The latest LAA Engineering topics and investigations By **Malcolm McBride**

Safety Spot

Airworthiness Information Leaflets, corrosion and Chobert rivets

Above This lovely Auster AOP. 9 belongs to Devon-based Auster aficionado, Richard Webber; LAA Inspector, Roger Benson, helps Richard keep this example in tip top condition. This particular machine is registered in the UK as G-BDFH but is permitted, quite right having served in the Army Air Corps, to operate under its army colours. If you've ever wondered what AOP stands for, and I did, a little research revealed that the letters stand for the aircraft's intended role – Air Observation Post. The LAA enjoys the company of 11 AOP. 9 aircraft, six of which hold a current Certificate of Validity (CV) for their Permits to Fly. **Photo: Bill Fisher**

Welcome to this early-spring edition of Safety Spot. As always, I'm hoping that you are looking forward to the (hopefully) less turbulent weather that's (again, hopefully) just around the corner. I would imagine that most of you who are in the wonderful position of owning your own aircraft would by now have prepared your machine for the summer season and that you've taken my colleague here at the LAA's Turweston HQ, Jerry Parr's, advice when it comes to putting your aircraft back on the line after its annual sojourn in the hangar.

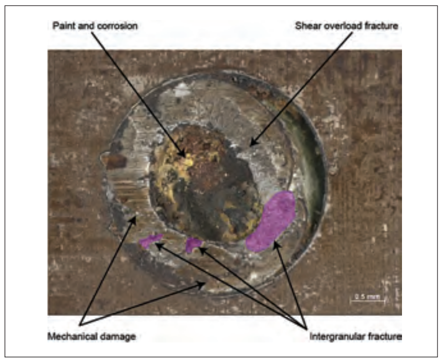
If you haven't yet taken time out to read Jerry's excellent article The Post-Winter Inspection (*LA* March issue), then I'd advise that you give it a go – lots of great advice about what you should be looking out for before returning your aircraft to its rightful place – above the airfield, not tucked away inside a hangar on it.

Now, I'm writing this April *Safety Spot* in the middle of March. Actually, as I write, our quite exposed HQ building is being battered by storm Gareth; as you read this now, a distant memory I expect as there are plenty more depressions ganging-up to attack our western shoreline if my reading of the isobars is anything like accurate. Such is the fickle nature of our weather here in the UK, because the early February's promise of spring has disappeared, I've not been able to get back on my preferred method of getting to my desk here in the mornings … my trusty Triumph. Naturally, as the years pass and she (and I) get more geriatric, and perhaps less and less 'trusty', I won't be returning to the bike until I've carried out a full post-winter inspection.

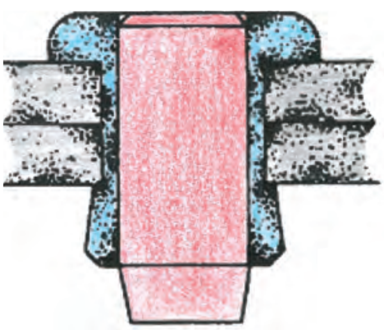
Of course, riding a motorcycle or flying an aircraft isn't just about maintaining a healthy machine … so I'll also be taking it very easy on the roads until I get back into the swing of things – think about doing the same if you haven't flown for some time. OK, chances are that you'll slip straight into the saddle when the time comes, and the time that's passed since your last flight will shrink to nothing; but think, 'what if something goes wrong' … 'will I cope'? Incidentally, and as a bit of a reminder, I'm not saying this because it sounds sensible, a sort of 'little Miss Perfect' comment. *Safety Spot* is always based upon real incidents that have affected pilots or engineers engaged in the active pursuit of flight. We've already had one serious incident this year where lack of recent flying experience shouts loud from the initial accident reports, please don't get in a mess for the sake of a bit of a work-out with an instructor.

