
Progress Report **2010**

***Responses to Air Accidents Investigation Branch (AAIB)
Safety Recommendations***

***Responses received to AAIB recommendations made up to 31 December 2009,
presented to the Secretary of State for Transport***

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Published December 2010

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Foreword

The Air Accidents Investigation Branch is the 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 Overseas Territories and Crown Dependencies. 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 (SRG) is established to develop the UK's aviation safety environment, in partnership with industry, through continuous improvements in aviation safety in the UK and, in partnership with the European Aviation Safety Agency (EASA), across Europe.

The European Community established EASA in 2003 with the legal competence to be the rulemaking and standard setting organisation for all aviation safety regulation on behalf of its member states. The EASA now actively undertakes the tasks of aircraft and product certification, and has responsibility for the rules related to the design and maintenance of aircraft products and parts, plus setting standards for those organisations involved in design, production and maintenance of these products and parts. The Agency's rulemaking role is expanding and the detailed Implementing Rules for aircraft operations and flight crew licensing will be completed in due course. Similarly, work has begun on developing draft (high level) Essential Requirements to cover air traffic management and aerodrome activities. This is expected to be the third and final major phase of the transition to a coherent European rulemaking body for aviation safety regulation.

As a National Aviation Authority however, the CAA SRG retains a statutory duty to exercise full rulemaking and oversight responsibility for all those aspects not being adopted by EASA. Moreover, as a Competent Authority within the new European framework, CAA SRG is required to deliver safety oversight of UK industry against EASA's pan-European rules and standards. The developing European framework for the regulation of aviation safety has at its heart '2 pillars' – EASA and the National Aviation Authorities of the Community member states. Collectively, therefore, a maturing European regulatory system will continue to be focused on seeing that aircraft are properly designed, manufactured and operated and maintained; that airlines operate safely; that flight crews, air traffic controllers and aircraft maintenance engineers are suitably skilled; that licensed aerodromes are safe to use and that air traffic control services and general aviation activities meet the required safety standards.

Accident investigation and safety regulation are clearly different and the two functions are deliberately kept independent from 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 accident investigation.

Effective liaison has been maintained between the AAIB, the CAA and the EASA, 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.

Safety 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 is informed of all AAIB Safety Recommendations and has, until now, responded to the AAIB, in the form of a Follow-up Action on Occurrence Report (FACTOR), on all Safety Recommendations, regardless of whether they were the action addressee. In future, however, the CAA will only formally respond to the AAIB with a FACTOR if a Safety Recommendation is specifically addressed to them. They have assured the AAIB, however, that they will continue to react appropriately to any Safety Recommendation if they believe it is in the interests of UK aviation safety.

Until September 2004, responses to the Air Accidents Investigation Branch's recommendations were 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 shift of 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 Sixth report details the responses received to AAIB Safety Recommendations made up to and including 31 December 2009.

The Report

This is the sixth 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 2009 including the responses to those recommendations received up to and including 30 June 2010 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 6 categories.

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

Statistics

Recommendations made in 2009 and status:

Number	Status Category					
	1 Accepted CLOSED	2 Rejected OPEN	3 Rejected	4 Partially accepted OPEN	5 Response awaited OPEN	6 Superseded CLOSED
104	46	2	5	1	49	1
% of total	44	2	5	1	47	1

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

Note: 14 Safety Recommendations were allocated with recommendation numbers of which 10 were withdrawn and 4 were no longer applicable before issue

Recommendations made in 2009 by Addressee:

Addressee	Number
Airbus	4
BAE Systems	2
Boeing Commercial Airplane Company	7
British Airways PLC	4
British Balloon & Airship Club	1
Civil Aviation Authority	21
EADS Socata	1
EASA	35
Embraer	4
Eurocopter	6
Extra GmbH	1
Extra-Flugzeugbau GmbH	1
FAA	18
Hamilton Sundstrand	1
Heathrow Airport Ltd	1
International Civil Aviation Organisation	1
Kenya Airport Authority	4
Light Aircraft Association	2
Luftfahrt-Bundesamt (LBA)	1
Nairobi International Airport	1
No1 Elementary Flying Training School, RAF	1
P&M Aviation/Flight design	1
Recaro	1
Rolls Royce	1
Serbian Civil Aviation Department	1
Tyco Electronics Corporation	1

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

Aeroplanes > 5,700kg MTWA or above

Airbus A320-214

Gatwick

15 January 2005

Accident

AAIB Bulletin: 10/2005

FACTOR: F38/2005

Synopsis

The left nosewheel 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 nosewheel 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 - 2005-074

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.

Response

The Agency will introduce a new task into the rule making inventory to address the requirement that no single electrical bus failure terminates the recording on both cockpit voice recorder (CVR) and flight data recorder (FDR).

This task will propose an amendment of Certification Specifications which will address the new Types or Types subject to Major changes. The requirement for newly manufactured aircraft will also be considered.

Note: this recommendation is already part of the EUROCAE ED-112 standard ("Minimum Operational Performance Specification for crash protected airborne recorder systems"): chapter 2-5.3.9 "Where practical, each flight recorder should be powered from an electrical source other than that providing power to any other flight recorder".

Status - Accepted - closed

Airbus A319-111

**Overhead Brest,
France**

15 September 2006

Serious Incident

AAIB Bulletin: 4/2009

FACTOR: F6/2007

Synopsis

The aircraft was dispatched under the provisions of the operator's Minimum Equipment List with the Auxiliary Power Unit (APU) generator on line, substituting for the No 1 main generator which had been selected off after a fault on the previous flight had caused it to trip off line. During the cruise, the APU generator disconnected from the system, probably because of a recurrence of the original fault. This caused the loss of a substantial number of aircraft services, including some flight instruments and all means of radio telephony (RTF) communication. Manual reconfiguration of the electrical system should have recovered many of the services but the flight crew was not able to achieve this. Since they were without RTF communications, the crew considered that the best option was to select the emergency transponder code and continue the flight in accordance with the flight plan.

In the light of the initial findings of the investigation, four Safety Recommendations are made. The investigation is continuing.

SAFETY RECOMMENDATION - 2008-083

It is recommended that the EASA and the FAA introduce certification requirements aimed at ensuring the flight deck control selectors are designed such that an immediate and unmistakable indication of the selected position is always provided to the flight crew. The indication should not rely solely on the illumination of a caption, as this may not be visible in some ambient conditions and may fail to function in some failure situations.

Response

EASA Certification Specifications for Large Aeroplanes (CS-25) was upgraded at amendment 3 to introduce a new chapter 25.1302 which contains requirements meeting the intent of this recommendation [refer also to Notice of Proposed Amendment (NPA) 15/2004 on The Agency Website].

In particular 25.1302(b) requires flight deck controls and information being presented in a clear and unambiguous form and enabling flight crew awareness of the effects on the aeroplane or systems resulting from crew actions.

