue, CASA requires that aircraft with certificated engines be subject to restrictions for 25

hours, and those with non-certificated engines, 40 hours. It is during this restriction period that the  $V_{so}$  can be established. Hopefully, the value will be within limits. You will be required to certify that it is.

Another point of note is that, as written, the new system makes no mention of an aircraft flight manual. While the AUF does not wish to burden its members with too many bureaucratic requirements, a flight manual or something purporting to be a document describing the operating parameters of the aircraft should be produced. In cases of approved kits and professionally designed aircraft these might already be available – or proformae to complete during early flights. The AUF Office is working in conjunction with a member to develop a simplified document that builders might be able to use in developing their own form of flight manual. Because the concept is in its early stages, this is not yet available, but will be reported on in future issues.

**Other Issues.** There are many other issues to be ironed out such as what actually constitutes the ‘major portion’ of an aircraft that a builder is supposed to fabricate, inspections one should perform after the first flights and other documentation that might be advisable for amateur builders/experimenters to maintain. These will be discussed in future issues.

**Thoughts on 28-XXXX Registered Aircraft vs 19-XXXX Registered.** Most of us are aware that the 28-XXXX registered aircraft is one which has been built to CAO 101.28 under the guidance/control of the SAAA. These aircraft are CASA approved and, subject mainly to engine fitment, qualify for registration as a VH-XXX aircraft: ie a properly designed, properly constructed, properly maintained and properly operated aircraft. On the other hand, the 19-XXXX aircraft can be designed, built, maintained and operated by anyone – regardless of knowledge or ability – provided they hold a valid AUF Pilot’s Certificate.

The AUF Office is receiving about two calls a day from people pondering whether to transfer their registration from a 28 to a 19. Many of these queries come from people who find the SAAA system too complex or inconvenient and they ask for advice on whether they should change category.

The answer being given from here is that the 28 aircraft is one which has been built with all the airworthiness controls of an approved professionally manufactured aeroplane and it complies with accepted standards (the CASA ABAA, CAO 101.28 and construction standards).

On the other hand, the 19 aircraft can be produced by anyone, regardless of knowledge or ability, so it can be an unknown. The 19 must also carry the airworthiness warning placards, so it need not be as intrinsically valuable as the 28.

Other things that would flow from this would be higher resale values and maybe better insurance prospects: ie the 28 will be recognised as a higher quality aeroplane. (An interesting side issue arising from discussion with the SAAA, is that some people are opting for the 28 process because they are assured of high quality help, supervision and inspection, and they know the aeroplane will be truly airworthy on completion).

#### April 99

To restate what people think is the experimental philosophy as specified by the CASA, the Amateur Built concept under CAO 95.55 para 1.5 allows a person to operate aircraft the major portion of which has been fabricated and assembled for educational and recreational purposes. It has been said that this is not everyone’s perception of ‘experimental’: that it is really only a big 95.10 .... and they’re probably right.

**The Major Portion.** Note that 95.55 specifies the term ‘major portion’. This is sometimes referred to as the 51% rule. The concept seems simple on the surface, but in practice it isn’t, particularly where regulatory bureaucracies are concerned. The CASA uses a document produced by the FAA in the US: Advisory Circular AC 20-139 titled “Commercial Assistance During Construction of Amateur Built Aircraft”. It is named this way because it also relates to work done on an aircraft by someone other than the builder.

The FAA AC has much phraseology and references not really applicable to the AUF, so it has been modified into an AUF document, but the basic checklist is identical. This is the same checklist used by CASA in accepting aeroplanes such as the Jabiru as Amateur Built. It is available from the AUF Office although to gain approval of a kit, AUF involvement will be required to avoid conflict of interests. It should be noted that kits meeting the requirement are not approved in the full sense: they classified as ‘eligible’ as distinct from ‘approved’ which is a powerful word in the aviation bureaucracy as it could imply full acceptance in all areas such as design, manufacture etc.

Prospective buyers should determine whether a kit has been assessed by the AUF as being eligible under this rule. Kits that are approved in the US are acceptable here and details are published in a

'Listing of Amateur Built Aircraft Kits' available from the AUF Office or for those with Internet access, from

[www.mmac.jccbi.gov/afs/afs600/ama\\_kit.html](http://www.mmac.jccbi.gov/afs/afs600/ama_kit.html).

Other aircraft which satisfy the requirement are published in the CASA Approved Listing of Aircraft, downloadable from

[www.cybersyte.com.au/saaa/building/types.htm](http://www.cybersyte.com.au/saaa/building/types.htm)

Note that the aircraft on the CASA list are fully approved (as well as being eligible) as they qualify for "VH" registration.

Since the inception of the Amateur Built Ultralight concept in October, the AUF has confirmed eligibility of one aeroplane: the X-Air, and another is being processed. Note that the AUF will not list separately aircraft that are already listed as eligible on the FAA and CASA listings.

An interesting point arising from this, possibly a little unnerving for X-AIR, was the advertisement on page 5 of the Dec/Jan issue which stated "40 hour assembly time"...for an Amateur Built! This threw a cat among the pigeons here at the time because it seems doubtful that the major portion of an aircraft could be fabricated and assembled within 40 hrs, but the aircraft has since been assessed and found to be eligible. Apparently the advertisement arose from a display at a large airshow where 2 skilled factory staff who had been practising assembly achieved the quoted figure in front of an audience.

**MTOW Weight Fiddles.** I touched on this last month drawing attention to the formulas in the new CAO 95.55 para 6 regarding payload. It specifically applies to Factory Built aeroplanes, but the figures are still a guide for people trying to introduce amateur built aeroplanes that are very heavy – particularly two place aircraft. The formulas for minimum useful load are (CAO 95.5 para 1.7):

- $(80 \times S) + 0.3P$  in kilograms for those baby boomers who do the metric thing. S is the number of seats and P is the engine power in kilowatts. From this it can be seen that the standard occupant weight is 80 kg.
- $(175 \times S) + 0.5P$  in pounds for true aviation people (or oldies) where S is the number of seats and P is in horsepower. (Standard occupant weight is 175 lb)

Without being privy to CASAs logic in the engine power term, if one considers, say an 80 HP engine for a heavy ultralight of 544 kg, the payload allowance of  $0.5P$  is 40 lb and if this is considered to be a fuel load, it would represent 5 or 6 gallons or in the ball-park of 25 litres. Not much allowing for reserves. These are rough illustrative figures

only, so no challenges in future magazines unless I have made glaring errors please!

The weight limit of 544 kg is 1200 lb (1199). This would require a reasonable engine of about 80 HP, so in this example the equation would give a minimum payload of 350 lb (occupants) plus 40 lb (for the engine) giving a payload of 390 lb. This would leave 810 lb or 367 kg for the maximum empty weight. For a single seater the empty weight under the same process would be  $1200 - (175 + 40) = 985$  lb or 447 kg.

Thus, there is not much point in applying for AUF registration if the empty weight of the aircraft under consideration is somewhat more than 800 lb (370 kg) for a two seater and 1,000 lb (450 kg) for a single seater.

**Factory Built Aircraft.** There have been numerous queries on transferring small factory built general aviation aircraft on to the AUF register, and the first response to these queries is to ask about the condition of the aeroplane: the second is to determine its eligibility with regard to its weight. The weight aspect has just been discussed above (800/1000lb max empty weight approx).

A factory built aeroplane is one which is both type certificated and has been built by a factory approved by a recognised airworthiness authority. Note that an aeroplane is only regarded as complying with its type certificate if it is maintained to approved procedures (which also means using approved parts) in accordance with its type certificate. Therefore, it means that a general aviation aeroplane must have been maintained by a LAME and that it must qualify for a maintenance release to remain a 'factory built aircraft' in terms of the order. In short, an aeroplane that has been tampered with or modified by unapproved people or dragged out of a chook shed will not qualify without extensive approved work. This might sound overly strict, and some aspects may be negotiable, but it is the literal interpretation of the CAO and is the starting point.

**Flight Test Areas and Restrictions.** On the Pre-flight Final Inspection Certificate of Approval for Flight (AUF Magazine, Dec/Jan 99, page 37), the Inspector states a test area and selects the number of test hours to be flown. For an aircraft with a type certificated engine this is 25 hours and for a non-type certificated engine it is 40 hours. The two flying hour periods were set by the CASA and are not presently negotiable by AUF members, but work is being done to try to change it. Note too, that passengers may not be carried during these periods.

The area restrictions are to be nominated by the inspector, but members should note that CASA guidance material states that:

“The desired flight test area should be requested by the applicant and, if found acceptable by the inspector, will be approved and specified in the operating limitations. It will usually encompass the area within a 25 statute mile radius (or larger depending on the type of aircraft) from the aircraft’s base of operation or in a designated test area. The area submitted by the applicant and submitted for approval should not be over populous areas or in congested airways, so that the flight testing, during which passengers may not be carried, would not likely impose any hazard to persons or property on the ground”

Note that this is guidance material and not strict legislation, so some flexibility is allowed. The phrase “if found acceptable by the Inspector” is really the operative.

**Flight Parameters.** A recommended flight manual for amateur built aircraft is being produced by the AUF and will be discussed in detail in later issues, but for the time being, builders should record the major flight parameters of their aircraft during the flight test period. Parameters such as stall speeds, best rate of climb speeds, best glide speeds, approach speeds, fuel and oil consumption, endurance, take off and landing distances, engine operating parameters such as static max power RPM, operating temperatures and pressures under different flight conditions etc are all valuable data and should be determined, recorded and kept with the aircraft. This is all covered in AC 90-89A which is being serialised in the magazine.

. Some aeroplanes have completed their test periods and there have been queries on what is required at this stage.

Firstly, the inspector and the AUF should be advised when the test period has been completed. Details of any problems should be advised to the AUF: not so much as a check on the builder or the aeroplane, but as information that might be valuable to other builders or which, when incorporated into the AUF information base, and when reviewed in conjunction with other reports may reveal matters that should be passed on to builders.

Secondly, because these aircraft are built to legal requirements, ie MTOW not exceeding 544 kg and Stalling Speed in the landing configuration not to exceed 45 kt, builders will be required to submit and sign their own certification of the empty weight of the aircraft (nominating equipment fitment at the time of weighing) and of the stall speed in the landing configuration so committing themselves

legally to the CAO requirements. Forms covering this are being prepared.

However, in the meantime, builders who have completed their test periods are requested to forward the following:

- advice that test period is complete and the hours flown
- advice of any significant problems
- the stall speed in the landing configuration
- the empty weight (with a listing of optional items fitted at the time of weighing)
- a signed statement attesting that the claimed stall speed and weight figures comply with CAO 95.55 para 1.5.

**Modifications to Amateur Built Aeroplanes in Service.** Already, after some Amateur Builts have gone into service, the grapevine has it that there are those engineering wizards out there making major changes to their aeroplanes. The regulations do not place any specific controls over such changes, but in the instances that have come to attention here, there seems to be a need to ensure that the intent of the Amateur Built concept be maintained.

The root of the issue is what to do about what sort of changes, ie whether something is a major or minor change and whether something should be done about it. An addition to the Tech Manual is being considered requiring people who make major changes to their amateur built aircraft report them to the AUF as a supplementary TDP and that the aircraft undergo another preflight final inspection before flight following the change.

How are major changes defined? The definition is neatly spelled out in CASR 21.95. Minor changes are those that have no appreciable effect on the weight, balance, structural strength, reliability, operational characteristics or other characteristics affecting the airworthiness of an aircraft, aircraft engine or propeller. **All other changes are major changes.** (But it shouldn’t be forgotten that a large number of minor changes in combination might constitute an appreciable effect on weight and balance and to this end there may be a future need to introduce weight verification periodically with re-registration, particularly if the original configuration had been close to the CAO MTOW limit).

For anyone out there performing or contemplating major changes, it is suggested that you conform with the above: ie have another preflight final inspection before flight and submit a supplemental TDP to the AUF Office. Note that the supplemental TDP is **not for any approval purposes**, but merely to maintain an aircraft configuration record. This procedure will be formalised when it has been

kicked around a bit and receives blessings from AUF officialdom.

## May

**When is Amateur Built not Amateur Built ?** In all systems there seem to be people who are going to screw things up for the majority for their own ends. An amateur built aeroplane – in this case, our new ‘experimental’ amateur built – is just that: an aeroplane, the major portion of which is built by a person or persons for educational and recreational purposes. That is the CASA, FAA and AUF definition of Amateur Built. It does not mean assembling a kit that might be marginal from the major portion aspect, build it as quickly as possible, sell it at a profit and go through the process again as fast as possible.

There is word of this already.

Attention is drawn to para 2.4 of CAO 95.10 which is included in the rear of your Ops Manual. (See the comment under the heading of Level 2 below regarding knowledge of manuals). This paragraph covers sale of aircraft accepted under CAO 95.10 which is a similar Amateur Built philosophy and it can be taken as a guideline on sales until a detailed policy is put into place on Amateur Built – if it is needed. More bureaucracy, but it will only be needed if there is a whiff in the wind of people not playing the game.

## June

### **Error in April Magazine.**

Page 43 of the April Magazine misquoted my input in both context and formatting. I certainly did not write “Error, bookmark not defined” twice but was advised that it “had something to do with windows”. It had more to do with an editorial blunder in my opinion – we here in the office do not see the final version of our input before it goes to print, so we cannot pick up things like that. I really think it had more to do with the drama your unfortunate editor had from internet hackers in his system. Until then I thought hacking was generally a benign thing, but this one was vicious and destructive and messed him up no end.

Anyway, the websites I wanted to pass to you were for the Federal Aviation Administration (FAA) in the US and CASA listings of eligible Amateur Built kits. The site for the FAA information is: [www.mmac.jcabi.gov/afs600ama\\_kit.html](http://www.mmac.jcabi.gov/afs600ama_kit.html) and [www.saaa.asn.au/building/types.htm](http://www.saaa.asn.au/building/types.htm) for the Australian information published on the SAAA site which gives a listing of CASA approvals.

