BGA Technical Committee

TNS/11/12/79

1.0. Airworthiness "Aggro" - The last for 1979. These items will be included in the 1980 GREEN pages.

1.1. Bocian Elevator Final Drive. Rod-end fatigue failure. The attached BGA Tech. Note was mailed to registered owners 31/10/79.

1.2. ASW.20 Control Hinges - Corrosion and loss of securing-pins. Water trapped by the gap-sealing tape may have corroded the hinge-pins, to the extent that the light alloy pins used to secure the hinge-pins have disintegrated. Inspection, corrosion preventive maintenance and drain-holes should be incorporated.

1.3. Bocian Rudder Hinge Bracket Failures. The attached sketch from S.G.U. is self-explanatory, and is a repeat of previous failures recorded in BGA Yellow Pages!

1.4. "Vega" (possibly also Kestrel and Libelle). Screws loose in root-rib attachment of flying-control bracketry. Counter-sunk screws into "blind" captive nuts may work loose. Check tighten after application of "loctite". (Reported by Len Morris of Swindon G.C. and discussed with Vickers Engineering who will issue a T.I.).

2.0. General Matters

2.1. G.R.P. Structural Repairs. Repairs to primary structural components must be carried out in accordance with Manufacturer's Repair Schemes, implemented by persons with the skill, experience and environmental conditions, necessary to ensure high integrity results. (Ref BGA Technical Procedure Manual para 7.7.). Where manufacturer's Product Support no longer exists, Slingsby Engineering have offered to provide Design Approval expertise, on a commercial basis. The applicant will be required to prepare drawings and process sheets for submission to the Chief Designer, Slingsby Engineering, Kirbymoorside; (Research into such repairs is now being conducted for the BGA by Bristol University).

2.2. Blanik L.13 Life Extension. Gliding Federation of Australia Airworthiness Directive GF/AD/16OLET 17 dated 15/10/79 authorises life extension modifications to drawing 78-E-1.

/2.....

(a) Undercarriage fatigue failure (Citabria)

(b) Propeller swinging injury

(c) Lack of performance

(d) Tug collision

(e) Tailplane corrosion (Robin DR 400 and Jodel)

(f) Dirty fuel.

PLEASE BRING TO THE NOTICE OF TUG PILOTS!

4.0. Parish Notices.

4.1. Inspection Renewals. These are now overdue. Please respond a.s.a.p. Renewal fee £7.50, to the BGA.

4.2. BGA Inspector Insurance Cover against liabilities which might arise against persons operating under BGA airworthiness schemes, has now been extended to those who may become involved in tug maintenance under BGA/CAA Approval. (Ref BGA Technical Procedure Manual (T) Tugs).

4.3. HAPPY CHRISTMAS AND "AGGRO-FREE" NEW YEAR to all our Readers with many thanks from the C.T.O. and the BGA Technical Committee for all your efforts.

Dick Stratton

R.B. Stratton
Chief Technical Officer

Enclosures/Attachments

This modification programme would extend life to 12,000 hours or 50,000 launches. (Present UK life limitation is 15,000 launches). The BGA Technical Committee, at their Meeting on 15/12/79 agreed to endorse the G.F.A. mod programme in the UK.

The work is believed to consist of:-

(a) Replace centre-section tie-bar
(b) Fit straps and doublers to each wing
(c) Fit new wing-root fitting
(d) T/P attachments to be modified for extension beyond 8,000 hours.

The proprietors of this modification kit and supplementary Type Certificate No. 96-1, are:-

Riley Aeronautics (Pty),
c/o Transavia,
73 Station Road,
Seven Hills 2147,
New South Wales, Australia.

Note: In support of this development programme, the Australians have test flown a strain-gauged Blanik! (The Great British have been unable to find the means of so doing!!)

However, before proceeding with these modifications, you should wait for further advice from the BGA Technical Committee, who have a mathematical re-appraisal of the original fatigue test report and fatigue damage assumptions, in hand!

2.3. "Carbon Fibres an Environmental Hazard?" The attached contribution by NASA would indicate that sooner or later you will black out the grid!

2.4. Peter Clifford Aviation (Blanik spares). Telephone 0628-82-3341. (White Waltham Aerodrome, Nr. Maidenhead, Berkshire).

3.0. Tugs

3.1. WINTERISATION!!

The attached extracts from General Aviation Safety Information Leaflet 11/79 are self-explanatory.

PLEASE DRAW TO THE ATTENTION OF YOUR TUG PILOTS

3.2. Tug Accidents.

The attached extracts from AIB Bulletins draw attention to:-

/3.....

