Air Accidents Investigation Branch

Progress Report 2006

Responses to Air Accidents Investigation Branch (AAIB) Safety Recommendations

Responses recieved to AAIB recommendations made up to 31 December 2005, presented to the Secretary of State for Transport

Department for Transport

Published March 2007

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Foreword

The Air Accidents Investigation Branch is part of the Department for Transport 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 United Kingdom. Its authority is enshrined in the Civil Aviation (Investigation of Air Accidents and incidents) Regulations 1996 and its purpose is 'to improve aviation safety by determining the causes of air accidents and serious incidents and making safety recommendations intended to prevent recurrence'. The AAIB reports directly to the Secretary of State for Transport on safety matters.

The Civil Aviation Authority (CAA) Safety Regulation Group's (SRG) role is to ensure that UK civil aviation standards are set and achieved in a co-operative and cost effective manner. Until recently the SRG had to satisfy itself that aircraft were properly designed, manufactured, operated and maintained; that airlines were competent; that flight crews, air traffic controllers and aircraft maintenance engineers were fit and competent; that licensed aerodromes were safe to use and that air traffic services and general aviation activities meet required safety standards. They continue to fulfil most of these functions but, in September 2003, the responsibility for certification and continued airworthiness of aircraft was transferred to the European Aviation Safety Agency (EASA). Therefore AAIB recommendations relating to airworthiness are now directed to the EASA.

Accident investigation and safety regulation are clearly different and the two functions 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. Thus a good working relationship between the AAIB, the CAA and the EASA is essential, while in no way jeopardising the independence of the accident investigation.

Effective day to day liaison has been maintained between the AAIB and the CAA, which has been particularly useful in the immediate aftermath of any accident. However, the formal procedure by which the AAIB identifies and conveys to the CAA, the EASA 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. Both the CAA and the EASA have formal procedures for the receipt and evaluation of such recommendations and initiation of necessary action. 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. The EASA response to AAIB safety recommendations however, has, until recently, been less formalised but the AAIB now receives an acknowledgement that a recommendation has been received but as yet the AAIB has not been informed by the EASA whether a recommendation has been accepted or if any safety actions have been implemented.

Historically, responses to the Air Accidents Investigation Branch's recommendations have been published by the Civil Aviation Authority in their annual Progress Report on AAIB recommendations under the cover of a Civil Aviation Publication (CAP). With the recent shift of airworthiness responsibilities however, it has become more appropriate for the

AAIB to take responsibility for reporting on the responses to its recommendations regardless of the target authority or organisation. The first AAIB progress report was published in March 2006. This second report details the responses received to AAIB recommendations made up to and including 31 December 2005.

The Report

This is the second annual Progress Report on Safety Recommendations submitted to the Secretary of State by the Air Accidents Investigation Branch (AAIB). It contains all the recommendations made by the AAIB in 2005 including the responses to those recommendations received up to and including 30 June 2006 and those recommendations categorised as open from previous years where significant additional information has been received.

The recommendations are grouped into eight sections:

1. Aeroplanes 5,700kg MTWA and above
2. Aeroplanes above 2,250kg and below 5,700kg MTWA
3. Aeroplanes 2,500kg MTWA and below
4. Microlights
5. Rotorcraft 5,700kg MTWA and above
6. Rotorcraft above 2,250kg and below 5,700kg MTWA
7. Rotorcraft 2,500kg MTWA and below
8. Others

Within each section the accidents are listed by event date in reverse chronological order. This date should be taken as the date the recommendation was made.

The Status of responses to safety recommendations, as determined by the AAIB, have been divided into 7 categories.

1. Accepted - CLOSED (appropriate action implemented/planned)
2. Accepted - OPEN (appropriate action planned but not yet implemented)
3. Rejected - OPEN (further action required)
4. Rejected - rejected for acceptable reasons not known at the time of publication (no further AAIB action)
5. Partially accepted – OPEN
6. Partially accepted - CLOSED
7. Response awaited - OPEN

Statistics

Recommendations made in 2005 and status:

Number	Status Category						
	1 Accepted CLOSED	2 Accepted OPEN	3 Rejected OPEN	4 Rejected	5 Partially accepted OPEN	6 Partially accepted CLOSED	7 Response awaited OPEN
126	50	17	1	10	3	2	43
% of total	39.68	13.49	0.79	7.94	2.38	1.59	34.13

87% of recommendations receiving a response have either been accepted or partially accepted.

Note: 19 safety recommendations were allocated with recommendation numbers of which 10 were withdrawn; 5 superceded & 4 no longer applicable before issue

Recommendations made in 2005 by Addressee:

Addressee	Number
Airbus	2
Apex Aviation	1
AvCraft	1
British Gliding Association (BGA)	2
British Microlight Aircraft Association (BMAA)	3
British Parachute Association	8
British Airways	2
British Airways Maintenance Organisation	6
Civil Aviation Authority (CAA)	31
Centro Tecnico Aeroespacial (CTA) of Brazil	1
Cessna Aircraft Company	2
Dassault Aviation	3
European Aviation Safety Agency (EASA)	21
Embraer	1
Empresa Brasileira De Aeronautica, SA (Embraer)	1
Eurocopter	3
Evergreen International Airline	1
Excel Airways	2
Federal Aviation Administration (FAA)	19
FlightSafety International	2
Hartzell Propeller Incorporated	2
Heathrow Airport Limited	10
Hoffman Propeller GmBH & Co	2
International Chamber of Shipping	3
Joint Aviation Authorities (JAA)	4
Manair Sports Limited	2
Manchester Airport ATC	1
Pakistan International Airline Corporation	1
Popular Flying Association (PFA)	2
Robinson Helicopter Company	1
Rolls Royce	1
Transport Canada	1
Thielert Aircraft Engines	1

Note: Please note that a number of Safety Recommendations are made to more than one Addressee

Section 1

Aeroplanes 5,700kg MTWA and above

Embraer 145-EP	**On approach to Manchester**	**25-Sep-2001**	**Incident**

AAIB Bulletin: 11/2005
FACTOR: F41/2005

Synopsis

The aircraft was carrying out a scheduled flight from Aberdeen to Manchester. The commander, who was the handling pilot, reported that during the flight the weather radar was displaying weak returns of cumulonimbus cloud activity, but he manoeuvred the aircraft in order to avoid the affected areas, primarily by visual means.

He accepted radar vectors to position the aircraft downwind for the landing runway. Just as the aircraft entered cloud, a lightning strike occurred. The commander subsequently reported that there was neither turbulence nor significant precipitation at that time. Recorded data indicated that the aircraft was close to Flight Level (FL) 70 at the time with a low thrust setting.

The first officer informed the commander that he had observed a left engine over-temperature indication. Within 5 to 10 seconds of the strike, both crew members noted that the left engine operating parameters were decreasing rapidly. They were not aware of any warning or caution indications at the time.

A distress call was broadcast and checklist procedures for both engine failure and single engined approach were carried out. An uneventful single engined landing then took place at 1415 hrs.

SAFETY RECOMMENDATION - 2005-094

It is recommended that, in order to minimise the risk of uncommanded shut-downs, EASA, FAA and the Centro Tecnico Aeroespacial (CTA) of Brazil in conjunction with aircraft and engine manufacturers should review and, if necessary, initiate appropriate research into the aero-thermal disruption of intake flow and other effects of lightning strikes on fuselage mounted turbine engines in order to establish whether there is a safety of flight issue that should be addressed by appropriate future rulemaking. They should also consider the application of any proposed rules to types currently in service.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-095

It is recommended that, with advances in the technology which becomes available to them, Rolls-Royce Corp continue to explore the potential to make modifications to the FADEC logic to enable the re-establishment of stable running conditions, after detection of a surge condition, before the FADEC attempts to restore selected engine power.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-096

It is recommended that, consideration be given by Embraer to amending the EMB 145 operating procedures and minimum equipment list to ensure that, in the event of an engine flame-out and

continued flight in a zone with a high probability of lightning strikes, the supply of APU air for main engine starting remains available.

Status - Response Awaited - open

Boeing 747-240B	Manchester Airport Runway 24R	13-Jun-2002	Incident

AAIB Bulletin: 3/2004
FACTOR: F16/2004

Synopsis

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 Nos 1, 2 and 4 reversers stowed normally but flight deck indications showed No 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.

SAFETY RECOMMENDATION - 2004-009

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.

Response

EASA Response

The Federal Aviation Administration (FAA) is responsible for the Type Certificate of the GE model CF6-6 and CF6-50 engines and the Type Certificate of Boeing products on which these engines are installed. The Agency will coordinate with the FAA to evaluate the need for a modified inspection procedure.

FAA Response

The AAIB report describes in detail the thrust reverser sleeve failure mechanism and recounts the history of the thrust reverser repairs. It is obvious that the immediate cause of the event was an undocumented, inappropriate repair to the part that ultimately failed. We agree that the root cause was probably an overload of the clevis installation some time in the past that necessitated the repair that ultimately failed. We also agree that the damage to this particular part or the inferior repair would not necessarily be visible during routine inspections. However, it is also apparent that in the recent months preceding the failure, the operator missed at least two opportunities to detect and properly correct the problem. It seems they dealt only with correcting what were probably symptoms of the impending failure rather than looking for some root cause for the attention the thrust reverser

was requiring on an unusually frequent basis. We do not believe this necessarily indicates a need to inspect all the similar thrust reversers.

The airplane manufacturer acknowledges the history of the subject thrust reversers but also notes that the earlier efforts by the thrust reverser manufacturer, as mentioned in the report, significantly reduced the occurrence of translating sleeve problems. Middle River Aircraft Systems, General Electric (GE), and The Boeing Company, the three companies concerned, believe the best course of action would be to reemphasize the importance of adequate thrust reverser preventive maintenance. To that end, the attached article will appear in "LINE/SHOP," GE's maintenance newsletter. The FAA would prefer a more direct approach, but after discussing the available alternatives with the manufacturer, and upon noting that FAA Airworthiness Directive AD 2000-14-11 will provide multiple opportunities for competent mechanics to detect overload conditions, the FAA agrees the manufacturer's approach is adequate. Therefore, no specific regulatory action to address the clevis fitting attachment is planned by the FAA at this time.

Status - Rejected - closed

Boeing 737-436	**Near Clacton**	**08-Nov-2002**	**Incident**

AAIB Bulletin: 6/2004
FACTOR: F35/2004

Synopsis

Whilst climbing through FL240 the flight crew noticed a small amount of smoke appear on the flight deck, accompanied by a smell of electrical burning. They decided to carry out a diversion but were hampered by difficulties in communications with the cabin crew and locating the appropriate checklist, since it was not clearly identified on the index page of the QRH. Fire damage had occurred to electrical wiring in the area of the 'drop-down' ceiling panel immediately aft of the flight deck door. A braided steel water supply hose to the forward galley had been attached by means of a simple electrical 'tie-wrap' to a wiring loom, and there was evidence of abrasion and arcing between the wires and the hose. This had resulted in the severing and shorting of a number of wires. It was determined that the hose was too long for this application and that the excess length had been looped through this overhead area and then secured by the tie-wrap to adjacent wire bundles. It was not conclusively determined when this had been done but it was most likely that the attachment was simply a short-term expedient while systems were being disconnected and disassembled, and that the error was then missed during reassembly.

SAFETY RECOMMENDATION - 2004-016

It is recommended that the Boeing Commercial Airplane Company review the B737 non-normal checklist for 'Smoke' to ensure that the procedure for smoke on the flight deck is unambiguous and clearly identified in order to give flight crews the best opportunity to locate it in conditions of low visibility.

Response

In response to this recommendation, the manufacturer has stated that they recognise there are issues with the current checklist(s) for smoke identification and resolution. As such, they are currently conducting an indepth review and are applying human factor research to improve the checklist selection via the indexes in the QRH.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2004-017

It is recommended that the Boeing Commercial Airplane Company review the illustration and text material of the Maintenance Manual relating to the installation of the forward galley installation in the B737-400, and any other affected model, to give clear instruction as to where the galley water supply hose disconnection should be made when removing the galley.

Response

In response to this recommendation, the manufacturer has made the following comments.

Due to the wide variety of installations of the subject galley (for example, the operator of G-DOCH has some six different installations in their B737-300/400/500 fleet alone), the water lines are unique for each galley installation. The manufacturer's main concern, therefore, has been to ensure the proper removal/installation of each galley in accordance with intended fit and function. As such, it has been acceptable for maintenance personnel to disconnect the water hose from any fitting in the system that is appropriate for a particular installation. Thus, the AMM instructions are often generic in nature for this type of application. However, the manufacturer plans to review this hose installation to ensure the security of the extra length of hose and validate any necessary changes to the galley installation and/or its procedures. This review will include the necessary specific instructions for securing the extra length of hose, or consider alternative solutions.

Status - Accepted - closed

DC-8-63F	Lyneham	29-Apr-2003	Incident

AAIB Bulletin: 3/2005
FACTOR: F12/2005

Synopsis

The aircraft's right main landing gear suffered extensive fracturing of its shock-strut piston as the aircraft was making a 180 taxiing turn. Associated disruption to the landing gear scissor linkage allowed the landing gear truck to diverge approximately 45° from the aircraft's heading, but one of the broken parts of the piston remained jammed in the shock-strut cylinder and continued to support the aircraft. Around 90% of the specified overhaul life of the landing gear remained at the time of the accident.

Specialist examination indicated that the piston material was in accordance with the aircraft manufacturer's specification. The fractures had originated from a small pre-existing stress corrosion crack in an area of the surface where cadmium plating was absent. The crack had probably been initiated by abnormally high local stresses associated with a step in a blend radius in the region of the crack origin and with surface scratches in the area. These features should have been apparent during the last overhaul of the landing gear. The pre-existing crack, while small, was probably sufficient to cause the rapid extensive fracturing of the piston under normal operating loads, given the notch sensitivity of the high-strength steel from which it was made.

SAFETY RECOMMENDATION - 2005-004

It is recommended that the Federal Aviation Administration (FAA) take measures aimed at ensuring that overhaul organisations approved by them have in place adequate standards of quality control.

Response

We have evaluated FAA Safety Recommendation 05.041 and have determined that the recommendation for adequate quality control standards were fulfilled January 31, 2004, in Title 14

Code of Federal Regulations part 145, REPAIR STATIONS, section 145.211, Quality control system. Section 145.211 (a) states: "A certificated repair station must establish and maintain a quality control system acceptable to the FAA that ensures the airworthiness of the articles on which the repair station or any of its contractors performs maintenance, preventive maintenance, or alterations"; and (c) "A certificated repair station must prepare and keep current a quality control manual in a format acceptable to the FAA…"

We consider that rules, guidance, and programs already in place satisfy the concerns of FAA Safety Recommendation 05.041, and we plan no further action.

We would like to thank the Air Accidents Investigation Branch of the United Kingdom for its diligent efforts and interest in aviation safety.

Status - Accepted - closed

Boeing 737-436	In flight near Lyon	30-May-2003	Incident

AAIB Bulletin: 6/2004
FACTOR: F33/2004

Synopsis

Whilst in the cruise the crew began to feel some discomfort in their ears. This was shortly followed by the cabin altitude warning horn which indicated that the cabin altitude had exceeded 10,000 feet and this was seen to continue to climb on the cockpit gauge. At the same time, the primary AUTO mode of the pressure control failed, shortly followed by the secondary STBY mode. The crew selected the first manual pressure control mode, but were unable to control the cabin altitude. An emergency descent and subsequent diversion to Lyon was carried out. The failure of the pressurisation control system was traced to burnt electrical wiring in the area aft of the aft cargo hold. The wiring loom had been damaged by abrasion with either a p-clip or 'zip' strap that, over time, resulted in the conductors becoming exposed, leading to short circuits and subsequent burning of the wires. There was no other damage. The wiring for all the modes of operation of the rear outflow valve, in addition to other services, run through this loom.

SAFETY RECOMMENDATION - 2004-033

It is recommended that in order to prevent failure of the cabin pressure control system in the event of damage to wiring loom W298, the Boeing Commercial Airplanes should consider, on the Boeing 737-436 and similarly configured models, separating or protecting the wiring associated with the different modes of operation of this system, which connects the cabin pressure controller to the rear outflow valve, such that any single point failure of the loom would not result in effective failure of the pressurisation control system.

Response

After a review of the issue and the service history of the pressurization system for the 737-100 thru -500 model airplane, Boeing felt that modifications of the wiring with the intent of separating the outflow valve functions consistent with the subject safety recommendation would not significantly contribute towards a reduction in the overall rate of depressurization events. Their rationale was based on the basic design philosophy and concept of the original system which includes:

1) A single, mechanical outflow valve which is controlled by a single multi-mode analog pressure controller and driven by independent AC or DC powered electrical motors. Each motor can also be manually commanded open and closed via separate switch on the pressure control panel.

2) In the event of a complete power/control loss (e.g. - electrical interruption or damaged wiring) either motor will remain in last commanded position. The airplane is equipped with an independent aural warning system (cabin above 10,000 feet) and visual cues (cabin above 14,000 feet) should this condition lead to a cabin pressure loss.

3) The airplane is equipped with both fixed and portable oxygen supply systems for passengers and crew.

4) If pressure cannot be reliably controlled/restored within a short period of time, the flight crew will utilize procedures (such as rapid reduction in altitude, declaration of emergency and landing at nearest suitable airport) which mitigate the exposure time to low pressure.

Status - Rejected - closed

Incidents Resulting From Damage To Electrical Wiring

AAIB Bulletin: 6/2004
FACTOR: F33/2004

Introduction

A number of accident and incident reports in recent years have identified causal factors that include electrical arcing and damage to aircraft wiring. Significant accidents include a Boeing 747-131, N93119, near East Moriches, New York on July 17, 1996 (TWA 800 - NTSB/AAR-00/03), a Boeing 767-322ER N653UA at London Heathrow Airport on 9 January 1998 (AAIB/AAR 5/2000) and McDonnell Douglas MD-11 HB-IWF near Peggy's Cove, Nova Scotia on 2 September 1998 (Flight 111 - Canadian Report Number A98H0003). Ageing and maintenance related wiring incidents continue to occur despite, generally, an enhanced awareness of the problems associated with aircraft wiring systems. Four such incidents are presented together in this issue of the AAIB Bulletin; all feature damage to electrical wiring and identify similar causal factors. Although each incident is reported separately in AAIB Bulletin 6/2004, this overview document draws together the common issues and makes four additional Safety Recommendations. The four incidents are as follows:

EW/C2002/11/02	Boeing 737-436, G-DOCH	8 November 2002
EW/C2003/05/06	Boeing 737-436, G-DOCE	30 May 2003
EW/C2003/06/03	Concorde Type 1 V102, G-BOAC	13 June 2003
EW/C2003/07/07	Boeing 737-300, G-LGTI	30 July 2003

The Ageing Transport Systems Rulemaking Advisory Committee

Background

In 1996, the US President established the White House Commission on Aviation Safety and Security (WHCSS) which recommended that '*In co-operation with airlines and manufacturers, the FAA's ageing aircraft programme should be expanded to cover non-structural systems*.' The Commission was concerned that existing requirements, procedures, maintenance practices and inspections may not be sufficient to prevent safety related problems caused by the deterioration of aircraft systems, including wiring, as aircraft get older. The findings from this Commission formed the basis for the FAA Ageing Transport Non-Structural Systems Plan. This acknowledged that both maintenance and design issues should be investigated and, in January 1999, the FAA chartered an advisory committee, the Ageing Transport Systems Rulemaking Advisory Committee (ATSRAC),

which included members from the FAA, DoD, NASA, JAA and industry. ATSRAC's primary task was *'to propose such revisions to the Federal Aviation Regulations (FAR) and associated guidance material as may be appropriate, to ensure that non-structural systems in transport airplanes are designed, maintained, and modified in a manner that ensures their continuing operational safety throughout the service life of the airplanes.*' The initial priority was given to electrical wiring systems.

Visual inspection was carried out on a number of in-service aircraft types and showed 'deterioration of electrical wire, wire bundles, earthing leads, clamps and shielding. Items such as improper clamp sizing, inadequate clearance to structure and accumulation of dust or debris were also common. Isolated cracking of outer layers of multi-layer electrical insulation and corroded electrical connectors were also found. The majority of the wiring discrepancies were found to be in areas of frequent maintenance activity, or related to housekeeping. Fluid contamination, dust and dirt accumulations were seen on the wiring on most of the aircraft.'

In light of these findings, a number of areas were identified as meriting attention; these included new design requirements to mitigate known problems due to ageing, which will cover wire accessibility provisions and wire selection, and wire installation to minimise strain and to provide protection from damage.

A draft FAA Advisory Circular (AC), dated 15 July 2002, was produced which provides guidance on changes to existing maintenance practices and analysis methods which could be applied to both in-service aircraft and new design, to ensure adequate consideration of the potential deterioration of electrical wiring systems. An important element of this AC is an enhanced zonal analysis procedure (EZAP), which has been adopted into the latest revision of the Air Transport Association of America (ATA) Maintenance Steering Group (MSG) guidelines, MSG-3. This AC also identifies protection and caution information to be added to maintenance instructions designed to minimise contamination and accidental damage to electrical wiring whilst working on aircraft.

Another draft AC, dated 2 August 2002, provides guidance to manufacturers, operators, maintenance organisations and repair stations for developing an effective wiring systems training programme. This AC promotes the philosophy of training for all personnel who come into close proximity with wiring as part of their job and proposes tailoring of the training for each workgroup according to their needs. It also gives guidance on all essential elements of both initial and recurrent wire training programmes.

A further draft AC, dated 31 October 2002, gives advice on developing an electrical systems standard wiring practices manual. The information in this AC is derived from maintenance, inspection, and repair best practice and promotes a common format and minimum content for documents containing standard practices for electrical wiring.

ACs provide guidance material and the FAA proposes to publish all these ACs in the Federal Register.

The FAA is also proposing publishing the Notice(s) of Proposed Rulemaking (NPRM), by January 2005, for the package of 'ageing systems' Rules. Existing Type Certificate holders are likely to be given 24 months after the Rule goes into effect for completion of the EZAP analyses, development of the required inspection and maintenance instructions, and their incorporation into the Instructions for Continued Airworthiness. Operators would then have a further 12 months to incorporate the required inspection and maintenance instructions into their maintenance procedures and initiate EZAP according to the enhanced maintenance programme. To ensure early attention to the three areas identified by ATSRAC as being of particular importance, ATSRAC advised the FAA to require a one-time cleaning and inspection of the cockpit, Electrical & Equipment bay, and power feeder cables within five years after the rule goes into effect. However, in order to avoid unnecessary increases in maintenance downtime, the FAA are considering not to require a one-time cleaning and inspection of these areas. Instead, these areas would receive the required attention at the appropriate periods defined by the EZAP analyses.

In further work conducted under ATSRAC, there is a general objective to develop strategies for technology transfer and implementation of the FAA research and development (R&D) products into the aviation community. The initial focus will be on Ageing Circuit Breaker recommendations and Arc Fault Circuit Breaker implementation.

European Ageing Systems Coordination Group

On 28 September 2003 the European Aviation Safety Agency (EASA) came into being and assumed responsibility for the certification and continued airworthiness of most aircraft manufactured and operated within the European Union. This responsibility includes continued airworthiness of all aircraft types covered by the ATSRAC work. The JAA, working on behalf of EASA, have recently started the European Ageing Systems Coordination Group (EASCG), which has the task of transcribing all the ATSRAC proposals into the European arena. The UK CAA chairs the EASCG, and it is highly likely that material in the FAA ACs will be adopted for use throughout the EU.

Damage to wiring

The visual inspections carried out by ATSRAC showed that aircraft wiring deteriorates with time and, particularly, in areas subject to high levels of maintenance activity. This is reflected in the incident to G-BOAC, where the airworthiness issues highlighted are not limited to Concorde, which is no longer in service, but reflect broader concerns on all aircraft types regarding wiring maintenance, particularly as aircraft age and modifications are introduced. The possibility for a wire to chafe was introduced during a maintenance input two years prior to this incident, when the wiring was last disturbed. This ultimately led to a short duration in-flight fuel fire.

Similar factors were identified in the incident to a B737, G-DOCH, where a maintenance input led to the mis-routing of the water supply line. This resulted in abrasion between the wires and the hose, and in the shorting and severing of a number of the wires. The hose was too long for this application and the excess length had been looped through the overhead area and then secured by a tie-wrap to adjacent wire bundles. It was most likely that that this was simply a short-term expedient while systems were being disconnected and disassembled and that the 'temporary' tie-wrap was then missed during reassembly.