### **Registration Numbers Explained.**

A few members have queried the registration numbers associated with the classifications introduced by the new CAO 95.55.

Essentially, the issue of CAO 95.55 which became effective on 1 October 1998 introduced two new classes of aircraft:

- **The Amateur Built Ultralight** (para 1.5). The AUF registration prefix designated for the Amateur Built series is 19. Amateur built means that the major portion of the aircraft is built by a person for educational and recreational purposes (eg not for sale!).
- **The Factory Built Ultralight** (para 1.6). The AUF registration prefix designated for the Factory Built series is 24. Factory Built means an aircraft that meets a CASA approved design standard and built in a Factory approved to CASA manufacturing standards.

In effect, the 19 is really a heavy 95.10 or 10-xxxx registered aeroplane and the 24 is a heavy 95.25/101.55 or 25-xxxx/55-xxxx. The old numbers will remain because the orders relating to them remain.

The 19 and 24 figures were nominated by CASA in a letter to the AUF. 24 was for Primary Category Aeroplanes and another number, 26 was nominated for Intermediate Category. Both Primary and Intermediate Category aeroplanes are certificated and factory built types but their minimum stall speeds and MTOWs can be well above the AUF aeroplane limits of 45kt stall speed and 544 kg MTOW. However there are some of these aircraft whose specifications will fall 45kt/544kg limits and these will be eligible as ultralights for AUF registration.

Because they are both factory built and must comply with the same limits to be eligible as Ultralights the extra number of 26 is really unnecessary for AUF purposes at this stage, so all factory built aircraft other than CAO 101.55 and 95.25 aircraft will be allocated a 24 prefix. In other words, when you see a 24 on an aircraft, you know it is factory built and certificated – like a 55 or 25.

### **Amateur Built Aircraft Flight Test Periods.**

This was covered on page 44 of the April issue, but queries are still being received. Paul Middleton has covered it elsewhere in this magazine, but from the queries being received, yet more reinforcement won't go astray. As the system stands at present, no flying training of any sort nor carriage of passengers is permitted during the flight test period.



The AUF is aware of the large number of hours involved: 40 for aircraft with non-certificated engines and 25 for aircraft with certificated engines, and action is being taken to find acceptable alternatives.

### **Provisional Registrations**

The AUF sometimes issues provisional registrations to allow specific functions to be performed. An example of this is the annotation "Provisional – Subject to Permit to Fly" for CAO 101.28 aircraft undergoing flight testing with the SAAA. The following is advice to the membership that the term will now be replaced by the term "Provisional – Subject to Annex" and why.

**Permits to Fly.** Permits to fly were documents issued by the CASA to permit operations under certain circumstances. The only AUF aircraft to use the Permit to Fly system were CAO 101.28 aircraft being built under the supervision of the SAAA. Aircraft subject to a permit to fly were not regarded by the AUF as qualifying for full registration, so their registration certificates (those small blue cards that everyone affixes to their cockpits!) were annotated "Provisional – Subject to Permit to Fly". One passing piece of information that might interest those already on permits to fly is that these have/had a maximum duration of 1 year and none have been issued after 1 October 1998. In short, if your permit is over 1 year old it is not valid and no permits will be valid after 1 Oct 1999.

**Annex to Certificate of Registration.** CASA ceased issuing Permits to Fly on 1 October 1998 when the experimental system came into being so a new AUF system is required.

The requirement for an equivalent to the Permit to Fly in General Aviation has been met by the Experimental Certificate, but because of the nature of the legislation, this only applies to VH registered aircraft. The AUF also retains a need for authorising flight for CAO 101.28 aircraft during their flight test periods and this requirement has been met by issuing a document called an Annex to the certificate of registration. This Annex is raised by the SAAA and is effectively the same as the Permit to Fly enabling testing to be carried out. To maintain consistency with the old system, the phrase "Provisional – Subject to Permit to Fly" has now been changed to "Provisional – Subject to Annex".

### **Provisional Registration: 19-XXXX Aircraft**

The legislation that spelt the demise of the permit to fly coincided with the legislation that introduced the Amateur Built Ultralight (the 19-XXXX aircraft – see the preceding article). Before their first flight, these aircraft are issued with a document

authorising flight by the inspector in the "Pre-Flight Final Inspection Certificate of Approval for Flight" (see the amendment to section 3.3 of the Tech Manual). This document is really a proviso to the Certificate of Registration meaning that full registration is not justified until successful completion of the flight test period. In effect, it is also an Annex document similar in intent to the Permit to Fly.

Because the flight test restrictions are conditions of registration, Amateur Built (19-XXXX) aircraft registrations are only provisional until the flight test is completed. Consequently, registrations during the currency of the flight test period will also be annotated "Provisional – Subject to Annex". This annotation will be removed when the Inspector and the AUF are advised that the test period is completed and the owner certifies to the AUF that the aeroplane complies with the basic requirements of weight and stall speed.

The Amateur Built Tech Manual Amendment at Section 3.3 now has a form that can be used for this advice and until the AUF receives the form, the annotation "Provisional – Subject to Annex" will be printed on the Registration Certificate. Therefore, the builder must advise the AUF of completion of the test period whereupon a new certificate will be issued (at no further cost).

The foregoing might sound bureaucratic, but it serves a number of purposes: it will enable the AUF to know how many aeroplanes are in the system still undergoing flight test; it will enable people to know whether passengers can be carried; it will remove the need for the AUF to follow up with people to confirm that their aeroplanes comply with the regulations; and the self certification will place the bulk of the responsibility on the builder. Note that bureaucracy has not completely taken over. In a true bureaucracy all the information on it such as times, and weights would need to be certified correct or carried out by someone else, but it is not required in this case.

## **July**

### **More on Amateur Built.**

I have received many queries on the need for stage inspection and "why does CASA insist on that silly Major Portion Rule ?" (and that is really a quote!) Because of various queries I've had on Amateur Built Philosophy this is explained at length below – with some more of the philosophy thrown in.

**The Amateur Built Philosophy.** The following is a (lengthy) effort at trying to explain where you stand legally in the Experimental or in AUF

terminology, Amateur Built and why some of the requirements are as they are.

The AUF Amateur Built is really just one element of the Experimental philosophy that was adopted by the CASA in harmonising Australian Aviation regulation with the main systems being used throughout the world. These new Regulations were issued late 1998 and with them a revised version of CAO 95.55 defining what is really an Ultralight, Amateur-Built Experimental category aeroplane known as the Amateur Built Ultralight.

As mentioned in earlier articles, the term “Experimental” covers a large number of aviation activities. Aircraft under the Experimental Category operate under a system of certificates and are broken up into a number of groups which are listed below. As you read them, **DON’T JUMP TO ANY CONCLUSIONS – we in the AUF have only the Amateur Built** and to some extent, kit-built. The categories are:

- Research and Development
- Showing compliance with regulations
- Training the applicant’s flight crew
- Exhibition
- Air racing
- Market Surveys
- Operating amateur-built aircraft
- Operating kit-built aircraft
- Private operations of aircraft previously used for research and development and showing compliance with regulations

The AUF Amateur Built Ultralight is based on the category “operating amateur built” above and is specifically defined in CAO 95.55 para 1.5. For the purposes of this discussion this is: “an aeroplane the major portion of which has been fabricated and assembled by a person who undertook the construction project solely for the person’s own education or recreation and has a MTOW not exceeding 544kg and a stall speed in the landing configuration not exceeding 45kt CAS”. This is where many of the 1998 hopefuls who were awaiting “Experimental” got it wrong. We only got the “Amateur Built” part, not all the other freedoms.

The weight and stall speed limits in our case are there to define Ultralight, while the Major Portion bit is there to make the builder responsible for his own fate and relieve everyone else, including government, of responsibility.

**The Builder is Responsible for His Own Fate.** (Apologies to the “Hers” out there – I’m old school and haven’t learned all the politically correct terms – believe me, I hold you “hers” in this business and

those supporting the “him’s” out there in the highest esteem).

CASA is a Government instrument and the Government has been put there by the people to look after the people. Against this, could you really call the act of allowing someone with no practical skills to design, build and fly an aeroplane of their own design and construction be called “looking after people”? Many in the Public felt that it should be everyone’s right to design, build and fly an aeroplane without government interference if they are prepared to take full responsibility on themselves. This was achieved in part years ago when CAO 95.10 was introduced, but progress beyond this toward higher stall speeds and take-off weights became bogged down in Australia by definition, legalese and bias.

The US system accepted this principle of personal responsibility in its Experimental Category - Amateur Built, so pressure was applied on CASA (and the Government) to adopt the US experimental system. This argument progressed for years and it was not until the legal concept of harmonising Australian Aviation rules and regulations with world standards that this was achieved with the introduction of the new legislation late last year.

**Building from Kits** Thus, the Amateur Built concept of allowing building while placing full responsibility on the builder was introduced. However, nothing is simple. Here, as in the US people then decided they wanted to build from material packages and kits as well as being able to build from scratch. This muddies the water because the public expects that the government looks after what people buy: eg condoms, toasters, push-bikes; sandwiches, cars etc. So what about aircraft kits? If something goes wrong with a product, (these days) the aggrieved party runs around trying to sue someone, ably assisted by the legal profession. In the end, they generally focus on the government because it has “pots of gold” to sue for and is supposed to write laws looking after people protecting them against themselves.

**Kits.** Note that in the list of categories under experimental above, there is a category called Kit Built. These are kits that the Government approves and are necessarily expensive because of the testing, quality control and certification the kit manufacturer must undertake to provide a product the government accepts as being suitable for a certificated purpose.

**Unapproved Kits.** Then there are all those other kits that are not approved. By building from an unapproved kit, the builder “personself” is accepting the integrity of a product made by some other person which is not be strictly exercising the

right to design and build something entirely of his own making. This is one of the reasons the Experimental Category has taken so long to be accepted in Australia because an aeroplane made from a kit could not be said to be entirely the builder's responsibility. From listening to the rumblings while I was in CASA, I gained the impression that it also had something to do with the different approaches of governments. It seemed that the charter in the US was that the government fostered aviation whereas in Australia, it went something along the lines of ensuring aviation safety. Thus, the two national approaches were different when it came to amateurs.

The solution seems to have arisen from the fact that if someone made more than half of the aeroplane himself, then the responsibility for the aeroplane lay with that person and that person alone. This gave rise to the Major Portion or 51% rule. These kits are not "approved" by the government, they are considered to be "eligible" for experimental amateur built under the Major Portion Rule. The philosophy here is probably based on the fact that if you consider you can design or accept responsibility for 51% of the design of an aeroplane and then build more than 51% of it, you have taken the responsibility for it. Thus, if you fabricate and assemble more than 51% of the aeroplane yourself, you and only you are responsible – and you sign for that before the first flight.

If you are backyard lawyer and reckon that's wrong, have a go, but it's enshrined in International precedent now so your loved ones will have an expensive fight if you don't come home one day while flying your experimental aeroplane. And that's why the AUF requires that the major portion rule be met, why you must build it yourself and why some of the quick build kits are of concern. Nevertheless, the builder signs a document accepting full responsibility before the first flight in any case.

The next step will be by those wishing to build less and fly more. They will have a problem in the legalities of buying aircraft and components on a commercial basis where there is no guarantee of quality. Remember the condoms and toasters. In these days when everyone is seeking compensation for anything, the government will have a real problem in letting them do it. It's all right to say that guarantee doesn't bother you because you only want to fly at your own risk: but aha, you've forgotten that money hungry legal profession who will only be too pleased to help your widow and underprivileged kids sue a government they claim after the event is derelict in its duties for not making sure the stuff you built your aeroplane from was material unsuitable for aviation use.

**The Pre-Flight Final Inspection.** If you've managed to digest all that, you may now understand the context of the pre-flight final inspection and the statement the builder must sign that he and only he is responsible for the airworthiness of the aircraft. Also from this, you may be able to understand that the primary role of the Inspector is really to only to allocate the flight test area to ensure that the aeroplane is tested away from areas where other people might become involved if there is any problem....and why passengers are not to be carried during the flight test period.

#### **Feedback from Inspectors.**

At the time of writing there are 94 19-XXXX aeroplanes on the register, most of which have had pre-flight final inspections, the others having come from other arrangements such as 101.28 aeroplanes whose builders have elected a simpler path to finish the process and start flying or from 95.10 aeroplanes with growing pains. Some of the inspectors have raised points which will save both their time, yours and your money if followed. These are given below.

#### **Builder Responsibilities at Time of Inspection.**

Some of the points raised are really covered in the new Section 3.3.1 page 2 of the Tech Manual under "Issue of a Registration Certificate" which covers:

- the fireproof plate,
- required instruments,
- seat belts and
- placards.

This new section of the Tech Manual has been printed and should have been included with your June issue of the magazine or this one. It is also printed in the Dec/Jan 99 issue of the AUF magazine (the one with the Spitfire in flight on the front)

Other requirements brought to attention by inspectors are:

- **AUF Membership.** The test pilot must be a current member of the AUF and hold a valid AUF Pilot's Certificate. (Yes, it's happened! – with an owner builder)
- **Builder's Log Book.** The Builder's Log Book required by the Tech Manual page 3.3.1-2 para 4 and certification of the pre-closure inspection at page 3.3.1-3 para f must be in a respectable format and available.
- **Weight And Balance.** A workable document giving weight and balance details is required.
- **Basic Fuel Calibration.** A basic fuel calibration is to have been carried out. Detail will depend on your system. Fuel bowser accuracies are quite adequate
- **Aircraft Maintenance Logbook.** An aircraft Maintenance Logbook appropriately prepared

for the aeroplane (available from the AUF Office at \$10 each) is required.