Above The aileron rod-end fitting as it can be seen in the aircraft; note that the rod-end bearing, which has a female thread, screws into a threaded fitting riveted into an aluminium tube. The other end is slightly different in that the rod-end isn't adjustable, though it uses rivets in the same way to attach the rod end to the tube. The aileron's final adjustment can be made by lengthening or shortening the component by, naturally, winding the rod-end in or out. This particular rod-end comes from an aircraft that's not actually on the LAA fleet and, unusually, uses Chobert rivets to secure the end fitting to the tube. These rivets wouldn't pass muster though because the sealing/strengthening pins weren't fitted when the rod was manufactured. **Photo: Courtesy of AAIB**

Above Because the AOP.9 never actually held a Type Certificate, it does mean that if the aircraft's manufacturer goes out of business there's no single source of technical information. When we were first alerted by the AAIB's investigator that they'd discovered a potential 'hidden' failure mode in a failed pop rivet and suggested that we let other AOP.9 owners know about it, we thought that an Auster Modification, (AM 995), involving this part meant that the failed rod actually had the obsolete type of rivets. Later research showed that Auster Mod 995 principally involved the method of securing the bearing into the housing – this is a pre-mod example where the rivet is held in place by a centre punch mark; the modification changed this to 'staking' and this is normally done with a cold chisel. **Photo: Malcolm McBride**



Above and right The picture on the left shows an example of the rivet used before the manufacturers changed the specification. We think this is an aluminium break-stem blind rivet because there is still so much of the stem itself showing (though very badly corroded), but it could be a Chobert rivet with an incorrect (mild steel) pin. The picture on the right shows us what all the fuss is about – in the view of the metallurgist who looked at the failed rivet, the failure mode showed clear evidence of Stress Corrosion Cracking (SCC), a failure mode that is very difficult, sometimes impossible, to see from an inspection point of view.
Photos: Malcolm McBride/Courtesy of AAIB



Above, middle and right Chobert rivets were first used when GB was gearing-up aircraft production in the decade before WWII. Unlike a break-stem or a break-head blind rivet, the forming mandrel isn't part of the rivet itself, instead it's the business end of the rivet gun. This method of rivet forming meant that a number of unformed rivet 'blanks' could be loaded onto the mandrel, speeding up the production process no end. Should the rivet need to take an increased shear load, or the hole left after the mandrel had done its work needed to be sealed, then pins could be impressed into the rivet (red in sketch), though they then needed to be ground flush to finish the job off. Each rivet 'set' needed three and a half turns of the handle on the rivet gun. I read somewhere that production fitters were expected to set over two thousand rivets a day – no wonder the chap in the advert shown had biceps to die for!
Photos: Malcolm McBride/LAA Library.

So, what's on offer in *Safety Spot* this month? Well, those of you who keep your eyes on the LAA's website will know that we've issued quite a few Alerts since the February edition of *Safety Spot*. There's been a bit of an issue with an Ikarus C42 nosewheel steering rod and, perhaps like busses, things come in groups, a similar issue has affected the steering control on some RotorSport Gyroplanes.

We've also finally managed to get all the ducks in a row and publish the long-proposed Airworthiness Information Leaflets (AILs) dealing with the various inspection issues surrounding the SportCruiser nose undercarriage systems – three in all – covering the fleet removal of the early PS Mk 1 noselegs, changes to the inspection regime for nosewheel spindles and an inspection requirement for the nosewheel forks.

Whenever an issue like these just mentioned affects specific LAA members, we'll send the relevant paperwork directly to them – and we'll follow this up by sending a message to all LAA inspectors letting them know that we've issued 'this or that' safety Information. Normally we'll do this by publishing an Airworthiness Alert. If you have an interest in any of the above, please have a look at the Alerts portal on the LAA website (*www.laa.uk.com*).

Auster AOP.9 – Aileron Pushrod Failure

If you have been following the various LAA Alerts as they've been posted, you will know that we issued an Alert at the beginning of February highlighting the publication of an Airworthiness information Leaflet (AIL) requiring a 'before further flight' inspection of the final aileron drive pushrods on all Auster AOP.9 aircraft operating under an LAA administered Permit to Fly. If, on inspection, the rod was found to be assembled without using Chobert rivets, the aircraft was temporarily grounded.

The reason for the urgency was that it had been discovered, during an AAIB fatal accident investigation involving an AOP.9, that some of the rivets securing the rod-end fittings to the rods themselves had failed. Very worryingly, the mode of failure included a metallurgical problem that hadn't been seen before in blind rivets – Stress Corrosion Cracking (SCC).

SCC is a rather complicated material-structure failure mechanism though sadly, because it's an extremely interesting subject in its own right, space doesn't allow too deep a delve. For SCC to occur, at least two factors must be present. One is that the material must be under stress.