Loss of the pressurisation system on another B737, G-DOCE, resulted from the abrasion of the insulation of two or more wires in the affected loom. As in the other incidents, there was the possibility that the loom may have been damaged whilst maintenance was carried out in the area, and that this may have started the process which led to the conductors being exposed.

The incident to B737 G-LGTI occurred prior to flight, when the flight crew became aware of an electrical burning smell and smoke. The aircraft was shut down and the passengers evacuated. Pre-existing damage to the electrical galley feeder cables was identified which provided for the possibility of electrical arcing. It is probable that the damage to these cables occurred at an earlier time, possibly during the replacement of the forward toilet service panel.

All these incidents show how prone electrical wiring is to damage, occurring over time or being introduced during maintenance or modification action. Periodic zonal inspections are carried out but damage and debris is often hidden within wiring bundles and is difficult to detect without disturbing the looms. The draft ACs, generated by the ATSRAC work, address wiring standards issues of the type identified by these incidents, notably by the EZAP procedure, and this has been adopted into the latest revision of MSG-3 guidelines. However, the draft ACs have not yet been published, despite draft documents having been developed and issued by ATSRAC in 2002.

SAFETY RECOMMENDATION 2004-018

It is recommended that the Federal Aviation Administration (FAA) accelerate the publication and adoption of the guidance material produced by the Ageing Transport Systems Rulemaking Advisory Committee (ATSRAC) on developing an electrical systems standard wiring practices manual, developing an effective wiring systems training programme and on changes to existing

maintenance practices and analysis methods, which could be applied to both in-service aircraft and new design, to ensure adequate consideration of the potential deterioration of electrical wiring systems.

Response

The FAA has developed a Notice of Proposed Rulemaking (NPRM) for airplane electrical wiring based on the Aging Transport Systems Rulemaking Advisory Committee (ATSRAC) recommendations. The recommendations cover all aspects of the aircraft wiring, design, installation, maintenance, and training. The NPRM along with the associated Advisory Circulars were published on October 6, 2005.

Among the advisory material published with the NPRM, Development of Standard Wiring Practices Documentation, and, Program to Enhance Transport Category Airplane Electrical Wiring Interconnection System Maintenance, were included which are described below:

Standard Wiring Practice Manual

A Standard Wiring Practice Manual (SWPM) minimum content is necessary to ensure that the operators and repair stations have the information necessary to maintain the electrical wire interconnection systems (EWIS) on their airplanes. Each SWPM must have a standardized organizational format so that the necessary EWIS maintenance information can be readily located. As part of the EAPAS rulemaking an Advisory Circular has been developed, which provides guidance for developing an electrical system, standard wiring practices document and acceptable EWIS maintenance practices in a standard guidance based on the ATSRAC.

Maintenance Practices and Analysis

An enhanced zonal analysis procedure (EZAP) has been developed by ATSRAC and recommended to the FAA. The EZAP is a zonal analytical assessment of the structure and systems within each physical zone of airplane. It is used to develop cleaning and inspection tasks for the EWIS and other system components in each zone. Currently manufacturers are voluntarily using EZAP. EZAP has also been incorporated in the MSG3 maintenance process.

The EAPAS notice of proposed rulemaking includes EZAP requirements identifying the physical and environmental conditions contained in each zone of an airplane, analysis of the effect on the EWIS, and assessment of the possibility for smoke and fire. From this analysis, cleaning and maintenance tasks can be developed to prevent ignition sources and to minimize the possibility of combustion by minimizing the accumulation of combustible materials such as lint. These guidance were published as Advisory Circular with the EAPAS NPRM.

Response - Accepted - closed

SAFETY RECOMMENDATION 2003-108

It is recommended that the Federal Aviation Administration (FAA) expedite a requirement for the replacement of existing thermal/mechanical type circuit breakers by arc fault circuit breakers, in appropriate systems on in-service and new build Civil Air Transport aircraft for which they have issued type certificates, when these devices are judged to have been developed to an acceptable standard and where the Safety Objectives for the circuits would be enhanced.

Response

Under the Enhanced Airworthiness Program for Airplane Systems (EAPAS) the FAA, jointly with industry and international Civil Aviation Authorities, has successfully identified and addressed the aging issues in the airplane wiring. Enhancements have been developed for design, certification, installation, and maintenance of the airplane electrical wiring. In addition to these enhancements,

many efforts have been put into the study of, and improvements to wiring components. Development and installation of Arc Fault Circuit Breakers (AFCB) AND Non-destructive Inspection (NDI) tools and techniques are examples of the improvements. As relate to this safety recommendation, the following describes the AFCB development.

We are in the process of developing the certification standards for AFCBs. The SAE has published AS5692, the minimum performance standard for single phase 400Hz, 115V AC AFCBs. FAA has developed a related TSO which will be published shortly. Specifications for the three phase and DC versions of AFCBs are in progress. The specifications are expected to be published soon.

We are continuing the efforts to install AFCBs on airplanes. The AFCBs installed on airplanes have accumulated well over 200,000 operational hours. An implementation plan is in progress for collecting necessary data, including cost-benefit analysis, in order to promote wider installation of AFCBs. Several operators are participating in this plan. Data collection flights with AFCBs installed and operational will begin in the third quarter of 2006.

A decision for mandating equipage with AFCBs is reserved until the cost-benefit evaluation is made. However, it is anticipated that the new airplane manufacturers will mostly voluntarily equip new airplanes with solid-state remotely controlled arc fault breakers.

The new proposed rules for the airplane electrical wiring emphasise the need for arcing protection. The designers are responsible to define the approach most suitable for their applications.

Response - Accepted - open (Appropriate Action Implemented/Planned)

Airbus A320-200	Bristol Airport	16-Jun-2003	Accident

AAIB Bulletin: 11/2004
FACTOR: F50/2004

Synopsis

The aircraft and pilots were normally based in Canada but were operating for a six month period over the summer from Bristol Airport as part of a wet-lease agreement. The inexperienced co-pilot had been undergoing a protracted period of line training and had been rostered to fly on four consecutive days with the same line-training captain. They had agreed that should a suitable opportunity present itself, the co-pilot would practise flying the aircraft without the autopilot, autothrust and flight directors being engaged. On the third day the co-pilot flew the ILS approach to Runway 09 at Bristol with the aircraft configured in this condition. At touchdown the aircraft bounced and on touching down a second time, the tail contacted the ground.

SAFETY RECOMMENDATION - 2004-058

Airbus Industrie should introduce an aural warning to its fly-by-wire aircraft types to alert pilots of excessive pitch angle or excessive pitch rate during landing.

Response

Airbus have developed, on the A340-500 and A340-600, a system giving a visual indication on the PFD and an aural warning in case of excessive pitch angle. They are now studying the feasibility to extend this on all other fly-by-wire aircraft types.

Additional Response:

Airbus did not send a letter to operators on this issue further to this incident but a presentation on tail scrape avoidance was foreseen for the next flight safety conference in October 2004.

Status - Accepted - open

Boeing 757-236	**Enroute from Heathrow**	**07-Sep-2003**	**Incident**

AAIB Bulletin: AAR 3/2005
FACTOR: F43/2005

Synopsis

The incident to the Boeing 757 aircraft occurred on the first flight following a 26-day major maintenance check. Shortly after takeoff on a scheduled passenger flight from London Heathrow to Paris, a hot oil smell, that had been present in the cockpit on engine startup, returned. The flight crew donned oxygen masks and immediately diverted to London Gatwick Airport. During the autopilot-coupled ILS approach to Gatwick, the aircraft drifted to the right of the localiser after selection of Flap 30. When the autopilot was disconnected, a large amount of manual left roll control was need to prevent the aircraft from turning to the right. It was necessary to maintain this control input until touch down. The aircraft landed safely despite these difficulties, with no injuries to any of the passengers or crew.

The investigation determined that the incident had been caused by maintenance errors that had culminated in the failure to reinstall two access panels, 666AR and 666BR, on the right-hand outboard flap and incorrect procedures being used to service the engine oils. The events were the result of a combination of errors on the part of the individuals involved and systemic issues, that had greatly increased the probability of such errors being committed.

The following immediate causal factors were identified:

1. The tasks of refitting the panels to the right wing and correctly certifying for the work carried out were not performed to the required airworthiness standard.

2. Ineffective supervision of maintenance staff had allowed working practices to develop that had compromised the level of airworthiness control and had become accepted as the 'norm'.

3. There was a culture, both on the ramp and in the maintenance hangar, which was not effective in ensuring that maintenance staff operated within the scope of their company authorisation and in accordance with approved instructions.

4. The maintenance planning and task instructions, relating to oil servicing on the Boeing 757 fleet, were inappropriate and did not ensure compliance with the approved instructions.

5. The Airline's Quality Assurance Programme was not effective in highlighting these unsatisfactory maintenance practices.

SAFETY RECOMMENDATION - 2005-116

British Airways Maintenance Organisation should take suitable action to ensure that maintenance tasks are certified for in a sequential and timely manner. All maintenance staff should also be reminded of their professional responsibilities, the limit of their authorisation, and that approval from the appropriate authority is required when it becomes necessary to deviate from approved instructions and procedures.

Response

Engineering have now submitted two articles for the 'FLYWISE' periodical, but the British Airways action did not clarify the frequency of submissions. Corporate has now agreed that Engineering will supply four articles a year and a process has been put in place to achieve this.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-117

British Airways Maintenance Organisation should review job card rack placement ergonomics to ensure that their positioning does not have a detrimental effect on the sequential and timely certification of maintenance tasks.

Response

British Airways carefully reviewed this recommendation, but overall remain concerned that implementing a number of locally controlled card locations as a solution rather than a central card control system is considered as a higher risk strategy, which is more than likely to lead to mis-laid or overlooked task cards.

Since the incident on G-CPER, the 'TBD' maintenance hangar has been closed and the maintenance relocated. During the facility refurbishment the location of all task card racking was given careful consideration to ensure that it is placed in the most effective position on and around the maintenance docking. This review addresses the ergonomics issue highlighted.

On completion of the facility upgrade, a risk assessment was carried out by the Quality department to ensure that all relevant areas of the EASA Part 145 code were reviewed and outcomes found to be acceptable before start up of the new facility.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-118

British Airways Maintenance Organisation should review their 'Maintenance Error Investigation' process, in order to ensure consistency, traceability and accountability in its application, with a view to restoring the confidence of maintenance staff in the process.

Response

All staff in Engineering have been appraised of the MEI process in a booklet distributed to each individual. The process has been reviewed and clarity provided for management and staff as to how and when MEI is applied.

The amended process chart now clearly identifies when the MEI procedure is invoked as part of the event investigation process, and is only carried out by staff trained in its use.

The Maintenance Safety Group previously described to the AAIB, has discussed and endorsed the amended process, which has been formally adopted in Engineering procedures available on-line to all Engineering staff.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-119

British Airways Maintenance Organisation should review the level of supervision on the 'shop floor' to satisfy itself that it is adequate to maintain the required standards of airworthiness.

Response

Implementation of the enhanced supervisory role was expected in autumn 2005, however this has not yet taken place due to protracted negotiations with union conveners at the Engineering negotiating forum. Progress is expected in April 2006.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-120

British Airways should review their structure and procedures for the management of quality, to satisfy themselves that there is sufficient degree of centralised control over the standards of quality within each section of the organisation.

Response

Since the incident, Safety Services as a department has been expanded to include Corporate Quality and has been renamed as Corporate Safety & Quality. The Corporate Quality activities have included the creation of the Operational Safety & Quality Management Manual (OSQMM), which has been accepted as the Airline's JAR-Ops Quality Manual by the CAA. This first issue was published on 30 June 2004. Corporate Quality has also revised and re-issued the Airline's Safety & Quality Policy Manual on behalf of the Chief Executive.

Following the publication of the OSQMM, Corporate Quality has instigated Safety & Quality reviews of operational and related departments in the Airline. To date, reviews have been conducted in Ground Operations, Cargo, Inflight Service (Cabin Crew and Catering), Engineering and Flight Operations. Reviews are also underway with Procurement (purchasing) and Training. The summary report of these reviews, delivered to the Accountable Manager's Meeting in May 2005, proposed further review of the Safety & Quality organisations across the Airline due to the differences in structures. This review is currently underway with benchmarking visits to a number of large airlines in the UK and Europe. This review will report to the next Accountable Manager's Meeting in September 2005 and intends to include proposed plans for implementing changes to the Airline organisation and responsibilities.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-121

British Airways Maintenance Organisation should review its maintenance planning and production control procedures, for the servicing of B757 engine oils, to ensure compliance with the Aircraft Maintenance Manual at all times, in both operational and heavy maintenance environments.

Response

a) Maintenance procedures have been reviewed and amended to provide clear instructions on requirements for oil servicing in the operating area and following extended periods when the engine has not been operating.

b) To remove any ambiguity for oil servicing, modification 10002944 has been embodied to provide clear markings on the oil level sight glass, and mod 10002961 embodied fitting an explanatory decal.

c) To provide our crew with improved guidance on scope for acceptable engine oil levels during the operating day, the B757 Operations Manual (Flying Manual) has been amended as below to ensure that engineers are not called upon to unwittingly overfill the engines.

d) A focus for engineers on problems of B757 engine oil servicing has been provided through a series of Quality Alert Bulletins issued by the Quality department.

The following summary is provided of Quality oversight of maintenance practices. Several actions have been taken within British Airways Engineering to address concerns raised over B757 oil servicing since G-CPER's diversion into LGW on the 07/09/03, following reports of oil smells on the flight deck.

Immediately following the incident, a Technical News was issued by the Powerplant Technical department to advise all certifying Engineers of the need to adhere to the following:

- Service engine oils between defined time intervals after engine shutdown.
- Awareness that British Airways' full limits are one litre less than the manufacturer's full limit.
- Awareness that oil servicing requirements are contained in Alert Temporary Revisions.
- Ensure that oil uplifts are correctly recorded in the Technical log.

In addition, Engineers attention was drawn to the Alert Temporary Revisions for oil servicing through awareness on the monthly Fleet 1 Quality hangar displays in September and November 2003.

In February 2004, a task audit conducted by Fleet 1 Quality sampled engine oil servicing standards at Terminal 1 and highlighted that defined time intervals for servicing (between 10 and 60 mins after engine shut-down) were not being adhered to in all cases. Non-conformances were duly responded to, which included a corrective action for Engineers to make a certifiable Technical log entry to record engine shutdown and oil servicing times. The B757 Daily Check sheets were amended to incorporate this requirement and a Quality Alert Bulletin, together with a further article on the April 2004 Fleet 1 Quality hangar display, were issued to raise awareness of the new requirement.

In September 2004, Powerplant issued a further Technical News, which publicised the following:

- Incorporation of colour coding on the engine sight glass through incorporation of a British Airways Service Bulletin to minimise servicing errors.
- Amendment to the British Airways maximum oil level of two litres down from full.
- Amendment of the Alert Temporary Revisions to incorporate the above requirements.

In conjunction with the Technical News, Powerplant also carried out a series of presentations to Production areas to raise awareness of the issues surrounding B757 oil servicing.

Although reports of oil smells in-flight dramatically reduced, two further task audits carried out by Fleet 1 Quality in January and May 2005 highlighted that some Engineers at both LHR and European Line Stations were not making the requisite Technical log entry for engine shutdown and oil servicing times. In addition, some recorded uplifts were still being recorded above the British Airways limit, as specified in the Alert Temporary Revisions. These audits have been closely monitored at the Fleet 1 Quality Forum and through awareness and oversight by the Terminal 1 and Line Maintenance Managers, sufficient improvements to oil recording have been made to allow the action for regular oversight to be closed at the July 2005 Forum. Standards will continue to be monitored during the quarterly production area audits.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-122

British Airways Maintenance Organisation should take suitable actions to ensure that the Engineering Quality Services department has a better oversight and understanding of the day to day practices in the areas where maintenance is carried out.

Response

The AAIB investigation report states that ½ day per month, on average, is spent in the work area by Quality Department staff. This statement does not fully reflect the actual time spent by Quality Department staff in the completion of oversight duties in the work area. The current audit schedule regarding tasks during maintenance and the audits previously reported identify that approximately 30% of the departments manpower is allotted to audit activity - the 2004 schedule identified 73 aircraft audits carried out as an example.

It should be noted that the report comment regarding compliance auditing does not appear entirely accurate, as this type of audit focuses on maintenance processes, rather than necessarily how tasks are performed.

Due to promotions and retirements resulting in staff movements, manpower in the Quality department is currently under review to ensure that optimum numbers are maintained. Accordingly the department is currently engaged in recruitment of additional staff to ensure that appropriate resources are available to conduct and maintain adequate levels of surveillance within the maintenance areas (ie in the actual work place as suggested).

To ensure that all maintenance areas have a good understanding of where working practices can be improved, feedback from Quality Audits is provided at monthly Quality Forums, chaired by the respective owning General Manager. As an additional focal point a Key Quality Initiative was raised on common audit findings which is regularly reviewed at the weekly GM Safety and Quality meeting and this links to actions taken by owning General Manager's for each of the areas concerned.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-123

The European Aviation Safety Agency (EASA) should consider introducing a requirement to carry out a duplicate inspection on aircraft access panels, removed and refitted or opened and closed as part of a maintenance procedure, that could significantly affect airworthiness if incorrectly secured and should they detach in flight, endanger either the aircraft, or persons on the ground.

Response

Status - Response Awaited - open

EMB-145EU	Birmingham	18-Nov-2003	Incident

AAIB Bulletin: 9/2004
FACTOR: F44/2004

Synopsis

During takeoff at Birmingham, the left inboard main wheel tyre (number 2) shed its tread. The tread had failed as a result of overstress in the sidewall of the tyre, leading to a break up of the tyre casing plies. Air penetrated through the failure in the inner wall of the tyre and then permeated through the casing leading to the tread package lifting from the carcass. The overstress was attributed to the tyre running under-inflated, which may have been as a result of leakage from the wheel fuse plugs.

SAFETY RECOMMENDATION - 2004-028

EMBRAER (Empresa Brasileira de Aeronautica SA) should amend the maintenance schedule for the EMB-145 and similar models, to require that:

a. Tyre pressures are checked every 24 hours.

b. The as-found and re-inflation tyre pressures are recorded in the technical log for monitoring purposes.

Response

Embraer did not concur: Embraer closely follows the recommendation of tire, wheel and brake manufactures regarding the equipment installed on all Embraer aircraft. Since these manufacturers have specialized proprietary knowledge as well as considerable more experience with their product, Embraer believes that it is a prudent policy to convey those same recommendations to our customers regarding the inspection and maintenance procedures for equipment in use on Embraer aircraft.

Consequently, Embraer believes that a recommendation similar to SR 2004-28, be made to all tire manufacturers, which will be a much more appropriate recipient, since they are in the best position to evaluate the potential recommendation, implement any procedural changes and then to disseminate those changes to the widest group of operators.

In addition, Embraer further suggested that a recommendation similar to SR 2004-28, be made to all regulatory authorities (FAA, EASA, JAA), since they have the evaluative and decision-making ability to mandate changes that seem warranted for the organizations under their jurisdiction."

Status - Rejected - closed

SAFETY RECOMMENDATION - 2004-030

The US Federal Aviation Administration should require all wheel repair stations conforming to FARs (Federal Aviation Requirements) to inform the tyre re-treader of the reason for removal of the tyre from the aircraft and indicate if there has been any suspicion of the tyre running under-inflated.

Response

The Federal Aviation Administration (FAA) has been concerned with tire care and maintenance practices to assure the safety of support personnel and the continued airworthiness of aircraft for many years. Most recently, the Aircraft Maintenance Division, AFS-300, has issued Advisory Circular (AC) No. 20-97B, "Aircraft Tire Maintenance and Operational Practices," dated April 18, 2005, and is finalising a Flight Standards Information Bulletin for Airworthiness, "Main Tire Fuseable Plug Maintenance for the Embraer EMB-145EU," that should be published in the near future.

Status - Accepted - open (Appropriate Action Implemented/Planned)

Airbus A320-232	**Overhead Birmingham**	**29-Nov-2003**	**Incident**

AAIB Bulletin: 11/2004
FACTOR: F52/2004

Synopsis

On a relatively clear evening, upon reaching the cruise level of Flight Level (FL) 280, the crew and passengers on a scheduled flight from London Heathrow to Edinburgh experienced momentary noise and vibration throughout the aircraft. This was repeated approximately one minute later. It was also reported that an orange flash, associated with the right engine, had been seen. The flight crew identified that No 2 engine had surged and recovered, with the engine indications returning to normal. The aircraft's Quick Reference Handbook, coupled with the training that the flight crew had

received, provided them with inadequate guidance with which to fully assess the situation. Their initial intention to continue to Edinburgh was changed upon advice from the operator and the crew initiated a return to Heathrow. The engine then began to surge again and, once more, recovered, but this was followed by another series of surges. At this point the crew believed that the No 1 engine had also surged so the declared a MAYDAY and diverted, uneventfully, to Birmingham Airport. Subsequently, it was determined that a progressive fault in the No 2 engine P2T2 probe had signalled inaccurate values to the No 2 engine computer, resulting in incorrect scheduling of the compressor inlet guide vanes, and this was a direct cause of the engine surges.

SAFETY RECOMMENDATION - 2004-059

It is recommended that Airbus Industrie and IAE review the EEC logic on the V2500 engine fitted to the A320 aircraft, regarding the selection of a temperature source, in the event that the system detects a greater than normally permitted difference between the available sources, so that an erroneous signal is not used for engine control.

Response

Aibus Response

The SCN 19 FADEC standard introduces a T2 Selection Logic Improvement. This software standard is targeted for availabilty June 2006.

The current T2 selection logic was designed to choose the best available T2 input from the four possible sources: left ADC TAT, right ADC TAT, local channel engine T2 probe, and remote channel engine T2 probe. However, it has been found that for some failure scenarios the best value is not chosen.

Indeed, the logic does not always choose the best available input when there is an engine T2 crosscheck fault and an engine T2 to ADC TAT disagreement fault. For this case, the logic will always choose the local engine T2.

On SCN19, the T2 selection logic has been improved in order to select the best available source of T2.

IAE - No response received

Status - Accepted - open (Appropriate Action Implemented/Planned)

SAFETY RECOMMENDATION - 2004-060

It is recommended that Airbus Industrie review the logic of the Centralised Fault Data Interface Unit (CFDIU) and the Engine Electronic Control (EEC) on A320 aircraft fitted with the V2500 engine, with respect to the Class 3 classification (a fault having no impact on flight safety) of a T2 Sensor Soft Fault (SSF), so that soft faults, such as an erroneous signal, is brought to the attention of flight and maintenance crews at the earliest opportunity.

Response

Noting the potential for increased maintenance costs and the committed SCN19 implemented changes to T2 selection logic, IAE and Airbus conclude that it is not appropriate to upgrade the T2/TAT disagreement message from maintenance to class 2. Therefore, the T2/TAT disagreement fault remains on SCN 19 as Schedule Maintenance Fault (500 hours dispatch).

Status - Rejected - closed

SAFETY RECOMMENDATION - 2004-061

It is recommended that Airbus Industrie reviews the ENG 1(2) STALL abnormal procedure for the A320 to reflect the ECAM messages which crews can or cannot expect to see during engine stall

events on aircraft fitted with IAE V2500 engines, taking account of the EEC software standard installed.

Response

After review of the QRH procedure, it is confirmed that the aim of the note stating 'only ENG 1(2) STALL is displayed on the ECAM" is to warn the crew on the fact that the ECAM will not display the procedure as read on the QRH but only the Title of the caution. This does not mean that the surge is not confirmed in the event the ECAM does not display any information. Per training, pilots are able to recognize a surge (which pilots did as per the report) and then once they have referred to the paper procedure they can apply it.

In response to the above recommendation, Airbus proposes to highlight at the beginning of the FCOM vol 3 and QRH procedures that " The procedure may be applied with or without ECAM activation".

In addition, Airbus will consider amending the QRH procedure in order to clarify that the note stating that "only ENG 1(2) STALL is displayed on the ECAM" is only applicable if ECAM caution triggered.

Status - Accepted - open (Appropriate Action Implemented/Planned)

SAFETY RECOMMENDATION - 2004-062

It is recommended that Airbus Industrie review the ENG 1(2) STALL checklist, as it appears in their A320 QRH, to ensure that it includes all the advice and information contained in the abnormal procedure for the same event, as laid out in their Flight Crew Operations Manual.

Response

It is considered that an engine stall can be recognized by pilots and this is why it has not been considered necessary to add the note describing the clues to identify an engine stall.