- **Inspection Checklist.** There must be a clear understanding with the inspector beforehand as to who will be providing the Inspection Checklist (The Appendix to Tech Manual Section 3.3 – this is only to be sure that one is actually available at the time). Photocopies of the pages of the manual will suffice, and it is recommended that three copies of the Certificate of Approval for Flight (3.3.1 page 5) be made: one for the inspector, one for the builder and one for onforwarding to the AUF Office for processing of the registration.
- **Warning Placards.** The warning placards (page 3.3.1-2 para d) can be obtained beforehand from the AUF Office, but they are normally supplied with the registration certificate after the final inspection form is processed by the AUF. It might be good practice to request these at the time requesting a number allocation.

## August 99

### Amateur Built Philosophy Continued.

Continuing from last month where the Amateur Built Philosophy was explained as a system whereby people could build and fly aeroplanes of their own design and manufacture provided they built the major portion thereby absolving the regulatory authorities of liability and placing the full onus on the builder.

There is another twist to this, and it deals with legality. The builder and aeroplane are legal – if, in the case of the AUF, the aeroplane is registered with the AUF, it weighs less than 544kg and has a stall speed in the landing configuration of less than 45kt. The operative word here is “legal”.

Being legal with your car means that it is registered and that the driver is licensed and everyone understands what this means: it means that insurance policies – third party AND life are honoured not to mention being clear of the nasties with the law in the case of accidents. The serious part of this is that it is not only the car or aircraft and third party policies that are involved: it is everything - which includes life insurance policies etc.

Being Legal with aeroplanes means that they comply with their registration requirements and with the Amateur Built it means: the major portion rule, 544kg MTOW, 45kt landing configuration stall speed. If you do not comply with these, in the event of an accident, your family could be without support through insurance and it might mean they

are even liable for third party damage in the event of death.

It has been said that the greatest controlling influence on our end of the experimental category in the US is the fear of the insurance companies and litigation rather than the FAA and the Regulators. So if you think you can crib a few extra knots stall speed and add some extra weight by doing some clever mods after registration, keep this in mind. Also, there will probably come the day – as it did with the 95-10 aircraft when demonstrably dubious aeroplanes started to draw attention - that weighing and verification of stall speed at a time like sale or, say every second registration, might be necessary to demonstrate to those outside that we remain compliant with the rules.

This is also the reason why it so important for people who might be tempted to fly unregistered aeroplanes should not do so as the same philosophy applies. The moral of the story is to keep legal. Whilst you might think that a little transgression will do no harm, think again. You may wind up in a heap and that might not worry you – but think of your dependents. They could carry the can.

**Insurance of 19-xxxx aeroplanes.** On page 20 of the March Issue (the one with the Thruster on the front), there were some thoughts on the merits of going through the SAAA route (28-xxxxx) versus the AUF Amateur Built route (19-xxxx). One of the points raised was the effects on insurance. This issue is starting to warm up with 19-xxxx people advising of problems in obtaining insurance. Also, the AUF friendly Insurance Company, Chamberlain Knights have been discussing the implications of the Amateur Built concept and the problems of underwriting the risks associated with aeroplanes of unknown pedigree and unknown builder competence.

Add to this the whole concept of Amateur Built where there are no guarantees at any stage of build or operation where the builder takes full responsibility, the insurer's problems are understandable. At the time of writing, I have just received a Kit being developed by the insurer to cover the Amateur Built Aeroplane and will report more on the topic in the next issue.

**Amateur Built Aircraft Stall Speeds - CAS.** We had a bad day here in the Office a few weeks ago when someone alerted Midde to the fact that CASA had snuck a new version of CAO 95.10 out into the system quite unannounced. It carried a few barbs on airspace and the stall speed requirement was reworded in a manner CASA regarded as insignificant, but in a way which has vast ramifications for the AUF.

CAO 95.55 as issued in October last year specified one of the requirements for eligibility as an Amateur Built Ultralight was that the stall speed in the landing configuration ( $V_{so}$ ) was not to exceed 45Kt. CASA has now changed the wording to read 45kt CAS.

For those of you who have missed the nuance here, the somewhat vague (in aeronautical terms) speed given in the initial issue of 45kt has been tightened up to read 45kt CAS (calibrated airspeed). Calibrated airspeed is defined as the indicated airspeed of an aircraft corrected for position and instrument error. (It is really true airspeed corrected to standard atmospheric conditions at sea level). This now introduces the requirement to measure the stall speed accurately instead of just reading the figure off your old, battered airspeed indicator of dubious accuracy being fed by 'wonky' pitot heads and static sources that are in the wrong places – or at least that is how CASA regards it.

This opens up the Pandora's box of calibration of instruments – not only in the amateur built case, but the wider issue of calibration of instruments in the AUF fleet in general and it also raises the spectre of flight testing to determine the other calibrations necessary when they are installed in the aircraft. The issue of calibration of instruments in general has never really come to a head before in the AUF to my knowledge and to do it properly which is the very essence of the word "calibration" will impose more cost, management and compliance requirements on the AUF. What makes it particularly onerous is the fact that Amateur Built Experimental Aircraft in the General Aviation Industry really have no such requirement imposed on them. The reason it is being imposed on AUF aeroplanes is merely to verify the stall speed based on a definition of Amateur Built Ultralight. General Aviation Amateur Built Experimental aeroplanes do not have any stall speed limitation which means their owners are exempt from worrying about the issues raised above.

Instructions and administration accommodating calibration and flight testing within the AUF will pose real headaches.

**What to do About it – Don't Panic Yet (?).** Firstly, under the new system of Aviation Management, CASA is required to consult with the Industry before making changes to regulations. There was no consultation by CASA with the AUF on this change, so the issue has been challenged. However, CASA holds the cards and unless it can be convinced to change the terminology, there will be problems. There are some alternatives such as the CAO 95.10 wing loading approach and

acceptance of aeroplanes whose stall speeds are obviously well within limits, but the system as it is has served us well for years, and when one considers General Aviation Amateur Built Experimental have no such requirement, why should we need to change? General Aviation Amateur Built Experimental has operational freedom and can therefore have a far greater "impact" on the public than the AUF equivalent which is restricted operationally by CAO 95.55.

Also, some of the initial investigation into what CASA regards a acceptable wing loadings is scary and considerable work and probably tough negotiation would need to be done before going this way.

Another fight for our freedoms!

**Zenair 601HDS.** The Zenair 601HDS is one aeroplane which is the subject of many queries as it seems to be quite a hot ship but it is one which is unacceptable according to CAO 95.55 para 1.6, so it is highlighted here. One gets tired of being the harbinger of bad news to people who have worked themselves up over something, so I have decided to go into print.

The figure given by the manufacturer (on brochures from the internet) for stall speed is 54mph which equals 47.9kt ( $54 \times 5,280 \div 6080 = 47.9$ ), well over 45kt, so it is clearly unacceptable. Even if it was borderline, manufacturer's figures are generally optimistic and you would be taking a big risk. Also, don't forget the spectre of CAS hanging over our heads where the speeds would need to be proven to be accurate. There is no doubt that this aeroplane does not meet the requirements on the information available

## September 99

### Inspection Requirements.

Frequent calls are being received regarding stage inspections during the building of Amateur Built aeroplanes. From past writings, you should be aware that there are, in effect, two types of Amateur Built: one is the CAO 101.28 aeroplane built under the supervision of the SAAA to be registered as a 28-xxxx; the other is the "Experimental" Amateur Built Ultralight under CAO 95.55 para 1.5 to be registered as a 19-xxxx.

The 28-xxxx which is the SAAA supervised aeroplane, has mandatory stage inspections and these are performed by SAAA people, while the inspection requirement for the 19-xxxx is spelt out in paras f and h of Section 3.3.1 of the Technical

Manual. Para f concerns pre-cover/closure inspections, while para h concerns the pre-flight final inspection.

**The Pre-Cover/Closure Inspection.** is a recommended inspection by an AUF Level 2 Maintenance Authority holder of the structure, fittings and internal control systems of the aircraft before the structure is closed preventing such inspection and it is to be documented in the builders' log book. The Tech Manual stresses that this inspection does NOT guarantee the airworthiness integrity of the aircraft or its systems.

In response to queries on pre-closure inspections, the advice being given is that such inspections can also be carried out by LAMEs and that good practice would suggest that builders should have as many people competent in aircraft construction or at least in mechanical construction check their work frequently. Independent inspections are common and mandatory requirements throughout the Aviation Industry and although not mandatory for the amateur builder, are a good and safe idea, particularly in critical areas where strength and controls are involved.

The Pre-Flight Final Inspection is a mandatory inspection that is to be "invigilated" (ie supervised – not performed) by an Authorised Inspector who may then authorise initial flying, the initial flight area and the period.

#### **Stall Speed Requirement - More on CAS**

As advised last month, there is a hassle with CASA on the introduction of the term CAS (calibrated airspeed) into the stall speed requirements for Amateur Built Ultralights. Nothing has been resolved yet, but your attention is drawn to the Test Pilot Tips article in last month's magazine by Mr Keith Engelsman on how to determine the stall speed in CAS.

Many thanks to him for such an excellent article which may well become a technical requirement if the AUF cannot farnarkle its way out of the CAS issue somehow. As mentioned in the last magazine article, CAS determination also requires a calibrated airspeed indicator so that the readings are accurate. There's a way of calibrating installed airspeed indicators for stall speed measurement in this exercise using a GPS (if you can get hold of one) instead of taking your instrument to a CASA approved instrument shop or using another which has been calibrated. Keith will be approached for wisdom on this in some future article – not that it is beyond a few of our AUF members to produce, but because he is a link with CASA on these matters means it would be more easily blessed as a

procedure by CASA. He is also a qualified test pilot as well as an AUF member. Anyway, the "balloon hasn't gone up yet" meaning that it isn't a requirement - yet.

#### **October 1999**

#### **Zenair 601HDS, Apology (Sort Of)**

In the August issue of the magazine at page 17 (the one with the Wheeler Scout cover), I pronounced that the Zenair 601HDS was not acceptable from the stall speed standpoint – unfortunately, I omitted to state that this was at the aircraft's advertised maximum take-off weight: ie the 601HDS cannot be operated as an Ultralight at its advertised MTOW. However, it can be at lesser weights making it acceptable for AUF operation and this is discussed below.

The reason for my concentrating on the design MTOW was a result of queries from GA pilots who were finding the payload capabilities of current Ultralights unattractive and who wanted to take advantage of the full capability of the aeroplane. Based on the advertised data, the aeroplane at maximum design take-off weight exceeds the stall speed requirement of 45kt and it was this point which the previous article intended to make. No mention was made of lesser weights in the article and this was really an unintentional oversight for which I apologise to Zenair.

The article was unfortunately placed above a Zenair advertisement which some in the Zenair camp took to be an insult and became quite heated thinking that the product was being maligned. That was editorial misfortune. Like all other types, the AUF can have no unfounded bias for or against and all that I can say here is that the AUF has no record of any problems with Zenair aeroplanes and that those I know who have built them are happy with them.

**The weight issue.** For a given aeroplane under the same operating conditions and using simplified analysis, the stall speed changes in direct proportion to the square root of the weight (from the equation  $W = \frac{1}{2} \rho V^2 \frac{1}{2} C_L$ , ie  $V_2 = V_1 \sqrt{W_2/W_1}$ ). The 601HDS at 1200lb has a stall speed in its specifications of 46.9 kt. Using the above formula, the weight for a stall speed of 45kt would be 1105lb.

With an empty weight of 570 lb, the aircraft would have a payload of 535 lb, well within AUF limits. However, remembering that this is a theoretical approach and there is still the spectre of CAS in the offing (it is in the new CASR 103) to assume the above calculations are exact would be folly. The only true way to

establish the MTOW at which the stall speed is 45kt would be to establish it from flight test. (At 1000lb with a payload by calculation of 430lb, the stall would be 43kt, almost worth a gamble)

In short, the 601HDS should be acceptable, but with a degraded MTOW. Prospective builders are advised to seek hard flight test information from Zenair to ensure they will be within limits as it is the builder who is responsible for compliance: not the AUF. However, aircraft accepted under these conditions will be required to carry a placard in the cockpit specifying the appropriate MTOW .

Once again, apologies to Zenair.

### **Producers or Importers of Amateur Built Kits – Requirements (Qualification against Major Portion Rule)**

One of the requirements of CAO 95.55 para 1.5 for amateur built ultralights is that the major portion must be fabricated and assembled by a person for educational and recreational purposes. The philosophy behind this has been discussed at length in previous issues of this magazine, but in a nutshell, the requirement for the “major portion” means that the builder of an aeroplane fabricated and assembled from a kit must make and understand so much of the aeroplane that he has no legal recourse to anyone: the government (on quality or integrity of product) the producers of the kit or any components or the AUF. **The builder of the aeroplane alone is to be responsible – for everything!**

If you read previous articles, legal precedent has it that this situation applies if the builder fabricates and assembles more than 51% of the aeroplane. The definition of 51% or Major Portion is contained in a CASA Advisory Circular 21.29 (presently in draft – but available - and in an AUF Technical Requirement: definitely not in draft and definitely available from the AUF Office. Aircraft that meet these requirements have been accepted by the FAA against Advisory Circular 20-139 and are contained in the FAA “Listing of Amateur Built Kits”, have been accepted by CASA or the AUF as meeting the same requirements. Details of all of these aircraft can be obtained from the AUF.

**SO – if you are planning on importing kits for sale as AUF Amateur Built, you should ensure that they meet eligibility requirements.**

**OR - if you are planning to produce kits in Australia, the eligibility assessment**

**requirement also applies.** Some thought should be given to this as such an assessment must be performed and **will probably cost you money.** You are encouraged to obtain all the assessment material and conduct your own evaluations beforehand, but finally, an independent evaluation by either CASA, the AUF or some authorised person will be required.