The related Acceptable Means of Compliance (AMC) 25.1302 provides further details and recommendations on how to comply with 25.1302 requirements. Flight deck controls are addressed in chapter 5.3.

Thus the Agency believes that the current requirements satisfactorily address this issue.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2008-084

It is recommended that the EASA require modification of Airbus A320-series and other applicable public transport aircraft to ensure that all RTF communication systems are not reliant on a single busbar for their electrical power.

Response

EASA has issued the Airworthiness Directive (AD) 2009-0235, effective on 12 November 2009, requiring the modification of the Electrical Power Distribution System, in accordance with Airbus Service Bulletin A320-24-1120.

The implementation of the automatic changeover of the Alternating Current (AC) Essential Bus bar of the Electrical Power Distribution System in accordance with the above mentioned Airbus Service Bulletin, addresses the requirements of this Safety Recommendation

The AD 2009-0235 is applicable to A318, A319, A320, and A321 aeroplanes, as requested by this Safety Recommendation.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2008-088

It is recommended that Hamilton Sundstrand modifies its repair and overhaul procedures as necessary, to ensure that a unit with an excessive service rejection rate or a recurrent fault is not repeatedly released back to service.

Response

Hamilton Sundstrand has made changes in our processes at our Dijon, France, Phoenix Arizona and Miramar, Florida repair facilities which we believe address the concerns presented in the AAIB Safety recommendation 2008-088. These changes include a multiple Return Unit Process and a Quality Clinic Investigation Procedure.

The Hamilton Sundstrand Repair facilities utilize an electronic data processing system called JDE One World that is used to maintain historical records for repairs that have been processed by Hamilton Sundstrand repair facilities. This system includes a database which is shared with all Hamilton Sundstrand repair facilities.

Using this database and in accordance with aerospace Industry standard practice, Hamilton Sundstrand implemented a Multiple Return Unit (MRU) process that identifies units that have been returned to any HS repair facilities three times in a 12 month period. The identification is done automatically through the JDE One World system. When a unit is received at the Hamilton Sundstrand repair facility. The repair administrator will open a repair using JDE Open World. The system will automatically search the Hamilton Sundstrand records to see if the unit had been returned previously to any Hamilton Sundstrand repair facilities worldwide and if the above criterion is met a Multiple Return Unit (MRU) text is added to the sales order as follows; 'THIS PART WAS SERVICED AT A HS REPAIR STATION AT LEAST 3 TIMES IN THE PREVIOUS 12 MONTHS AND IS CONSIDERED A MULTIPLE RETURN UNIT'.

This MRU alert is used to notify the Repair Engineering and Repair Administration of the multiple return statuses. Repair Engineering will review the history of the suspect unit, and contact other Hamilton Sundstrand support groups as necessary regarding the unit's condition and the need for special processing. Any resulting MRU investigation will be coordinated by our Customer Service Engineering personnel with Design Engineering involvement to address all resulting design changes.

This Hamilton Sundstrand MRU procedure was implemented into the master Hamilton Sundstrand JDE One World order entry system in January of 2009. Hamilton Sundstrand Dijon France, Phoenix Arizona and Miramar Florida repair facilities implemented this procedure in March 2009.

The Hamilton Sundstrand Dijon France repair facility implemented a similar procedure earlier; it is referred to as the Quality Clinic Investigation Procedure, which was instituted in the 3rd quarter of 2007.

With these improved procedures in place, Hamilton Sundstrand is confident that the concerns presented by the AAIB Safety Recommendation 2008-088 have been effectively addressed.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-063

It is recommended that the EASA extend the guidance material provided for the EASA 25-1309 certification standard for failure effects analyses, to include consideration of the effects of delayed or non-achieved crew actions, in addition to crew errors.

Response

EASA certification Specifications for Large Aeroplanes CS-25 was upgraded at amendment 3 to introduce a new chapter 25.1302 which contains requirements meeting the intent of this recommendation (refer also to NPA 15/2004 on the Agency website).

The principle is to require flight deck equipments designs and integration that preclude flight crew errors or non/delayed actions, and if errors or non/delayed actions occur, clear information shall be available to the crew to take action. In particular:

- CS 25.1302(b)(1) require that controls and information be provided in a clear and unambiguous form.
- CS 25.1302(b)(2) requires that controls and information be accessible and usable by the flight crew in a manner consistent with the urgency, frequency, and duration of their tasks.
- CS 25.1302(b)(3) requires that equipment presents information advising the flight crew of the effects of their actions on the aeroplane or systems, if that awareness is required for safe operation. The intent is that the flight crew be aware of system or non-achieved crew action, the system indications shall reflect and make the crew aware of the situation.

- CS-25.1302© requires that installed equipment be designed so its behaviour that is operationally relevant to flight crew' tasks is: predictable unambiguous; designed to enable the flight crew to intervene in a manner appropriate to the task.

As even well-trained crew may make errors, CS 25.1302(d) requires that equipment be designed to enable the flight crew to intervene in a manner appropriate to the task.

The related Acceptable Means of Compliance AMC 25.1302 provides further details and recommendations on how to comply with 25.1302 requirements.

Status - Accepted - closed

Boeing 757-204	Stansted Airport	22 October 2006	Serious Incident
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AAIB Bulletin; 6/2009

FACTOR: N/A

Synopsis

Shortly after reaching cruise altitude on a scheduled passenger flight from Newcastle to Larnaca, a blue haze was observed in the passenger cabin. A precautionary diversion was made to London Stansted, where an emergency evacuation was carried out successfully. One cabin crew member initially had difficulty in opening the rear cabin doors, due to insufficient force being used. The blue haze could not be reproduced on initial investigation, which included engine ground runs. A planned post-maintenance proving flight was aborted during the takeoff roll when smoke entered the flight deck and cabin. Further investigation, which included ground runs at higher engine power settings, identified the source of the smoke to be the No 2 (right) engine. The cause was determined to be a fractured No 1 bearing floating seal ring, which had allowed engine oil to leak into the compressor airflow path and to be ingested into the bleed air system, which provides air to the cabin air conditioning system.

SAFETY RECOMMENDATION - 2009-041

The Boeing Commercial Airplane Company should consider revising the procedures in the Boeing 757 Fault Isolation Manual to introduce a requirement for ground running at higher engine power settings, if initial testing fails to identify the source of smoke or fumes in conditioned air.

Status - Response awaited - open

SAFETY RECOMMENDATION - 2009-042

It is recommended that the European Aviation Safety Agency ensure that effective measures are in place for cabin crews to become, and remain familiar with, the different opening procedures and characteristics of aircraft exits in both normal and emergency modes of operation.

