

## It's in the blood

Got a problem? You can bet an LAAer will want to solve it



I have just come in from the car park where I have been chatting to John Broad, who many of you will know as our 'vintage' expert on the LAA Executive Committee. As I sit down, Ken Craigie asks me what I am smiling about.

I keep the grin and, avoiding any long explanations, settle down to write this month's Safety Spot. The reason for my smile is that I was reminded by John why I like LAA people so much. Let me share our exchange.

As I walked passed John he was just climbing

onto his highly polished BMW motorcycle.

It would have been rude of me not to say something so, having noted the number 80 on the badge, I said, "Hi John, nice bike. That 80 mean 800cc or 80hp?"

John looked a little surprised that I didn't already know the answer, but relaxed after a second or so, probably thinking that I knew but was just being polite. He replied, "Actually, it's got 1000 heads on it, which ups the capacity quite a bit. I've modded them (naturally) and increased the compression ratio." My smile

started, and John continued, "I've had terrible problems with detonation, and for ages I haven't been able to use more than half throttle, but I've managed to get some better fuel and it's all running better now."

My smile was becoming fixed and I asked, "Brilliant, what you doing here?" John started the engine and replied, "Just needed a ride."

I've just got back to work after a bout of flu and am running very late with this article so enough of the 'musings' – what's been going on in the LAA world?

## Induction hose, near miss

THOSE of you that follow these articles on a regular basis will know that I try to pass on the importance of checking things regularly.

In last month's magazine, I was trying to persuade you all to remove the engine cowlings and have a good look around. Of course, it is very important to ensure that you put everything back together correctly after you've finished your inspection.

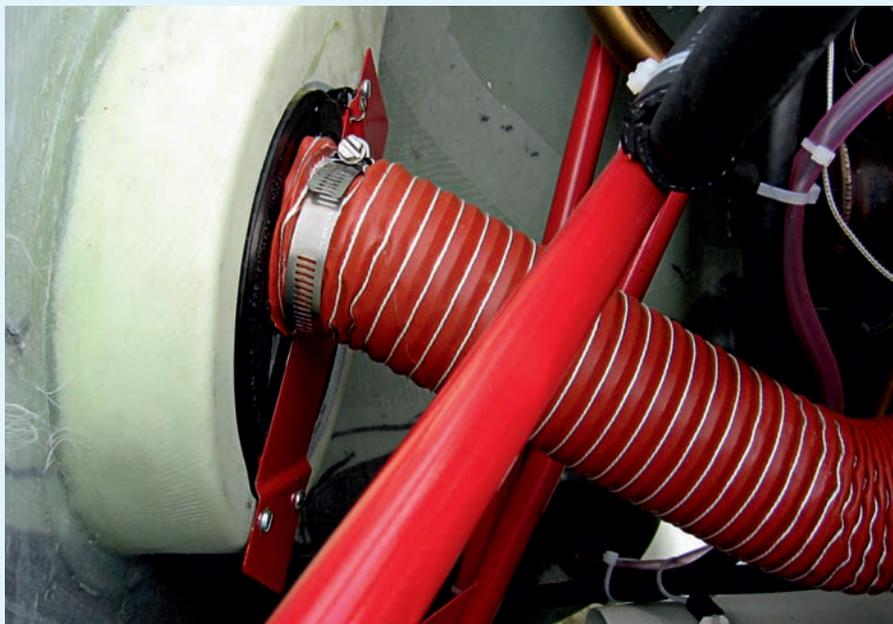
I got a call from a rather 'hot under the collar' Will Greenwood, who had just landed after a 'considerably shorter than expected' initial test flight of a SportCruiser aircraft at Fairoaks. Will's neck temperature had increased because he had just suffered an engine failure after take off. Well, not quite a full engine failure – quick thinking on his part prevented this – but it was a close-run thing. As the engine failed, Will quickly applied the carburettor heat, the engine picked up and he was able to get around the circuit and land.