The Airbus QRH is designed in order to be referred to in flight. It must be clear and directive. This is why it only contains the procedure steps. All guidelines and additional information are not considered to be of help in case of abnormal /emergency situation. The FCOM vol 3 is mainly dedicated to training, and Airbus recommendation is such that pilots apply the procedures as they are displayed in the QRH or on the ECAM and, after completion if time permits, they can refer to the FCOM vol 3 additional information. Based on this philosophy, Airbus does not intend to add the referenced information into QRH procedure.

Status - Rejected - closed

Falcon-900EX	Stansted Airport	09-Feb-2004	Accident

AAIB Bulletin: 6/2005
FACTOR: F26/2005

Synopsis

The aircraft departed from Kilimanjaro en route to London (Luton) Airport with a known hydraulic problem. The crew believed, incorrectly, that this was allowed under the terms of the Minimum Equipment List. During the approach at Luton the crew were unable to obtain indications that the gear was down and locked following selections on both the normal and emergency systems. The crew requested a diversion to Stansted and the aircraft was configured for a full flap landing on Runway 05. During the landing roll the right main landing gear partially retracted and the aircraft

veered to the right until it finally left the paved surface, crossed the grass, and came to rest about 139 metres to the right of the runway centreline.

SAFETY RECOMMENDATION - 2005-023

It is therefore recommended that Dassault Aviation should review Section 29, Part 1 of the Master Minimum Equipment List to make it clear that this refers to the pump caution lights and not the pumps.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-024

It is therefore recommended that Dassault Aviation review the indications likely to be seen following a failure of either hydraulic system and, if necessary, amend the checklist accordingly.

Response

After viewing the Falcon 900EX documentation, Dassault Aviation proposes to add some guidance in the Operating Manual to further describe the precautions to be taken should hydraulic level read zero on #1 hydraulic system. This could come from a defective indicator, or be a prelude to the loss of the #1 system. Sound practice would be to monitor pressure levels and prepare for this loss by reviewing the appropriate check lists.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-025

It is therefore recommended that FlightSafety International should review their process for ensuring the accuracy of the documents used in training and should promote the same procedures used in training that will be used when flying the aircraft.

Response

FlightSafety International rejected the Recommendation.

Status - Rejected - closed

SAFETY RECOMMENDATION - 2005-026

It is therefore recommended that FlightSafety International, in coordination with Dassault Aviation, should review their flight simulators used for Falcon 900 training to ensure they represent with acceptable realism the correct pilot input, as defined in the operations manual, to successfully lock down the landing gear during emergency gear extension.

Response

FlightSafety International rejected the Recommendation.

Status - Rejected - closed

Boeing 737-700	London Heathrow Airport	04-Mar-2004	Incident

AAIB Bulletin: 5/2005
FACTOR: F19/2005

Synopsis

When parking nose-in to Stand 214 at London Heathrow Airport, the captain thought he was expected to use the AGNIS and mirror guidance system which had been turned on by the handling agents. However, as both the flightcrew and groundcrew were unaware that Boeing 737 aircraft required a marshaller in order to park on this stand (due to an inherent difficulty in seeing the STOP mark in the mirror), the aircraft was taxied forward by the commander. Also, as a result of a previously unnoticed problem, the correct nosewheel stop mark was obscured in the mirror, from the left seat pilot's position, by an aircraft tug which was parked in the designated area adjacent to the stand. The commander, however, could see the end of the centreline marking, which took the form of a T and adjacent to which were some chocks, and assumed that to be the correct point at which to stop. Although the emergency stop light had been illuminated by the groundcrew, this was not in the commander's field of view when looking at the mirror to his left. As a result, the upper part of the No 1 engine cowling made contact with the stand jetty.

SAFETY RECOMMENDATION - 2005-009

It is recommended that Heathrow Airport Limited should provide information on each stand to enable the handling agents to be sure that the aircraft attempting to park is compatible with the guidance system installed.

Response

A dedicated lockable cabinet is being provided at the head of every stand, adjacent to the stand entry guidance controls, which will include a list of all aircraft types (including sub-models) that are authorised by HAL Airside Operations for self-parking on each stand. Access to this cabinet will be restricted to HAL Airside Operations staff only. Airlines and handling agents will be advised of the function of this and the need to include an aircraft compatibilty check as part of the stand preparation checks prior to aircraft arrival.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-010

It is recommended to Heathrow Airport Limited that when temporary restrictions apply, such as the requirement to use a marshaller when an aircraft is manoeuvring to park on a stand, an appropriate procedure should be developed to ensure that this information is made available promptly and clearly to all ground personnel associated with parking aircraft on such stands.

Response

The establishment of more positive control methods at 2005-009 will enable dynamic updates to changes in temporary and permanent aircraft parking positions.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-011

It is recommended that, in addition to the stop light at the end of each stand, Heathrow Airport Limited should also install an emergency stop light adjacent to any aid used by the pilot for alignment, or stopping, in such a position that, irrespective of which aid is being used, the light falls within the handling pilot's field of vision.

Response

A survey of all Heathrow's stands has concluded that the STOP sign is within the plot's field of vision, except for the 14 stands equipped with the mirror parking system. Discussions are underway with suppliers to install a more modern system which include the STOP message within the pilot's field of vision.

Status - Accepted - open (Appropriate Action Implemented/Planned)

SAFETY RECOMMENDATION - 2005-012

It is recommended that Heathrow Airport Limited should carry out a review of current guidance systems currently in use to ensure they provide adequate guidance for all aircraft types that are expected to use any particular stand, with particular reference to those stands where operators have already raised individual concerns.

Response

In parallel with 2005-11, those stands which are approached at an angle from the taxiway centreline are now fitted with modern systems (stands 212, 214, 215, and 127.) These improvements also take into account customer concerns.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-013

It is recommended that Heathrow Airport Limited should carry out a review of parking facilities for ground equipment in the vicinity of aircraft parking stands to ensure that ground equipment does not interfere with the correct use by flight crews of the stand guidance system.

Response

A review has concluded that there are no stands in this category of risk and no interference with sightlines is likely.

Status - Accepted - closed

Boeing 747-436	**Stand 127L Heathrow**	**21-Apr-2004**	**Accident**

AAIB Bulletin: 5/2005
FACTOR: F20/2005

Synopsis

Whilst attempting to park on its allocated stand, the aircraft struck the airbridge, which had been parked in the wrong position, with its left wing. Recent work altering the stand's alignment resulted in a choice of parking positions for different aircraft types and corresponding parking positions for the airbridge. The investigation revealed the airbridge had been parked in a position marked for aircraft parking on a different part of the stand.

SAFETY RECOMMENDATION - 2005-014

It is recommended that Heathrow Airport Limited should expedite the program to install duplicate emergency stop buttons at all of its airbridge control stations and ensure that all such buttons are clearly and unambiguously marked.

Response

The programme for installation of duplicate emergency stop buttons in the airbridge cabs is expected to be completed by August 2005. Each button will be labelled "Aircraft Emergency Stop".

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-015

It is recommended that Heathrow Airport Limited should identify a management post responsible for the maintenance, development and safety of aircraft stand parking guidance systems.

Response

The present Airside Safety Practices Manager now has responsibility for safety management and future development of stand entry guidance systems.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-016

It is recommended that Heathrow Airport Limited should review the system by which Operational Safety Instructions are published to ensure that they are either incorporated into a relevant document, such as the Aerodrome Manual or Aeronautical Information Publication, or are provided with an effective index such that the information they provide is readily identifiable.

Response

A major review and consolidation of Operational Safety Instructions is underway by HAL with the aim of updating the content and reducing the quantity of them. Experience has shown that a communication vehicle such as the Aerodrome Manual has its limitations as a reference point for up to date operational information. Few airlines avail themselves of this document and the updating process is not dynamic enough to provide the up to date ready reference required. Nevertheless, the Stand Entry Guidance OSI has been rewritten and the specific existence of this OSI will be included in the Aerodrome Manual at the earliest opportunity.

Status - Accepted - open (Appropriate Action Implemented/Planned)

SAFETY RECOMMENDATION - 2005-017

It is recommended that Heathrow Airport Limited should ensure that operating instructions are prominently displayed on any aircraft stand, including the airbridge, where changes in the operation have been made or where the mode of operation is non-standard.

Response

Detailed operating instructions for stand 127 have been fixed to both bridgeheads. This stand is the only one where non-standard operational rules affect the airbridge positions.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-018

It is recommended that Heathrow Airport Limited should review all ground markings related to aircraft parking stands, to ensure that their meanings are unambiguous, that markings are clearly displayed and that clear diagrams of such markings are prominently displayed on any aircraft stand.

Response

A full review of all Heathrow's stands has been completed to determine the accuracy of painted ground markings and to ensure that all nosewheel marks align correctly with installed stand guidance. An action plan for correction of deficiences is being prepared.

Status - Accepted - open (Appropriate Action Implemented/Planned)

SAFETY RECOMMENDATION - 2005-019

It is recommended that the Civil Aviation Authority should conduct a comprehensive, documented, audit of the Heathrow Airport Limited airside safety system.

Response

A fully documented audit of the airside safety system at Heathrow was completed by the CAA on 30 September 2005.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-020

It is recommended that British Airways should require that a member of their ground crew assumes the responsibility of being adjacent to the ground level emergency STOP light button and of monitoring the arrival of the aircraft onto the stand, whenever ground crews are present on a stand whilst an aircraft is manoeuvring to park.

Response

A procedural Change Notice has been issued and the British Airways Ground Operating Manual will be amended to include the following requirement:

"It is the responsibility of all ground staff to be aware of the dangers that may be present when an aircraft is taxying to stand. There must be procedures in place that in the event of imminent danger the aircraft commander is made aware and the aircraft brought to an emergency stop. This may be achieved by:

- The internationally recognised hand signals pressing the 'EMERGENCY STOP' button on the stand guidance system.

When an aircraft is taxying onto stand, a member of the ground staff must be clearly visible to the flight crew or, stationed at the 'EMERGENCY STOP' button where this is fitted to stand guidance system.

Where 'EMERGENCY STOP' buttons are fitted both at ramp level and in the airbridge either button may be attended. Where the 'EMERGENCY STOP' on the jet bridge is attended and other ground handling staff are present, a person should also be allocated to attend the ground level 'EMERGENCY STOP' button."

Status - Accepted - closed

Boeing 747-132	Airborne near the Compton VOR beacon	24-Apr-2004	Incident

AAIB Bulletin: 1/2006
FACTOR: F5/2006

Synopsis

The aircraft was carrying out a cargo flight from Ramstein in Germany to Wright Field in New York State. Shortly after reaching a cruising level of FL360, the left outboard engine ran down and could not be restarted. It was decided to return to Ramstein and the aircraft descended to FL210 and took up an easterly heading. The crew determined that the three remaining engines were not producing the selected thrust and declared an emergency requesting a diversion to London Heathrow airport. The aircraft was radar vectored onto the final approach track for Runway 27R and the commander completed a successful approach to a safe landing. Significant thrust was available and used during the final stages of the approach and the aircraft was taxied under its own power. Three safety recommendations were made and one was re-iterated.

SAFETY RECOMMENDATION - 2005-069

The Civil Aviation Authority (CAA) should review the guidance provided in the Manual of Air Traffic Services (MATS) Part 1 and Civil Aviation Publication (CAP) 475 (The Directory Of CAA Approved Organisations) and consider whether ATC unit Training for Unusual Circumstances and Emergencies (TRUCE) plans adequately prepare controllers to handle aircraft in emergency, and in particular, whether sufficient guidance is provided on the avoidance of built-up areas when vectoring aircraft in emergency. Where considered necessary, this guidance should be amended as soon as practicable.

Response

The CAA accepts this recommendation. The CAA has reviewed the guidance provided in MATS Part 1 and CAP 745, as well as that contained in CAP 744 (United Kingdom Manual of Personnel Licensing- Air Traffic Controllers) in respect of the training in Unusual Circumstances and Emergencies (TRUCE) Scheme and CAP 584 (Requirements for Initial Air Traffic Control Training).

On 20 March 2006, ANSPs and the relevant training institutions were notified by Air Traffic Service Information Notice (ATSIN) of the intended modifications to MATS Part 1. The ATSIN also notified the requirement for ANSPs to brief control staff appropriately and ensure that training for the revised policy was incorporated into unit TRUCE plans. An amendment to MATS Part 1 was promulgated on 28 April 2006.

The CAA will, however, continue to emphasise that the ultimate decision in such circumstances rests with the aircraft commander.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-070

The Federal Aviation Administration of the USA and the European Aviation Safety Agency should require that aircraft Flight Manuals contain guidance relevant to the aircraft's gliding characteristics in the optimum and approach configurations.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-071

Evergreen International Airlines should ensure that its flight crews have available onboard their aircraft all the pertinent en-route and approach charts for all the diversion airports applicable to the aircraft type and routes being flown.

Response

Evergreen carries Department of Defense approach charts for most of the world. These charts are located on the upper deck in a storage cabinet. They are for use in a situation when diversion to an airport not normally used by the Company may be required. Unfortunately, Heathrow is not included in the coverage. Stansted is included.

This was a severe emergency condition. In this situation, the closest and best destination was selected. Had this been a normal diversion, the appropriate charts would have been referenced and a destination selected accordingly.

Evergreen believed it was in full compliance with all regulations and, in fact, carries more approach information than many carriers.

Status - Accepted - closed

Boeing 777-222 **Airbus A340-313**	**Runway 27L Holding Area Heathrow**	**14-Jul-2004**	**Incident**

AAIB Bulletin: 9/2005
FACTOR: F32/2005

Synopsis

The holding area for Runway 27L at London Heathrow Airport is wide enough for two 'heavy' aircraft to position side by side and aircraft entering this area essentially follow a single yellow taxiway centreline, which then splits into two parallel lines. Prior to deprture, an Airbus A340 was stationary, well short of the N2W traffic bar behind an Airbus A320, which was stopped at the NB2W traffic bar, in the holding area awaiting its turn to line up. It was positioned on the southern most line, on the right of the holding area.

Whilst in that position, a Boeing 777 was instructed to taxi forward and hold on the left of the holding area. As it passed behind the A340, the handling pilot made use of reference points within the cockpit to assure wingtip clearance from the A340's tail but, as he continued along the northern taxiway line, the right wingtip of the B777 made contact with the left winglet of the A340. At the point of contact, the B777 had not reached the section of the line parallel to that upon which the A340 was parked. Although the B777 flight crew thought that the A340 was closer than it might be at other airports, this was not considered unusual for Heathrow.

SAFETY RECOMMENDATION - 2005-051

It is recommended that the Joint Aviation Authorities, in common with the Federal Aviation Administration intent, mandate a minimum recording duration of two hours for all aircraft currently required to be fitted with a Cockpit Voice Recorder.

Response

We considered the report, and in particular those Safety Recommendations directed to the JAA, 2005-51 and 2005-52.

The JAA intends to act upon these recommendations by means of tasking our Equipment Steering Group (EQSG) to investigate the ways and means of suitably incorporating them into the appropriate JARs.

This process normally takes over a year, provided things run smoothly. They will advise the AAIB of its progress from time to time.

Status - Accepted - open (Appropriate Action Implemented/Planned)

SAFETY RECOMMENDATION - 2005-052

It is recommended that the Federal Aviation Administration and the Joint Aviation Authorities review their processes of oversight of Operator's procedures and training support to ensure the timely preservation of Cockpit Voice Recorder recordings in accordance with ICAO Annex 6 Part I, 11.6, following a serious incident or accident. The operator procedures and training should provide the necessary skills and information to identify accidents and serious incidents and implement the necessary tasks to preserve these recordings in a timely manner.

Response

JAA Response

We considered the report, and in particular those Safety Recommendations directed to the JAA, 2005-51 and 2005-52.

The JAA intends to act upon these recommendations by means of tasking our Equipment Steering Group (EQSG) to investigate the ways and means of suitably incorporating them into the appropriate JARs.

This process normally takes over a year, provided things run smoothly. They will advise the AAIB of its progress from time to time.

Status - Accepted - open (Appropriate Action Implemented/Planned)

SAFETY RECOMMENDATION - 2005-053

It is recommended that the Federal Aviation Administration require United Airlines, and any other airline regulated by the Federal Aviation Administration with similar procedures, to amend their procedures to ensure prompt identification of accidents and serious incidents and timely preservation of Cockpit Voice Recorder recordings.

Response

Response from United Airlines

Below are some additional comments regarding the Draft AAIB Report Ref. EW/C2004/07/03.

It appears that the safety recommendations made regarding the CVR procedures and access are somewhat a matter of interpretation and did not significantly hamper or affect this investigation. Two items that were not covered and may be preventative in nature are:

1) The ground operation atmosphere at Heathrow as identified below, and

2) Aircrew training in large aircraft geometry.

Comments on the United Kingdom Air Accidents Investigation Branch report follow:

First, the responsibility for any taxi incident like this falls squarely on the shoulders of the pilot in command. No excuses. Second, there are some mitigating circumstances, particularly at Heathrow. These are:

(1) very congested conditions in the entire ramp area for large aircraft;

(2) flight crew perceptions that ATC expects fairly quick response to clearances and instructions.

> (i) United 10-7 page discusses taxi cautions and refers crews to the 10-9 pages, and we assume crews review these and exercise due diligence.
>
> (ii), 'United has received criticism from the ATC folks at Heathrow over the years for being "slow" in taxiing, taking the runway, and advancing power for takeoff. So, even though the AAIB report says "...being number six in the departure sequence, there was no urgency for their aircraft [United B-777] to taxi on to the left side of the holding area until the A340 had moved further forward," I think there is a desire by crews to move expeditiously on the Heathrow ramp. I guess we'll never know if the flight crew knew they were number six in the departure sequence. I would agree with the safety recommendation 2005-53 regarding preserving CVR information. That will probably require some changes to Flight Operations Manual pages 8.40.8 and 8.40.9 (30 JUN 05). Incidentally, this crew filed Aviation Safety Action Program reports that were accepted into the ASAP. They did receive training in aircraft geometry and a line check airman observation'.

FAA - No Response

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-054

It is recommended that the Federal Aviation Administration require United Airlines to amend their relevant procedures so as to ensure that flight and ground crews are made fully aware of their obligation following an accident or serious incident to allow unhampered access by the appropriate national Air Accident Investigation authorities to the flight recorders by complying with the requirements of ICAO Annexe 13, paragraph 5.6, and associated national legal requirements.

Status - Response Awaited - open

Boeing 767-204 **Boeing 737-37Q**	**Taxiway V/S, Manchester Airport**	**04-Nov-2004**	**Accident**

AAIB Bulletin: 12/2005
FACTOR: F6/2006

Synopsis

The left wing of the taxiing Boeing 767-200 struck the right horizontal stabiliser of the stationary Boeing 737-300. Both aircraft were awaiting departure from Runway 24 Left at Manchester. The investigation concluded that the B767 commander, who bore primary responsibility for collision avoidance, misjudged the available separation due to a combination of physiological limitations, distractions and a false assumption regarding his ATC clearance. Three safety recommendations are made, concerning flight crew awareness of clearance issues, recording of communications on the Airport Fire Service frequency and ATC procedures at Manchester Airport.

SAFETY RECOMMENDATION - 2005-124

The Civil Aviation Authority should consider publicising the circumstances of this accident with a view to raising flight crews' awareness of their responsibilities for collision avoidance during taxiing as detailed in CAP 637 and the Air Navigation Order.

Response

The CAA published a Flight Operations Department Communication (FODCOM) for the attention of all operators, publicising the circumstances of the accident and recommending that operators' and training manuals and guidance are reviewed to ensure that flight crews are made aware of their responsibilities for collision avoidance whilst taxiing aircraft. The FODCOM was issued at the end of December 2005.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-125

The Civil Aviation Authority should consider mandating the recording of frequency 121.6 MHz at those airfields where provision of the frequency is required.

Response

The CAA accepts this recommendation. The CAA is currently consulting with industry on a requirement for both the provision and recording of 121.6 MHz at airfields where Air Traffic Control is provided.

CAA Action

The CAA has amended CAP 168 so as to make the recording of frequency 121.6 MHz mandatory at those airfields where provision of the frequency is required. Edition 7 of CAP 168 was published on 8 May 2006.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-126

Manchester Airport Air Traffic Control should review local working practises with regard to the south side taxiways to ensure that they are standardised and accurately reflect the requirements of MATS Part 2. Furthermore, MATS Part 2 should be reviewed to ensure that the fullest information on the south side taxiways is included to assist controllers.

Response

Manchester Airport ATC established a VCR Working Group to examine procedures relating to crossing 06L/24R focussing on the following areas: Delegated areas; Operating procedures and Taxiway restrictions. They also proposed the following:

1. A three month trial to be commenced during which traffic will not be permitted to taxy behind 2 aircraft holding at T1.

2. The Manchester Airport LCS shall be used to highlight and ensure greater use of the holding points available for departure in relation to Rwy 24L. This to be done via the LCS bulletin, briefings carried out by the LCS Manager prior to summer. Southside Twy traffic management techniques to be included as a Hot Topic.

3. Airfield General Manager Manchester Airport to carry out a review of all south side taxiway restrictions.

4. Airfield General Manager Manchester Airport to publish a reminder in the AIP relating to aircrew responsibilities whilst manoeuvring on the ground at Manchester Airport.

5. Airfield General Manager Manchester Airport to request operators to provide performance figures for all intersection departures in flight crew publications.

6. LRST to provide a Hotspot chart including taxiway areas with potential ground collision risk in addition to Rwy Incursion hotspot areas.

7. Details of this accident to be included in G. Manager NATS safety briefings

8. All actions to be completed by May 2006. The review group to meet in May to receive progress reports.

Status - Partially Accepted - open

Boeing 757-3CQ	Manchester Airport	23-Nov-2004	Incident

AAIB Bulletin: 1/2006
FACTOR: F3/2006

Synopsis

The aircraft rolled unexpectedly during the flare phase of an automatic landing at Manchester International Airport. The commander disconnected the autopilots and landed safely. The aircraft rolled in response to temporary interference of the ILS localiser signal caused by a departing Embraer 145 aircraft; this aircraft took off immediately prior to the Boeing 757's landing. Low Visibility Procedures (LVPs), which are intended to protect aircraft carrying out automatic landings, had been cancelled a short time before the incident but this information was not communicated to the Boeing 757 crew.

SAFETY RECOMMENDATION - 2005-098

The Civil Aviation Authority should review the means by which critical information from airports, such as whether Low Visibility Procedures are in force, is communicated to pilots, and its receipt and ongoing accuracy are confirmed, and should take action to eliminate as far as is practicable any weaknesses identified during this review.

Response

The CAA accepts this recommendation. The CAA reviewed CAP168 with regard to Low Visibility Procedure activation/deactivation and communication of same to interested parties including flight crew. Additionally, the CAA reviewed CAP 493 - Manual Air Traffic Services Part 1 procedures with regard to communication of critical aerodrome information, such as Low Visibility Procedures, to pilots. The review of CAP493 has been completed, with regard to addressing the communication of critical aerodrome information. Additionally the CAA is currently working on two other areas related to this recommendation: a review of ATIS and the provision of weather information outside of unit operational hours. MATS Part 1 was updated accordingly in July 2006.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-099

The Civil Aviation Authority should require providers of Air Traffic Services at aerodromes which have Surface Movement Radar equipment to ensure that arrangements are in place for effective retention of information for a suitable period of time following any incident or accident.

Response

The CAA accepts this recommendation. The requirement mandating arrangements for effective retention of recorded Surface Movement Radar surveillance data for a minimum of 30 days were introduced as part of the fifth amendment to CAP 670 (Air Traffic Services Safety Requirements). The amendment was published in CAP 670 on 30 June 2006.

Status - Accepted - closed

Airbus A320-214	Gatwick	15-Jan-2005	Accident

AAIB Bulletin: 10/2005
FACTOR: F38/2005

Synopsis

The left nose wheel detached from the aircraft during the takeoff from London (Gatwick) Airport. Airport staff saw the wheel fall off and the flight crew were notified by Air Traffic Control (ATC). After holding for two hours, to burn off fuel and reduce the landing weight, the aircraft landed safely at Gatwick. The nose wheel detached as the result of the partial seizure of the outer wheel bearing, most probably caused by water contamination of the grease in the bearing.

SAFETY RECOMMENDATION - 2005-072

The European Aviation Safety Agency should ensure that Airbus undertakes a further investigation into the failure of the nose wheel bearings on the A319/320/321 series of aircraft.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-073

The European Aviation Safety Agency should ensure that the preventive measures identified by Airbus are introduced into the A319/320/321 series of aircraft to a timescale commensurate with the risk.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-074

For newly manufactured aircraft, the European Aviation Safety Agency should require that no single electrical bus failure terminates the recording on both cockpit voice recorder and flight data recorder.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-075

For newly manufactured aircraft, the European Aviation Safety Agency should require that the cockpit voice recorder and cockpit area microphone are provided with an independent 10 minute

back-up power source, to which the cockpit voice recorder and cockpit area microphone are switched automatically, in the event that normal power is interrupted.

