Safety Regulation Group

Civil Aviation Authority

CAP 752

Progress Report 2004

Responses to Air Accidents Investigation Branch (AAIB) Safety Recommendations

www.caa.co.uk

Safety Regulation Group

Civil Aviation Authority

CAP 752

Progress Report 2004

Responses to Air Accidents Investigation Branch (AAIB) Safety Recommendations

Civil Aviation Authority (CAA) and Department for Transport (DfT) responses to AAIB Recommendations received up to 31 December 2003, presented to the Secretary of State for Transport

September 2004

ISBN 1 904862 00 4

Published September 2004

Enquiries regarding the content of this publication should be addressed to:
Safety Investigation and Data Department, Safety Regulation Group, Civil Aviation Authority, Aviation House, Gatwick Airport South, West Sussex, RH6 0YR.

The latest version of this document is available in electronic format at www.caa.co.uk.

Published by TSO (The Stationery Office) on behalf of the UK Civil Aviation Authority.

Printed copy available from:
TSO, PO Box 29, Norwich NR3 1GN
Telephone orders/General enquiries: 0870 600 5522
Fax orders: 0870 600 5533
www.tso.co.uk/bookshop
E-mail: book.orders@tso.co.uk
Textphone: 0870 240 3701

List of Effective Pages

Part	Page	Date	Part	Page	Date
	iii	September 2004	Part 2	40	September 2004
	iv	September 2004	Part 2	41	September 2004
	v	September 2004	Part 2	42	September 2004
	vi	September 2004	Part 2	43	September 2004
	vii	September 2004	Part 2	44	September 2004
	viii	September 2004	Part 2	45	September 2004
	ix	September 2004	Part 2	46	September 2004
Part 1	1	September 2004	Part 2	47	September 2004
Part 1	2	September 2004	Part 2	48	September 2004
Part 1	3	September 2004	Part 2	49	September 2004
Part 1	4	September 2004	Part 2	50	September 2004
Part 1	5	September 2004	Part 2	51	September 2004
Part 1	6	September 2004	Part 2	52	September 2004
Part 1	7	September 2004	Part 2	53	September 2004
Part 1	8	September 2004	Part 2	54	September 2004
Part 1	9	September 2004	Part 2	55	September 2004
Part 1	10	September 2004	Part 2	56	September 2004
Part 1	11	September 2004	Part 2	57	September 2004
Part 1	12	September 2004	Part 2	58	September 2004
Part 1	13	September 2004	Part 2	59	September 2004
Part 1	14	September 2004	Part 2	60	September 2004
Part 1	15	September 2004	Part 2	61	September 2004
Part 1	16	September 2004	Part 2	62	September 2004
Part 1	17	September 2004	Part 2	63	September 2004
Part 1	18	September 2004	Part 3	64	September 2004
Part 1	19	September 2004	Part 3	65	September 2004
Part 1	20	September 2004	Part 3	66	September 2004
Part 1	21	September 2004	Part 3	67	September 2004
Part 1	22	September 2004	Part 3	68	September 2004
Part 1	23	September 2004	Part 3	69	September 2004
Part 1	24	September 2004	Part 3	70	September 2004
Part 1	25	September 2004	Part 3	71	September 2004
Part 1	26	September 2004	Part 3	72	September 2004
Part 1	27	September 2004	Part 3	73	September 2004
Part 1	28	September 2004	Part 3	74	September 2004
Part 1	29	September 2004	Part 3	75	September 2004
Part 1	30	September 2004	Part 3	76	September 2004
Part 1	31	September 2004	Part 3	77	September 2004
Part 1	32	September 2004	Part 3	78	September 2004
Part 1	33	September 2004	Part 3	79	September 2004
Part 1	34	September 2004	Part 3	80	September 2004
Part 1	35	September 2004	Part 3	81	September 2004
Part 1	36	September 2004	Part 3	82	September 2004
Part 1	37	September 2004	Part 3	83	September 2004
Part 2	38	September 2004	Part 3	84	September 2004
Part 2	39	September 2004	Part 3	85	September 2004

Part	Page	Date
Part 3	86	September 2004
Part 3	87	September 2004
Part 3	88	September 2004
Part 3	89	September 2004
Part 3	90	September 2004
Part 3	91	September 2004
Part 3	92	September 2004
Part 4	93	September 2004
Part 4	94	September 2004
Part 5	95	September 2004
Part 5	96	September 2004
Part 5	97	September 2004
Part 5	98	September 2004
Part 5	99	September 2004
Part 5	100	September 2004
Part 5	101	September 2004
Part 5	102	September 2004
Part 5	103	September 2004
Part 5	104	September 2004
Part 5	105	September 2004
Part 5	106	September 2004
Part 5	107	September 2004
Part 5	108	September 2004
Part 5	109	September 2004
Part 5	110	September 2004
Part 5	111	September 2004
Part 5	112	September 2004
Part 5	113	September 2004
Part 5	114	September 2004
Part 5	115	September 2004
Part 5	116	September 2004
Part 5	117	September 2004
Part 5	118	September 2004
Part 5	119	September 2004
Part 5	120	September 2004
Part 5	121	September 2004
Part 5	122	September 2004
Part 5	123	September 2004
Part 5	124	September 2004
Part 5	125	September 2004
Part 5	126	September 2004
Part 5	127	September 2004
Part 5	128	September 2004
Part 5	129	September 2004
Part 5	130	September 2004
Part 5	131	September 2004
Part 5	132	September 2004
Part 5	133	September 2004
Part 5	134	September 2004
Index	1	September 2004
Index	2	September 2004
Index	3	September 2004
Index of Recommendations	1	September 2004
Index of Recommendations	2	September 2004
Index of Recommendations	3	September 2004
Index of Recommendations	4	September 2004

Contents

Foreword

The role of the Civil Aviation Authority (CAA) Safety Regulation Group is to ensure that UK civil aviation standards are set and achieved in a co-operative and cost-effective manner. The Group must satisfy itself that aircraft are properly designed, manufactured, operated and maintained; that airlines are competent; that flight crews, air traffic controllers and aircraft maintenance engineers are fit and competent; that licensed aerodromes are safe to use and that air traffic services and general aviation activities meet required safety standards.

The Air Accidents Investigation Branch (AAIB), a branch of the Department for Transport, is responsible for the investigation of all civil aircraft accidents and serious incidents (collectively referred to as 'accidents' in this document) occurring in or over the UK.

The two functions, of accident investigation and safety regulation, are clearly different and the two organisations are deliberately kept independent of each other. However, the evaluation of the findings of an accident investigation and the determination of the need for, and the initiation of, appropriate action to maintain and enhance safety is an important part of safety regulation, i.e. the responsibility of the CAA. Thus a good working relationship between the two organisations is essential, while in no way jeopardising the independence of the accident investigation.

Effective day to day liaison is maintained between the CAA and the AAIB, which is particularly useful in the immediate aftermath of any accident. However, the formal procedure by which the AAIB identifies and conveys to the CAA, or other bodies, matters which it believes require action is by means of Safety Recommendations.

Recommendations can be made at any stage as the AAIB investigation progresses. The CAA has formal procedures for the receipt and evaluation of such Recommendations and initiation of necessary action. In its evaluation the CAA considers all the implications of the Recommendation and action being proposed; it must also take into account the views of other Regulatory Authorities, e.g. the European Aviation Safety Agency (EASA) or the European Joint Aviation Authorities (JAA). The CAA responds to the AAIB as quickly as possible on all Recommendations as they arise, those of an urgent nature being acted upon immediately. In the case of AAIB Formal Investigations for which an Aircraft Accident Report (AAR) is published, all Recommendations made are listed in the final AAR. In such cases, the CAA publishes its Response to the Recommendations on the day the AAR is published.

EASA was established in September 2003, with a remit that currently covers the design and production aspects of airworthiness. As a result, the AAIB now addresses a number of Safety Recommendations to that body, rather than the CAA, which previously held the responsibility for such Recommendations. As EASA adopts more, hitherto national, responsibilities in the future, the number of Safety Recommendations addressed to it from air accident investigation bodies, such as the AAIB, will increase.

The CAA Responses to all Recommendations addressed to the CAA are published, initially, by means of a FACTOR (Follow-up Action on Occurrence Report) but will subsequently appear in this annual Progress Report.

Some Recommendations involve long-term investigation or research. When this is so, the CAA's response will indicate that the status of the Recommendation is 'Open' until all action by the CAA has been completed. This Report contains the current status of earlier Recommendations addressed to the CAA which were listed as 'Open' in the previous Progress Report.

Once CAA action is complete a recommendation will be designated 'Closed' in this Report and will not appear in subsequent Reports. In some instances further action may still be being

progressed by organisations outside the jurisdiction of the CAA, for example, by EASA or the JAA. In these cases the CAA will continue to monitor progress as part of its normal regulation activity.

This will be the last Progress Report published by the CAA. Subsequent annual Reports will be drafted and published by the AAIB.

The Report

This is the fifteenth annual Progress Report submitted to the Secretary of State for Transport. It contains all Recommendations addressed to the CAA and received during 2003 together with the CAA's responses.

The Report also contains all Recommendations addressed to the CAA that remained 'Open' in the fourteenth annual Progress Report, together with a statement of their position as at 31 May 2004, and all 'Open' Recommendations addressed to the DfT.

The Recommendations addressed to the CAA have been separated into three Parts:

Part 1 - Aeroplanes at or above 5700kg Maximum Take-off Weight Authorised (MTWA)

Part 2 - All Rotorcraft

Part 3 - Aeroplanes below 5700kg MTWA and others (e.g. Balloons)

NOTES: The definitions of Aeroplane and Rotorcraft are as stated in the Air Navigation Order.

Within each Part the accidents are listed by event date in reverse chronological order. This date order should not be taken as an indication of the date of receipt of the Recommendation by the CAA as some are received a significant time after an accident.

Some of the Recommendations made by the AAIB are addressed to organisations other than the CAA. Following a request from the DfT, responses to Recommendations involving the DfT appear in Part 4. All other Recommendations made during 2003 are detailed in Part 5.

CAA Responses to AAIB Recommendations 15th Report

1 Introduction

This Report meets the Secretary of State for Transport's request for Annual Reports on the status and progress of its responses to the Recommendations made to the CAA from the Air Accidents Investigation Branch. The Report covers all of those Recommendations which remained 'Open' from the previous Report and all Recommendations received during 2003.

2 Recommendations - Status Summary

During 2003 61 Recommendations addressed to the CAA were received and processed compared with 25 for 2002. A Summary of the Acceptance and Current Status of these is as follows:

	Acceptance				**Current Status**	
	Fully	Partially	Fully & Partially	Not Accepted	Open	Closed
PRE 2002	760	96	856	142	3	995
2002	21	1	22	3	2	23
2003	44	12	56	5	20	41
TOTAL	825	109	934	150	25	1059

Part 1 AAIB Recommendations relating to aeroplanes at or above 5700kg MTWA

Airbus A310-308	Manchester Airport	15 Jul 2003	Incident

References: Bulletin 3/2004 dated 11 Mar 2004

FACTOR F17/2004 dated 15 Apr 2004

SYNOPSIS (From AAIB Report)

Following a technical problem, the airbridge on Stand 6 at Manchester Airport could not be parked in the correct position. From the remote location of Apron Control, the stand allocator was unaware that Stand 6 was obstructed and so allocated it to an arriving A310 aircraft. Although, irrespective of the position of the airbridge, a marshaller was required to guide the aircraft on to the stand, the stand allocator also activated the Stand Entry Docking Guidance (SEDG) lighting. The marshaller arrived at the stand when the A310 was already manoeuvring to park and following the illuminated SEDG. Neither the aircraft commander nor the marshaller noticed that the airbridge was incorrectly parked until it was too late to prevent the upper surface of the aircraft's left engine cowling striking the underside of the airbridge as the marshaller signalled the aircraft to stop. Two safety recommendations are made which address control of the SEDG systems at Manchester Airport. A third safety recommendation is addressed to the CAA proposing an expansion of the UK aerodrome audit process to include the control and use of SEDG systems.

RECOMMENDATION 2004-08

The UK Civil Aviation Authority should consider including within future audits of UK aerodromes compliance with CAP 642 advice in respect of the control and use of Stand Entry Docking Guidance systems.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation. The Aerodrome Standards Department of the Civil Aviation Authority has included a review of Stand Entry Docking Guidance systems and associated procedures, to ensure conformity with CAP 642 advice, in its forthcoming aerodrome audit programme.

De Havilland Canada DHC8	25 Miles North of Edinburgh	2 Mar 2003	Incident

References: Bulletin 12/2003 dated 11 Dec 2003

FACTOR F5/2004 dated 12 Jan 2004

SYNOPSIS (From AAIB Report)

The aircraft, in the climb with the autopilot engaged, failed to level at the selected altitude of FL170. The combined effort of both pilots to level the aircraft manually was also ineffective. The recall actions for an 'elevator jam' were initiated and reduced

elevator authority was regained on selection of the 'pitch disconnect handle'. The crew transmitted a 'MAYDAY' and, without further incident, and with the assistance of radar vectors, carried out as flapless landing on Runway 24 at Edinburgh. Even though the anti-icing systems were used during the climb, flight data analysis suggested that the control difficulties were due to a restriction of the right elevator spring tab brought about by ice contamination. Post flight examination revealed the presence of re-hydrated residues of anti-icing fluids remaining from previous fluid applications. It is possible that this re-hydrated gel, very low in glycol content and with a freezing point of approximately -1.1°C, had frozen around the bearings. Two safety recommendations are made: The first addresses the implementation of advice given to operators on airframe inspections and cleaning of aerodynamically 'quiet areas' where residues can accumulate, and the second highlights the need for anti-icing fluid manufacturers to develop gelling agents, with suitable holdover times, that are not re-hydratable.

RECOMMENDATION 2003-81

It is recommended that the Civil Aviation Authority satisfy itself that operators have in place the necessary measures to ensure that they have adopted the advice given in AIC 81/2001.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

In order to ascertain that operators have satisfactorily prepared for this winter's operations, including adopting the advice given in AIC 81/2001, the CAA is conducting a Special Objective Check (SOC) of AOC Holders. This SOC consists of the assigned Flight Operations Inspector conducting an interview with the operator, the completion of a questionnaire and the review and production of a report on the findings. This SOC will be complete by January 2004.

In addition to the SOC, UK AOC Holders and a number of other relevant organisations are being provided with a CD-ROM containing the CAA 'Ice Aware' film, the text of AIC 105/2003 (Pink 61 - "Recommendations for De-icing/Anti-icing of Aircraft on the Ground") which will be published on 11 December 2003, a copy of FODCOM 23/2003 which covers winter operations and Edition 18 of the Association of European Airlines document 'Recommendations for De-icing/Anti-icing of Aircraft on the Ground'. Also being distributed is a DVD, produced by NASA and containing three films entitled 'Icing for Regional and Corporate Pilots', 'Icing for General Aviation Pilots' and 'Tailplane Icing'. The CD and DVD are particularly intended to be used for the instruction and training of the flight crew and maintenance personnel.

RECOMMENDATION 2003-82

The Civil Aviation Authority should consult with anti-icing fluid manufacturers with a view to encouraging them to develop fluids, with suitable 'holdover' times, that incorporate gelling agents that are not rehydratable.

Status - Partially Accepted - Closed

CAA Response

The CAA partially accepts this Recommendation.

The CAA believes that the best way to encourage anti-icing fluid manufacturers to develop fluids with suitable holdover times that incorporate gelling agents that are not rehydratable is to submit a proposal to the SAE committee that develops the fluids specifications. Therefore, the CAA will propose to the SAE Fluids Committee that consideration should be given to developing a specification for a fluid with suitable holdover times that incorporate gelling agents that are not rehydratable, and of establishing a practical way of setting a pass/fail limit for the fluid. This proposal will be submitted to the secretary of the SAE Fluids Committee for discussion at the meeting in March/April 2004. The CAA will monitor the action taken in respect of the proposal and will then decide what if any further action is required.

CAA Action

The CAA has submitted the proposal to the SAE Fluids Committee that consideration should be given to developing a specification for a fluid with suitable holdover times that incorporate gelling agents that are not rehydratable, and of establishing a practical way of setting a pass/fail limit for the fluid. This proposal has been scheduled for discussion at the Committee's meeting in May 2004 where a member of the UK CAA will be present.

BAe 146-RJ100	**Birmingham Airport**	**10 Feb 2003**	**Accident**

References: Bulletin 7/2003 dated 10 Jul 2003
FACTOR F25/2003 dated 7 Aug 2003

SYNOPSIS (From AAIB Report)

Apart from a slight nose wheel shimmy during takeoff, the crew noticed nothing unusual during a flight from Glasgow to Birmingham Airport. However, after they had parked at the stand, it was apparent that the left nose wheel was missing and this was subsequently found adjacent to the runway at Birmingham. Examination of the aircraft revealed that an abutment ring (spacer) was incorrectly installed on the subject nose landing gear axle, and that this had precluded the correct locking action of two bolts designed to secure the wheel retaining nut. Three safety recommendations are made as a result of this event.

RECOMMENDATION 2003-30

It is recommended that the Civil Aviation Authority, in conjunction with the NLG and airframe manufacturers, review the design of the NLG nose wheel installation on the BAe 146/RJ aircraft with a view to precluding the possibility of incorrect assembly of the wheel abutment ring.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation. The CAA will, in conjunction with the NLG and the airframe manufacturer, review the design of the NLG nose wheel installation of the BAe 146/RJ aircraft with a view to precluding the possibility of incorrect assembly of the wheel abutment ring.

This review is targeted to be complete by 28 February 2004.

CAA Action

CAA, BAE Systems and Messier-Dowty reviewed the NLG wheel installation prior to 28 February 2004. BAE Systems has revised section 32-42-17 of the AMM to help ensure the correct installation of the wheel abutment ring. A modification to the abutment ring (Chamfered on both sides with an internal 'O' ring) is under investigation by BAE Systems and Messier-Dowty for possible action to further preclude incorrect assembly.

Airbus A340	London Heathrow Airport	30 Jan 2003	Incident

References: Bulletin 7/2003 dated 10 Jul 2003
FACTOR F24/2003 dated 7 Aug 2003

SYNOPSIS (From AAIB Report)

The aircraft was manoeuvring to line-up on Runway 27R and taxiing at a speed of approximately 6 kt when it started to slide on ice and snow. The application of asymmetric thrust failed to prevent the right main landing gear from leaving the paved surface. Subsequent disembarkation of the passengers was delayed for two and a half hours whilst de-icing equipment was provided and the taxiway de-iced. There is currently no requirement to measure or assess the taxiway surface friction conditions and no such measurements were made before or after the incident. A safety recommendation relating to guidance material dealing with contamination of aerodrome surfaces has been made as a result of this incident.

RECOMMENDATION 2003-51

The CAA review the current guidance material for dealing with winter contamination of aerodrome surfaces detailed in CAP 168 with a view to ensuring that conditions on all aerodrome manoeuvring areas are fit for use by aircraft.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation. The current guidance material contained within CAP 168, for dealing with winter contamination of aerodrome surfaces, is under review by the CAA Aerodrome Standards Department. It is recognised that, whereas guidance for the treatment and maintenance of runways is detailed comprehensively in CAP168, the treatment of taxiways is less well described and, therefore, an amendment to CAP 168 and the UK AIP, covering this issue, will be published shortly.

In addition, a Notice to Aerodrome Licence Holders (NOTAL) will be published prior to 2003 winter operations, reminding aerodrome operators of their responsibility to ensure that all manoeuvring areas have appropriate surface friction levels for safe operation by aircraft.

CAA Action

Notice to Aerodrome Licence Holders (NOTAL) 5/2003 was published on 1 December 2003, outlining the immediate amendment of the criteria contained in CAP 168 for the monitoring and treatment of movement area pavements, with particular regard to winter operations and this AAIB Recommendation. CAP 168 has subsequently been amended and now incorporates the changes notified in the NOTAL.

Embraer 135	Norwich Airport	30 Jan 2003	Incident

References: Bulletin 11/2003 dated 6 Nov 2003

FACTOR F39/2003 dated 10 Dec 2003

SYNOPSIS (From AAIB Report)

The crew reported for duty at 1200 hrs on the day of the incident expecting to fly two return flights from Norwich to Aberdeen. Snow showers at Norwich led to the cancellation of their first two sectors and it was 1730 hrs before they departed Norwich for Aberdeen. After an uneventful flight and turnaround they left Aberdeen for Norwich at 1919 hrs with the first officer acting as pilot flying (PF). During the cruise he briefed for an ILS approach to Runway 27 at Norwich using Flap 22 for landing, instead of the normal Flap 45, due to the forecast strong crosswind. ATIS 'L' was current at the time and gave landing conditions of light snow showers, a wind of 360°/11 kt, a temperature of +1°C and a wet runway. On first contact with Norwich Approach the crew were informed that ATIS 'M' was now in force with the wind now 030°/25 kt and the 'RUNWAY RECEIVING ANOTHER LIGHT DUSTING'. This was acknowledged by the crew but they did not listen to the complete broadcast of information 'M'. On base leg the approach controller informed the crew that the runway was covered in 'SLUSH MIXED WITH HAIL TO A DEPTH OF 2-3MM…. YOU CAN STILL SEE THE WHITE LINES THROUGH THE SLUSH.' Although the crew acknowledged this, they had no recollection after the incident of receiving this information.

During the descent the crew also received an Engine Indication and Crew Alerting System (EICAS) Stall Protection System (SPS) warning which had illuminated due to ice accretion. In accordance with company procedures they added 6 kt to their approach speed (VAPP) giving them 130 kt as their VAPP and 120 kt as their VREF. During the final stages of the ILS approach, the Norwich tower controller gave three further readouts as the wind veered and increased. On touchdown the wind was 020°/23 kt giving a tailwind component of 10 kt and a crosswind component of 21 kt.

The first officer flared the aircraft as normal and then felt the right wing drop. He corrected for this but the aircraft floated down the runway, touching down at 120 kt, between 500 and 600 metres from the threshold. Fire crews, who were on weather standby and pre-positioned near the taxiway/runway intersection at B1, 500 metres from the threshold of Runway 27, reported that the aircraft touched down beyond the intersection. In accordance with the company Standard Operating Procedures (SOP's), the Commander called 'MY BRAKES', pressed the brake pedals but felt no retardation. He tried several times with no effect and even the application of the parking brake, which applies full system pressure, made no noticeable difference to the aircraft's rate of retardation. The first officer transmitted that they were 'GOING

OFF THE END OF THE RUNWAY' and they left the paved surface at a ground speed of 74 kt. The overrun area was a field covered in snow. This produced significant retardation and they came to rest 130 metres after leaving the paved surface. The fire crews were in attendance at the aircraft just after it came to a stop. There were no immediate signs of damage or fire and, after the crew had shut down the engines, the passengers disembarked in the normal manner.

RECOMMENDATION 2003-96

It is recommended that the CAA encourage research that could lead to the production of equipment that can accurately measure the braking action of runways under all conditions of surface contamination.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts the recommendation. In response to the concerns of airlines when operating on runways of inferior friction characteristics, the CAA has convened a working group, involving airlines, aerodrome operators, research and development bodies and manufacturers of runway friction measurement devices, to address operational runway friction issues, including winter operations. The working group recognises that research worldwide has so far failed to provide an accurate measurement of friction or braking action on a runway contaminated by slush and wet snow, and that there are wider operational issues, such as the reliability of the reported measurement, that also need to be addressed.

In addition to the challenges and costs of developing a friction measurement device suitable for runways contaminated by slush and wet snow, manufacturers also have to consider whether there is sufficient market for such a device. However, the CAA is content to continue to encourage research that could lead to the production of equipment that can measure accurately the braking action the braking action under all conditions of surface contamination.

BAe 146-200	Near Birmingham Airport	12 Dec 2002	Accident

References: Bulletin 2/2004 dated 5 Feb 2004

FACTOR F11/2004 dated 16 Mar 2004

SYNOPSIS (From AAIB Report)

The aircraft was carrying out a scheduled passenger flight from Birmingham to Belfast City. During the climb, it appeared to hunt in pitch more than usual whilst the autopilot was engaged and it seemed to the flight crew that it would fail to maintain FL240, their cleared cruising level. When the autopilot was disconnected, the aircraft pitched up and the elevator control forces to counteract this were found to be very heavy. Nose down trim was applied, which caused the aircraft to pitch down. In an attempt to level the aircraft, both pilots then pulled back on the control columns with considerable force. The controls suddenly freed causing the aircraft to pitch up rapidly, resulting in a large excursion in normal acceleration which caused serious injuries to two cabin crew members.

The investigation determined that the accident was probably caused by icing of the elevator servo tabs, coupled with the crew's response to the situation for which they had not been trained.

There have been a number of previous occurrences of suspected servo tab icing on the BAe 146/RJ aircraft series. This report makes a number of safety recommendations calling for maintenance and inspection actions to reduce the probability of this occurring and for the introduction of an emergency procedure to enable flight crews to respond to such an event in a manner that minimises the risk to the aircraft and its occupants.

RECOMMENDATION 2003-119

It is recommended that the Civil Aviation Authority require operators of aircraft with nonpowered flying controls that are vulnerable to the effects of freezing of re-hydrated de-icing fluid residues, to establish engineering procedures for the inspection and removal of such residues from critical flying control surfaces.

Status - Fully Accepted - Open

CAA Response

The CAA accepts this recommendation. This recommendation, as worded, is directed at the CAA oversight of aircraft operators.

The CAA believes that operator procedures for the inspection and cleaning of re-hydrated de-icing fluid residues must be based on formal information from the applicable Type Certificate Holder/Type Design Organisation.

Since 28 September 2003, responsibility for the matters addressed in this Safety Recommendation as far as they relate to TC holders has passed to EASA under Regulation (EC) 1592/2002 and the recommendation should be addressed to that Agency.

Under the EASA transition arrangements and as the regulator within the State of Design for a number of aircraft types with non-powered flying control systems, CAA accepts this recommendation on behalf of EASA. CAA will therefore review the applicable UK aircraft types, and those types for which CAA is the EASA Lead Authority, with the Type Certificate Holders and where necessary require the development, approval and publication of such information and require operators to incorporate this information into their procedures. CAA will recommend the same action to EASA for any other applicable type.

The CAA has set a target date of September 2004 to complete this action.

RECOMMENDATION 2003-120

On behalf of EASA the CAA should take an oversight on the manufacturer's proposed flight crew abnormal and emergency checklist procedure for recognising and responding to frozen flight controls on the 146/RJ series aircraft to ensure the timely introduction of a suitable procedure.

Status - Fully Accepted - Open

CAA Response

Since 28 September 2003, responsibility for the matters addressed in this Recommendation has passed to EASA under Regulation (EC) 1592/2002 and the recommendation should be addressed to that Agency.

Under the EASA transition arrangements and as the regulator within the State of Design for the BAE146 aeroplane type, CAA accepts this recommendation on behalf of EASA.

The CAA is monitoring the manufacturer's actions relating to possible amendments to the flight crew abnormal and emergency procedure, for recognising and responding to frozen flight controls on the 146/RJ series aircraft. It is intended that this work will be completed by 31 December 2004.

RECOMMENDATION 2003-122

The CAA should require UK AOC holders operating BAe 146/RJ series aircraft to issue instructions to their staff for inspecting the gaps between the elevator and the tailplane and between the elevator and the trim and servo tabs for any precipitation contamination prior to departure, with a recommendation to de-ice the aircraft, when any doubt exists.

Status - Fully Accepted - Open

CAA Response

The CAA accepts this recommendation. This recommendation, as worded, is directed at the CAA oversight of UK AOC operators.

The CAA believes that operator procedures for the inspection of contamination must be based on formal information from the applicable Type Certificate Holder/Type Design Organisation.

Since 28 September 2003, responsibility for the matters addressed in this Safety Recommendation as far as they relate to the TC holder has passed to EASA under Regulation (EC) 1592/2002 and the recommendation should be addressed to that Agency.

Under the EASA transition arrangements and as the regulator within the State of Design for the BAe 146 and AVRO 146-RJ aircraft types, CAA accepts this recommendation on behalf of EASA. CAA will therefore require the Type Certificate Holder of the BAe 146 and AVRO 146-RJ aircraft types to develop, obtain approval and publish such information and require operators to incorporate this information into their procedures.

The CAA has set a target date of September 2004 to complete this action.

CAA Action

BAE Systems has developed and issued Service Information Leaflet SIL 27-80 covering the maintenance and de-icing of flight controls. This includes information on:

The importance of removing frozen contaminants from control gaps.

Removal of de-ice fluid residues from aerodynamically quiet areas where there is insufficient airflow to ensure this.

The use of approved de-icing fluids per the Aircraft Maintenance Manual (AMM)

Deterioration of "sealed for Life" bearings

Preventative maintenance to prolong the life of such bearings.

Further work is planned to develop Approved Flight Manual /AMM revisions.

Fokker FK100	Manchester Airport	1 Apr 2002	Incident

References: Bulletin 3/2003 dated 6 Mar 2003

FACTOR F7/2003 dated 15 Apr 2003

SYNOPSIS (From the AAIB Report)

The aircraft was taxiing for takeoff from Runway 24R at Manchester International Airport on a scheduled passenger service to Amsterdam, the Netherlands. The weather was dry with a light southerly breeze. Sunrise was due at 0543 hrs and the sky was just becoming light.

Shortly after passing holding point 'J4', the flight deck crew became aware of a burning smell in the cockpit which was becoming stronger and which they described as smelling like "hot light oil". The commander brought the aircraft to a halt and instructed the first officer to set the APU, which was supplying bleed air to the air conditioning packs, to OFF. At about the same time, cabin crew member No 3 (CC3), who was situated in the middle of the aircraft at seat row 15, became aware of smoke in the cabin. There was no intercom handset at CC3's position. She therefore walked to the front of the cabin to inform the In-Flight Supervisor(IFS) who was in the forward galley with cabin crew member No 2 (CC2). As CC3 approached the forward galley, she was passed by CC2 returning to his normal crew position at the rear of the aircraft.

On being advised of the smoke, the IFS entered the cockpit and informed the flight deck crew. Very soon after this exchange, both cabin toilet smoke alarms activated and the cockpit crew received a Master Caution alert and 'TOILET SMOKE' message. CC2 was passing seat row 15 at the time the toilet smoke alarms activated, and he continued to the rear of the aircraft and inspected both toilets for any signs of fire. Having found none, he advised the IFS via the intercom, who relayed the information to the commander, together with the fact that the smoke was continuing to move forward and was getting thicker.

Meanwhile the flight deck crew had closed the engine bleed air switches, thereby cutting off all possible sources of conditioned air. Both pilots looked back along the cabin through the open cockpit door and both remember having difficulty seeing as far as the rear of the passenger cabin. Realising that the smoke showed no sign of dissipating, the commander decided to carry out an emergency evacuation. He told the IFS to standby for his evacuation order, whilst he and the first officer carried out the 'On Ground Emergency/Evacuation' checklist, which involved lowering full flap and shutting down the engines. The Cockpit Voice Recorder (CVR) indicated that one minute forty seconds had elapsed between the cockpit crew first smelling burning in the cockpit and the engines being shutdown.

RECOMMENDATION 2002-42

The CAA and the JAA should review the design, contrast and conspicuity of wing surface markings associated with overwing emergency exits on all relevant Public Transport aircraft, with the aim of ensuring that the route to be taken from the wing to the ground is marked unambiguously.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts its part of this Recommendation.

In conjunction with the operators of all relevant Public Transport aircraft on the UK register the CAA will review the design, contrast and conspicuity of wing surface markings associated with overwing emergency exits, with the aim of ensuring that the route to be taken from the wing to the ground is marked unambiguously. CAA will aim to complete this review by 30 October 2003.

CAA Action

In conjunction with the operators of relevant Public Transport aircraft on the UK register the CAA has reviewed the design, contrast and conspicuity of wing surface markings associated with overwing emergency exits. As a result we have determined that for Public Transport aircraft, other than the Fokker 100, the route to be taken from the wing to the ground is marked unambiguously. Therefore no action is needed on those aircraft.

With respect to the Fokker 100, the CAA has determined that the aircraft is in compliance with its Type Certification basis, but that the resulting markings are ambiguous. Therefore, a change to the design of the markings on the Fokker 100 would be desirable. Since, 28 September 2003, the European Aviation Safety Agency (EASA) has assumed responsibility for the design standards of most aircraft types manufactured and operated in the European Union. This includes responsibility for the Fokker 100. In accordance with current EASA procedures the CAA Netherlands is acting as Lead Authority and is taking responsibility for continued airworthiness on the Fokker 100 on behalf of the EASA. Therefore, on 16 April 2004 the CAA wrote to the CAA Netherlands pointing out the circumstances of the subject incident and recommending that they consider changes to the design of the wing surface markings to ensure that the route to be taken from the wing to the ground is marked unambiguously. Such changes in design would then be effective for all Fokker 100 aircraft operating in the European Union, including the UK.

In the view of the CAA the Type Certification requirements with respect to wing escape path markings lack clarity and would benefit from the addition of interpretative material (or even new requirements). The EASA is now responsible for the European Union's design standards for large aeroplanes. Therefore, on 5 April 2004 the CAA wrote to the EASA pointing out the circumstances of the subject incident and recommending that it considers changes to its Certification Specifications to ensure a clear distinction between the escape route and the non-usable part of the wing.

EMB145	**En Route - Divert to East Midlands Airport**	**15 Feb 2002**	**Incident**

References: Bulletin 5/2002 dated 9 May 2002

FACTOR F9/2002 dated 17 Jun 2002

SYNOPSIS

On the 15 February 2002 a British Midland Embraer 145, registration G-RJXC, en route from Leeds to Paris developed hydraulic problems and diverted into East Midlands Airport. When full flap was deployed the left outboard spoiler opened and

resulted in the handling pilot requiring to use almost full roll trim and in excess of 75% of the available control wheel to maintain wings level attitude.

When the DFDR was replayed it was noted that data sampled at greater than one sample per second appeared not to have been updated at the appropriate time, in that a series of identical values were recorded. An alternative reason for the repeated samples was that the recorded resolution was inadequately low and variable in extent. It is possible that data sampled less frequently are similarly affected, but anomalies in the recording of data sampled at 1 sample per second are difficult to identify by inspection.

The AAIB has been involved in four other incidents to Embraer 145 aircraft of both British Midland and British Regional, and has data from 2 other routine downloads. All of these recorders exhibited similar faults. The inference must therefore be that the same problem exists on all Embraer 145 aircraft. The anomalies were discovered by detailed inspection of the data, it is unlikely that the problems would be picked up by the current routine replay system.

RECOMMENDATION 2002-01

As a matter of urgency, the Centro Tecnico Aeroespacial (CTA) of Brazil should require Embraer and the manufacturers of the flight data recording installation to investigate the nature and extent of the recording anomalies associated with the EMB145 DFDR installation, to correct them on existing and future aircraft, and subsequently demonstrate that the DFDR faithfully records the time histories of the data transducer outputs. The CAA as part of its JAA activities should monitor this process.

Status - Fully Accepted - Closed

CAA Response

This Recommendation is not addressed primarily to the CAA.

However, the CAA will monitor the process of the investigation by CTA and Embraer into the nature and extent of the recording anomalies associated with the EMB145 DFDR installation as part of the JAA's continued airworthiness follow-up activities.

CAA Action

Embraer have identified and rectified the incorrect parameters in the DFDR, but there is one outstanding parameter that remains slightly outside the specified limits. This is currently under investigation by both Honeywell and Embraer to establish the origin of the incorrect data. The Centro Tecnico Aeroespacial (CTA) has informed CAA that as soon as the current investigation is complete it will issue a mandatory Airworthiness Directive (AD) for the rectification Service Bulletin.

Since the 28 September 2003, the European Aviation Safety Agency (EASA) assumed the responsibility for setting the design standards for most aircraft manufactured or operating within the European Union. It is EASA policy to adopt the Airworthiness Directives of the State of Design as part of their own design standard. Thus on publication the CTA AD will become mandatory in the UK. If any further action is required this will be within the purview of EASA rather than the CAA.

RECOMMENDATION 2002-02

The CAA should liaise with Embraer to ensure that the DFDR installations on all UK registered Embraer aircraft meet applicable UK regulatory requirements.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

The CAA will liaise with Embraer and CTA to ensure that the DFDR installations on UK registered EMB145 aeroplanes meet the applicable requirements. Any subsequent action will take into account the results of the investigation performed under Recommendation 2002-01.

CAA Action

Embraer have identified and rectified the incorrect parameters in the DFDR, but there is one outstanding parameter that remains outside the specified limits. This is currently under investigation by both Honeywell and Embraer to establish the origin of the incorrect data. The Centro Tecnico Aeroespacial (CTA) has informed the CAA that as soon as the current investigation is complete it will issue a mandatory Airworthiness Directive (AD) for the rectification Service Bulletin.

Since the 28 September 2003, the European Aviation Safety Agency (EASA) assumed the responsibility for setting the design standards for most aircraft manufactured or operating within the European Union. It is EASA policy to adopt the Airworthiness Directives of the State of Design as part of their own design standard. Thus on publication the CTA AD will become mandatory in the UK. If any further action is required this will be within the purview of EASA rather than the CAA.

RECOMMENDATION 2002-04

The CAA should ensure that other aircraft types operating on the UK register and fitted with similar flight data recording installations meet UK regulatory requirements.

Status - Fully Accepted - Open

CAA Response

The CAA accepts this Recommendation.

The CAA will take measures to ensure that other aeroplane types operating on the UK register and fitted with similar flight data recording installations meet the UK regulatory requirements. The measures taken will take into account the results of the investigation performed under Recommendation 2002-01.

CAA Action

Embraer have identified and rectified the incorrect parameters in the DFDR used on their aircraft types, but there is one outstanding parameter that remains slightly outside the specified limits. This is currently under investigation by both Honeywell and Embraer to establish the origin of the incorrect data. Once this investigation is complete the CAA will request that Honeywell clarify the extent if any, of the effect on other aircraft types using a similar flight data recorder installations. If any other aircraft types are liable to be subject to irregularities in the data then CAA will notify the European Aviation Safety Agency (EASA) so that it may take the appropriate regulatory action.