The British Gliding Association Ltd.
Registered No. 422605 England
Registered Office as address

Administrator and Secretary Barry Rolfe

British Gliding Association

Kimberley House, Vaughan Way, Leicester
Telephone 0533 51051/2

1

31st October, 1979.

TO: ALL OWNERS

B.G.A. Technical Committee Ref. TNS 12/79

IMMEDIATE INSPECTION

BOCIAN ELEVATOR DRIVE ROD FAILURE

1) The Bristol and Glos. Gliding Club have reported a fatigue fracture in the thread of the adjustable fork-end of the final drive rod to the elevator. (ON D.I. the elevator was found to be disconnected!).

2) The fatigue-damage is incurred whilst towing on the ground, when the elevator drive rod may be forced into contact with the ARM, thereby inducing a bending movement.

3) An immediate inspection must be made to ensure that:-

   (a) Fatigue cracks have not been induced in the threads of the rod-end.

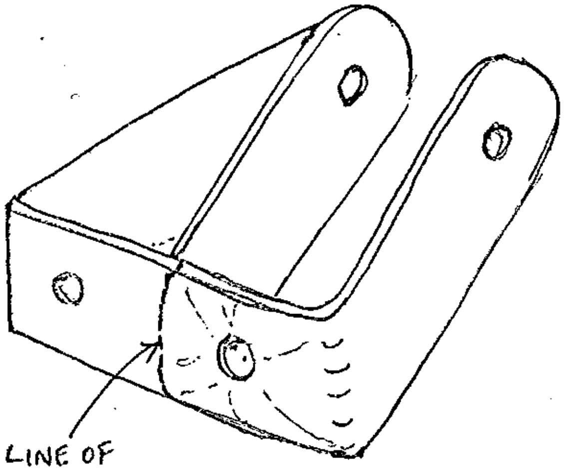
   (b) Clearance between the rod and the ARM exists in all circumstances.

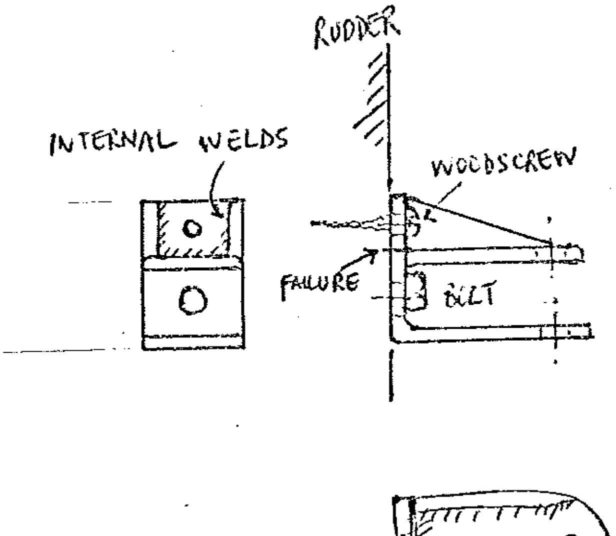
   (c) Control deflections / Cable tensions, comply with the requirements of Manufacturers Manual for the type.

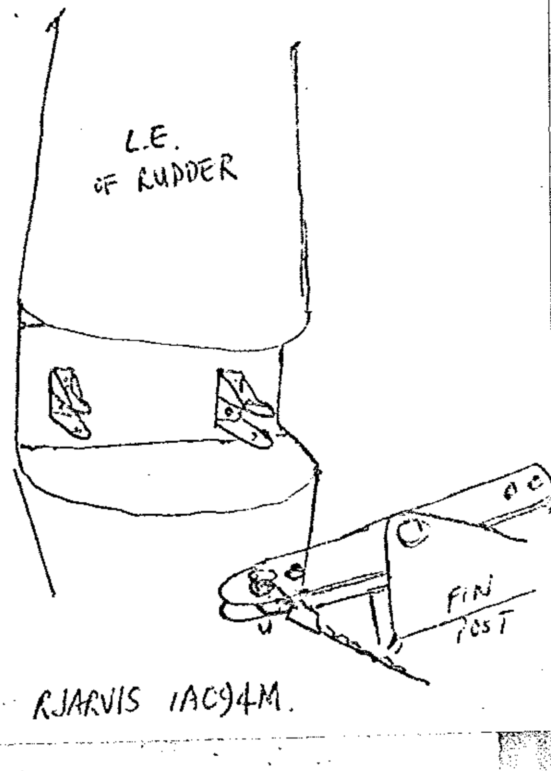
R. B. Stratton
Chief Technical Officer

BOCIAN IE BGA 1994

RUDDER ATTACHMENT BRACKETS (2 No)







NOT TO SCALE

10/10/79 RJARVIS IAC94M.