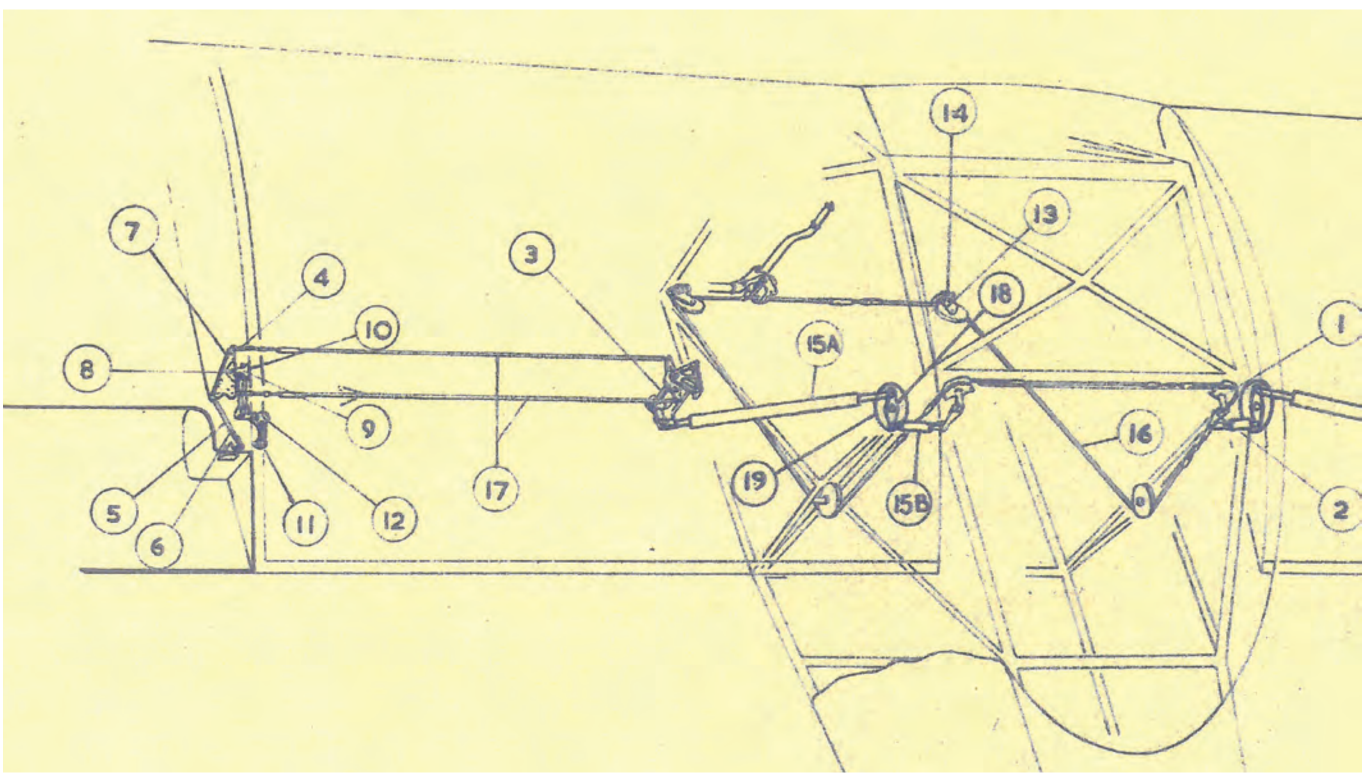
Remember, stress, at least in engineering parlance, is force per unit area. This force is resisted by the material in a gradual way through the material. The stress though, doesn't necessarily only come from an external pressure on the material, though it normally would. Internal residual material stresses, perhaps created during forming, count at the molecular level.

The second 'required factor' is, naturally, some kind of oxidative process… in other words, corrosion. Once SCC starts in a material it's unlikely to stop until all the residual stresses are relieved – in other words, the material breaks, often along a previously unspottable internal fault line. It's the unspottable nature of this failure mode that worries engineers.

The rivets that had failed were of a type that appeared on the Auster drawings to have been replaced by stronger rivets of a type less prone to SCC, suggesting that the aircraft might have been fitted with obsolete parts. Though it couldn't be completely ruled out, the accident investigation team don't think that the failure of the rivets was in any way causative of the accident, but rather, as a result of the ground impact – though a finding like this cannot, of course, be ignored.

Almost as soon as the problem was discovered, long before the investigation had been completed, the AAIB investigator in charge alerted us at LAA HQ of the rivet finding so that other Auster AOP.9 aircraft could be checked.