Lockheed L188C	10 miles South of Rennes	7 Jun 2001	Incident

References: Bulletin 1/2003 dated 9 Jan 2003

FACTOR F1/2003 dated 10 Feb 2003

SYNOPSIS

The aircraft was climbing out of Rennes, bound for Bordeaux, with all visual and audible flight deck indications normal when, upon passing FL40, a loud bang was heard. The aircraft shook violently and depressurised. The commander immediately initiated a return to the departure airfield and, suspecting that the aircraft may have sustained structural damage, transmitted a MAYDAY call. After carrying out all relevant emergency checks an uneventful ILS approach was made back into Rennes and the aircraft landed safely. Examination of the aircraft at Rennes showed that the Crew Emergency Exit Door (CEED) was missing.

Although this event occurred within French airspace, it was agreed with the French authorities that the investigation would be conducted by the AAIB. The aircraft was not examined by the AAIB in France, only upon its return to the UK after repair.

RECOMMENDATION 2002-31

The Civil Aviation Authority, together with the Federal Aviation Administration, ensure that action is taken aimed at preventing the accidental detachment of the Crew Emergency Exit Door, in flight, on all Lockheed Electra L188C aircraft that have been modified to freighter configuration in accordance with the door manufacturer's Supplemental Type Certificate.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

As the authority of the State of Design the Federal Aviation Administration (FAA) have primary responsibility for the continued airworthiness of the Lockheed Electra L188C. On 14 January 2003 CAA wrote to the FAA and proposed to them actions that they should consider taking aimed at preventing the accidental detachment of the Crew Emergency Exit Door, in flight, on all Lockheed Electra L188C aircraft that have been modified to freighter configuration in accordance with the door manufacturer's Supplemental Type Certificate. A reply from the FAA is awaited.

CAA Action

In conjunction with the aircraft manufacturer, the FAA has assessed how many Lockheed L188C Electra aircraft were modified with cargo door modification Supplemental Type Certificates including provision for a crew emergency escape door (CEED). According to the FAA there are 3 operators and a total of 12 aircraft affected.

With respect to the UK fleet, Atlantic Airlines has taken several measures to preclude further incidents with the CEED. It has improved the door indication system by replacing the single door closed indication micro switch with 3 micro switches. Two, one on each side of the door, will sense the door latched position and a third will

indicate that the door lock/hook tensioning handle is in the closed position. Atlantic Airlines also added placards to the door lock/hook tensioning handle to highlight the LOCKED/CLOSED and UNLOCKED/OPEN positions of the handle, has safety wired the door lock/hook tensioning handle to indicate movement of the door handle, amended the Pre-Flight Check List to physically check the door lock/hooks are in their LOCKED/CLOSED positions, and published a notice to crew concerning the correct operation of the CEED. CAA is satisfied that these measures satisfactorily address the CEED indication issues and provide the desired level of safety.

With respect to the six aircraft outside of the UK, four have no need for supernumerary cabin seating and have been modified to permanently remove the CEED along with its associated parts and to replace it with structure (formers, intercostals and skins). One aircraft has only a rear cargo door, which does not include a CEED. The final aircraft has the CEED deactivated and permanently bolted closed.

For future installations, the aircraft manufacturer has stated that they will not allow this STC to be incorporated into any other aeroplane.

The CAA is satisfied that no further actions are required in this matter.

MD83	Liverpool Airport	10 May 2001	Accident

References: AAR 4/2003 dated 21 Nov 2003

FACTOR F38/2003 dated 21 Nov 2003

SYNOPSIS

The aircraft carried out an automatic landing at Liverpool at 1232 hrs with the first officer (FO) being the pilot flying. The right main landing gear collapsed on touchdown and the commander took over control shortly afterwards. The aircraft continued travelling along the runway, maintaining approximately the centreline, and came to rest with the right wing in contact with the ground. A successful passenger evacuation was carried out using the forward escape slides and the left overwing emergency exit.

The following causal factors were identified :

1 The right Main Landing Gear (MLG) cylinder failed immediately upon touchdown due to the application of spin-up drag loads on a section of the cylinder containing a major fatigue crack 3.2 mm long and 1.0 mm deep and several other associated smaller cracks.

2 The origins of these fatigue cracks could not be identified but other embryonic cracks were found which were associated with surface irregularities arising from a grit-blasting process during manufacture. Abnormal loading, possibly due to an occurrence of a mode of fore-and-aft vibration known as 'gear walking' is thought to have been responsible, at some time in the aircraft's history, for propagating the cracks to a depth at which continued growth was possible under normal loading. Alternatively, some abnormal loading may have relaxed the beneficial compressive surface stresses induced by shot-peening at the critical section and allowed propagation from the same surface defects.

3 Inspection and other mandatory preventive measures taken following two similar accidents did not prevent the occurrence of this third accident. This was probably due to the small size of cracks which are required to be detected before reaching a critical dimension.

RECOMMENDATION 2003-45

It is recommended that the FAA and the CAA should promote an industry study into the possibility that beneficial residual stress fields induced by shot-peening could be relaxed under in-service conditions.

Status - Not Accepted - Closed

CAA Response

Since 28 September 2003, responsibility for the matters addressed in this Recommendation has passed to EASA under Regulation (EC) 1592/2002 and the Recommendation should be addressed to that Agency. Therefore, the CAA's position on this Recommendation is that it is not addressed to the CAA.

However, the CAA has promoted an industry study to examine the effects of in-service conditions on surface treatments, such as shot-peening and this is the subject of a CAA research project. Several European manufacturers have undertaken to participate in the study.

RECOMMENDATION 2003-48

It is recommended that the CAA, JAA and the FAA should provide guidance as to the recommended best practice for the evacuation of infants and small children down escape slides with minimum delay.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts its part of this Recommendation.

The CAA is not aware of any (preferably scientifically-based) guidance that could be promulgated to Industry. The Air Accident Report makes reference to the CAMI trial DOT/FAA/AM-01/18. The CAA believes this trial to be based on the results of a study of one aircraft type, the B737, which has a relatively low sill height. It is not known whether the results of a similar study conducted on other aircraft types would provide similar results. Also, the CAMI trial did not reach a conclusion as to what is the 'recommended best practice for the evacuation of infants and small children down escape slides with minimum delay'.

Therefore, the CAA will propose to the International Cabin Safety Research Technical Group that consideration should be given to conducting further research into the subject. The CAA will further propose that the aim of this work should facilitate the provision of guidance as to the recommended best practice. The CAA will review the results of the work with the intention of publishing guidance as to the recommended best practice for the evacuation of infants and small children down escape slides with minimum delay.

CAA Action

The CAA has proposed to the International Cabin Safety Research Technical Group (ICSRG) that consideration should be given to conducting further research into the

subject with the aim of providing guidance as to the recommended best practice. It is planned that the ICSRG will discuss this proposal at its next meeting on 25-26 May 2004.

Should the result of the ICSRG meeting lead to further research and to the production of a recommended best practice document, the CAA will review this document with the intention of publishing guidance to UK AOC Holders.

Shorts SD3-60	Near Edinburgh Airport	27 Feb 2001	Accident

References: AAR 2/2003 dated 25 Apr 2003

FACTOR F10/2003 dated 25 Apr 2003

SYNOPSIS(From AAIB Report)

The aircraft landed at Edinburgh Airport from its previous flight at 0003 hrs on 27 February 2001. The weather conditions, recorded in the 0002 hrs SPECIAL report, were as follows:- Surface wind 040deg/22 gusting 36 kt, visibility 5,000 metres, light ice pellets, scattered cloud at 900 feet, broken cloud at 1,200 feet, temperature +1deg C/dewpoint 0degC and QNH 992 mb.

The aircraft was taxied to and parked on Stand 31, on a heading of 035degM. The inbound crew reported that there were no abnormalities observed or technical defects on the aircraft. They supervised the refuelling of the aircraft to a final load of 3,000lbs (1,360 kg) before leaving the aircraft. Edinburgh Airport was not a main operating base for the airline and thereby flight crews were responsible for normal aircraft turnround procedures.

The aircraft was scheduled to depart Edinburgh at 0040 hrs with a different operating crew. This second crew arrived at the aircraft at about 0030 hrs. The aircraft required de-icing before departure but they were advised that there would be a delay of several hours before equipment would be available. In the interim they returned to the crew room. At 0210 hrs the airport closed as a result of the severe weather. At 0600 hrs this second crew were advised that the airport was not likely to reopen for several hours and so they returned to the aircraft to ensure it was secure before going off duty. At this time they fitted propeller straps to each engine and also put on the pitot head covers. Engine air intake bungs were not available for the crew to fit to the aircraft. The aircraft had not been de-iced.

The overnight weather conditions comprised a sustained strong north easterly wind, with a maximum recorded speed of 43 kt. Light or moderate snow fall occurred until 0952 hrs. There was no further snowfall after this time and by 1500hrs the weather conditions were:- Surface wind 030deg/15kts, visibility 10km, scattered cloud at 4,000 feet, broken cloud at 7,000 feet, temperature +2degC and dew point -3degC.

The pilots that were aboard the aircraft on the accident flight reported for duty at Glasgow Airport at 0810 hrs on 27 February 2001, for a planned flight to Islay departing at 0910 hrs. As a result of adverse weather conditions, that flight was cancelled and they were rescheduled to carry out the single sector flight delayed from 0040 hrs from Edinburgh to Belfast. Surface travel from Glasgow to Edinburgh was impossible due to adverse road conditions, so as soon as Edinburgh Airport re-opened

at 1130 hrs, the crew were positioned to Edinburgh as passengers on another company aircraft.

On their arrival at Edinburgh the crew went out to G-BNMT. There was no record of their activities there, but at 1503 hrs they requested clearance to start engines. Start clearance was obtained and then, at 1512 hrs, the crew advised Air Traffic Control (ATC) they were shutting down due to a technical problem. During this period the right engine had been observed to start and stop several times.

The crew returned to the terminal and contacted their company at Glasgow to ask for engineering assistance. They indicated that the right engine driven generator would not come on line. A company avionics/instrument engineer was in transit through Edinburgh Airport. He was contacted by the Line Maintenance Controller at Glasgow and asked to assist the crew. He carried out trouble shooting with advice from the Maintenance Controller. This action involved transposing the connections to the Generator Control Protection Units and required the crew to start and run both engines for approximately 15 minutes. The connections were then returned to their original positions. Thereafter, the crew carried out a second engine run of similar duration, again at the engineer's request. The original fault could not be reproduced. A ground power unit was not available, so the engine starts were carried out using aircraft battery power.

The commander then requested that the engineer check the engine oil contents. He also asked him to confirm that the upper surfaces of the aircraft were free from ice and snow. The engineer noted that the oil levels were such that replenishment was not required and the only airframe contamination was a small slush deposit on the windscreen. This was cleared by the engineer. Both engines were then restarted after which the aircraft remained on stand with the engines running for about another 20 minutes.

At 1710 hrs the first officer requested taxi clearance. After a short delay the aircraft powered back off stand and taxied to depart from Runway 06. While taxiing, as part of the first flight of the day engine checks, the crew carried out an Autofeather test, during which the automatic operation of the engine anti-icing vanes to fully deploy and return was also observed. The commander briefed the first officer that after takeoff they would recycle the landing gear once to ensure that it was free of snow and slush.

The aircraft was cleared for a Talla (TLA) 5D Standard Instrument Departure (SID). The commander was the designated handling pilot. He carried out a normal takeoff which was followed by the landing gear being cycled up and down once, before its final retraction. A reduction to climb power was made at 1,200 feet amsl. The commander then called for the after take-off checks to be completed. When the 'Stall Warning Heaters' item was reached, he requested that the first officer put on all the anti-icing systems. At this time the aircraft was handed over from Edinburgh Tower to Scottish ATCC (ScATCC), which was acknowledged by the first officer. With the aircraft at 2,200 feet amsl, the first officer then selected the anti-icing systems 'ON' while the commander selected the new radio frequency. Four seconds after the selection of each anti-icing vane switch, the torque on the corresponding engine reduced rapidly to zero. The commander quickly observed that the aircraft had suffered a double engine failure and advised the first officer. The first officer broadcast a MAYDAY call as the initial call on the ScATCC frequency as follows:- "MAYDAY MAYDAY MAYDAY THIS IS LOGAN SIX SEVEN ZERO ALPHA WE'VE HAD A DOUBLE ENGINE FAILURE REPEAT A DOUBLE ENGINE FAILURE".

The ScATCC controller responded to the MAYDAY call passing the crew position and heading information. The first officer asked the controller to repeat the message but this transmission from the aircraft was truncated. The commander continued to fly

the aircraft, initiating a descent while allowing the airspeed to reduce to 110kt and turning the aircraft to the right towards the coastline. The rate of descent stabilised at 2,800 feet per minute and he realised that the aircraft would have to be ditched in the water. The first officer attempted to make a further call to ScATCC advising that the aircraft was ditching, but this was not received. As the aircraft descended close to the water surface, the commander gradually increased the pitch attitude of the aircraft and correspondingly reduced the speed. The aircraft impacted the water in a 6.8deg nose up attitude at an airspeed of 86kt on a heading of 109degM. It came to rest on the sea bottom in a nose down attitude with the forward section of the fuselage submerged, 65 metres offshore, in a water depth of about six metres.

RECOMMENDATION 2002-39

It is recommended that the CAA publish information to educate flight crews as to the potential hazards associated with ice, snow of slush accretion in areas of the engine intakes which are not externally visible and highlight the necessity to conduct appropriate detailed inspections when such conditions are suspected. Such information should then be promulgated widely through the industry.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

The CAA will, by means of a Flight Operations Department Communication (FODCOM), publish information to educate flight crews as to the potential hazards associated with ice, snow or slush accretion in areas of engine intakes that are not externally visible. The FODCOM will also highlight the necessity to follow basic airmanship principles and ensure that, where there is any possibility of ice accretion or snow build up on the aircraft, that inspection of the engine intakes takes place as part of the pre-flight inspection. A recommendation that Operators ensure that this information is brought to the attention of all their flight crew will be included. This FODCOM will be published as part of the CAA's 'Winter Awareness' initiative in October 2003.

CAA Action

The CAA published FODCOM 23/2003 in October 2003 as part of its 'Winter Awareness' programme. This FODCOM covered the areas highlighted in the CAA Response to the Safety Recommendation and recommended that operators should highlight all winter operation issues both to flight crew and ground personnel as necessary.

B757/F15E	5nm West of Daventry	22 Nov 2000	Incident

References: Bulletin 5/2001 dated 10 May 2001

FACTOR F12/2001 dated 15 Jun 2001

SYNOPSIS

The Boeing 757 (B757) was scheduled for a turnaround flight from Birmingham Airport to Paphos, Cyprus. The aircraft departed Birmingham in a southerly direction

on a Cowley 1E departure and entered cloud in the climb between 3,000 and 4,000 feet. Not long after becoming airborne the departure controller cancelled the Standard Instrument Departure procedure and placed the aircraft under radar control. At FL60 control was handed from Birmingham Departures to Midland Terminal Control (MTC).

Immediately upon contact with MTC the B757 was cleared to climb to FL90 and shortly thereafter given a radar heading of 140deg. About one minute after initial contact with MTC the B757 was re-cleared to FL100. The controller acknowledged the B757 crew report on reaching FL100 and advised "MILITARY TRAFFIC IN YOUR ELEVEN O'CLOCK POSITION CROSSING LEFT TO RIGHT, ONE THOUSAND FEET ABOVE". The B757 crew acknowledged the advice and although the aircraft remained in cloud, they immediately began a visual search for the traffic, which their Traffic Alert and Collision Avoidance System (TCAS) was indicating one thousand feet above. The cloud proved to be too thick for visual contact with the military traffic, but the crew remained looking out as the TCAS contact passed clear down their right side.

Shortly after the traffic passed clear and, whilst still in cloud, the commander and the first officer suddenly became aware of an aircraft in their left 'half-past ten' position at very close range and at about the same level. The aircraft, which they were immediately able to identify as a twin-tailed fighter and later as an F15, passed rapidly across the B757's nose and disappeared down their right side. The B757 crew heard the noise of the F15's engines and their aircraft encountered its wake turbulence. There was no time for the B757 crew to take avoiding action. Subsequent analysis of radar data indicated that at the closest point of approach the two aircraft were separated by less than the minimum range detectable by the radar which is 0.0625 of a nautical mile. As far as is known, none of the cabin crew or passengers saw the F15, but the cabin crew felt the disturbance as the B757 flew through the F15's wake. The flight deck crew filed an AIRPROX report with ATC and continued to Cyprus.

The two F15s were two-seat E models, and the flight was planned as training for the front seat occupant of the No 2 aircraft. The pilot under training was in current flying practice on the single-seat F15C, but there are several significant differences between the F15C and the F15E, and the F15E instructor pilot was therefore in the rear seat. The plan was to carry out tactical low flying training in Wales followed by weapons delivery practice on one of the air-ground ranges in the Wash before returning to base at Lakenheath for circuit training. The route to Wales was to be flown at medium altitude crossing controlled airspace through the Daventry Radar Corridor and descending to low level once clear of controlled airspace to the west.

The two aircraft took off from Lakenheath approximately 20 seconds apart and took up a 'trail' formation with the No 2 aircraft about two miles behind the leader. In accordance with standard procedures for this type of formation only the lead aircraft was transmitting a Secondary Surveillance Radar (SSR) code (Squawk). The aircraft climbed through cloud, with the No 2 aircraft maintaining position by use of radar, and levelled at FL100 in VMC. Part of the briefed flight profile included an aircraft systems check for both aircraft to the carried out in VMC. The procedures for the checks involved a change of lead aircraft. The formation No 2 completed his checks and began to close on the lead aircraft to take the lead position, but the formation entered IMC, and the No 2 aircraft aborted the change of lead and dropped back to about a 1.5 mile trail. In the attempt to regain VMC the lead aircraft requested from ATC a climb to FL110.

Not long after the F15s became airborne, ATC control was handed to London Military Radar (in particular the London Joint Area Organisation Central (LJAO) of London Military Radar) by Lakenheath Departure Control. LJAO cleared the F15s to cross the Daventry Radar Corridor at FL100, and the FL15's request to climb to FL110 was

made to LJAO shortly after the aircraft entered the Daventry Radar Corridor. The controller's initial response was for the flight to maintain FL100, but she contacted the MTC controller by landline to co-ordinate a climb. The MTC controller agreed the higher level and LJAO later cleared the F15 flight to climb to FL110.

The leader immediately began a climb to FL110, but the No 2 aircraft did not hear the ATC clearance and maintained FL100. The two pilots of the No 2 aircraft later noticed that their radar showed the leader to be above their level, and they began a discussion of the indication. At about this time the front seat occupant was vaguely aware of a 'shadow' flashing rapidly down his right side. Shortly thereafter the LJAO controller asked the flight to confirm that both aircraft were level at FL110, and at this point No 2 climbed rapidly to FL110. Some time later the F15s were advised that the B757 had filed an airborne AIRPROX report, and only then did the front seat occupant of the No 2 aircraft associate the "shadow" with the possible presence of another aircraft. The rear seat occupant saw nothing of the B757.

RECOMMENDATION 2000-71

In order for STCA and TCAS to alert pilots and controllers to the possibility of mid-air collision it is essential that all conflicting aircraft should be transmitting SSR information. Transponding aircraft in formation will trigger unnecessary STCAs due to the proximity of their SSR returns, and specific procedures are needed to overcome this. Since this AIRPROX could have been averted if both aircraft in the formation had been 'squawking', it is recommended that the CAA and NATS should, without delay, implement procedures by which the safety assurance based on the use of SSRS is established for aircraft operating in formation

Status - Fully Accepted - Closed

CAA Response

The Civil Aviation Authority (CAA) accepts this Recommendation. Following discussions between the CAA, the Ministry of Defence (MOD) and the National Air Traffic Services Ltd (NATS), new military ATC procedures for formations of military aircraft crossing controlled airspace have been agreed and introduced, subject to the constraints imposed by the limitations inherent in current ground based radar equipment. These procedures will reduce the risk of elements of military formations not being at their assigned levels, and will complement the protection given to all aircraft by ACAS and STCA. Additionally, the MOD and NATS have independently but co-operatively commissioned research to consider whether further enhancement of the protection can be obtained within those constraints to allow all elements of a formation to be allocated individual SSR codes and hence full protection provided by ACAS/STCA.

NOTE: This Response to Recommendation 2000-71 was returned to the AAIB on 13th February 2001.

CAA Action

At the September 2002 meeting, MOD staff were tasked with trialing a new formation procedure. The MOD subsequently decided that a full safety analysis should precede the trial and this process revealed several points of concern which, collectively, they considered posed a significant risk to flight safety. Consequently it was proposed that military formations in CAS should continue to adhere to the extant procedures which were introduced, following the incident in November 2000. These have been refined and continue to be rigorously applied by controllers and pilots alike. Amongst other things, it was agreed at the September meeting, that military

controllers would normally take responsibility for formations flying in CAS. In addition, once the necessary agreement has been finalised between the MOD and NATS, safety in CAS will be enhanced by the removal of GAT (General Air Traffic) formation flights from UK CAS. They will now route as OAT (Operational Air Traffic), under military control, to the national boundary, keeping transits of CAS to a minimum. The solution, envisaged by the AAIB in issuing Recommendation 2000-71, cannot be achieved at present, however, the options for introducing more squawking elements in formations flying through CAS, for example the introduction of a 'trail formation' procedure, have been carefully considered and it has been concluded that they would pose significant safety risks, which could result in a net decrease in safety. Pending the introduction of a technological solution in the longer term, SRG is content that the safety assurance for aircraft operating in formation, based on the current use of SSR together with robust application of the procedures referred to above, will adequately address AAIB Recommendation 2000-71.

Further consideration of the issue, by SRG during 2003/04, has confirmed the difficulty in satisfying the detail of AAIB recommendation 2000-71 using current technology. Technical investigations suggest that it is not possible to modify many current types of equipment to display information on all aircraft in formation without adversely affecting the safety of the service provided to other aircraft.

Further experience gained in using operational procedures, introduced following original incident, including subsequent refinements, indicates that the risks associated with formation flights are being satisfactorily managed by the use of these procedures. Additional arrangements between MOD and NATS are now finalised and, since 19 February 2004, military formation flights may only operate as OAT within CAS.

The CAA believes that these procedures achieve the principal intent of the original recommendations and that further action is not practicable at this time.

BAe146-200	On descent to Birmingham Airport	5 Nov 2000	Incident

References: AAR 1/2004 dated 20 Feb 2004

FACTOR F12/2004 dated 20 Feb 2004

SYNOPSIS (From AAIB Report)

The incident occurred whilst on approach to Birmingham Airport. Following reports of unusual "oily petrol" smells in the cabin, the first officer, after visiting the cabin started to feel nauseous. The first officer's condition began to decline to an extent that he had difficulty in concentrating. The commander took over the handling duties and the first officer went onto 100% oxygen, and took no further part in the flight. The commander also felt "light headed" and had difficulty in judging height during the ensuing approach and landing. Following a successful landing, the commander was able to taxi the aircraft and began to feel better. The first officer and commander were taken to hospital and examined, but no abnormalities were found.

An engineering investigation revealed the presence of an oil leak from the auxiliary power unit (APU) generator cooling fan seal, which allowed engine turbine oil to enter the APU air inlet plenum chamber and, subsequently, fumes to enter the cabin via the Environmental Control System (ECS).

During the investigation, further incidents involving other aircraft types were reported. Therefore, the scope of the investigation was widened to include these other incidents.

The following causal factors were concluded during the investigation.

1 There is circumstantial evidence to suggest that the flight crew on G-JEAK were affected by contamination of the air supply, as a result of oil leakage from the APU generator cooling fan seal into the APU air stream, and into the ECS system ducting. This contamination allowed fumes to develop, a proportion of which entered the cabin and cockpit air supply.

2 Subsequent research and tests suggests that the crew of G-JEAK, and the crew of other aircraft which have suffered similar incidents, may have been exposed to turbine engine oil derived fumes in the cabin/cockpit air supply, originating from either an engine or APU, which had irritant, rather than a toxic effect.

Five safety recommendations were made during the course of this investigation.

NOTE: The five Safety Recommendations made by the AAIB during the course of the investigation were submitted to the CAA on 8 May 2001. The CAA took safety action at that time and formally submitted its Responses to the Safety Recommendations to the AAIB on 1 August 2001. The AAIB incorporated those Responses into the subject Report.

RECOMMENDATION 2001-04

It is recommended that the Civil Aviation Authority, as the Primary Certification Authority for the BAe146 type, takes early action in conjunction with BAE Systems to require that operators of this type should ensure that the standards of maintenance and modification of the aircraft's air conditioning system, engines and APU are such that air supply contamination by oil from the engines and/or APU, or by any other potentially hazardous substance, is avoided.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation. In November 2000 BAE Systems, the Type Certificate holder, issued Service Information Letter 21-45 that describes modifications to the BAe 146 air conditioning system, engines and APU, which define an improved standard of aircraft with respect to cabin air quality. On 21 March 2001 the CAA declared as mandatory, BAE Systems Service Bulletin 21-150, that reduced the risk of release of oil and/or oil breakdown products into the occupied areas of the aircraft by introducing specific and periodic inspections for oil leakage, and appropriate corrective actions. On 22 October 2002, the CAA declared as mandatory BAE Systems Service Bulletin 21-156. This required that certain ducts in the cabin/flight deck air distribution system be inspected and replaced if contaminated beyond a defined limit. These ducts are surrounded by sound attenuating material that was observed on some older aircraft to be heavily contaminated. Such contamination was predominantly composed of engine oil and its breakdown products (as subsequently confirmed by the research described in the CAA Response to AAIB Recommendation 2001-06) and thus maintenance of an acceptable air supply demanded their removal. On 30 April 2003 the CAA declared as mandatory BAE Systems Service Bulletin 49-036-36019E. This required, if not already carried out, a modified APU inlet seal be installed. The standard of seal fitted to many aircraft allowed leaking APU oil and/or exhaust fumes/mist present in the APU bay to be ingested into the APU air intake. The modified seal ensured that only outside air

could be drawn into the APU. These actions have greatly reduced the likelihood of hazardous contamination of the cabin air supply by the engines and/or APU. In addition the engine manufacturer has developed further modifications to improve engine internal oil seals. These modifications are presently subject to in-service trials, which have produced very promising results to date. Full implementation of these engine modifications is expected during 2004. There has been no incident reported to the CAA, involving adverse effects to BAE 146 flight crew, due to oil contamination of ECS air, since June 2002.

RECOMMENDATION 2001-06

It is recommended that the Civil Aviation Authority, as the Primary Certification Authority for the BAe146 type, should as a matter of urgency sponsor a thorough programme of research to establish the full range of contaminant compounds that can enter the flight deck and cabin air supplies of the BAe146 aircraft when engine or APU lubrication oils leak into the environmental control system.

Status - Partially Accepted - Closed

CAA Response

The CAA partially accepts this Recommendation. In 2001-2003 the CAA sponsored a programme of research into the possible contaminants that can arise in aircraft air conditioning systems as a by-product of pyrolised engine oil. However, this research was not specifically associated with fumes events on the BAe 146 which was the responsibility of BAE Systems and Honeywell (the Type Certificate (TC) holders for the aircraft, engine and APU), to technically investigate. The CAA programme was generic research with the intent of understanding what contaminants could arise in aircraft of any type and thus be best placed to judge the TC holder's proposed actions in the case of the BAE146, and to determine any similar needs for other aircraft types. The research was designed to be independent yet complementary to other research activities being undertaken by industry. The products of pyrolised engine oil and contaminants accumulated in aircraft ducting material were identified and subjected to a toxicological review by an organisation with expertise in toxicology. This review was completed in 2003 and concluded that no single component, or set of components, could be identified which, at conceivable concentrations, would definitely cause the symptoms reported in cabin air quality incidents. However, the presence of short chain organic acids that could cause irritant effects was identified. The effects of irritancy vary greatly between individuals and this variation in effect is a feature in the majority of recorded events. Therefore, it was concluded that the most likely cause of safety related problems was that pilots were experiencing the effects of 'irritancy' from these volatile organic compounds. This research evidence supports the view that the actions already taken to address the known oil leakage problems were entirely appropriate and no further actions are necessary for other aircraft types. There has been no incident reported to the CAA, involving adverse effects to BAE 146 flight crew due to oil contamination of ECS air, since June 2002.

RECOMMENDATION 2001-07

It is recommended that the Civil Aviation Authority reviews the types of contaminant compounds identified from the research programme recommended at 2001-6 above, to assess whether any of these compounds could induce adverse physiological and/ or neurological effects in the occupants of the BAe146 or other aircraft types.

Status - Partially Accepted - Closed

CAA Response

The CAA partially accepts this Recommendation. The determination of whether contaminant compounds from engine, APU or lubrication oils could cause adverse effects on aircraft occupants, demands a specialist knowledge of human toxicology. Such expertise is not available within the CAA. Therefore, rather than undertake this review itself, the CAA commissioned an organisation with expertise in toxicology to perform the recommended review on its behalf. Specifically, the research programme sponsored by CAA, described in the response to Recommendation 2001-6, included a toxicological review of the compounds identified.

RECOMMENDATION 2001-47

It is recommended that the Civil Aviation Authority should consider issuing additional advice to the crews of jet transport aircraft on the best operational practice when there is a suspicion of flight deck or cabin air contamination. The advice should include the necessity for all flight crew to use oxygen masks selected to 100% and the importance of cabin crew taking an active part in monitoring the flight crew in such circumstances.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation. The CAA gave consideration to expanding the current advice available on dealing with flight deck or cabin air contamination, including the necessity for flight crew to use oxygen masks selected to 100% and the importance of cabin crew taking an active part in monitoring the flight crew. The CAA decided that this was necessary and Flight Operations Department Communication (FODCOM) 14/2001, dated 24 August 2001, was published. This FODCOM contained advice on these matters and on the necessity to ensure that incapacitation procedures are regularly practised during recurrent training.

Following further reported instances of flight deck or cabin air contamination, the CAA decided that it would be prudent to remind both flight crew and operators of the current guidance contained in FODCOMs 17/2000 and 14/2001. The guidance was updated and Flight Operations Department Communication (FODCOM) 21/2002, dated 29 August 2002, was published.

Fokker F27 Mark 50	Coventry Airport	1 Jul 2000	Accident

References: Bulletin 4/2001 dated 5 Apr 2001

FACTOR F27/2001 dated 2 May 2001

SYNOPSIS

The aircraft was returning to Coventry with 400 kg of ballast after a night mail flight to Belfast. The ILS approach was flown slightly steep and 15kt above target speed and the aircraft landed 300 metres beyond the aim point at Vref plus 19kt. The commander inadvertently failed to select propellers to ground fine pitch and the excessive speed prevented the aircraft weight from transferring to the mainwheels. As a result the braking effectiveness was poor and the aircraft departed the runway

at approximately 60kt, impacting the airfield perimeter fence and coming to rest with the nosewheel collapsed half way across a public road.

The investigation determined that the following causal factors contributed to the accident:

1 The landing was continued even though the airspeed was above the calculated threshold speed and touchdown was beyond the normal point.

2 Ground fine pitch was not selected at the normal place in the landing roll, although the commander thought that he had done so.

3 The AFM Volume 1 target threshold speed (Vthr) exceeded the certified threshold speed (Vat) by 8 kt.

4 The flaps were not raised after touchdown which was not in accordance with the instruction contained in the Aircraft Flight Manual Volume 2.

RECOMMENDATION 2000-53

The CAA should require the manufacturer (Fokker Services BV) to correct the F27 Aircraft Flight Manual (AFM) Volume 1 speeds in accordance with the certified data in AFM Volume 2.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

The CAA has initiated an action with the manufacturer (Fokker Services BV) to correct the F27 Aircraft Flight Manual (AFM) Volume 1 speeds in accordance with the certified data in AFM Volume 2.

It is intended that this is accomplished by 30 September 2001.

CAA Action

Fokker Services B.V. has deleted the take-off speeds presented in Volume 1 of the Approved Flight Manual (AFM) thereby removing the discrepancies with the certified data in Volume 2. The CAA has accepted revised tabulated landing threshold speeds for flaps 40º in Volume 1 of the AFM which have been corrected in accordance with the certified performance data in Volume 2 of the AFM.

CAA has resolved its concerns with Fokker Services B.V over the tabulated landing threshold data presented in Volume 1 for the flaps 26·5º configuration. With regard to data for the flaps 0º configuration, Fokker Services B.V. has determined that the tabulated landing threshold speeds in Volume 1 of the AFM are correct but that the certified data in Volume 2 needs to be amended. Fokker Services B.V. intend to publish revised and approved certified data by 31 August 2004.

Shorts SD3-60, Tornado F3	26nm North Newcastle Airport	20 Mar 2000	Incident

References: Bulletin 2/2001 dated 20 Feb 2001

FACTOR F20/2001 dated 10 Apr 2001

SYNOPSIS

A Shorts SD3-60 aircraft, G-OLAH, was operating a scheduled service from Aberdeen to Newcastle. The direct track between the two aerodrome control zones followed by the aircraft lay within Class G airspace. At the same time a formation of three RAF Tornado F3 aircraft were engaged in a Tactical Leadership Training medium scale night exercise planned by the Air Warfare Centre and notified to civilian operators by NOTAM. As the SD3-60 descended to FL50 into Newcastle, under a Radar Advisory Service (RAS), one of the Tornados was manoeuvring at high speed and passed closely in front of the SD3-60 at the same level. The Newcastle radar controller, who observed the military traffic on his radar, provided the SD3-60 pilot with avoiding headings, which were followed. Despite this, and because the Tornado was manoeuvring, both aircraft conflicted, with the closest point of approach estimated to be some 300ft horizontally and 100ft vertically. The Tornado navigator detected the confliction on his radar moments before and warned his pilot of the danger. Neither he nor the pilot saw the aircraft until it had passed behind them and too late to take any avoiding action. The pilot of the SD3-60 did not see the Tornado until it passed in front of his aircraft.

RECOMMENDATION 2000-58

The CAA, in conjunction with the Director of Airspace Policy, should assess whether there is adequate provision of regulated airspace for scheduled air transport operations to and from regional airports that are not directly linked by airways or advisory routes.

Status - Partially Accepted - Open

CAA Response

The CAA partially accepts this Recommendation.

The safety assessment referred to in the response to Recommendation 2000-57 indicates that target levels of safety are met where Radar Advisory and Radar Information Services are utilised. However, a further consideration of the adequacy of the airspace in the Newcastle area will be conducted following discussions with MOD. It is expected that this further work will be concluded by April 2002.

CAA Action

The CAA's annual review of Airprox events established that the number of civil air transport (CAT)/ military Airprox events in class F and G airspace during 2002 had reduced, as had the rate of risk bearing occurrences. One category A (actual risk of collision) incident occurred following the unmonitored penetration of Instrument Meteorological Conditions (IMC) by a military aircraft, but the MoD subsequently made a significant change to its flying policy to prevent a recurrence. Overall the risk of collision for CAT operating outside controlled airspace remains within ICAO target levels of safety.

Nevertheless, revised airspace arrangements for the North Sea Area, that included controlled airspace access to the National Airways System from Newcastle International Airport, were introduced during March 2003. Further augmentation of controlled airspace connecting Newcastle and Aberdeen Airports with each other and the Scottish TMA is under discussion for adoption in Autumn 2004, the introduction of which will further enhance safety levels for CAT operating to and from these regional airports.

The CAA will continue to monitor the incidents to ensure that there is sufficient controlled airspace to meet the needs of scheduled air transport movements whilst having regard for the needs of other airspace users.

Fokker F27-600	**Final Approach to Guernsey Airport**	**12 Jan 1999**	**Accident**

References: AAR 2/2000 dated 4 Apr 2000

FACTOR F9/2000 dated 4 Apr 2000

SYNOPSIS (From AAIB Report)

The accident occurred when control of the cargo aircraft, carrying three tonnes of newspapers, was lost during the final stages of an approach to Guernsey Airport. Moments after the wing flaps were lowered to their fully down position, the nose of the aircraft rose and the crew were unable to prevent it rising further. The nose continued to rise until the aircraft's pitch attitude was near vertical. Although the crew applied nose down pitch trim and high engine power, the aircraft lost flying speed, stalled and entered an incipient spin. It descended in a shallow nose down pitch attitude with little forward speed and crashed at the rear of a private house, striking the house with its port wing. Both the house and the aircraft caught fire. The two pilots were killed but the sole occupant of the house escaped without physical injury.

The AAIB investigation identified the following causal factors:

1 The aircraft was operated outside the load and balance limitations.

2 Loading distribution errors went undetected because the load sheet signatories did not reconcile the cargo distribution in the aircraft with the load and balance sheet.

3 The crew received insufficient formal training in load management.

RECOMMENDATION 99-65

It is recommended that the CAA require operators to reassess the relevant equipment and engine fit on all UK registered aircraft subject to the requirements of the Air Navigation Order, Schedule 4, Scale P and require that, where now practicable, those aircraft are modified to enable the recording of pitch attitude, roll attitude and engine thrust.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

A Letter to Operators (LTO) will be sent to owners of affected aircraft which will request them to re-assess the Flight Data Recorder installation in their aircraft against the requirements of the Air Navigation (No 2) Order 1995, Schedule 4, Scale P. In addition, the owners of the aircraft will be asked to provide confirmation to the CAA of the status of the Flight Data Recorder System on their aircraft concerning the recording or non-recording of pitch attitude, roll attitude and engine thrust parameters. The CAA will assess these responses and require that where now practicable, those aircraft are modified to enable the recording of pitch attitude, roll attitude and engine thrust.

The LTO will be despatched by 31 March 2000.

CAA Action

As a result of the most recent assessments the affected operators have assured the CAA that all relevant UK registered aircraft that are still operating meet the requirements of the Air Navigation Order, Schedule 4, Scale P and that, where now practicable, those aircraft do record pitch attitude, roll attitude and engine thrust. However, to ensure the compliance of any future imported aircraft, and any aircraft brought out of storage, the CAA has written a further Letter to Operators reminding them of the continuing need to comply with the requirements of the Air Navigation Order, Schedule 4, Scale P. That further Letter to Operators, Number 2510, was dispatched on 24 March 2004.

HS748-Series 2B	London Stansted Airport	30 Mar 1998	Accident

References: AAR 3/2001 dated 7 Dec 2001

FACTOR F45/2001 dated 7 Dec 2001

SYNOPSIS (From AAIB Report)

The aircraft was scheduled to depart from London (Stansted) Airport at 2230 hours with a one hour flight to Leeds Bradford Airport. A baggage problem delayed the flight and the aircraft eventually taxied at 2323 hours, to holding point 'HP' for Runway 23. Takeoff clearance was given at 2329 hours. The First Officer was the handling pilot and the takeoff was to be made with full dry power; the water methanol system was selected to standby.