**Aeroplanes constructed from kits without confirmed eligibility will require individual assessment at cost and there is no guarantee then that these will be registerable.**

I am aware of a number of people intending to (now producing ?) kits with no prior correspondence to the AUF as I write. **Perhaps** one aeroplane of a type might be accepted on the basis that it is a joint amateur built project by the builder and prospective kit producer, but even this would require negotiation. Prospective kit producers should be aware that all aeroplanes must ultimately be reviewed by the AUF for registration and that the issue must surely come to a head at that time. →

### **Feb 2000**

#### **Buying and Selling an Amateur Built Aeroplane.**

There are all the usual procedures associated with buying and selling an Amateur Built Aeroplane, but the topics I wish to discuss here are those of workmanship, quality and responsibilities. The need for what follows has arisen from concern of a purchaser over the standard of construction of an Amateur Built Aeroplane.

In my article titled “The Amateur Built Philosophy” on page 15 of the July Magazine (the issue with the Sapphire on the cover) I explained that the Amateur Built Philosophy (as part of the Experimental Aircraft System) had as its cornerstone that the builder was responsible for his own fate. The system under CAO 95.55 para 1.5 requires that the builder takes full responsibility for the whole aeroplane: ie its design and manufacture. Under this system, the builder actually signs documents accepting that he/she understands and accepts that he/she and no other person or organisation is responsible for the airworthiness of their particular aircraft.

There are no external quality controls on the building of an Amateur Built Aircraft to CAO

95.55 para 1.5 meaning that the aeroplane quality is entirely the business of the builder. The AUF does have a recommendation that inaccessible areas are checked by a third party for integrity before closure, but this is only a recommendation. Thus, the quality of the aeroplane – in workmanship, material and design is an unknown to anyone other than the builder – and even then, *depending on the builder's background, it may even be an unknown to the Builder!!!*

This is enshrined in Legislation where an Amateur built aeroplane is the sole responsibility of the builder. Advisory information supporting our rules also recognises that an Amateur Built Aircraft is an Amateur Built Aircraft throughout the building process regardless of whether it changes hands during construction, meaning that the new owner of the project carries full responsibility. The purchaser then becomes the builder who accepts full responsibility. It is a concept accepting that the purchaser has the freedom to purchase a part completed project, is free under the experimental system to exercise personal judgement on the project and in doing so accepts full responsibility. This extends to the purchaser of a completed Amateur Built Aeroplane: the owner carries full responsibility as if he/she was the builder. This is simple to understand by considering the underlying principle of the Experimental Aircraft System - Operating Amateur Built - where the Government and Regulators allow people to amateur build with no regulatory control provided they accept full responsibility.

Then along comes Bloggs who wants to buy this terrific aeroplane built and registered under the Amateur Built system, only to find after purchase horrible things about the aeroplane: low quality parts, shoddy workmanship and lethal handling characteristics.

Whose responsibility is it?

If I have explained the system properly, you would've answered Bloggs (and for an honours answer you would have added, "and no other person or organisation"). Whilst the AUF will help people with problems, neither the AUF or anyone else can be held responsible.

This is being written as there has been verbal advice over one purchase disappointment. HOWEVER, as a dedicated long term AUF member (if not only at the suggestion of "Middo"), it might be timely to raise a point of caution. Regulation overtook the Ultralight Movement in the 1970s and early 1980s in response to public concern over ultralight

activities and fatalities. This gave rise Government involvement through the politicians which led to CAO 95.10 and 95.55 as well as the requirement for aircraft standards and the AUF itself. Regulation (and battles for freedoms within it) continues. The AUF has a magnificent freedom in the Amateur Built concept and it is up to everyone to preserve it.

Quality of construction, like flying and airworthiness is a discipline, all of which are essential for flight safety. Anything that smacks of shoddiness in amateur building enough to draw public attention can filter through from the public to the politicians to the CASA to more red tape - that dreaded bureaucratic interference in AUF Operations. None of us wants this (including the regulators) as it will involve more cost and inconvenience to members. As has been said before, the AUF is a high quality team and relies on every single member to maintain the high standard and to enable the AUF to keep costs to the membership as low as possible. This requires a continuing effort on everyone's part. (...and don't forget that the AUF still has enemies out there ready to ridicule and hold any unfortunate occurrences against us with Government).

The really scary part involves the ramifications of passenger or bystander injuries in an Amateur Built which progresses to involving the legal fraternity – but then there is the placard required by law to be in clear view of all occupants which states: "WARNING: This aircraft is not required to comply with the safety regulations for standard aircraft. Persons fly in this aircraft at their own risk". The situation would probably degenerate into a "legalfest" and a "regulationfest", although there should be precedent from overseas for guidance.

I have heard it said of the US system that the true regulator of the experimental system is not the FAA: it is the legal and insurance system.

Think about it.

## March 2000

### Regulations and AUF Requirements.

The Amateur Built Ultralight system is established in law via CAO 95.55 (soon to be superseded by CASR 103 if CASA advisories are correct). To bring the Amateur Built into operation for Ultralights, the AUF, in



conjunction with the CASA produced Section 3.3.1 to the AUF Technical Manual. This section was then processed through the necessary areas and levels of CASA and was given approval. Thus, Section 3.3.1 is virtually an order that must be complied with before an aircraft can be registered with the AUF.

Therefore, it is through compliance with the AUF Tech Manual Section 3.3.1 that all those 19-xxxx are flying and those potential 19-xxxx are being constructed. As I have said in earlier magazines: Just watch someone screw it up...and someone is trying to!

An incident occurred recently which resulted in refusal of registration because of disregard for these requirements. Development of a solution to this particular instance will be placed back in the hands of those involved and the aircraft will not be registered until it is compliant.

Following from this and other farnarkling that is starting to surface, the brink has almost been reached where builders' log books will be required by the AUF Office with all Amateur Built registration applications. Not yet though, but it will only require a little push.

One last point: the Certificate of Approval For Flight which attests to the carrying out and witnessing of the pre-flight final inspection and which gives the flight test time requirement and the allocation of the flight test area is one of the critical cornerstones upon which the whole process rests. It must be completed meticulously. The AUF form itself (or good photocopy) is to be used and not some locally produced version. All the content on it is carefully thought out and is there for carefully considered reasons. The words mean exactly what they say and the form should be completed exactly as it says - no proxies - no interpretations.

#### **April 2000**

*Transferring CAO 95.10 Aeroplanes to Amateur Built (CAO 95.55 para 1.5).*

There have been many requests since the introduction of the Amateur Built Aircraft to transfer 95.10 aircraft across to Amateur built (ie 10-xxxx registered aircraft to 19-xxxx) The two main reasons for this have been to allow increased weight operations and to convert single seaters to two seaters.

Note that the airworthiness responsibility for these aircraft lies entirely with the owner and that any changes to the MTOW within the legal

weight limits is the responsibility of the owner. However, requests for transfer to 19-xxxx for the purpose of increasing the maximum take-off weight generate concern as to whether the owner really knows what he is doing, particularly in cases where the owner is not the designer.

Requests for transfer to meet substantial weight increases will need to be accompanied by some form of evidence that the concept has been intelligently thought through. They will also require lodgment of an aircraft data sheet (which includes the requirement for photographs) to specify the new parameters being submitted for registration and there will generally be the requirement for an Amateur Built Pre-flight Final Inspection involving an Amateur Built inspector.

*Old Two Seat Aircraft Operating Under 95.10 as Single Seaters.* There are many single seat 95.10 aeroplanes on the register that originated from 2 seaters. In the early days before regulations for ultralights were introduced by government, there were many organisations and people importing kits and assembling them for sale on a commercial basis. Some of these types were Beavers, Chinooks, Maxair Drifters, Kolbs and others. This was not illegal in those days because there were no ultralight regulations in place.

When Ultralight Regulations were introduced, these aircraft came on to the AUF Register as a result of amnesties where the aircraft could be registered without questions regarding origin. However, the only way the two seat versions of these aircraft could meet the new legislation allowing them to be registered as a two seat ultralight was for them to obtain certification of the aircraft type through CASA under CAO 95.25 and for the assemblers/manufacturers to be approved by CASA as manufacturers. The Austflight development of the Maxair Drifter into the Wire Braced Drifter (at great expense and credit to Jim) is a case in point where an aircraft underwent changes to make it to comply with CAO 95.25 and Austflight received approval to manufacture.

Failing this process of certification and approval to manufacture, if the aircraft could meet the requirements of CAO 95.10 as a single seater, the second seat and any dual controls were to be removed and the aircraft could then be registered as a CAO 95.10 aircraft.

The new rules for ultralights introduced in October 1998 state that an aircraft must either be amateur built (which includes 95.10) or factory built. If you are still with me after wading through the above, those early two seat aircraft under discussion were generally commercially built and no matter what farnarking logic the crafty applicant might supply, they will always retain a commercial origin. This is in spite of the fact that they are registered 95.10 which in essence is an amateur built category. Consequently, under the rules as they are currently written, they cannot be transferred to Amateur Built and their second seat capability cannot be restored ***unless you can prove legally (in writing) that the aeroplane was built "by a person or persons for educational and recreational purposes"*** as required by CAO 95.55 para 1.5.

Some people have provided such information proving Amateur Built origin and have been successful in obtaining registration of their aircraft as Amateur Built, so if you see a two seat Maxair Drifter or a two seat Beaver or something else out there carrying 19-xxxx numbers that you might have you doubts about or wish the same for your own aircraft, be advised that these aircraft have been extensively scrutinised before registration in that category. Files of aircraft registered in the days of the amnesty generally contain documentation indicating whether the aircraft were manufactured/assembled by an organisation or by a lone individual. This means that the AUF has a good idea of the origin of the aircraft.

There are some very good arguments raised about the airworthiness of these early two seat aircraft being better than the current Amateur Built and that because of this they should be registerable as a two seat. The argument is that they were manufactured by people who knew what they were doing in spite of not being approved by CASA and because the design of these aircraft was produced commercially by people with knowledge of ultralights, they should be safer than a dubious home grown amateur built which is allowed to carry two people. This is acknowledged and there is probably merit in the argument. Unfortunately rules is rules and the AUF didn't make them – CASA did and the AUF only manages them. Commercial design and commercial manufacture are not qualifiers for registration under the new system of Amateur Built. The aircraft must be bona fide amateur built and must comply with the weight and stall speed requirements.

In summary, 95.10 aircraft of 2 seat derivation cannot presently be registered as 2 seat aircraft unless they are proved to be amateur built.

### **The Administrative Sequence in Registering an Amateur Built.**

Although it has been written before, many people express confusion over the processes involved in registering an Amateur Built. Here it is again in a different format. There are six stages to final registration:

- Confirmation and Understanding of Building Requirements.
- Advising the AUF of Intent to Build and receiving confirmation of acceptability.
- Applying for Allocation of an AUF Number.
- Pre-Flight Final Inspection.
- Issue of a Provisional Registration.
- Issue of Full Registration.

1. *Confirmation and Understanding of Building Requirements.* The builder should consult Section 3.3 of the Tech Manual and CAO 95.55 para 1.5 to determine whether the aircraft will physically comply with the regulations and to become familiar with amateur built policy and building procedure.
2. *Advising the AUF of Intent to Build and Receiving Confirmation of Acceptability.* Before commencing the project, the builder should contact the AUF by phone or in writing to confirm that the AUF considers the project meets the requirements that will allow the aircraft to be registered with the AUF as an Amateur Built on completion. Upon receiving this notification of intent, the AUF will advise the builder in writing of its acceptability or otherwise.
3. *Applying for Allocation of an AUF Number.* Allocation of an AUF registration number can be requested at any time but it is probably best and cheaper to wait until the project is nearing completion. About two months before the expected first flight, builders might apply for allocation of an AUF number (which will be the final registration number) to enable them to apply markings during the finishing stages. There is a special form for this which is available on request from the Office (no, not bureaucracy – a form is needed to ensure sufficient information is available for the AUF to record the project properly). Cost of a number allocation is \$35 per year

but if the aircraft receives provisional or full registration within 2 months of receiving an allocated number, the initial \$35 is credited against the cost of the registration proper.

**NOTE: allocation of a number is NOT a registration and the aircraft cannot be flown at this stage.** It can only be flown when a Provisional Registration Certificate is received.

4. Pre-Flight Final Inspection. When the builder is satisfied that the aircraft has been completed and is ready for flight, the aircraft must undergo the pre-flight final inspection specified in Section 3.3 of the Tech Manual. This involves supervision by an AUF Inspector (details of Inspectors are routinely published in the AUF Magazine).
  - *Inspection.* The inspector will supervise the pre-flight final inspection by the builder, detail any additional work requirements if necessary and when satisfied, certify on the form contained in the Technical Manual that the pre-flight final inspection has been satisfactorily performed by the builder. (These documents are available from the office and are soon to be placed on the internet). Photocopies from the Tech Manual will suffice.
  - *Builder's Acceptance of Full Responsibility.* The inspector will then witness the Builder's signature attesting that the builder is aware that he as the builder and he alone is responsible for the airworthiness of the aircraft.
  - *Allocation of Flight Test Area and Period.* Following this, the Inspector will allocate a test area and a flight test period. The inspector will then sign the form, which, together with other paperwork is to be forwarded to the AUF Office for processing for issue of a Provisional Registration Certificate.
  - *Other Paperwork for the AUF.* The Registration Application Form and the Aircraft Data Sheet (which must include photographs) are required by the AUF to satisfy the legal and database requirements necessary for registration. If so desired, these documents and the necessary moneys can be forwarded by prior arrangement to the AUF Office in advance of the Pre-Flight Final Inspection documents so that only the pre-flight final inspection documents (which can be FAXed) need to be forwarded to the AUF Office for prompt issue of a provisional registration certificate.