Response

Appendix 1 to OPS 1.1010(c) provides that:

'An operator shall ensure that:

1. each cabin crew member operates and actually opens each type of variant of normal and emergency exits in the normal and emergency modes, including failure of power assist systems where fitted. This is to include the action and forces required to operate and deeply evacuation slides. This training shall be conducted in an aeroplane or representative training device; and

2. the operation of all other exits, such as flight deck windows is demonstrated'

Additionally, Appendix 1 to OPS 1.1015 provides that:

'(b) An operator shall ensure that every 12 calendar months the programme of practical training includes the following:

3. touch drills by each cabin crew member for opening normal and emergency exits for passenger evacuation;

(c) An operator shall ensure that, at intervals not exceeding three years, recurrent training also includes:

1. each cabin crew member operating and actually opening each type or variant of normal and emergency exit in the normal and emergency modes, including failure of power assist systems where fitted. This is to include the action and forces required to operate and deploy evacuation slides. This training shall be conducted in an aeroplane or representative training device;

2. demonstration of the operation of all other exits including flight deck windows;

Those requirements were transferred in the draft Part CC for the aircraft type-specific training [CC.TRA.125 and related Acceptable Means of Compliance (AMC)] and in the draft Part OR (OR.OPS.CC.135 and related AMC) for recurrent training, as published in the Notice of Proposed Amendment 2009-02. The Agency will continue dedicating its efforts for the adoption of these rules.

The Agency considers that the above addresses the intent of the safety recommendation. It is then within the competences of the Member States to check compliance with these rules.

Status - Accepted - closed

Airbus A319-111	En route from Barcelona to Liverpool	6 February 2007	Incident
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AAIB Bulletin: 9/2009
FACTOR: N/A

Synopsis

During a scheduled passenger flight from Barcelona to Liverpool, numerous caution messages and accompanying aural tones were generated, some of which occurred repeatedly for the remainder of the flight. Although the flight crew were unable to resolve the problem, they concluded that the messages were most probably spurious. A MAYDAY was declared and the aircraft was diverted to London Stansted, where it landed safely. No faults were confirmed that could have accounted for these symptoms, but an intermittent fault in one of the Display Management Computers was considered to be the most likely cause.

SAFETY RECOMMENDATION - 2009-058

It is recommended that Airbus either amend the Quick Reference Handbook of Airbus aircraft with switchable EIS DMC selections, or introduce a memory drill to emphasise that EIS DMC switching may be an appropriate response to abnormal display unit operation even if the 'INVALID DATA' ECAM message is not displayed.

Status - Response Awaited - open

BAe 146**London City Airport****20 February 2007****Serious Incident****AAIB Bulletin: 1/2008****AAIB Formal Report: 5/2009****FACTOR: N/A****Synopsis**

On 20 February 2007 London City Airport notified the Air Accidents Investigation Branch (AAIB) of an incident involving a BAe 146 in which the aircraft burst all four main landing gear tyres during the landing. Enquiries by AAIB revealed that the aircraft had overrun the landing distance available (LDA), but remained on the paved surface, and that the flight crew had reported a total failure of the aircraft's brakes. In light of previous overrun events involving the BAe 146 and Avro RJ series of aircraft the Chief Inspector of Air Accidents ordered an Inspectors Investigation to be carried out into this incident.

SAFETY RECOMMENDATION - 2008-062

It is recommended that the European Aviation Safety Agency should mandate BAe Systems Service Bulletin 27-73-00889 for the BAe 146 series of aircraft, which increases the operating force in the forward direction from zero to 12 lb, of the lift spoiler/airbrake selector lever, to prevent the lever moving forward under the influence of vibration or being inadvertently nudged forward during the landing roll.

Response

EASA issued AD 2009-0206 'Flight controls - Airbrake Lever Detent Mechanism - Modification' on 30 September 2009.

Status - Accepted - closed**Boeing 777****Heathrow Airport****26 February 2007****Accident****AAIB Bulletin: 2/2009****FACTOR: N/A****Synopsis**

The aircraft operator's duty manager at Heathrow notified the Air Accidents Investigation Branch (AAIB) of the accident at 1140 hrs on 26 February 2007 and the investigation commenced the next day.

A preliminary report on the initial findings from the accident was published in AAIB Special Bulletin S2-2007 on 17 April 2007. This formal report contains the final findings and Safety Recommendations from the investigation.

The accident occurred during engine start after pushback from the stand. After the right generator came online an electrical failure occurred in the right main bus. The failure resulted in severe internal arcing and short circuits inside the two main power contactors of the right main bus. The heat generated during the failure resulted in the contactor casings becoming compromised, causing molten metal droplets to fall down onto the insulation blankets below. The insulation blankets ignited and a fire spread underneath a floor panel to the opposite electrical panel (P205), causing heat and fire damage to structure, cooling ducts and wiring. The flight crew responded to the bus failure and a burning smell by shutting down the right engine and taxiing to a nearby stand. The Airfield Fire Service attended the aircraft when it arrived on stand and entered the Main Equipment Centre where they discovered significant smoke but no fire. The passengers were evacuated uneventfully via the steps.

The investigation identified the following causal factors:

- i) An internal failure of the Right Generator Circuit Breaker or Right Bus Tie Breaker contactor on the P200 power panel inside the Main Equipment Centre resulted in severe internal arcing and short-circuits which melted the contactor casings. The root cause of contactor failure could not be determined.
- ii) The open base of the P200 power panel allowed molten metal droplets from the failed contactors to drop down onto the insulation blankets and ignite them.
- iii) The aircraft's electrical protection system was not designed to detect and rapidly remove power from a contactor suffering from severe internal arcing and short-circuits.
- iv) The contactors had internal design features that probably contributed to the uncontained failures.

Five Safety Recommendations were made.

SAFETY RECOMMENDATION - 2009-021

Boeing Commercial Airplanes should consider implementing differential current fault protection of main power contactors when designing future electrical systems.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-022

The Federal Aviation Administration, in conjunction with the European Aviation Safety Agency, should consider mandating the replacement of ELM 827-1 contactors with ELM 827-3 contactors on all Boeing 777 aircraft, to reduce the risk of a contactor breakdown that results in uncontained hot debris.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-023

Tyco Electronics Corporation should introduce mitigating action to reduce the risk of auxiliary contact blade failure in ELM 827 and ELM 828 contactors, in order to prevent a broken blade from causing a short-circuit failure.

Response

Tyco Electronics Corporation is offers the following comments and actions regarding the Safety Recommendation:

The Safety Recommendation is concerned with the possibility that a broken auxiliary contact blade could create conductive FOD that might create a short circuit between conductor and a grounded metal part. [It should be noted here that all auxiliary contact blades for the contractors involved in the N786UA incident were intact and accounted for. Thus, broken auxiliary contact blades were ruled out as the initiating cause of that incident.] The concern of the AAIB investigator came from a finding in another contactor which had been requisitioned from service for the purpose of a tear down analysis of contractors of approximately the same age and number of cycles as those involved in the incident. A review of three years worth of the Tyco Electrics, Hartman Repair Station contactor repair data for contactors eight or more years old revealed three other reports of broken auxiliary contact blades. A broken auxiliary contact blade is of a size that could bridge between conductors. Although these were found in examinations and records reviews, broken blades have been found in only a fractional percentage of contactors over fifteen years of service history.