(The following sequence of events was established from the flight recorders). The aircraft was cleared to takeoff and the First Officer called for full dry power. As engine power stabilised, the First Officer called that the warning 'lights were out and the emergency panel was clear'. As the aircraft accelerated, the Commander announced 'sixty knots' and relinquished steering control to the First Officer who acknowledged and confirmed, 'full dry we have, just slightly low on the right'. No significant variation in engine rpm between the two engines could be detected from the Flight Data Recorder (FDR) recording. The aircraft accelerated through 80kt and, for a period of two seconds, the sound of the nosewheel running over the runway centreline lighting was recorded on the area microphone channel of the Cockpit Voice Recorder (CVR). At an airspeed of 111kt the Commander called 'vee one, rotate', the First Officer moved the control column rearwards and the aircraft became airborne.

Less than five seconds after the 'rotate' call, at an airspeed of 115kt and a height of between 30ft and 100ft agl, the sound of a sharp report followed by an engine run-down was recorded on the CVR. The aircraft yawed 11deg to the right of the runway heading. As the crew asked each other what the noise had been, loud shouting could be heard from the passenger cabin. The First Officer said, as he corrected the yaw, 'something's gone' and the Commander then stated that he had taken control of the aircraft. Within eight seconds of the event the First Officer stated that an engine had stopped. Simultaneously, the senior cabin attendant, using the Public Address (PA) system, told the passengers to sit down and then advised the flight deck crew via the interphone that the right engine was on fire. Engine power was reduced and the aircraft yawed 14.5deg to the left of runway heading. Four seconds later, the sound of the engine fire warning bell was recorded. Without using the PA system, the senior cabin attendant told the passengers to 'stay in your seats and make sure your seatbelts are all fastened'.

The aircraft was in the air for a total period of 27 seconds before the noise of touchdown was recorded. The Commander called for brakes, to which the First Officer replied 'coming on'. The First Officer then suggested that he 'fire' the right engine fire bottle but the Commander asked him to call the fire brigade, which he then did continuously. The Flight Fine Pitch Stops (FFPS) warning horn activated 5 seconds after touchdown, 4 seconds before the aircraft ran off the end of the runway at 62kt. The warning sounded for the remainder of the audio recording.

After the aircraft left the runway, the CVR cockpit area microphone picked up the noises of the aircraft rolling over uneven ground, the point at which the perimeter track was crossed and the final collapse of the nose landing gear. Recording on both the FDR and CVR terminated due to the removal of electrical power 7.1 seconds after the aircraft departed the paved surface. When the aircraft came to a halt, the First Officer left his seat immediately to assist with the evacuation of the aircraft. The Commander carried out a limited shutdown. He then satisfied himself that the cabin was clear before leaving the aircraft. All passengers and crew evacuated the aircraft without serious injury.

RECOMMENDATION 2001-22

It is recommended that the CAA review the adequacy of their current procedures to ensure that aircraft being entered into the UK Register have DFDR installations that satisfy the requirements of applicable performance specifications.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

The CAA will review the adequacy of its current procedures to ensure that aircraft being entered into the UK Register have DFDR installations that satisfy the requirements of applicable performance specifications. Target date: 31 March 2002.

CAA Action

The CAA published Civil Aviation Publication (CAP) 731 – Approval, Operational Serviceability and Readout of Flight Data Recorder Systems - giving 'best practice' information on the handling of Flight Data Recorder issues on 28 May 2004. This CAP covers all aspects from Type Certification to Certificate of Airworthiness issues and ongoing system serviceability assessment. The CAP underwent consultation with two Accident Investigation Agencies, representatives of industry and other CAA Departments.

RECOMMENDATION 2001-23

It is recommended that the CAA provide adequate guidance material on the subject DFDR installations to all personnel responsible for the surveying and regulation of such installations.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

The CAA will review the existing internal guidance material on DFDR installations as promulgated in September 2000. If, in the light of the review, changes are made to the material then it will be reissued to all personnel responsible for the surveying and regulation of such installations. Target date: 31 March 2002.

CAA Action

The CAA published Civil Aviation Publication (CAP) 731 – Approval, Operational Serviceability and Readout of Flight Data Recorder Systems - giving 'best practice' information on the handling of Flight Data Recorder issues on 28 May 2004. This CAP covers all aspects from Type Certification to Certificate of Airworthiness issues and ongoing system serviceability assessment. The CAP underwent consultation with two Accident Investigation Agencies, representatives of industry and other CAA Departments.

RECOMMENDATION 2001-24

It is recommended that the CAA, in conjunction with operators, review the DFDR installation of aircraft on the UK Register which are fitted with the type PV1584 DFDR to determine compliance with the applicable minimum performance standards.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

The CAA, in conjunction with operators, will review the DFDR installation of aircraft on the UK register which are fitted with the type PV1584 DFDR to determine compliance with the applicable minimum performance standards. Target date: 31 March 2002.

CAA Action

Letter to Operators (LTO) number 2017 has been sent to identify operators of aircraft utilising Flight Data Recorders under the ANO scale P. The feedback from the LTO was analysed, compliance with the applicable minimum performance standards determined, and the results used during the preparation of the 'best practice' CAP. The CAA published Civil Aviation Publication (CAP) 731 – Approval, Operational Serviceability and Readout of Flight Data Recorder Systems - giving 'best practice' information on the handling of Flight Data Recorder issues on 28 May 2004. This CAP covers all aspects from Type Certification to Certificate of Airworthiness issues and ongoing system serviceability assessment. The CAP underwent consultation with two Accident Investigation Agencies, representatives of industry and other CAA Departments.

RECOMMENDATION 2001-25

It is recommended that the CAA should require that, during a mandatory DFDR installation calibration, a range of expected data values should be stipulated for every point of a transducer's travel that is tested. These range values should be stated in either the calibration test procedure or the appropriate test results sheet.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

The CAA will require that, during a mandatory DFDR installation calibration, a range of expected data values must be stipulated for every point of a transducer's travel that is tested. These range values must be stated in either the calibration test procedure or the appropriate test results sheet. Target date: 31 March 2002.

CAA Action

The CAA published Civil Aviation Publication (CAP) 731 – Approval, Operational Serviceability and Readout of Flight Data Recorder Systems - giving 'best practice' information on the handling of Flight Data Recorder issues on 28 May 2004. This CAP covers all aspects from Type Certification to Certificate of Airworthiness issues and ongoing system serviceability assessment. The CAP underwent consultation with two Accident Investigation Agencies, representatives of industry and other CAA Departments.

RECOMMENDATION 2001-26

It is recommended that the CAA should require that, during a mandatory readout of a DFDR, a section of the readout data should be examined to determine that all parameters have been recorded in accordance with the repetition rate specified in the data frame layout and conversion document pertinent to the DFDR installation being assessed.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

The CAA will require that, during a mandatory readout of a DFDR, a section of the read out data must be examined to determine that all parameters have been recorded in accordance with the repetition rate specified in the data frame layout and conversion document pertinent to the DFDR installation being assessed. Target date: 31 March 2002.

CAA Action

The CAA published Civil Aviation Publication (CAP) 731 - Approval, Operational Serviceability and Readout of Flight Data Recorder Systems - giving 'best practice' information on the handling of Flight Data Recorder issues on 28 May 2004. This CAP covers all aspects from Type Certification to Certificate of Airworthiness issues and ongoing system serviceability assessment. The CAP underwent consultation with two Accident Investigation Agencies, representatives of industry and other CAA Departments.

HS748 Series 2A	Liverpool Airport	9 Feb 1998	Accident

References: Bulletin 7/99 dated 10 Dec 1999

FACTOR F23/99 dated 1 Dec 1999

SYNOPSIS

The left wheel of the nose landing gear detached on take off. This was not apparent to the crew until after they had landed and taxied to the stand. Examination revealed extensive fretting and hammering type damage to the components, including thread damage sufficient to allow the axle nut to detach from the axle. The evidence indicated that this had resulted from the use of an incorrect procedure for tightening the axle nut. Similar failures attributed to this cause had previously occurred to HS748 aircraft on a number of occasions and the Nose Landing Gear manufacturer had issued two Service Letters, the first some time before 1982, informing operators of the correct procedure and warning of the consequences of failing to follow it. Damage to G-BPDA's axle nut and bearing adjustment nut was indicative of attempts to rotate them without using the specified tools. A Nose Landing Gear manufacturer's Service Bulletin in 1990 had recommended a special check of the axle assembly for correct adjustment and axle nut integrity but this had not been mandated by the CAA and had not been carried out on G-BPDA.

A number of features of the maintenance background, including an attempt five flights prior to the accident to adjust and tighten the axle assembly without the correct tools and without the work having been entered in the maintenance records, suggested a maintenance standard unlikely to achieve a satisfactory level of airworthiness.

RECOMMENDATION 99-25

The CAA define limits for the scope of line and base maintenance operations and take measures aimed at ensuring that operators and maintainers are fully aware of these limits.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

The CAA submitted proposals to the Joint Aviation Authorities (JAA) on 2 October 1998 to amend the definitions provided by the Joint Aviation Requirements for Approved Maintenance Organisations (JAR-145). The proposals, if adopted by the JAA, are intended to clearly define the scope together with associated limitations of both line and base maintenance, in order that operators and maintainers are fully aware of these limits. The CAA will continue to monitor the progress of these proposals, and if not adopted before February 2000 by the JAA, will further review our position.

CAA Action

The CAA has given consideration to this matter and decided that industry should be reminded of the requirements and its responsibilities. The CAA has been involved in the creation of European Aviation Safety Agency (EASA) Implementation Rule (IR)

work that was believed could change the definition of line maintenance. This has not occurred and the CAA currently understands that the IR will be based almost exclusively on JAR 145 material.

The CAA is unable to progress this recommendation further. The definitions of line and base maintenance, central to this action, have not been agreed by EASA at this early stage in its development, and the CAA is unable to adopt a unilateral position for these definitions.

On 28 September 2003, responsibility for matters addressed in this Recommendation passed to EASA under Regulation (EC) 1592/2002 and the Recommendation should be re-addressed to that Agency.

B767-322ER	London Heathrow	9 Jan 1998	Accident

References: AAR 5/2000 dated 2 Nov 2000

FACTOR F21/2000 dated 2 Nov 2000

SYNOPSIS

Whilst in cruising flight near Paris during an ETOPS flight from Zurich to Washington, DC, abnormal warnings appeared on the flight deck instrumentation and circuit breakers began tripping. The commander, in consultation with the operator's maintenance control centre at London Heathrow Airport, decided to divert and land at Heathrow. The aircraft subsequently landed safely, but during the landing ground roll the right thrust reverser failed to deploy fully and smoke appeared at the forward end of the passenger cabin. As a result, the commander ordered an evacuation when the aircraft was on the taxiway, adjacent to the landing runway. During the evacuation, the right off-wing escape slide failed to deploy and several minor injuries occurred.

A confusion in communication between the aircraft and various Air Traffic Control units resulted in the Heathrow Airport Tower controller being unaware that the aircraft was landing with technical problems until the evacuation was announced, whereupon the emergency services were alerted.

The investigation identified the following causal factors:

1 The tripping of multiple circuit breakers had been caused by the occurrence of electrical arcing and associated thermal damage to a wiring loom adjacent to the aft/upper inboard corner of the forward galley chiller unit within the Electronic and Equipment (E&E) bay, with resultant thermal damage to an adjacent loom and smoke generation.

2 Prior damage to the wiring loom insulation adjacent the aft/upper corner of the chiller unit had occurred due to contact with such units during associated removal and installation; this chiller unit had been replaced on the day before the accident.

3 Aluminium alloy swarf was present within the E&E bay prior to the accident and had probably assisted the onset of arcing between adjacent damaged wires in the loom.

4 Incorrect installation of the chiller unit, with its heat exchanger exhaust fitted with a blanking plate, would have caused warm exhaust air to discharge from an

alternative upper vent which was capable of blowing any aluminium swarf around the wiring looms.

5 The crew were unaware of the potentially serious arcing fire in the E&E bay during the flight due to failure of the bay smoke warning system to activate on the flight deck, because the density of smoke emitted by the arcing wiring in the bay was not apparently sufficient to be detected by the only smoke sensor, which was located in the card and rack cooling system exhaust duct.

6 The jamming of a severely worn latch, associated with the right off-wing slide compartment, prevented that escape slide from operating during the evacuation; such latches exhibited vibration induced wear on other aircraft.

RECOMMENDATION 99-51

It is recommended that manufacturers such as Boeing and Airworthiness Authorities such as the FAA should require that all operators and maintenance organisations should ensure that before maintenance activities take place which are likely to generate conductive debris, wiring looms and electrical equipment in the working area are provided with temporary protection against associated contamination, and that at the end of the maintenance activity such areas are specifically inspected to be free from such contamination.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

The CAA represents the JAA on the Ageing Transport Systems Rulemaking Advisory Committee and its various working groups. Amongst a number of recommendations that are likely to emerge from the Committee early in 2001 is a recommendation that will ensure "best practice" is always adopted when work is accomplished adjacent to wiring. Another recommendation is expected to state how the analytical process that examines in depth the maintenance requirements that will be applied to a particular aircraft type should be enhanced to focus attention on wiring inspections with regard to general condition and contamination. These recommendations will be commended to the JAA for implementation across the JAA Member States in a harmonised fashion. Target date for transmission of the Committee's recommendations to JAA is 31 August 2001.

CAA Action

The Ageing Transport Systems Rulemaking Advisory Committee (ATSRAC) has forwarded to the FAA recommendations for improvements to maintenance practices, enhancement of maintenance programmes and additions to training and awareness for maintenance personnel. The JAA (supported by the CAA) worked with the FAA and Transport Canada with the aim to bring about a harmonised suite of rules that addressed the products of the Ageing Transport Systems Rulemaking Advisory Committee (ATSRAC). This led to delays in the expected delivery time-scales.

The responsibility for ATSRAC activity was transferred from JAA to EASA management (see EASA work programme 2005 – 2007) before the JAA had developed and published an NPA, and therefore the CAA is unable to progress this recommendation further.

On 28 September 2003, responsibility for matters addressed in this Recommendation passed to EASA under Regulation (EC) 1592/2002 and the Recommendation should be re-addressed to that Agency.

Fokker F27-500	Jersey Airport	6 May 1997	Accident

References: Bulletin 12/97 dated 9 Dec 1997

FACTOR F2/98 dated 11 Mar 1998

SYNOPSIS (From AAIB Report)

The aircraft was operating on a scheduled freight service carrying newspapers from Bournemouth to Jersey. The commander, a training captain working part time for the company, was training a new first officer on his first line-training sector. The flight, which was delayed due to poor weather and strong cross winds at Jersey, departed nearly three hours behind schedule at 0638hrs with the first officer as the handling pilot. He flew for most of the sector but the commander briefed that he would probably take control for the landing. The aircraft was radar vectored for an ILS approach to Runway 27 at Jersey where the weather had moderated to give a surface wind of 330deg/24 to 34kt with a visibility of 30km and a cloud base of 1,600 feet. The first officer continued to fly the aircraft as it descended on the glide path with the commander taking control 4 seconds before touchdown. The aircraft landed heavily nose wheel first distorting the nose wheel assembly rearwards into the aircraft structure. The aircraft bounced, and after a second heavy impact, the main landing gear retracted allowing the fuselage to contact the runway. The aircraft slid several hundred metres along the runway before departing the paved surface coming to rest on the grass close to the airfield boundary. There was no fire and the crew vacated the aircraft without injury.

RECOMMENDATION 97-68

The CAA should require that an aircraft operator maintains, for each recorder installation type, a data frame layout document which contains details of all parameters recorded, the layout of the recorded data and the algorithms required to convert that data to engineering units. The layout of the document should be of a format standard to be stipulated by the CAA.

Status - Partially Accepted - Closed

CAA Response

The CAA partially accepts this Recommendation. The Civil Aviation Authority Specification 10A, which covers the installation of flight data recorders into aircraft, already requires a reference document to be prepared that provides details of the conversion data and logic required for the translation of the data held in memory to parameters expressed in engineering units. The CAA's earlier version of Specification 10 allows the record to be kept as an analogue trace, digital transcription or original record. These Specifications are provided as a means by which operators can meet the requirements of the Air Navigation Order. In addition, the implementation of Joint Aviation Requirement JAR-OPS 1.160 has required JAR-OPS operators to keep a document which presents the information necessary to retrieve and convert the

stored data into engineering units. The CAA is, however, aware that the accident investigators of various states are collaborating to define and standardise documents for the data frame layout and conversion of flight recorder data to engineering units. The CAA will, therefore, await the outcome of this work with the intention of promulgating recommendations for a standardised document.

CAA Action

The CAA published Civil Aviation Publication (CAP) 731 – Approval, Operational Serviceability and Readout of Flight Data Recorder Systems - giving 'best practice' information on the handling of Flight Data Recorder issues on 28 May 2004. This CAP covers all aspects from Type Certification to Certificate of Airworthiness issues and ongoing system serviceability assessment. The CAP underwent consultation with two Accident Investigation Agencies, representatives of industry and other CAA Departments.

RECOMMENDATION 97-70

The CAA should require that an organisation conducting scheduled mandatory readouts from a digital flight data recorder has procedures in place to ensure that all information, within a data frame layout document, is correctly interpreted, used for a scheduled mandatory readout of the relevant recording installation and that any assessment is conducted only on data that has been converted to engineering units. Furthermore, any report issued by the organisation shall reference, both by document number and issue status, the data frame layout document against which the readout was performed.

Status - Partially Accepted - Closed

CAA Response

The CAA partially accepts this Recommendation. Whilst understanding the rationale for this Safety Recommendation the CAA foresees practical difficulties if organisations were constrained to convert to engineering units and to interpret a complete data recording against a data frame. Consequently, the CAA proposes to consult industry on this matter to determine the value of such a requirement.

The CAA does, however, accept that reports on FDR readouts should reference, both by document number and issue status, the applicable data frame document used. The CAA will therefore advise all organisations who undertake FDR readouts that the associated reports are to contain this information. Target date: 31 December 1998.

CAA Action

The CAA published Civil Aviation Publication (CAP) 731 – Approval, Operational Serviceability and Readout of Flight Data Recorder Systems - giving 'best practice' information on the handling of Flight Data Recorder issues on 28 May 2004. This CAP covers all aspects from Type Certification to Certificate of Airworthiness issues and ongoing system serviceability assessment. The CAP underwent consultation with two Accident Investigation Agencies, representatives of industry and other CAA Departments.

Part 2 AAIB Recommendations relating to all rotorcraft

Bell 206B Jet Ranger III	**Crag Lough, Northumberland**	**30 May 2003**	**Accident**

References: Bulletin 1/2004 dated 8 Jan 2004

FACTOR F9/2004 dated 12 Feb 2004

SYNOPSIS (From AAIB Report)

The helicopter was involved in relatively slow speed, low level aerial photography that involved it flying a straight track before turning right around a fixed structure of significant historical interest. The pilot carried out one practice run that was judged to be slightly too fast and too close to the structure. The second attempt proceeded without incident until, when half way around the turn, the helicopter began to yaw to the right. Application of corrective left pedal was ineffective and as the helicopter continued yawing right it descended. The rotation continued through several complete revolutions and it struck sloping ground at low forward speed rolling on to its right side. All three occupants were able to vacate the aircraft with only minor injuries. An engineering investigation failed to find any technical fault that could have accounted for the accident. There was evidence, however, that the helicopter may have been operating in a part of the flight envelope where the susceptibility to loss of tail rotor effectiveness was possible. Two safety recommendations, promoting the dissemination of literature relating to the loss of tail rotor effectiveness, have been made.

RECOMMENDATION 2003-126

The CAA should publish, as widely as possible within the UK, information on the Loss of Tail Rotor Effectiveness (LTE).

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

The CAA has taken action to publish this information. This publicity has included inclusion of LTE at the helicopter flight instructor examiners (FIE(H)) seminar held in October 2003, the issuance of a training communication to all helicopter flight instructors (FI(H)), and information on the provision of the appropriate training materials identified by the report for use at FI(H) seminars. In addition, all UK FIE(H) have been briefed to include LTE and tail rotor malfunctions in the mandatory section of the FI(H) rating revalidation process. Further to promulgate information on LTE, the CAA published Flight Operations Department Communication (FODCOM) 1/2004 on 9 January 2004. A comparable article for the general aviation community will be published in the first 2004 issue of the General Aviation Safety Leaflet (GASIL).

CAA Action

GASIL 1 of 2004 was published on 1 March 2004 containing an article on 'Loss of Tail Rotor Effect'.

Bell 206L Longranger	Near Pathhead, Midlothian	30 Apr 2003	Accident

References: Bulletin 3/2004 dated 11 Mar 2004

FACTOR F19/2004 dated 15 Apr 2004

SYNOPSIS (From AAIB Report)

Towards the end of a flight, the pilot had transited through Edinburgh Airport Zone in preparation for a landing at his home site of Oxenfoord Castle, north of Pathhead. When to the east of Edinburgh, he deviated to the south to avoid some low cloud but, as he started heading east towards his intended landing area, the pilot encountered further low cloud at the beginning of a valley. He descended to remain in sight of the ground and almost immediately saw pylon cables directly ahead of the helicopter. He initiated a climb but the rear of the helicopter struck a cable and the tail rotor/fin assembly detached. G-IANG force landed heavily on the upslope of a grass field. The helicopter was extensively damaged but the three occupants escaped with minor injuries. The pilot's shoulder harness failed during the forced landing.

RECOMMENDATION 2004-12

The CAA should re-emphasise to the aeronautical community in general, and licensed engineers in particular, the importance of ensuring that any occupant restraint systems already fitted, or to be replaced, on an aircraft or helicopter, comply with the relevant airworthiness requirements.

Status - Fully Accepted - Open

CAA Response

The CAA fully accepts this Recommendation.

The CAA will re-emphasise to the aviation industry, including licensed aircraft engineers, the importance of ensuring that any occupant restraint system already fitted, or to be replaced, on an aircraft or helicopter, complies with the relevant airworthiness requirements. A Flight Operations Department Communication (FODCOM) and a GASIL article will be published in June 2004.

RAF 2000 GTX Gyroplane	Long Marston Airfield	8 Feb 2003	Accident

References: Bulletin 11/2003 dated 6 Nov 2003

FACTOR F40/2003 dated 10 Dec 2003

SYNOPSIS (From AAIB Report)

The pilot took off from Runway 22 at Long Marston for a local flight at which time the surface wind was estimated to be south-westerly at about 10 kt, but with the wind strength increasing noticeably at altitude. After takeoff the pilot found he had to apply

full left roll trim and some additional left roll control input to maintain his track, and he maintained the full left trim for the remainder of the flight. On returning to the airfield some 15 minutes later, the pilot made an uneventful approach to Runway 22, describing the wind as being straight down the runway. During the flare, with the aircraft approximately one foot above the ground, the pilot stated that he encountered a gust of wind from the left at which point the machine started to roll to the right. He immediately applied full left roll input on the controls, but the aircraft continued to roll to the right until it was lying on its side on the runway.

RECOMMENDATION 2003-93

It is recommended to the Civil Aviation Authority that the Authority's requirement for 'IN EMERGENCY PULL' external placards adjacent to the top latches of the exit doors of RAF 2000 gyroplanes on the UK register should be reviewed.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation. The CAA will complete the review of the requirement for an external placard by the 27th February 2004.

CAA Action

Prior to 27 February 2004 CAA completed its review of the requirement for an external placard. It was agreed with the original applicant for the approval of the RAF 2000 that there was a need to reposition this placard to a location at which it is possible to externally gain sufficient finger purchase to pull the exit door open.

RAF 2000	Hall Farm Strip, near Lichfield	5 Feb 2003	Accident

References: Bulletin 2/2004 dated 5 Feb 2004

FACTOR F13/2004 dated 16 Mar 2004

SYNOPSIS (From AAIB Report)

The aircraft, built from a kit by its previous owner, had suffered at least one roll over accident and the rotor blades had been replaced twice before it was sold to the pilot. He fitted new parts including further new rotor blades and the aircraft subsequently completed about 60 hours of flying without incident.

Not long before the accident flight, chord-wise cracks had been found in both of the composite main rotor blades and the aircraft had been grounded. The AAIB commissioned a detailed material examination of the cracks as they were thought to be related to a fatal accident involving another RAF 2000. The examination indicated that the cracks, that were not relevant to the earlier fatal accident, were a result of 'lay-up' issues which were subsequently taken up by the CAA with the kit manufacturer.

A further set of new blades for G-BWAE were received from the manufacturer, and these were fitted. A new, taller teeter block was also obtained. While attempting to fit this however, some damage was found to bolts in the assembly. This was considered to have been damage undetected after the roll over accident and

consequently a complete new gimbal head was procured. Much effort was expended carefully aligning the new rotor hub bar and gimbal head, in order to achieve low vibration levels. Ultimately the gimbal head was successfully fitted to the aircraft and signed off by a PFA inspector who was also a gyroplane instructor.

The aircraft was inspected on the morning of the accident and issued with a flight release note by the PFA inspector. The inspector then carried out two solo flights, in calm wind conditions, during which the aircraft performed well with no undue vibration. The third flight was flown dual with the inspector being accompanied by the owner.

A handling check, carried out after a normal takeoff and climb to 1,500 feet, showed no problems and the flight was continued as a circuit training detail at a local microlight airfield. The aircraft landed back on its home grass strip without incident 1 hour and 15 minutes later. The aircraft was then refuelled and prepared for a further flight.

After the usual checks, including control checks, the aircraft was positioned for takeoff, the pre-rotator engaged and the takeoff commenced. The aircraft lifted into a level attitude and the owner, who was handling, gently eased the stick forward to increase airspeed. As expected the aircraft maintained a level attitude as the speed increased until, at an estimated height of approximately 10 feet, it developed a marked nose down attitude and rolled slightly right. The instructor felt the pilot compensate but considered, from the attitude of the aircraft, that he had not been positive enough with the controls, and so pulled firmly and fully aft. The aircraft did not respond and hit the ground hard breaking off the nose gear and coming to rest upright with the engine still running. The aircraft was shut down and the occupants vacated the cockpit without injury. The pilot and instructor both felt that there had been no response to the controls, and that the stick had moved without the usual resistance from normal control forces.

RECOMMENDATION 2003-130

It is recommended that the CAA and PFA ensure that the 'eye end' fittings of the RAF 2000 rotor head control rods are manufactured from material of a suitable specification to prevent failure during operation within the certified flight envelope.

Status - Fully Accepted - Open

CAA Response

The CAA accepts this Recommendation.

The CAA will establish whether the eye end fittings of the RAF 2000 rotor head control rods are manufactured from material of a suitable specification to prevent failure during operation within the certified flight envelope. The CAA is currently discussing this with the Manufacturer and anticipates the necessary structural analysis will be concluded by June 2004.

CAA Action

The process of showing compliance with the design requirements of BCAR Section T ensures the suitability of the material specification of the eye end fittings of the RAF 2000 by requiring demonstration of reserved factors appropriate to the chosen material. The manufacturer has agreed to confirm compliance of the RAF 2000 control system with BCAR Section T by June 2004.

Bell 206B Jet Ranger III	Cudham, Kent	17 Jan 2003	Accident

References: Bulletin 12/2003 dated 11 Dec 2003

FACTOR F4/2004 dated 12 Jan 2004

SYNOPSIS (From AAIB Report)

The pilot, a part-time flying instructor, planned to collect the helicopter from Biggin Hill Airport, Kent and fly it to Southend, Essex. The weather for the departure from Biggin Hill was generally poor with low cloud and reduced visibility in rain. The pilot's stated intention was to depart to the north-east, but after initially departing on an easterly track the helicopter turned toward the south. Witnesses in an area about one and a half miles east-south-east of Biggin Hill saw the helicopter disappear from view into cloud and later reappear in a steep descent and strike the ground. Both occupants were killed on impact. An engineering examination of the helicopter revealed no defects that could have caused the accident. The investigation concluded that the accident was probably a result of the pilot's spatial disorientation brought on by inadvertent entry into cloud.

RECOMMENDATION 2003-110

It is recommended that, the CAA place visibility, and consider placing cloudbase, minima on VFR helicopter cross country flights to be undertaken by PPL (Helicopter) holders.

Status - Fully Accepted - Open

CAA Response

The CAA accepts this Recommendation.

The CAA will take action to require flights by UK PPL (Helicopter) Licence holders to be conducted in conditions not less than specified minimum visibilities unless the licence holder has an instrument rating. The CAA will table the subject for consideration by the Small Helicopter Action Group, a joint CAA/Industry working group, at its meeting on 22 January 2004.

CAA Action

The Small Helicopter Working Group (SHWG) (previously known as the Small Helicopter Action Group), at its meeting on 22 January 2004, agreed that the CAA should take action to amend Schedule 8 of the Air Navigation Order 2000 to introduce requirements that holders of UK PPL (Helicopters), PPL (Gyroplanes) and JAR FCL PPL (Helicopters) will require a visibility of at least 3 km for a cross-country flight and 10 km for a special VFR flight in a control zone. Also, holders of all helicopter licences that do not include an instrument rating will be prohibited from undertaking a flight out of sight of the surface.

RECOMMENDATION 2003-111

It is recommended that, the CAA take action to amend the ANO to forbid flying in IMC on IFR flights in Class D, E, F or G airspace by UK PPL (Helicopters) holders unless they hold an instrument rating.

Status - Partially Accepted - Open

CAA Response

The CAA partially accepts this Recommendation.

The CAA will not take action to amend the ANO. However, the CAA will take action to require flights by UK PPL (Helicopter) Licence holders to be conducted in conditions not less than specified minimum visibilities unless the licence holder has an instrument rating. The CAA will table the subject for consideration by the Small Helicopter Action Group, a joint CAA/Industry working group, at its meeting on 22 January 2004.

CAA Action

The Small Helicopter Working Group (SHWG) (previously known as the Small Helicopter Action Group), at its meeting on 22 January 2004, agreed that the CAA should take action to amend Schedule 8 of the Air Navigation Order 2000 to introduce requirements that holders of UK PPL (Helicopters), PPL (Gyroplanes) and JAR FCL PPL (Helicopters) will require a visibility of at least 3 km for a cross-country flight and 10 km for a special VFR flight in a control zone. Also, holders of all helicopter licences that do not include an instrument rating will be prohibited from undertaking a flight out of sight of the surface.

RECOMMENDATION 2003-112

It is recommended that, the CAA carry out a review of all regulations, training and educational material, relating to flights by PPL (Helicopter) holders in poor weather conditions, to ensure that they are consistent, easily assimilated and clearly presented.

Status - Partially Accepted - Closed

CAA Response

The CAA partially accepts this Recommendation.

The CAA will carry out a review of all regulations, training and educational material that it produces, relating to flights by PPL (Helicopter) holders in poor weather conditions, to ensure that they are consistent, easily assimilated and clearly presented.

Also, the CAA will table the subject for consideration by the Small Helicopter Action Group, a joint CAA/Industry working group, at its meeting on 22 January 2004.

CAA Action

The CAA has reviewed the regulations, training and educational material that it produces, including LASORS which contains Safety Sense leaflet (SSL) 17 "Helicopter airmanship". LASORS was amended in January 2004 to incorporate clear written and diagrammatic guidance of VFR minima and the CAA is satisfied that it is consistent with current regulations, easily assimilated and clearly presented.

Following a review of the relevant regulatory material, the Small Helicopter Working Group (SHWG) (previously known as the Small Helicopter Action Group), at its meeting on 22 January 2004, agreed that the CAA should take action to amend Schedule 8 of the Air Navigation Order 2000 to introduce requirements that holders of UK PPL (Helicopters), PPL (Gyroplanes) and JAR FCL PPL (Helicopters) will require a visibility of at least 3 km for a cross-country flight and 10 km for a special VFR flight in a control zone. Also, holders of all helicopter licences that do not include an Instrument rating will be prohibited from undertaking a flight out of sight of the

surface. SSL 17 will be further reviewed when the result of the consultation on the amendment to Schedule 8 is known.

Sikorsky S61N	Poole, Dorset	15 Jul 2002	Accident

References: AAR 2/2004 dated 16 Apr 2004

FACTOR F21/2004 dated 16 Apr 2004

SYNOPSIS (From AAIB Report)

G-BBHM, which was based at Portland, was being operated in the Search and Rescue role. Following the first alert of the day, G-BBHM had been airborne for about 40 minutes over Poole Harbour when the two rear crew members became aware of an unusual noise. Almost immediately, the pilots saw the 'NO 2 ENG FIRE WARN' light illuminate accompanied by the audio alert. The pilots commenced their emergency procedures, including shutting down the No 2 engine and activating the fire extinguisher, and initially set heading for Bournemouth Airport. However, with the 'FIRE' light still illuminated and indications of hydraulic failures from both tactile and warning systems, the co-pilot alerted the commander to a suitable nearby landing area. The commander called for an immediate landing and made a successful approach and touchdown; during the approach, the pilots became aware that 'NO 1 ENG FIRE WARN' was also illuminated. After touchdown, the pilots shut down No 1 engine and the crew quickly vacated the helicopter. G-BBHM was destroyed by fire shortly after they were clear. The time between the onset of the original fire warning and touchdown was 82 seconds.

The investigation identified the following causal factors:

1 The No 2 engine had suffered rapid deterioration of the No 5 (location) bearing of the free turbine, causing failure of the adjacent carbon oil seal and mechanical interference between the Main Drive Shaft Thomas coupling and the Engine Mounting Rear Support Assembly tube, which completely severed the support tube.

2 A severe fire, outside of the engine fire zone, was caused because the released engine oil was ignited either by this mechanical interference, or by contact with the hot engine exhaust duct.

3 The No 2 engine's No 5 bearing failed because of unusual and excessive cyclic loading conditions arising from shaft vibration. The bearing deterioration was exacerbated by a reduction in its oil supply during the same period, when the live oil jet fractured as a consequence of the vibration.

4 It is probable that the Main Drive Shaft vibration was caused by damage or distortion sustained during one or more previous No 2 engine starts involving a high torque rotor engagement.

5 There was no specific torque limitation published in the manufacturer's Flight Manual, used by Bristow Helicopters Limited, during rotor engagement after engine start.

RECOMMENDATION 2002-51

The US Federal Aviation Administration, in conjunction with UK CAA and the airframe and engine manufacturers, implement a means of providing a suitable warning to aircrew and/or engineering staff, of any impending loss of integrity of the drive shaft system of the S61N helicopter which could lead to failure of the engine rear support mounting tube.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

In accordance with standard practice the CAA stands ready to support the US Federal Aviation Administration and the airframe and engine manufacturers to implement a means to provide a suitable warning to aircrew of any impending loss of integrity of the drive shaft system of the S61N helicopter which could lead to failure of the engine rear support mounting tube. In the meantime, in order to address one possible source which could lead to failure of the engine rear support mounting tube, the CAA UK issued Additional Airworthiness Directive (AAD) number 002-12-2002 on the 17th December 2002. This AAD requires UK operators of S61N helicopters, by the 31st January 2003, both to install electrical chip detectors (ECDs) on each engine's power turbine accessory drive, and to modify the aircraft to enable monitoring of these ECDs to be conducted by means of in situ continuity checks by engineering staff after each engine shutdown.

CAA Action

The FAA has issued NPRM 2003-SW-35-AD dated 24th November 2003 that addresses this Recommendation.

In addition, notwithstanding the fact that this machine was being operated in a Search and Rescue role and subject to the provisions of Article 1(2) of EC Regulation1592/2002, the CAA considers that this Recommendation should be applicable to all S61-N helicopters and has therefore submitted the AAD to the European Aviation Safety Agency (EASA) under Article 10(1) of EC Regulation 1592/2002. When the FAA NRPM is issued as a final rule, the CAA will cancel AAD 002-12-2002 and advised EASA accordingly.

RECOMMENDATION 2002-52

The US Federal Aviation Administration, in conjunction with UK CAA and the airframe manufacturer, ensure that the integrity of the engine fire zones on the S61N helicopter is not breached by a failure of the engine rear support mounting tube.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

In accordance with standard practice the CAA stands ready to support the US Federal Aviation Administration and the airframe manufacturer in developing any airworthiness measures that are deemed necessary to ensure safe operation of the S61N helicopter. To that end, on 13 November 2002, CAA wrote formally to the US Federal Aviation Administration and the airframe manufacturer with a request for consideration of appropriate actions that may be necessary to meet the intent of this Recommendation.

RECOMMENDATION 2002-53

The US Federal Aviation Administration, in conjunction with UK CAA and the airframe manufacturer, devise a means of protecting essential systems in the main rotor gearbox bay of the S61N helicopter from the effects of fire.

Status - Not Accepted - Closed

CAA Response

The CAA does not accept this Recommendation.

The current design requirements for fire protection of essential systems, as contained within JAR 29.1191, have given, over many years, a satisfactory level of safety for large helicopters of all types. These requirements specify that essential systems need be fireproof only in cases where they are not isolated from potential powerplant fires by a firewall shroud. In that respect, assurance of the integrity of the engine fire zones has been covered by the CAA response to Recommendation 2002-52.

RECOMMENDATION 2003-84

The FAA, CAA, and engine manufacturer should introduce a modification to the oil jet assembly that, in the event of fracture of the tube which supplies oil to the carbon seal, would prevent a large reduction in supply pressure to the nozzle which supplies oil to the No 5 bearing.

Status - Not Accepted - Closed

CAA Response

The CAA does not accept this Recommendation.

The Accident report states clearly that failure of the oil tube was not the primary cause of the No 5 bearing deterioration.

In view of the report's conclusion, the CAA believes that action focussed upon preventing fractures of this oil tube would be preferable and would support any design activity undertaken by the manufacturer and the FAA to this effect.

RECOMMENDATION 2003-85

The CAA, together with the FAA, airframe and engine manufacturers, should consider the possible value of measuring short term variability in the recorded NF speed on S-61 helicopter engines, in order to provide early warning of loss of integrity of the drive shaft system, which could lead to failure of the engine mounting rear support assembly tube and subsequent fire.

Status - Not Accepted - Closed

CAA Response

The CAA does not accept this recommendation.

The Accident report acknowledges that the Nf speed variation increased during the final hour of flight. The CAA however, does not agree that a 'noticeable change' could be observed at this time. The report also acknowledges that such speed fluctuations are inherently variable and that, consequently, an early warning by this means may be neither reliable nor adequate.

In addition, the CAA considers that the timely introduction of a practicable warning means has been provided through the action already taken in addressing recommendation 2003-51.