**Note that the aircraft is still unregistered at this stage and cannot be flown until the Provisional Registration Certificate is received by the builder.**

5. Issue of a Provisional Registration. Subject to receipt of:
  - Application for Registration,
  - Aircraft Data Sheet
  - Inspectors Certification and Inspection Sheets
  - The necessary funds
 the AUF will issue a provisional registration certificate which will state that registration is "Subject to Annex" the Annex being a requirement document that is attached to the certificate. The Annex will specify the flight test area, the flight test period and any other conditions nominated by the inspector. It will require that the AUF is advised of the completion of the flight test period. It will also require at the end of the flight test period certification from the builder that the aircraft has been amateur built, certification of the empty weight and certification of the stall speed determined during the test period. **It is only when the provisional registration certificate has been received by the builder and the registration sticker that comes with it has been attached to the aircraft that the aircraft is permitted to fly.**
6. Issue of full registration. A full registration will be issued (at no cost to the builder) when the correctly compiled Flight Test Completion Form is submitted to the AUF at the end of the flight test period.

## May 2000

### Operating Privileges: Built-up Areas

The following arises from a letter from a member who proposed to build a CAO 95.10 aeroplane with the intention of flying over a built up area. This opens a tin of worms and it is probably timely with the advent of the Amateur Built to run through the CASA rules.

**Summary.** The moral of what follows is that certificated aircraft must not fly at less than 1000ft AGL and must be able to glide clear of all dwellings, buildings and persons in a built up area. Amateur built aircraft must get permission from CASA or an Authorised Person to fly over built-up areas, and 95.10 aircraft cannot fly over built up areas. If this or the following confuses you, see your local CFI or contact the AUF Office.

Firstly, the flight conditions of a CAO 95.10 aircraft are contained in CAO 95.10 Section 5.1, subpara (l) of which states that "the aeroplane must not be flown over any city or town". (CAO 95.10 is contained at the back of your Ops Manual.) This statement is absolute and does not carry with it any flexibility for a person, authorised or otherwise, to permit operation over cities or towns. Consequently, 95.10 aircraft do not fly over cities and towns!

The same wording (and paragraphing ) applies to CAO 95.32 aeroplanes: trikes, powered parachutes and other weight shift machines.

On the other hand, all other AUF aircraft (95.25, 101.55 and Amateur Built) are covered by CAO 95.55 para 5.1 subpara (i) and (ia).

- **Certificated Ultralights.** Subpara 5.1(i) covers type approved aeroplanes such as CAO 95.25, 101.55 and Factory Built. It states that they must not be flown over a built up area at a height:
  1. "from which they cannot glide clear of dwellings, buildings and persons within the built up area";
  2. "less than 1000 feet above ground level".
- **Non Certificated Ultralights** CAO 95.55 subpara 5.1(ia) covers 101.28 and Amateur Built aeroplanes (ie the aircraft registered as 28-xxxx and 19-xxxx which are the non certificated ones - other than 95.10 and 95.32). This states that:
  1. "...-the aeroplane must not be flown over a built up area except as authorised in paragraph 5.1A" and paragraph 5.1A states that
  2. "CASA or an authorised person ....., may authorise an aeroplane to be operated over a built up area subject to the conditions and limitations that CASA or the Authorised Person considers necessary in the interests of safety of other airspace users or persons on the ground or water"

In other words 28-xxxx and 19-xxxx may be operated over built up areas IF THEY OBTAIN AUTHORISATION FROM CASA OR AN AUTHORISED PERSON.....who may impose any restrictions they consider appropriate to the aircraft or operator.

Note that this privilege of being able to operate 28 and 19 aircraft over built-up areas was one of those that was removed with the issue of CAO 95.55 (19 May

1999) before the issue of the version now in force (1 August 1999). The privilege was only reinstated after the Government agreed following representations from the others and supported by "friends" that CASA had not consulted with the public on its withdrawal. However, it indicates that the 'writing is on the wall' from the CASA standpoint and it is an issue that should be watched carefully.

To the legally astute, then comes the issue of "what is a built-up area"? A search of the CAR and CASR definitions did not reveal any definition or explanation of the term and a query to CASA did not come up with a clear definition. After discussion with CASA people, the conclusion I reached was that a built up area is really "man made tiger country". If you don't know instinctively what the term "Tiger Country" means, you are probably one of the newer folk, so go find out from an old bloke as it is a common term from my era. Anyway, this is getting into Middy's province, so I will desist. (The new Civil Aviation Safety Regulation (CASR) 103 which will come into force in about 6 months to a year uses the term "closely settled".....no mention of built-up area .....for what it's worth).

#### **Selling: Number per Year**

There have been a few queries lately on selling Amateur Built aeroplanes and on how many a person can sell. This was discussed in the

The term "Amateur Built Aircraft " in the dictionary of the new CASR 103 is defined as "an aircraft, most of which has been fabricated and assembled by somebody who did so solely for his or her own education and recreation". There is no mention of how many can be built and there is nothing on the number which can be sold.

The term "education and recreation" clearly establishes that building is not to be for commercial gain. Nevertheless, it is reasonable that builders may wish to sell an amateur built aeroplane to make space or to enable another building project, so the issue reduces to how many. The guide is in para 2.4 of CAO 95.10 which states

"a person is an eligible private builder only if the person has not, within the preceding 12 months and whether alone or jointly with another person or other persons, completed building another ..... privately built.....aeroplane".

That means 1 a year.

**October 2000**

### **Amateur Built - A Refresher on the Amateur Built Philosophy**

After the initial flush of activity on Amateur Built in late 1998 and early 1999 when the Amateur Built system was introduced (ie "19-xxxx" aeroplanes) and the heavy query traffic that followed it, things quietened down. However, there seems now to be a renewing of interest from both outside the AUF as well as within. Judging from the answers I am giving to these enquiries, it seems appropriate to run through the principles again even if only for the new membership. It is also re-run because of the nature of some queries from prospective kit suppliers.

The AUF Amateur Built is really just one element of the Experimental philosophy that was adopted by the CASA in harmonising Australian Aviation regulation with the main systems being used throughout the world. These new Regulations were issued late 1998 and with them a revised version of CAO 95.55 defining what is really an Ultralight, Amateur-Built Experimental category aeroplane known as the Amateur Built Ultralight.

The term "Experimental" covers a large number of aviation activities. Aircraft under the Experimental Category operate under a system of certificates and are broken up into a number of groups which are listed below. As you read them, **DON'T JUMP TO ANY CONCLUSIONS – we in the AUF have only the Amateur Built** and to some extent, kit-built. The categories are:

- Research and Development
- Showing compliance with regulations
- Training the applicant's flight crew
- Exhibition
- Air racing
- Market Surveys
- Operating amateur-built aircraft
- Operating kit-built aircraft

- Private operations of aircraft previously used for research and development and showing compliance with regulations

The AUF Amateur Built Ultralight is based on the category "operating amateur built" above and is specifically defined in CAO 95.55 para 1.5. For the purposes of this discussion this is: "an aeroplane the major portion of which has been fabricated and assembled by a person who undertook the construction project solely for the person's own education or recreation and has a MTOW not exceeding 544kg and a stall speed in the landing configuration not exceeding 45kt CAS". This is where many of the 1998 hopefuls who were awaiting "Experimental" got it wrong. We only got the "Amateur Built" part, not all the other freedoms.

The weight and stall speed limits in our case are there to define Ultralight, while the Major Portion bit is there to make the builder responsible for his own fate and relieve everyone else, including government, of responsibility.

**The Builder and the Builder Alone is Responsible.** CASA is a Government instrument and the Government has been put there by the people to look after the people. Against this, could you really call the act of allowing someone with no practical skills to design, build and fly an aeroplane of their own design and construction be called "looking after people"? Many in the Public felt that it should be everyone's right to design, build and fly an aeroplane without government interference if they are prepared to take full responsibility themselves. This was achieved in part years ago when CAO 95.10 was introduced, but progress beyond this toward higher stall speeds and take-off weights became bogged down in Australia by definition, legalese and bias.

The US system accepted this principle of personal responsibility in its Experimental Category - Amateur Built, so pressure was applied on CASA (and the Government) to adopt the US experimental system. This argument progressed for years and it was

not until the legal concept of harmonising Australian Aviation rules and regulations with world standards that this was achieved with the introduction of the new legislation late last year.

**Building from Kits** Thus, the Amateur Built concept of allowing building while placing full responsibility on the builder was introduced in the legislation. However, nothing is simple. Here, as in the US people then decided they wanted to build from material packages and kits as well as being able to build from scratch. This muddies the water because the public expects that the government looks after what people buy: eg condoms, toasters, push-bikes; sandwiches, cars etc. So what about aircraft kits? If something goes wrong with a product, (these days) the aggrieved party runs around trying to sue someone, ably assisted by the legal profession. In the end, they generally focus on the government because it has "pots of gold" to sue for and is supposed to write laws looking after people protecting them against themselves.

**Unapproved Kits.** Then there are all those other kits that are not approved. By building from an unapproved kit, the builder "personself" is accepting the integrity of a product made by some other person which is not strictly exercising the right to design and build something entirely of his own making. Building from an unapproved kit is one of the reasons the Experimental Category has taken so long to be accepted in Australia because an aeroplane made from a kit could not be said to be entirely the builder's responsibility. From listening to the rumblings while I was in CASA, I gained the impression that It also had something to do with the different approaches of governments. It seemed that the charter in the US was that the government fostered aviation whereas in Australia, it went something along the lines of ensuring aviation safety. Thus, the two national approaches were different when it came to amateurs.

The solution seems to have arisen from the fact that if someone made more than

half of the aeroplane himself, then the law would accept that the responsibility for the aeroplane lay with that person and that person alone. This gave rise to the Major Portion or 51% rule. These kits are not "approved" by the government, they are considered to be "eligible" for experimental amateur built under the Major Portion Rule. The philosophy here is probably based on the fact that if you consider you can design or accept responsibility for 51% of the design of an aeroplane and then build more than 51% of it, you have taken the responsibility for it. Thus, if you fabricate and assemble more than 51% of the aeroplane yourself, you and only you are responsible – and you sign for that before the first flight.

If you are backyard lawyer and reckon that's wrong, have a go, but it's enshrined in International precedent now. It also means your loved ones will have an expensive fight if you don't come home one day while flying your experimental aeroplane which you have agreed is your responsibility and your responsibility alone. That's why the AUF requires that the major portion rule be met, why you must build it yourself and why some of the quick build kits are of concern. Nevertheless, the builder signs a document accepting full responsibility before the first flight in any case.

#### **Eligibility under the Major Portion Rule.**

The requirements for Government acceptance of a kit as being eligible under the "Major Portion Rule" are specified by CASA in an Advisory Circular, AC 21.29(0) which is available from the CASA website, the kit must: be declared eligible by either CASA or the AUF; be listed on the FAA (US) Amateur Built Kit List or it must have a CASA ABAA (Amateur Built Aircraft Acceptance) from CASA.

The next step will probably be by those wishing to build less and fly more. They will have a problem in the legalities of buying aircraft and components on a commercial basis where there is no guarantee of quality. Remember the condoms and toasters. In these days when everyone is seeking compensation

for anything, the government will have a real problem in letting them do it. It's all right to say that guarantee doesn't bother you because you only want to fly at your own risk: but aha, you've forgotten that money hungry legal profession who will only be too pleased to help your widow and underprivileged kids sue a government they claim after the event is derelict in its duties for not making sure the stuff you built your aeroplane from was material suitable for aviation use.

**Approved Kits (As distinct from "Major Portion" Eligible).** Note that in the list of categories under experimental above, there is a category called Kit Built. This is for kits that the Government approves. These kits are necessarily expensive because of the testing, quality control and certification the kit manufacturer must undertake to provide a product the government accepts as being suitable for a certificated purpose. These kits must be built under some form of approved supervision. This is similar to the CAO 101.28 system.

**The Pre-Flight Final Inspection.** If you've managed to digest all that, you may now understand the context of the pre-flight final inspection and the statement the builder must sign that he and only he is responsible for the airworthiness of the aircraft. Also from this, you may be able to understand that the primary role of the Inspector is really to only to allocate the flight test area to ensure that the aeroplane is tested away from areas where other people might become involved if there is any problem....and why passengers are not to be carried during the flight test period. Then there is the flight test completion form which requires you to certify that you built the major portion and that the aircraft meets the specifications of CAO 95.55 para 1.5.

**February 2001**

### **Buying and selling an amateur built ultralight.**

A letter by an AUF member, John Gilpin, was published on page 8 of the December 2000 magazine under the heading "Is

there a Plain English Waiver". In it he expressed concern over the legal aspects of carrying passengers in an Amateur Built and discussed waivers in general. Our valiant editor made some comments on the article, but I feel compelled to add some more.

One of my articles in the February 2000 edition covered this issue and is mentioned again to bring the matter of responsibilities associated with Amateur Building into view so there can be no doubt as to where the AUF and CASA stand on the matter. This article is on the website in Constructor's Corner or it can be obtained from the Office in a document containing all articles to date on Amateur Building. In a nutshell it states and explains why the full responsibility for an Amateur Built rests on the builder and the builder alone: neither CASA, the AUF nor any other person (including the Inspector) carry any responsibility for the aeroplane.

The question has also been raised regarding legal liability of builders years down the track with regard to ancestral liability after their amateur built creations have passed through several hands should something go wrong airworthiness-wise. There is no quick answer to this. However, for the very cautious, there are some in the US where the concept of "Experimental" commenced who offer the following advice. It goes: "When you've finished with it, BURN IT!". This would be a fail safe way out for the faint of heart for the time being.