Status - Response Awaited - open

HS.748 Series 2A	**East Midlands Airport**	**28-Jan-2005**	**Accident**

AAIB Bulletin: 1/2006
FACTOR: F6/2006

Synopsis

The aircraft's left over-wing emergency escape hatch detached from the aircraft during takeoff from East Midlands airport. A deferred technical defect in the aircraft's pressurisation system meant that the loss of the hatch, was only discovered after landing at Ronaldsway airport on the Isle of Man. The investigation established that a protective cover, in the cargo area, intended to prevent inadvertent operation of the over-wing emergency escape hatch handle, was not attached prior to loading and that movement of the cargo probably caused the handle to move to the 'open' position, allowing the hatch to detach from the aircraft. The investigation also established that a number of deficiencies existed in the operator's training and oversight of contracted loading staff. Four safety recommendations are made.

SAFETY RECOMMENDATION - 2005-140

The Civil Aviation Authority should ensure that Emerald Airways reviews its procedures for initial training and periodical examination of contracted loading staff at outstations, including the provision of written instructions and aircraft technical training, to ensure that Emerald Airways fully meets the responsibilities placed on it by JAR-OPS 1.205.

Response

The CAA accepted this recommendation. Since the audit carried out prior to the incident flight, the CAA have ensured that adequate written instructions have been provided by Emerald for contracted loading staff and that has included aircraft technical training. This has been coupled with multiple ramp checks on Emerald aircraft and a further audit in July 2005.

Status - No longer Applicable - closed (Emerald Airways has since ceased trading)

SAFETY RECOMMENDATION - 2005-141

Emerald Airways should review its safety management system with a view to accelerating the current audit schedule for outstations, and conduct a risk assessment of them all to establish those most 'at risk', prioritising audit inspections accordingly

Status - No longer Applicable - closed (Emerald Airways has since ceased trading)

SAFETY RECOMMENDATION - 2005-142

Emerald Airways should take immediate action to ensure that applicable, detailed and current written instructions are readily available to loading staff at all bases and outstations.

Status - No longer Applicable - closed (Emerald Airways has since ceased trading)

Safety Recommendation 2005-143

The Civil Aviation Authority should pursue the findings of its own audits of Emerald Airways' loading procedures, particularly in respect of the provision of written instructions, with a view to enforce compliance as soon as practicable.

Response

The CAA accepted this recommendation. In addition to the increased frequency of ramp checks and a follow-up audit in relation to recommendation 2005-140, the CAA has continued with close continued oversight of the Emerald operation. In response to the original audit findings several meetings have taken place between the accountable manager of Emerald Airways and the CAA's Regional Manager (Operations). The findings reported in the original report have now been addressed. Subsequently, Emerald Airways implemented a change to their management structure replacing certain post holders in order to avert similar discrepancies. The CAA is continuing its close oversight of this company.

Status - No longer applicable - closed (Emerald Airways has since ceased trading)

Airbus A340-642	**En-route to London diverted into Amsterdam**	**08-Feb-2005**	**Incident**

AAIB Bulletin: S1/2005
FACTOR: N/A

Synopsis

This report follows on from AAIB Special Bulletin S1 of 2005 which published the circumstances and facts established during the early part of the investigation. Investigative work continues and the final report will not be published before February 2006. This interim report contains safety recommendations addressed to the primary certification bodies for large transport category aircraft.

SAFETY RECOMMENDATION - 2005-036

Airbus should review the FCMC master/slave determination logic of the affected Airbus A340 aircraft so that an FCMC with a detected discrete output failure or ARINC 429 data bus output failure cannot remain the master FCMC or become the master FCMC.

Response

Airbus has completed a review of the FCMC software and logic systems and as a result some change have been implemented.

A) The logic of the monitoring processor is changed (software standard FL8). It will not be the same logic / software as the command processor. This means that if the command processor does not identify the automatic fuel transfer the monitoring channel will be able to determine the fault and cut off the ARINC and discrete outputs.

B) If the command processor does not set the Fuel Low Level output then the integrity processor will detect this loss and cut off the ARINC and discrete outputs.

In both the above cases the cut off of the ARINC data will result in a warning being issued to the flight crew to enable them to take the appropriate action is taken.

The recommendation is specific that an FCMC that does not have the ARINC or discrete outputs cannot be in command is not then necessary to be implemented. However the above described modifications will ensure that the outputs are being correctly cut off at the appropriate times thus ensuring that the correct certified process for the FCMC in control logic will work. This logic is defined such that if both FCMC are degraded then if one FCMC is still providing fuel quantity values it will continue to do so. Applying the recommendation exactly as defined would mean that this information would be lost.

Status - Accepted - open (Appropriate Action Implemented/Planned)

SAFETY RECOMMENDATION - 2005-037

Airbus should review the logic of the low fuel level warnings on affected Airbus A340 aircraft so that the FDC low fuel level discrete parameter always triggers a low fuel level warning, regardless of the condition of the other fuel control systems.

Response

The investigation has not been able to identify the cause of the event but Airbus agrees that the aims and reasoning of the recommendations are to ensure that the flight crew are made aware of an automatic fuel transfer failure or a low level fuel warning intime for the crew to take the necessary corrective actions. Therefore Airbus has lauched modifications that will go beyond the spirit of the recommendations.

The modifications being made to the FCMC will ensure correct warnings are provided to the flight crews in a timely manner. However as a further enhancement an independent FWC "Fuel Low Level" warning is defined (system architecture is not yet frozen).

Status - Accepted - open (Appropriate Action Implemented/Planned)

SAFETY RECOMMENDATION - 2005-108

It is recommended that the European Aviation Safety Agency introduces into CS-25 the requirement for a low fuel warning system for each engine feed fuel tank. This low fuel warning system should be independent of the fuel control and quantity indication system(s).

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-109

It is recommended that the European Aviation Safety Agency should review all aircraft currently certified to EASA CS-25 and JAR-25 to ensure that if an engine fuel feed low fuel warning system is installed, it is independent of the fuel control and quantity indication system(s).

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-110

It is recommended that the USA's Federal Aviation Administration should introduce into FAR-25 a requirement for a low fuel warning system for each engine feed fuel tank. This low fuel warning system should be independent to the fuel control and quantity indication system(s).

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-111

The Federal Aviation Administration should review all aircraft currently certified to FAR-25 to ensure that if an engine fuel feed low fuel warning system is installed, it is independent of the fuel control and quantity indication system(s).

Response

While in most instances the recommended independence constitutes good design practice, lack of such independence does not inherently render a design unsafe. Hence, universally mandating such independence would not be warranted under FAR Part 39. However, we continually review the operating safety of the transport airplane fleet. If an unsafe condition exists, we take appropriate mandatory corrective action.

We trust that this information is sufficient to address the concerns of the AAIB with regard to the safety recommendations.

Status - Rejected - open

Dornier 328-100	London City Airport	20-Feb-2005	Incident

AAIB Bulletin: 2/2006
FACTOR: F12/2006

Synopsis

Shortly after touchdown at London City Airport (LCY), the aircraft veered to the right and departed the runway before the flight crew were able to bring it under directional control. The investigation revealed that a combination of crosswind and asymmetric reverse thrust caused the initial divergence. Because the aircraft was held in a slightly more nose-up attitude than normal, the nose wheel steering (NWS) system did not become enabled. The consequent unavailability of nose wheel steering resulted in the crew not acquiring directional control immediately. Directional control was only gained after the aircraft had departed the runway when differential braking and asymmetric reverse thrust were applied.

SAFETY RECOMMENDATION - 2005-139

It is recommended that AvCraft, the Dornier 328 type certificate holder, produce guidance to all Dornier 328 operators regarding post-touchdown elevator handling and the implications of the noseleg weight-on-wheels switch not being activated.

Status - Response Awaited - open

EMB-145EP	Charles de Gaulle	20-Feb-2005	Incident

AAIB Bulletin: 1/2006
FACTOR: F9/2005

Synopsis

During the climb, the pilots were unable to keep the autopilot engaged, and later became aware of smoke and fumes in the cockpit. Shortly afterwards the commander's flight displays and the Engine Instrument and Crew Alerting System failed. Smoke was evident briefly in the passenger cabin and the aircraft diverted to Paris Charles de Gaulle Airport. After landing, disembarkation was delayed whilst the crew attempted to follow complex taxi instructions. The source of the smoke was identified as the number 1 IC-600 avionics integrated computer.

The investigation found that the procedure for recovering information to cockpit displays in the event of failure of an IC-600 computer had been omitted during a previous revision of the Quick Reference Handbook (QRH). One safety recommendation was made concerning restoration of the appropriate procedure in the QRH.

SAFETY RECOMMENDATION - 2005-080

On 8 September 2005 it was recommended that:

Empresa Brasileira De Aeronautica SA (Embraer) should publish a readily identifiable procedure in the quick reference handbook of all ERJ135/140/145 series aircraft which restores information to flight instruments affected by the failure of either IC-600 avionics integrated computer.

Response

On 14 October 2005 Embraer notified the AAIB in writing that: 'Embraer is at present in the process of revising the current QRH to incorporate the suggested recommendation. Embraer expects to have this revision available for operators by the end of 2005.

Status - Accepted - open (Appropriate Action Implemented/Planned)

Boeing 777-200	Manchester	01-Mar-2005	Incident

AAIB Bulletin: 1/2006
FACTOR: F10/2005

Synopsis

Whilst the aircraft was taxying, following an otherwise uneventful landing at Manchester, flames were seen around the wheels of the left main landing gear. As the airport Rescue and Fire Fighting Service (RFFS) attempted to extinguish the flames, copious quantities of what the RFFS Watch Commander assessed as smoke were produced and, fearing that the fire was getting out of control, he advised the aircraft commander to evacuate the aircraft. Minor injuries were sustained by some passengers and several fire service personnel during the evacuation. The investigation determined that the cause of the fire, established as being in the No.10 main landing gear wheel, most likely resulted from the maintenance practice used when cleaning the wheel heat shields. It was likely that these had been immersed in a flammable solvent, which allowed the ceramic fibre insulation material contained within to become contaminated. The fire occurred on the second landing after the wheel had been fitted to the aircraft, when the brake pack temperature was likely to have been higher than on the previous landing.

SAFETY RECOMMENDATION - 2005-092

The Civil Aviation Authority should require at aerodromes, where the Rescue and Fire Fighting Category is 3 and above, or where an air traffic control service is provided, that a radio frequency to facilitate direct communications between an aircraft and the Airport Rescue and Fire Fighting Service, in the event of an accident or incident to an aircraft on the airfield, is made available and appropriately promulgated.

Response

The CAA accepts this recommendation. CAP 168 was amended on 8 May 2006 to require, at all aerodromes, where the RFF category is 3 and above, a radio frequency to facilitate direct communications between an aircraft and the Airport Fire Service. The radio frequency is promulgated in the UK AIP. For those aerodromes where the RFF category is 1, 2 or Special, a

review was carried out to assess the need for the provision of such a radio frequency. This review was completed in December 2006. The review identified that, of the 85 aerodromes in these categories, only 14 provided an Air Traffic Control service and of these only 5 do not promulgate the availability of a radio frequency to facilitate direct communications between an aircraft and the Airport Fire Service. The CAA wrote to these five aerodromes in April 2007 to recommend that the provision of such a facility is included in any future equipment upgrades.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-093

The Civil Aviation Authority should require that any radio communication frequency used to facilitate direct communications between an aircraft and the Airport Rescue and Fire Fighting Service, in the event of an accident or incident on the airfield, should be recorded, in order that it may be reproduced to assist in accident and incident investigation.

Response

The CAA accepts this recommendation. The CAA amended CAP 168, on 8 May 2006, with regard to the recording of all direct radio communications between an aircraft and the Airport Fire Service in order that it may be reproduced to assist in accident and incident investigation.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-097

It is recommended that Pakistan International Airline Corporation review the training given to their cabin crews with the intention of ensuring that, in the event of an evacuation command being given by the aircraft commander, the evacuation is carried out as expeditiously as possible, irrespective of the lack of any threat to the aircraft perceived by the cabin crew.

Response

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-131

It is recommended that the Civil Aviation Authority review the advice given in CAP 168 in regard to aerodrome procedures for leading passengers, evacuated from an aircraft, to secure areas away from the scene of the incident and ensure that the relevant Aerodrome\Emergency orders suitably address this topic.

Response

The CAA accepts this recommendation. The CAA has amended CAP 168, on 8 May 2006, in regard to aerodrome procedures for leading passengers, evacuated from an aircraft, to secure areas away from the scene of the incident and to ensure that the relevant Aerodrome/Emergency orders suitably address this topic. The CAA has included this topic as a theme item in the 2006/7 audit programme.

Status - Accepted - closed

Avro 146-RJ100	Approach to Paris	18-Mar-2005	Incident

AAIB Bulletin: 4/2006
FACTOR: F14/2005

Synopsis

During the winter of 2004/2005, UK-based airline operators experienced numerous incidents of restricted elevator and aileron controls on their Avro 146-RJ100 fleets. One operator also reported occurrences of restricted elevator controls on its Embraer 145 and Bombardier DHC-8 aircraft. These aircraft types are similar in having non-powered flight controls. Other European operators of Avro 146/RJ-series aircraft also reported flight control restriction events during the same period.

Many of these events were found to be associated with residues of 'thickened' de-icing fluids, that had accumulated in the aerodynamically 'quiet' areas of the elevator and aileron controls. These residues rehydrate on exposure to precipitation and can freeze at altitude, with the potential for restricting control movement. In most of these incidents, the control forces returned to normal after the aircraft had descended into warmer conditions. Despite recent industry efforts at addressing the problems posed by such residues, an effective solution remains to be found.

This bulletin reiterates the safety recommendations issued in a recent AAIB bulletin, which stated that the build-up of such residues must be avoided through a tightly controlled regime of inspection and cleaning, and that new types of thickened fluids must be developed, whose residues do not cause flight control restrictions on aircraft with non-powered flight controls.

SAFETY RECOMMENDATION - 2005-135

It is recommended, that the Joint Aviation Authorities, in consultation with the European Aviation Safety Agency, issue safety documentation to strongly encourage operators of aircraft with non-powered flight controls to use Type I de/anti-icing fluids, in preference to 'thickened' fluids, for de-icing.

Response

Discussions took place in December 2005 between representatives of UK AAIB, EASA and JAA. During those discussions, the recommendations made in the report were discussed.

Operator awareness of the vulnerability of certain aircraft was the first consideration, and to this end, the JAA issued a Safety Information Communication (SIC), which was effectively, a republishing of the ACJ. This was done because it was thought that the SIC would reach a rather wider audience than subscribers to JAR-OPS 1.

We are also considering a fresh TGL, to be ultimately converted into JAR-OPS section 2 material, concerning snow/slush contamination of engine intakes.

Regarding recommendations 2005-135, 136, 137 and 148, they are receiving our attention. To this end, I will send electronic copies of the AAIB reports to the JAA De/Anti-icing Steering Group for their consideration. I have not yet been able to do this because of AAIB constraints on forwarding material ahead of it being placed on the website.

Status - Accepted - open (Appropriate Action Implemented/Planned)

SAFETY RECOMMENDATION - 2005-136

It is recommended that where the use of 'thickened' de/anti-icing fluids is unavoidable, the Joint Aviation Authorities, in consultation with the European Aviation Safety Agency, ensure that operators of aircraft with non-powered flight controls who use such fluids, invoke controlled

maintenance procedures for the frequent inspection for accumulations of fluid residues and their removal.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-137

It is recommended that the European Aviation Safety Agency introduce certification requirements relating to de/anti-icing fluids for use on aircraft with both powered and non-powered flight controls.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-148

It is recommended that prior to the European Aviation Safety Agency assuming responsibility for operational matters within Europe, they consider the future need for the training and licencing of companies who provide a de/anti-icing service, so that anti-icing fluids are applied in an appropriate manner on all aircraft types, but specifically to ensure that the entry of such fluids into flight control mechanisms and control surfaces is minimised.

Status - Response Awaited - open

Boeing 737-33V	Lyons Airport France	22-Mar-2005	Incident

AAIB Bulletin: 4/2006
FACTOR: F18/2006

Synopsis

During a flight from Nice to Luton, the flight crew experienced progressive abnormal annunciator indications. For some of these there were no procedures in the Quick Reference Handbook. Having determined that these indications were a symptom of a greater electrical problem, including degradation of their flight instruments and loss of protection systems, a PAN call was declared and a diversion to Lyons initiated where an uneventful landing was made. The subsequent investigation revealed that a failure of a contact post had occurred in the R1 relay associated with the Battery Busbar, and that power had been lost from this Busbar in flight. There were no drills published for such a failure on this model of the Boeing 737. With this failure there is a risk that, due to the loss of power to the equipment cooling fans, all attitude information could eventually be lost if power is not switched to an alternate supply. The many different configurations of the electrical system in the Boeing 737-300/400/500 fleet have made it difficult for the manufacturer to produce a generic procedure for this failure, although they have provided information to enable operators to write a procedure for their own aircraft.

SAFETY RECOMMENDATION - 2005-065

It is recommended that the Federal Aviation Administration require that the Boeing Airplane Company examine the various electrical configurations of in-service Boeing 737 aircraft with the intention of providing operators with an Operations Manual Procedure that deals with loss of power from the Battery Busbar.

Status - Response Awaited - open

Beech 76	Adjacent to Belfast City Airport	10-Apr-2005	Accident

AAIB Bulletin: 1/2006
FACTOR: F7/2006

Synopsis

The aircraft took off from Belfast (City) airport and the landing gear was retracted. Witnesses heard a sound similar to that of a reduction in engine power and shortly afterwards the aircraft turned to the left. It failed to gain any further height, struck some trees and crashed into a sports field, coming to rest against a substantial steel mesh fence. There was an immediate fire. The pilot escaped from the aircraft unassisted but suffered severe burns.

SAFETY RECOMMENDATION - 2005-138

It is recommended that the FAA, in collaboration with Hartzell, ensure that all Hartzell propellers in service that are fitted with part A-1590 pitch locks should have these replaced by part B-317 or B-318 pitch locks, as appropriate, at the next overhaul.

Response

Hartzell Propeller, Inc. has issued a change to the Hartzell Overhaul Manual 117D, highlighting an additional requirement to replace the A-1590 start lock flyweight part during the routine scheduled overhaul. The change also details the appropriate replacement part(s) that can be substituted for the A-1590 start lock flyweight part. This change was implemented on October 4, 2005.

Status - Accepted - closed

Slingsby T67C	Near Pottersbury, 6 miles northwest of Milton Keynes	25-May-2005	Accident

AAIB Bulletin: 3/2006
FACTOR: F16/2006

Synopsis

An instructor and his student were conducting a training flight when the aircraft was seen to enter a spin. The aircraft was still in a spin when it impacted the ground. There was no evidence of a mechanical problem; however, it is possible that the engine might have stopped during the spin. Whilst it was not possible to establish what the instructor planned to do on this flight, the investigation concluded that the aircraft probably entered an unintentional spin during an exercise involving oscillatory stalling. This particular exercise is not part of the UK Private Pilot's Licence syllabus. As this exercise is considered inappropriate for ab initio flying training, a recommendation has been made to the CAA to ensure that flying instructors do not include oscillatory stalling during early flying training.

SAFETY RECOMMENDATION - 2005-146

It is recommended that the United Kingdom Civil Aviation Authority highlight the circumstances of this accident and issue guidance to all UK registered flying instructors to ensure that oscillatory stalling is not included in flying exercises during ab initio flying training

Response

The CAA accepts the recommendation, although the term "oscillatory stalling" is not recognised by the CAA as standard terminology. Guidance to Instructors and Examiners, in the form of a TrainingCom, will be issued and will emphasise:

1. Adherence to standard training syllabus for flying training, particularly ab-initio training, and avoidance of inappropriate or personalised procedure.

2. Observance of minimum height limits for stalling, spinning and aerobatic manoeuvring, and consideration of risk of unintended loss of control or entry into spin.

3. Consideration of recovery, or abandonment and use of safety equipment, and minimum safe height for both.

TrainingCom 1/2006 was issued in September 2006.

Status - Accepted - closed

Boeing 757-200	Manchester Airport	11-Jun-2005	Accident

AAIB Bulletin: 4/2006
FACTOR: F19/2006

Synopsis

Whilst closing the R4 door prior to departure, the cabin attendant trapped her left forearm between the door assist handle and aircraft bulkhead, causing her wrist to fracture in three places. Two safety recommendations are made.

SAFETY RECOMMENDATION - 2005-133

It is recommended that Excel Airways reviews its procedures for the closing of cabin doors, to reflect the fact that there are occasions when cabin attendants may require assistance from ground staff.

Response

In response to this recommendation, the operator has now incorporated the instruction previously issued directly to cabin crew into their Company Operations Manual, Part E (SEPs) Chapter 2, Page 8. In addition, the instruction has been expanded to encompass any requirement for additional assistance, as follows:

'Any additional assistance to help with the closing of aircraft cabin doors must be obtained from another cabin crew member on board.'

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-134

It is recommended that Excel Airways reviews its training with respect to the operation of Boeing 757-200 cabin doors, to ensure that the final assessment of any authorised individual's capability to operate a cabin door safely is carried out on an aircraft under representative conditions.

Response

In response to this recommendation, the operator stated that representative training is now being carried out on board each Excel Airways aircraft type before cabin crew are signed off as qualified and authorised to operate cabin doors unsupervised.

Status - Accepted - closed

Challenger 604	**8nm West of Midhurst VOR**	**11-Nov-2005**	**Incident**

AAIB Bulletin: S3/2006
FACTOR: N/A

Synopsis

At FL400, approximately four and a half hours after departure from Lagos on an intended flight to Farnborough, the crew received an 'AUTO PILOT PITCH TRIM' caution. Approximately 30 minutes later the 'STAB TRIM' and 'MACH TRIM' cautions illuminated. Stabiliser and mach trim modes were temporarily restored by re-engaging stabiliser command trim channel 1 only but, shortly afterwards, the 'STAB TRIM' and 'MACH TRIM' cautions illuminated again.

While descending towards Farnborough, several further attempts at re-engagement resulted in disconnection of the autopilot and indications of intermittent engagement of stabiliser trim channel 2. Application of nose-up stabiliser trim commands, using the yoke mounted switches, resulted in nose-down trimming of the horizontal stabiliser and the crew elected not to attempt further stabiliser trim re-engagements. The autopilot was re-engaged, but not before almost full nose down trim had been applied, which could not be corrected for the remainder of the flight.

The crew were concerned at the physical effort required to fly the aircraft manually and elected to make a flapless approach and landing in order to avoid increasing the already considerable nose-down pitching moment. The aircraft diverted to London Heathrow Airport, where a successful flapless landing was achieved by the co-ordinated efforts of the commander and co-pilot operating the primary flight controls and an off-duty pilot operating the thrust levers.

The operator has reported two previous events involving the stabiliser trim system on this aircraft.

SAFETY RECOMMENDATION - 2005-147

It is recommended that Transport Canada ensure that Bombardier Aerospace eliminate the risk of contamination affecting the operation of the horizontal stabiliser trim control system fitted in the Challenger 604 and other Bombardier aircraft with similar trim systems.

Status - Response Awaited - open

Section 2

Airplanes above 2,250kg and below 5,700kg MTWA

L39 Albatros L39ZO	**Near Duxford Airfield, Cambridgeshire**	**02-Aug-2003**	**Accident**

AAIB Bulletin: 2/2005
FACTOR: F6/2005

Synopsis

During a 'run and break' rejoin to the circuit at Duxford, the pilot turned crosswind, reduced the throttle to IDLE and extended the speed brakes. After lowering the landing gear he increased the throttle but then noticed "a change in the usual sound" of the engine. As the aircraft was descending below circuit height he added full power but the engine did not spool up. After making a MAYDAY call he considered that the aircraft was too low to attempt an engine restart and that he was also outside the safe ejection envelope. The pilot therefore decided to carry out a forced landing into a field. The landing was successful but the nose landing gear collapsed during the ground roll. An examination of the engine revealed that the inlet directing body of the high pressure compressor had seized. This could have caused a sub-idle engine surge when the throttle was rapidly retarded to IDLE. A service bulletin calling for a torque check of the inlet directing body had not been carried out. In addition, there was no record of the engine having been overhauled since its manufacture in 1982.