Any accident that causes damage to vessel or persons is, of course, a tragedy. An accident involving loss of life or serious injury is especially so. I think that aviators the world over would agree that it's



Above This drawing shows the aileron control mechanism on the AOP.9, which has a mixture of cables and push-pull rods. One reason why we were so concerned about the report that an aileron operating rod had failed was because the rivets in this particular component (Item 5) were particularly highly stressed. We think that Auster engineers recognised this and that's why they 'upped' the rivet strength quite considerably towards the end of the production run of the type. We surveyed the rest of the system and the safety factors of the rods in the rest of the circuits were all much better – though advice to owners suggests a complete inspection of the flight control systems on the AOP.9 regularly as part of the aircraft's TMS. **Photo: LAA Library**

Above and right It's difficult to spot corrosion hidden between riveted joints or buried within a closed structure. The picture on the left shows 'between skins' corrosion in an aluminium structure; the problem here is that the rivets used are only 3/32in diameter aluminium alloy rivets, so there's not much meat in them to start with. This type of corrosion in a structure is relatively easy to spot as rivets that become loose tend to move, and this movement causes 'smoking' – easily spottable on the surface, or 'quilting' at the joint – this is where the aluminium oxide, which occupies more space than the donor aluminium, causes a raised area-in between the rivets. The picture on the right shows that the inside structure of a Luscombe tailplane can be checked with even a relatively inexpensive (and readily available) inspection borescope system. **Photos: Owen Watts/Peter Dyer**

essential to tease-out as many causative factors as possible from an accident involving the loss of life, not only to try to figure-out ways that future similar events can be avoided, but also to give meaning to a fellow aviator's passing. I actually think that it's this basic principle that drives the excellent safety culture we enjoy as aviators.

Most of us are quite happy to put our hands up to a mistake made. Most experienced aviators I know become agitated when they see the less experienced seemingly binning safety legislation, apparently without understanding this respect, and often for the weakest of reasons. Most of the rules governing aviation, after all, have a life (or lives) lost somewhere as a driver for their creation.

Now, in terms of all the lessons to learn, we've just received the final AAIB 'Red Top' report into the AOP.9 accident, so this isn't the time, or perhaps even the place, to discuss in any detail any of the many and various individual aspects they've highlighted in their report.

Also, it must be said, there are many aircraft that use this type of push-pull rod somewhere in their control system so, although the finding came from an AOP.9 aircraft, perhaps we shouldn't limit any response to this aircraft type – but we have to start somewhere. Experience has shown us that the efficacy of an overall failure led safety requirement requires a multi-pronged approach; for me I've found that there are three basic things that need to be achieved.

Firstly, and this should be done as quickly as possible, when an issue affecting safety is discovered, others who might be affected by the specific issue need to be made aware that there's been a problem. Using the AOP.9 finding as an example, we achieved this by publishing an AIL requiring owners to inspect the aileron rods on their aircraft to see whether the later type rivets were in place, and make sure that the rivets were not showing signs of suffering SCC by carrying out some gentle levering under the rivet heads to make sure they didn't fall off.

Often, at least early on in an investigation, there's not that much information available. But that's not saying that the aircraft is in any way not up to its role, or that it wasn't built to the highest of standards, just that there's no 'one' source of technical information as would be found in a Type Certificated aircraft.

Initially, just to expand the point about accuracy, we thought that an Auster Mod 995 was connected with a rivet change from the early type break-head pop rivets to Pinned Chobert rivets, although when some of the paperwork covering the Mod 995 became available, we found that this mod, at least in part, really covered a different assembly technique to be used when fitting the bearing into the rod-end. Some got a little hot under the collar about this 'mistake' and suggested, though rather missing the point, that we didn't know what we were talking about.

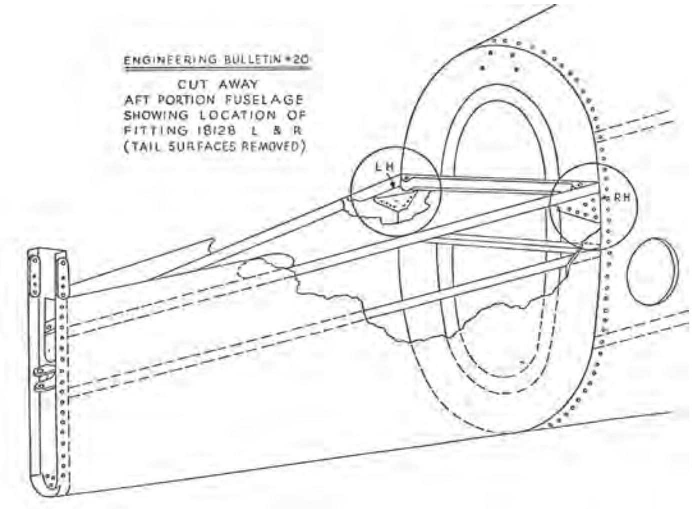
We then concluded that though we have a drawing, which showed that there was a rivet change (to the beefier Choberts), we weren't able to see how this change was promulgated.