SGU PORTMOAK AIRFIELD.

CARBON FIBRES AN ENVIRONMENTAL HAZARD?

NASA assesses the risk

Printed by permission of Interavia - World Aviation Review 7/79

by Chris Bulloch

FIBRE/RESIN COMPOSITE materials are already being used extensively in airframe structures, and more are likely to be used in the future. Their superior strength-to-weight ratio compared with most metals yields improvements that cannot be ignored.

This is generally accepted, as was made clear in two articles published in *Interavia* 3/1979 (pages 207-214); these also described other advantages of advanced fibre (generally carbon or graphite*) composites, such as better fatigue properties, facility for 'aeroelastic tailoring', more convenient manufacturing techniques and lower maintenance costs.

Attention is however being drawn to a potentially serious environmental problem associated with these fibres. All forms of carbon are excellent conductors of electricity and the fibres used in composites are finer than a human hair, capable of being borne on the wind, and are virtually indestructible. Fears have been raised that increasing industrial use of composites could lead to their frequent release into the air, causing widespread short-circuit and arcing problems in electrical devices of all sorts over a broad area. This could result in stoppages, destruction of equipment and potentially serious fires.

The scenario most often cited is that of an accident, followed by fire, to an aircraft containing a large amount of graphite composites. In fact, the problem is one facing other industries besides aircraft manufacture and operation. Carbon and graphite composites are already being used in sporting goods (skis, fishing rods, golf clubs), while a major anticipated use is in motor vehicle bodies. It has been estimated that, by 1990, fuel savings resulting from the use of composites in private cars could amount to 2,000 million US gallons (7,570 million litres) per year in the United States alone.

Once the fibre has been incorporated into its resin matrix, almost the only way loose filaments can be released is by burning the material, so reducing the organic resin to ash. Fire is experienced in a high proportion of aircraft crashes, but it is not necessary for an accident to be involved. The usual method of disposing of non-recyclable wastes and factory scrap is by incineration, a special hazard now that these fibres are being used in consumer products. There is also the possibility of fibres 'escaping' during composite production, before they are impregnated with resin. However, all responsible companies handling mineral fibres already take steps to prevent their getting airborne, for industrial safety reasons – especially since the cancer-inducing properties of asbestos became known.

NASA cautious but optimistic

About two years ago, the US National Aeronautics and Space Administration – which is heavily committed to advancing the use of weight-saving materials through projects such as the Aircraft Energy Efficiency program instituted a study to determine the size of the environmental hazard and find ways of controlling it. By September 1978, James J. Kramer, Associate Administrator in NASA's Office of Aeronautics and Space Technology, was able to testify to a Congressional committee: "During the past year, significant effort has been devoted to this end, and the results to date have been encouraging . . . we have found that the amount of fibre released during combustion is less than anticipated and . . . tends to be more broadly dispersed than was hitherto believed . . . we feel that the risk will prove to be acceptable and that non-hazardous composites will be evolved."

In fact, NASA is continuing composite development programs contracted to major airframe companies, although Leonard Harris, Manager of the Materials and Structures Office, acknowledged to *Interavia* that the flight test portion of these efforts had been deferred: "We've taken a conservative approach in light of the potential hazard." He continued, "We expect to have a pretty good definition of the problem by the end of the year, or early into the coming year . . . this is one of the kinds of unusual occurrences one expects in the development of new materials."

The NASA study, devoted essentially to the use of composites in civil aircraft, is aimed at determining the situations where loose fibres can cause short-circuits and arcing (which can occur at voltage below 30 V), and finding means of protecting electrical equipment at acceptable cost. A "conservatively high" estimate suggests that one accident involving fire to an aircraft containing 4.53 kg (10 lb) of *fibre* – not this weight of composite – might cause up to 250 electrical failures. It is also investigating ways of preventing the release of reinforcing fibres, or of making them non-hazardous if they do escape.

Developing safer composites

Research in the first area, devoted to containment of fibres after a fire, suggests that they might be bundled to make their escape less easy, or designed to disintegrate into small, harmless fragments. There is a possibility that the addition of glass fibre might help to inhibit release. Attention is also being given to the binder resins, either to develop fire-resistant types or else those which merely char but remain cohesive, rather than burning to a friable ash.