SAFETY RECOMMENDATION 2004-094

It is recommended that UK Civil Aviation Authority emphasises to operators of Permit to Fly aircraft that in situations where service information is only available in a foreign language, it is the operator's responsibility to obtain, if necessary, a translation of the service information into a language that the operator understands.

Response

The CAA has published Letter to Owners/Operators (LTO) No 2775 on 10 March 2005 to remind operators of Permit to Fly aircraft of the need to obtain the latest service information for their aircraft in the English language.

In addition the CAA is to revise British Civil Airworthiness Requirements Chapter A3-7 to require published service information to be available in the English language for all aircraft issued with a Permit to Fly. The next revision date for BCAR A is proposed for September 2007. However, before that time the EASA procedures for the issue of Permits to Fly will have been issued, superseding much of BCAR A3-7.

The BCAR A8-20 requirement is the main control of this risk as Permits to Fly are issued upon the recommendations of approved organisations. Permits to Fly issued outside of BCAR A8-20 are subject to evaluation by CAA surveyors, which include assessments of available service information. CAA internal procedures ensure that service information is translated for the surveyors' appraisal.

Status - Accepted - closed

Cessna T310R	**Hotham, South Cave, Humberside**	**13-Mar-2004**	**Accident**

AAIB Bulletin: 4/2005
FACTOR: F15/2005

Synopsis

The aircraft departed from Humberside airport on an instructional flight and was being flown in clear air at medium level when radar contact was lost. Shortly afterwards it impacted the ground in a steep nose-down attitude at high speed which killed both pilots on board.

SAFETY RECOMMENDATION - 2005-001

The Federal Aviation Administration (FAA) of the USA should require all flying training performed in the United Kingdom for the award of FAA professional pilots' licences to be conducted by flying training organisations that have been evaluated and approved by the FAA.

Status - Response Awaited - open

Cessna T310R	**Wycoller Country Park Trawden Nr Colne, Lancs**	**30-Mar-2004**	**Accident**

AAIB Bulletin: 8/2005
FACTOR: F29/2005

Synopsis

Fire in the aircraft's nose baggage compartment, which started in the vicinity of the cabin heater, caused the smell of smoke in the cockpit. This prompted the pilot to request a return to Leeds Bradford Airport six and a half minutes after he had taken off for a flight to Connaught (Knock) in Ireland. The aircraft successfully negotiated a level turn to the left at 3,400 feet onto a south-easterly heading but then started a rapid descent and a steep turn or series of turns where radio and radar contact was lost. This may have been the result of controlled flight or uncontrolled manoeuvres. The aircraft was seen to be flying slowly and 'not in trouble' a matter of seconds before it struck the ground. The aircraft crashed in a field at an elevation of 950 feet above mean sea level (amsl) approximately 0.5 nm to the south-south-east of the last radar return and within two minutes of loss of contact. Ground impact marks were consistent with an uncontrolled impact yet the positions of some of the controls suggested that the pilot may have been trying to make a forced landing, albeit with a tailwind, into a sloping field which may have appeared level from the air. Post mortem examination of the pilot concluded that there was no evidence of cabin air contamination which could have had an incapacitating effect and that he died as the result of multiple injuries sustained at the time of impact.

SAFETY RECOMMENDATION - 2005-066

It is recommended that the FAA introduce inspection and maintenance requirements for combustion heaters in Part 23 aircraft to ensure that adequate detailed inspections are carried out at specified calendar intervals.

Response

The Cessna 310 R airplane in question currently has inspection requirements on the combustion heater. Inspections are required during annual inspections. Additionally, Cessna has generated

Service Bulletin MEB95-9, which require inspection of the heater fuel lines. Airworthiness Directive (AD) 81-09-09 mandates compliance with Cessna Service Bulletin MEB95-9 at 250-hour intervals. The inspection of the aircraft records did not indicate compliance with this AD and these inspections. During interviews with the maintainance engineers who had performed the recent annual inspection, they did not have detailed recollection of the particular work regarding the combustion heater inspection. According to interpretation of the AD inspection interval requirements and the aircrafts records, the airplane had not been in compliance with the AD since June 1999. The airplane accident occurred 30 March 2004.

The airplane's maintainance records do not indicate compliance with existing mandatory heater inspection requirements. Based on lack of compliance documentation found in the airplane's maintainance records and the lack of stated compliance from the engineers who had performed the recent annual inspections, we must conclude that the airplane was not in compliance with these existing inspection requirements. Thye FAA cannot conclude that existing Part 23 inspection requirements are inadequate because this Cessna 310 R airplane was not in compliance with its own mandated requirements. This accident does not warrant additional inspection requirements for Part 23 airplanes.

We believe this is an acceptable response to Safety Recommendation 05.189 and request that it be closed.

Status - Partially Accepted - open

BN2A Mk.III-2 Trislander	**Guernsey**	**23-Jul-2004**	**Accident**

AAIB Bulletin: AAR 1/2006
FACTOR: F1/2006

Synopsis

Shortly after take-off from Guernsey Airport, a loud crack or bang was heard in the aircraft's cabin. The aircraft commander was told by a colleague in the cabin that one or more passengers had been injured and that a cabin window was broken. He decided to return to Guernsey Airport having been airborne for approximately four minutes. After the passengers disembarked the pilot noticed that a de-icer boot had separated from the left hand propeller and was now on the seat inside the cabin, adjacent to the broken window.

SAFETY RECOMMENDATION - 2005-078

The UK Civil Aviation Authority and the European Aviation Safety Agency should work closely together to develop further the valuable progress already made in human factors in aircraft maintenance, focusing on the underlying reasons for both errors and violations, with a view to reducing the potential for system-induced errors and violations, and therefore the risk of maintenance related accidents.

Response

CAA Response

The CAA accepts the Recommendation insofar as it relates to human factors in aircraft maintenance. However, the CAA continues to work towards ensuring that an adequate understanding of the application of human factors and human performance in aircraft maintenance is established for all staff involved in aircraft maintenance within Part 145 organisations. UK based organisations are required by Part 145.A.30 (e) to establish competence in the field of human

factors and human performance of all personnel involved in maintenance, management and/or quality audits. Competence in this area for affected staff must be established by 28 September 2006 (this being the end date of the derogation provided to EU Member States within article 7.3(c) of (EC) Regulation 2042/2003). To help organisations achieve this and other human factors related elements of Part 145, the CAA published CAP 716 issue 2 "Aviation Maintenance Human Factors" in December 2003. Development of any regulations and guidance material in this field is the responsibility of the EASA. The CAA will, when invited, participate in this process.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-079

Hartzell Propeller Incorporated should investigate the feasibility and potential benefits of using thermal imaging techniques to inspect de-icer boots for disbonded areas.

Response

Hartzell's overall impression of such a system is that while thermal imaging would provide an additional means of inspection, it would not replace the existing visual and tactile inspection. We continue to believe that the existing visual and tactile inspection is adequate.

Although a thermal imaging system may be useful as a supplemental tool for detecting disbonds; there are likely significant limitations to its effectiveness. There are several other propeller and de-icer boot manufacturers and each is responsible for their own particular, albeit similar, installation and inspection methods. If you believe thermal imaging offers an appropriate additional inspection, the other manufacturers and their governmental agencies should also be involved in this consideration.

Hartzell provided comments about such an inspection system. While each of these systems can be debated and perhaps resolved, they considered that a successful and worth-while implementation of such a system was not simple to achieve.

Hartzell believe in-flight de-icer separations are rare. The accident on G-BEVT and the other known events of de-icer separation have typically been attributed to improper installation of the de-icer, possibly combined with inadequate inspection(s) after being placed in service. Since installation and recurring inspection errors appear to often be the root cause of a separation event, preventing these occurences seems a more appropriate response to the problem. We believe the existing inspection procedures and inspection intervals are adequate if properly performed.

Service experience indicates that if existing installation procedures and periodic inspection requirements are properly followed, boot separations should not occur. In Hartzell's opinion, there is inadequate justification for implementation of a thermal imaging inspection of de-icer boots.

FAA Response

The FAA has carefully reviewed this request and has evaluated the proposed thermal imaging inspection process during a recent propeller de-icer boot certification program. It has been determined that the thermal imaging process offers some benefit for certain areas of the bonded area of the propeller de-icer boot. In other areas of the bonded propeller de-icer boot, the thermal imaging inspection process was not entirely reliable to show proper bond line adhesion. The standard visual and tactile inspection method has proven itself to be an effective and reliable method to determine the propeller de-icer boot bond line adhesion integrity. Extensive service experience and the small number of reported propeller de-ice boot adhesion failures proves that this inspection technique is reliable.

Status - Accepted - closed

Cessna 208B Caravan	Netheravon Airfield	04-Nov-2004	Accident

AAIB Bulletin: 1/2006
FACTOR: F4/2006

Synopsis

The aircraft was returned to dispersal after its pilot heard two loud bangs from the area of the nose landing gear whilst taxiing to depart. The rear support of the nose landing gear spring had come away from its fuselage mounting point because one attachment bolt had failed due to bending fatigue and the other three had pulled from their self locking anchor nuts. Long-term fretting between the bolts and the rear support casting was evident and elongation of the bolt holes in the fuselage structure had occurred in a forwards direction, indicating that the nose gear spring had moved forward, possibly whilst the aircraft was being towed over a surface irregularity. Four safety recommendations were made which addressed nose gear maintenance inspections and the control of towing loads.

SAFETY RECOMMENDATION - 2005-102

It is recommended that the Federal Aviation Administration of the USA requires the Cessna Aircraft Company to augment the current routine maintenance procedure for the nose landing gear forward and aft drag link spring supports of the Cessna 208 Caravan aircraft models with a requirement to torque check the attachment bolts.

Response

Cessna reviewed the documentation of this incident that was provided with these safety recommendations. The operator used a towbarless (powered) tug to tow the airplane to and from the hanger. The Model 208 Maintenance Manual specifically requires that the towing of the airplane be accomplished through the nose gear axle, using a yoke-type tow bar (standard equipment in the airplane). The use of a towbarless tug is not permitted. This tug lifts and tilts the airplane pulling on the lower portion of the nose landing gear. The loads placed on the gear by the tug are different than those generated by the tow bar. It is our belief that the nose landing gear spring support would not have come loose if the operator had followed Cessna's towing procedures. We are unaware of any other occurrences of the nose landing gear spring supports becoming loose and causing the nose spring support to separate from the fuselage.

The Model 208 Maintenance Manual calls out specific inspections of the nose gear drag link spring attach structure to look for loose bolts every 200 hours. Cessna believes this inspection is adequate for finding loose bolts. In addition, Cessna believes that the towing procedures in the Maintenance Manual are adequate for finding loose bolts. The towing procedures in the Maintenance Manual are adequate so towing load limits are not necessary. Since this incident was precipitated by an operator not following the Maintenance Manual procedures, action on the part of Cessna is not warranted.

Status - Rejected - closed

SAFETY RECOMMENDATION - 2005-103

It is recommended that the Federal Aviation Administration of the USA requires the Cessna Aircraft Company to advise maintainers of Cessna 208 Caravan aircraft to replace the nose landing gear rear spring support attachment bolts if these bolts are found to be loose when torque checked during routine inspection.

Response

Cessna reviewed the documentation of this incident that was provided with these safety recommendations. The operator used a towbarless (powered) tug to tow the airplane to and from the hanger. The Model 208 Maintenance Manual specifically requires that the towing of the airplane be accomplished through the nose gear axle, using a yoke-type tow bar (standard equipment in the airplane). The use of a towbarless tug is not permitted. This tug lifts and tilts the airplane pulling on the lower portion of the nose landing gear. The loads placed on the gear by the tug are different than those generated by the tow bar. It is our belief that the nose landing gear spring support would not have come loose if the operator had followed Cessna's towing procedures. We are unaware of any other occurrences of the nose landing gear spring supports becoming loose and causing the nose spring support to separate from the fuselage.

The Model 208 Maintenance Manual calls out specific inspections of the nose gear drag link spring attach structure to look for loose bolts every 200 hours. Cessna believes this inspection is adequate for finding loose bolts. In addition, Cessna believes that the towing procedures in the Maintenance Manual are adequate for finding loose bolts. The towing procedures in the Maintenance Manual are adequate so towing load limits are not necessary. Since this incident was precipitated by an operator not following the Maintenance Manual procedures, action on the part of Cessna is not warranted.

Status - Rejected - closed

SAFETY RECOMMENDATION - 2005-104

It is recommended that the Federal Aviation Administration of the USA requires the Cessna Aircraft Company to establish the maximum towing loads that can be applied to the nose landing gear wheels of Cessna 208 aircraft and to publish suitable towing load limits in the Aircraft Operating and Maintenance Manuals.

Response

Cessna reviewed the documentation of this incident that was provided with these safety recommendations. The operator used a towbarless (powered) tug to tow the airplane to and from the hanger. The Model 208 Maintenance Manual specifically requires that the towing of the airplane be accomplished through the nose gear axle, using a yoke-type tow bar (standard equipment in the airplane). The use of a towbarless tug is not permitted. This tug lifts and tilts the airplane pulling on the lower portion of the nose landing gear. The loads placed on the gear by the tug are different than those generated by the tow bar. It is our belief that the nose landing gear spring support would not have come loose if the operator had followed Cessna's towing procedures. We are unaware of any other occurrences of the nose landing gear spring supports becoming loose and causing the nose spring support to separate from the fuselage.

The Model 208 Maintenance Manual calls out specific inspections of the nose gear drag link spring attach structure to look for loose bolts every 200 hours. Cessna believes this inspection is adequate for finding loose bolts. In addition, Cessna believes that the towing procedures in the Maintenance Manual are adequate for finding loose bolts. The towing procedures in the Maintenance Manual are adequate so towing load limits are not necessary. Since this incident was precipitated by an operator not following the Maintenance Manual procedures, action on the part of Cessna is not warranted.

Status - Rejected - closed

SAFETY RECOMMENDATION - 2005-105

It is recommended that the UK Civil Aviation Authority should advise all UK aircraft and airport operators that utilise powered aircraft towing equipment, to fit a suitable weak link and safety strap between the towing equipment and the aircraft.

Response

The CAA accepts the recommendation insofar as it concerns advice to the interested parties. Advice was published on 29 March 2006 in Appendix 70 to Airworthiness Notice No 12, Aircraft Towing and Limitations, and guidance to Aerodrome Operators was published in Issue 10 of 'Reference Point', published in February 2006. In addition, advice was provided in the May 2006 edition of General Aviation Safety Information Leaflet (GASIL).
However, the CAA cannot ensure that airport operators, other than those licensed by the CAA, will receive the advice or adopt the appropriate procedures.

Status - Accepted - closed

Section 3

Aeroplanes 2,250kg MTWA and below

Piper PA-34-200T	**White Waltham Airfield**	**22-Feb-2003**	**Accident**

AAIB Bulletin: 11/2005
FACTOR: F42/2005

Synopsis

During take-off, the nose landing gear collapsed and the pilot was unable to prevent the propellers and the nose of the aircraft from striking the runway. Investigation showed that the upper eye end of the Sprung downlock link had failed and that there was considerable wear in the upper and centre pivots of the drag brace.

The geometric download mechanism had recently been adjusted to correct an inability of the nose landing gear to free fall. There was no procedure available in the aircraft maintenance manual for correcting an inability to lower the landing gear by free fall.

SAFETY RECOMMENDATION - 2005-106

The Federal Aviation Administration of the USA should ensure that the New Piper Aircraft Company includes, in the appropriate Maintenance Manuals, clear advice on the factors affecting 'free fall' extension of this landing gear and a more precise definition of an 'acceptable' nose landing gear 'Retraction Link Retention Spring'.

Response

In regard to the "free fall", Chapter 32-00-00, page 3, 4D3 of the Seneca V Maintenance Manual, it has been revised to include instructions regarding the potential failure of the Nose Landing Gear to fully lock down during the free fall check.

Piper has provided a clarification of the "Retraction Link Retention Spring", Chapter 32-20-00, page 13, 4ED; sketch to show the lock components.

The above information will be included in the April, 2006 Seneca V Maintenance Manual updates and similar action will be taken for the earlier out of production PA-34 models by end of 2006.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-107

The Federal Aviation Administration of the USA should ensure that the New Piper Aircraft Company reviews the content of Service Bulletin 1123A and expedites embodiment of the resulting instructions into the Maintenance Manual.

Response

Piper has agreed to incorporate SB 1123A into the Piper (Seneca) Maintenance Manual for the models PA-34. This information has already been incorporated in the Piper (Seneca V) Maintenance Manual and similar action will be taken for the earlier out of production PA-34 models by end of 2006.

Piper and Atlanta ACO Action

Piper will incorporate the above information and update the Piper (Seneca V) Maintenance Manual. Additionally, for earlier out of production PA-34 models Piper will incorporate these changes at their next scheduled release for completion by the end of this year (2006).

Status - Accepted - open

Denney Kitfox Mk4	**Gumley Road, Smeeton Westerby, Leicestershire**	**13-Jun-2003**	**Accident**

AAIB Bulletin: 3/2004
FACTOR: F20/2004

Synopsis

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 he 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.

SAFETY RECOMMENDATION - 2004-010

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.

Response

In response to the recommendation, we published information under our own reference PFA ID 04-8 in our Notes to PFA Aircraft Inspectors, known as SPARS. This was originally published in October 2004 although the page has since been updated and reissued on September 2005.

Debris in Fuel System

During 2004 a recently completed PFA Kitfox aircraft was test flying to qualify for the issue of a Permit to Fly when it was written off in a forced landing following engine failure. Fortunately the pilot was unhurt. 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. The builder and inspector had earlier realised there was a contamination problem and had done their best to purge the system, and with hindsight felt that it would have been better to replace the system. PFA has since heard of another accident where an aircraft was badly damaged in a forced landing after, as subsequently discovered, silicone sealant used (inadvisably) to join the carburettor and blocked the system.

There have been many aircraft accidents over the years caused by fuel systems being contaminated by the inappropriate use of jointing compounds. The use of any kind of jointing compound at any fuel line connection is fundermentally unwise and in any case shouldn't be necessary. All joints should be as intended by the aircraft designer or in accordance with standard practice. Any leak in a joint that can't be cured by reasonable tightening should be resolved by replacing the joint with new parts. In the case of rubber hoses fitting over a metal hose it is essential that the mating sizes be correctly matched. Never use jointing compound in this situation as any compound remaining on the business side of a jubilee clip is bound to migrate into the systen eventually.

Aircraft Weighing

A few years ago a PFA Jabiru aircraft was crashed and badly damaged. The wreck was sold and a professional outfit took on the job of repair. In preparation they weighed the pieces and found that, even with a few shards of fibreglass missing, the sum of the parts already weighed more than the declared empty weight of the aircraft. Consequently, the insurance company who were to pay up on the loss concluded that the aircraft had been operating 'illegally' overweight as a microlight and hence refused to settle the claim.

More recently a PFA single-seat homebuilt aircraft was damaged whilst in the hands of a second owner. Weighing prior to repair showed that the aircraft was significantly heavier than the existing weight schedule reported the aircraft to be. The new conclusion was that there was now not enough 'disposable load' for the new owner to legally strap in and fly his aircraft with any useful fuel load and all previous flights must have been conducted illegally for the same reason. Also, the resale value of his aircraft had taken a serious knock.

In both cases above the reason for the reported or apparent weight growth was never proven but inevitably doubt was cast over the original weighings. Fortunately both cases were resolved amicably without recourse to the courts but these events do underline the importance of inspectors ensuring that any weighings they are responsible for are completed as accurately as possible. Inspectors should be careful to note and record the condition of the aircraft as weighed and list all 'removable' equipment fitted (or not fitted) such as radios, carpets, doors, spats etc. If an owner subsequently compromises his aircraft weight by refitting equipment then it's he who will be responsible for those actions.

Status - Accepted - closed

Stampe SV4C(G)-C	Quarry at Redhill Surrey	26-Jul-2003	Incident

AAIB Bulletin: 10/2004
FACTOR: F46/2004

Synopsis

The pilot, who was also the owner of the aircraft, departed from Runway 19 at Redhill Aerodrome, turned left onto a northerly heading and levelled off at 1,000 feet, with the engine at 1,900 RPM. The pilot's intention was to practise aerobatics to the north of the M25 but, about one mile to the north of the airfield, the engine faltered and the pilot saw an object fly off from around the propeller hub. This was followed almost immediately by the pilot observing the propeller detach itself from the engine. He closed the throttle, turned off the engine switches and made a MAYDAY call to Redhill, stating that he had lost his propeller and was making a forced landing.

Looking for a suitable landing area, the pilot found his options were very limited by standing crops. He then noticed a green area which was upwind and he was able to make a successful 'three point' landing. He found that he had landed in a former quarry which had been filled and grassed over. The pilot made his way by foot to the security guard at the gate and he was able to contact the airfield by telephone. The police arrived soon afterwards.

SAFETY RECOMMENDATION - 2004-075

It is recommended that the UK Civil Aviation Authority specifies a calendar time limitation for Gipsy engines, at least for those aircraft operating in the Public Transport and Aerial Work categories, to cover areas where periodic predictive inspections are not effective.

Response

CAA Action

CAA has received feedback from owners and operators and remains in discussion concerning this recommendation. These discussions have been delayed in part due to company approval issues and the need for a fuller assessment of the proposal upon the operational fleet. Further discussions were planned on this subject, with a view to reaching a conclusion by September 2007.

Status - Partially Accepted - closed

Piper PA-28-161	Wellesbourne Runway 18	28-Oct-2003	Accident

AAIB Bulletin: 9/2004
FACTOR: F42/2004

Synopsis

The aircraft was being flown for the purpose of flight instructor training. The handling pilot was the instructor under training and he was seated in the right hand seat. Weather conditions were good with a surface wind of 240/07 kt. The aircraft made a normal approach and landing on Runway 18, which has an asphalt surface with 912 metres (2,990 feet) landing distance available. During the landing roll the pilots noticed some shaking through the airframe, the right wing began to lower towards the runway surface and the aircraft veered to the right. The aircraft came to rest at the right side of the runway, after which shutdown checks were completed and the crew evacuated.

The right main wheel and leg had broken away from the underside of the wing but remained attached to the aircraft by the hydraulic brake pipe.

SAFETY RECOMMENDATION - 2004-015

Until such time as they gain experience in matters of continuing airworthiness, it is recommended that the European Aviation Safety Agency review the policy of cancellation of National Mandatory Items, including Additional Airworthiness Directives.

Response

Email from EASA acknowledged receipt of Recommendation and also said a copy of safety recommendation has been directed to the Agency's technical specialists.

Status - Rejected - closed

SAFETY RECOMMENDATION - 2004-020

It is recommended that the Federal Aviation Administration, (FAA), as certifying authority for the Piper PA-28 series of aircraft, mandate Piper Service Letter No 842, which called for an improved inspection procedure for the bolt attaching the upper and lower links in the main landing gear torque link assembly. It is further recommended that a similar inspection procedure should be mandated for the lower torque link bolt.

Response

This office disagrees with the recommendation to mandate compliance with Piper Service Bulletin 842 and to adopt a similar inspection for the lower MLG torque link bolts. A thorough search of the FAA's Service Difficulty Database reveals a total of 20 reports of bolt failures over a 31 year period and 16,000+ airplanes. Using this data, the attached risk assessments were performed for each of the three torque link bolts, in accordance with the Small Airplane Directorate Airworthiness Directive Manual Supplement. They indicate that mandatory action in the form of an Airworthiness Directive is not warranted.

The inspection of these items is in fact already mandated by the requirements set forth in 14 CFR part 43.15(c) (1) which states that each 100-hour and annual inspection include items contained in 14 CFR Part 43 Appendix D. These items specifically include, under paragraph (e)(1) regarding landing gear, inspection of "Linkages, trusses, and members for undue or excessive wear, fatigue, and distortion". Also, as noted in the subject recommendation, the applicable Piper maintenance manual also includes several references to inspections of the subject bolts.

Status - Superceded - closed

Cessna F177RG	**Meppershall Airfield, Shefford, Bedfordshire**	**09-Feb-2004**	**Accident**

AAIB Bulletin: 6/2005
FACTOR: F27/2005

Synopsis

The aircraft was flown to a maintenance organisation for the rectification of a landing gear retraction problem. It was flown with the landing gear extended and the electric circuit breaker for the electrical hydraulic pump 'pulled'. The accident flight was uneventful and the landing very smooth.

As the aircraft decelerated, its nose dropped and the propeller struck the ground. Post accident rectification revealed defects in all three landing gears. The nose landing gear overcentre downlock was out of adjustment, and the breakout force was minimal. Both main landing gear downlock latch pivot pins had double fatigue and the left one had failed which was the reason for the original landing gear problem.