Auxillary contact blades are primarily used to indicate the status of the contactor's main contacts. Although not all auxillary contacts are used in all the various applications of the contactor, the breaking of a contact blade would generally create an EICAS or maintenance message that would indicate a system problem and lead to removal of the contactor. In the mounting attitude per the application of the contactor, the main conductive elements are aligned in a vertical plane. The auxillary switch stacks are mounted (relatively speaking) on the top and

bottom of the contactor's coil and actuator assembly. Gravity would naturally cause a broken blade to fall to the bottom surface of the contactor, which is a side of the cover assembly. The area has no conductors. The natural tendency is for the broken part to fall harmlessly into the contactor cover or into insulators as happened in both cases cited. The loss of the contact would generally create a failure message and cause an immediate action to remedy the problem.

Although the explanation above indicate that the probability of this particular piece of FOD creating a short circuit is remote, any conductive FOD, within an electrical device, poses a potential problem. Therefore, Tyco Electronics has taken actions to help prevent or mitigate the effects of FOD. Many of these actions took effect several years ago, while others were introduced in the current production dash number for the ELM 827 and ELM 828 contactors.

In the cases of the broken blades found, the blades showed evidence of tool marks imparted during the contactor adjustment process. The blades are adjusted for contact force and timing within contactor specifications. Over-adjustment or improper use of the adjustment tool can create tool marks and stress points on the blade. The auxiliary contact blade is made from an alloy of Silver and Aluminum to yield the properties of high conductivity and to provide some necessary spring properties. By the nature of this material the part can be subject to fracture if over stressed or scored during manufacturing adjustments. A change to the material would likely result in performance problems and would probably require product re-qualification. For that reason, Tyco Electronics focused on process control as the preventative for blade breakage.

In February of 2006, a new format for Assembly Work Instructions was introduced to this product line. These instructions provide visual reference for proper assembly and adjustment of the contactors.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-024

The Federal Aviation Administration, in conjunction with the European Aviation Safety Agency, should mandate that all Boeing 777 aircraft be equipped, at the earliest opportunity, with a software update that will generate a caution message to alert flight crew of the presence of smoke in the Main Equipment Centre.

The aircraft manufacturer responded to this Safety Recommendation by stating: 'Boeing is undertaking a review of system architecture, smoke detection, flight deck indications, and flight crew procedures across all of our production models to ensure a consistent approach to fireworthiness and flight crew indication, and identify safety enhancements that may be warranted. This work will include a review of the "SMOKE EQUIP COOLING" message for 777 passenger aircraft.'

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-025

The Federal Aviation Administration, in conjunction with the European Aviation Safety Agency, should mandate that all Boeing 777 aircraft be equipped, at the earliest opportunity, with a containment tray below the open base of the P100, P200 and P300 power panels, to prevent any hot debris from a failed contactor from falling on to insulation blankets or other components and causing heat and fire damage.

Status - Response Awaited - open

**Boeing 777-236
Airbus A321-231**

**London Heathrow
Airport**

27 July 2007

Accident

AAIB Bulletin: 6/2009

FACTOR: N/A

Synopsis

A Boeing 777 collided with an Airbus A321 whilst the former was being pushed back from stand. Moments earlier, the A321 had taxied behind the Boeing 777 towards its own stand, but had been unable to park because the electronic stand guidance had not been activated. The A321 remained partially on the taxiway behind the 777 and was not seen by the pushback crew until just before the collision.

The investigation determined that the causal factor in the accident was the pushback crew's non-adherence to normal procedures. A major contributory factor was the operator's lack of effective action in addressing known problem areas, which included stand guidance issues and other shortcomings in its Safety Management System. Ten Safety Recommendations were made.

SAFETY RECOMMENDATION - 2009-034

It is recommended that British Airways PLC should include generic post-accident and emergency procedures for ground handling staff in its Aircraft Towing and Pushback Manual, and include such procedures in recurrent safety awareness training.

Response

British Airways accept the recommendation. Amendments have already been made to the Towing and Pushback Procedures Manual to highlight that ATC clearance to tow or push does not confirm that you are clear of obstacles. The ATPM was also amended to reflect the fact that tow and push crews must be vigilant at all times.

All staff have been briefed and alert notices issued after the previous incidents.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-035

It is recommended that British Airways PLC should ensure that an effective and robust system is in place to monitor and manage the working hours of its Heathrow Aircraft Movements staff, ensuring compliance with applicable working time rules and agreed practices.

Response

The new policy relating to working time was introduced on 1 June 2009. This was simplified to aid compliance. We had originally expected this to be in place by April 2009 as we had previously informed you and as stated in the report.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-036

It is recommended that British Airways PLC introduce a process to review recommendations arising from formal corporate safety investigations, to ensure closure and to consider whether they have been effective.

Response

British Airways accept the recommendation. The British Airways Safety Management System is continually reviewed to identify improvements; however in this case, British Airways had already introduced a formalised tracking system of all corporate safety investigation incident

recommendations. This was introduced as part of our Accident Prevention and Flight Safety Programme in early 2006. The process was not introduced to retrospectively review past investigations. The review period was set approximately twelve months after the incident, hence a review of the recommendations made from the previous incidents, referred to in this report, would not have been captured at the time of this incident.

The tracking system was designed to ensure correct incorporation of each recommendation and provide a review of the trend in regard to similar incidents, so that the effectiveness of the action could then be determined.

In 2007 further improvements were introduced. The corporate quality department now conduct the reviews instead of the original safety investigator. The reviews are automatically tracked within the incident management system (eBASIS). Additionally all corporate safety recommendations now require metrics to be added to each recommendation to enable an objective measure of the effectiveness to be made.

This process has allowed British Airways to monitor the continual improvement as a result of the implementation of our mitigation and therefore determine the overall effectiveness of the actions taken as a result of investigation recommendations.

The output of the tracking and the findings are reported in the Board Safety Review papers so that immediate action can be taken should any deficiencies be found.

The process is quite mature and meets the requirements of the AAIB recommendation, but will continue to develop.

The relevant extract from the Corporate Safety & Quality Local Procedures Manual is attached.

Agree with the additional text

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-037

It is recommended that British Airways PLC reinstate recurrent safety awareness training for its Aircraft Movements staff.

Response

British Airways accept this recommendation.

