SAFETY SPOT

With Malcolm McBride
Airworthiness Engineer

Extract about
'Rudder Fin Post cracking'
from ***Light Aviation***
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Because of the nature of the design, the Shadow series of aircraft rest on their tail when the pilot's weight is removed; you can see that it would be easy to inadvertently impart quite large loads through the fin post into the fuselage boom and it's definitely worth taking this into account when pull starting the engine. *(Photo: Richard Hamblyn)*

Here's the reason why a good walk-round inspection could prevent a good day from becoming a bad one. This is a picture of the Fin Post (less the fabric covering) from a Streak Shadow complete with a nasty crack near the point where the fin post enters the fuselage boom. The owner only noticed it because he felt an unusual movement in the fin… well done to him for having a good feel. Humour, such as it is, aside… I think that it's always a good idea to have a good pull and prod on bits of the aircraft to check whether one bit is moving correctly against another and to detect whether there's movement where their shouldn't be. *(Photo: Fiona Luckhurst)*

STREAK SHADOW FAILED FIN POST

We received an email from an old friend of mine, Fiona Luckhurst, now an acclaimed Shadow expert and co-owner of the Shadow Flight Centre at Old Sarum. Her letter explains all so, as usual, I'll let her initial letter relate the facts.

Dear Malcolm and Ken,
Unfortunately I have to report an occurrence concerning a fin post on a Streak Shadow.

Attached photos of the Fin Post (T147) from a Streak Shadow showing cracks found by the owner when he noticed an unusual movement in the fin post when he was preparing for flight. Historically MPD 1998 -013 R1 was raised after cracks had appeared at the top of the fin post where it enters the boom and mandated the fitting of the additional inner sleeve. The inner sleeve (T188) is intact in this case and has done its job.

Interestingly, the failure on this fin post was not at the top by the first line of rivets securing the wooden gusset as had been seen before but at the second, lower, set of rivets. This machine has flown nearly 700 hours and has a Rotax 618 fitted. This is a heavier engine than the standard R582. She also has a fixed rudder trim which was found to be very loose on inspection the week before. (A possible suspect for the unusual damage?)

Best wishes,
Fiona Luckhurst,
LAA Inspector.

Certainly a crack like this is serious as progression of the crack could lead to the complete fin and rudder assembly separating from the aircraft. The Streak is a famously benign handling aircraft, but losing the fin and rudder would be likely to result in pretty disastrous directional instability. We discussed this failure at one of our regular engineering meetings and the Chief Engineer suggested that I ask the aircraft's designer, another old friend, David Cook, what he thought about it.

> "By this time the wings were at a 60% nose-down angle when I felt a jolt and heard a horrible noise"

David is retired now and, like so many retired chaps, doesn't sit still for long, so it took me a while to make contact… it was good to hear, when we finally touched base, that he hadn't lost any of his east country humour.

"I agree with Francis," David explained, "and it wouldn't be good if a pilot lost his fin, that's why we reinforced it with the extra internal tubework early on." David continued, "I think that it's most likely that the reason for this fatigue failure is that, either the aircraft sits outside and is being blown from side to side by the wind or, and this is the most likely, the owner is starting the aircraft with the tail still on the ground."

I admitted that I've done this myself. David said that he would send me the correct starting procedure and, "While I think about it, there was a case where a South African chap lost his fin and rudder. I'll see if I can dig out the report that he sent me. It was a few years ago now."

Next day, David sent through, as promised, the starting instructions and the letter from the South African pilot – I extracted the pertinent portion (dated 2010) and copy it below:

(I) wound up the Rotax 912 engine on the runway pointing towards 'Lite Flite' (about 2nm away) opened the throttle and away we went. As the nose lifted, I saw a bunch of birds about 200 metres from my nose, but by this time I was already committed and the Grassroots runway was very short and by now there was no runway left to abort.

I tried to out-climb the birds at 1,700fpm, but the birds were scattered all over the sky in front of me. At that time I was about 600ft above ground. I veered to the left to avoid the birds but they were there as well; I then veered to the right, but they were there as well. At this stage the birds were about 10ft in front of me and at a height of 700ft, I shut the throttle down, pushed the Streak's nose down and switched the mags off as I knew I was going to fly into the birds.

By this time the wings were at a 60% nose-down angle when I felt a jolt and a horrible noise, something like when your wife is cross with you and slams the door in your face – and then the hand of God took over.

I push the ailerons left to bring the wings horizontal, push the rudder to the left, for a left into-wind approach for Runway 19 at 'Lite Flite', BUT, there was no rudder response.

I pushed the nose down further to gain more speed and aimed for Lite Flite's runway. With no direction control and hard rudder control and full aileron control I put the Streak down in the middle of the runway at the edge of the runway at a speed of 60 to 65kt.

When the Streak's back main gear touched the ground, I applied right brake to steer the Streak down the runway, but I was too fast and, with no rudder, the Streak had just one direction and that was straight forward, I went across the runway ran into the rough on the other side of the runway and just before the Streak came to a standstill the main undercarriage collapsed.

Jas van Wyk

What had happened was the fin and rudder had been removed because of the impact with a large bird… unspecified. This rather catastrophic event though does reinforce Francis' worries about the lack of directional stability with the fin missing.

We'll be discussing the way forward with this issue at the next Airworthiness Review Meeting, but meanwhile this cracking does provide a timely reminder of the need for careful pre-flight checks and always being on the alert for anything that doesn't look or feel as it should, especially with the very lightweight structures on microlight and similar airframes which, designed for flight loads, may not be too tolerant of ground abuse.

Oh well, it's a couple of minutes to five and I've just made the 'Safety Spot' deadline, next deadline, the Aegean…

Fair winds! ■