SAFETY RECOMMENDATION - 2005-032

It was recommended to the Cessna Aircraft Company that the Cessna 177RG Maintenance/Service documentation should specify to owners, operators and maintainers that whenever a mechanical failure is found in any part of a main landing gear assembly, the corresponding main landing gear assembly should be examined for a potential similar failure.

Response

It should be noted that the subject nose gear collapse on G-TOTO was caused by a nose landing gear downlock being out of adjustment and not by a failure of any main landing gear component. Inspection items for the landing gear are located in the 177RG Maintainance Manual, section 2, Landing Gear Retraction System which applies to both left and right main landing gear.

Status - Rejected - closed

SAFETY RECOMMENDATION - 2005-056

It was recommended to the Cessna Aircraft Company that consideration be given to making available to owners and operators of Cessna 177RG Cardinal aircraft a Service Kit that will enable them to upgrade their aircraft's landing gear extension/retraction system to the standard fitted to aircraft serial number 0283 onwards.

Response

'Cessna has issued SK177-22 and SK177-22 to upgrade the main landing gear downlock mechanisms. With proper maintainance, these systems have proven reliable. Developing a modification kit to bring earlier aircraft up to configuration of serial 0283 and on, is not necessary to address a safety issue.

Status - Rejected - closed

Avid Speedwing (Modified)	**Caernarfon**	**28-Mar-2004**	**Accident**

AAIB Bulletin: 10/2004
FACTOR: F48/2004

Synopsis

Whilst taxiing, following an uneventful landing, the nose landing gear collapsed. Subsequent investigation revealed that circumferential cracking had developed from a through bolt hole used to retain a stop bushing (or lower bearing sleeve) on the nose gear strut. These holes had been drilled aligned with the fore and aft axis of the aircraft and were in the area of highest stress whenever the gear flexed, for example, during touchdown. It was recommended by the manufacturer and the PFA that the axis of this hole should be aligned perpendicular to the line of flight, in the axis of minimum stress loading, which is left to right and parallel to the nose wheel axle.

SAFETY RECOMMENDATION - 2004-071

It is recommended that the PFA ensure all Avid Speedwing aircraft under construction or in service in the UK, that are fitted with a nose landing gear, have the nose gear strut installed with the axis of the bolt hole for the stop bushing aligned parallel to the nose wheel axle, and that none have been modified to leave redundant holes aligned with the aircraft longitudinal axis.

Response

A mandatory PFA inspection/modification instruction is to be published by the PFA and sent to all Avid owners soon under the PFA MOD number above and this may be backed up by a CAA MPD. Meanwhile, at the next opportunity inspectors are asked to check the alignment of the bolt holes in question on any noseleg equipped Avid aircraft that they inspect. If the bolt holes are incorrectly aligned, flying the aircraft should immediately cease and PFA Engineering contacted for appropriate advice.

Status - Accepted - open (Appropriate Action Implemented/Planned)

Cessna U206F	**Beacon Village, near Honiton, Devon**	**27-Jun-2004**	**Accident**

AAIB Bulletin: 11/2005
FACTOR: F40/2005

Synopsis

Shortly after takeoff, with the pilot and five parachutists on board (including one 'tandem' pair), the aircraft's engine began to lose power. The pilot flew to the east away from the airfield for a distance of some 6 nm, achieving a maximum height of approximately 1,100 ft agl, before turning back. As the engine lost power the pilot was unable to maintain height and, in attempting a forced landing, the aircraft clipped the tops of several tall trees and crashed steeply nose down into a sloping grass field.

SAFETY RECOMMENDATION - 2005-040

It is recommended that the British Parachute Association review the contents of the Pilot's Information Manual to ensure that all information contained is accurate, presented clearly in a professional manner and that a procedure is adopted to ensure that any future changes are promulgated expeditiously to all member clubs.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-041

It is recommended that the Civil Aviation Authority, in consultation with the British Parachute Association, review their oversight of Parachute Schools, to ensure that the procedure currently in place adequately addresses its original intent, ie. the establishment and maintenance of the highest reasonable standards of operation of such schools, including the operational standards for the aircraft and pilots engaged in parachuting operations.

Response

CAA Action

The CAA, in consultation with the BPA, has reviewed the Exposition forming the basis of the approval. Previous arrangements were for the BPA to audit every club at least once every 3 years and 3 audits per year included a CAA Flight Standards Officer. This number of accompanied audits was considered to be adequate. However, with effect from January 2006, this oversight by the CAA of BPA audits will be enhanced by the inclusion of a CAA Surveyor in the audit team. His task will be to concentrate on aircraft airworthiness matters. The BPA exposition regarding the composition of their audit team members will be changed from "may be assisted by a pilot examiner" to "pilot examiner will be included where practicable". Many recommendations for improvement to the BPA form 170 (audit checklist) have been accepted by the BPA and are in the process of being incorporated.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-042

It is recommended that the British Parachute Association revise sections of the Operations Manual relating to the operation of parachuting aircraft, with the intention of clarifying the flying training syllabus and test syllabus required to qualify as a parachute pilot.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-043

It is recommended that the British Parachute Association, in consultation with the Civil Aviation Authority, consider issuing a requirement for appropriate energy attenuating material to be installed as flooring in aircraft engaged in parachuting operations, where the occupants are required to be seated on the floor.

Response

BPA - No response received

CAA Response

This recommendation is not addressed to the CAA. The CAA, however stands ready to assist the BPA in its consideration of the need for a requirement for appropriate energy attenuating material to be installed as flooring in aircraft engaged in parachuting operations, where the occupants are required to be seated on the floor.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-044

It is recommended that the British Parachute Association include specific advice in their Manuals detailing emergency situations, in aircraft engaged in parachuting operations, concerning when conjoined tandem jumpers should separate from each other.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-045

It is recommended that the British Parachute Association, in consultation with the Civil Aviation Authority, consider the practicality of installing appropriate restraint systems for parachutists in all aircraft engaged in parachuting operations.

Response

BPA - No response received

CAA Response

This recommendation is not addressed to the CAA. The CAA, however, stands ready to assist the BPA in its consideration of the practicality of installing appropriate restraint systems for parachutists in all aircraft engaged in parachuting operations.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-060

It is recommended that the British Parachute Association, in consultation with the Civil Aviation Authority, establish an appropriate 'brace' position for each seating position on aircraft engaged in parachuting operations.

Response

BPA - No response received

CAA Response

This recommendation is not addressed to the CAA. However, the CAA stands ready to work with the British Parachuting Association to consider whether an appropriate brace position can be established for each seating position on aircraft engaged in parachuting operations.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-061

It is recommended that the British Parachute Association, in consultation with the Civil Aviation Authority, and the European Aviation Safety Agency, conduct a review of cabin interiors on aircraft engaged in parachuting operations with regard to improving their crashworthiness.

Response

BPA - No response received

CAA Response

This recommendation is not addressed to the CAA. The CAA, however, stands ready to assist the BPA in conducting, in consultation with EASA, a review of cabin interiors on aircraft engaged in parachuting operations with regard to improving their crashworthiness.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-062

It is recommended that the European Aviation Safety Agency develop standards for appropriate recording equipment that can be practically implemented on small aircraft.

Status - Response Awaited - open

Diamond DA40D	**Field near Old Stratford, Northamptonshire**	**29-Jun-2004**	**Accident**

AAIB Bulletin: 10/2005
FACTOR: F35/2005

Synopsis

The aircraft's engine failed in flight when most of the oil was lost overboard. From an altitude of 2,000 feet the pilot carried out a successful forced landing into a field. The engine's turbocharger compressor had been damaged resulting in an imbalance that caused vibration. This vibration induced a fatigue failure of a bearing and a piece of this bearing passed into the oil scavenge pump, causing it to seize. With the pump seized, the oil separator overfilled causing the engine oil to escape via the breather vent line. This caused a loss of oil that resulted in the engine overheating and then seizing. Two safety recommendations were made to reduce the probability of a recurrence.

SAFETY RECOMMENDATION - 2005-047

Thielert Aircraft Engines should modify the TAE-125-01 diesel engine's oil system to reduce the likelihood of sections from a failed turbocharger causing seizure of the oil scavenge pump.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-048

The European Aviation Safety Agency (EASA) should consider requiring Thielert Aircraft Engines to modify its TAE-125 diesel engine's oil system to reduce the likelihood of sections from a failed turbocharger causing seizure of the oil scavenge pump.

Status - Response Awaited - open

Grob G115E	**4.5 nm Southwest of Salisbury, Wiltshire**	**29-Jun-2004**	**Accident**

AAIB Bulletin: 4/2005
FACTOR: F17/2005

Synopsis

The aircraft was completing an aerobatic manoeuvre when one of the propeller blades separated from the hub. Despite severe vibration, the pilot was able to shut down the engine quickly and perform a successful forced landing in a field. There were no injuries to either crew member.

The investigation determined that the No. 1 propeller blade had detached due to a high-cycle fatigue failure of the blade socket in the aluminium alloy hub. The pattern of cracking suggested that the failure may have been vibration related. It was also established that the propeller blade-retaining nut preload decreases rapidly in the first few hours of propeller operation, raising concerns that the reduction in blade retention stiffness could increase the blade's propensity to vibrate, thereby increasing the stresses in the hub. A safety recommendation concerning the need for further vibration testing to be carried out in order to fully understand the mechanism of the failure was made on 1 December 2004. Two further safety recommendations have also been made concerned with the continued airworthiness of the propeller and focusing on propeller blade

retaining nut maintenance procedures and the non-destructive testing of propeller blade sockets to detect fatigue cracks.

SAFETY RECOMMENDATION - 2005-002

It is recommended that Hoffmann Propeller GmbH & Co KG introduce suitable maintenance procedures, or a suitable technical solution, for the type HO-V343K-V/183GY propeller on the Grob G 115E, to ensure that the preload of the propeller blade retaining nut is maintained at an acceptable level.

Response

As a result of the investigations Hoffmann decided to make a product change (mainly: increasing the torque and establishing a "Bedding In Procedure". The application is already at LBA/ EASA.

After receiving the approval they will publish a new Service Instruction for introducing the product change. The Draft therefore is already at LBA/ Braunschweig.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-003

It is recommended that Hoffmann Propeller GmbH & Co KG introduce adequate, high confidence level, non-destructive test (NDT) procedures, that will detect cracks in the threads of the type HO-V343K-V/183GY propeller blade sockets during overhaul and whilst in operational service on Grob G 115E aircraft.

Response

As a result of the investigations Hoffmann decided to make a product change (mainly: increasing the torque and establishing a "Bedding In Procedure". The application is already at LBA/ EASA.

After receiving the approval they will publish a new Service Instruction for introducing the product change. The Draft therefore is already at LBA/ Braunschweig.

Status - Accepted - closed

Pulsar	**Taynuilt Argyle & Bute, Scotland NN033289**	**25-Jul-2004**	**Accident**

AAIB Bulletin: 5/2005
FACTOR: F21/2005

Synopsis

The Pulsar, is a low-wing composite single-seat kitplane operated under a permit to Fly. The aircraft was on a cross-country flight from Perth to Oban. Ten miles away from Oban the pilot called Oban Radio and requested the airfield information. He did not receive a reply but he heard the wind direction and speed being passed to another aircraft. While at 4,000 feet on the Oban QFE the pilot detected a slight burning smell. He advanced the throttle but the engine did not respond. The pilot immediately declared a MAYDAY, stating his position and the nature of his emergency to Oban Radio, but the Oban radio operator was unable to decipher the message. Due to a strong westerly wind the pilot decided that he would be unable to reach Oban. There were no suitable fields nearby for a forced landing so the pilot selected a field on flat ground beside a river and planned a circuit while repeating his MAYDAY transmission several times but with no response. At approximately

1,000 feet agl the engine seized. The aircraft reached the chosen field but the touchdown was hard and the field was rough with cows grazing at the eastern (near) end. The landing gear separated during the ground roll and the aircraft decelerated rapidly to a rest. The propeller had stopped in a horizontal position and so was undamaged. The pilot was able to vacate the aircraft by opening the canopy as normal and then telephoned '999' from his mobile phone for assistance. It was later determined that the pilot had suffered from a crushed vertebra.

SAFETY RECOMMENDATION - 2005-005

The Popular Flying Association should:

a. Ensure that Pulsar aircraft owners are aware of, fit and use only radiator hoses approved for use by the Association or the Pulsar aircraft kit manufacturer.

b. Encourage Pulsar owners to carry out regular checks of the integrity of the engine cooling system, especially in the regions of the radiator hose couplings.

Response

The PFA are designing a modification which will reduce the vibration transmitted via the hose and avoid any pre-stress in the hose connection which they will issue to Pulsar owners shortly.

Status - Accepted - open (Appropriate Action Implemented/Planned)

Pierre Robin HR100/200B	**Blackbushe Airport**	**29-May-2005**	**Accident**

AAIB Bulletin: 2/2006
FACTOR: F13/2006

Synopsis

The aircraft had completed a flight to Perranporth where the landing was uneventful, as was the subsequent taxiing and airborne portion of the return flight. The pilot reported that following a normal approach to Runway 25 at Blackbushe, with a speed of between 85 and 90 kts, flaps 1 selected, and calm wind, the aircraft touched down normally. However, when the pilot applied the brakes he felt no retardation and asked the passenger to assist him in applying brake pressure, which again had no effect. Around 200m before the end of the runway he made an RT transmission stating ‘brake failure’. By this time he judged it was too late to perform a go-around and the aircraft overran the end of the runway coming to rest on a small bank in amongst some gorse bushes. Both the pilot and passenger exited the aircraft unaided.

SAFETY RECOMMENDATION - 2005-145

It is recommended that Apex Aircraft, the Manufacturer and Type Certificate holder for Robin aircraft types, issues appropriate information to owners and maintenance organisations regarding the revised standard of brake pads with bonded and riveted friction material and clarify the acceptability of fitting brake pads which have been relined.

Status - Response Awaited - open

Section 4

Microlights

Skyranger 912(1)	**Barton Airfield, Manchester**	**08-Jul-2003**	**Accident**

AAIB Bulletin: 11/2004
FACTOR: F51/2004

Synopsis

Just after takeoff, at an estimated height of 40 feet, the aircraft was seen to roll to the left. The bank continued to increase to the point where the nose dropped and the aircraft descended and struck the ground in a steeply banked, nose down attitude. The aircraft came rapidly to a halt with the pilot trapped in the wreckage having suffered serious injuries. An engineering investigation revealed that the aileron cables had been rigged in the reverse sense to normal.

SAFETY RECOMMENDATION - 2004-048

It is recommended that the PFA and the BMAA ensure that as aircraft, which are certificated to the requirements of BCAR Section S, continue in service, no degradation of any distinctive markings applied to the flight control systems connections intended to minimise the possibility of cross connection of flight controls during the aircraft rigging process, occurs.

Response

The PFA issued the following advice: During 2003 a Skyranger aircraft (BMAA fixed wing microlight) that had just been rigged for flight by the owner took off from Barton with cross-coupled aeleron controls. Control was lost soon after take off and the aircraft crashed causing serious injury to the owner pilot. With the aircraft being designed for rigging prior to flight this was not a circumstance where a formal duplicate inspection was required, however, the desirability of a second check being carried out by another pilot or inspector is obvious, and recommended whenever possible. In this event, distraction from others during the rigging checks led to the error but it's far from being the first time that an aircraft has crashed because of crossed controls. A few years ago in Canada a float equipped Cessna 172 flipped over on take off and in 1997, also in Canada, a de Havilland Beaver crashed on take off, both aircraft having elevator controls cables that were cross connected. Not long ago an Airbus A320 almost crashed on take off when the aircraft came out of maintenance with the captain's side stick mis-wired electrically. The day was saved, just, by the first officer switching priority to his side stick and recovering with the wing tip close to the ground.

GA aircraft designers are encouraged to minimise the possibility of such occurrence but nevertheless there are a few designs out there where cross-coupling of controls remains a possibility. Be wary, and employ avoidance techniques where possible such as colour coding etc. Further, and as a response to the AAIB's recommendation following the Skyranger accident, inspectors and owners should ensure that there is no degradation of any distinctive markings applied to the aircraft intended to minimise the possibility of cross connection of flight controls during the rigging process.

Status - Accepted - closed

Hybred 44XLR **Robinson R22 Beta**	**Overhead Welham Green, Hertfordshire**	**06-Jul-2004**	**Accident**

AAIB Bulletin: 4/2005
FACTOR: F23/2005

Synopsis

A Robinson R22 helicopter departed Elstree Aerodrome with an instructor who was the aircraft commander and a student who was receiving a trial lesson. A microlight aircraft with a pilot and his friend were carrying out a local private flight returning from Hunsdon to Plaistow Farm near St Albans. Both aircraft were operating under VFR in good VMC when they collided at about 1,200 feet above Welham Green. The microlight suffered severe structural damage and descended out of control into a wooded area, fatally injuring both persons on board. The helicopter instructor received a serious injury to his left foot and despite some structural damage to the helicopter, he was able to perform a successful emergency landing in a crop field. Both occupants of the helicopter survived the accident.

NOTE: The same safety recommendations made in this report are also be made in the report on the mid-air collision between two gliders on the 26 April 2004 approximately 2 km west of Lasham airfield, (EW/C2004/04/03) - published in Bulletin 5/2005.

SAFETY RECOMMENDATION - 2005-006

It is recommended that the Civil Aviation Authority should initiate further studies into ways of improving the conspicuity of gliders and light aircraft, to include visual and electronic surveillance means, and require the adoption of measures that are likely to be cost-effective in improving conspicuity.

Response

The CAA does not accept this Recommendation. However, the CAA reviewed its ongoing work on the use of visual and electronic measures to enhance the conspicuity of General Aviation aircraft, particularly in the light of impending wider transponder carriage. Since the review, the CAA has taken action in relation to contrasting colour and reflective surfaces. Two further recommendations concerning the "see and avoid" principle and GA carriage of transponders and electronic awareness systems will be included in the CAA's GA safety promotion activities.

In respect of gliders the CAA has no regulatory powers to require the adoption of any recommended measures. The CAA will forward details of any recommended measures to the British Gliding Association (BGA) and the European Aviation Safety Agency (EASA) for their information.

Status - Rejected

SAFETY RECOMMENDATION - 2005-008

It is recommended that the Civil Aviation Authority should promote international co-operation and action to improve the conspicuity of gliders and light aircraft through visual and electronic methods.

Response

The CAA does not accept this Recommendation insofar as it is directed to light aircraft. The promotion of international co-operation and action to improve the conspicuity of light aircraft through visual and electronic measures will depend upon the outcome of the review noted in Recommendation 2005-06. The CAA cannot accept the Recommendation in respect of gliders since it has no regulatory powers to require adoption of recommended measures. Details of

recommended measures will be forwarded to the British Gliding Association (BGA) and the European Aviation Safety Agency (EASA) for their information and use for any international promotion that these agencies might believe appropriate.

Status - Rejected - closed

Pegasus Quik	Eastchurch, Isle of Sheppey, Kent	21-Aug-2004	Accident

AAIB Bulletin: AAR 2/2005
FACTOR: F39/2005

Synopsis

The Pegasus Quik microlight, with an instructor and passenger on board, departed Rochester Airfield for a trial lesson. Thirty five minutes into the flight, as it was flying at 500 ft along the north coast of the Isle of Sheppey, it pitched up steeply to the near vertical and entered a series of tumbling manoeuvres. As the microlight tumbled the trike unit, containing the two occupants, separated from the wing and descended vertically to the ground. Neither the pilot nor his passenger survived the impact. The initiation of the pitching moment and subsequent entry into the tumbling sequence was brought about by the failure of the right upright upper fitting, which caused full nose-up trim to be suddenly applied.

Some time previously the microlight's uprights upper fittings had been modified to comply with Service Bulletin 116 requiring the fitting of additional rivets. The additional rivets were not only fitted incorrectly, and without reference to the Service Bulletin, but two of them did not match the specification of those rivets supplied by the manufacturer in the modification kit. Additionally, no duplicate independent inspection was carried out on the correct embodiment of the modification.

SAFETY RECOMMENDATION - 2005-082

It is recommended that the Civil Aviation Authority review its policy on the use of crash helmets and shoulder harnesses on microlight aircraft.

Response

CAA Action

The CAA have reviewed the regulatory policies in both these areas as they apply to microlight aircraft. The requirements for seat belts and harnesses, and for briefings and instructions for passengers regarding their use, are contained in the Air Navigation Order and are believed to be sufficiently robust. The policy and guidance on the use of crash helmets, has also been reviewed and other than for certain specialist operations that require CAA sanction, the current policy of leaving such matters to personal discretion is considered to be appropriate.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-083

It is recommended that the Civil Aviation Authority conduct a review of the British Microlight Aircraft Association (BMAA) policy on the selection, training and revalidation of inspectors with a view to establishing; the minimum engineering skills and knowledge; appeal procedures and the individuals within the BMAA who should authorise a reduction in the minimum engineering standards.

Response

CAA accepts this recommendation. CAA has reviewed these activities and identified areas of improvement. Following this review the BMAA are implementing changes to their internal procedures and processes for selection, qualification, training and revalidation of inspectors. These changes will also establish the minimum engineering skills and knowledge required and the associated procedures for appeals and variations relating to inspector appointments. On completion of these changes the CAA will verify their efficacy by undertaking a review of their implementation with an anticipated completion date of June 2006.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-084

It is recommended that the Civil Aviation Authority review their audit procedures of the British Microlight Aircraft Association inspectorate.

Response

CAA accepts this recommendation. CAA has reviewed the audit procedures for the British Microlight Aircraft Association. As a result of the review, CAA carried out a detailed audit of the British Microlight Aircraft Association in May 2005. The CAA's future oversight of the British Microlight Aircraft Association will include product audits to further validate the BMAA processes. These product audits will include surveys of aircraft and the associated records and take account of the embodiment of modifications, the stage construction of homebuilt microlight aircraft, and an assessment of the annual inspection process by MAA inspectors that forms part of the renewal of the certificate validity. In addition the CAA will conduct audits on a quarterly rather than annual basis for the immediate future.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-085

It is recommended that the Civil Aviation Authority ensure that Service Bulletins involving work conducted on primary aircraft structure include a statement that duplicate independent inspections are required, and that both inspections are to be recorded in the aircraft logbook.

Response

The CAA accepts this recommendation insofar as it relates to the need for a duplicate inspection. However, the CAA does not consider it appropriate to amend Service Bulletins with requirements for duplicate/independent inspections. This requirement is contained in the BMAA guide to airworthiness which identifies the need to carry out independent inspections whenever work is carried out on a primary structure and the CAA consider this to be the most appropriate place for this information. The CAA has written to the BMAA and microlight aircraft manufacturers requiring them to identify alterations and modifications that affect primary structure in Service Bulletins and other change documents. The BMAA published an article in November/December 2004 issue of its magazine "Microlight Flying" to remind all of its members of the importance of conducting independent inspections following work on the primary structure and the requirement to record their accomplishment in the aircraft log book.

Status - Partially Accepted - closed

SAFETY RECOMMENDATION - 2005-086

It is recommended that the Civil Aviation Authority and Mainair Sports Limited take appropriate action to ensure that Pegasus Quik uprights that have been modified by owners are replaced with factory modified items.

Response

The CAA accepts this recommendation. P&M Aviation (formerly Mainair Sports Ltd) have issued Service Bulletin 120 which requires all modified uprights to be returned to the factory for verification of correct embodiment of the modification. Incorrectly modified uprights are to be replaced with factory modified items. The Civil Aviation Authority under Mandatory Permit Directive 2005-007 issued in July 2005 has mandated this Service Bulletin.

Mainair Sports Ltd - No response received

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-087

It is recommended that the British Microlight Aircraft Association (BMAA) liaise with industry to ensure that advanced copies of Service Bulletins are passed to the BMAA so that comments can be made on their owner/members' and inspectors' ability to competently satisfy the instructions.

Response

The recommendation that the BMAA liaise with industry to ensure that advanced copies of Service Bulletins are passed to the BMAA so that comments can be made on their owner/members' and inspectors' ability to competently satisfy the instructions, has largely been addressed, we believe, by the issue of TIL 38 and the consultation process referred to in our response to Safety Recommendation 2004-081 above. However we wish to make it clear that while we recommend that A1 companies consult us over the issue of Service Bulletins in respect of our members' aircraft, we cannot at present ENSURE that they do so because companies holding a CAA A1 approval to manufacture microlight aircraft are able to deal directly with the CAA regarding Service Bulletins. We have raised this issue with the CAA and it will be discussed further at our next Airworthiness Review Meeting with our CAA surveyors on the 26th of January 2006 to see if a procedure can be agreed to achieve the intention of the recommendation .