The Aircraft Movements (ACM) Safety Awareness Day has been completely reviewed and as a result updated to include the following:

1. Safety awareness of all ACM working areas such as terminals and engineering base
2. Conformance and compliance in regard to standard operation procedures and ATPM
3. Accident reporting/investigation
4. Alcohol and Drugs testing (EG303)
5. Training procedures and records
6. Dangers of electricity
7. The Environment
8. FOD
9. Hand Signals
10. Wing observer
11. Specific observation skills
12. UK aerodrome phraseology

13. Evacuation and facilities
14. Ramp Safe process
15. Health & Safety
16. Fire
17. Personal Protective Equipment
18. Aircraft damage reporting
19. Vehicle accident reporting
20. Personal accident reporting
21. High access equipment
22. De-icing/winter wise requirements

The revised safety data commences on 1 April 2009. There will be two sessions per week. Six staff will attend each session and the intention is to have all staff completed by the end of September 2009. The Sections on Site Demonstrators (OSD's) are currently being trained to deliver the course, with the support of the ACM Quality and Compliance Manager.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-038

It is recommended that Heathrow Airport Limited reissue the requirements of Operational Safety Instruction OS/20/05, specifically prohibiting aircraft commanders from allowing any part of their aircraft to enter a stand area if the Stand entry Guidance System is not activated.

Response

Heathrow Airport Limited (HAL) has published specific instructions within a new Operational Safety Instruction (OSI) with respect to pilots not taxiing their aircraft across the double white lines if the Stand Entry Guidance is not switched on. There is also a cross-reference to the UK AIP for Heathrow.

Status - Accepted - closed

Boeing 737-3Q8	Bournemouth Airport	23 September 2007	Incident
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AAIB Bulletin: 3/2009
FACTOR: N/A

Synopsis

The Air Accidents Investigation Branch was notified by the operator on the 5 October 2007 of an unstable approach and stall during go-around by a 737 aircraft at Bournemouth Airport. The event had occurred on the 23 September 2007, 12 days previously.

The Boeing 737 had been approaching Bournemouth following a routine passenger flight from Faro in Portugal. Early in the ILS approach the auto-throttle had disengaged with the thrust levers at idle thrust. The disengagement was not commanded or recognised and the thrust levers remained at idle throughout the approach. With the aircraft fully configured for landing, the air speed rapidly dropped below that required for the approach. The commander took control and initiated a go around. During the go-around the aircraft nose pitched up excessively; flight crew attempts to reduce the aircraft's pitch were ineffective. The aircraft reached a maximum pitch of 44° nose up and the indicated airspeed fell to 82 kt. The aircraft

then stalled, the flight crew were able to recover control of the aircraft and complete a subsequent approach and landing at Bournemouth.

Although the commander reported the event to the operator the severity of the event was not recognised until the 4th of October.

The aircraft remained in service in a potentially un-airworthy condition throughout this period.

The investigation identified the following causal factors

1. The flight crew did not recognise the disengagement of the autothrottle system
2. The flight crew did not recognise the speed excursion below bug speed until below 125 kt.
3. The trimmed position of the stabiliser combined with the selection of maximum thrust overwhelmed the available elevator authority.
4. The operator's safety management system did not adequately track the ASR.

Contributory factors

1. The autothrottle warning system on the Boeing 737 did not alert the crew to the disengagement of the autothrottle system.

Six Safety Recommendations have been made.

SAFETY RECOMMENDATION - 2009-043

It is recommended that Boeing, in conjunction with the Federal Aviation Administration, conduct a study of the efficacy of the Boeing 737-300/400/500 autothrottle warning and if necessary take steps to improve crew alerting.

Response

We are continuing to evaluate the findings of this and related incidents involving the B-737 autothrottle system. We are working with Boeing to develop a comprehensive solution to these issues.

We expect to provide a follow- on response outlining our action plan by September 2010.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-044

It is recommended that the European Aviation Safety Agency review the requirements of Certification Standard 25 to ensure that the disengagement of autoflight controls including autothrottle is suitably alerted to flightcrews

Response

The Agency has reviewed the latest version of CS-25 as recommended and concluded that sufficient provisions exist to suitably and clearly alert flight crews when the autothrottle or autothrust is disengaged.

The Notice of Proposed Amendment (NPA 18/2006) that is relevant to this Safety Recommendation introduced improvements to address the performance and safety requirements of modern flight guidance systems including autopilot, autothrust and flight director systems. These revisions took into account recommendations of the Federal Aviation Administration (FAA) Human Factors Team showing difficulties for flightcrews interacting with the increasing automation of flight decks. Among the various specific issues addressed by NPA, there was the 'Insufficient crew awareness of flight guidance system (FGS) behaviour and operation' and 'History of lack of awareness of unusual/hazardous attitudes during FGS operations'. These improvements were introduced in CS-25 Amdt 4, dated 27 December 2007.

CS 25.1329 defines the level of alert corresponding to a disengagement of autothrust function.

AMC 25.1329 provides for more details concerning the way this alert should be presented to flight crews.

These provisions are deemed sufficiently extensive, and the autothrust or autothrottle disengagement alerting efficiency has to be evaluated on every new aeroplane type depending on the particular FGS architecture.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-045

It is recommended that Boeing clarify the wording of the approach to stall recovery Quick Reference Handbook Non-normal Manoeuvres to ensure that pilots are aware that trimming forward may be required to enhance pitch control authority.

Response

Boeing training materials currently address the use of stabilizer trim stall recovery in certain situations. The 'Upset Recovery Training Aid' remains available to operators. It also addresses the use of stabilizer trim during stall recovery in specific situations.

In light of the existence of this training material, available for use in the development of carrier specific training, we plan no further action with regard to FAA Safety Recommendation 09.100.

Status - Rejected

Boeing 777-236	Short of threshold to RWY 27L, London Heathrow Airport	17 January 2008	Accident
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AAIB Formal Report: 1/2010

FACTOR: N/A

Synopsis

The flight from Beijing to London (Heathrow) was uneventful and the operation of the engines was normal until the final approach. The aircraft was correctly configured for a landing on Runway 27L and both the autopilot and the autothrottle were engaged. The autothrottles commanded an increase in thrust from both engines and the engines initially responded. However, at a height of about 720 ft the thrust of the right engine reduced to approximately 1.03 EPR (Engine Pressure Ratio); some seven seconds later the thrust on the left engine reduced to approximately 1.02 EPR. The reduction in thrust on both engines was the result of less than the commanded fuel flows and all engine parameters after the thrust reduction were consistent with this. Parameters recorded on the Quick Access Recorder (QAR), Flight Data Recorder (FDR) and Non Volatile Memory (NVM) from the Electronic Engine Controllers (EECs) indicate that the engine control system detected the reduced fuel flows and commanded the Fuel Metering Valves (FMVs) to open fully. The FMVs responded to this command and opened fully but with no appreciable change in the fuel flow to either engine.