It may also be possible to produce fibres which do not present an electrical hazard even if released. Heavier filaments would have a faster sink rate, and so would not be distributed so widely. There could be ways of 'doping' or encapsulating fibres with substances that reduce their conductivity. Renewed attention is being given to non-conductive boron fibre – which has been somewhat neglected of late – with a view to developing ways to eliminate its heavy (and mechanically valueless) tungsten core. Finally, the entire laminate could be wrapped in a single ply of fire-resistant material to contain all of the residues. "There are many solutions", said NASA's Dr Harris, "many of which are economically feasible".

* Current industry practice is to reserve the term "carbon fibre" for filaments which have been pyrolyzed (carbonized) by heating to 1,100–1,200°C and "graphite" for those pyrolyzed at 2,200–2,700°C. While carbon fibres have an amorphous structure, that of graphite is chrystalline, and results in a higher modulus of elasticity. Most "carbon composites" used in the aerospace industry are based on aphite fibre.

(4)

EXTRACTS FROM GASIL 1/7[illegible]

FROZEN ENGINE CONTROL

4. Frozen Propeller Control

Aircraft : Piper PA31 Navajo
Date : March 1979

After the aircraft had levelled off at the top of climb the right-hand pitch lever jammed at 2400 rpm. During the descent the lever freed itself.

Traces of water were found on the constant speed unit control at the front of the engine, and it was thought that the control froze at altitude. The exposed parts of the CSU control were cleaned and lubricated with anti-freeze oil. The pitch lever was checked for freedom of movement and the propeller speed checked during ground run. It is now company policy to include lubrication with anti-freeze grease at Check 1.

5. De-Icer Fluid Obscured Windscreen

Aircraft : Piper PA31 Navajo
Date : March 1979

The aircraft had been de-iced using KILFROST 55. After take-off all windscreens became obscured, making any visual manoeuvres difficult. The aircraft was fitted with a windscreen wiper on the left-hand side, but this only gave limited visibility straight ahead.

CAA Comment:
The manufacturer of 'Kilfrost' markets a number of compounds, some of which do obscure vision. Warnings are published in the manufacturer's technical literature and in Civil Aircraft Inspection Procedures AL/11-3. In particular it is stated for some of these compounds that "If the nose of the aircraft has been sprayed, it must be wiped afterwards to ensure that any excess fluid will not blow back onto the windscreens".

6. Aircraft Crashed Shortly After Taking Off with Snow and Ice on Wings

Aircraft : Cessna 172, Registration G-AWMJ
Date : January 1979
Notifiable Accident at Biggin Hill

The aircraft had been parked outside all night in wintry conditions. A broom was used to clear accumulated frost and snow since the aerodrome's stocks of de-icing fluid were exhausted. While taxying the aircraft was seen by one witness to have some ice and snow on the upper wing surfaces. The aircraft took off and crossed the boundary much lower than usual. A gradual descent occurred, the aircraft then rolled to the left, followed by a steeper bank to the right with a sharp nose drop. It struck the ground almost vertically, killing all four occupants. The temperature was -5°C with high humidity; carburettor icing could also have been a factor. The aircraft was also considerably overweight.

CAA Comment:
GASIL 2/79 Item 4 describes an almost identical fatal accident to a Cessna 180 in the US.

7. Propeller Damage While Taxying with Heater/Defroster Unserviceable

Aircraft : Piper PA23 Aztec 250
Date : February 1979

The heater/defroster was unserviceable. Due to a combination of condensation on the windscreen, lack of centre line taxiway lights, and poor edge lights, one propeller struck a protruding edge light, even though the aircraft was being taxied slowly and cautiously. The propeller required rectification of tip damage, and the engine had to be checked for shock-loading.