RECOMMENDATION 2003-86

The FAA and CAA should require Flight Manuals for all variants of the S-61 and similar types to include an appropriate torque limitation during rotor engagement.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this recommendation. In accordance with standard practice the CAA will support the FAA and the manufacturer in introducing appropriate torque limitations to the Flight Manual.

RECOMMENDATION 2003-87

The FAA and CAA, together with the airframe and engine manufacturers, should investigate the dynamic behaviour of the S-61 MDS and associated high speed rotating components in support of the introduction of an appropriate torque limitation during rotor engagement.

Status - Not Accepted - Closed

CAA Response

The CAA does not accept this recommendation.

The results of the analytical MDS dynamic analysis undertaken during the course of this investigation contradict those of comprehensive tests and analyses undertaken previously by the aircraft manufacturer. The results of the manufacturer's work do not support the need for torque limitations to be imposed as a result of any dynamic behaviour of the S-61 MDS.

The manufacturer has accepted that there is a potential for damage to the No. 5 bearing of the engine to occur as a result of high torque during rotor engagement and it is for this reason that appropriate torque limits are being established.

It is considered that the manufacturer's proposed action to introduce engine torque limitations during rotor engagement (Refer to Recommendation 2003-86) within the Flight Manual addresses this Recommendation.

RECOMMENDATION 2003-88

The CAA, in conjunction with the HUMS systems designers, should require the incorporation into future software versions the capability of providing, automatically, appropriate information about the recorded parameters and the integrity and completeness of the data.

Status - Partially Accepted - Open

CAA Response

The CAA partially accepts this Recommendation.

Failure fully to acquire HUMS data during a single flight is in itself not a safety concern as the HUMS is intended to identify trends and thereby anticipate those failures that could escalate to a potentially Hazardous condition over a number of flights.

Nevertheless, the CAA recognises the potential for benefits to be realised through more robust HUMS designs that may result from action taken to address this Recommendation. Therefore, whilst not requiring the implementation of such means in future software at this stage, the CAA will review the need for a capability to provide, automatically, appropriate information about the recorded parameters and the integrity and completeness of the data. This review will be undertaken in conjunction with HUMS designers and operators and will be completed by December 2005.

RECOMMENDATION 2003-89

The CAA should require, for operations where HUMS is expected to contribute to the safe operation of the aircraft, improved training for the engineering staff to facilitate useful and meaningful 'first level' interrogation and investigation of the data.

Status - Partially Accepted - Closed

CAA Response

The CAA partially accepts this Recommendation.

Insufficient training for engineering staff in the use of HUMS is not identified within the investigation report as a contributing factor in this incident. Furthermore, the CAA is not aware of any other data that indicate that current training requirements are inadequate.

The CAA, when making HUMS mandatory, issued CAP 693 which provides acceptable means of compliance for the implementation and operation of HUMS. This document describes the necessary skills required by staff and the associated training. Both the CAA and the aircraft operators carry out routine audits of HUMS that include checks of staff training.

CAP 693 will be updated to take account of latest regulatory developments for HUMS. During the course of this revision all aspects of the document, including initial and continuation training for HUMS, will be checked and enhanced where appropriate in accordance with the CAA's policy of continuous improvement.

RECOMMENDATION 2003-90

The CAA, together with HUMS system designers, should incorporate in future HUMS software versions, algorithms which can identify changing signal parameters, other than levels, such as frequency changes and the development of harmonics.

Status - Partially Accepted - Open

CAA Response

The CAA partially accepts this Recommendation.

The investigation report does not suggest either that the HUMS data or its interpretation was flawed, and contributed in any way to this incident.

The service experience to date indicates that HUMS are approximately 69% effective at detecting incipient failure modes. The CAA considers that with further design enhancements this figure may increase to 80% and beyond. The CAA has therefore

invited tenders for the research and development of neural networks and associated algorithms that will contribute towards the achievement of this goal. The results of this research will be used to help inform a decision on the need for algorithms which can identify changing signal parameters, other than levels, such as frequency changes and the development of harmonics.

This research is expected to commence in 2004 and to be completed by July 2006.

RECOMMENDATION 2003-91

It is recommended that the CAA, together with HUMS systems designers, should incorporate in future HUMS requirements, a requirement for a suitable infrastructure to facilitate the comparison of stored HUMS data between aircraft.

Status - Partially Accepted - Open

CAA Response

The CAA partially accepts this Recommendation.

The investigation report does not suggest either that the HUMS data or its interpretation was flawed, and contributed in any way to this incident.

Nevertheless, the CAA recognises the potential for benefits to be realised through comparison of stored data. The CAA will therefore include this subject within a review undertaken in conjunction with HUMS designers and operators that will be completed by December 2005. The results of this review will be used to help inform a decision on the need for a requirement for an infrastructure to facilitate the comparison of data.

RECOMMENDATION 2003-92

The CAA, in conjunction with HUMS system designers, should consider in future design, the incorporation of modified DAPUs which provide an indication of the completion of the data acquisition cycle.

Status - Fully Accepted - Open

CAA Response

The CAA accepts this Recommendation.

The investigation report does not identify incomplete HUMS data acquisition as a contributory factor in this incident.

Nevertheless, the CAA recognises the potential for benefits to be realised through more robust HUMS designs that may result from action taken to address this Recommendation. Therefore, the CAA will consider for future designs the incorporation of modified DAPUs that provide an indication of the completion of the data acquisition cycle. This will be included in a review undertaken in conjunction with HUMS designers and operators that will be completed by December 2005.

In the meantime, it has been confirmed that SAR operational procedures are in place that ensure complete in-flight data collection. These procedures include a safeguard to ensure that when a failure to acquire a full data set is detected, an additional "rotors running" data acquisition is required.

Bolkow BO 105-DBS-4	**Brough of Birsay, Orkneys**	**24 May 2002**	**Accident**

References: Bulletin 8/2003 dated 7 Aug 2003

FACTOR F28/2003 dated 10 Sep 2003

SYNOPSIS (From AAIB Report)

The helicopter was carrying out external load lifting operations from the Brough of Birsay island lighthouse off the north-west coast of the Island of Orkney to a site some two miles away on the main island. The pilot was very experienced in carrying out external load lifting and had transported a number of loads that morning without incident. On the accident flight the load was seen to become unstable and contact the tail rotor resulting in total loss of tail rotor thrust. The helicopter was seen to descend rapidly in a spiral to the right and impact the sea. The pilot was fatally injured during the impact and the helicopter sank almost immediately. Recommendations are made concerning the guidance available to load constructors and enhancing a pilot's chances of surviving a tail rotor strike.

RECOMMENDATION 2003-37

In consultation with the helicopter industry, the Civil Aviation Authority should produce guidance for the preparation, construction and carriage of external loads. This guidance should include methods of improving the stability of loads that have poor or unpredictable flight characteristics.

Status - Fully Accepted - Open

CAA Response

The Civil Aviation Authority accepts this Recommendation.

The CAA, in consultation with the helicopter industry, will produce guidance for the preparation, construction and carriage of external loads and include methods of improving the stability of loads that have poor or unpredictable flight characteristics.

The subject was discussed at the inaugural meeting of the CAA/British Helicopter Advisory Board (BHAB) Onshore Liaison Committee meeting on 12 June 2003. The BHAB has agreed to draft guidelines on best practice for the preparation, construction and carriage of external loads. When agreed and accepted, this guide will form the basis of a revised CAA publication, CAP 426 (Helicopter Underslung Load Operations). It is expected that this revision to CAP 426 will be completed during 2004.

CAA Action

The BHAB project to draft guidelines on best practice for the preparation, construction and carriage of external loads is ongoing. In addition the CAA is gathering best practice information from other National Aviation Authorities who have produced such material and collate it, together with the BHAB draft guidelines, in revised CAP 426. Target date for publication of CAP 426 – end 2004.

RECOMMENDATION 2003-38

The Civil Aviation Authority should take forward a proposal to the appropriate helicopter manufacturers and type certification bodies that the flight characteristics of a helicopter following the loss of tail rotor effectiveness should be promulgated in every helicopter type's Flight Manual.

Status - Fully Accepted - Open

CAA Response

The CAA accepts this Recommendation.

In view of the imminent transfer of type certificate responsibility in European Union States from national aviation authorities to the European Aviation Safety Agency (EASA), the CAA will, by 31 March 2004, propose to EASA that it amend its standards to require helicopter manufacturers to promulgate, in every helicopter type's Flight Manual, the flight characteristics of the helicopter following the loss of tail rotor effectiveness.

CAA Action

CAA is preparing a submission to EASA, based on accident and serious incident reviews that proposes amendment of a number of rotorcraft design standards. The submission will include a proposal that consideration must be given to the effects of tail rotor failures on the behaviour of the rotorcraft for promulgation in the Aircraft Flight Manual. The CAA proposal will be submitted to EASA by 30 June 2004.

RECOMMENDATION 2003-39

The Civil Aviation Authority should consider providing a tail rotor failure safety information package to all helicopter pilots and operators to improve their awareness of the effects of the loss of tail rotor thrust.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

CAA has considered the provision of a tail rotor failure safety information package. The type specific variations of aircraft response to this failure condition point to the need for type-specific information to be provided. Only the aircraft manufacturers can achieve this with the required accuracy and completeness. To achieve this outcome, the CAA has submitted a proposal to the JAA Rotorcraft Steering Group for additional Advisory Material for FAR/JAR 27/29 such that 27.1585(a) and 29.1585(a) are interpreted to require that the latest analysis and validation techniques are utilised to provide improved Emergency Procedures for the tail rotor failure case.

RECOMMENDATION 2003-41

The Civil Aviation Authority should consider recommending two way radio communication between a pilot undertaking external load lifting operations and persons at the pick-up and drop points when another crew member is not available onboard the helicopter to monitor the behaviour of the external load.

Status - Fully Accepted - Closed

CAA Response

The Civil Aviation Authority accepts this Recommendation.

The CAA has considered recommending two-way radio communication between a pilot undertaking external load lifting operations and persons at the pick-up and drop points when another crew member is not available onboard the helicopter to monitor the behaviour of the external load.

The CAA will advise operators of the safety benefits of radio communications and will recommend that they include a section in their Operations Manual, or other operating instructions, on the use of two-way radio communications with ground personnel when appropriate to the circumstances of the task. This will be achieved through a Flight Operations Department Communication (FODCOM) to be published by 31 October 2003.

RECOMMENDATION 2003-42

The Civil Aviation Authority should consider recommending the wearing of protective flying helmets for flight crews carrying out external load lifting operations.

Status - Fully Accepted - Closed

CAA Response

The Civil Aviation Authority accepts this Recommendation.

The CAA will consider recommending the wearing of protective flying helmets for flight crews carrying out external load lifting operations.

The CAA, through the CAA/British Helicopter Advisory Board (BHAB) Onshore Liaison Committee, has begun dialogue with industry to develop this subject and agree a position.

CAA Action

The CAA, in consultation with the British Helicopter Advisory Board, agrees that the wearing of protective flying helmets by flight crew members would provide an additional level of safety and protection, but feels that this should be applicable to all crew members carried in the aircraft during underslung load operations. A Flight Operations Department Communication was published in May 2004 containing the recommendation that operators should implement procedures to require that all crew members wear protective flying helmets when conducting underslung load operations.

RAF 2000 GTX-SE	Black Notley, Essex	17 May 2002	Accident

References: Bulletin 9/2003 dated 11 Sep 2003

FACTOR F34/2003 dated 14 Oct 2003

SYNOPSIS (From AAIB Report)

On the afternoon of the accident the pilot and his colleague had arranged to go for a flight together in G-BYDW. They took off in the middle of the afternoon from the farm strip at Rayne and spent about twenty minutes flying in the local area. The pilot then

took his colleague's wife for a short flight, again in G-BYDW. On their return it was agreed that the pilot would fly once more with his colleague, but this time in his colleague's machine, G-CBAG. The pilot then went on to conduct some solo circuits in G-BYDW, whilst his friend got G-CBAG out of the hangar and completed a pre-flight check and engine warm up.

After landing from his solo flight the pilot put G-BYDW away before getting into the right hand seat of G-CBAG. His unqualified colleague occupied the left-hand seat, which on the RAF 2000 is usually occupied by the pilot flying the aircraft as the blade pre-rotator required during takeoff is only operable from this seat. They then taxied out and took off, flying back over the airfield before heading off in a southerly direction. A witness at the airfield later estimated the departure time as 1600 hrs. Witnesses reported seeing or hearing nothing unusual.

The weather that afternoon was described by witnesses as bright and sunny. Some described the wind as calm, but others estimated that there was a north-easterly wind of between 10-15 kts. One witness commented that whilst it had been generally calm, there had also been some gusts of wind. An aftercast from the Met Office indicated that there was a moderate south-easterly flow covering the area at the time of the accident, with winds up to 1,000 feet being generally easterly at 13 to 20 kt. Stansted Airport, 12 nm to the west of the accident site, had fine weather and an easterly wind of about 12 kt and Andrewsfield, located 4 nm to the north-west, also had an easterly wind of about 13 kt. No gusts were recorded in these reports. However, by convention, no gusts below 10 kt are required to be reported. Hence it is possible that, at times, the wind speed could have been gusting to just over 20 kts.

Several witnesses in the local area reported seeing a gyroplane at various times that afternoon. Most of these sightings were at the time when the pilot was flying G-BYDW. However, there were also some witnesses to the accident itself. These all reported seeing G-CBAG suddenly fall vertically to the ground, shedding parts as it fell, with some able to identify one of the rotors separating.

The aircraft seemed to have been flying normally up to this point, although one witness reported seeing the gyroplane lose height both shortly before and then again immediately before it started to fall. Descriptions of the height at which G-CBAG was flying varied, but it was probably between 500 and 1,000 feet.

There were also varying eyewitness descriptions about the engine noise. Whilst all agreed there had been engine noise up to the point where the aircraft had dropped, there were differences in the point at which witnesses heard the noise cut out. Some reported this to be when the gyroplane had started to fall, some reported it cutting out during the fall and others reported that the engine could be heard until the aircraft hit the ground.

On seeing the crash witnesses close by notified the emergency services and made their way to the accident site to offer what assistance they could. The emergency services were quickly at the scene. Both occupants sustained fatal injuries on impact.

RECOMMENDATION 2003-01

It is recommended that the CAA should review the pitch stability requirements of BCAR Section 'T' in the light of current research, and amend the Requirement as necessary. The CAA should consider the need for an independent qualified pilot assessment of the handling qualities of different gyroplane types currently approved for the issue of a Permit to Fly against the standards of BCAR Section T, as amended.

Status - Fully Accepted - Open

CAA Response

The CAA accepts this Recommendation.

The CAA will review the pitch stability requirements of BCAR Section T in the light of current research and introduce amendments, where found to be appropriate. This review will be completed by 31 November 2003.

The CAA will, by 31 December 2003, also consider the need for an independent qualified pilot assessment of the handling qualities of different gyroplane types currently approved for the issue of a Permit to Fly against the standards of BCAR Section T, as amended.

CAA Action

CAA reviewed the static and dynamic pitch stability requirements in the course of a general review of BCAR Section T prior to 31 November 2003. BCAR Paper T925 proposes revisions to those requirements and has now been issued as a Working Draft, for public consultation.

CAA considered the need for an independent test pilot prior to 31 December 2003 and has engaged the services of an experienced autogyro pilot to conduct independent assessments of gyroplane flying characteristics where required.

RECOMMENDATION 2003-02

It is recommended that the CAA should consider retrospectively assessing all gyroplane types currently on the UK register for acceptable pitch stability characteristics.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

The CAA will, by 31 December 2003, consider retrospectively assessing all gyroplane types currently on the UK register for acceptable pitch stability characteristics.

CAA Action

CAA completed the review of all gyroplane types prior to 31 December 2003 and concluded, based on their respective accident rates, that the pitch stability characteristics of the RAF 2000, Bensen B8MR and Cricket types should be investigated.

RECOMMENDATION 2003-03

It is recommended that the CAA should assess the RAF 2000 for compliance with the requirements of BCAR Section 'T', as amended, and, if necessary, require appropriate modification to achieve compliance.

Status - Fully Accepted - Open

CAA Response

The CAA accepts this Recommendation.

The CAA will, within one year of the completion of amendments to BCAR Section T, assess the RAF 2000 for compliance with the requirements of BCAR Section 'T', as amended, and, if necessary, require appropriate modification to achieve compliance.

CAA Action

The proposed amendments to BCAR Section T are currently subject to public consultation. The assessment of the RAF 2000 for compliance with the requirements of BCAR Section 'T', as amended, will follow thereafter.

RECOMMENDATION 2003-04

It is recommended that the CAA consider the introduction of a wind and gust speed limitation for inexperienced autogyro pilots, similar to that already in effect for inexperienced pilots of certain small helicopters.

Status - Fully Accepted - Closed

CAA Response

CAA accepts this Recommendation.

On 20th January 2003, the CAA issued Mandatory Permit Directive 2003-001, applicable to RAF 2000 and RAF 2000 GTX-SE gyroplanes, which specifies wind and gust speed limitations for autogyro pilots with less than 40 hours on type.

CAA will, by 31 December 2003, consider the introduction of a wind and gust speed limitation for inexperienced autogyro pilots of other types on the UK Register, similar to that already in effect for inexperienced pilots of certain small helicopters.

CAA Action

Prior to 31 December 2003 CAA considered the introduction of a wind and gust speed limitation for inexperienced autogyro pilots of other types on the UK Register.

The CAA concluded that such a limitation is appropriate and is currently evaluating the means by which this can best be achieved.

Eurocopter EC135 T1	**Near Muirkirk, East Ayrshire**	**17 Feb 2002**	**Accident**

References: Bulletin 8/2003 dated 7 Aug 2003

FACTOR F30/2003 dated 10 Sep 2003

SYNOPSIS (From AAIB Report)

The pilot and two police observers (legally designated as passengers but referred to as crew in this report), were tasked to conduct an operation, close to the village of Muirkirk, in support of the police. The helicopter lifted off from its Glasgow base at 2137 hrs and climbed to an altitude of 1,500 feet. The pilot later received clearance from air traffic control to climb to 2,000 feet. As the helicopter settled onto an initial direct track of 165° M towards Muirkirk the pilot could see clearly the lights of East Kilbride about 8 miles ahead and assessed the visibility to be greater than 10 km with a cloud base between 3,000 and 3,500 feet. As the helicopter approached the high ground to the south of Eaglesham it unexpectedly entered snow showers and encountered reduced visibility. The pilot immediately turned onto a reciprocal heading and soon regained visual flight. He then discussed with his crew the option of flying to the east, towards Hamilton, following the M74 motorway to Douglas and from there flying west towards Muirkirk. This route was intended to avoid the high ground

and any associated poor weather. The flight continued at an altitude of approximately 2,000 feet, and from overhead the village of Douglas the pilot could see the lights of Muirkirk. Shortly afterwards the helicopter unexpectedly entered cloud. The pilot immediately turned to the left, away from the high ground to the north, rapidly regained visual flight and re-located the lights of Muirkirk. The helicopter continued towards the village and the crew commenced their task maintaining an altitude of about 1,800 feet (approximately 1,000 feet agl). The task was completed after approximately 15 minutes during which time the weather remained good.

Whilst orbiting the village the crew utilised a very powerful, steerable, searchlight mounted on the left side of the helicopter. When the task was complete this light was extinguished. The helicopter was also equipped with a fixed, forward facing, high intensity light fitted to the nose of the aircraft; the pilot left this light illuminated for the return journey.

The pilot initially intended to return to Glasgow via Douglas and the M74, however, as soon as the helicopter turned towards Douglas he could see an extensive area of cloud ahead. He therefore decided to fly west along the valley, towards lower ground, and then return to Glasgow via Kilmarnock. As the crew set off on a westerly track at an altitude of approximately 2,000 feet (1,200 feet agl) they could see beyond the town of Cumnock, 9 miles ahead.

The helicopter then unexpectedly entered thick cloud once more and the police observer, occupying the front left seat, recalled that the airspeed indicator showed approximately 80 kt. The pilot, who was aware of the high ground on either side and reluctant to turn, decided that the safest option was to maintain his present track and descend using the radio altimeter as his height reference. When passing 1,000 feet agl, and still in cloud, the pilot selected the 'ALTITUDE' (ALT) and 'HEADING' (HDG) modes of the autopilot with the intention of maintaining his current altitude and heading. He then noticed that the helicopter had entered a turn to the right with approximately 15° angle of bank (AOB). He manually overrode the autopilot and regained a westerly heading, but the helicopter re-commenced the turn to the right causing him to intervene once more. Following this second manual intervention the pilot recalled seeing discrete 'AP' and 'A.TRIM' red warnings and red 'P' and 'Y/R' annunciations. These warnings indicate that the autopilot has disconnected. The helicopter then entered a steep nose down attitude whilst turning to the right at about 45° AOB. The descent was rapid and despite his corrective control inputs the pilot was unable to prevent the helicopter striking the ground.

After impact the pilot, in the front right seat, and the police observer, in the front left seat, were able to release their harnesses and vacate the helicopter via the disrupted area on the right side of the fuselage. The pilot then returned to the cockpit to shut down the engines that were still running. The police observer, seated in the rear of the helicopter, was seriously injured and required assistance from his two colleagues to vacate the wreckage. Once the injured observer had been dragged clear of the helicopter the pilot remained with him whilst the other observer sought assistance from a nearby farm. The emergency services arrived at 2235 hours, approximately 10 minutes after the accident.

Prior to take off an 'ACTUATION' message had appeared on the Caution and Advisory Display (CAD) with an associated 'R' (roll axis) warning on the pilot's Primary Flight Display (PFD); the warning had remained illuminated throughout the flight. This warning indicates a reduction in roll control authority due to a failure of one of the two roll control actuators. The pilot considered this warning to be a false warning since it had appeared on a number of recent occasions and the higher modes of the autopilot

had still been available. (These modes would not have been available if the warning had represented a flight critical failure).

RECOMMENDATION 2003-49

The CAA should require that Police Air Operators Certificate (AOC) holders review the safety benefits provided by the use of helmet mounted night vision goggles (NVGs) with a view to the introduction of NVGs for helicopter operations conducted at night in support of the police in areas of limited cultural lighting, particularly in hilly or mountainous regions.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

The CAA will require Police Air Operator Certificate (PAOC) holders to review the safety benefits provided by the use of helmet mounted Night Vision Goggles (NVGs) with a view to the introduction of NVGs for helicopter operations conducted at night in support of the police in areas of limited cultural lighting, particularly in hilly or mountainous regions.

Considerable work has already taken place within the European forum to establish certification requirements for NVG equipment and the associated aircraft cockpit instrumentation. In parallel with this work, operational rules are being developed within the JAA for NVG equipment. The UK CAA will require PAOC holders to consider the safety benefits offered by NVGs once criteria are in place.

CAA Action

The CAA in conjunction with the Home Office have required that police Air Support Units consider the safety benefits of using NVGs by night. This was promulgated by CAA attendance at respective meetings of the Association of Chief Police Officers and the Unit Executive Officers. The Home Office policy has been revised such that funding support will only be provided for new helicopters that are NVG capable.

RECOMMENDATION 2003-50

The CAA should review the Police Air Operators Manual (PAOM) to ensure that training in the use of autopilot systems is required to be covered by the operator during initial and recurrent line training and the PAOM Part II contains instructions for the use of autopilot systems by pilots during normal operations.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

The CAA has reviewed the Police Air Operators Manual (PAOM) to ensure that training in the use of autopilot systems is required to be covered by the operator during initial and recurrent line training and that the PAOM Part II contains instructions for the use of autopilot systems by pilots during normal operations.

A consultative letter was issued on 16 May 2003 proposing amendments to the PAOM to require PAOC holders to place in their PAOM Part II, autopilot training requirements and appropriate standard operating procedures.

Aerospatiale SA365N	Kyle of Lochalsh	21 Jan 2002	Incident

References: Bulletin 8/2003 dated 7 Aug 2003

FACTOR F29/2003 dated 10 Sep 2003

SYNOPSIS (From AAIB Report)

The flight was planned to depart at 0815 hrs from a heliport located at Kyle of Lochalsh, operating under Visual Flight Rules (VFR). The weather conditions were assessed by the commander before departure as surface wind easterly at 10 kt, cloud base above 600 feet, visibility 5 km with heavy rain. The local time of sunrise was at 0834 hrs. The route was to the north and, because of low cloud over the land, it was planned to cross over the Skye Bridge and to continue over water along the Inner Sound towards the destination on Rona Island, a distance of about 20 nm. The flight was part of a regular contract to take personnel to various locations in the area; thus both the commander and the passengers frequently flew on the route.

The passengers walked out to the helicopter at about 0815 hrs. It was raining hard and consequently their clothing was wet by the time they boarded. The commander and one of the passengers were wearing survival suits, the remainder of the passengers were dressed in normal clothing. When boarding was complete the commander started the engines, keeping his door open in an attempt to prevent an accumulation of condensation. After engine start he selected the demist system on and closed the door.

The helicopter took off at 0820 hrs towards the south and, after it had departed, the lights at the heliport were turned off. After takeoff the commander carried out a turn to the right and climbed to 300 feet amsl, heading towards the Skye Bridge. Finding that the weather conditions and continuing accumulation of condensation on the windscreen were such that he could not continue the planned flight under Visual Flight Rules, he decided to return to the departure point. He informed the passengers of his intention and believed that he may also have radioed to the base at this time. He commenced a turn to the right and carried out the landing checks, but he had difficulty in locating the landing site. The condensation on the inside of the windshield was restricting his forward visibility. He was able to see the lights on the shore and to identify the locality of the heliport but could not see precisely where it was. He opened his side window to help improve the visibility and attempted to clear the forward windscreen using a towel. He did this by leaving the collective pitch control lever unguarded for a time, moving his left hand to the cyclic and using his right hand to wipe the screen. Looking again out of the side window he suddenly saw the sea surface some 10 feet below and, with both hands now back on the controls, initiated a full power climb. He was however unable to arrest the descent in time to prevent the helicopter from momentarily contacting the water.

The impact was described as a thud or jolt by those in the cabin. The helicopter lifted off again into a climb. When level at about 100 feet the commander radioed the base, the lights were switched on for him and he located the heliport. He flew to the landing area, where the ground crew visually inspected the undercarriage before he carried out a normal landing.

RECOMMENDATION 2003-09

It is recommended that the Civil Aviation Authority review the terms of the Air Operator's Certificates issued to those helicopter operators whose operations take place over water where the water temperature may be less than +10°C. A special requirement for the wearing of survival suits by both crew and passengers where the likely rescue time exceeds the estimated survival time should be considered. Particular attention should be paid to those flights where personnel are carried on a regular basis as a part of their work, with a view to standardising requirements whatever the nature of the industry.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

The CAA has reviewed the terms of the Air Operators Certificate's issued to those helicopter operators whose operations take place over water where the water temperature may be less than +10ºC and has considered a special requirement for the wearing of survival suits by both crew and passengers where the likely rescue time exceeds the estimated survival time.

Passengers onboard helicopters operated in support of oil/gas exploitation are required to wear survival suits by JAR-OPS 3. In the case of overwater operations conducted by single engine helicopters in accordance with either a Permission under Article 36(5)(b) of the Air Navigation Order (in the case of an ANO AOC holder) or the coastal corridor concept contained in JAR-OPS 3.240 (by a JAR Ops AOC holder), both crew and passengers are already required to wear survival suits if the water is below +10ºC (ANO) or if the likely rescue time exceeds the estimated survival time (JAR-OPS). In these instances the significant common factor is that an exposure to a ditching exists in the event of an engine failure occurring during the offshore take-off and landing phase of flight for the offshore oil/gas exploitation twin helicopters or during prolonged overwater flight for the single engine helicopters.

To require the provision of survival suits for all overwater passenger flights in the circumstances recommended in the report is considered impractical and not justified for 'normal' overwater transit flights by multi-engine helicopters. It is accepted however that operators may, for specific contracts or tasks, have a duty of care to look closely at introducing enhancements to basic legislative requirements and consider whether the provision of additional equipment and/or training, would be appropriate. A FODCOM will be published by 31 October 2003 advising operators to consider the safety benefits of providing survival suits to passengers and crews when appropriate to the circumstances of the task.

RECOMMENDATION 2003-73

It is recommended that the Civil Aviation Authority require operators of flights for which there is an existing equipment requirement for a Radio Altimeter to be fitted, to have, in their operations manuals, a procedure for the setting of the height bug.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

The CAA will require operators of flights for which there is an existing equipment requirement for a Radio Altimeter to be fitted to have, in their operations manuals, a procedure for the setting of the height bug or equivalent decision height indicator.

A FODCOM will be published by 31 October 2003 informing operators of flights where there is a requirement for a Radio Altimeter of the need to review their Operations Manuals, amending them where necessary, to ensure that they contain a procedure for the setting of the height bug or equivalent decision height indicator.

CAA Action

FODCOM 25/2003 was published on 27 October 2003 informing operators of flights where there is a requirement for a Radio Altimeter of the need to review their Operations Manuals, amending them where necessary by 31 December 2003, to ensure that they contain a procedure for the setting of the height bug or equivalent decision height indicator.

Hughes 269C	**Hare Hatch, Berkshire**	**8 Mar 2000**	**Accident**

References: AAR 1/2003 dated 21 Feb 2003

FACTOR F3/2003 dated 21 Feb 2003

SYNOPSIS (From AAIB Report)

On the day of the accident the owner, who was an instructor and type-rating examiner, had intended to use the helicopter for recurrent training and testing of a private pilot, but the wind conditions were unsuitable. The helicopter was therefore released to the owner's son and his friend for their use.

During the morning the helicopter had been refuelled at Shoreham Airport and had then flown to a private landing site nearby. At around 1500 hrs, the two pilots and a mutual female friend had boarded the helicopter to fly to Wycombe Air Park. The mutual friend occupied the centre seat position. Before the centre seat can be occupied, the right seat occupant's collective lever must be removed and the gap between the seats bridged with a purpose-designed cushion. The helicopter manufacturer provided a lap belt for the centre seat occupant, whereas the other two 'permanent' seats were equipped with lap and shoulder straps. The flight to Wycombe Air Park was apparently uneventful.

During the time that the helicopter was shut down at Wycombe Air Park, the female passenger had remained onboard while one pilot had collected some ground handling wheels and the other had paid the landing fee, 'booked in and out', and attended to some private business. Before the helicopter took off, a member of staff at a training centre had taken a digital photograph of the friend who had just completed his helicopter instructor's course. The picture showed the friend standing at the left side of the helicopter, with his back to the tailboom attachment area. After the photograph was taken, the friend had ducked under the tailboom and had gone to the right hand door, which led to the seat without a collective lever.

Nobody recalled seeing the two pilots boarding the helicopter and only two people saw if take off; they reported nothing abnormal. At 1631:40 hrs, one of the pilots transmitted that he was changing to an en-route frequency; this was the last RT message recorded from the helicopter on any of the likely frequencies. However, a

minute later the helicopter's transponder was interrogated by radar at Heathrow and the data was recorded. The data did not include height encoding, but after making due allowance for the likely wind it enabled an accurate reconstruction of the helicopter's track which ceased some two minutes later, a few metres from the crash site.

The helicopter was tracking over the town of Wargrave on a southerly heading at about 65kt indicated airspeed (IAS) when witnesses on the south side of the town first noticed it. Their attention was drawn to the helicopter because it was quite low and the sound of its engine changed as it progressed towards the village of Hare Hatch. They reported that the engine note changed from a steady noise to a 'spluttering sound'. Other witnesses in the vicinity of Hare Hatch also heard an unusual engine note, but most saw the helicopter either coming towards them or going away from them.

Only two witnesses had an appreciable side view of the helicopter. They were standing in a garden and saw it flying at a steady height and speed, but the engine note sounded 'course'. Suddenly the helicopter broke into two sections with an audible 'pop' sound. They thought the cockpit section broke away from the combined engine and tailboom assembly, amidst a short-lived but large ball of dark coloured smoke; the main rotor blades then folded downwards and stopped. The witnesses saw smaller parts detach from the two main sections as they fell, in a manner similar to a ballistic trajectory. One witness reported seeing one of the occupants 'jump out' of the helicopter.

This person's body, that of the female passenger, was found some 50 metres from the main wreckage and to the north of the cockpit section's trajectory.

CAA SUMMARY

Aviation safety regulations and requirements, in conjunction with manufacturer's published recommendations, establish the sound basis that contributes to the continued safe operation of aircraft. This includes the requirements and standards for maintenance, including repair and inspection, so that aircraft remain in an airworthy condition. It is therefore essential that those who have legal obligations and authority to certify that an aircraft is fit to fly ensure that manufacturer's and regulatory continued airworthiness requirements are fully complied with. Deviation from these standards will directly affect the safe operation of the aircraft.

The CAA, consistent with its ongoing safety improvement process and, recognising the events that may have contributed to the accident involving G-ZAPS, carried out a detailed review of its procedures, working practices, the training of technical staff and the Technical Procedures they are required to follow. The review concluded that CAA's continued airworthiness requirements and standards continue to be relevant and valid. Additionally, the Safety Regulation Group in its 2002 / 2003 Business Plan included a review designed to provide greater focus on industry's management of airworthiness directives and other mandatory requirements. This review culminated with the CAA publishing additional best practice advice to industry, the briefing of its Surveyors, further enhancements to its aircraft survey programme and, in 2003, the delivery of Continued Airworthiness industry seminars to promote applicable requirements and standards.

The CAA, having carried out a comprehensive review of this report into the accident involving Hughes 269C G-ZAPS, has concluded that it does not provide the clarity or credence to the different roles, interfaces and responsibilities of those involved. These include the Licensed Aircraft Engineer, the CAA approved welder, the aircraft commander on the day of the accident and the CAA. The report challenges the long

established continued airworthiness assurance process prevailing in the UK that fully conforms to international standards and which has positively contributed to the UK aviation safety record that is amongst the best in the world.

The CAA therefore responds to the report's safety recommendations as follows,

RECOMMENDATION 2001-82

The CAA should take early action to introduce a requirement that Welding Certificates of Conformity must state details of the applicable aircraft registration, type, component/part number, serial number and approval for the related weld repair.

Status - Partially Accepted - Open

CAA Response

The CAA partially accepts this Recommendation.

The CAA approves welders who have demonstrated competence to carry out particular weld techniques. They are not required to have knowledge of an aircraft type or components on which they are carrying out a weld repair. Their involvement is restricted to the accomplishment of a weld or series of welds in accordance with approved technical data. The responsibility for ensuring a repair scheme conforms to approved technical data rests with the LAE who will certify the work done.

Both Airworthiness Notice No. 3 and BCAR Chapters A6-2 and A6-7 require a summary of the work carried out, including a reference to any associated repair schemes or approved drawings, to be recorded in the legally required aircraft records.

The Welding Certificate of Conformity is not a required document. Where the work is carried out on an aircraft, the details of a welding repair will be added to the maintenance work sheets already in use. Alternatively, a welder or an organisation, at a facility remote from the aircraft, may carry out work on a component or part. The responsible welder or organisation will then supply an appropriate record of the work carried out which includes the details of the component, part number and serial number. The aircraft registration may not be appropriate, since the component or part may be returned after repair and fitted to another aircraft.

The LAE accepting the repaired component or part, prior to fitting to an aircraft, is responsible for ensuring that the weld repair carried out has been done to approved technical data and that the details of the repair are sufficient to meet the requirement for appropriate records to be satisfied. Although this is considered to be implicit in paragraph 1.5 of Airworthiness Notice No. 3 this will be reviewed.

CAA Action

Following the review referred to, Airworthiness Notice 3, paragraph 1.5, will be amended. The revised notice will be published with the September 2004 revisions.

Part 3 AAIB Recommendations relating to aeroplanes below 5700kg MTWA and others, (e.g. balloons)

Streak Shadow SA	Old Sarum	17 Sep 2003	Accident

References: Bulletin 5/2004 dated 13 May 2004

FACTOR F25/2004 dated 11 Jun 2004

SYNOPSIS (From AAIB Report)

During the take-off run, a weld connecting the right stub axle to the right landing gear strut, failed. The end of the strut contacted the ground and twisted rearwards, the aircraft veered to the right and came to rest just off the runway. Fuel leaked from the slipper fuel tank located beneath the fuselage, as a result of the rearward twisting of the landing gear having crushed, and holed, the top of the slipper tank. The investigation revealed the very poor standard of this weld on this aircraft, and on eight other examples examined, suggesting that many other aircraft might be similarly affected.

RECOMMENDATION 2004-02

The UK Civil Aviation Authority, in conjunction with the British Microlight Aircraft Association (BMAA) and the Popular Flying Association (PFA), should review the adequacy of the main landing gear lower fittings currently in service on Shadow aircraft, in light of the evidence suggesting that significant numbers of these are likely to contain weld defects which significantly reduce their static strength compared with that assumed at the time of certification.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this recommendation. The CAA in conjunction with the British Microlight Aircraft Association (BMAA) and the Popular Flying Association (PFA), has reviewed the adequacy of the main landing gear lower fittings currently in service on Shadow aircraft. As result of this review, a new main undercarriage has been developed and is in the process of being approved under the control of the BMAA and PFA. This new undercarriage includes a redesigned lower fitting with increased strength and post welding heat treatment. The UK CAA has issued Mandatory Permit Directive 2004-007 making the replacement of the standard undercarriage mandatory on all UK registered Shadow, Streak Shadow and Starstreak aircraft types under the control of the PFA. CAA will revise this MPD to address BMAA aircraft when the BMAA modification approval process has been completed.

RECOMMENDATION 2004-03

The UK Civil Aviation Authority, in conjunction with the British Microlight Aircraft Association (BMAA) and the Popular Flying Association (PFA), should review the adequacy of the slipper fuel tank mounting arrangement, insofar as this makes the tank vulnerable to fracture and leakage of fuel during any incident which causes a rearward rotation of the gear about its attachment to the fuselage.

Status - Fully Accepted - Closed

CAA Response

This CAA accepts this recommendation. The CAA in conjunction with the British Microlight Aircraft Association (BMAA) and the Popular Flying Association (PFA), has reviewed the adequacy of the slipper fuel tank mounting arrangement, insofar as this makes the tank vulnerable to fracture and leakage of fuel during any incident which causes a rearward rotation of the gear about its attachment to the fuselage. The new main undercarriage, developed under the control of the BMAA and PFA, includes strengthened main undercarriage attachment fittings and reinforcement of the fuselage floor at the attachment point, to prevent rotation of the gear about its attachment point and minimise the risk of slipper tank fracture and leakage of fuel. The UK CAA is in the process of mandating the replacement of the standard undercarriage on all UK registered Shadow, Streak Shadow and Starstreak aircraft types.