The aircraft had previously operated a flight on 14 January 2008 from Heathrow to Shanghai, with the return flight arriving on 15 January 2008. The aircraft was on the ground at Heathrow for 20 hours before the departure to Beijing on the 16 January 2008. Prior to these flights the 777 had been in maintenance for two days, during which the left engine EEC was replaced and left engine ground runs carried out.

SAFETY RECOMMENDATION - 2009-028

It is recommended that Boeing and Rolls-Royce jointly review the aircraft and engine fuel system design for the Boeing 777, powered by Rolls-Royce Trent 800 engines, to develop

changes which prevent ice from causing a restriction to the fuel flow at the fuel oil heat exchanger.

Response

Boeing and Rolls-Royce accept the above recommendation. Rolls-Royce has developed a modification to the Trent 800 Fuel / Oil Heat Exchanger (FOHE) that is believed to satisfy the intent of the above AAIB recommendation. Testing of the modified FOHE has shown a significant improvement in its tolerance to ice shed from the aircraft fuel system. Boeing and Rolls-Royce are working closely with regulators to define the certification program and are launching an aggressive deployment schedule to the fleet. Our deployment schedule includes deployment to specific 777- Trent 800 airplanes used on long, cold routes prior to the 2009-2010 winter operations and retrofit of the entire fleet by the end of 2010.

In the interim period, Boeing has provided airlines with operational procedures to mitigate the risk of ice in the fuel system causing a fuel flow restriction during critical phases of flight. These interim operational procedures are specifically designed to assure continued safe operation of the 777-Trent 800 fleet under all operating conditions until hardware modifications are implemented. We expect that these procedures will be removed once the modified FOHEs are installed in the 777-Trent 800 fleet.

The above plan is dependent on regulatory approval by the FAA and EASA.

Boeing and Rolls-Royce have accepted the above recommendation. To mitigate the potential for a future fuel system ice accumulation and release event, to cause a blockage at the inlet to the FOHE, Rolls-Royce have developed a modification to the FOHE. The modification will improve the FOHE's capability in the event of a fuel ice release event.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-029

It is recommended that the Federal Aviation Administration and the European Aviation Safety Agency consider mandating design changes that are introduced as a result of recommendation 2009-028, developed to prevent ice from causing a restriction to the fuel flow at the fuel oil heat exchanger on Boeing 777 aircraft powered by Rolls-Royce Trent 800 engines.

Response

EASA Airworthiness Directive (AD) has been issued instructing installation of the modified Fuel Oil Heat Exchanger (FOHE) for all Rolls-Royce Trent 800 engines.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-030

It is recommended that the Federal Aviation Administration and the European Aviation Safety Agency conduct a study into the feasibility of expanding the use of anti-ice additives in aviation turbine fuel on civil aircraft.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-031

It is recommended that the Federal Aviation Administration and the European Aviation Safety Agency jointly conduct research into ice formation in aviation turbine fuels.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-032

It is recommended that the Federal Aviation Administration and the European Aviation Safety Agency jointly conduct research into ice accumulation and subsequent release mechanisms within aircraft and engine fuel systems.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-091

It is recommended that the European Aviation Safety Agency introduce a requirement to record, on a DFDR, the operational position of each engine fuel metering device where practicable.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-092

It is recommended that the Federal Aviation Administration introduce a requirement to record, on a DFDR, the operational position of each engine fuel metering device where practicable.

Response

The Federal Aviation Administration believes the recommended parameters and the operating state of the engines can be adequately inferred from other required parameters recorded on the Digital Flight Data Recorder (DFDR). The DFDR of the accident airplane, similar to other newer-technology airplanes, stores enough parameters to discern the state of the parameters requested in this recommendation.

Following this accident, if the Quick Access Recorder (QAR) had been unavailable, the commanded and actual behavior of the Fuel Metering Valves (FMV) would have been inferred from the recording on the DFDR of the Engine Electronic Controller (EEC) Loop in Control and the absence of the EEC faults on the recorder.

We plan no further action with regards to FAA Safety Recommendation 10.036.

Status - Rejected - open

SAFETY RECOMMENDATION - 2009-093

It is recommended that Boeing minimise the amount of buffering of data, prior to its being recorded on a QAR, on all Boeing 777 aircraft.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-094

It is recommended that Boeing apply the modified design of the B777 200LR main landing gear drag brace, or an equivalent measure, to prevent fuel tank rupture, on future Boeing 777 models and continuing production of existing models of the type.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-095

It is recommended that the Federal Aviation Administration amend their requirements for landing gear emergency loading conditions to include combinations of side loads.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-096

It is recommended that the Federal Aviation Administration, in conjunction with the European Aviation Safety Agency review the requirements for landing gear failures to include the effects of landing on different types of surface.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-097

It is recommended that the Federal Aviation Administration require that Boeing modify the design, for the Boeing 777, of the indirect ceiling light assemblies, their associated attachments, and their immediate surroundings to ensure that the fluorescent tubes, or their fragments, will be retained in a survivable impact.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-098

It is recommended that the Federal Aviation Administration and the European Aviation Safety Agency, review the qualification testing requirements applied by manufacturers to cabin fittings, to allow for dynamic flexing of fuselage and cabin structure.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-099

It is recommended that Recaro review the video monitor fittings on the seat model 3410 and, if appropriate, extend the inspection and replacement requirements for the video monitor fittings, as detailed in Service Bulletin SB4400-25MB059 Revision 3.

Status - Superseded - closed

SAFETY RECOMMENDATION - 2009-100

It is recommended that the European Aviation Safety Agency mandate MSB4400-25MB059 Revision 3 to require the inspection and replacement of the video monitor fittings on the Recaro seat model 4400.

Response

EASA has assessed safety consequences of the dislodging of the video monitors and does not consider that an unsafe condition under Part 21A.3B has been established.

Therefore EASA, whilst agreeing that the design could be improved, does not consider that mandatory action is warranted.

Status - Rejected

Jetstream 4102	Climbing through FL90	9 April 2008	Incident
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AAIB Bulletin: 10/2009
FACTOR: N/A

Synopsis

The aircraft departed Aberdeen in snow and freezing conditions, but had not been de-iced and anti-iced appropriately. During the climb the elevator became jammed by ice. The crew used changes in power and higher forces on the elevator controls to gain sufficient control to descend into warmer air, where the ice melted. Three safety recommendations are made. The investigation also identified that the commander's fitness to fly, coupled with pressures he may have felt to operate the flight, may have been contributory factors in the incident.

SAFETY RECOMMENDATION - 2009-077

It is recommended that BAE Systems review the emergency and abnormal checklist for the Jetstream 41 aircraft to ensure that it includes adequate instruction and advice for flight crews who encounter in-flight control problems associated with airframe ice.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-078

It is recommended that BAE Systems review the advice contained in the emergency and abnormal checklist concerning flap extension following failure of the aircraft's ice protection systems, or when ice is present on the airframe, to ensure that advice and instruction relating to flap extension is optimized for safety.