The earlier magazine articles on responsibilities arose from a serious issue about the standard of workmanship and changes made by a builder of a well known kit. Rumbblings associated with it still have not died down and methods of preventing similar occurrences without ruining the Amateur Built concept by introducing bureaucratic controls are constantly teasing my brain - unsuccessfully as yet!

**March 2001**

### **Amateur Built Inspectors.**

Before launching into the real reason for this topic, I would like those Amateur Built Inspectors out there to know that they are really appreciated and that AUF Builders would be in a real hole without them. I have intended to write some form of newsletter to Inspectors, but haven't managed to do so.

One of my reasons for writing this is that the AUF is quite thin on the ground for inspectors. We currently have none in South Australia, one in Tasmania, one in Western Australia and one in the Northern Territory. I have not communicated with those inspectors to determine whether they are in it for the long haul, but I am concerned that if any do wish to relinquish the Authority as some have, most recently the Inspector in South Australia, the members in those states will have quite a problem.

An inspector must be a current LAME holding Airframe and Engine groups. Those currently on the AUF Inspector list have generally volunteered for it although some have been inveigled into the job by needy AUF members. However, some of my recent attempts to recruit new inspectors have been met the disappointing response that the Ultralight Fraternity are either beneath their dignity (in some cases, quite positively expressed) or that they are concerned about the legal liability aspects. On the other hand, some of my attempts have been received with genuine warmth and respect for the AUF so things aren't all bad. In many cases, I feel that the concern over liability may result from a lack of knowledge of the system. An example is that they have been unaware (or unsure of whether it will work if problems arise) of the fact that builders must sign that they and they alone are responsible for the airworthiness of their creations and that if the inspector does not wish to be associated with a particular contraption, he is under no obligation to continue and can just walk away leaving the builder to find another.

Nevertheless, as in most aspects of law, one's success in matters such as liability

probably depends the price being paid to and the relative skills of the legal people representing you. Personally, I operate on the "Faint heart ne'er won fair hand" principle, touch wood and get on with it although I also have saying that "The system's designed so the individual can't win"!

We need more inspectors, particularly in South Australia (definitely in South Australia where we don't have one), Tasmania, Western Australia and the Northern territory, not to mention that more in the other states would provide a greater level of coverage meaning less cost to members.

*So, if you have friendly LAMEs in your vicinity, particularly in the states mentioned as being critical and if you think they might oblige, could you please either approach them or give me their contact details so that I can make the approach. For those inspectors out there who are already in the fold, I wish to thank you on behalf of the membership for your services or for remaining on the books in case you are needed.. Indeed, if there are any likely candidates who may not wish to join now, but who would be willing to assist in their area if a specific requirement arises, the AUF would be pleased to place them in reserve.*

For recruiters: The LAMEs must hold airframe and engine ratings and they must become members - members because they must hold L2 Authorisations (according to the CASA Instrument of Authorisation) which can only be held by members. Also, AUF Membership means that they will receive the magazine which is the prime means of communication within the AUF. Non-Flying Membership is \$88 per year (\$55 of which covers the magazine subscription). There are no laid down AUF charges for the inspection service; that is a matter for the inspector, being a professional, to establish individually.

**April 2001**



### Amateur Building Notes

Much was written in the early days about the Amateur Built philosophy and procedures and some of these articles probably need to be re-run for newer members or those whose who may have forgotten. However, there are a few matters that have arisen recently which are worth emphasising:

- **Major Portion Rule.** The Amateur Built (or 19-xxxx) aeroplane is one which MUST meet the Major Portion Rule: ie the builder must fabricate and assemble more than 50% of the aeroplane.

How to determine what 50% actually is is given in a CASA Advisory Circular (21.29(0)) which is available on the AUF website or in hard copy from the Office. Any amount of work that is done on an aeroplane that was built commercially will not make the aeroplane qualify. Work on a commercially built aeroplane that has been completely disassembled is really repair, overhaul or modification. I am at present investigating two aircraft as having possibly breached this. A dog will always be a dog - you can't turn it into a cat! Same applies to Commercially Built and Amateur Built aeroplanes. (There are the smarties (and from my experience here they are out there believe me) who will argue against this, but the real issue is that rules are rules and they are there for good reasons).

- **Meeting the legal requirements for registration.** The Tech Manual Section 3.3.1-1-2 requires builders to advise the AUF in advance of commencing their projects.

This is to guard against the sadness of someone building something only to find that it cannot be registered because it does not meet the weight, stall speed or builder content. Some people haven't. Remember that if your pride and joy is outside the AUF limits, the only recourse is VH Experimental (CASR 191) for which a minimum of a CASA Private Pilot's Licence is required.

- **Log Book and receipts for materials.** The Tech Manual Section 3.3.1-2-3

requires that all receipts for materials purchased be kept.

The reason for this may not be immediately obvious to people at first, but if you think about it, this is one of the indicators which can be used to determine how much of the aeroplane you have actually fabricated.

For example, if there are no receipts or vouchers for wing or fuselage frame materials the conclusion might be drawn that either the wing was procured complete or that it might originate from another aeroplane. Be advised that there are two aeroplanes suspected to have been rebuilds currently under investigation for which receipts for material do not appear to be available.

- **Builder's Log.** The Tech Manual Section 3.3.1-2-4 requires that an AUF Building Log Book be maintained and it goes into the detail of what is required. Note that a photographic record is recommended and it is suggested that some of these photographs include the builder at work on the project.
- **Warning Placards.** The Technical Manual Section 3.3.1-2-d. requires that warning placards the wording of which is given are to be affixed to the aircraft quote: *in a position in the cabin where the wording is clearly visible to any occupant or pilot* - repeat: ***in a position in the cabin where the wording is clearly visible to any occupant or pilot.*** This is required to warn occupants that the aircraft is not required to comply with safety regulations, so the placards must be located where ***the wording is clearly visible to any occupant or pilot.***

*For the sake of aesthetics, it may be that two are required: one for the pilot and one for a passenger.* They should be affixed at the time of the pre-flight final inspection and suitable placards can be obtained free of cost from the AUF Office. These AUF placards come in two formats: almost square (8cm x 7cm) and rectangular (18.5cm x 4cm)

- **Allocation of a Number.** One of the administrative processes involved in registration is that a builder may apply for allocation of an AUF registration

number at any time during the building process.

Such an allocated number **is NOT (repeat NOT!!)** to be taken as aircraft registration. It is merely a number allocated to the aeroplane to allow the builder to manufacture the required data plate (see 3.3.1-2-a) and to enable the markings to be placed on the aeroplane as part of the finishing process. Aircraft registration is applied for when the pre-flight final inspection has been completed and a Certificate of Approval for Flight has been completed.

- **Fuel Calibration.** This is mentioned in the note which accompanies the Pre-Flight Final Inspection forms. Queries have been received as to whether this is absolutely necessary, particularly if a tank comes already marked. The answer lies in commonsense. If you don't really know by experiment where the tank stops feeding fuel when installed, you don't really know when you are going to run out of fuel and this can have grave operational consequences. Also, checking fuel quantity indications by introducing known amounts of fuel and making corresponding marks is most important to correlate the quantity of fuel added to the expected duration of fuel supply given engine fuel consumption. A basic fuel calibration is commonsense.
- **Weight and Balance.** Some members have engaged CASA Weight and Balance Authorities to perform the weight and balance process on their aeroplanes under the impression that the AUF requires that these CAS people be employed. This is not correct. The AUF requires that a workable weight and balance document be produced - again commonsense, but it can be produced by the builder or anyone the builder considers appropriate. If you do not feel you have the necessary knowledge to carry this out, your kit supplier or an appropriate Level 2 should be able to help. If all else fails, contact the AUF.

- **The Pre-flight Final Inspection.** The purpose of this inspection is exactly what it says: pre-flight final inspection. This is performed by the builder under supervision of the inspector and if all is in order, it is supposed to be the builder's final inspection before flight. It is also an inspection which requires engine running.

Cases have arisen where builders have called for inspections where their aeroplanes, although built, are far from being rigged and ready for flight. Aeroplanes should really be complete and ready to fly (note that an engine run is required) when the inspector is called although this is a matter which should be resolved with the inspector before he makes his visit.

- **Certificate of Approval for Flight.** The Certificate of Approval for flight is the document that the builder signs as having completed the pre-flight final inspection and declares that he and only he is responsible for the airworthiness of the aeroplane. It is the document which the inspector signs as having witnessed the builder perform the inspection and it is the document on which the Inspector allocates the Flight Test Area and Flight Test Period.

This document is required before a provisional registration is issued. **The aircraft is not to be flown until provisional registration is received.** Note that Certificate of Approval for Flight can be FAXd to the AUF Office and that the provisional registration can be FAXd in return. The whole process can be done in a matter of hours. The other paperwork such as the inspection sign off sheet, aircraft data sheet and photographs can follow, although full registration at the completion of the flight test period will not be issued until all the paperwork is in order.

- **Full Registration.** Aircraft are issued with a Full Registration when the builder advises via the Flight Test Completion Form that the flight test has been completed and all other necessary paperwork has been received.

- **Photographs.** The aircraft datasheet that is to accompany registration applications requires photographs. The main reason for this is for identification of the aircraft in the event of an accident or some misfortune (and the existence of photographs has proved and is proving most valuable with rescue services because they then know what they are looking for in colour and form). The other is that photographs confirm that markings have been applied and the condition of the aircraft. On sale, photographs are required with the Ultralight Aircraft Condition report for much the same reasons explained above and they do give an indication of the standard and airworthiness of the aircraft (haven't seen a bad one yet!).

I hope the foregoing is not taken as a harangue: it is really a series of answers to recent queries which are worth passing on.

## May 2001

### Charges for Amateur Built Inspections

As true Ultralighters, the AUF membership knows that we operate on a minimum cost, minimum bureaucracy and maximum of fun philosophy. However, there are some out there who seem to have forgotten that these days, professional services do not come cheaply, particularly in aviation. It might be the phases of the planets that a number of cases have occurred in close succession, but over the past month, I have had sad conversations with some inspectors over how a few Amateur Builders forget that the professional service of the Amateur Built Pre-Flight Final Inspection is not just an AUF thing performed by specially talented members AUF with a "Club" approach.

In one case the inspector was sent packing by a mean member with no recompense at all after travelling some considerable distance and after performing the inspection.

*Think about it.* CASA has decreed that Inspectors must be (paid up) LAMEs with

engine and airframe ratings and that they must also hold AUF Level 2 Authorities. While many AUF members argue over the necessity that they be LAMEs, it is CASA's game and CASA's football (merely an extension of the General Aviation Experimental System under CASR 191).

When one looks at the legal ramifications of what the experimental category really is – that the Government allows anyone to build and fly anything provided the public is not placed at risk – it is quite understandable that the Government wishes to have some supervision of what is going on. LAME Inspectors are Government licensed professionals in the airworthiness area and it is reasonable to expect the Government to use them for inspections. Again, if you have read my earlier writings, their responsibility lies primarily with the protection of the Public moreso than the Builder of the aeroplane.

Having established that aviation professionals are required and that professionals earn their living from their LAME skills, **they can be expected to charge for their LAME services.** I have not canvassed LAMEs on rates (real LAMEs that is, not those in administrative appointments), but when one thinks of computer people (next door here in Canberra) charging \$97.50 per hour for simple service on top of travel and parts costs, if LAMEs charged anything like that, the GA Aviation industry would probably succumb and the truly interested pilots and owners would be forced to become members of the AUF and scrounge off our Level 2s.

What follows is not intended to be AUF policy on standard rates for Inspections. It is written more to acquaint people with a view of the monetary aspects of inspections. If any inspector out there feels I am wrong in the figures I use and that the record needs to be put straight, I would welcome help on the matter. I do know that the SAAA has a substantial standard charge on top of which (I think) travel, accommodation and time must be added. This SAAA figure is higher than my figures, but it is no doubt the result of

some sound research and could be more valid than my schoolboy generalist approach which follows.

While you read on, don't forget the ever present GST (10%), Income Tax (say 40%), and unionised labour gets something like time and a half on weekends which is the time when many these inspections are performed (another 50%) all of which in total rounds off nicely to 100% which means that the results could be well doubled! Now read on.

I know that the typical time taken by one inspector for an aircraft inspection is 4 hours. Then there is travel cost – vehicle, fuel, meals and whether a rate for time spent in travel is charged. On top of this might come accommodation if the matter continues into another day.

A LAME I was talking with the other day mentioned rates of \$45 per hour for some type of work, \$35 for another and maybe a lesser rate for an AUF inspection. (These figures seem to be in the lower bracket to me, but we will proceed using them. It doesn't really matter what they are, you can use your own and you will realise that a freebie is not really an option). If the \$35 rate is taken, the actual inspection itself would cost \$140 and at the \$45 rate, \$180.

Then, 4 hours plus travel time would mean that at least one meal might be involved (how much – say \$10 min maybe \$20 to be fair). How far does the LAME have to travel? Let's keep to an easily factorable unit, say 50km which means 100km out and back total. What rate do we use? Casual inquiries give answers ranging from 71c per K to about 32c per K depending on who you work for – public service, private, tax office assessment etc. What's a simple approach? Say 12L/100K is \$12 for fuel per 100km (12c per km) and another 10c per km for wear and tear, total 22c per km or \$22 for a 50K distance (out and back). This is being very miserly when compared to 32 or 71 which would be \$32 to \$71 out and back. What about charges for travel time? The \$35 per hour LAME said he charged \$20 per hour for travel. At a rough miserly calculation, say \$20 for a

50km out and return segment. [*Using ATO figures for a 6 cylinder car and a common average of 10L/100km, \$60 for a 100km round trip is very fair. Ed.*]

Then, don't forget that the LAME must pay AUF membership to be a Level 2: \$88 per annum minimum for a non-flying membership. Say he does 3 aircraft a year, the pro-rated charge to cover this would be about \$30.