In the UK fleet surveyed, and rather strangely, we only appeared to have one aircraft that used Chobert rivets. As it turns out, later research suggests strongly that we were probably right in the first place, even if rather by accident, and that Mod 995 actually included both the bearing 'staking' change and the rivet upgrade!

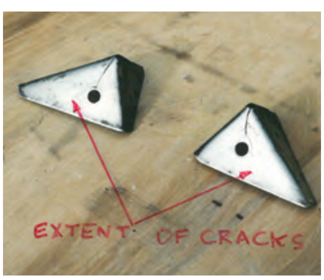
After much discussion, and some careful study of the drawings and documents that were now becoming available, we decided that, while in view of the recent findings from the accident, it would be desirable to safety to implement the rivet upgrade, which did not seem to have been mandated previously by Auster or Beagle. It also became clear that fitting Chobert rivets involved special tools and procedures that nowadays are not widely available, so we feared that mandating the upgrade on a 'before next flight' basis might risk botched results and reduced airworthiness.

With AOP.9 owners chafing at the bit at being grounded, we therefore decided that from the point of view of overall fleet safety, it would be OK to allow individual aircraft to be returned to service on a temporary basis with either of the two types of rivet fitted, subject to nothing being found amiss after a close inspection by an LAA Inspector. This inspection was focussed on the rivets of course, although our initial decision to permit a return to service was based, to some extent, on the fact that the aircraft had served quite satisfactorily for many years with these lower strength rivets.

The second of the three basic continuing airworthiness objectives is to widen the specific issue as far as possible into other areas where safety might be being compromised. In this case, which is a reasonable example of how we do this, our latest AIL requires owners to inspect the rod-end connections throughout the whole aircraft every three years – there are many rods like this specific aileron operating rod in the AOP.9 control circuitry, as you can see in the accompanying drawing. In the course of our examinations into potential failure causes, we discovered that the reserve strength



Top It turns out that cracking in the structural members of the Luscombe empennage has been an issue for many years, and that the design has been changed three times to date. The sketch shows the original forward attachment fitting, these were formed triangular steel plates riveted to the structure against which the tailplane was bolted. Between the plates (not shown) was a cast aluminium spreader bar. **Above** The second iteration of the design was a one-piece cast aluminium spreader.
Photos: LAA Library/Owen Watts.



Above, middle and right The first picture (left) shows the cracking problems found in the initial design of the forward tailplane attachment. The second picture (middle) shows casting cracks in the second type of fitting. The third picture (right) shows the latest 'all steel' design. LAA Engineering, in the AIL covering the required inspection intervals, requires these attachment brackets to be checked every six years as part of the aircraft's Tailored Maintenance schedule (TMS). **Photos: Jane Barrett/Peter Bentley/Owen Watts.**

– that's the factor of safety above the minimum strength to operate in-service safely – was only really small in the aileron control rod. It's a tiny rod driving a great big metal aileron. Certainly, the day to day flight loads would be small but the Auster technical office's work had revealed that the rivets would be 'on the limit' if the pilot were to apply all his strength to the stick to attempt to free a jammed control. The other rods in the AOP.9 system were all checked and they all had reasonable safety factors built in.

We think that it is very likely that Auster engineers were worried about the 'only just OK' nature of this particular rod; it's possible there had been an in-service failure. That's probably why Auster design engineers changed the weakest link in this part, removed the pop rivets and changed the design to incorporate the pinned Chobert rivets.

Having identified a means of carrying out the upgrade, we issued the latest issue of the AIL, which requires all the early pop rivets to be replaced with the later specification pinned Choberts before the Permit Renewal inspection of 2020. Because the Chobert riveting process requires special tooling and some considerable expertise, we've only approved one inspector thus far to carry out the process; he's had to jump through a few hoops, including writing up-to-date process sheets and sending in a number of test pieces. Fortunately, we've been able to locate a source of enough of these Chobert rivets to service the UK fleet of AOP.9 pushrods. Such is the wonder of the LAA system, this inspector will be modifying the aileron control rods on an 'at cost basis', which is marvellous.