The reason for the failure became obvious after the top cowl was removed. The air induction hose had separated from its connection with the lower cowl. A further look showed that the hose clamp had not been done up. Initially, with everything in place, induction air had free passage to the carburettors but, as the aircraft climbed away, the hose came off and 'sucked' itself onto the bottom cowl, blocking the airflow and stopping the engine. Will's action in applying carb heat gave the carburettors an alternative source of air.

This is not the first time that I've come across this sort of event and the lessons need to be learnt, and quickly. I spoke to the owner of the aircraft and he could hardly believe it could possibly happen. Well, it did, and all concerned



Poorly secured hose 'sucked' onto bottom cowl.



A correctly installed induction hose; do make sure that the hose clamp is securely done up.

were pretty lucky to get away with it. Remember, this engine failure occurred on the aircraft's first flight. Personally, I think it never hurts to get somebody else to check your work where aircraft are concerned.

We're all very careful when it comes to the big things, but it is often the little, seemingly inconsequential items, that get left undone.

First flights on any aircraft often show up small errors, which is why things need to be taken carefully. The owner of the SportCruiser featured above was kind enough to send me a picture of another small problem that he found when they lifted the top cowl.

You can see from the picture (right) that the pilot would have lost control of the propeller within a fairly short period of time. This is a good demonstration of how things can change from the ground to the air. On the ground this cowling afforded plenty of room for the propeller control wires; in the air it didn't. Thanks to all concerned for this report.

Oh, by the way, I did speak to Graham Smith, the SportCruiser guru, and he said that an induction hose had been incorrectly fitted on a SportCruiser before and he recommends lacing the hose so that it cannot 'flop' onto the bottom cowl. Like I said before, if you disturb something on an aeroplane, it doesn't hurt to get somebody else to check it out before you go flying.



Propeller control wires would quickly have worn.

PHOTOS Barry Williams



# Undercarriage warning system must be independent of others

PETER Wells is becoming well known for his Twister displays, quite rightly. Of course, we all like to see the testosterone generators roaring around the sky at air shows, but Peter, in his Silence Twister, brings along a measure of finesse that helps to balance a little ying against the yang of the usual grunTERS.

Peter, an LAA Inspector, operates a composite glider/small aeroplane repair facility, Zulu Glasstek, at a private airfield near Aylesbury and is the UK agent and LAA 'centre of excellence' for Silence Twister aircraft. Peter has two machines, both retractable undercarriage versions. The original Twisters had a retractable undercarriage, and a later fixed-gear variant is now available. The retraction mechanism hasn't really changed the performance of the aeroplane much, if at all, but it certainly gives the airframe a slippery look.

Peter sent me an email the other day in which he described a problem he had had with the undercarriage on his machine after a demonstration he gave to Peter Scandet ('Red Starz' – the Yakeslov display pilot). Peter mentioned that he managed to get a flight in a Yak which, and I quote Peter, "Despite appearing

like a skip lorry was one of the nicest planes I've flown."

As a quick aside, with regard to the benefits (or otherwise) of undercarriage retraction systems, there is always a bit of a trade off where the extra weight required will balance any drag advantage. This 'transitional' point applies in other areas. For example, variable pitch propellers do not necessarily up the speed, reduce the fuel consumption or take off roll in every case. In other words complex equipment in itself does not guarantee extra performance and might not be worth the extra hassle and cost.