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-088

It is recommended that the British Microlight Aircraft Association (BMAA) ensure, through the issue of the Permit to Fly, that microlight aircraft are fitted with the correct placards and are maintained in accordance with either the manufacturer's or BMAA recommended maintenance schedule and that all maintenance is recorded in a Civil Aviation Authority approved log book.

Response

The BMAA "Guide To Airworthiness Procedures" Issue 7 dated April 2004, which is sent to all new members of the BMAA and can be found on the BMAA website includes specific information on maintenance and logbooks on pages 19 and 20 respectively. We intend to reinforce this information, and the requirement for microlight aircraft to be fitted with the correct placards, through direct communications to the BMAA inspectorate, through a series of "inspector focused" articles in our members' magazine Microlight Flying, and through a series of Inspector Seminars to be held at different venues across the UK in 2006/7. We have recruited a new Chief Inspector/Safety Officer who is a Chartered Engineer, who has been interviewed and approved by the CAA and who will start work on the 3rd of January 2006 to begin a handover from our current Chief Inspector/Safety Officer who is to retire at the end of January. The new Chief Inspector/Safety Officer is already aware of our intentions in this area.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-089

It is recommended that the British Microlight Aircraft Association review and regularly update their document entitled 'Guidelines for the Inspection and Maintenance of Microlight Aircraft'.

Response

The BMAA intends to review and update the document entitled "Guidelines for the Inspection and Maintenance of Microlight Aircraft" and make it available via our website in the first half of 2006. This task will be a high priority for our new Chief Inspector.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-090

It is recommended that Mainair Sports Ltd takes action to ensure that the limitation placard on the Pegasus Quik is protected, or relocated, so that the data remains clearly visible to the pilot.

Status - Response Awaited - open

Pterodactyl Ptraveller	**Prospect Farm, Wollaston, Northants**	**11-Dec-2004**	**Accident**

AAIB Bulletin: 9/2005
FACTOR: F33/2005

Synopsis

During a Check Flight for revalidation of a Permit to Fly the aircraft entered a left turn at about 150 ft agl, the angle of bank increased and the nose pitched down; the aircraft then impacted the ground. The manner in which the flight was conducted had caused concern to witnesses before the accident. Investigations revealed that the pilot had made claims of experience to the British Microlight Aircraft Association (BMAA) in order to obtain ongoing qualification as a Check Pilot, that were not substantiated by evidence in his log book.

SAFETY RECOMMENDATION - 2005-067

It is recommended that the Civil Aviation Authority should conduct a thorough review of the manner in which Permit to Fly renewals are carried out by the British Microlight Aircraft Association, to ensure that persons involved in Check Flying are appropriately experienced and qualified, and receive relevant training and guidance.

Response

The CAA conducted a thorough review of the manner in which Permit to Fly renewals are carried out by th British Microlight Aircraft Association, to ensure that persons involved in Check Flying are appropriately experienced and qualified, and receive relevant training and guidance. During the CAA audit of the BMAA in May 2005 the procedures covering check pilots were reviewed. Various changes were agreed, including the Technical Information Leaflet 041 Procedure for checking a new check pilot. The BMAA Flight Test Procedures Manual (Technical Procedures Manual Appendix 14) was also amended and agreed. This covers the management and role of BMAA staff, and guidance for the control of Flight Test crew.

Status - Accepted - closed

Rans S6-ES	Weston Park near Shifnal, Shropshire	28-Mar-2005	Accident

AAIB Bulletin: 4/2006
FACTOR: F17/2006

Synopsis

During a go-around, the aircraft stalled and crashed into two parked motor caravans, seriously injuring the owner of one of them. Investigations revealed that the pilot, who had qualified and trained on flex-wing aircraft, had not received adequate training to fly a three-axis aircraft, and was not in current flying practice. The approach had been flown towards rising ground and an illusory visual horizon was a contributory factor. The aircraft was overweight at the time of the accident and its elevators were incorrectly rigged. Pilot training requirements did not differentiate between control system types and so safety recommendations were made to address this aspect.

SAFETY RECOMMENDATION - 2005-128

The Civil Aviation Authority should require holders of the Private Pilots Licence (Aeroplane) (Microlights) converting from weight shift to three-axis control systems, or the reverse, to undertake adequate conversion training and pass a Flight Test conducted by an appropriately qualified microlight pilot examiner.

Response

The CAA accepts this recommendation and proposes that the requirements at Schedule 8 Part A Section 3 (7)(b) in respect of differences training between 3-axis and weight shift Microlights be moved to Schedule 8 Part B -Microlight Class Rating, and be revised to incorporate a skill test with an authorised Microlight Flying Examiner as part of differences training. This will require consultation with industry, regulatory impact assessment and an amendment to the Air Navigation Order. A date for possible implementation is likely to be end of 2007.

Status - Accepted - open

SAFETY RECOMMENDATION - 2005-129

The Civil Aviation Authority should mandate the arrangements for grant of National Private Pilots Licence (Microlights) qualifications which are presently published in the British Microlight Aircraft Association's Instructor and Examiner Guide and incorporate them into LASORS.

Response

The CAA accepts this recommendation insofar as it may implement the recommendation itself, or delegate action to the BMAA and NPLG. A decision on which method will be employed will be made by end August 2006, at which time an implementation date will also be estimated.

Status - Accepted - open

SAFETY RECOMMENDATION - 2005-130

The Civil Aviation Authority should mandate that, where holders of an NPPL(M) are required to undertake Control System Differences Training in accordance with the Air Navigation Order 2005, they should also be required to demonstrate an adequate level of flying skill on an aircraft possessing the previously unfamiliar control system before flying unsupervised in an aircraft with such a control system.

Response

The CAA accepts this recommendation. The changes proposed in response to AAIB Safety Recommendation 2005-128 will also serve to satisfy this recommendation.

Status - Accepted - open

Section 5

Rotorcraft 5,700kg MTWA and above

Sikorsky S61N	**Near Sullom Voe, Shetland**	**15-Sep-2004**	**Accident**

AAIB Bulletin: 5/2005
FACTOR: F24/2005

Synopsis

During a winching operation, the rotors of G-BDOC struck the top of a mast on the deck of the receiving ship. The helicopter recovered safely to Scatsta Aerodrome. The investigation revealed some misunderstandings between the helicopter operator and the maritime operator about the winching deck markings on the ship. Accordingly, recommendations have been made to the CAA and to The International Chamber of Shipping (ICS) to ensure that aircraft and ship crews are aware of the information required before undertaking winching operations. Shortly after the accident, the helicopter operator instituted revised rules to clarify the information required before any winching operation.

SAFETY RECOMMENDATION - 2005-027

The Civil Aviation Authority should establish clear guidance for companies operating both Search and Rescue (SAR) tasks and Commercial Air Transport (CAT) tasks to ensure that current and future operators have clear regulations for crews involved in both types of task during one period of duty.

Response

The current published guidance to operators covering Commercial Air Transport (CAT) winching operations to ships has been reviewed and the CAA is satisfied that it is clear. To conduct winching operations (not just to ships), AOC Holders require an Exemption from certain Rules of the Air. The wording of the current Exemption to permit winching operations, will be revised to amplify the CAP 437 guidelines that must be applied to CAT winching operations. In addition, the sole operator currently conducting both Search and Rescue (SAR) and Commercial Air Transport tasks will be reminded by letter before 31 May 2005, of the need to provide clear guidance to crews, to ensure that no confusion exists between the requirements and regulations applicable to CAT operations and those applicable to SAR operations. Any further operator wishing to conduct both types of operation will have to submit an operations manual to the CAA. At that time the CAA will ensure that the guidance for both types of operation is appropriate and that it clearly differentiates between SAR and CAT operations.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-028

The International Chamber of Shipping should review the current 'Guide to Helicopter/ Ship Operations' to ensure that it is accurate and includes information on all current helicopters.

Response

ICS has already commenced a complete review of the Guide to Helicopter/Ship Operations with the aim of publishing a new edition in due course. Advice on current helicopter types involved in maritime work will be widely sought.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-029

The International Chamber of Shipping should encourage the practice of holding a current copy of the 'Guide to Helicopter/ Ship Operations' by all ships that may be involved in helicopter operations.

Response

ICS will advertise the publication of the revised Guide throughout the international shipping community and urge that ships should hold a copy if helicopter operations may be undertaken. This action will not be undertaken until the revised Guide is produced.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-030

The International Chamber of Shipping should review the deck markings on ships involved in winching operations with the aim of including a requirement to clearly display the dimensions of the 'manoeuvring zone', such that it can be clearly seen by the helicopter crew.

Response

Care will be taken to ensure that deck markings recommended in the book are in compliance with markings endorsed by other aviation authorities. It should be recalled however that ICS is not a legislative body and that therefore only recommendations can be made.

Status - Accepted - closed

Section 6

Rotorcraft above 2,250kg and below 5,700kg MTWA

Agusta A109E	**1 mile east of Bournemouth (Hurn) Airport, Dorset**	**03-Mar-2004**	**Accident**

AAIB Bulletin: 6/2005
FACTOR: F28/2005

Synopsis

The pilot was flying a visual approach to Bournemouth Airport in poor weather at night; radar data indicated that the aircraft was tracking the extended centreline of Runway 26 at between 800 to 1,000 feet amsl. The pilot declared that he was visual with the airport but, shortly afterwards, the radar data indicated that the aircraft had entered a turn to the left. The aircraft turned through about 540 before striking the ground, fatally injuring both the pilot and the passenger. The pilot had probably became disorientated, and his limited instrument flying background did not equip him to cope with degraded visual environment. There was no evidence of any mechanical failure or unauthorised interference with the aircraft or its systems that may have contributed to the accident.

SAFETY RECOMMENDATION - 2005-055

The Civil Aviation Authority should review the Rules of the Air and relevant regulations in their applicability to helicopters and should consider imposing minimum in-flight visibility requirements for day and night. These minima should afford an effective safety margin to prevent inadvertent flight in instrument meteorological condition or loss of adequate external visual references. The requirement for a clearly defined horizon, particularly over water or featureless terrain should also be considered.

Response

In July 2000 the CAA commissioned research into the nature of the visual cue environments necessary for helicopter pilots to conduct flights safely by visual reference. The results of this research are intended to assist in formulating guidance material to underpin the revised regulatory proposals that will be made in this area. In this context the CAA is considering precisely how to define the adequacy of visual cues required to obviate the hazards associated with flight, for example over water or unlit onshore areas at night. The CAA will also amend Article 49 of the Air Navigation Order 2005 to provide that a flight must not be continued unless the weather at the destination, or an alternate, is likely to be suitable for making an approach and landing. This latter amendment is expected to enter into force early in 2006.

Status - Accepted - closed

Section 7

Rotorcraft 2,250kg MTWA and below

Robinson R44 Raven	**Carlenrig, Teviothead, near Hawick Scotland**	**30-Jul-2003**	**Accident**

AAIB Bulletin: 5/2005
FACTOR: F22/2005

Synopsis

The helicopter departed on a VFR flight from a private site near Hawick in Scotland to route to Barton Airfield in Manchester. Initially it flew southwards at 1,500 feet amsl but as it approached hills, whose tops were reportedly covered by an area of low cloud, it turned away from the planned route and probably entered cloud. As the turn continued the helicopter accelerated, entered a rapid descent and the main rotor blades struck the tailboom. Most of the tailboom detached, the rotors virtually stopped and the helicopter impacted the ground at the bottom of a valley, fatally injuring the pilot.

A number of military aircraft were operating in the area at the time of the accident but none of these could have influenced the safe progress of the flight. No signs of pre-accident malfunction of the helicopter were found, but full determination of its pre-impact serviceability was prevented by extensive post-crash fire damage. The available evidence indicated that the accident followed a main rotor blade strike on the tailboom, probably as the result of excessively low rotor rpm. The control loss and low rotor RPM may have resulted from spatial disorientation and mishandling of the controls but the possibility that aircraft malfunction had contributed to the accident could not be eliminated.

Two safety recommendations have been made; one relating to safety notices to be included in the Pilot's Operating Handbook and one concerning the re-assessment of 'corrective action time delay' after sudden power loss on a single engined helicopter.

SAFETY RECOMMENDATION - 2005-021

It is recommended that the Robinson Helicopter Company consider including in the R44 and R22 Pilot's Operating Handbooks, a specific warning highlighting the possibility of a rapid and excessive collective pitch demand causing a hazardous loss of rotor RPM, together with guidance on the appropriate handling of the collective lever.

Response

Robinson Helicopter Company (RHC) has reviewed the draft copy of AAIB Bulletin No: 5/2005 and the accompanying safety recommendations. The bulletin exhibits AAIBs typical professionalism and thoroughness. RHC concurs with all technical aspects of the bulletin.

RHC also agrees that it is important for all helicopter pilots to understand the effects of excessive collective pitch on rotor RPM. However, we believe that this is more appropriately addressed in training material than the flight manual. Revisions to pilot certification standards and training material as a result of low rotor RPM accidents have already taken significant steps in this direction. RHC therefore suggests that Safety Recommendation Number 2005-021 be expanded to address pilot certification requirements and/or training material for all helicopters (particularly small helicopters with low-inertia rotor systems) rather than specifically addressing R22 and R44 flight manuals.

Based on the details provided in Bulletin No: 5/2005, loss of outside visual references leading to disorientation most likely initiated the accident chain in the case of G-OUEL. RHC safety data indicates that disorientation is a leading cause of fatal accidents in the R22 and R44. RHC recommends that the dangers associated with loss of outside visual references be emphasized at every opportunity during pilot training and certification. Loss of visibility is addressed in our Safety Notice SN-18 in the flight manual.

FAA Response

We believe the existing material provided in the Rotorcarft Flight Manual (RFM) adequately describes the proper handling of the R22 and R44 to avoid a hazardous low rotor RPM. Section 4 of RFM provides a discussion on main rotor stall conditions and flight manoeuvres that can result in low rotor RPM. Also, Section 10 of the RFM includes Safety Tips and Safety Notices that specifically address the appropriate use of the flight controls for low rotor RPM:

Safety Tip 6. Avoid abrupt control inputs or accelerated manoeuvres, particularly at high speed. These produce high fatigue loads in the dynamic parts and could cause a premature and catastrophic failure of a critical component.

Safety Tip 9. Never allow your rotor RPM to become dangerously low. Most hard landings will be survivable as long as the rotor keeps turning and is not allowed to stall.

Safety Notice SN-10, Fatal Accidents Caused by Low RPM Rotor Stall.

Safety Notice SN-18, Loss of Visibility Can be Fatal.

Safety Notice SN-24, Low RPM Rotor Stall Can be Fatal.

Both SN-10 and SN-24 highlight the fact that excessively low rotor speed can cause the main rotor blades to "blow back" and strike or cut off the tail cone.

Status - Partially Accepted - open

SAFETY RECOMMENDATION - 2005-022

It is recommended that the Federal Aviation Administration (FAA) and the European Aviation Safety Agency (EASA) reasses the 'corrective action time delay' in reducing the collective control after sudden power loss on a single-engined helicopter, with the aim of ensuring, as far as possible, that the minimum reaction time required is realistically within the capability of an average qualified pilot.

Response

EASA Response

In a reply dated 21 July 2005, EASA 'Partially Accepted' the recommendation stating that the proposal will be considered in the Agency's future Rulemaking Programme for Certification Specification CS-27. The Agency will produce a Notice of Proposed Amendment (NPA) to certification Specifications CS-VLR within the Rulemaking Programme for 2005-2006.

FAA Reponse

We have determined the existing certification rules on minimum reaction times following a sudden power loss are appropriate. Under 14 CFR 27, a rotorcraft's flight characteristics must allow for transition from one flight condition to another without requiring exceptional skill, alertness, or strength. Further, 27.141(b)(2) and 27.143(d) specifically require evaluating the rotorcraft for "sudden, complete power failure" at conditions that include maximum continuous power and critical weight and using a "one-second delay time or normal pilot reaction time (whichever is greater)." This reaction time has been explicitly stated since 27 was codified. It provides a way of consistently evaluating a variety of rotorcraft having basic design differences (such as different rotor inertias, engine-airframe characteristics, and flying qualities). Reducing pilot reaction time to less than one

second would be inappropriate, as the rotorcraft flying qualities would likely be compromised (especially for autorotation and height-velocity) for an average qualified pilot.

Additionally, normal category rotorcraft are required to have both a main rotor tachometer (27.1305(h)(1)) and main rotor low speed warning (27.33(e)). These requirements are designed to ensure the pilot's reaction time is minimised during an engine failure. Thus, it is unnecessary to redefine existing pilot reaction time required under 27.143(d).

Status - Partially Accepted - open

Eurocopter EC 120B	Swansea Airport	07-Nov-2003	Accident

AAIB Bulletin: 6/2005
FACTOR: F25/2005

Synopsis

The helicopter was stationary in the hover over the apron area at Swansea Airport when it unexpectedly yawed left and pitched nose down. The surface wind was a gusting crosswind, varying in direction, from the right and slightly behind the helicopter at 15 to 20 kt. The pilot attempted to recover but the cyclic control reached its aft limit of travel and he was unable prevent the forward fuselage and front of the right skid contacting the paved surface, followed by the main rotor blades. The helicopter rolled over and slid along the ground for some distance before coming to rest against a vehicle. All persons on board escaped uninjured. The helicopter was found to have been loaded marginally beyond the forward limit of the longitudinal Centre of Gravity (CG) envelope.

SAFETY RECOMMENDATION - 2005-033

It is recommended that Eurocopter highlight the circumstances of this accident to EC 120 operators, with a view to emphasising the importance of correct loading and the possible adverse effects a gusting tail wind can have on a hovering helicopter with a centre of gravity (CG) close to or on the forward CG limit.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-034

It is recommended that Eurocopter include information, in the EC 120 Approved Flight manual (AFM), concerning the locus of the cyclic control and the possibility that restriction in its movement, brought about by the morphology of either of the front seat occupants, may not be apparent prior to flight, when dual controls are fitted, because a pre-flight 'full and free' control check by the pilot is not routinely performed.

Status - Response Awaited - open

AS355F1	Near Lasham Airfield, Hampshire	19-Jul-2004	Incident

AAIB Bulletin: 10/2005
FACTOR: F36/2005

Synopsis

The pilot had flown passengers from Lasham to the Farnborough Airshow and was returning to Lasham empty. Whilst approaching Lasham in the cruise at 1,500 ft amsl and 120 kt IAS, a thump was heard from an indeterminate source. On checking the engine instruments, the pilot noticed that the No 2 engine was indicating ground idle rpm. He shut down the engine and performed an uneventful single engine landing at Lasham. The pilot recalled that whilst on the ground at Farnborough he had felt an unusual high frequency vibration that he could not trace.

SAFETY RECOMMENDATION - 2005-081

It is recommended that Eurocopter review the design, or maintenance procedures adopted for the installation, of 'flector' couplings to ensure that the potential for fretting of the split-pin/nut/bolt assembly is eliminated.

Status - Response Awaited - open

Gazelle HT.Mk2	On approach to Sheffield City Airport	04-Nov-2004	Incident

AAIB Bulletin: 8/2005
FACTOR: F30/2005

Synopsis

Following a loud bang and a jolt during his approach, the pilot determined that the engine and rotor systems were operating within limits and so he landed normally. After landing the right engine cowling was missing and there were small marks on the main rotor blades. Two fractured portions of the missing cowling were later found.

Each cowling panel has two hinges at the top, a lower latch and part of a single latch which secures the forward edge of both panels. It appears that at least one of the top spigot fittings had failed through cracking from previous overloads and the aft lower latch had probably not been fully secure. Tests showed that this aft lower latch can appear latched when it is not actually engaged.

SAFETY RECOMMENDATION - 2005-049

The UK Civil Aviation Authority should review the periodic inspection of the spigot fittings on the engine cowlings of SA341-type Gazelle helicopters operated on CAA Permits-to-Fly, to reduce the number of cracked fittings in service.

Response

The CAA has reviewed the periodic inspection of the spigot fittings on the engine cowlings of SA341-type helicopters operated on CAA Permits-to-Fly. In addition, the CAA has reviewed previous incidents involving UK aircraft where latching of cowls has been implicated. As a result of these reviews the CAA has issued a Mandatory Permit Directive (MPD2005-005) that requires a one-time inspection of the latches, lanyards and hinge spigots. Owners/operators are required to

report findings to the CAA. An assessment of these findings will allow the CAA to determine what further action if any is necessary.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2005-050

The European Aviation Safety Agency should review the periodic inspection of the spigot fittings on the engine cowlings of SA341-type Gazelle helicopters operated on Certificates of Airworthiness, to reduce the number of cracked fittings in service.

Response

The design of the spigot fittings and engine cowling panels are similar to that used on civil Eurocopter SA 341 G and SA 342 J helicopters.

Eurocopter and DGAC France have reviewed SA 341 G and SA 342 J maintenance instructions relating to the spigot fittings and latching of the engine cowlings and concluded that the current maintenance instructions are acceptable. In addition to the maintenance instructions Eurocopter will issue a Service Letter to operators of the SA 341 G and SA 342 J to raise awareness of this issue.

The Agency agrees with DGAC France and Eurocopter that the existing maintenance instructions adequately control the risk to the civil SA 341 G and SA 342 J fleet.

Status - Accepted - closed

Enstrom F-28A-UK	**Corporation Lane, Coton Hill, Shrewsbury**	**15-Dec-2004**	**Accident**

AAIB Bulletin: 11/2005
FACTOR: F37/2005

Synopsis

The pilot was on the return leg of a solo flight from Manchester to Nottingham when the engine suddenly cut out. He entered autorotation but the aircraft sustained extensive damage in the ensuing forced landing. On inspection it was found that the aircraft had run out of fuel. Investigation revealed that there was no appropriate data on fuel consumption rates in the helicopter's Flight Manual although some information existed in the Lycoming engine manual. The pilot did not posess a copy of the engine manual and had incorrectly based his fuel planning on the consumption rate witnessed on the aircraft's fuel flow gauge during previous flights.

SAFETY RECOMMENDATION - 2005-059

The Federal Aviation Administration of the USA should instruct the Enstrom Helicopter Corporation to include useful information on fuel consumption rates in all their Rotorcraft Flight Manuals.

Response

The FAA has evaluated AAIB Safety Recommendation 2005-059, and has determined that no action will be taken to change the small rotorcraft certification requirements to include flow consumption rates in the Enstrom Rotorcraft Flight Manual (RFM). The FAA develops the certification requirements to produce a safe product assuming that operators will follow the operational regulations of the country and the manufacturer's recommendations. Under 14 CFR 91.151, the regulation states: "No person may begin a flight in a rotorcraft under VFR conditions

unless (considering wind and forecast weather conditions) there is enough fuel to fly the first point of intended landing and, assuming normal cruising speed, to fly after that for at least 20 minutes." Similar requirements exist for operations in the United Kingdom. The incident discussed in the recommendation provides an example of fuel "mismanagement." The pilot was in violation of operational regulations; therefore, there is no justification to change certification requirements.

The Enstrom Model F-28A was originally certificated in the United States on May 28, 1968, under Civil Air Regulations (CAR) Part 6, as amended by 6-1 through 6-5. Under CAR 6.429, "the fuel quantity indicator shall be installed to indicate clearly to the flight crew the quantity of fuel in each tank while in flight." Also, CAR 6.613(b) requires that the "fuel quantity indicator be calibrated to read zero during level flight when the quantity of fuel remaining in the tank is equal to the unusuable fuel supply." Enstrom recommends calibrating the fuel quantity indicator during the annual inspection. When maintained accordingly, the fuel indicator should provide an accurate indication for determination of fuel during flight.

The CAR did not require fuel flow indicators for rotorcraft, nor "re-codified" Federal Aviation Regulations parts 27 and 29 for normal and transport rotorcarft, respectively. Fuel flow information is useful for airplanes (where the percentage of flight time in cruise is high). However, helicopter operations are typically shorter in duration and include a higher percentage of in-flight modes where fuel flow information is more difficult to define (such as low-speed maneuvering, takeoff, and landing). Since the type of operations and variety of flight techniques affect the rate of fuel consumption, we do not require cruise information in RFMs. Some manufacturers provide cruise performance information, including fuel flow in the RFM. However, since we do not require this data, the manufacturer will include this information in the RFM as "Not FAA Approved" data.

Status - Rejected - closed

Ken Brock KB-2	**Sutton Bank Gliding Club, Thirsk, North Yorkshire**	**15-Dec-2004**	**Accident**

AAIB Bulletin: 9/2005
FACTOR: F34/2005

Synopsis

Shortly after take-off from a grass strip at Sutton Bank Airfield, the gyroplane developed a nose low attitude and descended over the edge of an escarpment. Its engine noise was heard to reduce and a 'crunch' noise was heard by witnesses as it began its descent. The wreckage of the gyroplane was discovered at the base of the escarpment where the pilot had been fatally injured.