Widening this individual issue still further borders on the third of our basic continuing airworthiness jobs. This part of the exercise has two parts; the first concentrates on expanding the safety advice to operators of other similar types, and the second is the reinforcement of a group safety culture. I've already mentioned that this type of riveted connection is ubiquitous in many airframes, not just control systems. If you fly an early-designed microlight, just take a look at how the end-fittings in the structural tubes work. After reading this you'll most likely want to have a close look at the standard of the rivets you're hanging your life on!

Our next subject shows just how strongly the excellent safety culture within the Association's ranks shines.

Luscombe Tailplanes – Corrosion Inspection Update

Regular readers will know that in the February edition of Safety Spot we featured a very scary story concerning unseen corrosion in the tail sections of a Luscombe. LAA member, and Luscombe restorer, Peter Bentley sent in pictures of some of the problems he encountered

during the refurbishment of the empennage on his aircraft. Peter worked alongside Luscombe specialist, LAA Inspector Owen Watts, and ended up pretty much renewing the whole tailplane such were the depths of the problems. One really scary picture, certainly the picture that created the biggest response from members, showed some very badly corroded tailplane attachment brackets.

There's not a lot of point re-explaining this story here, if you haven't seen the piece you can download a copy from the *Safety Spot* section of the LAA website (*www.laa.uk.com*).

Things have moved on considerably from Peter's initial report though. We were so worried about this issue, where the result of a primary structural component failure were unthinkably horrible, that we wrote to all our Luscombe owners letting them know what had been found by Peter and advised that they should consider building in a close inspection in this area of their airframes as soon as possible.

I must say that I was gratified by the response we received here at LAA Engineering HQ from owners who received the letter, it demonstrated that engineering safety is a team effort. There were no groans and moans from the Luscombe-owning community, and every response we received contained a sensible suggestion or two about how we should proceed with the creation of an inspection regime designed to ensure that there's no UK Luscombe flying around in an unsafe structural condition.

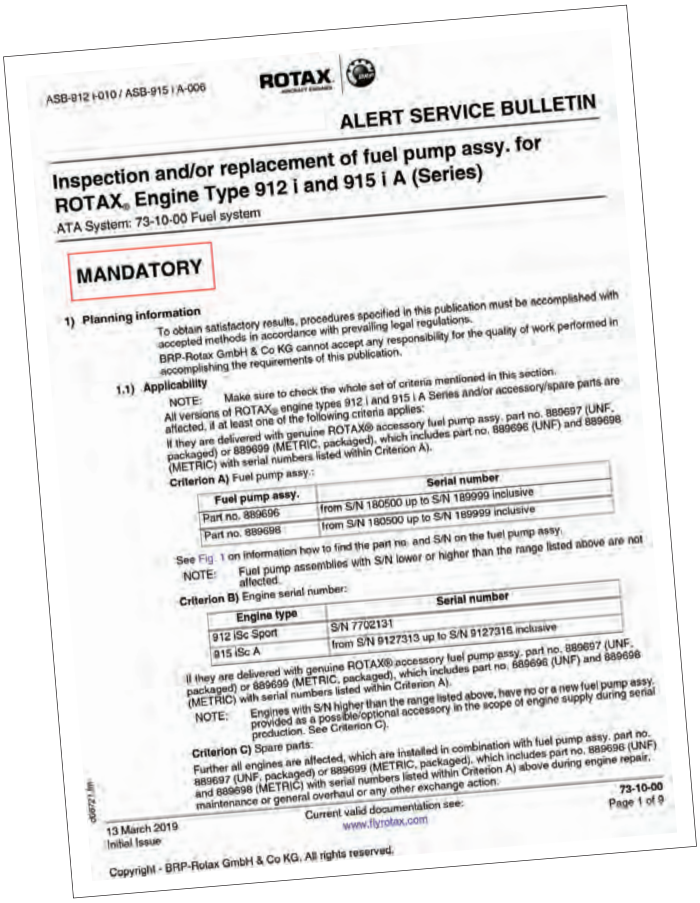
Of course, just like the issue with the AOP.9 discussed earlier, our initial response needs to be focused on the specific issue on the specific aircraft type; but the reality of this finding is that it reminds us all that none of our aircraft are getting younger by the moment. Keeping some of our oldest machines airworthy is, without doubt, going to be increasingly challenging as time marches on and, if this is to be afforded, a step-wise (and continuing) approach is probably the best way of achieving longevity.