Status - Response Awaited - open

Airbus A340-313	Nairobi Airport, Kenya	27 April 2008	Incident
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AAIB Bulletin: 11/2009
FACTOR: N/A

Synopsis

During the final stages of landing at Nairobi (NBO) the flight crew lost visual references, during which time the pilot flying made a left rudder pedal input. A go-around was initiated. However, the aircraft touched down and the left main landing gear ran off the paved runway for a distance of 180 m. No significant damage occurred. The Ministry of Transport (Air Accident Investigation Department) of Kenya delegated the entire investigation to the UK AAIB and appointed an Accredited Representative to assist with the subsequent enquiries.

At an early stage of the investigation the AAIB issued a Special Bulletin to publicise factual information available at that time. Due to the inability to obtain pertinent information related to a number of areas of inquiry, the Chief Inspector of Air Accidents has ordered that this report be completed as a Bulletin rather than an Inspector's Investigation.

Five Safety Recommendations are made.

SAFETY RECOMMENDATION - 2009-069

It is recommended that the Air Traffic Controllers at Nairobi International Airport are provided with appropriate training in the use of the Runway Visual Range measuring equipment which is a function of the Automated Weather Observation System installed at the airport.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-070

It is recommended that the Kenya Airports Authority review their maintenance programme for runway lighting at Nairobi International Airport to ensure that runway lighting quality complies with ICAO Standards.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-071

It is recommended that the Kenya Airports Authority take action to ensure that the positioning of the runway edge lights at Nairobi International Airport complies with ICAO Standards.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-072

It is recommended that the Kenya Airports Authority notify all aircraft operators using Nairobi International Airport of the fact that the runway edge lights are positioned 7.5 m away from the edges of the declared runway surface rather than the maximum of 3 m specified by ICAO.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-073

It is recommended that the Kenya Airports Authority initiates routine testing to monitor runway friction levels at Nairobi International Airport in order to ensure compliance with the standards required by ICAO.

Status - Response Awaited - open

Boeing 767-324	Manchester Airport	9 May 2008	Incident
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AAIB Bulletin: 10/2009

FACTOR: N/A

Synopsis

During pre-startup checks, a burning smell was identified in the rear of the aircraft cabin. The commander investigated and decided to disembark the passengers. During the disembarkation it was reported that the aircraft was "on fire". The commander made a MAYDAY call to ATC, switched off all aircraft power and exited the aircraft.

Examination revealed that the 'unloader check valve' (a non-return valve between the potable water tank and the potable water air compressor) had failed and this allowed moisture or liquid into the air compressor which, in turn, caused the air compressor to lock up. The thermal cut-out switch, associated with the electric motor that powered the potable water air compressor, had cycled until it eventually became welded, or fused, in the ON position allowing a constant supply of electrical power to the compressors' motor, causing it to overheat severely.

SAFETY RECOMMENDATION - 2009-090

It is recommended that the Federal Aviation Administration (FAA) review the continued airworthiness of the potable water air compressor system fitted to Boeing 767 aircraft, to ensure that the compressor's electric motor does not overheat, causing the generation of acrid fumes and creating a fire hazard.

Status - Response Awaited - open

Airbus A321-211	Manchester Airport	18 July 2008	Accident
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AAIB Bulletin: 6/2009
FACTOR: F8/2009

Synopsis

During a landing at Manchester Airport the aircraft was not flared sufficiently and a 'hard' landing, categorised as 'severe hard', occurred. The possibility of a landing parameter exceedence was not reported by the crew following discussion with ground engineers who had been on the flight. The presence of a landing parameter exceedence report was identified after a further two sectors had been flown, when an unrelated inspection of the landing gear found a crack in a wing rib gear support lug. Four Safety Recommendations have been made.

SAFETY RECOMMENDATION - 2009-059

It is recommended that Airbus ensure that the generation of a LOAD<15> report by the DMU following a landing parameter exceedence, is indicated to the flight crew involved to enable them to record it in the aircraft's technical log.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-060

It is recommended that the Civil Aviation Authority require operators to provide training in the procedures associated with the reporting of suspected hard landings and the information available to assist decision making on reporting for the aircraft types operated. This should include, for Airbus types, the nature, significance and interpretation of Airbus LOAD<15> reports.

Response

The CAA accepts this recommendation and will publish a FODCOM which will advise operators to review operations manual material to ensure that it contains guidance for crews regarding the reporting of suspected heavy landings. The FODCOM will include, for operators of Airbus types, a reference to the "nature, significance and interpretation of LOAD<15> reports". The required FODCOM will be published by the end of August 2009.

FODCOM 21/2009 'Reporting of Suspected Hard/Heavy Landings' was published on 17 July 2009. It will be reviewed in July 2010 and either kept as an "active" FODCOM, or withdrawn and the content published in CAP 789.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-061

It is recommended that the European Aviation Safety Agency ensure adequate training is provided for ground engineers maintaining Airbus aircraft regarding the correct approach to troubleshooting suspected hard landings and the correct means of obtaining and interpreting the Airbus LOAD<15> report.

Response

This technical investigation underlined that the ground engineers consulted by the flight crew were unaware that LOAD<15> report would not always be automatically printed and the subsequent lack of even a precautionary tech log entry meant that no process for a formal engineering investigation was initiated. Consequently the Data Management Unit (DMU) was not interrogated and the presence of the LOAD<15> report confirming the hard landing was not identified before.

Annex I to Commission Regulation EC 2042/2003 (Part M) as last amended by EC 1056/2008, chapter M.A.201 (h) provides in the case of commercial air transport the responsibilities of an operator for the continuing airworthiness of aircraft it operates.

In this frame, ED Decision 2003/19/RM (AMC to Part M) as last amended by ED Decision 2008/013/R chapter M.A.201 (h) provides further explanations on how these responsibilities should be interpreted:

Subparagraph 4) states that: ' An operator should therefore have adequate knowledge of the design status (type specification, customer options, airworthiness directives (AD), airworthiness limitations including Critical Design Configuration Control Limitations (CDCCL) modifications, major repairs, operational equipment) and required and performed maintenance. Status of aircraft design and maintenance should be adequately documented to support the performance of the quality system.'

And Subparagraph 5) adds. 'An operator should establish adequate co-ordination between flight operations and maintenance to ensure that both will receive all information on the condition of the aircraft necessary to enable both to perform the tasks.'