8. Unable to Select Alternate Air due to a Frozen Cable

Aircraft : Rockwell Commander 685
Date : March 1979

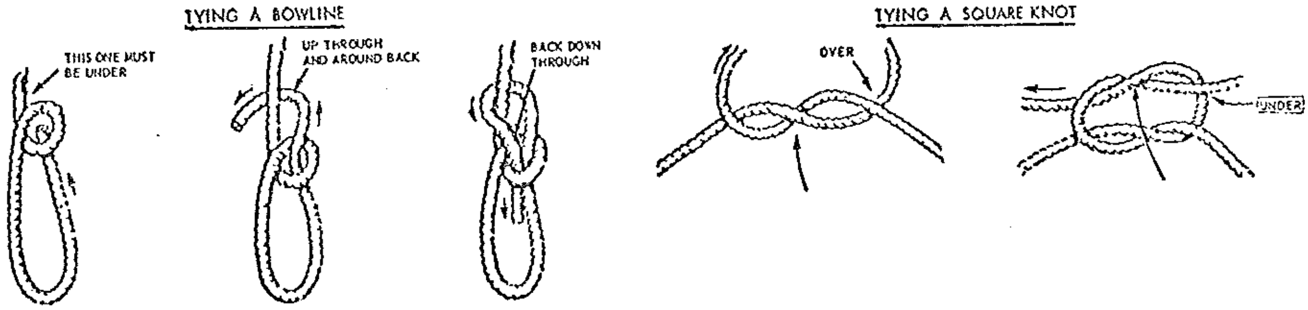
Intermittent light airframe icing was experienced at about FL60 during the climb, but the left-hand alternate air door could not be moved even with considerable force. The flight was continued by avoiding icing conditions. During the descent as the OAT passed through $0^{\circ}C$, the control freed itself. Prior to flight the aircraft had been parked outside for 4 hours in moderate rain, and it was thought that the problem was due to water freezing on the control cables. On a later flight the left-hand alternate air door could not be closed after it had been opened. Again it freed on passing through $0^{\circ}C$.

9. Incorrect Rope Used for Tethering

Date : December 1978

A number of twin-engined aircraft were stored in the open, and were tethered using 12 mm ($\frac{1}{2}$ in) polypropylene rope. One night there was a Force 8 to 9 gale which caused varying degrees of damage to a number of the aircraft. The whole of the rear fuselage was broken off one aircraft when another was blown on top of it.

CAA Comment:
It is well known to sailors and boating enthusiasts that polypropylene rope is not suitable for knotting with variable loads unless "jam knots" are used, eg



Although it is more expensive, nylon rope is preferable. ... A ha'p'orth of tar.

Almost every time there are abnormally high winds, damage is caused to aircraft tethered outside. The CAA's Civil Aircraft Inspection Procedures Part II, Leaflet GOL/ 1-1 para 4 and the FAA Airframe & Powerplant Mechanics General Handbook Chapter 11 contain comprehensive information on tethering and tie-down practices. The Pilot's handbooks for many aeroplanes also contain specific information.

FAA Advisory Circular 20-35B dated 19 April 1971 gives comprehensive advice on the construction of tie-down anchors, strengths of ropes, types of knots, and the securing of aeroplanes and helicopters.

10. Intake Iced up due to Blocked Drain

Aircraft : Piper PA23 Aztec 250
Date : February 1979

During the climb the left-hand engine suddenly and abruptly lost all power. Selection of alternate fuel tanks, pumps and rich mixture had no effect. A single engined landing was made. The suddenness of the failure was such that the pilot suspected fuel starvation and did not select alternate air.

Immediate ground inspection found that the air intake was iced up and the intake filter was completely frozen up. The air intake drain hole was blocked, which probably accounted for the large quantities of ice in the bottom of the intake. The alternate air system was checked and found to be satisfactory.

WINTER PRECAUTIONS. (6)

13. CAA General Comments

In addition to the measures recommended in the occurrences described above and in GASIL 10/78, the following winter precautions are suggested:

a. Ensure that the correct winter grade of grease has been used in the control and trim systems, engine controls and landing gear.

b. The engine may need a manufacturer's approved winter cooling restrictor to allow the oil to become warm enough.

c. Check that control surface drain holes are clear. Water freezing inside can cause damage to the surface and seriously upset the balance of the surface.

d. Make sure the cabin heater system is working properly, and that summer corrosion will not allow carbon monoxide fumes into the cabin. Carbon monoxide is colourless, odourless, tasteless and very lethal.

e. Ensure that all snow and ice is cleared from wings and control surfaces. Cold hands are better than a broken neck.