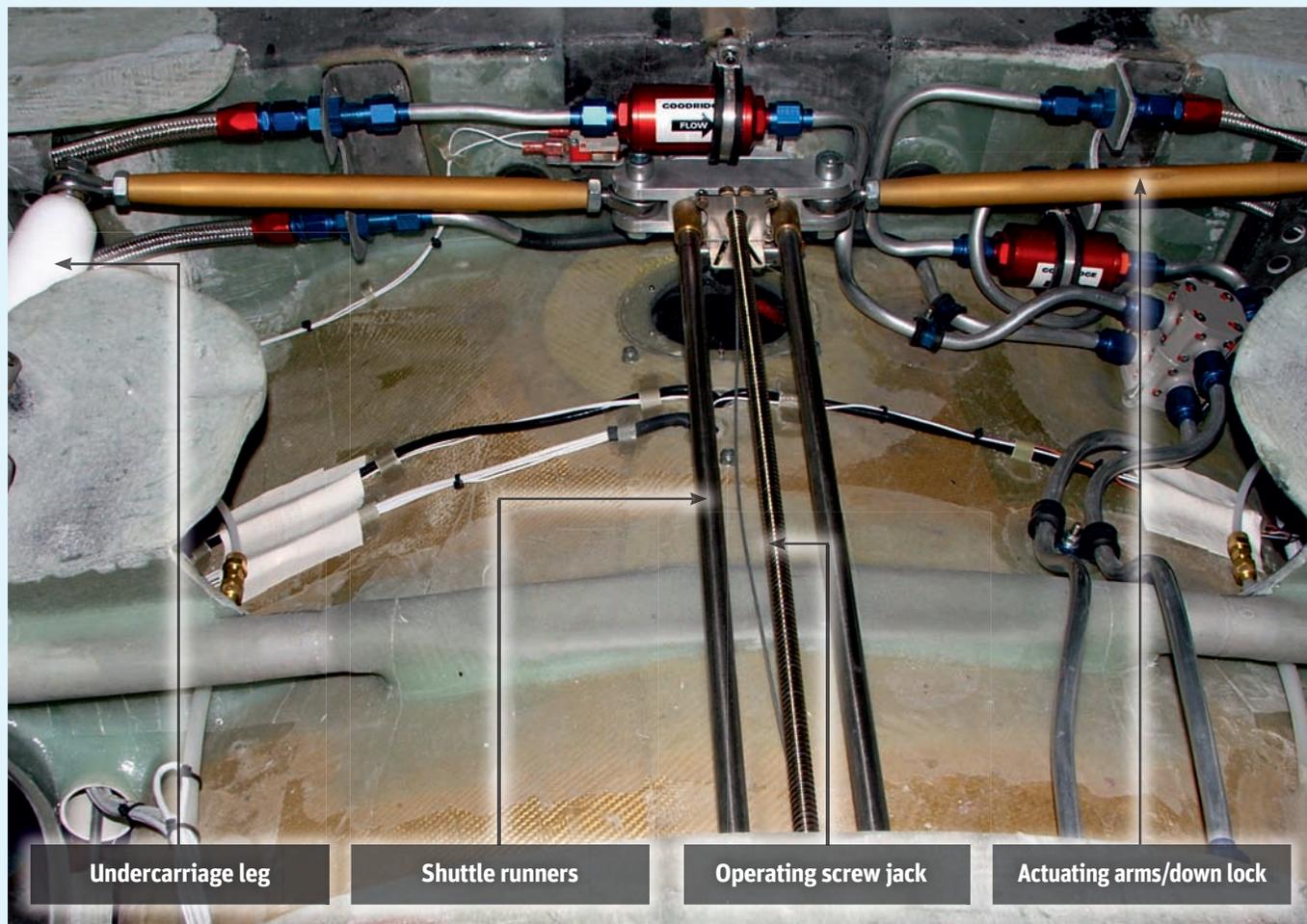
Most undercarriage systems incorporate some kind of indicator to let the pilot know the 'status' of the undercarriage. Complex aircraft will normally have a green light that illuminates to tell the pilot that the gear is down and locked,

*"The system shared various components and a failure condition could be mis-read"*

and a good final approach call is "three greens – brakes off", for pretty obvious reasons. Aircraft often incorporate some kind of warning system to alert the pilot if he or she looks as if they're going to land and the undercarriage is not down. These warning systems are normally connected to some other landing-connected system within the airframe. Simple aircraft may have a warning that comes on if the flaps are lowered without the undercarriage being down, while other aircraft have micro switches fitted to the throttle so a warning horn goes off as the throttle is closed.