We're negotiating the content of the final AIL laying out the inspection requirements for Luscombe empennages, but we're all breathing a sigh of relief that the internal structure can be inspected using modern camera systems – thanks to all of you that have sent in pictures showing bracketry that remains in excellent condition. This borescope method means that owners don't need to be cutting holes in the skin, or worse, de-skinning the flying surfaces to check the critical structural elements within.

That said, because of an ongoing issue involving cracking of the forward tailplane attachment bracket, owners are going to have to remove the tailplane to check this component. Naturally, it's much easier to carry out a borescope inspection with these flight control

Above LAA Engineering has just issued an AIL requiring annual checks of the strut end fittings that support the tailplane on all Murphy Rebel aircraft. This follows a finding by Murphy Aircraft that there has been a failure of a strut rod-end, and they promptly issued a Service Bulletin letting owners know of the issue and that they had designed an upgraded strut, which is retrofitable. There are a number of reasons why a strut like this might fail, the first being overload because of an impact – Murphy think this to be the reason for the most recent failure. The second reason is of course, corrosion. Corrosion pitting in a highly loaded item will almost certainly lead to cracks forming within the structure of the part. The third reason is poor fitting practice; fork-ends like this must not be 'pinched' together when bolted onto the fuselage structure – if they are then stresses are created in the material's structure which could lead to premature failure …. especially if corrosion is also present in the surface. **Photos: LAA Library/Murphy Aircraft**

Above and right The picture on the left from Murphy Aircraft shows the original tailplane strut design with deep corrosion pits in the structure of the strut tube itself, and the strut's end-fitting. Of course, owners and inspectors must adopt a zero-tolerance attitude to corrosion on all aircraft structural components. These old struts are now subject to an annual strip inspection. The picture on the right shows Murphy's latest strut design, we think that this is actually a prototype as the fitting kit, available from Murphy Aircraft, uses rivets to attach the strut's end fitting to the strut itself. Either way, this manufacturer's upgrade is accepted by LAA Engineering and its fitment relieves owners of the strip part of the annual inspection. **Photos: Murphy Aircraft**


ASB-912 i-010 / ASB-915 i A-006

ROTAX

ALERT SERVICE BULLETIN

Inspection and/or replacement of fuel pump assy. for ROTAX® Engine Type 912 i and 915 i A (Series)

ATA System: 73-10-00 Fuel system

MANDATORY

1) Planning information

To obtain satisfactory results, procedures specified in this publication must be accomplished with accepted methods in accordance with prevailing legal regulations. BRP-Rotax GmbH & Co KG cannot accept any responsibility for the quality of work performed in accomplishing the requirements of this publication.

1.1) Applicability

NOTE: Make sure to check the whole set of criteria mentioned in this section.

All versions of ROTAX® engine types 912 i and 915 i A Series and/or accessory/spare parts are affected, if at least one of the following criteria applies:

If they are delivered with genuine ROTAX® accessory fuel pump assy. part no. 889697 (UNF, packaged) or 889699 (METRIC, packaged), which includes part no. 889696 (UNF) and 889698 (METRIC) with serial numbers listed within Criterion A).

Criterion A) Fuel pump assy.:

Fuel pump assy.	Serial number
Part no. 889696	from S/N 180500 up to S/N 189999 inclusive
Part no. 889698	from S/N 180500 up to S/N 189999 inclusive

See Fig. 1 on information how to find the part no. and S/N on the fuel pump assy.

NOTE: Fuel pump assemblies with S/N lower or higher than the range listed above are not affected.

Criterion B) Engine serial number:

Engine type	Serial number
912 iSc Sport	S/N 7702131
915 iSc A	from S/N 9127313 up to S/N 9127316 inclusive

If they are delivered with genuine ROTAX® accessory fuel pump assy. part no. 889697 (UNF, packaged) or 889699 (METRIC, packaged), which includes part no. 889696 (UNF) and 889698 (METRIC) with serial numbers listed within Criterion A).

NOTE: Engines with S/N higher than the range listed above, have no or a new fuel pump assy. provided as a possible/optional accessory in the scope of engine supply during serial production. See Criterion C).