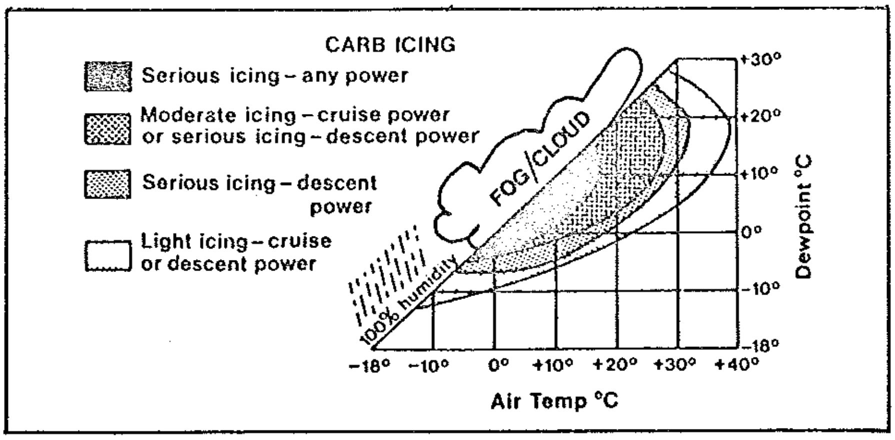
f. During the pre-flight inspection, check that the pitot heat is working.

g. There is a greater risk of water condensation in aircraft fuel tanks in winter. Check all water drains. There can be as many as five, even on some single-engined aircraft.

h. Beware of wheel fairings becoming jammed full of mud, snow and slush.

i. Do not fly in icing conditions for which the aircraft is not cleared. Many general aviation aeroplanes are not cleared for flight in any icing conditions. This includes all general aviation helicopters. Most clearances are only for flight in light icing conditions. Light icing is the equivalent on a build up of $\frac{1}{2}$ in of ice in 40 nautical miles.

j. The chart below shows when carburettor icing is most likely to occur.



CARB-ICING!!

i) Ensure the carb heat works during the pre-take off checks
ii) During flight monitor engine instruments for loss of rpm (fixed pitch) or manifold pressure (constant speed), which could mean carb ice is forming.
iii) Apply full carb heat early - and keep it on. The engine may continue to run roughly for a short period until the ice melts.
iv) Use full carb heat for several minutes before a descent, and periodically warm the engine during a closed throttle descent.

k. Have warm clothing available in case of heater failure, or a forced landing.

l. After flight in heavy rain ensure pitot-static and intake drains are clear. Trapped water may freeze in winter.

TNS 12/79

(7)

Tug u/c Fatigue Failure. Ref: EW/G79/08/01

Aircraft:	Bellanca 7GC BC(Citabria) G-BBEN
Date and time (GMT):	5 August 1979 at 1005 hrs
Location:	Bellarena Aerodrome, Londonderry, Northern Ireland
Type of flight:	Glider Tug
Persons on board:	Crew - 1 Passengers - nil
Injuries:	Crew - nil Passengers n/a
Nature of damage:	Port undercarriage leg broken in half
Commander's Licence:	Private Pilot's Licence
Commander's total flying experience:	190 hours (of which 80 were on type)

After launching a glider the aircraft made a straight in approach to land. During the landing roll, following a normal touch-down, when the ground speed had dropped to about 10 knots the port undercarriage leg collapsed allowing the port wing tip to touch the ground. This caused the aircraft to ground loop and come to a stop.

Examination revealed a substantial fatigue fracture in the undercarriage leg.

Crack testing of the other leg showed signs of incipient fatigue cracking.

Propeller Swinging Injury. Ref: EW/G79/09/04

Aircraft:	Stampe SV4 G-BAKN
Date and time (GMT):	11 September 1979 at 1700 hrs
Location:	Henstridge, nr Yeovil, Somerset
Type of flight:	Private
Persons on board:	Crew - 1 Passengers - nil
Injuries:	Crew - nil Passengers - n/a Others on ground - 1 (serious)
Nature of damage:	Nil
Commander's Licence:	Airline Transport Pilot's Licence
Commander's total flying experience:	4,500 hours (of which 240 hours were on type)

During the engine starting sequence another pilot on the ground, who had some previous experience of starting the engine, was swinging the propeller. When the engine fired the propeller struck and fractured his elbow.

LACK OF PERFORMANCE.

(8)

Ref: EW/G79/08/04

Aircraft:	Piper J-3 (Cub) G-BGXV
Date and time (GMT):	18 August 1979 at 1205 hrs
Location:	Grass field at Hungerford, nr Newbury, Berkshire
Type of flight:	Private
Persons on board:	Crew - 1 Passengers - 1
Injuries:	Crew - nil Passengers - nil
Nature of damage:	Propeller broken and undercarriage leg bent
Commander's Licence:	Commercial Pilot's Licence
Commander's total flying experience	1,633 hours (of which 2 hours were on type)

The pilot had been carrying out circuits and landings over a two hour period using a take-off direction of 320° to the left of a line of trees. The wind was veering progressively throughout the period and he subsequently changed the take-off direction to 020° with an estimated W/V of 330° to 360°/5 to 15 knots. The take-off run available on this heading was 250 metres and passed to the right of the line of trees. There was a slight uphill gradient and the strip was covered with longer grass.