What are the totals? \$140 - \$180 for the inspection, \$10-\$20 for a meal, \$22-\$70 for 100km out and return, \$20 to \$45 for travel time and \$30 for membership. This gives \$222 - \$345 for a typical inspection where the inspector must travel 50km or \$264 - \$480 for 100km and more for greater distances.

A fair price for fair work

The AUF does not wish to set fixed costs (check the SAAA figure and think about it – I won't mention the figure here – it's not really relevant) and until necessary, will not do so. However, a really basic minimum would seem to be in the vicinity of \$200 for starters and anywhere from \$250 to \$500 for a fair to short distance could still be classed as reasonable. Any inspection around \$300 would seem to be reasonable and even then remember that the LAME would still be doing you a favour by even doing it.

But what about the extra 100% from tax and overtime rates? ...too hard! [*Prices quoted should include GST, so any charge should be +10% on the **total bill**. Ed*]

The moral is that we are fortunate in having LAMEs who are prepared to participate and a pox on that man who refused to pay and on those who might grizzle.

**June 2001**

### **Amateur Built "Cheque Book Building"**

Cheque book building is the term given to building where the "builder" claims to have built the aeroplane when in fact he has paid someone else to do it. It is not permissible for AUF registration.

The following has been repeated in this magazine many times: that the aeroplanes built under CAO 95.55 para 1.5, ie our 19-xxxx registered aircraft must be - to quote 95.55 para 1.5(a) - **"fabricated and assembled by a person who undertook the construction project solely for the person's own education and recreation; and"** This is all for good reason, the background to which I have related in those frequent articles. The reason is that if an amateur builder builds the Major Portion of an aeroplane, the law recognises that the builder and no other person is responsible for it or its airworthiness. This way, people are free to build and fly what they want and the Government, CASA, AUF, Kit Manufacturer or anyone else carries no responsibility for liability, damage, injury, or anything related to that aeroplane. This concept was a major concession from the way the Australian Government managed Aviation in the good/bad (?) old days and even then CASA did not do it willingly: it was only the fact that they were beating the drum of harmonising with the major aviation codes of the world that swung the balance because the world was already doing it.

There will always be someone out there who tries to beat the system. I was embarrassed at the recent Board meeting when challenged by some Board members about what I knew about the origin of an aircraft ("an aircraft" for the sake of this article - but it was at a Board meeting) and was quizzed on the fine points of my administration of the Amateur Built System. My feeble response was the carrot vs stick or honey vs vinegar approach and that if the time comes, a change might be required. There may be a whiff of it and the issue is under investigation..

If you read section 3.3.1 of the AUF Tech Manual carefully and from the standpoint of someone with a need to enforce amateur building to the letter, you will see that there are a number of clauses which make it quite easy to control amateur building in detail. Add to this the AUF

database and a filing system of hard copies the result is something that can be developed into a nice little militaristic system instead of the current system that is now managed as a routine rather than by full and detailed examination..

I do not propose to make drastic changes at this stage because I only have hearsay, but if the scent develops into a smell (and there are plenty of AUF officials out there to sniff it out), the starting point will be assiduous attention to the detailed requirements of Section 3.3.1 of the Tech Manual. Remember that under "Implementation" paras 3 and 4 require that all receipts for materials (and this includes kits) be kept on file and that a Log Book be maintained for the project. Although not specifically mentioned in the dissertation on log books, the actual location of where the building is taking place should also be recorded. Only a few of these documents have been required to date, but if there are problems, it may be necessary to examine them for all projects!.

End of grumble.

#### **Advice of Building.**

This is not a grumble, but an occasion has occurred where a builder had intended to register with the AUF only to find that the aeroplane was outside AUF limits. Fortunately, the builder had a GA licence and the aeroplane could be registered VH Experimental. Although only a recommendation in the Tech Manual, builders are advised that unless they are absolutely sure of their proposed project, they should seek confirmation of acceptability from the Office.

#### **July 2001**

#### **Amateur Building - Group building - Ops bulletin 1/01**

Without going into the reasons for its issue, it has been necessary to clarify who can legally be taught to fly in an Amateur Built aircraft. Para 2 of the Operations Bulletin 1/01 (see also [www.auf.asn.au/constructors](http://www.auf.asn.au/constructors)) has been issued to clarify this.

Para 4.2 of CAO 95.55 states that "if a person has wholly built or assembled an aeroplane to which this section applies, or a group of persons has wholly built or assembled such an aeroplane, then that person, or each of those persons, may use the aeroplane for their personal flying training."

The AUF interpretation is that the "person/s" must have *participated* in the building project on a *repetitive* and *contributory basis to an amount acceptable to the AUF*. Building will be in accordance with Section 3.3.1 of the Technical Manual. "*Persons Contributing*" must be recorded in the Builder's Log. NB: The complexity of the project will determine the "*acceptability*".

Although not covered in the Ops Bulletin, those who purchase an aircraft built under CAO 95.55 paras 1.2 and 1.5 should also be mindful of para 4.2.

## **2 Seat Amateur Built Trikes and Powered Parachutes.**

Recently, there have been many queries from people wishing to Amateur Built 2 seat trikes and 2 seat Powered Parachutes. The rule covering the whole Amateur Built building system as it applies to the AUF is CAO 95.55 para 1.5. Until now, AUF advice has been that it was not possible to register amateur built 2 seat trikes and powered parachutes with the AUF under the current rules, but there may be light at the end of the tunnel following some "bush lawyering" on the part of the AUF.

### **The Law.**

Quoting from the opening sentence of Para 1.5 of CAO 95.55: "This section also applies to an aeroplane if the following conditions are satisfied" and it goes on with some sub paragraphs giving the conditions to be satisfied. One of these at sub para (b) states specifically that ".....and sections 95.10 and 95.32 of the Civil Aviation Orders do not apply to the aeroplane....". This means that an Amateur Built Trike or Powered Parachute must not fit the rules laid down in CAO

95.32. (A backward contorted way of saying it, but this is the key. Normally one tries to fit something to the rules, not to prove that it doesn't!)

CAO 95.32 in para 1.1 (a) refers to a "...weight shift controlled aeroplane or Powered Parachute" requiring that these be commercially sourced under conditions acceptable to CASA (my words RH-C....if you want to see the real ones, go to subparas 95.32 sub paras 1.1 (b) through (f) yourself). The operative words here are "commercial" and "acceptable to CASA" which means that only commercially sourced machines acceptable to CASA are covered by 95.32.

However, this in itself is not the answer yet. There's a hitch. The term "Kits" comes into the equation with 95.32 para 1(b) stating that it applies to kits supplied from a commercial manufacturer which means that Amateur Built craft cannot be built from commercially manufactured kits. Thus far, this would mean that if the kit was bought from someone, it must come under 95.32 because the kit would have been produced commercially. This is gloomy, but reading on, para (c)(i) says that the manufacturer of a CAO 95.32 kit must hold a certificate of approval to manufacture. The requirement to hold an approval to manufacture is the next key. If the craft are not manufactured from kits produced by holder **Amateur Built Kit Lists**

The Office is receiving an increasing number of queries for advice on what kits are acceptable for Amateur Building and details of these have been placed on the "Constructors" page of our Website at [www.auf.asn.au/constructors](http://www.auf.asn.au/constructors). Three lists are involved and the three are on the page although two of them will still require effort on the part of hopeful builders to fit to AUF requirements. A copy of the AUF List is attached elsewhere in this document while the other two can be obtained from our AUF website or in hard copy from the AUF Office.

To those new to the AUF, those who are old, have drunk too much beer or have just

forgotten or any combination of these, the requirements for an Amateur built are that:

1. it must be an aeroplane (lift derived from fixed aerodynamic surfaces (eg no rotorcraft))
2. the major portion must be fabricated and assembled for educational and recreational purposes (ie not for financial reward)
3. it must have one engine and one propeller (rules out jets and multi-engines)
4. it must have a Max Take-Off Weight (MTOW) not greater than 544Kg (1200lb) (Seaplanes 614Kg)
5. it must have a max stalling speed in the landing configuration ( $V_{so}$ ) not greater than 45Kt (51.7mph, 83.4Km/Hr) CAS

Item 2 requires that the "major portion" must be fabricated and assembled.... One of the problems for builders is in the determination of "major portion". For various reasons, not the least being subjective bias on the part of the builder, the major portion determination is made by officialdom.

**FAA Amateur Built Kit List.** The AUF system is based on CASA's CASR 191 experimental system which is in turn harmonised with the US experimental system, both of which use the Major Portion Rule in their determinations for acceptability. The US FAA publishes a list called the "Amateur Built Kit List" covering aeroplanes that are acceptable to the FAA under the Major Portion Rule and aeroplanes on this list are acceptable to both CASA and the AUF: however, only those meeting the other 4 requirements listed above viz, MTOW (544Kg),  $V_{so}$  (45Kt) etc are acceptable.

**CASA ABAA. List.** In the early days, the Australian Department of Civil Aviation was a world leader in its attitude toward home building. For various bureaucratic reasons tied up with ICAO, the DCA introduced a system by which people could build aeroplanes and fly them on the Australian Register. This meant that they required government approval of the aeroplane AND government approval of the builder. In modern times, the

government approval of the aeroplane is given in a document called an ABAA (Amateur Built Aircraft Approval) and the builders were approved and building supervised by the SAAA. These are the aeroplanes built under the present CAO 101.28. The aircraft awarded an ABAA were also cleared against the Major Portion Rule, so aeroplanes on the "ABAA List" are also eligible for AUF Amateur Building if they meet the other requirements of MTOW,  $V_{so}$  etc.

**The AUF Amateur Built Kit Eligibility List.** With the introduction of AUF Amateur Built, many aeroplanes from Australia and all over the world which had not been covered by other agencies came to notice by builders and these required assessment. CASA issued guidelines for major portion rule assessment in its advisory circular AC 21.24(0) and assessments have been performed on other aircraft not already on the other two lists. Aircraft assessed as being acceptable but not contained in the other two lists are included on the AUF list.

**Eligibility, NOT Approval.** Thus, there are three lists available to prospective builders. Builders should note that these three lists when used for AUF Amateur Built DO NOT CARRY ANY FORM OF GOVERNMENT AIRWORTHINESS APPROVAL. They are lists of aeroplanes considered ELIGIBLE FOR AMATEUR BUILDING under the Major Portion Rule. So that there can be absolutely no misunderstanding, inclusion on these lists for AUF amateur built purposes carries NO guarantee of airworthiness, they are only aircraft considered eligible to be built under the Major Portion Rule. The operative word is "eligible"

**Do Your Own Sums.** The AUF list is a list of those that were eligible in all aspects, weight, stall speed and content in the configuration shown by the date on the table. Any changes to the kits or specifications of the aeroplane since that date may render it ineligible. Also, the aeroplanes listed in the FAA and CASA

documents cover aeroplanes **outside AUF limits**, so builders should check for themselves that the other specifications are acceptable. The AUF has this on a list of things to do, but don't hold your breath! s of manufacturing approvals (or the other way round: if they are produced from kits that are not produced by holders of manufacturing approvals), they don't come under CAO 95.32.

This is what you amateur builders want - you don't want to come under 95.32, you want to come under the amateur built order, 95.55.

### The News.

***If you are not with me this far in the gobbledegook, all the foregoing can be boiled down to the fact that trikes and powered parachutes can be amateur built (according to the major portion rule) if the kits are not manufactured by an organisation holding a certificate of approval to manufacture (ie with involvement by CASA or any other Regulatory Authority). Plans built machines are definitely in.***

So Dave Robertson and that bloke in Tasmania, you are quite free to build your Huntwing plans, but you must comply with Section 3.3.1 of the Tech Manual and all that other stuff like the Major Portion Rule which is on the website at [www.auf.asn.au/constructors](http://www.auf.asn.au/constructors). If you aren't on the web, call the AUF Office for a Builder's Pack. Remember too that the Tech Manager must be contacted at the start of any project. This is only to ensure that the project can be registered by the AUF.

As closure, this makes sense when you consider the cornerstone of the Amateur Built concept which is that the builder and the builder alone takes full responsibility. The bit about not being able to buy kits from organisations holding manufacturing approvals fits in place because approvals imply that the approved organisation and through the approval, the government carry is involved somewher. There must be absolutely no doubt that the amateur builder (and the purchaser of an amateur

built) alone carries full responsibility. (However, it seems a bit silly to RH-C from the airworthiness standpoint because the product from an approved org should be safer)

## August 2001

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### September 2001-08-30

#### **Amateur Built: More Haste - Less Aeroplane.**

An incident occurred recently where an Amateur Built Aircraft was involved in a "sadness" during its initial flight testing. Not being a ghoul, I have not added to the misery associated with the incident by immediately demanding detail, but one of the things that from *hearsay* may be relevant but an issue worth highlighting anyway, is that the weather at the time was less than perfect. Whether these turn out to be the facts or not, it doesn't matter: it's time for a sermon!

The initial test flight in particular is something that should be approached with the utmost care and it should not be attempted in anything less than ideal

conditions. Everything you can control should be at its best to lessen the effects of that unknown that might be difficult to handle or even outside your control. Remember SOD's law: "If it can happen, it will happen - at the worst possible time and when you least expect it"! SOD is alive and well. AUF activity is not life threatening thing like the enemy suddenly appearing over the hill in wartime and demanding instant action. AUF activity is recreational and it is a sport requiring the maturity known as good airmanship so there is no reason to rush. Hasty judgement could result in the loss of that beautiful thing you have just completed, not to mention your financial investment as well as your life and reputation.

Preventing haste is one of the reasons nothing has been done about that cursed delay in obtaining a Provisional Registration to permit test flying immediately following the pre-flight final inspection.