Criterion C) Spare parts:

Further all engines are affected, which are installed in combination with fuel pump assy. part no. 889697 (UNF, packaged) or 889699 (METRIC, packaged), which includes part no. 889696 (UNF) and 889698 (METRIC) with serial numbers listed within Criterion A) above during engine repair, maintenance or general overhaul or any other exchange action.

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13 March 2019
Initial Issue

Current valid documentation see:
www.flyrotax.com

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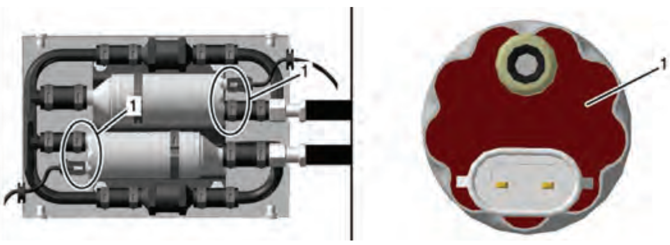

An example of a pipe with not enough of a radius – note the reduction in the pipe's internal diameter (and therefore area).

This example shows the bare minimum radius necessary to ensure no kinking in this type of rubber fuel pipe – note, different pipes will require a different minimum bend radius.

surfaces removed, so our AIL will reflect this. Because attachment bracket cracks have been an ongoing feature of the Luscombe story for so long, there is a 'latest fix' available. We don't have any information as to whether this design, which is now manufactured from steel rather than from the cast aluminium of the previous design, fixes the issue for the long term. For this reason, we're going to insist that the empennage is disassembled from the fuselage every six years and, while the flying surfaces are off, an internal borescope inspection might as well be done.

Just before I sign off for another month, I'd like to mention a couple of things. One, don't forget that your airframe log-book contains a space to add the repetitive inspection items – quite often one-off inspections are driven because of an in-service failure will lead to annually required checks. These need to be written into the pink pages of your log book. Certainly, the annual checks are quite easy to remember, but it is really easy to forget a six-yearly recurring requirement.

The second thing in my mind relates to LAA courses. Now I expect that you know that it's our intention to increase the number of courses available to members over the coming years though, as you can imagine, it's quite difficult to actually gauge exactly what courses members might actually benefit from. It's been suggested by a few members that a course covering the basics of weight and balance calculations would be welcomed. We've considered two types of course, a half-day course 'Weight and Balance for the Pilot', which would be principally a theory course. The other course, 'Weight and Balance for the Aero-Engineer', would include both theory and a practical session to create a weight and balance schedule for a donor aircraft.

We would really like to hear from you if you have an interest in this subject and if you fancy attending either of these proposed courses. Please drop us a line, by email preferably using the usual engineering email address – *engineering@laa.uk.com* – Fair Winds. ■

As we were going to press we received details of an important Alert Service Bulletin (ASB) published by Rotax. The ASB affects owners of the 912iS engine, of which there are twelve operating in the LAA system. The Bulletin warns that there have been some occurrences of a high-pressure fuel pump, needed on this injected engine type, leaking in the vicinity of its electrical power supply. The problem affects engines and pumps within a specific serial number range. We've sent details of the bulletin to all of our 912iS owners and, as always, these details can be downloaded from the Alerts section of the LAA website. **Photos: Rotax Engines.**

LAA engineering charges – PLEASE NOTE, NEW fees have applied since 1 April 2015

LAA Project Registration	
Kit Built Aircraft	**£300**
Plans Built Aircraft	**£50**
Issue of a Permit to Test Fly	
Non-LAA approved design only	£40
Initial Permit issue	
Up to 450kg	£450
451-999kg	£550
1,000kg and above	£650
Permit Renewal (can now be paid online via LAA Shop)	
Up to 450kg	£155
451-999kg	£200
1,000kg and above	£230
Factory-built gyroplanes (all weights) Note: if the last Renewal	£250
wasn't administered by the LAA an extra fee of £125 applies	
Modification application	
Prototype modification	min £60
Repeat modification	min £30

Transfer	
(from C of A to Permit or CAA Permit to LAA Permit)	
Up to 450kg	£150
451 to 999kg	£250
1,000kg and above	£350
Four-seat aircraft	
Manufacturer's/agent's type acceptance fee	£2,000
Project registration royalty	£50
Category change	
Group A to microlight	£135
Microlight to Group A	£135
Change of G-Registration fee	
Issue of Permit documents following G-Reg change	£45
Replacement Documents	
Lost, stolen etc (fee is per document)	£20
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