YAK 50	North Weald Airfield	22 Aug 2003	Accident

References: Bulletin 2/2004 dated 5 Feb 2004

FACTOR F14/2004 dated 16 Mar 2004

SYNOPSIS (From AAIB Report)

A pneumatic system reservoir, pressurised to a nominal 50 kg/sq cm (711 psi), mounted behind the engine bay firewall burst in two as the aircraft was starting to taxi. As well as causing substantial structural and systems damage, parts from the disrupted bottle increased the throttle setting causing the aircraft to accelerate and pitch nose down bringing the propeller into contact with the ground.

The bottle had fractured, at normal pressure, because of severe internal corrosion resulting from the presence of water and the absence of effective surface protection. Water draining procedures appeared inadequate, there appeared to be no published or generally accepted standards for bottle inspection or corrosion protection for aircraft on the UK register and the required five yearly interval for internal inspection and proof pressure checking appeared inappropriate. Similar bottles are used on a number of Eastern Bloc manufactured aircraft operated in the UK and previous cases of failure, due to internal corrosion, have reportedly been caused by 'pinholing' of the reservoir walls, brought about by pitting, and not fracturing. It appears that this relatively benign failure mode may have led to an inappropriate attitude towards the prevention, detection and rejection of corroded bottles. Significant levels of bottle internal corrosion may therefore be widespread on UK registered aircraft. Three safety recommendations addressing this subject were made to the CAA on 2 September 2003.

RECOMMENDATION 2003-101

The CAA, as a matter of urgency, inform all UK operators of aircraft fitted with pneumatic system reservoirs similar to those on the Yak 50 of the possibility of advanced, undetected internal corrosion of the reservoirs and of the potentially catastrophic consequences of a reservoir failure.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

This Recommendation was received on 03 September 2003 and was acted on immediately. Letter to Operators 2464 was issued on 9 September 2003 to all A8-20 organisations and to all owners of Yak, Sukhoi, L29/L39 and Nanchang aircraft owners, alerting them to the possibility of advanced, undetected internal corrosion of such reservoirs and reminding them of the relevant CAA Airworthiness Approval Notes. In addition, details of this incident were publicised in GASIL 4 (General Aviation Safety Information Leaflet) in December 2003.

RECOMMENDATION 2003-102

The CAA, as a matter of urgency, specify a maintenance schedule and procedures for the Yak-50 pneumatic system reservoirs, and similar reservoirs fitted to other aircraft types, aimed at preventing serious internal corrosion and reservoir failure. This should include reservoir draining, inspection, rejection criteria and corrosion protection aspects. It is recommended that the required repeat interval for inspection and proof-pressure testing should be no more than one year.

Status - Partially Accepted - Closed

CAA Response

The CAA partially accepts this Recommendation.

The maintenance schedule for aircraft such as the Yak 50 issued with a Permit to Fly is specified in the individual aircraft's Airworthiness Approval Note (AAN). As regards procedures for the pneumatic system reservoir, the CAA will publish a leaflet in Civil Aircraft Airworthiness Inspections & Procedures (CAP 562) in the first quarter of 2004 giving generic guidance on the operation and maintenance of high-pressure pneumatic systems in aircraft.

To supplement existing material regarding the content of scheduled maintenance tasks and acceptance / rejection criteria for pneumatic reservoirs, the CAA has issued Mandatory Permit Directive (MPD) 2004-004 on 30 January 2004 which clarifies the requirements.

In the absence of specific recommendations by the manufacturer relating to the use of particular corrosion-inhibiting compounds in pneumatic system reservoirs the CAA consider that the clarification in the MPD provides sufficient inspection and test requirements without the need to specify corrosion protection. The CAA has contacted Yakovlev for further advice on this matter. As stated in the MPD, the CAA also considers that the proof-pressure testing of pneumatic system reservoirs should be carried out at periods specifically recommended by the manufacturer or in the absence of such advice at periods not exceeding five years.

RECOMMENDATION 2003-103

The CAA require all UK operators of aircraft fitted with pneumatic system reservoirs similar to those on the Yak-50 to thoroughly inspect, proof-pressure test and effectively corrosion protect the reservoirs as a matter of urgency.

Status - Partially Accepted - Closed

CAA Response

The CAA partially accepts this Recommendation.

To supplement existing material regarding the content of scheduled maintenance tasks and acceptance / rejection criteria for pneumatic reservoirs, the CAA has issued Mandatory Permit Directive (MPD) 2004-004 on 30 January 2004 which clarifies the requirements.

In the absence of specific recommendations by the manufacturer relating to the use of particular corrosion-inhibiting compounds in pneumatic system reservoirs the CAA consider that the clarification in the MPD provides sufficient inspection and test requirements without the need to specify corrosion protection. As stated in the MPD, the CAA also considers that the proof-pressure testing of pneumatic system reservoirs should be carried out at periods specifically recommended by the manufacturer or in the absence of such advice at periods not exceeding five years.

Cessna F152	**Headcorn Aerodrome**	**1 Jul 2003**	**Accident**

References: Bulletin 5/2004 dated 13 May 2004

FACTOR F23/2004 dated 12 May 2004

SYNOPSIS (From AAIB Report)

The instructor and her student were on a training flight from Lydd to Headcorn. The student who had accumulated 36 hours was the handling pilot and the intention was to do a touch and go at Headcorn and then return to Lydd. The engine power checks at Lydd were normal and the acceleration during takeoff was also reported as normal. During the cruise, at an altitude no higher than 2,100 feet, they observed some showers in the area and applied carburettor heat several times as a precautionary measure. After a direct join to the downwind leg at Headcorn, the student applied carburettor heat for approximately 10 seconds and then set it back to COLD. On base leg the student re-applied carburettor heat and reduced the power to 1,700 RPM to begin a descent. The aircraft was lined-up on finals for an approach to Runway 29 (grass) with full flap (30°) at 65 KIAS. At approximately 200 feet agl the student set the carburettor heat back to COLD.

The instructor reported that the final approach was stable and she estimated that the aircraft touched down 30 feet beyond the runway threshold marker boards. During the landing roll the instructor reduced the flap setting to 10° and visually checked that the flaps had been retracted to this position. She then realised that the aircraft was not accelerating normally and called to the student "Full power! Full power!" She then placed her hand on the throttle, over the student's hand, and confirmed that the throttle was set to full power. She glanced at the RPM gauge, which was indicating approximately 2,100 RPM. The aircraft was still not accelerating normally and the airspeed indicator was rising slowly. At approximately 40 to 45 KIAS the instructor took control and aborted the takeoff because she did not believe the aircraft would gain sufficient speed to clear the hedge at the end of the runway. She closed the throttle, pulled the yoke aft and applied the wheel brakes. At this point she estimated the aircraft had used up more than two thirds of the runway length (landing distance available was 796 metres). The braking action was not very effective and the instructor believed that they were probably skidding on the short wet grass. The

aircraft ran off the end of the runway and penetrated a hedge approximately 180 metres from the runway threshold. It came to a rest on a country road on the other side of the hedge. Both pilots had been wearing lap and diagonal harnesses and were able to exit the aircraft unaided and uninjured.

RECOMMENDATION 2004-01

The CAA should sponsor or conduct research to determine:

a) How readily carburettor ice can form at low power settings with carburettor heat ON.

b) How quickly carburettor ice can form when carburettor heat is OFF;

c) Whether the Authority's advice on the use of carburettor heat during an approach to land should be revised in the light of its research findings.

Status - Fully Accepted - Open

CAA Response

The CAA accepts this recommendation.

A CAA sponsored research programme has been initiated at Loughborough University to investigate a wide range of issues relating to Carburettor Icing. The scope of this research includes the need to determine the propensity for carburettor ice to form with the carburettor heat in both the on and off positions.

The CAA's advice on the use of Carburettor Icing during an approach to land will be reviewed against the conclusions of this research and revised as necessary.

This work is expected to be complete by December 2005.

Piper PA 38-112	Wycombe Air Park, Bucks	15 Jun 2003	Accident

References: Bulletin 12/2003 dated 11 Dec 2003

FACTOR F1/2004 dated 12 Jan 2004

SYNOPSIS (From AAIB Report)

Following the completion of a training flight, the pilot experienced an unusual vibration on his first approach to Wycombe. He aborted the landing and continued in the circuit. On a subsequent landing, the nose of the aircraft continued to drop after touchdown, and so he raised the nose and took off again. He was asked by ATC to remain in the circuit and was also informed that the nose landing gear had detached from the aircraft. He was then talked through the subsequent approach and landing by the CFI of his training organisation. An engineering investigation revealed that the leg had failed as a result of a fatigue crack at a lubrication groove at the base of the nose gear strut housing, and that this mode of failure had happened on previous occasions to other PA-38 aircraft. An inspection of the groove may not have been carried out due to previous confusion over the insertion of the requirement into the Maintenance Manual by the manufacturer.

RECOMMENDATION 2003-95

The CAA should consider making the requirement to carry out a dye penetrant inspection of the Piper PA-38 Tomahawk NLG cylinder lubrication groove, in accordance with the manufacturer's documentation, mandatory.

Status - Not Accepted - Closed

CAA Response

The CAA does not accept this Recommendation.

Since 28 September 2003, responsibility for the matters addressed in this Recommendation has passed to EASA under Regulation (EC) 1592/2002 and the recommendation should be addressed to that Agency.

Under the EASA transition arrangements Austria have been nominated Lead Authority with responsibilities for continued airworthiness for the PA-38 Tomahawk. Details of the AAIB report, the CAA sponsored failure analysis and CAA comments will be forwarded to the Austrian Airworthiness Authorities.

Spirit of St Louis Replica	Coventry Airfield	31 May 2003	Accident

References: Bulletin 1/2004 dated 8 Jan 2004

FACTOR F10/2004 dated 12 Feb 2004

SYNOPSIS (From AAIB Report)

Shortly after takeoff from Runway 23, whilst climbing and manoeuvring gently to begin its display sequence, the aircraft's right wing suffered a major structural failure and the aircraft fell steeply into an industrial compound bordering the airfield. There was no post impact fire. The pilot survived the impact, but died shortly afterwards from his injuries. The failure in fatigue of a combined right landing gear and wing strut support fitting was determined to have precipitated the wing failure.

RECOMMENDATION 2003-116

The CAA, in conjunction with the Department for Transport, should review the process by which foreign registered replica homebuilt aircraft are granted Exemptions to Article 8(1) of the Air Navigation Order, which permits such aircraft to fly within UK airspace and at public air displays, without an appropriate Certificate of Airworthiness. Such a review should consider the possibility of requesting specific assurance from the State of Registry that such aircraft are maintained, and records have been kept, in accordance with the requirements of that State.

Status - Fully Accepted - Open

CAA Response

The CAA accepts this Recommendation.

The CAA, in conjunction with the Department for Transport, will review the process by which foreign registered replica homebuilt aircraft are granted Exemptions to Article 8(1) of the Air Navigation Order, which permits such aircraft to fly within UK

airspace and at public air displays, without an appropriate Certificate of Airworthiness. The review will consider the possibility of requesting specific assurance from the State of Registry that such aircraft are maintained, and records have been kept, in accordance with the requirements of that State. It is planned to complete this review by end-December 2004.

CAA Action

The CAA and the DfT are currently engaged in a review of this process. The planned date for the completion of the review remains as end-December 2004.

Cessna C421C	Humberside Airport	29 Mar 2003	Accident

References: Bulletin 4/2004 dated 8 Apr 2004

FACTOR F22/2004 dated 12 May 2004

SYNOPSIS (From AAIB Report)

About 50 minutes into the flight, the aircraft returned to Humberside circuit and was cleared by ATC for a touch-and-go landing on Runway 21. The landing was firm but otherwise uneventful and witnesses heard the power being applied as it accelerated for takeoff. Just before rotation two large "puffs of smoke" were seen to come from the vicinity of the mainwheels as both propellers struck the runway. The aircraft then lifted off and almost immediately began to yaw and roll to the left. The left bank reached an estimated maximum of 90° but reduced just before the left wing tip struck the ground. The aircraft then cartwheeled across the grass to the south of the runway and burst into flames. The owner in the left pilot's seat and the pilot in the right pilot's seat escaped from the wreckage, but the flight examiner, who was occupying a seat in the passenger cabin, was unable to vacate the aircraft and subsequently died of injuries sustained in the post impact fire. An engineering investigation found no fault with the aircraft that might have caused the accident. The investigation concluded that the most probable cause was an inadvertent retraction of the landing gear whilst the aircraft was still on the ground.

RECOMMENDATION 2003-118

The Civil Aviation Authority should take action to publish more information that re-emphasises the dangers of piloting an aircraft after taking medication.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

AIC 58/2000 contains current and concise information for pilots on the subject of piloting an aircraft after taking medication. The CAA published FODCOM 30/2003 on 22 December 2003, reminding AOC holders of this AIC and requesting that they bring the contents of the AIC to the attention of their flight crew.

The CAA also published an article in GASIL in December 2003 bringing this subject to the attention of General Aviation pilots.

Yak 52	Two miles NE of Towcester	5 Jan 2003	Accident

References: Bulletin 10/2003 dated 9 Oct 2003

FACTOR F37/2003 dated 10 Nov 2003

SYNOPSIS (From AAIB Report)

The pilot was a member of a syndicate who operated the aircraft from a private farm strip at Cuddesdon, Oxfordshire. On the morning of the accident he arrived at the farm strip with his brother who was to fly in the rear seat as a passenger. His brother was also a qualified pilot although less experienced. The aircraft, which was started with the help of another syndicate member, then departed Cuddesdon and flew to Turweston Airfield to refuel. The pilot and passenger re-entered the cockpit when the refuelling was complete. Both were seen to be wearing flying suits, parachutes and helmets. They then departed Turweston, from Runway 27, at 1110 hrs and flew to the north-east. The pilot informed the air ground radio operator that they were intending to carry out aerobatics to the north-east of the airfield for approximately 30 minutes before returning to Turweston to refuel again. The weather in the area was fine with no cloud, a light north-westerly wind and a temperature of +1°C.

Five minutes later the aircraft was observed flying aerobatics 2 miles to the north-east of Towcester. After flying a sequence of manoeuvres lasting approximately 10 minutes the aircraft was seen to enter a vertical climb and execute a stall turn. The aircraft completed the manoeuvre and began a vertical descent, from which there was no apparent sign of recovery. It impacted the ground directly beneath power lines without disrupting the electrical supply. There was no fire and the rescue services arrived at the scene 15 minutes later. Both pilot and passenger were fatally injured.

RECOMMENDATION 2003-71

The CAA should require the Yak-52, and aircraft of a similar design operating on the UK register, to have fitted a method of preventing loose articles migrating to a position where they could interfere with the operation or jam the flight controls.

Status - Partially Accepted - Closed

CAA Response

The CAA partially accepts this Recommendation.

The CAA will consider requiring the Yak 52 and aircraft of a similar design operating on the UK register, to have fitted a method of preventing loose articles migrating to a position where they could interfere with the operation or jam the flight controls.

The CAA will complete its consideration by end February 2004.

CAA Action

The CAA completed its consideration of this matter prior to end February 2004. The CAA's partial acceptance of this Recommendation was due to a concern relating to the possible need to fit a guard to "aircraft of a similar design". Accordingly, the CAA's incident and accident database was searched in an attempt to identify any similar, previous, incidents to that which occurred to G-YAKW. Of the five events identified over some 25 years of recorded data from a totality of 145,000 reported UK

events, each involved a different aircraft type and a different aspect of flight control restriction. The CAA looked carefully at each event and concluded that, rather than mandating the fitment of guards to all "aircraft of a similar design", adoption of those measures introduced to address Recommendation 2003-72 was considered more appropriate in order to prevent the problem at source. This recommendation proposed the alerting of maintenance personnel to the need for more effective tool control systems to preclude these types of incident. The reason for this was that mandating modifications could introduce more hazards e.g. reduced access for inspection and maintenance. In the case of the Yak-52, however, the CAA became aware of several documented cases of elevator control restrictions. As a result a Mandatory Permit Directive (MPD) has been issued by the CAA which required UK registered YAK-52s to be fitted with a barrier across the rear fuselage to prevent foreign object ingress into the elevator quadrant. The MPD also required amendment to the aircraft's maintenance schedule to ensure that the last fuselage bay behind the barrier is examined at every annual inspection.

RECOMMENDATION 2003-72

The CAA should publicise the circumstances of this accident in order to bring to the attention of Licenced Engineers (LAE) and maintenance organisations the need for them to have in place an effective tool system that reduces the likelihood of tools being left in aircraft after maintenance.

Status - Fully Accepted - Open

CAA Response

The CAA accepts this Recommendation.

The CAA will publicise the circumstances of this accident, including the need to have in place an effective tool system that reduces the likelihood of tools being left in aircraft, by means of an article in GASIL in November 2003 and an Airworthiness Notice in March 2004.

CAA Action

An article entitled 'Loose Articles' was published in GASIL 4/2003 in December 2003.The publication of the Airworthiness Notice (AN) has been delayed until the next AN publication date of October 2004.

Slingsby T67B Firefly	Near Banbury	3 Nov 2002	Accident

References: Bulletin 8/2003 dated 7 Aug 2003

FACTOR F31/2003 dated 10 Sep 2003

SYNOPSIS (From AAIB Report)

On the day of the accident, both pilots had other flights prior to the accident flight. They flew one training flight together in a PA-28 and each flew a training flight in a PA-28 with other pilots. These pilots considered that the two pilots involved in the accident appeared well and, during the morning, a further pilot saw the two accident pilots briefing for a forthcoming flight.

Prior to the accident flight, G-BLTV had been flown twice by other pilots. The first flight of the morning involved some aerobatic manoeuvres, including a loop and an aileron roll, and the pilots who flew the aircraft confirmed that it appeared fully serviceable. One of these pilots recalled that the control column appeared slightly stiff when he moved it rearwards during checks prior to flight. However, he was able to achieve full control movement and subsequently noted no airborne unserviceabilities. Discussions with these pilots revealed that the aircraft had approximately 4 gall imp of fuel indicated on the gauges just prior to the accident flight and that the flight instruments and stall warning device worked as normal. The only known loose articles in the cockpit were a small fuel strainer under the left seat and a paper checklist under the right seat.

The weather was good with a surface wind of 210°/10 to 15 kt, visibility of 10 km, rain showers and scattered cloud at 1,500 feet and 2,500 feet amsl. In accordance with normal practice, a 'Departure Authorisation Form' was completed. This indicated that the flight would depart with the two pilots involved in the accident at 1315 hrs for a duration of 45 minutes.

A recording of the Oxford 'Tower' radio traffic on frequency 133.425 MHz, included transmissions relating to G-BLTV. The crew called the tower at 1306 hrs for clearance to taxi to the fuel pumps. A subsequent check indicated that 57.32 litres (12.6 gall imp) of fuel was uploaded; this would result in approximately 16.6 gall imp of fuel in the aircraft. Then, at 1319 hrs the crew called for taxi clearance and subsequently reported ready for departure at 1326 hrs. At 1328 hrs, G-BLTV was cleared for takeoff on Runway 19. After departure, at 1332 hrs, the crew reported that the aircraft was leaving the 'Zone' and requested a Flight Information Service; ATC replied with a confirmation of that service and no subsequent transmissions were heard from G-BLTV.

There were only a few witnesses to the manoeuvres of the aircraft during the flight. One witness was standing with her partner about 1.5 km south of the accident site. She described the visibility as excellent and the weather as bright and sunny with a few scattered clouds. She heard the sound of a small aircraft and looked up to see it in the direction of Banbury and apparently flying towards her. The wings were level and the engine was "steady". As she watched it, "The engine spluttered once or twice then stopped completely, almost immediately. The right wing dipped right down, the tail came up and the plane began spiraling anticlockwise to the ground." As the aircraft descended, it continued to spiral with the tail higher than the nose. She could not be certain of the number of turns but counted at least seven. At one point, she had the impression that the aircraft seemed to hesitate, pointing in her direction before continuing the spiral. As her concern mounted, she took out her mobile phone and began to dial the emergency services. The aircraft disappeared behind some trees and shortly afterwards a plume of black smoke appeared. The police arrived very quickly and she accompanied them to the scene. Another witness near Banbury also saw the aircraft flying in a straight line before the sound of the engine stopped and the aircraft went into a spinning manoeuvre. She thought that it described about five turns before she lost sight of the aircraft. During these manoeuvres, she could hear a noise "as if an attempt was being made to restart the engine"; she could not see if the propeller was turning. Both of these witnesses considered that the aircraft was at a reasonable height and estimates from the position of one of the witnesses indicated an altitude of around 4,000 to 5,000 feet agl. One further witness only saw the aircraft during the spinning manoeuvre at an estimated 500 to 600 feet agl. This witness could neither see any smoke or flame, nor hear any engine noise. He described the rate of rotation, and the aircraft attitude, as constant but thought that

the radius of turn was increasing as the aircraft descended. None of the witnesses saw the aircraft impact the ground.

The Fire Service was alerted at 1353 hrs and the first vehicle was on the scene of the accident at 1403 hrs. By then, the fire was smoldering and was brought under control using foam extinguishant. Fire vehicles from both Banbury and Kidlington attended the scene.

RECOMMENDATION 2003-76

The Civil Aviation Authority should conduct a review of the present advice regarding the use of parachutes in GA type aircraft, particularly those used for spinning training, with the aim of providing more comprehensive and rigorous advice to pilots.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this recommendation. A review of published advice has been conducted. Changes to the current advice will be published in the General Aviation Safety Information Leaflet (GASIL) and included in the next issue of Safety Sense Leaflet 19 and LASORS 2004, to be published in January 2004.

CAA Action

The article on safety in spin training published in the June 2002 issue of GASIL has been updated specifically on the use of parachutes, and was re-published in GASIL 2/2004 in June 2004. Safety Sense leaflet 19 was also amended accordingly, and has been published in LASORS in January 2004.

Cessna C152	**Chenies, Bucks**	**28 Sep 2002**	**Incident**

References: Bulletin 3/2004 dated 11 Mar 2004

FACTOR F15/2004 dated 15 Apr 2004

SYNOPSIS (From AAIB Report)

The commander of the aircraft, a flying instructor, reported that he departed from Denham, with the student pilot handling, on a dual training flight. The aircraft climbed initially to 1,000 feet on the Denham QNH before initiating a further climb at Chalfont St Giles (approximately 5 nm from Denham), levelling at 1,900 feet over Amersham, (some 8 nm NNW of Denham). The aircraft was turned right towards Maple Cross and Denham Information/Radio was called for rejoin information.

The Instructor stated that carburettor air was selected hot and power reduced from 2,100 RPM to 1,800 RPM to commence a descent towards Maple Cross. A FREDA check was then carried out and all engine indications appeared to be normal. The Denham QFE was set and at a point some 5 nm north of Denham, the instructor remarked to the student that the aircraft was slightly high. The student therefore reduced power to approximately 1,700 RPM. Shortly afterwards the engine lost power, its speed decreasing to about 1,000 - 1,100 RPM.

The student opened the throttle but obtained no response from the engine. The instructor then operated the throttle with little effect; the engine spluttered and its speed increased by 50 - 100 RPM. The instructor therefore took over control and turned the aircraft away from a built-up area. He tried the effect of various throttle settings with the carburettor air control in both the hot and cold positions but was unable to obtain any increase in engine power and subsequently transmitted a distress call. He then selected a field, established the aircraft on a right hand base leg and desisted from making further attempts to obtain power from the engine. He selected 20 degrees of flap on the base leg and made a right hand turn onto a final approach, before selecting full flap.

The instructor noticed a low fence, half way along the field, which he was able to fly over. He stated that crash drills were carried out; however, he did not consider, or have time, to switch off the fuel or the battery master switch. Seat belts were tightened and both doors opened. A normal touch-down was made with the stall warner sounding and the Instructor brought the aircraft to a halt despite the downslope of the chosen field. The engine was then found to be operating at idle power so the instructor shut it down and the aircraft was vacated.

RECOMMENDATION 2004-11

The Civil Aviation Authority should consider the safety implications of Rule 5 with respect to its effect on realistic training for engine failure after takeoff and en route engine power loss on single engined aircraft and publish a paper on the subject, for the information of Flight Instructors, making clear the Authority's philosophy and promulgating what they believe to be acceptable best practice.

Status - Partially Accepted - Closed

CAA Response

The CAA partially accepts this Recommendation. The CAA has recently reviewed Rule 5 in its entirety and takes the view that, practice of Engine Failure After Take-Off (EFATO) in single engine aeroplanes can be conducted effectively and realistically without infringement of Rule 5.

The CAA has taken steps to ensure that guidance on this topic is included in the seminars required for revalidation of Flight Instructor (FI(A)) ratings and Flight Instructor Examiner (FIE(A)) authorisations with immediate effect. Further guidance will be promulgated to all holders of a current FI(A) rating through the CAA's routine advisory document (TrainingCom).

Jet Provost T3A	Near Humberside Airport	18 Aug 2002	Incident

References: Bulletin 8/2003 dated 7 Aug 2003

FACTOR F26/2003 dated 10 Sep 2003

SYNOPSIS (From AAIB Report)

The aircraft was due to undertake a flight test to renew its Permit to Fly. The pilot carrying out the test was accompanied by an observer whose task it was to note and record the various instrument readings required. The observer had no flying

qualifications and sat in the left-hand seat in order to read the main instruments more easily.

Since the test involved flying above 10,000 feet, both the pilot and the observer were wearing oxygen masks connected to the oxygen hoses attached to their ejection seats. The pilot stated that as part of his pre-flight check he visually checked the oxygen hoses were properly connected. He also checked the Standard Warning Panel (SWP) by means of the test switch on the instrument panel; amongst the various captions are two labelled 'OXY', one for each seat. These captions should illuminate during the SWP test and at any time if either of two 'pull apart' connections between the pilots' oxygen masks and their oxygen supply hoses are not established. All seemed satisfactory and the aircraft departed Humberside Airport to carry out the flight test.

The pilot requested permission from ATC to climb to FL250 to conduct the initial part of the test, but he was cleared only to FL240. ATC also gave the pilot instructions to remain inside radar coverage and clear of controlled airspace. The aircraft began its climb with the relevant information being recorded every 5,000 feet for the air test. As the aircraft approached FL240, the observer noticed that the aircraft began to roll to one side, the roll becoming progressively steeper. The pilot's face was obscured by his helmet's dark visor and oxygen mask, but he was sitting upright with his hands on the controls. The observer spoke to him but, getting no reply, took the controls and attempted to fly the aircraft himself.

The aircraft had been on a northerly track approaching Airway L975. ATC repeatedly passed instructions to try to turn it onto a southerly heading but no reply was received and the aircraft flew through Airway L975, later crossing the coast and flying out to sea. At first the controller suspected the aircraft had experienced an electrical failure and contacted the ATC Distress and Diversion cell, but when its flight path became erratic, he was concerned that there might be a problem with the crew's oxygen. The aircraft's transponder was unserviceable and contact had been maintained throughout the flight by primary radar alone. The pilot's previous report to ATC, however, had informed them that he was passing FL140 in the climb.

The observer managed to maintain control of the aircraft and descend to about FL210. At this point the pilot became conscious and took the controls putting the aircraft back into a climb. The aircraft continued its ascent to approximately FL270, the pilot rapidly falling unconscious again. The observer, realising the pilot was hypoxic, continued to fly the aircraft and put it into a descent in the hope that the pilot would once again regain consciousness. The pilot did indeed 'come round' but it took about half a minute before he was coherent enough to take control, during which time the observer ensured the aircraft was not put back into another climb. The pilot stated that he had no recollection of events after approaching FL240, until he was aware of the aircraft descending again through approximately FL150.

The ATC controller reported eventually regaining radio contact, although the pilot's transmissions were initially described as unintelligible with the aircraft continuing to fly erratically. The controller passed the pilot his position as 5 nm east of Flamborough Head whereupon the pilot stated he was returning to Humberside. The controller stated that he continued to carry out radio checks with the aircraft but it was not until the pilot reported being at 2,500 feet that the pilot's voice became completely intelligible again.

The aircraft made an uneventful landing at Humberside Airport. Upon inspection of the cockpit, it was discovered that the pilot's oxygen hose (the right hand seat) was disconnected at the break point connector between the seat and the cockpit floor.

This connection cannot easily be checked once the seat is occupied and it could be affected by items firmly stowed between the ejection seat pan and the cockpit wall.

RECOMMENDATION 2003-27

The Civil Aviation Authority should consider whether ex-military aircraft operated in accordance with a Permit to Fly and CAP 632 may still be operated in accordance with the original limitations and procedures specified in the Military Aircrew Manual after changes to the design standard that have an impact on the aircraft's operation.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

The CAA will, by 29 February 2004, review, and if necessary amend, its procedures for the approval of changes to the design standard of ex-military aircraft operated in accordance with a Permit to Fly and CAP 632. The review will ensure that procedures identify those design changes that have an impact upon the aircraft's operation and in such cases, require both that a risk assessment is conducted and any amendments to original limitations and procedures specified in the Military Aircrew Manual are established and implemented.

CAA Action

Prior to 29 February 2004 the CAA procedures covering modifications to ex-military aircraft were reviewed. The CAA concluded that although its procedures already states that departures from the military standard must be justified (as modifications) the following words were added:

"To approve a design change that has an impact upon the aircraft's operation, a qualitative risk assessment will be necessary, and any amendments to original limitations and procedures specified in the Military Aircrew Manual will be established and implemented via a Supplement which will be referred to in the Airworthiness Approval Note."

RECOMMENDATION 2003-29

The UK Civil Aviation Authority should review the air test schedules of all ex-military aircraft on the UK Register to harmonise those schedules with any additional limitations placed upon the aircraft resulting from changes to the design standard.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

The CAA will, by 29 February 2004, annotate air test schedules of all ex-military aircraft on the UK Register to require the test pilot to observe any limitations stated on the Permit to Fly for that aircraft and to require the pilot to notify the CAA where this results in a conflict with the schedule. This will facilitate effective and timely identification of any issues that may need to be harmonised as a result of conflicts between the schedule and any additional limitations placed upon the aircraft resulting from changes to the design standard.

CAA Action

The air test schedules applicable to all ex-military aircraft on the UK Register have been amended to require the test pilot to observe any limitations stated on the Permit to Fly for that aircraft and to notify the CAA where this results in a conflict with the schedule.

Tri-R Kis	Cumbernauld Airfield	11 Aug 2002	Accident

References: Bulletin 8/2003 dated 7 Aug 2003
FACTOR F27/2003 dated 10 Sep 2003

SYNOPSIS (From AAIB Report)

Whilst landing on Runway 08 the aircraft bounced heavily and the pilot initiated a go-around. He applied full power but the right wing stalled, dropped and contacted the runway surface turning the aircraft to the right. With the engine still producing full power, the aircraft continued towards long grass at the side of the runway. As the main wheels and right wing entered the grass the retardation caused the aircraft to pitch forward, invert and come to rest upside down in a wings level attitude. In the process the right wing separated at its root and the main landing gear was torn off. The propeller shattered, shock loading the engine.

Having shut the aircraft down, the pilot and his passenger were left suspended upside down in their four point harnesses. Although uninjured, they were unable to get out of the aircraft because the gull wing doors were held shut by the weight of the aircraft. The pilot used a hand held fire extinguisher to break the perspex windscreen and, in doing so, activated the extinguisher filling the cockpit with extinguishant. At that point two people arrived from the control tower and righted the aircraft. The two occupants were then able to exit normally through the doors. There was no fire and they suffered no ill effects from the contents of the fire extinguisher.

The wind at the time of the landing was from 080° at 5 kt under a 1,000 foot cloudbase, with rain approaching the airfield. The pilot stated that the aircraft, which has a tailwheel configuration, is susceptible to bouncing when trying to effect a three point landing. He concluded that, on this occasion, he flared the aircraft too high causing it to bounce heavily and, due to a high angle of attack during the early stages of the go-around, the right wing stalled.

The pilot expressed concern that, had the aircraft caught fire while it was inverted, he and his passenger would have had significant difficulty in evacuating safely because they were unable to open the gull wing doors.

The aircraft was produced as a kit in the USA and under Federal Aviation Regulations (14 CFR part 21) it would be operated there on a Special Airworthiness Certificate, in the Experimental Category, because of its status as an amateur-built aircraft. In the USA there are no design requirements for aircraft operating under this approval. As a British registered aircraft it was operating on a Permit to Fly, which had been issued by the CAA on the recommendation of the Popular Flying Association (PFA). The PFA had approved the type using The Joint Aviation Requirements for Very Light Aeroplanes (JAR VLA) as guidance, as they are authorised to do.

RECOMMENDATION 2003-70

The CAA should take forward to the JAA a proposal to review the requirements for the design of exits and the provision of safety equipment, in aircraft of the Very Light Aeroplanes category, to enable rapid escape from such aircraft in any normal and crash attitude including turnover.

Status - Fully Accepted - Closed

CAA Response

The CAA will by 27th September 2003, forward to the JAA a proposal to review the requirements for the design of exits and the provision of safety equipment, in aircraft of the Very Light Aeroplanes category, to enable rapid escape from such aircraft in any normal and crash attitude including turnover.

CAA Action

On 19 September 2003 CAA forwarded to the JAA a proposal to review the requirements for the design of exits and the provision of safety equipment, in aircraft of the Very Light Aeroplanes category, to enable rapid escape from such aircraft in any normal and crash attitude including turnover.

Aero L39C Albatros	Duxford Airfield	2 Jun 2002	Accident

References: Bulletin 7/2003 dated 10 Jul 2003

FACTOR F21/2003 dated 7 Aug 2003

SYNOPSIS (From AAIB Report)

The planned flight was part of a conversion course onto the L-39 aircraft. The flight included navigation and general handling exercises and was to culminate in a landing at Duxford in order to refuel. The aircraft departed from its base at North Weald with the student occupying the front seat and the instructor in the rear seat. This is the conventional seating arrangement for an instructional flight in this tandem seat aircraft. The flight proceeded uneventfully and the aircraft joined the visual circuit at Duxford where Runway 06 was in use. The reported surface wind was 140°/10 kt, the visibility was greater than 10 km, there was no significant cloud or weather and the runway surface was dry.

When the aircraft arrived at Duxford the fuel quantity was 350 kg. The student pilot flew a slightly extended downwind leg, as requested by ATC, to allow time for a light aircraft to clear from the adjacent grass runway. The instructor considered that the subsequent approach profile was satisfactory although he noted that the airspeed during the final stages of the approach was reducing through 218 km/hr (118 kt) as opposed to the briefed speed of 200 km/hr (108 kt). During the landing flare the airspeed was 210 km/hr (113 kt) and still reducing. The instructor described the touchdown as "soft" (meaning a gentle touchdown) and noted that there was a slight drift to the left in the light crosswind. He estimated that the aircraft touched down about 150 to 200 metres along the runway and various eye-witnesses confirmed this estimate. This is the normal touchdown point for this type of aircraft. After landing the instructor was not aware of any retardation so he told the student pilot to "load the nose wheel and start braking". (Braking is inhibited until a micro switch on the nose

wheel oleo operates). This instruction appeared to have been followed in that the control column moved further forward, but there was still no retardation. After further instructions to the student pilot to brake the instructor took control and applied the brake lever on his control column a number of times but to no avail.

When the aircraft was approaching the far end of the runway, with its attendant raised earth embankment, the instructor decided to steer the aircraft to the right towards open, level fields. However, he was able only to turn the aircraft through about 20° to 30° before the rudder became ineffective. ATC saw the aircraft deviate from the runway and asked the pilots if they had a problem; the student pilot replied "BRAKE FAILURE". The aircraft was, by then, running across a field of light crops towards the M11. The instructor asked the student in the front seat to operate the undercarriage retraction lever. He was unable to use the corresponding lever in the rear cockpit because the mechanism had been wire locked to prevent operation of the landing gear from that position. The instructor pilot did not use the emergency brake lever nor did he instruct the student pilot to do so. Moreover, the instructor did not shut down the engine nor did he instruct the student pilot to do so.

As the aircraft reached the airfield boundary, at a speed of about 20 kt, it passed to the south of the raised earth embankment and through the wooden boundary fence. It descended onto the motorway approximately 15 feet below, slid across the northbound carriageway, struck the central crash barrier and came to rest on the southbound carriageway. The instructor pilot, who had remained in his seat, was uninjured and the engine was still running.

At about the time that the aircraft went through the wooden fence and ran down the motorway embankment, the front ejection seat fired. The instructor had not ordered the student pilot to eject nor had he warned him not to do so (since by that time the aircraft's speed was well below the minimum for safe ejection on the ground). During the ejection sequence the student pilot separated from his seat but his parachute did not have sufficient time to deploy fully before he struck the ground.

The safety pins for the ejection seat and canopy jettison mechanisms were not carried on board the aircraft. Suitable safety pins were offered and fitted by a technician based at Duxford before the aircraft was removed from the motorway.

RECOMMENDATION 2003-13

The Civil Aviation Authority should review the current arrangements at Duxford Aerodrome for preventing aircraft over running onto the M11 motorway after a landing or rejected takeoff on Runway 06.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this recommendation. In co-operation with Duxford Aerodrome, the CAA has reviewed the arrangements at Duxford Aerodrome to prevent an aircraft excursion on to the M11. The Aerodrome already meets all licensing requirements, nevertheless, the CAA has accepted the Aerodrome's proposal to reduce the runway declared distances, thus creating increased Runway End Safety Areas (RESAs) which will exceed international recommendations. The CAA is of the opinion that increased RESAs should provide additional protection against an aircraft overrun on to the M11.

RECOMMENDATION 2003-14

The Civil Aviation Authority should encourage L-39 Albatros operators to include the use of the Emergency wheel brakes into the training syllabus and normal operation of the aircraft type.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation. The CAA will in future require L-39 Albatros operators to include the use of the Emergency wheel brakes into training syllabi, for normal operation of the aeroplane, when submitted for the issue of Exemptions to allow type training.

RECOMMENDATION 2003-68

The Civil Aviation Authority should require operators of civil registered aircraft fitted with live ejection seats to carry the aircraft's escape systems safety pins:

a) On all flights and high speed taxi tests.

b) In a position where they are likely to be found and identified without assistance from the aircraft's flight or ground crews.

Status - Fully Accepted - Open

CAA Response

The CAA accepts this Recommendation. Operational requirements applicable to ex-military aircraft are set out in Civil Aviation Publication (CAP) 632 (Operation of 'Permit-to-Fly' Ex-Military Aircraft on the UK Register). The CAA has notified current operators of civil registered, ex-military aircraft, fitted with live ejection seats, that they are required to carry the aircraft's escape systems safety pins:

a) On all flights and high speed taxi tests.

b) In a position where they are likely to be found and identified without assistance from the aircraft's flight or ground crews.