You are not to fly an aeroplane without registration and Provisional Registration is only given on receipt of the Certificate of Approval for Flight which is the document signed by the Inspector. Although provisional registration can be issued very quickly, it introduces a delay between the inspection itself and the first flight. If conducted properly the pre-flight final inspection involves a long period of intense concentration and effort and possibly time in correcting anomalies. The delay in obtaining the provisional registration is probably valuable in that it slows the process down giving time for the test flight itself to be treated separately as another completely distinct exercise rather than as a continuation of the pre-flight final inspection. It should also result in yet another routine preflight inspection before the test flight.

**"Amateur-Built Aircraft and Ultralight Flight Testing Handbook", FAA AC 90-89A.** FAA AC 90-89A is some 100 pages long and is a compendium of experience by people who've done test flying for a living (and survived) like Chuck Yeager. It contains very good advice and should be

consulted by anyone involved with initial test flying of an aeroplane. The document is on our website at **www.auf.asn.au/constructors** (about 800KB download) or it can be obtained from the Office for about \$11.00.

### **Ignition Switch Orientation**

Two amateur built aircraft I have been directly involved with have been presented with the ignition switches installed with "off" being up and "on" being down. Although placarded in the true sense of their function in those aircraft, these switch positions are opposite to convention where **down is off and up is on.**

In debating on whether to raise this in the magazine, I consulted some international aviation regulations and could find no reference to switch orientation, only the requirement that they be "labelled as to operation and the circuit controlled". Some very erudite people were also contacted, with no positive result other than "convention" has it that **down is off and up is on.**

I clearly recollect from my early military flying training days being told that down was off because in an emergency, all electrical switches on a panel could be easily turned off by simply swiping the hand or arm downwards. If I'm wrong, I guess there will be plenty of "Gen Merchants" out there who will provide me with more material for the magazine.

### **Amateur Built Kit List**

It happened as I had dreaded! Last month, a table giving a list of aeroplanes that had been accepted by the AUF as being Major Portion Rule compliant was printed on page 18. Together with this was a lengthy narrative which tried to explain that the table contained only those aeroplanes which did not appear on the CASA or FAA listing and that these other two lists contained aircraft that were acceptable. Some people were disappointed that their cherished machines did not appear, so this month, a list (on one of the fill sheets following) of all types that have been registered under both the CAO 95.55 and CAO 101.28 definitions of Amateur Built

has been produced from the database together with types the AUF has been advised are under construction..

Please note that many entries confuse type with model and manufacturer and to refine the list would be time consuming - must be done, but not for this edition of the magazine. I can even now hear howls from people over the confusion between things like Pietenpol, Grega and Aircamper, and those funny names and numbers against RANS and Jabiru not to mention some repetition due to confusion between type and model, but bear with us

- this list is really a conglomeration of words which will indicate to people with an interest and a little knowledge of ultralights what types are on the register.

If you are interested in anything not mentioned on this list, go back to pages 18 and 19 of last month's magazine or to [www.auf.asn.au/constructors](http://www.auf.asn.au/constructors).

**LISTING OF AIRCRAFT  
ACCEPTED AS MAJOR PORTION RULE COMPLIANT  
(As at 30 August 2001)**

<b>AIRCRAFT</b>	<b>SUPPLIER</b>	<b>KIT CONFIGURATION</b>
Aerodesign Pegasus	PO Box 1331 CASTLE HILL NSW 1765	April 2000
ATEC Zephyr	Only accept on individual assessment (Importer has not sponsored type) Czech Republic	May 99
Austflight Drifter	Austflight ULA Pty Ltd PO Box 84 BOONAH QLD 4310	April 99
BushCaddy R80	Mr A D Stiller 10 Caryota ST NAMBOUR QLD 4560	July 2000
Fisher MK1	Spectrum Aviation Hangar 4, Lismore Airport LISMORE NSW 2480	October 1999
Flightstar Spyder and Formula	Flightstar Aviation Australia PO Box 208, Albert St BRISBANE 4002	January 1999
Sapphire LSA Mk II	Sapphire Aircraft Australia 13 Ancura Crt WATTLEGROVE NSW 2173	May 1999
Spitfire	Supermarine Aircraft Factory 200 Beatty Rd ARCHERFIELD QLD 4108	April 1999
Storm	Sierra Aviation PO Box 505 LILYDALE VIC 3140	July 2000
Supa Pup	Aero Sport Pty Ltd PO Box 630 OAKBANK SOUTH AUSTRALIA 5243	November 1999
Terrier 100	FoxCon Aviation M/S 895 MACKAY QLD 4741	December 1999
X-Air	X-AIR Australia, 24 Leda Drive Leda Business Centre BURLEIGH HEADS, QLD, 4220	Feb 1999

## AMATEUR BUILT AIRCRAFT TYPES ON AUF DATABASE

Aircraft Type	Model/Design
Aircamper	Grega G N I
Aircamper	Pietenpol
Amethyst Falcon	
Atec Zephyr	
Avid Flyer	C
Avid Flyer	Mk 4
Avid Flyer	Aerobat
Avid Flyer	STOL
Baby Lakes	Oldfield
Bandit	Mk IV
Beaver	RX 550
Biplane Rogal	Rogal
Bluebird	Proto
Bonel	05
Boorabee	Mk I
Boorabee	Mk II
Boorabee	MKI
Breezy	RLU 1
Capella	X S
Capella XS	C 65
Carlson	P T 2
Carlson Sparrow	II
Catalina	
Challenger	Challenger
Challenger	Challenger 2
Challenger	Clipped Wing
Circus Special	Circus Special
Cobra	A
Corella	Model 1
Corella	UD-2
Currie Wot	
Cygnets	SF-2A
Drifter	503
Druine Turbulent	D31
EAA Biplane	P2
Europa	Classic
Europa	XS
Fisher	Classic
Fisher	Horizon 1
Fisher	Mk 1
Fisher	Mk II
Fisher Mark I Kit	Bright Special
Flightstar	11
Flightstar	11S L
Flightstar	2SC
Flightstar	S C
Flutter Bug	
Flying Fox	
G 2000	G 2000
Genesis	Slip Stream
Glass House	TH
Glasshouse	TPT TH
Hawk	2
Hawker Hurricane	5/8 Scale
High-wing	Mono-plane
Hunter	912

Aircraft Type	Model/Design
Jabiru	22A
Jabiru	J 200
Jabiru	LSA/55K
Jabiru	S P
Jabiru	S P Tail Wheel
Jabiru	S P -470
Jabiru	S P 470
Jabiru	S P 6
Jabiru	S P Kit
Jabiru	S P-T
Jabiru	Sk
Jabiru	SP 6
Jabiru	UL
Jodel	D18
Jodel	D9
Jodel	D 11
Karatoo	J-6
Kitfox	2
Kitfox	3
Kitfox	4
Kitfox	IV-1200
Kitten	J6
KR 2	
KR 2	2.S S
Light Wing	GA-55
Light Wing	GA-912
Light Wing	GR 1400
Light Wing	Pocket Rocket
Luton Minor	L A4
Magpie	Magpie
Maxair Drifter	XP-503
Messerschmitt	109 Replica
Minicab	GY-20
Minicab	GY-201
Murphy Maverick	Maverick
Murphy Rebel	
Murphy Renegade	
Murphy Renegade	Spirit
Mustang	P51B
Osprey 11	Long-wing
Panther	*
Pazmany	PL4
Pelican	PL
Pelican	Sport 600
Petrel	Kit
Protech	PT 2
Pulsar	Mk 1
Pulsar	XP
Quickie	Q1
Quicksilver	GT500
Quicksilver	GT-500
Quicksilver	MXL 2 Sport
Rand	K R 2
RANS	S4
RANS	S6
RANS	S6S Coyote

<b>Aircraft Type</b>	<b>Model/Design</b>
RANS	S6ES Coyote II
RANS	S7 Courier
RANS	S9
RANS	S10 Sokota
RANS	S-12
RANS	S12 XI Airaile
RANS	S-14 Airaile
Renegade	Spirit
Revelation	Revelation
Solitaire	Rutan RAF 77-6
Sakota	S-10
Sapphire	Mk 2
Sassy	PT 2
Shuttle	11
Skyboy	582 SEF
Skyboy	
Skydart	ULA
Snark/Condor	HA3-B
Sonerai	2
Sonerai	2L
Sonerai	LS 11
Spacewalker	1 UL
Sparrow	XC
Spitfire	Mk 25
Spitfire	MKX 11
Sportsman	
Sprite	Mk 2
Starlet	CJ1
Storch	Mk 4
Storch	MK 4 EX
Storch	SS 4
Storm	300
Shadow	C F M
Streak Shadow	C F M
Sunbird	MK1
Supa Pup	4
Supa Pup	II
Supa Pup	Mk IV
T1	TH
Tara	
Taylor Monoplane	JT1
Teenie Two	Parker
Terrier	100
Thunderbird	
Tipsy Nipper	T66 MkII
Tipsy Nipper	Mk III A
Tornado	II
Twin Star	MK I
Volksplane	Evans VP-1
Volksplane	Evans VP-1A
Volksplane	Evans VP-2
Wombat	Wombat
X-Air	
Zenair	C H 701
Zenith Zodiac	601 H D
Zephyr	
Zodiac	C H 601

### Under Construction

<b>Aircraft Type</b>	<b>Model/Design</b>
Boredom Fighter	
Bush Caddy	
Curtiss Jenny	
Flitzer	
Fly Baby	1B
Hummel Bird	Modified
Kiebitz	
Nova	
P 40	Loehle
P5151	Loehle
Sea Star	
Sonex	
Super Koala	Fisher
Team Hi Max	

## Checklists

AMATEUR BUILT ULTRALIGHT  
Before Building Checklist

This checklist is intended to provide to a prospective builder the requirements necessary for a construction project to be eligible to become an AUF Amateur Built Ultralight under CAO 95.55, para 1.5.

1. When completed, the aircraft is required to comply with CAO 95.55, para 1.5 before it can be accepted as compliant with the regulations. Complete the boxes below. **If there is any non-compliance, ie if the answer to any question in the boxes is “No” the aircraft cannot be registered with the AUF as required by subpara (c) below.**

CAO 95.55 para 1.5 (U/L Amateur Built)	
YES/NO	
—	
<input type="checkbox"/>	1.5 — This section also applies to an aeroplane if the following conditions are satisfied:
<input type="checkbox"/>	(a) the aeroplane is an ultralight aeroplane the major portion of which has been fabricated and assembled by a person who undertook the construction project solely for the person's own education or recreation; and
<input type="checkbox"/>	(b) paragraphs 1.2, 1.3, and 1.4, and sections 95.10 and 95.32 of the Civil Aviation Orders, do not apply to the aeroplane; and
<input type="checkbox"/>	(c) the aeroplane is registered with the AUF; and
<input type="checkbox"/>	(d) the aeroplane has one propeller, one engine and a maximum of 2 seats; and
<input type="checkbox"/>	(e) the aeroplane has a maximum take-off weight not exceeding:
	(i) in the case of an aeroplane other than a seaplane—544 kg; or
	(ii) in the case of a seaplane with a single seat—579 kg; or
	(iii) in the case of a seaplane with two seats—614 kg; and
<input type="checkbox"/>	(f) the aeroplane has, in the landing configuration, a stall speed $V_{SO}$ that does not exceed 45 knots.

<b>Yes No</b>	2. If the aircraft is being built from a kit, has the kit been accepted as an eligible Amateur Built Kit in the US or Australia: ie does it comply with the major portion rule? (A No in this box will require that the project be reviewed by the AUF)
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## **“Pre-Pre-Flight Final Inspection Checklist” BEFORE YOU CALL THE INSPECTOR**

At the time of writing there were 94 19-XXXX aeroplanes on the register, most of which have had pre-flight final inspections, the others having come from other arrangements such as those 101.28 aeroplanes whose builders have elected a simpler path to finish the process and start flying or from 95.10 aeroplanes with growing pains. Some of the inspectors have raised points which will save both their time, yours and your money if followed. These are given below.

**Builder Responsibilities at Time of Inspection.** Some of the points raised are really covered in the new Section 3.3.1 page 2 of the Tech Manual under “Issue of a Registration Certificate” which covers requirements for:

- the fireproof plate,
- required instruments,
- seat belts and
- placards.

This new section of the Tech Manual has been printed and should have been included with your June issue of the magazine or this one. It is also printed in the Dec/Jan 99 issue of the AUF magazine (the one with the Spitfire in flight on the front)

Other requirements brought to attention by inspectors are:

- **AUF Membership.** The test pilot must be a current member of the AUF and hold a valid AUF Pilot's Certificate. (Yes, it's happened! – with an owner builder)
- **Builder's Log Book.** The Builder's Log Book required by the Tech Manual page 3.3.1-2 para 4 and certification of the pre-closure inspection at page 3.3.1-3 para f must be in a respectable format and available.
- **Weight And Balance.** A workable document giving weight and balance details is required.
- **Basic Fuel Calibration.** A basic fuel calibration is to have been carried out. Detail will depend on your system. Fuel bowser accuracies are quite adequate
- **Aircraft Maintenance Logbook.** An aircraft Maintenance Logbook appropriately prepared for the aeroplane (available from the AUF Office at \$10 each) is required.
- **Inspection Checklist.** There must be a clear understanding with the inspector beforehand as to who will be providing the Inspection Checklist (The Appendix to Tech Manual Section 3.3 – this is only to be sure that one is actually available at the time). Photocopies of the pages of the manual will suffice, and it is recommended that three copies of the Certificate of Approval for Flight (3.3.1 page 5) be made: one for the inspector, one for the builder and one for onforwarding to the AUF Office for processing of the registration.
- **Warning Placards.** The warning placards (page 3.3.1-2 para d) can be obtained beforehand from the AUF Office, but they are normally supplied with the registration certificate after the final inspection form is processed by the AUF. It might be good practice to request these at the time requesting a number allocation.