Regular readers will remember the recent case of a Europa monowheel that departed the runway after landing because one of the aircraft's outer undercarriage legs had failed to lock down and collapsed after landing (Safety Spot, Sept 08). The primary reason for the incident, as I recall it, was that the pilot didn't trust the warning system as it had been 'playing up' a bit over the previous few weeks. Further investigations revealed that the system was not very well designed because it shared various components and a failure condition could be mis-read.

There is a good lesson here and we are all reminded that safety systems need to be



Undercarriage leg

Shuttle runners

Operating screw jack

Actuating arms/down lock

View 'looking-up' into the undercarriage retraction bay of a Twister airframe. Note that until the actuator link arms go over centre there is no 'down lock'.



independent and, where possible, un-ignorable! I expect that you've heard the tale of the hapless student pilot explaining to the CFI, "I didn't put the gear down, Sir, because I was distracted by that blasted noise and couldn't think straight." Anyway, back to Peter's incident.

Peter was on finals to land at his home strip when he applied landing flap. On the Twister, the undercarriage warning should go off if more than ten degrees of flap is selected and the throttle closed, if the undercarriage is not down and locked.

Peter's immediate thought, naturally, was that he had forgotten to put the gear down but, a quick check showed a green light, down and locked. He then presumed that there was a problem with the warning system, but rather than risk a landing on a 'nearly down' undercarriage he climbed away to give the situation some thought.

Peter said, "I had a nagging feeling that things were not quite right. The aircraft was not making the normal burbling noises associated with the approach configuration." (Know thy plane!)

Peter tried to cycle the undercarriage but nothing appeared to be happening, the down and locked light remained illuminated. Decision time. What would you do?

Peter decided not to trust the down light and elected to pull the emergency undercarriage release. Pulling this lever effectively free falls the gear into its mechanically locked-down position.

## *"The system was being told that the gear was down even though it wasn't"*

Problem number two. Peter couldn't get sufficient purchase under the release lever to operate it; there simply wasn't enough play in the system for him to be able to get his fingers under the lever and apply enough force to break the safety wire. Remember, all this is going on in a busy cockpit!

Peter had a look around the cockpit for something to help release the gear and found the fuel dip stick in a side pocket. With the aid of this simple lever he managed to release the undercarriage and, after a few centimetres of mechanical movement, the electrical system kicked in and the undercarriage fully extended. After a few moments to let the heart rate return to something like normal levels, Peter landed without further incident. Well done Peter for making all the right decisions.

The following day, Peter got the aircraft up on jacks to see what was going on and was able to simulate what had happened in the air. He found that the motor-down limit micro switch had stuck in the closed position, so the system was being told that the gear was down even though it wasn't. In other words, this warning

system is combined with another system, the motor limit switch. Peter had fortunately fitted another warning system, this time a horn, which alerted him of the danger. This warning horn is totally independent of any of the mechanism. Just the job.

Check out the photo on page 59. I think you will agree that this is a very clever and compact undercarriage retraction mechanism; a beautiful design.

A couple of lessons have been learnt here and it might be worth a few moments thinking about the system(s) on your aircraft. Undercarriage 'down and locked' micro switches should be placed on the down locks. It's important that they are independent of everything else, and I mean independent. I saw a system recently that shared an earth wire between two systems. This is a no-no, as a problem in one thing can lead to confusion in another.

The other lesson that has been learnt after evaluating this event is this. If there is a safety system fitted make sure that you can work it. It's not good enough knowing the theory here – emergency systems need to be practiced. Peter would have been in a little trouble if he hadn't found a tool to help him release the gear.

Think about the safety systems on board your machine. For example, when did you last try the emergency door-release on your aircraft? You may carry a life jacket, but when was the last time you tried it on?

## And finally, is this tyre servicable?

I am certainly a firm believer in getting the most out of a component, especially in these difficult 'credit crunching' days, but I think that this tyre (which was recently spotted on an LAA'ers aircraft) could probably do with being changed! And no, I'm not going to tell you where it came from, but thanks to one of our Inspectors for sending in the photograph. For now, Fair Winds.



With more cracks than a dried-up reservoir, this tyre is definitely due to be changed.



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