This requirement will be included in a newsletter and also the next addendum to CAP 632, both to be published in December 2003.

CAA Action

The publication of the newsletter took place in May 2004, with the addendum to CAP 632 under preparation and planned for publication in July 2004.

Cessna U206F	Strathallan Airfield	5 May 2002	Accident

References: Bulletin 6/2003 dated 5 Jun 2003

FACTOR F16/2003 dated 11 Jul 2003

SYNOPSIS (From AAIB Report)

The aircraft was operated by a parachuting club and was on its twelfth sortie of the day at about 1955 hrs (2055 hrs local time) operating on grass Runway 10. The visibility was good, with no cloud and only light winds. The aircraft was being flown

by the Chief Pilot, who was also the Chairman of the club; it was his twelfth sortie that day and his eighth in G-BAGV. The accident was observed by a number of club members who were around the club buildings and hangar, abeam the threshold of the runway in use.

The pilot reported that the aircraft had behaved normally during a drop of parachutists from 4,500 feet altitude and the subsequent 'straight in' approach to landing. However, just as the aircraft crossed the airfield boundary, with full flap and "at about 70 mph", the nose dropped. The aircraft struck the ground nose-down and turned over. The pilot recalled hearing a bang just prior to the loss of control and also that he had trimmed the elevator control all the way back but was still holding a small amount of back pressure on the controls. The aircraft came to rest, inverted, some 75 metres inside the airfield boundary. The pilot sustained minor head injuries but, although he was upside down, he was able to escape from the aircraft through the cargo door with the assistance of the airfield staff. There was no fire.

A number of the eyewitnesses wrote down brief accounts of what they had observed during the accident. The accounts agreed in stating that the landing approach had appeared normal and a number commented that, at a late stage (one suggested 12 feet wheel height and the engine noise reducing at the same moment), the nose had dropped and the rate of descent increased. The accounts were consistent in describing the nose leg collapsing as the aircraft struck the ground and the aircraft tipping over its nose onto its back.

RECOMMENDATION 2003-26

The Civil Aviation Authority should re-iterate its advice regarding the use and re-use of self-locking fasteners, contained in Leaflet 2-5 of CAP 562, in a document likely to be widely read by and easily accessible to aircraft maintenance engineers and technicians.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

The advice contained in Civil Aircraft Airworthiness Inspection & Procedures (CAP 562) Leaflet 2-5 has been included in Airworthiness Notices (CAP 455) Notice 12 "Experience from Incidents" Appendix 17, Self-locking fasteners. Airworthiness Notices are circulated to every CAA licensed aircraft maintenance engineer and every CAA approved maintenance organisation. CAP 455 is also available free from the CAA Internet web site www.caa.co.uk.

The CAA will re-iterate its advice regarding the use and re-use of self locking fasteners contained in CAP 562 and CAP 455 to the light aircraft industry, with an article in the September 2003 issue of the General Aviation Safety Information Leaflet (GASIL). This document is widely read by, and easily accessible to, aircraft maintenance engineers and technicians associated with the light aircraft industry.

CAA Action

GASIL 2003/03 was published in September 2003 and contained an article that reiterated the CAA advice to aircraft maintenance engineers and technicians associated with the light aircraft industry regarding the use and re-use of self-locking fasteners.

Piper PA30	Near Wolverhampton Business Airport	8 Mar 2002	Accident

References: Bulletin 4/2003 dated 3 Apr 2003

FACTOR F12/2003 dated 14 May 2003

SYNOPSIS (From the AAIB Report)

Following a comprehensive pre-flight inspection by the prospective owner, which included a thorough fuel drain check, the aircraft was taxied to the refuelling pumps where 103 litres per side were uplifted; 75 litres per side into the main tanks and 28 litres per side into the auxiliary tanks. G-ASMA was the eighteenth aircraft to be replenished with Avgas that day and there had been no bulk fuel deliveries. After refuelling, the aircraft was taxied to the runway holding point where power and pre-departure checks were carried out. Both engines performed satisfactorily, including the idle check. The fuel selectors were set to the MAIN tank positions where they remained for the duration of the flight. After a normal takeoff and climb the aircraft was levelled at about 3,000 feet altitude where the prospective owner carried out some gentle handling exercises. These exercises took place over a period of about 30 minutes and both pilots noted how 'smooth' the engines were. Following the handling exercises, the aircraft was flown back towards the departure airfield to join the circuit and land.

On joining the downwind leg, the instructor noticed that the sound from the propellers indicated that they had gone out of synchronisation. Thinking that the prospective owner, who was the handling pilot, had moved the power levers disproportionately, the instructor moved them both forward but there appeared to be no response from the right engine. The prospective owner stated that the right engine had totally lost power by the end of the downwind leg and that at that time, the engine power levers were not at their fully retarded (idle) positions. Moreover, the right propeller control lever was not selected to feather.

The instructor assisted the handling pilot to turn the aircraft onto the final approach. The landing gear was selected DOWN when the aircraft was at approximately 500 feet, but the green 'DOWN AND LOCKED' indicator light in the cockpit did not illuminate. A request for the Tower to observe if the landing gear was down was considered but the RTF frequency was in use by another aircraft. The landing gear was cycled twice but on neither occasion did the green 'DOWN AND LOCKED' light illuminate. The landing gear lever was left in the DOWN position. By this time the instructor had taken control of the aircraft and, at a height of about 300 feet, "pushed everything forward" to initiate a go-around. The left engine appeared to respond fully but the aircraft did not climb or maintain height. Because there was not enough runway distance remaining in which to land, the instructor initiated a left turn and landed in a nearby ploughed field. Towards the end of the landing roll, the instructor turned the aircraft sharply to the left to avoid colliding with a hedgerow; during this manoeuvre the left landing gear collapsed.

RECOMMENDATION 2003-11

It is recommended to the Civil Aviation Authority that an article be published warning owners and operators of all aircraft that have flexible bladder fuel tanks of the

potential problems associated with parking aircraft for extended periods of time with part-filled fuel tanks.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation. The CAA will publish articles in the issue of General Aviation Safety Information Leaflet to be published in June 2003, and in a Flight Operations Department Communication to be published in May 2003, warning owners and operators of all aircraft that have flexible bladder fuel tanks of the potential problems associated with parking aircraft for extended period of time with part-filled fuel tanks.

CAA Action

Articles have been published in GASIL 2003/02 in June 2003, and Flight Operations Department Communication, 19/2003 in July 2003, warning owners and operators of aircraft that have flexible bladder fuel tanks of the potential problems associated with parking aircraft for extended periods of time with part-filled fuel tanks.

Spitfire PR XI	Near Rouen, Valle de Seine Airport	4 Jun 2001	Accident

References: Bulletin 5/2003 dated 8 May 2003

FACTOR F14/2003 dated 11 Jul 2003

SYNOPSIS (From AAIB Report)

NOTE: This is an account of an accident that occurred in France and which was subject to an investigation by the Bureau d'Enquetes et d'Analyses pour la Securite de l'Aviation Civile (BEA) and the French judiciary. The AAIB were asked to conduct and oversee a strip inspection of the Rolls-Royce Packard Merlin engine on their behalf.

Rouen, Vallee de Seine Airport has a main, paved, Runway 04/22 and a shorter, grass Runway 05/23. During the pre-display briefing, pilots were advised to make use of the latter in case of emergency.

G-PRXI was joining one of four 'vics' of aircraft forming-up to the south-east of the airfield at crowd rear. The aircraft was observed to join-up, as briefed, on the extreme right of one of the 'vics'. The pilot maintained the correct position for a few minutes before he was seen to slowly drop back about 50 yards and also to move out a distance of about four wingspans from the ideal position. There were no visible signs of any problems with the engine or airframe. Eventually he went out of sight to the 'vic' leader and was heard to call on the radio "GOT A PROBLEM, RETURNING TO THE AIRFIELD". Then he transmitted "GOING FOR THE GRASS". At some point, the Tower controller suggested that Runway 05 was available, but there was a quartering tailwind for that runway and it appeared that the pilot, having sufficient height available, opted for the reciprocal Runway 23.

The leader, and others, saw the aircraft descending towards the grass strip on a base leg and it appeared that it was fairly well set up for a landing. The pilot was then heard to call "THERE'S PEOPLE ON THE RUNWAY" in what was described as a 'calm, if surprised voice'. The formation leader confirmed this visually, noting that the

numbers he saw being likened to "that seen during a cricket match, with most of the people at the north-eastern end".

A witness video, broadcast in an edited form on UK television, showed the aircraft apparently extending the base leg to make an approach to Runway 22 with the landing gear down and the flaps extended. The propeller was rotating at some indeterminate speed as the aircraft headed towards the camera. As it approached abeam the camera in almost level flight, a puff of dense black smoke was seen to issue from the exhaust stubs and the propeller seemed to slow rapidly after an initial burst of power is heard (note: a detailed analysis of video and audio information was conducted by the BEA and a summary is contained in their report). Almost immediately, the right wing dropped and the aircraft rolled inverted before diving into the ground almost vertically. An immediate fireball followed and much of the airframe was subsequently consumed by fire.

A post-mortem report carried out when the pilot's body was returned to the UK showed that he had died instantly on impact from severe multiple injuries.

RECOMMENDATION 2003-15

It is recommended that the Civil Aviation Authority should issue a letter to all operators of Rolls-Royce Merlin powered aircraft, equipped with Rotax magnetos, recommending that the insulator, P/No N72791, be replaced at magneto overhaul. In addition, the letter should draw the attention of operators to the following recommendations made by Rolls-Royce plc:

1 Magneto overhaul on low utilisation engines should be accomplished at about half the generally accepted 500 hour engine overhaul life.

2 A magneto inspection should be performed on all Merlin engines within 50 hours/ one year, and thereafter at yearly intervals, which should include visual checks of:

   a) Points setting, condition and function

   b) Insulator condition

   c) Correct lubrication

   d) Anti-tracking paint condition

   e) Other apparent faults and signs of deterioration

A once-off check should be performed to ensure that copper inserts are used in the high-tension leads rather than aluminium or any other metal.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

The CAA issued a letter (Reference LTO No. 2440, dated 29 May 2003) to all operators of Rolls-Royce and Packard Merlin powered aircraft, equipped with Rotax magnetos, recommending the replacement of the insulators P/No N72791 at magneto overhaul. The letter and promulgating the additional further recommendations made by Rolls-Royce and in addition extended the recommended actions to Packard Merlin engines equipped with Rotax magnetos.

The letter further recommended that advised operators to incorporate these maintenance actions into their aircraft maintenance programmes.

Piper PA24-250	Osea Island, Essex	12 May 2001	Accident

References: Bulletin 12/2002 dated 12 Dec 2002

FACTOR F24/2002 dated 31 Dec 2002

SYNOPSIS

The left seat pilot on the accident flight had been a part owner of G-ARIE since 1995. He had held a PPL since 1992 and his most recent revalidation for his single-pilot, single-engine rating had been 3 July 1999. He had a total of 265 hours flying experience of which 130 hours were on type. In accordance with Joint Aviation Requirements - Flight Crew Licensing (JAR-FCL) 1.245(c)(1), this revalidation was required every two years and, as a consequence, the pilot had made a private arrangement with a Qualified Flying Instructor (QFI) to fly a one hour dual flight in G-ARIE. No witnesses were found to confirm the intended profile of the flight although Aeronautical Information Circular (AIC) 127/1999 details the content of such a flight. The QFI had been a flying instructor since 1991.

An acquaintance had sat with the two pilots before the flight and saw them walk out to G-ARIE. He saw the pilot sit in the front left seat and the QFI sit in the front right seat. One witness heard a sound of 'backfiring' during engine start but no other unusual events were reported. Take-off appeared normal at approximately 1515hrs. The acquaintance described the weather as 'CAVOK' with the surface wind as 10 to 12 kt from the northeast.

Numerous eye witnesses, on the surface, near Osea Island saw the final manoeuvres of G-ARIE. Most described it as being in a descent, pointing nose down and "spiralling" or "spinning". Additionally, a pilot who was flying a Yak 11 in the area also saw the aircraft spinning. This pilot was flying between 2,500 and 3,000 feet amsl when he saw the aircraft to his left and below him; he described it as being in a spin to the right with a nose down pitch attitude of about 60deg. Initially he thought that it was a training spin but became puzzled as it continued to spin and so he flew towards the area. He saw about four to six complete turns before the aircraft impacted the ground; as it did so, he saw a ring of spray from the crash site.

Numerous personnel alerted the emergency services. The Yak pilot transmitted a 'Mayday' call on 121.5 Mhz and remained over the crash site until the emergency helicopters arrived; the 'Mayday' call was recorded at 1527hrs. The RAF Search and Rescue (SAR) helicopter reported on the frequency at 1533hrs and was in visual contact with the Yak at 1541hrs. By 1547hrs, the RAF helicopter, a police helicopter and an air ambulance helicopter were on the scene and had confirmed that the accident had been fatal. The police had recorded the first telephone call from the public at 1529 hrs.

All the witnesses described the weather as very good with a clear horizon. The pilot of the RAF rescue helicopter estimated that the visibility was about 15km although the horizon was "hazy".

RECOMMENDATION 2002-23

The Civil Aviation Authority should develop an appropriate recognised performance specification against which carbon monoxide detectors can be assessed and approved, with the eventual aim of mandating their use on all piston engined aircraft.

Status - Partially Accepted - Open

CAA Response

The CAA partially accepts this Recommendation.

The CAA will commission a feasibility study to determine whether an appropriate airworthiness specification could be developed that would form the basis for a practicable and cost effective CO detector for aviation use. This study will investigate also whether any of the currently available domestic detectors would work sufficiently reliably in the aircraft environment.

The target for completion of this feasibility study is 31 December 2003.

Until the feasibility study is complete, it would be inappropriate for CAA to commit to an action to mandate carriage of an instrument, which may eventually prove impractical or not cost effective to produce.

CAA Action

Since CAA does not have the expertise needed to derive a technical specification for a carbon monoxide detector it approached the European Organisation for Civil Aviation Equipment (EUROCAE), with a request that they use their access to expertise to develop an appropriate minimum performance specification. This request found favour with the EUROCAE Technical Committee, which proposed setting up an expert working group to undertake the technical work. Unfortunately, the EUROCAE call for participation in the working group elicited little support from the aviation industry and insufficient suitable expert resource was made available to allow the task to be started. Therefore the EUROCAE Council had no choice but to abandon the development of the specification.

Having now had closed the most promising route to progress on this Safety Recommendation, it remained to find an alternative way for CAA to satisfy its obligations in this matter. At the meeting of the SRG Airworthiness Research Committee on 25th November 2003, the possibility of the need for research into CO detection was raised and found favour. As a matter of priority the CAA is now seeking to fund a research project within the UK to develop an appropriate CO detector specification to meet the intent of the recommendation. The research project will also look at past studies of detectors to ensure that the developed equipment specification will provide a suitable basis for rule-making.

Since 28 September 2003, the European Aviation Safety Agency (EASA) has been the organisation responsible for setting the design standards for most aircraft operated in the European Union. On completion of the research work the results will be made available to the EASA with a recommendation for them to take an appropriate action on aircraft design standards.

Piper PA28-180	**Nayland Airfield, Suffolk**	**28 Apr 2001**	**Accident**

References: Bulletin 1/2004 dated 8 Jan 2004

FACTOR F7/2004 dated 12 Feb 2004

SYNOPSIS (From AAIB Report)

The aircraft, flown by two qualified and experienced pilots, suffered a power loss necessitating a forced landing. At that time the aircraft was in a position to land on

Nayland airfield in Essex. At a late stage in the approach however, the handling pilot was unable to prevent the aircraft's right wing from impacting with a large tree; the right wing was torn from the fuselage and the aircraft came to rest inverted on its right side. Both pilots, one of whom was seriously injured, were able to vacate the cabin with external assistance. The fuel selector was selected to the right tank, that was ruptured in the impact, and although it was not possible prove that this tank contained fuel at impact calculations showed that it should have contained approximately 8 US Gallons. Subsequent examination and testing of the engine and its components revealed no anomalies and it was concluded that, due to the ambient weather conditions at the time, induction system icing was the most likely cause of the power loss. A recommendation has been made to the CAA for measures to be taken to significantly reduce the numbers of accidents resulting from forced landings, brought about by induction system icing.

RECOMMENDATION 2003-125

It is recommended that the CAA take measures, both technological and procedural, including the review and promulgation of published material and the re-assessment of warning systems and their capabilities and reliability, to significantly reduce the number of potential accidents, to UK registered piston-engined aircraft, resulting from engine failures brought about by induction system icing.

Status - Partially Accepted - Open

CAA Response

The CAA partially accepts this recommendation. On 28 September 2003, responsibility for the technological measures addressed in this Recommendation passed to the European Aviation Safety Agency (EASA) under Regulation (EC) 1592/2002 and the recommendation should be addressed to that Agency. Nevertheless, the CAA has been drafting new design requirements intended to prevent induction system icing and these will be forwarded to the EASA by March 2004.

With regards to the procedural measures, a CAA sponsored research programme has been initiated. This programme will review both the adequacy of the current carburettor ice prevention operating procedures and the viability of warning systems. This research is due to be completed by December 2005. The CAA is also reviewing the PPL training syllabus to ensure that the subject of carburettor icing is adequately addressed. This review will be completed by July 2004. In the meantime, the CAA will continue to publicise widely the problem of carburettor icing.

CAA Action

A change to the engine design certification requirements was introduced in the initial issue of the EASA Certification Specification for Engines (CS-E) which was published in October 2003. This change now requires provision for the fitting of an induction thermometer or ice indicator as appropriate for the control of ice prevention systems.

The CAA will continue to monitor the output from the research activity to assess the potential need for further rulemaking.

Piper PA28-200-2	Warren Farm, Lambourne	3 Dec 2000	Accident

References: Bulletin 11/2003 dated 6 Nov 2003

FACTOR F41/2003 dated 10 Dec 2003

SYNOPSIS (From AAIB Report)

Whilst apparently flying normally in clear air at a height of around 4,200 feet, at or below manoeuvre speed, the aircraft suffered an in-flight structural failure within five seconds of deviating from straight and level flight. The main part of the aircraft was severely disrupted by trees just before ground impact, but there was no fire. Detailed examination and analysis of the wreckage revealed that the first event in the break-up sequence had been the failure, in download, of the outer section of the left wing. No pre-existing defects were identified in the structure of the wing or the flying control systems, and there was no evidence of atmospheric turbulence or any factor requiring the pilot to carry out an evasive manoeuvre. The investigation concluded that a manoeuvre, resulting from unintentional and unusual control inputs by either the pilot and/or the front seat passenger, sufficient to overload the wing structure, was the most likely cause of the wing failure.

RECOMMENDATION 2003-98

The CAA should review the current training syllabus for the Private Pilot's Licence and the literature available to pilots generally, with respect to raising the awareness of the significance of manoeuvre speed, and clearly make it known that flying at or below manoeuvre speed does not provide protection for the aircraft structure from damaging stresses for all possible combinations, and reversals of, control inputs.

Status - Fully Accepted - Closed

CAA Response

The CAA accepts this Recommendation.

The CAA will review the current training syllabus for the Private Pilot's Licence by 1 April 2004.

The CAA already publicises the dangers of extreme control movements during General Aviation safety evenings. In order to further raise the awareness of the significance of manoeuvre speed, an article on the subject will be published in the General Aviation Safety Information Leaflet (GASIL). The article will highlight that flying at or below manoeuvre speed does not provide protection for the aircraft structure from damaging stresses for all possible combinations, and reversals of, control inputs.

CAA Action

The CAA has reviewed the current training syllabus for the Private Pilot's Licence and, whilst determining that no amendment is required, acknowledges that publicity of this aspect of the existing ground syllabus would be of benefit.

In order to further raise the awareness of the significance of manoeuvre speed, an article on the subject was published in the General Aviation Safety Information Leaflet (GASIL) 1 of 2004, published in March.

Cessna C404 Titan	Near Glasgow Airport	3 Sep 1999	Accident

References: AAR 2/2001 dated 31 Jul 2001

FACTOR F35/2001 dated 31 Jul 2001

SYNOPSIS (From AAIB Report)

The aircraft had been chartered to transport an airline crew of nine persons from Glasgow to Aberdeen. The aircraft was crewed by two pilots and its weight was close to the maximum permitted for take-off. ATC clearance for an IFR departure was obtained before the aircraft taxied from the business aviation apron for take-off from Runway 23, which has a take-off run available of 2,658 metres. According to survivors, the take-off proceeded normally until shortly after the aircraft became airborne when they heard a thud or bang. The aircraft was seen by external witnesses at low height in a wings level attitude that later developed into a right bank and a gentle descent. Witnesses reported hearing engine spluttering and saw at least one propeller rotating slowly. There was a brief 'emergency' radio transmission from the commander and the aircraft was seen in a steep right turn. It then entered a dive. A witness saw the wings being levelled just before the aircraft struck the ground on a northerly track and caught fire. Three survivors were helped from the wreckage by a nearby worker before flames engulfed the cabin.

RECOMMENDATION 2001-40

The increased statistical risk in operating FAR/JAR Part 23 aircraft, in comparison with the larger FAR/JAR Part 25 "Transport Airplanes", is a strong incentive to incorporate at least some of upgraded seat requirements into the existing light aircraft fleet, particularly for those types in continuing production. For example, dynamic testing has shown the advantages of the fitting of upper torso restraints. Similarly, it is possible for seat attachment fittings to be strengthened without imposing a requirement that the FAR/JAR 23.562 injury criteria be demonstrated.

It is therefore recommended the CAA should undertake a study to identify those elements of the current JAR 23 seat standards which may be used for retrofit into existing aeroplanes whose maximum certified take-off mass is less than 5,700kg and, separately, for those designs in continuing production which are not covered by the current JAR 23 standards. These elements should then be applied at least to those that are operated in the Transport Category (Passenger).

Status - Fully Accepted - Open

CAA Response

The CAA accepts this Recommendation. In the context of the factual information contained in Section 1 of the report, the CAA will undertake a study to identify any relevant parts of current JAR-23 seat standards that could effectively be applied retrospectively to aircraft. The study will separately focus on "in-service" aircraft and those "in continuing production" at weights under 5700kg operated in the Transport Category.

On completion of the study, by March 2002, consideration will be given to proposing amendments to the JAA operational requirements.

CAA Action

From the study completed in March 2002 the CAA is satisfied that only the retrospective application of current JAR 23 upper torso restraint requirements was worthy of further study.

A separate study to investigate the viability and costs associated with such a change was completed by the end of July 2003 and a summary of the investigations was sent to Central JAA for action. A reply was received from Central JAA indicating their intention to discuss such a proposal internally with the Operations Division, and requesting CAA to draft an NPA for proposed rulemaking for inclusion in JAR 26.

CAA will submit a NPA to JAA by the end of June 2004.

Part 4 AAIB Recommendations involving the DfT

There were no AAIB Recommendations involving the DfT

Part 5 AAIB Recommendations made to other non-CAA bodies

Airbus A310-308	Manchester Airport	15 Jul 2003	Incident

References: Bulletin 3/2004 dated 11 Mar 2004

FACTOR F17/2004 dated 15 Apr 2004

SYNOPSIS (From AAIB Report)

Following a technical problem, the airbridge on Stand 6 at Manchester Airport could not be parked in the correct position. From the remote location of Apron Control, the stand allocator was unaware that Stand 6 was obstructed and so allocated it to an arriving A310 aircraft. Although, irrespective of the position of the airbridge, a marshaller was required to guide the aircraft on to the stand, the stand allocator also activated the Stand Entry Docking Guidance (SEDG) lighting. The marshaller arrived at the stand when the A310 was already manoeuvring to park and following the illuminated SEDG. Neither the aircraft commander nor the marshaller noticed that the airbridge was incorrectly parked until it was too late to prevent the upper surface of the aircraft's left engine cowling striking the underside of the airbridge as the marshaller signalled the aircraft to stop. Two safety recommendations are made which address control of the SEDG systems at Manchester Airport. A third safety recommendation is addressed to the CAA proposing an expansion of the UK aerodrome audit process to include the control and use of SEDG systems.

RECOMMENDATION 2003-131

Manchester Airport plc should ensure that Stand Entry Docking Guidance lighting is not activated by Apron Control until a positive communication has taken place with staff at the stand confirming that the stand is clear. Until the aircraft has parked and shut down its engines, those staff should remain available at the stand to inform Apron Control if the stand subsequently becomes obstructed.

Status - Not CAA - Closed

Response

From Manchester Airport

We have now made budgetary provision for SEG modifications so that we will comply with the recommendations 131 & 132.

Actions to date have included investigations into the engineering and electronic functions of our current SEG systems. We have included all three terminals in the investigation, having concluded at an early stage that we can make improvement to safety standards by including terminal 2 along with terminal 1 & 3, in the scope of proposed works.

RECOMMENDATION 2003-132

For the airbridges and stands serving Terminals 1 and 3, Manchester Airport Plc should, within a reasonable timescale, fund and develop Stand Entry Docking Guidance lighting controls and associated procedures that comply with the advice and guidance contained in Civil Aviation Publication (CAP) 642.

Status - Not CAA - Closed

Response

From Manchester Airport

We have now made budgetary provision for SEG modifications so that we will comply with the recommendations 131 & 132.

Actions to date have included investigations into the engineering and electronic functions of our current SEG systems.

We have included all three terminals in the investigation, having concluded at an early stage that we can make improvements to safety standards by including terminals 2 along with terminal 1 & 3, in the scope of proposed works.

Zenair CH 601UL Zodiac	Near Bewdley, Worcs	28 Jun 2003	Accident

References: Bulletin 12/2003 dated 11 Dec 2003

FACTOR F6/2004 dated 12 Jan 2004

SYNOPSIS (From AAIB Report)

This was the first flight of a recently constructed aircraft and it was using premium unleaded motor fuel. The engine had been run on the ground for about 12 minutes and the aircraft had then been parked in the open for over an hour. Subsequently, the aircraft was started up, taxied and took off, but the pilot had omitted to select on the electric fuel pump. During the initial climb the engine lost power and a forced landing was carried out. The aircraft was inspected following the accident and no apparent faults were found with the engine or the fuel system. It was concluded that a vapour lock had occurred in the fuel lines to the engine mechanical fuel pump, and that this could have probably been avoided had the electric pump been operational. The aircraft's fuel system was not fitted with a vapour return line, which was required on all Rotax 912 equipped aircraft using unleaded motor fuel and issued with a UK PFA permit to fly; this was to comply with CAA Airworthiness Notice 98B.

RECOMMENDATION 2003-124

The PFA should inform all owners of the Zenair CH601 aircraft, fitted with Rotax 912 engines and issued with permits to fly, of the need to install a vapour return fuel line to the fuel system in order to comply with CAA AWN 98B.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

The CAA has raised the subject of this Safety Recommendation at a recent meeting with the PFA, and will monitor the action taken by the PFA in response to it.

Piper PA 38-112	Wycombe Air Park, Bucks	15 Jun 2003	Accident

References: Bulletin 12/2003 dated 11 Dec 2003

FACTOR F1/2004 dated 12 Jan 2004

SYNOPSIS (From AAIB Report)

Following the completion of a training flight, the pilot experienced an unusual vibration on his first approach to Wycombe. He aborted the landing and continued in the circuit. On a subsequent landing, the nose of the aircraft continued to drop after touchdown, and so he raised the nose and took off again. He was asked by ATC to remain in the circuit and was also informed that the nose landing gear had detached from the aircraft. He was then talked through the subsequent approach and landing by the CFI of his training organisation. An engineering investigation revealed that the leg had failed as a result of a fatigue crack at a lubrication groove at the base of the nose gear strut housing, and that this mode of failure had happened on previous occasions to other PA-38 aircraft. An inspection of the groove may not have been carried out due to previous confusion over the insertion of the requirement into the Maintenance Manual by the manufacturer.

RECOMMENDATION 2003-94

In order to prevent failure of the NLG on the Piper PA-38 Tomahawk, the aircraft manufacturer should change the requirement for conducting a dye penetrant inspection of the NLG cylinder lubrication groove, such that the interval between inspections takes into account those aircraft which experience high numbers of landings per hour, but particularly those aircraft used to conduct basic flight training, and to communicate that such an inspection exists through appropriate service information documentation.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

Denney Kitfox Mk4	Smeeton Westerby	13 Jun 2003	Accident

References: Bulletin 3/2004 dated 11 Mar 2004

FACTOR F20/2004 dated 15 Apr 2004

SYNOPSIS (From AAIB Report)

The aircraft was being flown on one of a series of test flights, which were required before it could be issued with a Permit to Fly. The aircraft had been airborne for 15 minutes and, having completed some handling tests, was returning to Leicester Airport at 1,500 feet QFE when the engine stopped. The commander selected what

he considered to be the only suitable field for a forced landing, knowing that it contained a standing cereal crop. He did not attempt to restart the engine or transmit a radio call because he decided that his priority should be to fly the aircraft.

With the aircraft flying just above the level of the top of the cereal crop its speed reduced and it started to sink. As the mainwheels contacted the crop, which the crew estimated stood two and a half feet tall, the aircraft pitched forward and came to rest inverted after travelling a further 30 to 40 feet. The pilots released themselves from their harnesses and exited the aircraft through the doors, which had already sprung open during the accident. All three emergency services attended the scene but there was no fire and the occupants of the aircraft were uninjured. The commander had particular praise for the four-point shoulder and lap harnesses, which he believes had saved both him and his fellow pilot from injury.

Subsequent examination revealed that the engine failure was the result of fuel starvation caused by debris in the fuel pipe and fuel pump. The debris was identified as a rubber jointing compound, which had been used to connect rubber fuel pipes to metal hose nipples during construction. During a previous ground run this substance had been responsible for a blockage in the fuel system causing the engine to stop. The commander, who is also a PFA inspector, had advised the owners to remove the jointing compound from the fuel system following the ground run. In hindsight he considers that the fuel system should have been replaced, but without the use of rubber jointing compound on the rubber to metal joints.

RECOMMENDATION 2004-10

The Popular Flying Association should issue a technical instruction, which contains advice on the suitability of rubber jointing compound and alternate methods of achieving fuel tight joints in aircraft fuel systems.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

Spirit of St Louis Replica	Coventry Airfield	31 May 2003	Accident

References: Bulletin 1/2004 dated 8 Jan 2004

FACTOR F10/2004 dated 12 Feb 2004

SYNOPSIS (From AAIB Report)

Shortly after takeoff from Runway 23, whilst climbing and manoeuvring gently to begin its display sequence, the aircraft's right wing suffered a major structural failure and the aircraft fell steeply into an industrial compound bordering the airfield. There was no post impact fire. The pilot survived the impact, but died shortly afterwards from his injuries. The failure in fatigue of a combined right landing gear and wing strut support fitting was determined to have precipitated the wing failure.

RECOMMENDATION 2003-115

The Civil Aviation Administration of Estonia should review their regulatory function, which underpins the airworthiness oversight of aircraft such as the 'Spirit of St Louis' replica that are issued with a Limited Certificate of Airworthiness in the Experimental category, so as to be assured that such aircraft are maintained to an internationally agreed standard, especially if such aircraft are based in a different State.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

Bell 206B Jet Ranger III	**Crag Lough, Northumberland**	**30 May 2003**	**Accident**

References: Bulletin 1/2004 dated 8 Jan 2004

FACTOR F9/2004 dated 12 Feb 2004

SYNOPSIS (From AAIB Report)

The helicopter was involved in relatively slow speed, low level aerial photography that involved it flying a straight track before turning right around a fixed structure of significant historical interest. The pilot carried out one practice run that was judged to be slightly too fast and too close to the structure. The second attempt proceeded without incident until, when half way around the turn, the helicopter began to yaw to the right. Application of corrective left pedal was ineffective and as the helicopter continued yawing right it descended. The rotation continued through several complete revolutions and it struck sloping ground at low forward speed rolling on to its right side. All three occupants were able to vacate the aircraft with only minor injuries. An engineering investigation failed to find any technical fault that could have accounted for the accident. There was evidence, however, that the helicopter may have been operating in a part of the flight envelope where the susceptibility to loss of tail rotor effectiveness was possible. Two safety recommendations, promoting the dissemination of literature relating to the loss of tail rotor effectiveness, have been made.

RECOMMENDATION 2003-127

The European Aviation Safety Agency (EASA) should ensure that information on Loss of Tail Rotor Effectiveness (LTE) is included in helicopter pilot training syllabi.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

Although not specifically a recommendation for the CAA, the UK has, through its involvement with formulating the Joint Aviation Requirements for Flight Crew

Licensing – Helicopter (JAR-FCL 2), gained the agreement of the other JAA Member States to an amendment to the helicopter pilot training syllabi to include LTE. The amendment will be subject to the Notice of Proposed Amendment procedure during 2004. It is anticipated that JAR-FCL 2 will form the basis of European requirements for flight crew licensing scheduled for adoption during 2005.

Piper PA31	54 Miles West of Barbados	18 May 2003	Accident

References: Bulletin 11/2003 dated 6 Nov 2003

FACTOR F42/2003 dated 10 Dec 2003

SYNOPSIS (From AAIB Report)

The aircraft was on a flight from Canouan, a small island in the St Vincent group, to Barbados. Shortly after entering Barbados airspace, radar recordings show the aircraft deviated to the south of a direct easterly track to Barbados and descended from cruise flight level (FL) 55 to an altitude of 2,300 feet. The aircraft levelled at 2,300 feet and resumed an easterly track for about six minutes before once again deviating to the south and commencing a further descent. About 16 minutes after the aircraft's initial descent from FL55, the pilots of a commercial aircraft flying from Grenada to Barbados relayed a MAYDAY call from G-ILEA to Barbados Arrivals reporting that the pilot "had lost one engine; it appeared he was losing fuel and he doubted that he would be able to make it to Barbados". Some three and a half minutes after the initial MAYDAY call, the pilot of the commercial aircraft relayed a further message stating that the pilot intended to ditch. The final radar return for the aircraft showed it at an altitude of 600 feet about 55 miles on the 259° radial from Barbados Airport. Despite an extensive search and rescue operation, no trace of the aircraft or its two occupants was found. A reconciliation of fuel receipts and flight times shows that, at best, the aircraft would have been short of fuel for the flight, and at worst could have run out of fuel.

RECOMMENDATION 2003-77

It is recommended that New Piper Aircraft Ltd develop advice on ditching and ditching checklists for inclusion in the Aircraft Flight Manuals and Pilot Operating Handbooks of the PA-31 and other Piper types.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

Piper PA34-200T	Sherburn-in-Elmet Aerodrome	8 May 2003	Accident

References: Bulletin 5/2004 dated 3 May 2004

FACTOR F24/2004 dated 11 Jun 2004

SYNOPSIS (From AAIB Report)

After completing the power and pre-takeoff checks, the handling pilot taxied the aircraft past the holding point in order to line up on Runway 29. At a reported groundspeed of approximately 5 to 7 kt the nose gear leg suddenly collapsed. The aircraft slid approximately 30 feet and came to rest with its nose and both propellers touching the ground. The aircraft was shut down and both occupants evacuated the aircraft via the main door. The probable cause of the nose gear collapse was a mis-rigged nose gear downlock spring link. One safety recommendation concerning the Seneca Maintenance Manual was made to the Federal Aviation Administration of the USA.

RECOMMENDATION 2004-07

It is recommended that the Federal Aviation Administration, as the primary certificating authority for the Piper PA-34 Seneca aircraft series, should require the aircraft manufacturer to provide a clear and unambiguous description of the operation of the nose gear downlock spring link, its installation and its correct rigging by both narrative and pictorial means.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

Robinson R22	Cranfield Airfield	4 May 2003	Accident

References: Bulletin 10/2003 dated 9 Oct 2003

FACTOR F32/2003 dated 14 Oct 2003

SYNOPSIS (From AAIB Report)

The student pilot had been authorised to carry out the pre-flight checks, start the aircraft, as he had done on over 30 previous occasions, and wait for his instructor to join him. Having engaged the rotors and accelerated them to 100% RPM, he was checking that the low RPM horn and caution light came on as the RPM decreased through 97%. To achieve this the pilot had to raise the collective level slightly before reducing the amount of throttle because the horn and caution light are disabled with the collective lever in the fully down position. The pilot stated that he followed this procedure with the cyclic and collective frictions ON and the governor OFF.

Having decreased the RPM to 90% the horn and caution light had still not activated. The pilot lowered the collective and opened the throttle to regain 100% RPM. Suspecting that he may not have raised the collective sufficiently, the pilot decided to repeat the procedure. He again raised the collective and stated to reduce the amount of throttle. As the RPM was approaching 97% the pilot noticed that the aircraft had begun to rotate, as he recalls, in an anti-clockwise direction and he visually checked the position of the yaw pedals to ensure that the rotation was not the result of an input by him. He observed that the yaw pedals were centralised. By this stage the rate of rotation had increased and the pilot became aware that the aircraft was lifting off the ground. In what he described as a rapid sequence of events, the aircraft spun around three or four times, lifted into a two feet hover and, as he attempted to lower the collective, rolled right and descended on to the ground coming to rest on its right side. The pilot heard the low RPM horn sounding and noticed fuel spilling on to the apron from behind his right shoulder. He switched off the fuel shut off valve and the master switch and exited the aircraft through the left door. He had suffered minor injuries but there was no fire.

ATC became aware of the accident when they were advised by the pilot of a single engine light aircraft which was carrying out engine checks prior to take off. This pilot did not see the accident occurring, only the aftermath.

The accident was witnessed by a passenger in a helicopter which was hover taxiing towards the apron where the R22 was starting up. She recalled seeing the R22 on the ground facing the hangar building. With its skids still on the ground, the R22 started to rotate in a clockwise direction at an increasing rate. It spun around two-and-a-half times and then lifted into an estimated 10 feet hover. It was then seen to rotate while haphazardly pitching forwards and backwards and rolling left and right in a 'shaking and snaking' fashion. It then lifted a bit further before appearing to lose energy and, simultaneously, fall and roll onto the ground on its right side. The pilot of the witness's helicopter did not have a clear recollection of the accident because his concentration was devoted to manoeuvring his aircraft away from the vicinity of the R22.

The weather was warm and dry with the surface wind from 160° at 13 kt. The aircraft was on a heading of approximately 240° when it was starting up on the apron.