On take-off the aircraft accelerated normally to just below take-off speed after which the rate of acceleration decreased so that the aircraft only just became airborne before reaching the boundary fence which was struck by the undercarriage.

(9)

(TUG COLLISION)

Ref: EW/G79/09/03

Aircraft:	Robin DR 400 (Regent) G-BAEN Piper PA 38 (Tomahawk) G-DFLY
Date and time (GMT):	8 September 1979 at 1600 hrs
Location:	5 miles west of Chinnor, Buckinghamshire
Type of flight:	G-BAEN-Private G-DFLY-Training
Persons on board:	G-BAEN Crew - 1 Passengers - 1 G-DFLY Crew - 2 Passengers - nil
Injuries:	G-BAEN Crew - nil Passengers - nil G-DFLY Crew - nil Passengers - n/a
Nature of damage:	No damage to G-BAEN, but G-DFLY sustained damage to the elevator and tailplane
Commander's Licence:	G-BAEN - Private Pilot's Licence G-DFLY - Private Pilot's Licence
Commander's total flying experience:	G-BAEN - 676 hours (of which 40 hours were on type) G-DFLY - 690 hours (of which 300 hours were on type)

Both aircraft had taken off from Wycombe Air Park but at different times. At about 1600 hrs both aircraft were operating in the vicinity of Chinnor.

The instructor in G-DFLY saw G-BAEN ahead and spoke to the pilot on the radio indicating that he could see 'EN'. When the pilot of 'EN' said he couldn't see 'LY' the instructor said that he was behind him. The pilot of 'EN' turned his aircraft to the left but as he couldn't see 'LY' continued flying straight on a northerly heading. He then banked over to the right and as he did so felt a light bump. 'LY' then came into sight very close under the nose and port wing of 'EN'.

After this he returned and landed safely back at the aerodrome.

The instructor in 'LY' had lost sight of 'EN' when it turned. The next time he saw 'EN' it was to his right, slightly above and very close. He then felt a bang in the rear of his aircraft and noticed the speed drop off. He regained speed and checked the amount of control still available which felt safe enough to return to Wycombe Air Park where he landed without further incident.

(10)

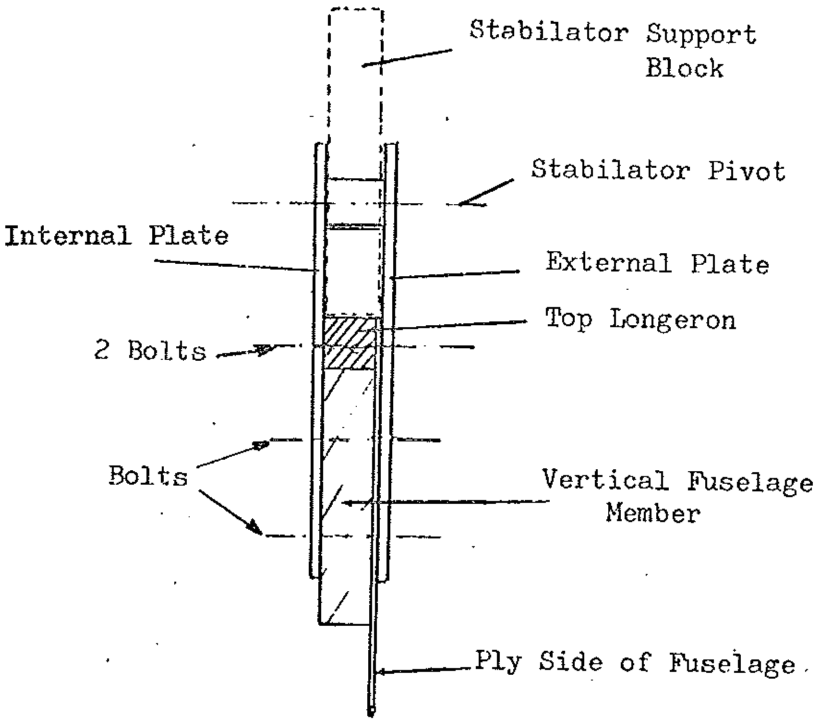
17. SEVERE CORROSION OF TAILPLANE ATTACHMENT PLATES

CORROSION

Aircraft : Robin DR400 including CEA and Jodel aircraft with stabilators
Date : August 1979

During the C of A renewal corrosion was found on the outside of both external plates that support the stabilator. When the plates were removed the inside face was found to be severely corroded at the top bolt holes. There are two plates each side, held by four bolts per pair. Adhesive is not used between the plates and the fuselage side. The aircraft had flown 3410 hours. Examination of other older aircraft showed some evidence of external corrosion on the plates.