SAFETY RECOMMENDATION - 2005-064

It is recommended that the Popular Flying Association (PFA) emphasise to all PFA Inspectors, and owners of Brock KB-2 and similar gyroplanes, the particular importance of checking the security of all seat attachments and fittings and, where looseness is found, that no cracking or deformation of the airframe or seat attachments is present.

Status - Response Awaited - open

Bell 206B Jetranger III - B	**Priors Park Wood, 5nm south of Taunton, Somerset**	**22-Jan-2005**	**Accident**

AAIB Bulletin: 1/2006
FACTOR: F8/2006

Synopsis

The pilot had planned to fly with some friends from Staverton Airport, near Gloucester, to a private landing site in the Torbay area but, due to deteriorating weather, landed at Topsham to the south of Exeter Airport. After a period of several hours, the weather had not improved so the pilot decided to return to Staverton. Although on the outbound trip he had routed south via the Bristol Channel and the M5 corridor, an area of low lying terrain, he elected to return to Staverton via Sidmouth, and communicated this to Exeter ATC, advising them that he would be flying at an altitude of 900 ft. As he approached Sidmouth, he then informed Exeter that he was going to go north towards Wellington and Taunton. This route would take the helicopter over the Blackdown Hills, which rise to a height of some 1,000 ft amsl. Witnesses in an area approximately 5nm south of Taunton generally heard, but did not clearly see, a low flying helicopter and one heard a 'bang'. A subsequent search and rescue effort failed to locate the helicopter, due to very poor weather conditions, and it was found by a dog walker the following morning. All four occupants had received fatal injuries in the accident. No pre-accident defects were found during the wreckage examination.

SAFETY RECOMMENDATION - 2005-100

The European Aviation Safety Agency should promote research into the design and development of inexpensive, lightweight, airborne flight data and voice recording equipment.

Response

The Agency notes that Safety Recommendations 2005-100 and 2005-101 are addressed to the EASA.

A copy of which has been directed to the Agency's technical specialists.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2005-101

The European Aviation Safety Agency should promote the safety benefits of fitting, as a minimum, cockpit voice recording equipment to all aircraft operated for the purpose of commercial air transport, regardless of weight or age.

Response

The Agency notes that Safety Recommendations 2005-100 and 2005-101 are addressed to the EASA. A copy of which has been directed to the Agency's technical specialists.

Status - Response Awaited - open

Section 8

Others

Sports Vega Glider - T65D	**Wormingford Airfield, Colchester**	**23-Jun-2002**	**Accident**

AAIB Bulletin: 7/2004
FACTOR: F38/2004

Synopsis

This accident was the subject of an investigation conducted on behalf of the AAIB by the British Gliding Association (BGA). Further investigation, concerning the apparent failure of the pilot's restraint harness, was undertaken by the AAIB.

A practice 'competition finish' was being attempted when the glider descended below tree top level but failed to climb again due to insufficient energy. The aircraft crashed through the upper branches of the trees and came to rest in a field. The pilot was released from his harness during the impacts. He sustained serious injuries and the aircraft was damaged beyond economic repair.

SAFETY RECOMMENDATION - 2004-046

The British Gliding Association should review the document 'Maintenance of seat harnesses and belts' so as to reflect best industry practice and to provide clearer guidance for airworthiness inspection.

Response

Following receipt of the recommendation, the BGA Executive Board (who consider all AAIB recommendations made to the BGA) accepted the AAIB view and directed the BGA Technical Committee to address the recommendation. The output that resulted from the work associated with that directive was an amendment to the BGA Airworthiness and Maintenance Procedures Part 4 Leaflet 4-8.

Status - Accepted - closed

Schempp-Hirth Ventus cT	**Approximately 1.4 nm west of Lasham Airfield**	**26-Apr-2004**	**Accident**

AAIB Bulletin: 5/2005
FACTOR: F23/2005

Synopsis

The Ventus and Skylark gliders collided while gliding at approximately 4,000 feet agl a short distance west of Lasham Airfield. Both were severely damaged. Visibility was generally in excess of 5 km, but was variable and decreased with height. The investigation concluded that the gliders had approached each other about 28 degrees off head-on, probably while both were flying straight and level. Following the collision, the pilot of the Skylark parachuted to the ground with no injuries.

The pilot of the Ventus was injured in the collision and was still in his aircraft when the main wreckage impacted the ground.

Safety recommendations have been made regarding international co-operation and action to improve the conspicuity of gliders and light aircraft, a study to assess means of improving light aircraft conspicuity, the adoption of measures likely to be cost-effective and operational advice to glider pilots concerning flight in IMC or marginal VMC conditions.

SAFETY RECOMMENDATION - 2005-006

It is recommended that the Civil Aviation Authority should initiate further studies into ways of improving the conspicuity of gliders and light aircraft, to include visual and electronic surveillance means, and require the adoption of measures that are likely to be cost-effective in improving conspicuity.

Response

The CAA does not accept this Recommendation. However, the CAA reviewed its ongoing work on the use of visual and electronic measures to enhance the conspicuity of General Aviation aircraft, particularly in the light of impending wider transponder carriage. Since the review, the CAA has taken action in relation to contrasting colour and reflective surfaces. Two further recommendations concerning the "see and avoid" principle and GA carriage of transponders and electronic awareness systems will be included in the CAA's GA safety promotion activities.

In respect of gliders the CAA has no regulatory powers to require the adoption of any recommended measures. The CAA will forward details of any recommended measures to the British Gliding Association (BGA) and the European Aviation Safety Agency (EASA) for their information.

Status - Rejected

SAFETY RECOMMENDATION - 2005-008

It is recommended that the Civil Aviation Authority should promote international co-operation and action to improve the conspicuity of gliders and light aircraft through visual and electronic methods.

Response

The CAA does not accept this Recommendation insofar as it is directed to light aircraft. The promotion of international co-operation and action to improve the conspicuity of light aircraft through visual and electronic measures will depend upon the outcome of the review noted in Recommendation 2005-06. The CAA cannot accept the Recommendation in respect of gliders since it has no regulatory powers to require adoption of recommended measures. Details of recommended measures will be forwarded to the British Gliding Association (BGA) and the European Aviation Safety Agency (EASA) for their information and use for any international promotion that these agencies might believe appropriate.

Status - Rejected - closed

SAFETY RECOMMENDATION - 2005-046

The British Gliding Association should review its operational advice to and training for glider pilots with respect to flying in IMC and marginal VMC conditions.

Status - Response Awaited - open

Glider - K13	Booker, Wycombe Air Park	06-Aug-2004	Accident

AAIB Bulletin: 8/2005
FACTOR: F31/2005

Synopsis

The accident occurred during a 'trial lesson'. The glider was a tandem seat aircraft and the instructor gave a standard brief to his passenger, which included procedures for handing over control and when the student would be invited to take over control. The importance of the student staying away from the controls at other times was emphasised. The student had a camera with him which he placed on the floor between his feet.

The launch was conducted using a tug aircraft and the takeoff proceeded normally. Soon after the glider became airborne the instructor noticed that he was unable to move the control column forward. The student confirmed that he was not touching the controls. The glider continued to climb at an increasingly steep angle. As the tug pilot noticed the increasing force on the tow he released the tow.

The glider was seen to rise steeply to about 100 feet and enter a descending turn to the left. The instructor managed to level the wings and as the glider pitched up again it struck the ground, bounced and became airborne and then finally struck the ground in an almost vertical attitude left wing first. Both occupants were seriously injured.

SAFETY RECOMMENDATION - 2005-077

It is recommended that the British Gliding Association reinforce the message that there must be no loose articles in aircraft when they are being flown.

Status - Response Awaited - open

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Section 2	Aeroplanes above 2,250kg and below 5,700kg MTWA			
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Cessna T310R	Hotham, South Cave, Humberside	13-Mar-2004	Accident	45
Cessna T310R	Wycoller Country Park Trawden Nr Colne, Lancs	30-Mar-2004	Accident	45
BN2A Mk.III-2 Trislander	Guernsey	23-Jul-2004	Accident	46
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Section 3	Aeroplanes 2,250kg MTWA and below			
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Denney Kitfox Mk4	Gumley Road, Smeeton Westerby, Leicestershire	13-Jun-2003	Accident	52
Stampe SV4C-(G)C	Quarry at Redhill, Surrey	26-Jul-2003	Incident	54
Piper PA-28-161	Wellesbourne Runway 18	28-Oct-2003	Accident	54
Cessna F177RG	Meppershall Airfield, Shefford, Bedfordshire	09-Feb-2004	Accident	55
Avid Speedwing (Modified)	Caernarfon	28-Mar-2004	Accident	56
Cessna U206F	Beacon Village, near Honiton, Devon	27-Jun-2004	Accident	57
Diamond DA40D	Field near Old Stratford, Northamptonshire	29-Jun-2004	Accident	60
Grob G115E	4.5 nm Southwest of Salisbury, Wiltshire	29-Jun-2004	Accident	60
Pulsar	Taynuilt Argyle & Bute, Scotland NN033289	25-Jul-2004	Accident	61
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2005-146	Slingsby T67C Firefly	Near Pottersbury, 6 miles NW of Milton Keynes	25-May2005	41
2005-145	Pierre Robin HR100/200B	Blackbushe Airport	29-May2005	62
2005-143	HS748	East Midlands Airport	28-Jan-2005	34
2005-142	HS748	East Midlands Airport	28-Jan-2005	33
2005-141	HS748	East Midlands Airport	28-Jan-2005	33
2005-140	HS748	East Midlands Airport	28-Jan-2005	33
2005-139	Dornier 328-100	London City Airport	20-Feb-2005	36
2005-138	Beech76 Duchess	Adjacent to Belfast City Airport	10-Apr-2005	41
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2005-135	Avro 146 RJ100	Approach to Paris	18-Mar-2005	39
2005-134	Boeing 757-200	Manchester Airport	11-Jun-2005	42
2005-133	Boeing 757-200	Manchester Airport	11-Jun-2005	42
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2005-129	Rans S6-ES	Weston Park near Shifnal, Shropshire	28-Mar-2005	69
2005-128	Rans S6-ES	Weston Park near Shifnal, Shropshire	28-Mar-2005	69
2005-126	Boeing 767-204 / Boeing 737-37Q	Taxiway V/S, Manchester Airport	04-Nov-2004	30
2005-125	Boeing 767-204 / Boeing 737-37Q	Taxiway V/S, Manchester Airport	04-Nov-2004	30
2005-124	Boeing 767-204 / Boeing 737-37Q	Taxiway V/S, Manchester Airport	04-Nov-2004	30
2005-123	Boeing 757-236	Enroute from Heathrow	07-Sep-2003	17
2005-122	Boeing 757-236	Enroute from Heathrow	07-Sep-2003	16
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2005-119	Boeing 757-236	Enroute from Heathrow	07-Sep-2003	14
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2005-109	Airbus A340-642	Enroute to London, Diverted into Amsterdam	08-Feb-2005	35
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2005-101	Bell 206B	Priors Park Wood, 5nm south of Taunton, Somerset	22-Jan-2005	80
2005-100	Bell 206B	Priors Park Wood, 5nm south of Taunton, Somerset	22-Jan-2005	80
2005-099	Boeing 757-3CQ	Manchester Airport	23-Nov-2004	32
2005-098	Boeing 757-3CQ	Manchester Airport	23-Nov-2004	31
2005-097	Boeing 777-200	Manchester	01-Mar-2005	38
2005-096	Embraer 145-EP	On approach to Manchester	25-Sep-2001	3
2005-095	Embraer 145-EP	On approach to Manchester	25-Sep-2001	3
2005-094	Embraer 145-EP	On approach to Manchester	25-Sep-2001	3
2005-093	Boeing 777-200	Manchester	01-Mar-2005	38
2005-092	Boeing 777-200	Manchester	01-Mar-2005	37
2005-090	Pegasus Quik	Eastchurch, Isle of Sheppey, Kent	21-Aug-2004	68
2005-089	Pegasus Quik	Eastchurch, Isle of Sheppey, Kent	21-Aug-2004	68
2005-088	Pegasus Quik	Eastchurch, Isle of Sheppey, Kent	21-Aug-2004	67
2005-087	Pegasus Quik	Eastchurch, Isle of Sheppey, Kent	21-Aug-2004	67
2005-086	Pegasus Quik	Eastchurch, Isle of Sheppey, Kent	21-Aug-2004	66
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2005-084	Pegasus Quik	Eastchurch, Isle of Sheppey, Kent	21-Aug-2004	66
2005-083	Pegasus Quik	Eastchurch, Isle of Sheppey, Kent	21-Aug-2004	66
2005-082	Pegasus Quik	Eastchurch, Isle of Sheppey, Kent	21-Aug-2004	66
2005-081	Aerospatiale AS355F1 Ecureuil II	Near Lasham Airfield, Hampshire	19-Jul-2004	77
2005-080	Embraer 145-EP	Charles de Gaulle	20-Feb-2005	37
2005-079	BN2A Mk.111-2 Trislander	Guernsey	23-Jul-2004	47
2005-078	BN2A Mk.111-2 Trislander	Guernsey	23-Jul-2004	46

2005-077	ASK13	Booker, Wycombe Air Park	06-Aug-2004	83
2005-075	Airbus A320-214	Gatwick	15-Jan-2005	32
2005-074	Airbus A320-214	Gatwick	15-Jan-2005	32
2005-073	Airbus A320-214	Gatwick	15-Jan-2005	32
2005-072	Airbus A320-214	Gatwick	15-Jan-2005	32
2005-071	Boeing 747-132	Airborne near the Compton VOR beacon.	24-Apr-2004	27
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2005-069	Boeing 747-132	Airborne near the Compton VOR beacon.	24-Apr-2004	26
2005-067	Pterodactyl Ptraveller	Prospect Farm, Wollaston, Northants	11-Dec-2004	68
2005-066	Cessna 310R	Wycoller Country Park Trawden Nr Colne, Lancs	30-Mar-2004	45
2005-065	Boeing 737-33V	Lyons Airport, France	22-Mar-2005	40
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2005-061	Cessna U206F	Beacon Village, near Honiton, Devon	27-Jun-2004	59
2005-060	Cessna U206F	Beacon Village, near Honiton, Devon	27-Jun-2004	59
2005-059	Enstrom F28A-UK	Corporation Lane, Coton Hill, Shrewsbury	15-Dec-2004	78
2005-056	Cessna F177RG	Meppershall Airfield, Shefford, Bedfordshire	09-Feb-2004	56
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2005-054	Boeing 777-222 / Airbus A340-313	Runway 27 Holding Area, Heathrow	14-Jul-2004	29
2005-053	Boeing 777-222 / Airbus A340-313	Runway 27 Holding Area, Heathrow	14-Jul-2004	28
2005-052	Boeing 777-222 / Airbus A340-313	Runway 27 Holding Area, Heathrow	14-Jul-2004	28
2005-051	Boeing 777-222 / Airbus A340-313	Runway 27 Holding Area, Heathrow	14-Jul-2004	27
2005-050	Gazelle HT MK2	On approach to Sheffield City Airport	04-Nov-2004	78
2005-049	Gazelle HT MK2	On approach to Sheffield City Airport	04-Nov-2004	77
2005-048	Diamond DA40D	Field near Old Stratford, Northamptonshire	29-Jun-2004	60
2005-047	Diamond DA40D	Field near Old Stratford, Northamptonshire	29-Jun-2004	60
2005-046	Ventus Turbo / Slingsby T50 Skylark 4	Approximately 1.4 nm west of Lasham Airfield	26-Apr-2004	82
2005-045	Cessna U206F	Beacon Village, near Honiton, Devon	27-Jun-2004	58
2005-044	Cessna U206F	Beacon Village, near Honiton, Devon	27-Jun-2004	58
2005-043	Cessna U206F	Beacon Village, near Honiton, Devon	27-Jun-2004	58

2005-042	Cessna U206F	Beacon Village, near Honiton, Devon	27-Jun-2004	58
2005-041	Cessna U206F	Beacon Village, near Honiton, Devon	27-Jun-2004	57
2005-040	Cessna U206F	Beacon Village, near Honiton, Devon	27-Jun-2004	57
2005-037	Airbus A340-642	Enroute to London, Diverted into Amsterdam	08-Feb-2005	35
2005-036	Airbus A340-642	Enroute to London, Diverted into Amsterdam	08-Feb-2005	34
2005-034	Eurocopter EC120B	Swansea Airport	07-Nov-2003	76
2005-033	Eurocopter EC120B	Swansea Airport	07-Nov-2003	76
2005-032	Cessna F177RG	Meppershall Airfield, Shefford, Bedfordshire	09-Feb-2004	56
2005-030	Sikorsky S61N	Near Sullom Voe, Shetland	15-Sep-2004	72
2005-029	Sikorsky S61N	Near Sullom Voe, Shetland	15-Sep-2004	72
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2005-026	Falcon 900EX	Standsted Airport	09-Feb-2004	21
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2005-024	Falcon 900EX	Standsted Airport	09-Feb-2004	21
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2005-020	Boeing 747-436	Stand 127L Heathrow	21-Apr-2004	25
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2005-018	Boeing 747-436	Stand 127L Heathrow	21-Apr-2004	24
2005-017	Boeing 747-436	Stand 127L Heathrow	21-Apr-2004	24
2005-016	Boeing 747-436	Stand 127L Heathrow	21-Apr-2004	24
2005-015	Boeing 747-436	Stand 127L Heathrow	21-Apr-2004	24
2005-014	Boeing 747-436	Stand 127L Heathrow	21-Apr-2004	23
2005-013	Boeing 737-700	London Heathrow Airport	04-Mar-2004	23
2005-012	Boeing 737-700	London Heathrow Airport	04-Mar-2004	23
2005-011	Boeing 737-700	London Heathrow Airport	04-Mar-2004	22
2005-010	Boeing 737-700	London Heathrow Airport	04-Mar-2004	22
2005-009	Boeing 737-700	London Heathrow Airport	04-Mar-2004	22
2005-008	Ventus Turbo / Slingsby T50 Skylark 4	Approximately 1.4 nm west of Lasham Airfield	26-Apr-2004	64/82
2005-006	Ventus Turbo / Slingsby T50 Skylark 4	Overhead Welham Green, Hertfordshire	26-Apr-2004	64/82

2005-005	Pulsar	Taynuilt Argyle & Bute, Scotland NN033289	25-Jul-2004	62
2005-004	DC8-63F	RAF Lyneham, Wiltshire	29-Apr-2003	6
2005-003	Grob G115E	4.5 nm SW of Salisbury, Wiltshire	29-Jun-2004	61
2005-002	Grob G115E	4.5 nm SW of Salisbury, Wiltshire	29-Jun-2004	61
2005-001	Cessna T310R	Hotham, South Cave, Humberside	13-Mar-2004	45
2004-094	L39 Albatros L39ZO	Near Duxford Airfield, Cambridgeshire	02-Aug-2003	44
2004-075	Stampe SV4C(G)	Quarry at Redhill, Surrey	26-Jul-2003	54
2004-071	Avid Speedwing (Modified)	Caernarfon	28-Mar-2004	57
2004-062	Airbus A320-232	Overhead Birmingham	29-Nov-2003	20
2004-061	Airbus A320-232	Overhead Birmingham	29-Nov-2003	19
2004-060	Airbus A320-232	Overhead Birmingham	29-Nov-2003	19
2004-059	Airbus A320-232	Overhead Birmingham	29-Nov-2003	19
2004-058	Airbus A320-200	Bristol Lulsgate Airport	16-Jun-2003	12
2004-048	Skyranger 912(1)	Barton Airfield, Manchester	08-Jul-2003	63
2004-046	Sports Vega Glider T65D	Wormingford Airfield, Colchester	23-Jun-2002	81
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2004-030	Embraer 145EU	Birmingham Airport	18-Nov-2003	18
2004-028	Embraer 145EU	Birmingham Airport	18-Nov-2003	17
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2004-017	Boeing 737-436	Near Clacton, Essex	08-Nov-2002	6
2004-016	Boeing 737-436	Near Clacton, Essex	08-Nov-2002	5
2004-015	Piper PA-28-161	Wellesbourne Mountford, Warwickshire	28-Oct-2003	55
2004-010	Denney Kitfox Mk4	Gumley Road, Smeeton Westerby, Leicestershire	13-Jun-2003	52
2004-009	Boeing 747-240B	Manchester International Airport	13-Jun-2002	4
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GLOSSARY OF ABBREVIATIONS

ACAS	Airborne Collision Avoidance System
ACARS	Automatic Communications And Reporting System
ADF	automatic direction finding equipment
AFIS(O)	Aerodrome Flight Information Service (Officer)
AFRS	Aerodrome Fire & Rescue Service
agl	above ground level
AIC	Aeronautical Information Circular
amsl	above mean sea level
AOM	aerodrome operating minima
APU	auxiliary power unit
ASI	airspeed indicator
ATC(C)(O)	Air Traffic Control (Centre)(Officer)
ATIS	Automatic Terminal Information System
BMAA	British Microlight Aircraft Association
BGA	British Gliding Association
BBAC	British Balloon and Airship Club
BHPA	British Hang Gliding & Paragliding Association
CAA	Civil Aviation Authority
CAVOK	Ceiling And Visibility OK (for VFR flight)
CAS	calibrated airspeed
CG	centre of gravity
cm	centimetres
cc	cubic centimetres
°C,F,M,T	Celsius, Fahrenheit, magnetic, true
DGAC	Direction Général à l'Aviation Civile
DME	distance measuring equipment
EAS	equivalent airspeed
EASA	European Aviation Safety Agency
EGPWS	Enhanced GPWS
EGT	exhaust gas temperature
EPR	Engine Pressure Ratio
ETA	estimated time of arrival
ETD	estimated time of departure
FAA	Federal Aviation Administration (USA)
FIR	flight information region
FL	flight level
ft	feet
ft/min	feet per minute
g	normal acceleration
GPS	Global Positioning System
GPWS	Ground Proximity Warning System
hrs	hours (clock time as in 12:00 hrs)
HP	high pressure
hPa	hectopascal (equivalent unit to mb)
IAS	indicated airspeed
IFR	Instrument Flight Rules
ILS	Instrument landing system
IMC	Instrument Meteorological Conditions
in	inch(es)
IP	intermediate pressure
IR	Instrument Rating
ISA	International Standard Atmosphere
kg	kilogram(s)
KCAS	knots calibrated airspeed
KIAS	knots indicated airspeed
KTAS	knots true airspeed
km	kilometre(s)
kt	knot(s)
KTAS	knots true airspeed
lb	pound(s)
LP	low pressure
LDA	landing distance available
LPC	licence proficiency check
ltr	litre(s)
m	metres
mb	millibar(s)
MDA	Minimum Descent Altitude
METAR	a timed aerodrome meteorological report
min(s)	minutes
mm	millimetre(s)
mph	miles per hour
MTWA	maximum total weight authorised
N	Newtons
N_R	Main rotor rotation speed (rotorcraft)
N_g	Gas generator rotation speed (rotorcraft)
N_1	engine fan or LP compressor speed
NDB	non-directional radio beacon
nm	nautical mile(s)
NOTAM	Notice to Airman
OPC	Operator proficiency check
PAPI	Precision Approach Path Indicator
PF	Pilot flying
PFA	Popular Flying Association
PIC	pilot in command
PNF	Pilot not flying
psi	pounds per square inch
QFE	pressure setting to indicate height above aerodrome
QNH	pressure setting to indicate elevation above mean sea level
RA	Resolution Advisory
rpm	revolutions per minute
RTF	radiotelephony
RVR	runway visual range
SAR	Search and rescue
SSR	secondary surveillance radar
TA	Traffic Alert
TAF	Terminal Aerodrome Forecast
TAS	true airspeed
TAWS	Terrain Awareness and Warning System
TCAS	Traffic Collision Avoidance System
TGT	turbine gas temperature
TODA	takeoff distance available
UHF	ultra high frequency
USG	US gallons
UTC	Co-ordinated Universal Time (the contemporary equivalent of GMT)
V_1	Takeoff decision speed
V_2	Takeoff safety speed
V_R	Rotation speed
V_{REF}	Reference airspeed (approach)
V_{NE}	never exceed airspeed
VASI	Visual Approach Slope Indicator
VFR	Visual Flight Rules
VHF	very high frequency
VMC	Visual Meteorological Conditions
VOR	VHF omni-range

Progress Report 2006

Department for Transport

Air Accidents Investigation Branch