RECOMMENDATION 2003-74

It is recommended that Patriot Aviation amend their procedure for checking the Low RPM Horn and Caution Light during the STARTING ENGINE checks to reflect Robinson Helicopter Company's procedure, for the same check, in the R22 Pilot's Operating Handbook.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

Cessna C421C	Humberside Airport	29 Mar 2003	Accident

References: Bulletin 4/2004 dated 8 Apr 2004

FACTOR F22/2004 dated 12 May 2004

SYNOPSIS (From AAIB Report)

About 50 minutes into the flight, the aircraft returned to Humberside circuit and was cleared by ATC for a touch-and-go landing on Runway 21. The landing was firm but otherwise uneventful and witnesses heard the power being applied as it accelerated for takeoff. Just before rotation two large "puffs of smoke" were seen to come from the vicinity of the mainwheels as both propellers struck the runway. The aircraft then lifted off and almost immediately began to yaw and roll to the left. The left bank reached an estimated maximum of 90° but reduced just before the left wing tip struck the ground. The aircraft then cartwheeled across the grass to the south of the runway and burst into flames. The owner in the left pilot's seat and the pilot in the right pilot's seat escaped from the wreckage, but the flight examiner, who was occupying a seat in the passenger cabin, was unable to vacate the aircraft and subsequently died of injuries sustained in the post impact fire. An engineering investigation found no fault with the aircraft that might have caused the accident. The investigation concluded that the most probable cause was an inadvertent retraction of the landing gear whilst the aircraft was still on the ground.

RECOMMENDATION 2003-117

The Federal Aviation Administration should review the relevant Federal Aviation Regulations and guidance material for flight examiners to ensure that:

a) The policy on conducting flight tests from seats other than a pilot's seat in multiseat aircraft certified for single crew operations is clear and unambiguous.

b) The Pilot in Command on Practical Test flights is clearly defined.

Status - Not CAA - Closed

Response

FAA Response:

'The FAA intends to revise Order 8710, 3C, chapter 5, to ensure that FAA's policy concerning the conduct of practical tests by DPE from other than a cockpit seat in aircraft certificated for only a single pilot crewmember is clear and unambiguous as to the "command" status or responsibility of those on board and will allow the examiner to fully assess the command ability of the candidate and the assisting crewmember during a practical test conducted in this manner. Further, in the interest of improving safety, the FAA will provide additional emphasis and information on FAA policy concerning this matter to DPE who attend Examiner Standardization courses in the future.'

Pegasus CT2K	Wycombe Air Park	18 Feb 2003	Accident

References: Bulletin 6/2003 dated 5 Jun 2003

FACTOR F17/2003 dated 11 Jul 2003

SYNOPSIS (From AAIB Report)

The aircraft had been used throughout the day for the purposes of training, covering a mixture of exercises including an hour of circuit flying in the morning. This flight was a short air experience flight which was conducted in the local area. The final approach to Runway 07L was made in conditions of smooth air, with 75% flap, and an approach speed of 55 kt. The touchdown was smooth, with the nosewheel being held off in the normal manner and the aircraft was slowed with the minimum of braking as the pilot intended to vacate the runway at its northerly end. Nothing abnormal was noted whilst on the runway. The aircraft was then taxied onto the grass in the direction of the parking area and, after approximately 50 metres taxing over the fairly rough surface, the aircraft suddenly pitched forward. This was accompanied by a loud 'cracking' noise and the propeller stopped after contacting the ground. The fuel and magnetos were switched off, as were the electrical services, immediately after informing the tower of the accident. The occupants were uninjured and evacuated the aircraft via the normal exits.

It was immediately evident that the nosewheel had failed and that the nosewheel forks had contacted the ground, and that this had caused the nosegear strut to be bent backwards.

RECOMMENDATION 2003-33

It is recommended that the aircraft manufacturer, Pegasus Aviation, should modify the nosewheel assembly to minimise or eliminate the possibility of incorrect assembly by insertion of the wheel half mounting bolts in to the wrong holes in the nosewheel hub.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

RECOMMENDATION 2003-34

It is recommended that the aircraft manufacturer, Pegasus Aviation, should issue written instructions to owners of the CT2K microlight explaining how to correctly install the nosewheel assembly.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

RECOMMENDATION 2003-35

It is recommended that the aircraft manufacturer, Pegasus Aviation, should take appropriate measures to ensure that recently replaced nosewheel assemblies have been correctly installed.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

Scheibe SF25E Super-Falke	Bowland Forest, Lancashire	15 Feb 2003	Accident

References: Bulletin 9/2003 dated 11 Sep 2003
FACTOR F35/2003 dated 14 Oct 2003

SYNOPSIS (From AAIB Report)

On the day of the accident, Runway 12 was in use. The weather was good with clear skies and a surface wind of 120°/ 5 to 10 kt. The left seat pilot had already flown three gliding flights, each lasting 6 minutes. The right seat pilot had flown three flights in G-KDFF prior to the accident flight; these were the only flights flown by G-KDFF during the day. In the club 'Flight and Payment Log', the deputy CFI was annotated as P1 for all these flights. There were no reported aircraft unserviceabilities and no reported co-ordination difficulties between the gliders and G-KDFF.

Prior to engine start on the accident flight, another club member approached the aircraft. He had flown twice in G-KDFF that day with the deputy CFI, and he informed the right seat pilot (deputy CFI) that two gliders were being towed towards the rear of G-KDFF and that a tractor was towing two cables from the winch; the deputy CFI acknowledged this information. Later, the same club member heard the aircraft taxiing and saw it turning on the runway in preparation for takeoff. This club member had used the normal 'circle' take-off point on his takeoffs in G-KDFF and his impression was that, on the accident flight, the aircraft had turned earlier on the runway than he would have expected. He saw the take-off run, during which the aircraft appeared to bump up off the ground twice before lifting off. After lift-off, he observed that the aircraft's nose was lowered slightly and he then turned away. Shortly after, he heard a change in engine noise and, when he looked back he saw G-KDFF diving towards and impacting the ground. He was some 400 metres away from the impact point and ran towards the clubhouse to phone the emergency services.

There were other witnesses to the accident. One of these was standing near the clubhouse with a good view of the runway. He had heard the engine of G-KDFF start and had noticed it taxiing towards the runway. He watched it commence its take-off run and considered that the engine sounded normal. However, as it passed abeam his position, his impression was that it was going slower than normal, was "bumping along the field" and was "struggling to build up speed". However, approximately 100 metres past the clubhouse, it was airborne. With the aircraft clear of the ground, the witness saw a cable "snagged" on the tailwheel of G-KDFF. The aircraft climbed

straight ahead to about 100 feet agl before turning right through 90° with the cable still attached. Then, as G-KDFF seemed to be starting a further turn to the right, the aircraft banked sharply to the right and "spun in" to a field just beyond the club boundary.

The driver of the tractor also saw the accident flight as he returned to the winch after laying the winch cables on the runway. His impression was that the aircraft bounced about three times on the ground before getting airborne and that it seemed to climb at a shallower angle than normal. He also saw something attached to the tailwheel and realised that it was the winch cable. Prior to the accident, the tractor driver had checked with the winch operator as to how the cables should be laid. As instructed, he laid them along the runway and with a slight bow to the right.

Witnesses at the glider launch point also saw the accident and some of these saw one of the cables moving along the ground as G-KDFF tookoff.

RECOMMENDATION 2003-75

It is recommended that the British Gliding Association issue guidance to their member clubs to have rules to ensure that, with cables laid on or near the runway, a takeoff by a powered aircraft is only undertaken when the positions of the cables are known to the pilot and the take-off run can remain well clear of the cables.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

BAe 146-RJ100	Birmingham Airport	10 Feb 2003	Accident

References: Bulletin 7/2003 dated 10 Jul 2003

FACTOR F25/2003 dated 7 Aug 2003

SYNOPSIS (From AAIB Report)

Apart from a slight nose wheel shimmy during takeoff, the crew noticed nothing unusual during a flight from Glasgow to Birmingham Airport. However, after they had parked at the stand, it was apparent that the left nose wheel was missing and this was subsequently found adjacent to the runway at Birmingham. Examination of the aircraft revealed that an abutment ring (spacer) was incorrectly installed on the subject nose landing gear axle, and that this had precluded the correct locking action of two bolts designed to secure the wheel retaining nut. Three safety recommendations are made as a result of this event.

RECOMMENDATION 2003-31

It is recommended that BAE Systems review the AMM procedures for the removal and installation of the nose wheel of the BAe 146/Avro RJ series aircraft to include a

specific caution with respect to the fitment of the nose wheel abutment ring located at the inboard end of the NLG axle.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

RECOMMENDATION 2003-32

BAE Systems should ensure that the introduction of an awareness programme to highlight the possibility of incorrect assembly of the nose wheel abutment ring to the NLG axle is instigated, and include this awareness as an item in the aircraft type and recurrent training courses.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

Embraer 135	Norwich Airport	30 Jan 2003	Incident

References: Bulletin 11/2003 dated 6 Nov 2003

FACTOR F39/2003 dated 10 Dec 2003

SYNOPSIS (From AAIB Report)

The crew reported for duty at 1200 hrs on the day of the incident expecting to fly two return flights from Norwich to Aberdeen. Snow showers at Norwich led to the cancellation of their first two sectors and it was 1730 hrs before they departed Norwich for Aberdeen. After an uneventful flight and turnaround they left Aberdeen for Norwich at 1919 hrs with the first officer acting as pilot flying (PF). During the cruise he briefed for an ILS approach to Runway 27 at Norwich using Flap 22 for landing, instead of the normal Flap 45, due to the forecast strong crosswind. ATIS 'L' was current at the time and gave landing conditions of light snow showers, a wind of 360°/11 kt, a temperature of +1°C and a wet runway. On first contact with Norwich Approach the crew were informed that ATIS 'M' was now in force with the wind now 030°/25 kt and the 'RUNWAY RECEIVING ANOTHER LIGHT DUSTING'. This was acknowledged by the crew but they did not listen to the complete broadcast of information 'M'. On base leg the approach controller informed the crew that the runway was covered in 'SLUSH MIXED WITH HAIL TO A DEPTH OF 2-3MM…. YOU CAN STILL SEE THE WHITE LINES THROUGH THE SLUSH.' Although the crew acknowledged this, they had no recollection after the incident of receiving this information.

During the descent the crew also received an Engine Indication and Crew Alerting System (EICAS) Stall Protection System (SPS) warning which had illuminated due to ice accretion. In accordance with company procedures they added 6 kt to their approach speed (VAPP) giving them 130 kt as their VAPP and 120 kt as their VREF.

During the final stages of the ILS approach, the Norwich tower controller gave three further readouts as the wind veered and increased. On touchdown the wind was 020°/23 kt giving a tailwind component of 10 kt and a crosswind component of 21 kt.

The first officer flared the aircraft as normal and then felt the right wing drop. He corrected for this but the aircraft floated down the runway, touching down at 120 kt, between 500 and 600 metres from the threshold. Fire crews, who were on weather standby and pre-positioned near the taxiway/runway intersection at B1, 500 metres from the threshold of Runway 27, reported that the aircraft touched down beyond the intersection. In accordance with the company Standard Operating Procedures (SOP's), the Commander called 'MY BRAKES', pressed the brake pedals but felt no retardation. He tried several times with no effect and even the application of the parking brake, which applies full system pressure, made no noticeable difference to the aircraft's rate of retardation. The first officer transmitted that they were 'GOING OFF THE END OF THE RUNWAY' and they left the paved surface at a ground speed of 74 kt. The overrun area was a field covered in snow. This produced significant retardation and they came to rest 130 metres after leaving the paved surface. The fire crews were in attendance at the aircraft just after it came to a stop. There were no immediate signs of damage or fire and, after the crew had shut down the engines, the passengers disembarked in the normal manner.

RECOMMENDATION 2003-97

It is recommended that City Airline, review its Embraer 135 landing configuration policy and, in consultation with Embraer Brasileira de Aeronautica SA, produce a comprehensive written procedure that includes advice and highlights the ramifications associated with the execution of a 'Flap 22' landing.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

BAe 146-200	Near Birmingham Airport	12 Dec 2002	Accident

References: Bulletin 2/2004 dated 5 Feb 2004

FACTOR F11/2004 dated 16 Mar 2004

SYNOPSIS (From AAIB Report)

The aircraft was carrying out a scheduled passenger flight from Birmingham to Belfast City. During the climb, it appeared to hunt in pitch more than usual whilst the autopilot was engaged and it seemed to the flight crew that it would fail to maintain FL240, their cleared cruising level. When the autopilot was disconnected, the aircraft pitched up and the elevator control forces to counteract this were found to be very heavy. Nose down trim was applied, which caused the aircraft to pitch down. In an attempt to level the aircraft, both pilots then pulled back on the control columns with considerable force. The controls suddenly freed causing the aircraft to pitch up

rapidly, resulting in a large excursion in normal acceleration which caused serious injuries to two cabin crew members.

The investigation determined that the accident was probably caused by icing of the elevator servo tabs, coupled with the crew's response to the situation for which they had not been trained.

There have been a number of previous occurrences of suspected servo tab icing on the BAe 146/RJ aircraft series. This report makes a number of safety recommendations calling for maintenance and inspection actions to reduce the probability of this occurring and for the introduction of an emergency procedure to enable flight crews to respond to such an event in a manner that minimises the risk to the aircraft and its occupants.

RECOMMENDATION 2003-121

The aircraft manufacturer, BAE Systems, should alert operators of 146/RJ series aircraft to the possibility of precipitation accumulating in the elevator gaps whilst the aircraft is parked in near freezing conditions, or following a hailstorm, and that if untreated, this precipitation can lead to pitch control problems in flight.

Status - Not CAA - Closed

Response

BAE Systems issued a Notice to Aircrew (NTA OP 25) dated on 8 Jan 04 and changes to the Manufacturer's Operations Manual also dated 8 Jan 04 which covered this issue.

RECOMMENDATION 2003-123

The aircraft manufacturer, BAE Systems, should consider the introduction of a sampling programme for the elevator servo tab bearings and other flight control system bearings that are vulnerable to the effects of aircraft washing and de-icing, with a view to establishing a regular maintenance or replacement requirement for those bearings as necessary.

Status - Not CAA - Closed

Response

From BAe Systems

Following a series of restrictions in icing conditions, one of our operators conducted a bearing replacement programme in the flying control circuits on a number of their 146 aircraft. BAE SYSTEMS requested that the removed bearings be returned to Prestwick for examination. As a result of this exercise, a service bulletin, 146-27-177, is being raised. This will recommend that the exposed bearings in the aileron and elevator trim tab, servo tab, control rods, and surfaces are replaced at the 8 year structural check. This periodicity was supported by the fleet check results, and by a statistical analysis of the flying control restrictions across the Bae146/RJ fleet. The service bulletin has been formatted in parts to facilitate AD action on the most critical bearings.

Boeing B727 230F	East Midlands Airport	19 Nov 2002	Incident

References: Bulletin 12/2003 dated 11 Dec 2003

FACTOR F3/2004 dated 12 Jan 2004

SYNOPSIS (From AAIB Report)

The crew reported a loud grinding sound immediately followed by illumination of the 'engine failure' light. They aborted the takeoff at approximately 30 kt and as the thrust levers were closed the commander was aware of resistance within the No 1 thrust lever system. Subsequent examination revealed significant fire damage centred around the underside of No 1 engine, evidence of penetration from inside the engine casing and a fracture of a second stage low pressure (LP) compressor fan blade at the root attachment. There was no evidence of cowl penetration.

Previous incidents, where JT8D second stage LP compressor blade root fractures have caused the release of a blade from the disk, resulted in a manufacturer's Alert Service Bulletin (ASB) No 5729 requiring an ultrasonic and fluorescent penetrant inspection of all second stage fan blade roots. The fan blades from this engine had been inspected in accordance with the ASB but this failure occurred before a re-inspection was required. A blade redesign is available through implementation of a further Service Bulletin (SB). There have been no reported failures to modified blades.

RECOMMENDATION 2003-113

It is recommended that the FAA, in conjunction with Pratt & Whitney review the inspection and re-inspection period for the LP compressor second stage fan blades as detailed in ASB 5729 and mandated in AD 87-14-01.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

RECOMMENDATION 2003-114

It is recommended that the FAA, in conjunction with Pratt & Whitney, mandate SB 5866 that provides a more durable second stage fan blade root attachment and a higher life second stage disk.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

HS748	Western Italian Alps	14 Nov 2002	Incident

References: Bulletin 9/2003 dated 11 Sep 2003

FACTOR F33/2003 dated 14 Oct 2003

SYNOPSIS (From AAIB Report)

The airline had recently started operations for a customer who required short notice reaction to move freight between multiple destinations in Europe. This required two aircraft and three crews to be based at Paris Charles de Gaulle (CDG) working '12 hour' standby shift patterns.

On the night prior to the incident, the crew, who were positioned at CDG, had flown a return flight to London Stansted finishing their flying duty period at CDG by 0300 hrs. At 1230 hrs the crew were woken by a telephone call from company operations tasking them to fly an aircraft from Rome to Pisa, continuing onto CDG later that evening. Having missed an earlier positioning flight, they arrived in Rome at the scheduled time of their departure. They met with their ground engineer, who was to accompany them on both flights, and after some difficulties in obtaining their ATC clearance, departed Rome just over one hour late.

During the 'turn round' at Pisa, the commander supervised the cargo loading whilst the first officer, who was to be the handling pilot for the next sector, planned the route. He became concerned that one leg of their route had a Minimum Safe Altitude (MSA) of 15,900 feet and the aircraft they were flying had an operational ceiling of 15,000 feet. The crew discussed this and decided to fly the planned route at FL160. The commander reported that he had been told that a senior pilot within the company had successfully flown the aircraft to FL180 and that the company was seeking approval to remove the 15,000 feet ceiling limitation. The CAA however had no knowledge of any request seeking this approval.

The take-off from Pisa was performed with water methanol assistance and they climbed to FL160 following a non-standard departure to 'SPEZI' waypoint. During the climb Milan Control offered a re-route to the north via 'CANNE' waypoint in the Swiss Alps, as opposed to their flight planned route to the west. The commander accepted the re-route but mistook 'CANNE' waypoint to be the CANNES/TANNERON VOR that is positioned close to the town of Cannes in southern France. Although the crew followed ATC instructions, which continued to take them northbound, there remained an element of doubt in their minds as to their final routing. Approaching Genoa (GEN) VOR on the Italian coastline, the crew received a GPWS 'PULL UP' warning and initiated an immediate climb. As they climbed through FL180 the first officer pressed the radio altimeter test button which immediately cancelled the GPWS warning.

The aircraft was levelled at FL180 and the crew decided to remain at this height as they were now heading towards an area with a higher MSA. A few moments later they noticed ice forming on the windscreen wipers and wings. All their anti and de-icing equipment was switched on and according to their instrumentation was functioning correctly, but the rapid build up of ice continued. They estimated that the ice thickness reached 4-5 inches on the windscreen with a 'clear area no bigger than a letter box to look through'. Power was increased to the maximum continuous limit on both engines but the speed slowly decayed from 150 kt to 120 kt. A descent was requested along their route but this was denied by ATC because of the height of the terrain ahead. At 120 kt the stick shaker activated and they were unable to maintain

level flight. At this point they had passed 'CANNE' waypoint and were heading directly towards the Luxeuil (St Sauveur) 'LUL' VOR. Terrain within 10 miles of their track reached a height of 14,100 feet. The airspeed was stabilised with the stick shaker activating intermittently but this resulted in a descent with a vertical speed of approximately 500 feet per minute. In response to a further request for descent ATC vectored the aircraft to the northeast and authorised descent to FL160. At this level there was clear air which allowed the ice to dissipate and the airspeed to increase.

Eventually the aircraft was re-cleared to route to the 'LUL' VOR. When the crew altered course the aircraft re-entered cloud and almost immediately ice began to adhere to the airframe again and although the airspeed was indicating 160 kt the stick shaker activated. The crew were cleared to descend to FL100. The speed was increased in the descent to 205 kt before the stick shaker cancelled. After levelling at FL100 the flight continued in clear air to CDG with the ice clearing. The landing, carried out with approach flap, was without incident.

Visual inspection after landing revealed large lumps of ice remaining underneath the fuselage. The aircraft's de-icing system had appeared fully functional. Inspection of the de-icing system, after the aircraft landed at CDG, however, showed that a repair patch on the right inner wing de-ice boot was missing.

RECOMMENDATION 2003-61

It is recommended that Emerald Airways re-examine the adequacy of its flight planning system with a view to automating the process.

Status - Not CAA - Closed

Response

Emerald Airways Ltd are currently considering a computer based system and are working closely with the CAA prior to any implementation decision being taken.

Airbus A320-214	Kefallinia, Greece	27 Oct 2002	Incident

References: Bulletin 1/2004 dated 8 Jan 2004

FACTOR F8/2004 dated 12 Feb 2004

SYNOPSIS (From AAIB Report)

The aircraft had been positioned, empty, from Gatwick to Kefallinia in preparation for public transport charter flights back to Gatwick via Zakinthos. On its arrival at Kefallinia 69 passengers boarded the aircraft prior to the short sector to Zakinthos. The commander was the handling pilot for this flight, which was preparing to depart from Runway 32. The surface wind was from 250º at 4 kt.

Having lined up on the runway for takeoff, the commander advanced the thrust levers to 50% N1 while holding the aircraft against the brakes. Once the engine parameters had stabilised he released the brakes and advanced the thrust levers to the take-off position. As the aircraft started its take-off roll the nose pitched up rapidly. The commander reduced the thrust to idle immediately and applied forward side-stick and gentle braking to encourage the aircraft to pitch back down, which it did promptly. The

aircraft had very little forward speed and was quickly brought to a halt on the runway. Having liaised with the cabin crew, and made an announcement to reassure the passengers, the commander taxied the aircraft slowly back on to the stand whence it had just departed. There were no injuries; however, one of the cabin crew seated at the rear of the cabin had heard a scraping noise after the aircraft had pitched up. On investigation the flight crew discovered that all the passengers were seated aft of row 13, which was significantly different from the distribution shown on the Load Form and Trim Sheet. These forms indicated that the passengers had been spread evenly through the cabin. An examination of the underneath of the tail of the aircraft revealed that the rear galley drain mast had been damaged. While conducting this external check, the first officer (FO) also saw that the nose oleo was very noticeably extended, which suggested a possible problem with the position of the CG.

RECOMMENDATION 2003-104

It is recommended that Air 2000 review the advice given to handling agents at outstations to ensure that the commanders of the company's aircraft are in possession of all the relevant loading information before they compile a Trim Sheet.

Status - Not CAA - Closed

Response

Air 2000 has published a revision to their Ramp Manual which emphasises the correct loading procedures to be followed by all their handling agents.

RECOMMENDATION 2003-105

It is recommended that Air 2000 review the training given to Flight Supervisors for the Airbus A320 with regard to passenger distribution in the cabin and its effect on the CG of the aircraft.

Status - Not CAA - Closed

Response

Air 2000 has published a revision to their Cabin Crew Safety Manual emphasising the importance of an even distribution of passengers throughout the cabin, and the requirement for the Flight Supervisor to inform the Captain if this is not the case. Their Cabin Crew recurrent training requirements and the content of their Flight Supervisor training course have been revised to reflect this.

Gill SA Pulsar	Gloucester-Staverton Aerodrome	14 Aug 2002	Accident

References: Bulletin 5/2003 dated 8 May 2003

FACTOR F15/2003 dated 11 Jul 2003

SYNOPSIS (From AAIB Report)

Whilst taking off from Staverton for a local flight, the nose wheel became detached as the aircraft rotated. The event was not apparent to the aircraft occupants, who were subsequently informed by a radio message from an aircraft preparing to take off

behind them. They decided to circle the airfield for 20 minutes while the emergency services were assembled, following which a low approach and go-around was made. This allowed observers on the ground to confirm that the nosewheel and fairing were missing from the aircraft. Another long approach was made, and when it was certain that a go around was not required, the magnetos were switched off and the propeller rotated to the horizontal position before turning off the fuel and battery master switch. The latter actions were discussed whilst orbiting the airfield and were carried out by the passenger, who also held a current PPL.

After touch down, the nose was held off for as long as possible, with no wheel braking, before the nose leg settled onto the runway. It slid along for about 30 metres before digging in, bringing the aircraft to an abrupt halt. The aircraft occupants were uninjured and exited by the normal means.

RECOMMENDATION 2003-06

It is recommended that the Popular Flying Association conduct a design review of the nose landing gear as fitted to Pulsar aircraft on the UK register and liaise with the Experimental Aircraft Association (EAA) in the USA on this matter.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

Beech 200 Super Kingair	**12nm Northeast of Clacton**	**23 Jul 2002**	**Incident**

References: Bulletin 7/2003 dated 10 Jul 2003

FACTOR F23/2003 dated 7 Aug 2003

SYNOPSIS (From AAIB Report)

The aircraft was in the cruise at FL190, en-route from Oxford to Amsterdam, when there was a sudden bang and hissing noise and the cabin atmosphere became fogged. Having confirmed a rapid cabin decompression, by noting the climbing cabin altitude indication, the crew transmitted a PAN call and descended the aircraft to FL90. The reason for the decompression could not be identified by the crew and the aircraft returned to Oxford. After landing the main cabin door could not be opened so the passengers were disembarked through the emergency exit.

RECOMMENDATION 2003-36

It is recommended that the Federal Aviation Administration, in conjunction with Raytheon Aircraft Company, review the method of securing, or the inspection requirements of, the main cabin door latch roller assembly on Beech 200 aircraft with a view to preventing roller retaining pin migration.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

Sikorsky S61N	Poole, Dorset	15 Jul 2002	Accident

References: AAR 2/2004 dated 16 Apr 2004

FACTOR F21/2004 dated 16 Apr 2004

SYNOPSIS (From AAIB Report)

G-BBHM, which was based at Portland, was being operated in the Search and Rescue role. Following the first alert of the day, G-BBHM had been airborne for about 40 minutes over Poole Harbour when the two rear crew members became aware of an unusual noise. Almost immediately, the pilots saw the 'NO 2 ENG FIRE WARN' light illuminate accompanied by the audio alert. The pilots commenced their emergency procedures, including shutting down the No 2 engine and activating the fire extinguisher, and initially set heading for Bournemouth Airport. However, with the 'FIRE' light still illuminated and indications of hydraulic failures from both tactile and warning systems, the co-pilot alerted the commander to a suitable nearby landing area. The commander called for an immediate landing and made a successful approach and touchdown; during the approach, the pilots became aware that 'NO 1 ENG FIRE WARN' was also illuminated. After touchdown, the pilots shut down No 1 engine and the crew quickly vacated the helicopter. G-BBHM was destroyed by fire shortly after they were clear. The time between the onset of the original fire warning and touchdown was 82 seconds.

The investigation identified the following causal factors:

1 The No 2 engine had suffered rapid deterioration of the No 5 (location) bearing of the free turbine, causing failure of the adjacent carbon oil seal and mechanical interference between the Main Drive Shaft Thomas coupling and the Engine Mounting Rear Support Assembly tube, which completely severed the support tube.

2 A severe fire, outside of the engine fire zone, was caused because the released engine oil was ignited either by this mechanical interference, or by contact with the hot engine exhaust duct.

3 The No 2 engine's No 5 bearing failed because of unusual and excessive cyclic loading conditions arising from shaft vibration. The bearing deterioration was exacerbated by a reduction in its oil supply during the same period, when the live oil jet fractured as a consequence of the vibration.

4 It is probable that the Main Drive Shaft vibration was caused by damage or distortion sustained during one or more previous No 2 engine starts involving a high torque rotor engagement.

5 There was no specific torque limitation published in the manufacturer's Flight Manual, used by Bristow Helicopters Limited, during rotor engagement after engine start.

RECOMMENDATION 2003-83

The aircraft manufacturer, Sikorsky, should relocate the No 1 and No 2 engine bay fire warning lights on the main instrument panel of the S-61N helicopter, with the intention of ensuring as far as possible that unambiguous information is presented to both flight crew members in the event of an engine bay fire.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

Robinson R22 Beta	**Hampton Magna, Warwickshire**	**13 Jul 2002**	**Accident**

References: Bulletin 12/2003 dated 11 Dec 2003

FACTOR F2/2004 dated 12 Jan 2004

SYNOPSIS (From AAIB Report)

The aircraft was flying in a level attitude in the cruise at approximately 1,500 feet agl and at about 70 kt when it was seen to suffer an in-flight break-up. Evidence suggests that, as a result of mast bumping, the tail cone of the aircraft was struck by the main rotor blades. The Pilot's Operating Handbook states that mast bumping can be caused by abrupt control inputs and, in this case, it is possible that this occurred as the result of an unintentional abrupt input on either the cyclic control or yaw pedals, or both. One Safety Recommendation relating to Safety Notices included in the Pilot's operating handbook, has been made.

RECOMMENDATION 2003-100

It is recommended that the Robinson Helicopter Company publish a Safety Notice, for inclusion in the R22 Pilot's Operating Handbook, which stresses the importance of removing the dual controls when the left seat is occupied by a passenger who is not a rated helicopter pilot.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

However the CAA will publish details of the accident and this Safety Recommendation for the benefit of the general aviation community. This will be achieved by way of an article in the General Aviation Safety Information Leaflet (GASIL) due to be published in March 2004.

Boeing B747-286B	London Heathrow Airport	20 Jun 2002	Incident

References: Bulletin 5/2003 dated 8 May 2003

FACTOR F13/2003 dated 12 Jun 2003

SYNOPSIS (From AAIB Report)

Boarding had been completed and the aircraft was ready to depart from the stand. The handling agent's airbridge controller was qualified according to the Airport operator's requirements but she was not very familiar with the type of airbridge installed at Stand M30. When she attempted to back it away from aircraft Door 2 Left, she was conscious of how near the airbridge head was to the aircraft's wing root. Consequently, before starting to back away from the door, she turned the drive axle to ensure that the airbridge head did not hit the wing. However, when reverse drive was applied to the drive axle, the airbridge head started to move to the left, parallel to the fuselage side.

A member of the ramp crew, observing that the drive axle was aligned with the side marked 'BACK' facing towards the front of the aircraft, told the controller not to operate the airbridge and to ask for assistance from the Airport operator's engineering department. At this point, an inspection showed there to be some scratches on the aircraft paintwork below Door 2 Left.

The airbridge controller, however, believing that the operator wished to get their aircraft clear of the ramp as soon as possible, made a further attempt to realign the drive axle and retract the airbridge. This was also unsuccessful and resulted in the fuselage skin being dented. The airbridge controller then asked for, and obtained, assistance from the handling agent's airbridge training officer but during the subsequent attempt to retract the airbridge, the aircraft's pressure hull was punctured by the front of the airbridge. At this point the Airport operator's engineers arrived but declined to assist in separating the airbridge from the aircraft as they might then be responsible for causing further damage.

The damage to the hull resulted in the aircraft having to be withdrawn from service and a substitute aircraft flown into Heathrow. At the time of the incident, the sun was very bright and shining directly through the sideways facing window in the airbridge head into the face of the operator when she faced the airbridge control panel.

RECOMMENDATION 2003-23

Heathrow Airport Limited, in consultation with Thyssen, the airbridge manufacturer, should improve the ease of use and accuracy of the means by which airbridge controllers can assess the orientation of the drive axles of the type of airbridge installed at Stand M30 of Heathrow Terminal 3.

Status - Not CAA - Closed

Response

BAA LHR Response

An approach has been made to the manufacturer (Thyssen) to establish what modifications could reasonably be made to reconfigure these airbridges with a wheel position indicator. A full response is awaited. Meanwhile, the modification under trial

in response to recommendation 2003-24 goes some way towards the elimination of further risks associated with approach to aircraft fuselages. Thyssen's response is expected for evaluation by early November.

RECOMMENDATION 2003-24

Heathrow Airport Limited should consider determining and setting the steering limits of 'Apron-drive' type airbridges such that whilst the airbridge is being driven in reverse, it is not possible for the bridgehead to approach the fuselage side of a correctly positioned aircraft.

Status - Not CAA - Closed

Response

BAA LHR Response

A modification to the steering limits, currently under trial on Stand 330 effectively prevents selection of reverse drive when the airbridge is within one metre of the aircraft. This has proved successful and may be installed on other airbridges of Thyssen manufacture.

Boeing B747-240B	Manchester Airport	13 Jun 2002	Incident

References:Bulletin 3/2004 dated 11 Mar 2004

FACTOR F16/2004 dated 16 Mar 2004

SYNOPSIS (From AAIB Report)

The aircraft was operating a scheduled service between New York Kennedy Airport and Manchester International Airport. An uneventful approach and touchdown were carried out on Runway 24R following which reverse thrust was selected on all engines to approximately three-quarters power. At around 80 kt reverse thrust was cancelled, engine numbers 1,2 and 4 reversers stowed normally but flight deck indications showed number 3 reverser remained unlocked and in transit.

After the landing of the B747, a Boeing 757 aircraft was cleared to cross Runway 24R, from the F2 holding point on the north side to the south side. While crossing behind the B747 the first officer on the B757 noticed a large piece of engine cowling falling from the aircraft during its landing roll. He notified Air Traffic Control (ATC) who took action to prevent other aircraft landing on the runway. ATC also offered the support of the emergency services to the commander of the B747 which was declined. The B747 continued taxiing to its allocated parking stand where, following engine shutdown, the passengers were disembarked.

RECOMMENDATION 2004-09

The Federal Aviation Administration and the European Aviation Safety Agency, in conjunction with the manufacturers of the thrust reverser system and the affected aircraft types, should consider requiring an inspection procedure, to be performed whenever reverser re-rigging becomes necessary, to ensure the soundness of the

bonding and mechanical fastenings attaching the clevis fittings to the transcowl of the thrust reversers of CF6-6 and CF6-50 engine installations.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

Rans S10 Sakota	Lower Whitley, Cheshire	2 Jun 2002	Accident

References: Bulletin 7/2003 dated 10 Jul 2003

FACTOR F22/2003 dated 7 Aug 2003

SYNOPSIS (From AAIB Report)

The aircraft was flying from a private airstrip in Cambridgeshire to Blackpool, routing via the Manchester Low Level Corridor. The pilot reported that this was the longest flight he had planned in this aircraft and that, in his eagerness to complete the journey, he cruised at a faster speed than normal. Throughout the flight fuel was being fed from the left tank, and on arrival at the Corridor the pilot recalled that the fuel level in that tank appeared to be low. While transiting the Low Level Corridor the aircraft entered the Liverpool Control Zone and the pilot's concentration was devoted to regaining the correct track and altitude. He next noticed that the fuel in the vapour return line, situated under the instrument panel, was becoming "agitated" and that the reading on the fuel pressure gauge was falling. He switched the electric fuel pump on and selected the fuel to feed from the right tank, which he estimated was half full; although the light was poor, making it difficult for him to see the fuel levels in the tanks clearly. No fuel appeared to flow and the engine stopped. The aircraft was at an altitude of 1,200 feet amsl.

The pilot transmitted a 'MAYDAY' call and selected a field for a forced landing. He commented that, while executing this, he was distracted by a radio request for the number of people on board. On final approach, at a height of approximately 25 feet, the aircraft struck a powerline, cutting it with its propeller. Thereafter, the pilot was not sure of the aircraft's movements. It seemed to turn through 360° before coming to rest in the field the right way up. Although there was substantial damage to the aircraft, the pilot reported that the tubular steel fuselage survived well and he was able to exit normally with only minor injuries. All three emergency services attended the scene. There was no fire.

The same journey had been attempted the day before. The pilot had abandoned that flight after 35 minutes because he smelled fuel and, on investigation, found a slow leak in the vapour return line. He returned, rectified the leak and took the aircraft for a further 20 minute flight, during the course of which fuel was successfully fed from each tank in turn. On completion the aircraft was fully refuelled with AVGAS.

The pilot remarked that there had been no evidence that any fuel had been lost overnight, nor had he been aware of any fuel leak or fumes during the flight. He estimated that the aircraft had been flying for one and a half hours at the time of the accident.

RECOMMENDATION 2003-05

It is recommended that the Popular Flying Association reviews its procedures for ensuring that engineering inspections and relevant documentation are correctly completed, when required, following modification to an aircraft system.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

Bolkow BO 105-DBS-4	**Brough of Birsay, Orkneys**	**24 May 2002**	**Accident**

References: Bulletin 8/2003 dated 7 Aug 2003

FACTOR F28/2003 dated 10 Sep 2003

SYNOPSIS (From AAIB Report)

The helicopter was carrying out external load lifting operations from the Brough of Birsay island lighthouse off the north-west coast of the Island of Orkney to a site some two miles away on the main island. The pilot was very experienced in carrying out external load lifting and had transported a number of loads that morning without incident. On the accident flight the load was seen to become unstable and contact the tail rotor resulting in total loss of tail rotor thrust. The helicopter was seen to descend rapidly in a spiral to the right and impact the sea. The pilot was fatally injured during the impact and the helicopter sank almost immediately. Recommendations are made concerning the guidance available to load constructors and enhancing a pilot's chances of surviving a tail rotor strike.

RECOMMENDATION 2003-40

Eurocopter should review the 'Tail Rotor Drive Failure - Flight', emergency procedure included in the BO 105 rotorcraft flight manual. Specifically Eurocopter should consider the following aspects:

a) Whether the procedure regarding use of the collective lever and cyclic stick, in order to, 'if possible maintain level flight', is realistic since it may in fact de-stabilise the aircraft.

b) Emphasise the importance of carrying out a double engine emergency shut-down after a tail rotor failure in forward flight before attempting an autorotative forced landing.

c) Ensuring that all the actions required within the emergency drill are memory items.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

Robinson R22 Beta	Sywell Aerodrome, Northampton	14 May 2002	Accident

References: Bulletin 9/2003 dated 11 Sep 2003

FACTOR F36/2003 dated 10 Nov 2003

SYNOPSIS (From AAIB Report)

G-IORG was used primarily as a camera platform for photographic survey work, flown usually by a freelance commercial pilot with the owner operating the camera from the left hand seat. On the morning of the incident the helicopter was flown by this pilot from his home to Maxey, Cambridgeshire, where he picked up the owner as his passenger. Weather conditions were fine with good visibility and a westerly wind. The plan was to carry out a photographic flight, the intended destination being Retford (Gamston) Airport, Nottinghamshire.

During the previous flight the pilot had noticed some vibration which had not been present on earlier flights; this vibration was again noticeable on his flight over to Maxey. When he subsequently took off with the owner on board, the vibration was considerably worse and he decided to abandon the proposed photographic flight and fly instead to Sywell Aerodrome, Northampton, where the helicopter was maintained, so that the cause of the vibration could be investigated.