CAA Comment:
The CAA has written to the manufacturer about the necessity for formal action.



... it collided with the tail of a parked D H Rapide.

DIRTY FUEL Ref: EW/G79/07/10 (11)

Aircraft:	Beagle Auster A61 G-ARLO
Date and time (GMT):	10 July 1979 at 1618 hrs
Location:	Shoreham Beach, West Sussex
Type of flight:	Private
Persons on board:	Crew - 1 Passengers - 1
Injuries:	Crew - 1 (minor) Passengers - 1 (minor)
Nature of damage:	Wings damaged, engine displaced on mountings, windscreen broken and rudder damaged
Commander's Licence:	Commercial Pilot's Licence
Commander's total flying experience:	304 hours (of which 7 hours were on type)

The aircraft had flown from Redhill to Shoreham for landing and overshoot practice, a detail similar to that carried out the previous day. The pilot completed two satisfactory landings and overshoots quite normally. However, during the third climb out at a height of 350 to 400 feet over the sea the engine lost power. The pilot turned towards the beach and effected a forced landing in about 6 feet of water. On contacting the water the aircraft turned over onto its back and came to rest in 3 feet of water.

Inspection indicated the power loss to be probably due to a fuel jet blockage.

Aircraft Maintenance Foundation (U.S.A). Books :- From :-

(TECH. LIBRARY). CSE Aviation Ltd. Oxford Airport. Kidlington Oxon. OX5 1RA

EA-ARE	Aircraft Reciprocating Engines.	£3.00
EA-AHS	Aviation Maintenance Handbook & Standard Hardware Digest.	£3.00
EA-SMF	Aircraft Sheet Metal Construction.	£3.00
EA-AH-1	Aircraft Hydraulic Systems.	£3.00
EA-BEM	Basic Electronics.	£3.00
EA-AOS	Aircraft Oxygen Systems.	£2.47
EA-AIS	Aircraft Instruments.	£3.00
EA-AS	Applied Science.	£4.25
EA-CC-1	Aircraft Corrosion Control.	£2.47
EA-AP-1	Aircraft Painting and Finishing.	£3.00
EA-IGS	Aircraft Ignition Systems.	£3.00
EA-AC43-3	Nondestructive Testing In Aircraft.	£1.00
EA-FMS	Fuel Metering Systems.	£3.00
EA-NHR	Aircraft Bonded Structures.	£3.00
EA-WB-1	Welding Guidelines.	£4.25
EA-WB-2	Welding Guidelines.	£5.61
EA-BE-1	Basic Electricity for A & P Mechs.	£3.00
EA-AMP-1	Aircraft Maint for Pilots.	£4.25
EA-AMP-2	Aircraft Maint for Pilots.	£5.61
EA-ADF	Aircraft Fabric Covering.	£3.00
EA-BX2-C	Bendix D-2000 Dual Magneto Timing Tips (Cassetts).	£6.25
EA-AB-1	Aircraft Batteries.	£2.47
EA-BAL	Aircraft Weight and Balance.	£3.00
EA-TEP-1	Aircraft Gas Turbine Engines.	£4.25
EA-AWB	Aircraft Wheels & Brakes.	£3.00
EA-APC	Aircraft Propellers and Controls.	£3.72
EA-IAR	Aircraft Inspection and Maintenance Records.	£3.00
EA-ATD	Aircraft Technical Dictionary.	£2.47
EA-AC-65-9A	A & P Mechs General Handbook.	£5.21
EA-AC-65-12A	A & P Mechs Powerplant Handbook.	£5.21
EA-AC-65-15A	A & P Mechs Airframe Handbook.	£5.21
EA-AC-65-9ASG	A & P Mechs General Handbook Study Guide.	£3.12
EA-AC-65-12ASG	A & P Mechs Powerplant Handbook Study Guide.	£3.12
EA-AC-65-15ASG	A & P Mechs Airframe Handbook Study Guide.	£4.37
EA-AC43-13-1A & 2A	Acceptable Methods, Techniques and Methods.	£5.63
EA-AAC	Aircraft Airconditioning Systems	£2.47
EA-AEG-1	Aviation Electronics	£6.85
EA-AC61-13B	Basic Helicopter Handbook.	£1.72