The pilot decided to use a reduced power setting of 20 inches Hg for the flight to Sywell. Some 20 minutes into the flight the vibration became markedly worse but with Sywell now in sight the pilot decided to continue to there. He made a radio call to advise that he had a problem with vibration and once across the airfield boundary transited to the maintenance facility at low level as a precaution. The pilot described the vibration as being of low frequency and from the rotor head. He commented that he had experienced similar amounts of vibration in other types of helicopter and was not therefore unduly concerned.

After landing, a test pilot from the maintenance organisation went out to carry out an assessment. During his preliminary walk-round inspection, oil contamination was noted around the rotor head area. After climbing up to investigate the source of this oil, he was examining the spindle bearing oil retention boots for damage which from experience he considered a likely source, when he saw a large crack in one of the main rotor blades close to the root end. The test pilot was appalled at the extent of the crack, and immediately quarantined the aircraft pending the AAIB investigation.

RECOMMENDATION 2003-78

It is recommended that the FAA, as the Primary Certificating Authority for the R22 helicopter, require the manufacturer of the R22 helicopter to establish an inspection procedure capable of identifying blades containing cracks originating in the main rotor blade root fitting leading edge region.

Status - Not CAA - Closed

Response

Recommendations 03.205 and 03.206. Since there has been only one failure of this kind and since the inspection of the cracked root fitting revealed nothing anomalous

about the blade, the cause of the blade failure is unknown. Inspection of root fittings of other blades have revealed no further cracks. The scratches found at the point of initiation of the fatigue crack exist on numerous other blades and existed on the fatigue specimens from the initial certification of the blade. An inspection of the root fitting appears to be the only way to determine if other cracks exist. However, due to sensitivity of the front spar to fatigue cracks, we have determined that such an inspection would damage the blade and increase the possibility of cracks after the blade is returned to service. An acceptable inspection for cracks of the blade root area without damaging the root fitting is detailed in RHC Service Letter SL-21A, dated May 31 2002. The FAA has released a Special Airworthiness Alert Bulletin No. SW-04-36 dated December 17 2003, recommending that operators follow SL-21A.

RECOMMENDATION 2003-79

It is recommended that the FAA require the manufacturer of the R22 helicopter to devise an inspection method which will identify, on in-service blades, the type of root fitting surface abrasion damage found on both a cracked blade and several non-cracked sample blades, that is potentially capable of initiating fatigue cracking. (In devising an appropriate inspection method, due consideration should be given to the beneficial influence of the shot peen layer on the surface of the blade root fitting, and appropriate steps taken to ensure that any procedures used to remove the filler and adhesive layers and expose the metal beneath do not compromise the integrity of the peened layer).

Status - Not CAA - Closed

Response

Recommendations 03.205 and 03.206. Since there has been only one failure of this kind and since the inspection of the cracked root fitting revealed nothing anomalous about the blade, the cause of the blade failure is unknown. Inspection of root fittings of other blades have revealed no further cracks. The scratches found at the point of initiation of the fatigue crack exist on numerous other blades and existed on the fatigue specimens from the initial certification of the blade. An inspection of the root fitting appears to be the only way to determine if other cracks exist. However, due to sensitivity of the front spar to fatigue cracks, we have determined that such an inspection would damage the blade and increase the possibility of cracks after the blade is returned to service. An acceptable inspection for cracks of the blade root area without damaging the root fitting is detailed in RHC Service Letter SL-21A, dated May 31 2002. The FAA has released a Special Airworthiness Alert Bulletin No. SW-04-36 dated December 17 2003, recommending that operators follow SL-21A.

RECOMMENDATION 2003-80

It is recommended that the FAA confirm that the manufacturer of the R22 helicopter has adjusted their manufacturing processes of the main rotor blade, since the discovery of a large crack on an in-service main rotor blade, to preclude abrasion damage of the shot peened surface treatment during the adhesive clean-up process, and ensure that the depth of the shot peened layer on the blade root fitting conforms to the manufacturer's specification.

Status - Not CAA - Closed

Response

RHC has corrected the procedure that allowed mechanics to cause abrasion scratches during adhesive clean up. Blades produced after November 2001 should be free of abrasion scratches. The depth of the shot peen layer is not in question, and the quality control system at RHC has not found any reason for concern.

Also RHC redesigned the root fitting of the blade to be more robust in that area. The newly-designed blades, part no (P/N) A016-4, will be the only new blades available and will eventually replace the older style blades.

Dornier 328-100	Edinburgh Airport	6 Mar 2002	Accident

References: Bulletin 3/2004 dated 11 Mar 2004

FACTOR F18/2004 dated 15 Apr 2004

SYNOPSIS (From AAIB Report)

Prior to the planned flight the forward passenger door was closed and locked. The flight crew confirmed the correct positioning of the door during their pre-start checks. During the take-off run, at about 100 kt, the door opened and the flight crew aborted the take off. The door and locking mechanism were undamaged, however, the hinge arms of the integral air stairs were so severely damaged that it is unlikely that the door and the integral stairs would have remained attached had the aircraft continued to accelerate and become airborne. It is concluded that the most probable way in which the door opened was that the door-handle was inadvertently operated during the take-off run. The ergonomic features of the cabin crew station would have contributed to the handle being inadvertently grasped during this phase of flight. A recommendation has been made to the European Aviation Safety Agency regarding the design characteristics of the door.

RECOMMENDATION 2003-109

It is recommended that the European Aviation Safety Agency review the design characteristics of the door operating, attachment and restraint mechanisms of the Dornier 328 aircraft type, in order to minimise the possibility of inadvertent door operation and to ensure that there is sufficient residual strength in the door/airstair attachments to prevent separation of the door in the event of a door coming open during takeoff or initial climb.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

Piper PA28R-200	Off NW Guernsey	3 Jul 2001	Accident

References: Bulletin 2/2002 dated 7 Feb 2002

FACTOR F2/2002 dated 18 Mar 2002

SYNOPSIS (From AAIB Report)

Having flown, without incident, from Guernsey two days previously, the owner pilot had intended to make a direct return flight from Liverpool to Guernsey on Saturday 21 July. Before departure he had uplifted 55 litres of Avgas. Take-off was at 0915 UTC and the planned flight time was 2 hours. When overhead Exeter, the pilot checked the Guernsey weather via the broadcast and, due to reports of fog at Guernsey, he decided to divert to Exeter and continue his journey the next day.

After start-up for the continued flight the following day, a very severe drop on the right magneto, reported as being nearly a dead cut, was experienced during the pre-departure run-up check. Engineering assistance was sought and the engineer spent over 2 hours checking the plugs, leads and magneto alignment and changed the capacitor in the right magneto as the points appeared to be slightly white. Following this work, extensive run-up checks indicated that the fault had been rectified and the pilot decided to continue the journey.

After take-off the pilot climbed at full throttle and levelled at 3,000 ft. After flying down the coast to Berry Head he headed out to sea; but about 5 miles off-shore the engine started to feel 'lumpy'. The pilot advised Air Traffic Control that he was returning to Exeter and maintained his cruising height during the return. When about 5 miles short of the airfield the engine began to run extremely roughly, although he was able to maintain height. The airfield initiated full Emergency procedures when the pilot reported a deterioration of the engine condition, but the aircraft was landed without further incident. Before shutting down, the pilot conducted further engine power runs, experiencing severe drops on both magnetos, and elected to abandon the journey that day and address the problem on the Monday.

The following morning, the pilot taxied the aircraft over to the maintenance hangar and noted that, although the drop on the left magneto appeared to have gone, that of the right magneto was still as bad as ever. The plugs were inspected again and cleaned and the leads rechecked, without improving the magneto drops, so the points and capacitor were then changed, also to no effect. The magneto was then removed for a bench check and following adjustments, which appeared to result in the production of good sparks, was refitted on the engine. During the subsequent run-up checks, however, it was found that the magneto drop was just as severe as previously and consequently, the pilot purchased and had fitted a new, replacement right magneto. Following this, run-up checks indicated that the problem had been eliminated as no undue drops were observed on either magneto during power checks.

The pilot decided to continue his journey and after taking off, he climbed, at full power to 3,000 ft before levelling into the cruise. About 10 minutes after leaving Berry Head for the flight over the sea, the pilot and front seat passenger noticed a slight vibration which persisted for about 2 to 3 minutes. No abnormal indications were observed and, after the vibration had ceased, the flight proceeded normally.

About 12 miles from Guernsey, just after the pilot had started to descend, the engine began to run very roughly, with extreme speed fluctuations and a loss of power. The pilot attempted to restore engine power using the mixture control, power lever, switching on the fuel pump and changing the fuel tank selected, none of which was consistently effective. During the descent, the pilot informed Air Traffic Control of his situation and instructed the passengers to put on their life jackets, which they did when the aircraft was estimated to be at about 500 ft; he did not put his own life jacket on as he was concentrating on flying the aircraft.

As the aircraft approached the water, the door was unlatched and the landing gear override up lever pulled up to prevent the automatic deployment of the landing gear. This latter task was then taken over by the front passenger to enable the pilot to handle the aircraft more easily. The aircraft was ditched, wheels up, flapless and with the stall warning sounding, onto a mild swell and remained level and upright when it came to rest. The deceleration at touchdown caused both front seat occupants, who were wearing lap and diagonal harnesses, to strike their faces on objects ahead of them; the pilot struck his eyebrow on the coaming and the passenger, who was leaning forward to hold the landing gear lever, struck her chin on the control column. All three occupants left the cabin and stood on the wing whilst the pilot extracted and inflated the 4 man dinghy. The two passengers entered the dinghy whilst the pilot retrieved further articles from the aircraft before joining them. Shortly after this the aircraft tipped on its nose and sank slowly. Two flares were fired and after 25 minutes a fishing boat and rescue craft launched as a result of emergency actions initiated by ATC arrived at the scene.

The aircraft has not been recovered and, therefore, an examination to try to establish the cause of the loss of engine power has not been possible.

RECOMMENDATION 2001-94

The General Aviation Safety Council should draw up, and maintain, a dossier of information on the commercially available life jackets which exhibit the desired characteristics, as described in Safety Sense Leaflet 21A. This information should be available for dissemination, on request, and the CAA should publicise this service in Safety Sense Leaflet 21A.

Status - Not CAA - Closed

Response

Publication by the General Aviation Safety Council of a dossier of information on commercially available lifejackets with the desired characteristics has been postponed pending their consideration of issues of legal liability. Any amendment of CAA Safety Sense leaflet 21A to include contact details for obtaining this information is dependent on the foregoing.

Piper PA28-161	Wolverhampton Airport	30 Jun 2001	Accident

References: Bulletin 7/2003 dated 10 Jul 2003

FACTOR F20/2003 dated 7 Aug 2003

SYNOPSIS (From AAIB Report)

The aircraft, with two pilots on board, suffered an engine failure shortly after takeoff from Runway 28 at Halfpenny Green Airfield. The instructor pilot managed to effect a landing on the reciprocal runway but overran the paved surface. All three landing gear legs failed during the overrun and the left wing detached. The pilots suffered minor whiplash injuries. At the time of the accident the engine had accumulated 1,865 hours since its rebuild in 1997. Examination of the engine revealed severe wear to the engine valve operating mechanism and extensive cracking of the No 1 cylinder assembly. Wear to the valve operating mechanism was considered not to be a factor in this accident but the use of an oil additive, mandated by the manufacturer for other engine models, would possibly have reduced this wear. The total power loss had probably resulted when a substantial pre-existing cylinder head crack had suffered a rapid and large extension around most of the cylinder head circumference allowing the crack to open up and vent the cylinder. A safety recommendation has been made concerning the reduction in wear to the valve operating mechanisms, in this and other similar engine types, by mandating the use of oil additives.

RECOMMENDATION 2003-69

It is recommended that the FAA require Textron Lycoming to take measures to substantially reduce the incidence of excessive wear to the valve operating mechanism of the Lycoming O-320-D3G engine and all other affected engine models. Measures considered should include advising or requiring usage of the oil additive in engines not covered by Mandatory Service Bulletin No 446D, advising on engine starting procedures and re-emphasising use of the correct grade of oil for the prevailing ambient temperature.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

Lockheed L188C	10 miles South of Rennes	7 Jun 2001	Incident

References: Bulletin 1/2003 dated 9 Jan 2003

FACTOR F1/2003 dated 10 Feb 2003

SYNOPSIS

The aircraft was climbing out of Rennes, bound for Bordeaux, with all visual and audible flight deck indications normal when, upon passing FL40, a loud bang was heard. The aircraft shook violently and depressurised. The commander immediately initiated a return to the departure airfield and, suspecting that the aircraft may have sustained structural damage, transmitted a MAYDAY call. After carrying out all relevant emergency checks an uneventful ILS approach was made back into Rennes and the aircraft landed safely. Examination of the aircraft at Rennes showed that the Crew Emergency Exit Door (CEED) was missing.

Although this event occurred within French airspace, it was agreed with the French authorities that the investigation would be conducted by the AAIB. The aircraft was not examined by the AAIB in France, only upon its return to the UK after repair.

RECOMMENDATION 2002-32

The Federal Aviation Administration should re-examine the manufacturer's Supplemental Type Certificate associated with the design of the installation of the Crew Emergency Exit Door on G-FIZU, to ensure that a DOOR UNSAFE indication is resented to the flight crew whenever the door is not properly locked closed.

Status - Not CAA - Closed

Response

The FAA has carried out interim actions in respect of this Recommendation - notified to the AAIB in May 2003. No notification has been received from the FAA that the final actions are complete.

MD83	Liverpool Airport	10 May 2001	Accident

References: AAR 4/2003 dated 21 Nov 2003

FACTOR F38/2003 dated 21 Nov 2003

SYNOPSIS

The aircraft carried out an automatic landing at Liverpool at 1232 hrs with the first officer (FO) being the pilot flying. The right main landing gear collapsed on touchdown and the commander took over control shortly afterwards. The aircraft continued travelling along the runway, maintaining approximately the centreline, and came to rest with the right wing in contact with the ground. A successful passenger evacuation was carried out using the forward escape slides and the left overwing emergency exit.

The following causal factors were identifie:

1 The right Main Landing Gear (MLG) cylinder failed immediately upon touchdown due to the application of spin-up drag loads on a section of the cylinder containing a major fatigue crack 3.2 mm long and 1.0 mm deep and several other associated smaller cracks.

2 The origins of these fatigue cracks could not be identified but other embryonic cracks were found which were associated with surface irregularities arising from a grit-blasting process during manufacture. Abnormal loading, possibly due to an occurrence of a mode of fore-and-aft vibration known as 'gear walking' is thought to have been responsible, at some time in the aircraft's history, for propagating the cracks to a depth at which continued growth was possible under normal loading. Alternatively, some abnormal loading may have relaxed the beneficial compressive surface stresses induced by shot-peening at the critical section and allowed propagation from the same surface defects.

3 Inspection and other mandatory preventive measures taken following two similar accidents did not prevent the occurrence of this third accident. This was probably

due to the small size of cracks which are required to be detected before reaching a critical dimension.

RECOMMENDATION 2001-54

The Federal Aviation Authority and the Boeing Commercial Airplane Group urgently review the continued airworthiness of the MD-83 MLG strut. In particular, the need for repeat inspection of the strut in the critical area be considered and the ability of the mandated NDE inspection to detect embryonic fatigue cracks in the material, given the small critical crack size, should be reassessed.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

RECOMMENDATION 2003-44

It is recommended that the Joint Aviation Authorities amend the relevant sections of JAR-OPS 1 with a view to requiring that all aircraft fitted with a Cockpit Voice Recorder record, without interruption, the audio signals received from each boom and mask microphone in use.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

RECOMMENDATION 2003-47

It is recommended that the Boeing Commercial Airplane Group should conduct an ultimate load test on a suitable MD-80 series main landing gear cylinder in order to determine the strength of the component and to verify the figures used in both the original static strength and in the fatigue life calculations.

Status - Not CAA - Closed

Response

FAA Response (Ref: FAA 04.022)

Boeing has reviewed the design, analysis, and certification of the MD-80 series main landing gear (MLG) in light of the subject outer cylinder failure at Liverpool Airport. Boeing has concluded that additional ultimate load testing is not warranted, because the subject failure root cause has been determined to be unrelated to the cylinder's strength or fatigue certification. Rather, Boeing has identified a unique root cause for this failure, and has addressed the risk to other airplanes with fleet service bulletin recommendations that have been mandated by the FAA.

The DC-9-80(MD-80) series MLG was derived from the DC-9-10 MLG, which was previously certified by both analysis and by a static strength proof test. The MD-80 outer cylinder is longer and larger than the DC-9 cylinder, and is made from a higher strength steel alloy than the DC-9.

The majority of MD-80 cylinder design features are similar to their counterpart DC-9 cylinder features. These were certified for strength and fatigue by analysis. The only significantly different features associated with reacting torque from wheel braking. These new MD-80 features were certified with new tests. Boeing also tested coupons and tubular sections (representative of MD-80 cylinder dimensions) to substantiate ultimate strength and fatigue properties of the higher-strength steel alloy. Boeing's overall method of compliance was reviewed by the FAA, and was consistent with methods that had been employed on other aircraft models. FAA is unaware of any service experience that suggests inadequacy in the certification of the MD-80 cylinder strength of fatigue life.

FAA and Boeing have concluded that the root cause of the reference cylinder failure was a brake system hardware configuration that was capable of inordinately rapid anti-skid valve activity. This relatively uncommon system condition resulted in occasional excitation and sustainment of a normally well-damped mode of gear vibration. Repeated large stresses during these vibration events, concentrated in only one specific area on the cylinder's outer surface, resulted in the initiation of fatigue cracks. The condition is recognized by Boeing to have initiated cracks in a least seven other cylinders, with four of these having resulted in service failures.

Boeing recommended the installation of new brake system hardware that can prevent this modal excitation by issuing Service Bulletin MD80-32-246. Boeing emphasized the same actions in Alert Service Bulletin MD80-32A2 in 1995. FAA Airworthiness Directive 96-01-09 mandated the installation of this damage-preventive hardware in 1996. Boeing also recommended non-destructive inspections in MD80-32A344. As knowledge of the root cause improved, Boeing published revisions to these inspections that became progressively more stringent between 1995 and 2004, in order to enhance the probability of detection of cracks that might have initiated on cylinders prior to the installation of the preventive hardware. Such small cracks are capable of very slow growth under normal operational loads.

The current revision of MD80-32A344 recommends indefinite repetitive inspections of effected cylinder at intervals no more than 450 landing cycles. Affected cylinders are those that were potentially exposed to operation without the braking system modification. FAA AD2004-05-03, effective March 15, 2004, mandated this recommendation.

Beech 200	**Blackbushe Airport**	**23 Dec 2000**	**Accident**

References: Bulletin 7/2003 dated 10 Jul 2003

FACTOR F19/2003 dated 7 Aug 2003

SYNOPSIS (From AAIB Report)

The aircraft, with the pilot and four passengers on board, departed Blackbushe from Runway 08 in fog with a visibility of less than 500 metres. As the aircraft reached the upwind end of the runway it was seen to bank to the left before disappearing from view. It crashed 13 seconds later into a factory complex where a major fire ensued. All on board were fatally injured. A substantial amount of the aircraft structure was consumed by fire. Engineering examination of that which remained showed that there was no malfunction found within the engines, propellers or controls that would

have affected the flight. Analysis of the cockpit voice recorder however showed a reduction in one of the propellers rpm as the aircraft rotated that would have led to thrust asymmetry. Through a combination of lack of visual reference, confusion as to the cause of the power reduction and possible disorientation the pilot lost control of the aircraft and although he may have realised the situation seconds before impact with the ground there was insufficient height available to effect a safe recovery.

RECOMMENDATION 2003-17

The Raytheon Aircraft Company should ensure that reference to the correct adjustment of power lever friction is suitably emphasised in the Beech 200 Aircraft Operating Manual (AOM) and the consequences of insufficient adjustment are not only highlighted in the AOM but also included in the recommended Beech 200 type training syllabus.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

B747-2B5F	Near London Stansted Airport	22 Dec 1999	Accident

References: AAR 3/2003 dated 25 Jul 2003

FACTOR F18/2003 dated 25 Jul 2003

SYNOPSIS (From AAIB Report)

The aircraft arrived at Stansted Airport after a flight from Tashkent, Uzbekistan. Prior to leaving the aircraft, the flight engineer made an entry in the Technical Log to the effect that the captain's Attitude Director Indicator (ADI) was 'unreliable in roll'; he also verbally passed the details to the operator's ground engineer who met the aircraft on arrival. This fault had been detected after takeoff from Tashkent. The inbound flight crew then left the aircraft without meeting the outbound crew who were due to operator HL-7451 to Milan (Malpensa) Airport later that day.

During the turnaround, some cargo was offloaded and other cargo, which had been transported by road from London, was loaded. At the same time, the operator's ground engineer and two other engineers from a local maintenance organisation carried out rectification action in an attempt to correct the reported fault with the ADI. The loading was almost complete when the outbound crew arrived; this crew comprised the commander who was to be the handling pilot, the first officer and the flight engineer. Prior to engine start, the commander accompanied the load controller through the aircraft to check the security of the cargo, and then checked the load sheet before signing it and leaving a copy with the load controller. The operator's ground engineer who had met the aircraft on its arrival at Stansted also boarded the aircraft for the flight to Milan.

At 1727hrs, the aircraft was ready to depart. However, there were delays caused by various factors outside of the crew's control and they were not cleared to taxi until 1825hrs. By 1835 hrs, the crew had contacted the 'Tower' and were instructed:

"AFTER THE NEXT LANDING AIRCRAFT ON FINAL LINE UP AND WAIT RUNWAY 23". Subsequently, at 1836 hrs HL-7451, using the callsign KAL8509 was cleared to take off with a reported surface wind of 190deg/18kt. The Tower controller considered that the takeoff was normal and the aircraft disappeared from sight as it entered the cloud base at about 400 feet agl. At 1838hrs, as the aircraft indicated altitude passed 1,400 feet, KAL 8509 was transferred to 'London Control' on frequency 118.82MHz. The crew had been cleared for a departure procedure, which required a left turn at 1.5nm from the Stansted DME (co-incident with the 152deg radial from Barkway VOR) onto a radial of 158deg to the Detling VOR. No radio calls were heard from the aircraft subsequent to the frequency transfer instruction from 'Stansted Tower'. The ATC personnel in the 'Tower' then saw an explosion to the south of the airport and immediately implemented their emergency procedures. The Aerodrome Fire Service recorded receipt of the alerting action from ATC at 1840hrs. Essex police recorded the first emergency call from a member of the public at 1843 hrs.

Investigations revealed that, throughout the accident flight, the captain's ADI indicated the correct pitch attitude but that the roll attitude remained at a wings level indication. Radar and Flight Data Recorder data showed that the aircraft commenced a turn to the left but that this turn was continuous until impact with the ground. At impact, the aircraft was assessed to be pitched approximately 40deg nose down, banked close to 90deg to the left and with a speed in the region of 250 to 300kt.

The investigation identified the following causal factors:

1 The pilots did not respond appropriately to the comparator warnings during the climb after takeoff from Stansted despite prompts from the flight engineer.

2 The commander, as the handling pilot, maintained a left roll control input, rolling the aircraft to approximately 90deg of left bank and there was no control input to correct the pitch attitude throughout the turn.

3 The first officer either did not monitor the aircraft attitude during the climbing turn or, having done so, did not alert the commander to the extreme unsafe attitude that developed.

4 The maintenance activity at Stansted was misdirected, despite the fault having been correctly reported using the Fault Reporting Manual. Consequently the aircraft was presented for service with the same fault experienced on the previous sector; the No 1 INU roll signal driving the captain's ADI was erroneous.

5 The agreement for local engineering support of the Operator's engineering personnel, was unclear on the division of responsibility, resulting in erroneous defect identification, and mis-directed maintenance action.

RECOMMENDATION 2003-62

It is recommended that Korean Air continue to update their training and Flight Quality Assurance programmes, to accommodate Crew Resource Management evolution and industry developments, to address issues specific to their operational environment and ensure adaptation of imported training material to accommodate the Korean culture

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

RECOMMENDATION 2003-63

It is recommended that Korean Air continue to review its policy and procedures for maintenance support at international destinations with a view to deploying sufficient of its own full-time engineers at the outstation or delegating the entire task to another operator or third-party maintenance organisation locally-based at the destination (Full Technical Handling). If neither of these approaches is practicable then the support arrangements must be detailed and of such clarity as to preclude confusion.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

RECOMMENDATION 2003-64

It is recommended that Korean Air review its policy and procedures to ensure that a copy of the relevant pages of the Technical Log and any other transit certification documents are left on the ground at the point of departure.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

RECOMMENDATION 2003-65

It is recommended that ICAO Technical Instructions Part 7, Chapter 4.6.1 be amended to, 'The operator of an aircraft carrying dangerous goods which is involved in an aircraft accident must, as soon as possible, inform the appropriate Authority in the State in which the aircraft accident occurred of the dangerous goods carried together with their proper shipping names, class and subsidiary risks for which labels are required, the compatibility group for Class 1 and the quantity and location on board the aircraft'.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

RECOMMENDATION 2003-66

It is recommended that ICAO consider an initiative to review the current methods of tracking air cargo and further consider improved systems, utilising electronic data storage and transmission, with a view to providing timely information on the cargo carried by any aircraft involved in an accident.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

RECOMMENDATION 2003-67

It is recommended that the ICAO Hazard at Accident Sites Study Group is supported and resourced to enable it to meet its target date for delivery of the necessary data and risk management advise.

Status - Not CAA - Closed

Response

At the time of compilation of this Progress Report no response has been received. The AAIB is pursuing the matter.

Index

Index of Recommendations

Aircraft Type	Location	Recnum	Date	Page No
Fokker F27-500	Jersey	97-68	6-May-1997	36
Fokker F27-500	Jersey	97-70	6-May-1997	37
HS748 Series 2A	Liverpool Airport	99-25	9-Feb-1998	33
B767-322ER	London Heathrow	99-51	9-Jan-1998	35
Fokker F27-600	Final Approach to Guernsey Airport	99-65	12-Jan-1999	28
Fokker F27 Mark 50	Coventry Airport	2000-53	1-Jul-2000	26
Shorts SD3-60, Tornado F3	26.5nm North Newcastle Airport	2000-58	20-Mar-2000	27
B757/F15E	5NM West of Daventry	2000-71	22-Nov-2000	21
BAe146 - 200	On descent Birmingham Airport	2001-04	5-Nov-2000	23
BAe146 - 200	On descent Birmingham Airport	2001-06	5-Nov-2000	24
BAe146 - 200	On descent Birmingham Airport	2001-07	5-Nov-2000	24
HS748-Series 2B	London Stansted Airport	2001-22	30-Mar-1998	30
HS748-Series 2B	London Stansted Airport	2001-23	30-Mar-1998	31
HS748-Series 2B	London Stansted Airport	2001-24	30-Mar-1998	31
HS748-Series 2B	London Stansted Airport	2001-25	30-Mar-1998	32
HS748-Series 2B	London Stansted Airport	2001-26	30-Mar-1998	32
Cessna C404 Titan	Near Glasgow Airport	2001-40	3-Sep-1999	91
BAe146 - 200	On descent Birmingham Airport	2001-47	5-Nov-2000	25
MD83	Liverpool Airport	2001-54	10-May-2001	129
Hughes 269C	Hare Hatch, Berkshire	2001-82	8-Mar-2000	63
Piper PA28R-200	Off NW Guernsey	2001-94	3-Jul-2001	126
EMB145	En Route - Divert to EMA	2002-01	15-Feb-2002	12
EMB145	En Route - Divert to EMA	2002-02	15-Feb-2002	12
EMB145	En Route - Divert to EMA	2002-04	15-Feb-2002	13
Piper PA24-250	Osea Island, Essex	2002-23	12-May-2001	87
Lockheed L188C	10 miles South of Rennes	2002-31	7-Jun-2001	14
Lockheed L188C	10 miles South of Rennes	2002-32	7-Jun-2001	128
Shorts SD3-60	Near Edinburgh Airport	2002-39	27-Feb-2001	19
Fokker FK100	Manchester Airport	2002-42	1-Apr-2002	10
Sikorsky S61N	Poole, Dorset	2002-51	15-Jul-2002	46
Sikorsky S61N	Poole, Dorset	2002-52	15-Jul-2002	46
Sikorsky S61N	Poole, Dorset	2002-53	15-Jul-2002	47
RAF 2000 GTX-SE	Black Notley, Essex	2003-01	17-May-2002	54
RAF 2000 GTX-SE	Black Notley, Essex	2003-02	17-May-2002	55
RAF 2000 GTX-SE	Black Notley, Essex	2003-03	17-May-2002	55
RAF 2000 GTX-SE	Black Notley, Essex	2003-04	17-May-2002	56
Rans S10 Sakota	Lower Whitley, Cheshire	2003-05	2-Jun-2002	121
Gill SA Pulsar	Gloucester-Staverton Aerodrome	2003-06	14-Aug-2002	115
Aerospatiale SA365N	Kyle of Lochalsh	2003-09	21-Jan-2002	60

Piper PA30	Near Wolverhampton Airport	2003-11	8-Mar-2002	84
Aero L39C Albatros	Duxford Airfield	2003-13	2-Jun-2002	81
Aero L39C Albatros	Duxford Airfield	2003-14	2-Jun-2002	82
Spitfire PR XI	Near Rouen, Valle de Seine Airport	2003-15	4-Jun-2001	86
Beech 200	Blackbushe Airport	2003-17	23-Dec-2000	131
Boeing B747-286B	London Heathrow Airport	2003-23	20-Jun-2002	118
Boeing B747-286B	London Heathrow Airport	2003-24	20-Jun-2002	119
Cessna U206F	Strathallan Airfield	2003-26	5-May-2002	83
Jet Provost T3A	Near Humberside Airport	2003-27	18-Aug-2002	78
Jet Provost T3A	Near Humberside Airport	2003-29	18-Aug-2002	78
BAe 146-RJ100	Birmingham Airport	2003-30	10-Feb-2003	4
BAe 146-RJ100	Birmingham Airport	2003-31	10-Feb-2003	107
BAe 146-RJ100	Birmingham Airport	2003-32	10-Feb-2003	108
Pegasus CT2K	Wycombe Air Park	2003-33	18-Feb-2003	105
Pegasus CT2K	Wycombe Air Park	2003-34	18-Feb-2003	105
Pegasus CT2K	Wycombe Air Park	2003-35	18-Feb-2003	106
Beech 200 Super Kingair	12nm Northeast of Clacton	2003-36	23-Jul-2002	115
Bolkow BO 105-DBS-4	Brough of Birsay, Orkneys	2003-37	24-May-2002	51
Bolkow BO 105-DBS-4	Brough of Birsay, Orkneys	2003-38	24-May-2002	52
Bolkow BO 105-DBS-4	Brough of Birsay, Orkneys	2003-39	24-May-2002	52
Bolkow BO 105-DBS-4	Brough of Birsay, Orkneys	2003-40	24-May-2002	121
Bolkow BO 105-DBS-4	Brough of Birsay, Orkneys	2003-41	24-May-2002	52
Bolkow BO 105-DBS-4	Brough of Birsay, Orkneys	2003-42	24-May-2002	53
MD83	Liverpool Airport	2003-44	10-May-2001	129
MD83	Liverpool Airport	2003-45	10-May-2001	16
MD83	Liverpool Airport	2003-47	10-May-2001	129
MD83	Liverpool Airport	2003-48	10-May-2001	16
Eurocopter EC135 T1	Near Muirkirk, East Ayrshire	2003-49	17-Feb-2002	58
Eurocopter EC135 T1	Near Muirkirk, East Ayrshire	2003-50	17-Feb-2002	58
Airbus A340	London Heathrow Airport	2003-51	30-Jan-2003	5
HS748	Western Italian Alps	2003-61	14-Nov-2002	113
B747-2B5F	Near London Stansted Airport	2003-62	22-Dec-1999	132
B747-2B5F	Near London Stansted Airport	2003-63	22-Dec-1999	133
B747-2B5F	Near London Stansted Airport	2003-64	22-Dec-1999	133
B747-2B5F	Near London Stansted Airport	2003-65	22-Dec-1999	133
B747-2B5F	Near London Stansted Airport	2003-66	22-Dec-1999	133
B747-2B5F	Near London Stansted Airport	2003-67	22-Dec-1999	134
Aero L39C Albatros	Duxford Airfield	2003-68	2-Jun-2002	82
Piper PA28-161	Wolverhampton Airport	2003-69	30-Jun-2001	127
Tri-R Kis	Cumbernauld Airfield	2003-70	11-Aug-2002	80
Yak 52	Two miles NE of Towcester	2003-71	5-Jan-2003	72
Yak 52	Two miles NE of Towcester	2003-72	5-Jan-2003	73
Aerospatiale SA365N	Kyle of Lochalsh	2003-73	21-Jan-2002	60

Robinson R22	Cranfield Airfield	2003-74	4-May-2003	103
Scheibe SF25E Super-Falke	Bowland Forest, Lancashire	2003-75	15-Feb-2003	107
Slingsby T67B Firefly	Near Banbury	2003-76	3-Nov-2002	75
Piper PA31	54 Miles West of Barbados	2003-77	18-May-2003	101
Robinson R22 Beta	Sywell Aerodrome, Northamptonshire	2003-78	14-May-2002	122
Robinson R22 Beta	Sywell Aerodrome, Northamptonshire	2003-79	14-May-2002	123
Robinson R22 Beta	Sywell Aerodrome, Northamptonshire	2003-80	14-May-2002	123
De Havilland Canada DHC8	25 Miles North of Edinburgh	2003-81	2-Mar-2003	3
De Havilland Canada DHC8	25 Miles North of Edinburgh	2003-82	2-Mar-2003	3
Sikorsky S61N	Poole, Dorset	2003-83	15-Jul-2002	117
Sikorsky S61N	Poole, Dorset	2003-84	15-Jul-2002	47
Sikorsky S61N	Poole, Dorset	2003-85	15-Jul-2002	47
Sikorsky S61N	Poole, Dorset	2003-86	15-Jul-2002	48
Sikorsky S61N	Poole, Dorset	2003-87	15-Jul-2002	48
Sikorsky S61N	Poole, Dorset	2003-88	15-Jul-2002	48
Sikorsky S61N	Poole, Dorset	2003-89	15-Jul-2002	49
Sikorsky S61N	Poole, Dorset	2003-90	15-Jul-2002	49
Sikorsky S61N	Poole, Dorset	2003-91	15-Jul-2002	50
Sikorsky S61N	Poole, Dorset	2003-92	15-Jul-2002	50
RAF 2000 GTX Gyroplane	Long Marston Airfield, Warwickshire	2003-93	8-Feb-2003	41
Piper PA 38-112	Wycombe Air Park, Bucks	2003-94	15-Jun-2003	98
Piper PA 38-112	Wycombe Air Park, Bucks	2003-95	15-Jun-2003	70
Embraer 135	Norwich Airport	2003-96	30-Jan-2003	7
Embraer 135	Norwich Airport	2003-97	30-Jan-2003	109
Piper PA28-200-2	Warren Farm, Lambourne	2003-98	3-Dec-2000	90
Robinson R22 Beta	Hampton Magna, Warwickshire	2003-100	13-Jul-2002	117
YAK 50	North Weald Airfield	2003-101	22-Aug-2003	66
YAK 50	North Weald Airfield	2003-102	22-Aug-2003	67
YAK 50	North Weald Airfield	2003-103	22-Aug-2003	67
Airbus A320-214	Kefallinia, Greece	2003-104	27-Oct-2002	114
Airbus A320-214	Kefallinia, Greece	2003-105	27-Oct-2002	114
Dornier 328-100	Edinburgh Airport	2003-109	6-Mar-2002	124
Bell 206B Jet Ranger III	Cudham, Kent	2003-110	17-Jan-2003	43
Bell 206B Jet Ranger III	Cudham, Kent	2003-111	17-Jan-2003	43
Bell 206B Jet Ranger III	Cudham, Kent	2003-112	17-Jan-2003	44
Boeing B727 230F	East Midlands Airport	2003-113	19-Nov-2002	111
Boeing B727 230F	East Midlands Airport	2003-114	19-Nov-2002	111
Spirit of St Louis Replica	Coventry Airfield	2003-115	31-May-2003	100
Spirit of St Louis Replica	Coventry Airfield	2003-116	31-May-2003	70
Cessna C421C	Humberside Airport	2003-117	29-Mar-2003	104
Cessna C421C	Humberside Airport	2003-118	29-Mar-2003	71
BAe 146-200	Near Birmingham Airport	2003-119	12-Dec-2002	8
BAe 146-200	Near Birmingham Airport	2003-120	12-Dec-2002	8

BAe 146-200	Near Birmingham Airport	2003-121	12-Dec-2002	110
BAe 146-200	Near Birmingham Airport	2003-122	12-Dec-2002	9
BAe 146-200	Near Birmingham Airport	2003-123	12-Dec-2002	110
Zenair CH 601UL Zodiac	Near Bewdley, Worcs	2003-124	28-Jun-2003	97
Piper PA28-180	Nayland Airfield, Suffolk	2003-125	28-Apr-2001	89
Bell 206B Jet Ranger III	Crag Lough, Northumberland	2003-126	30-May-2003	39
Bell 206B Jet Ranger III	Crag Lough, Northumberland	2003-127	30-May-2003	100
RAF 2000	Hall Farm Strip, near Lichfield	2003-130	5-Feb-2003	42
Airbus A310-308	Manchester Airport	2003-131	15-Jul-2003	96
Airbus A310-308	Manchester Airport	2003-132	15-Jul-2003	96
Cessna F152	Headcorn Aerodrome	2004-01	1-Jul-2003	69
Streak Shadow SA	Old Sarum	2004-02	17-Sep-2003	65
Streak Shadow SA	Old Sarum	2004-03	17-Sep-2003	65
Piper PA34-200T	Sherburn-in-Elmet Aerodrome	2004-07	8-May-2003	102
Airbus A310-308	Manchester Airport	2004-08	15-Jul-2003	2
Boeing B747-240B	Manchester Airport	2004-09	13-Jun-2002	119
Denney Kitfox Mk4	Smeeton Westerby	2004-10	13-Jun-2003	99
Cessna C152	Chenies, Bucks	2004-11	28-Sep-2002	76
Bell 206L Longranger	Near Pathhead, Midlothian	2004-12	30-Apr-2003	40