Furthermore Part M chapter M.A.301 'Continuing airworthiness tasks' provides the aircraft continuing airworthiness and the serviceability of both operational and emergency equipment; its related AMC Chapter M.A.301 -1- states that:

3). 'In the case of commercial air transport, an operator should publish guidance to maintenance and flight personnel and any other personnel performing pre-flight inspection tasks, as appropriate, defining responsibilities for these actions and, where tasks are contracted to other organisations, how their accomplishment is subject to the quality system of M.A.712. It should be demonstrated to the competent authority that pre-flight inspection personnel have received appropriate training for the relevant pre-flight inspection tasks. The training standard for personnel performing the pre-flight inspection should be described in the operator's continuing airworthiness management exposition'.

At last, it is specified in Annex II to Commission Regulation EC 2042/2003 (Part 145) as last amended by EC 1056/2008 chapter 145.A 35 (e), that maintenance organisations shall establish a program for continuation training for certifying staff.

The oversight of the operators is within the scope of the National Aviation Authorities (NAA's), a letter has been sent to NAAs of the European Union Member states, addressing the issue highlighted in the Safety Recommendation. It will be up to each NAA, in coordination with each of the concerned national air transport operators, to:

- Ensure that maintenance personnel have adequate knowledge on the correct method to troubleshoot a suspected hard landing, whatever aeroplane type,
- Supervise the training of certifying staff involved in Airbus aeroplanes maintenance to ensure their adequate knowledge of the Airbus AIDS and DMU so that they are able to obtain and interpret the Airbus LOAD<15> report.
- Ensure that each of the concerned operators have established adequate co-ordination between flight operations and maintenance to ensure that both will receive all information on the condition of the aircraft necessary to enable both to perform their tasks.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-062

It is recommended that Airbus review their procedure for identifying and classifying parameter exceedences based on data recorded by the aircraft during landing, either to ensure that all sources of recorded data give the same outcome or to provide guidance on which source of data should take precedence in the event of a discrepancy. Changes resulting from this review should be reflected in the relevant maintenance manual tasks.

Status - Response Awaited - open

Airbus A321-231	Manchester Airport	28 July 2008	Accident
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AAIB Bulletin: 6/2009

FACTOR: N/A

Synopsis

The aircraft made a hard landing, in a flat attitude, in which the nose landing gear sustained internal damage. An engineer, following the process in the Aircraft Maintenance Manual (AMM), determined that no inspections were required as the relevant recorded parameters had not exceeded the stated threshold values. On the next flight, the flight crew were unable to retract the landing gear. Subsequent investigation of this defect identified internal damage to the nose landing gear and a bent proximity switch link rod. The nose landing gear was replaced and extensive inspections conducted before the aircraft was released to service. Three Safety Recommendations are made.

SAFETY RECOMMENDATION - 2009-047

It is recommended that Airbus include a specific reference in the AMM to inspecting the nose landing gear proximity target link rod for damage as, due to the landing gear geometry, it is a likely indicator of full nose landing gear compression.

Status - Response Awaited - open

Airbus A330-243	Montego Bay, Jamaica	28 October 2008	Incident
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AAIB Bulletin: 11/2009

FACTOR: N/A

Synopsis

Due to an error in the takeoff performance calculations, incorrect takeoff speeds were used on departure. On rotation, the aircraft initially failed to become airborne as expected, causing the commander to select TOGA power. The aircraft then became airborne and climbed away safely. Whilst the investigation could not identify the exact source of the error, deficiencies were revealed in the operator's procedures for calculating performance using their computerised performance tool.

A study of previous takeoff performance events showed that the number and potential severity is sufficient to warrant additional safeguards to be identified by industry and to be required by regulators.

Two Safety Recommendations are made.

SAFETY RECOMMENDATION - 2009-080

It is recommended that the European Aviation Safety Agency develop a specification for an aircraft takeoff performance monitoring system which provides a timely alert to flight crews when achieved takeoff performance is inadequate for given aircraft configurations and airfield conditions.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-081

It is recommended that the European Aviation Safety Agency establish a requirement for transport category aircraft to be equipped with a takeoff performance monitoring system which provides a timely alert to flight crews when achieved takeoff performance is inadequate for given aircraft configurations and airfield conditions.

Status - Response Awaited - open

ERJ 190-200 LR	Overhead Edinburgh	15 January 2009	Incident
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AAIB Bulletin: 1/2010

FACTOR: N/A

Synopsis

During flight, "smoke" was seen to emanate from a galley sink and the flight deck and cabin crews took appropriate emergency action. In the course of the 'Electrical System Fire or Smoke' procedure the flight crew established the aircraft on emergency power, after which communications between the flight deck and cabin became difficult. The aircraft landed safely. Deficiencies in the interphone system were identified, and four Safety Recommendations were made in AAIB Special Bulletin S1/2009 (February 2009).

SAFETY RECOMMENDATION - 2009-017

It is recommended that Embraer (Empresa Brasileira de Aeronautica SA) immediately notify all operators, of the Embraer 190 family of aircraft, to inform flight crew of the importance of advising cabin crew when an aircraft is on emergency electrical power.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-018

It is recommended that Embraer (Empresa Brasileira de Aeronautica SA) immediately notify all operators, of the Embraer 190 family of aircraft, to inform their flight and cabin crew of the functioning of the interphone system when the aircraft is supplied only with emergency electrical power.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-019

It is recommended that Embraer (Empresa Brasileira de Aeronautica SA) modify the functioning of the interphone systems of Embraer 190 family aircraft to provide crew with the facility to make both normal and emergency calls when the aircraft is supplied only with emergency electrical power.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-020

It is recommended that Embraer (Empresa Brasileira de Aeronautica SA) immediately notify all operators, of the Embraer 190 family of aircraft, to inform flight and cabin crew of the functioning of the flight deck access system when the aircraft is supplied only with emergency electrical power.

Status - Response Awaited - open

Aeroplanes <> 2,250kg and 5,700kg MTWA

BN2B-26 Islander	7.7nm west-north-west of Campbeltown, Argyll	15 March 2005	Accident
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AAIB Formal Report: 2/2006
FACTOR: F39/2006

Synopsis

The watch supervisor at the Scottish and Oceanic Area Control Centre notified the accident to the Air Accidents Investigation Branch (AAIB) at 0115 hrs on 15 March 2005.

The Glasgow based Islander aircraft was engaged on an air ambulance task for the Scottish Ambulance Service when the accident occurred. The pilot allocated to the flight had not flown for 32 days; he was therefore required to complete a short flight at Glasgow to regain currency before landing to collect a paramedic for the flight to Campbeltown Airport on the Kintyre Peninsula.

Poor weather at Campbeltown Airport necessitated an instrument approach. There was neither radar nor Air Traffic Control Service at the airport, so the pilot was receiving a Flight Information Service from a Flight Information Service Officer in accordance with authorised procedures. After arriving overhead Campbeltown Airport, the aircraft flew outbound on the approach procedure for Runway 11 and began a descent. The pilot next transmitted that he had completed the 'base turn', indicating that he was inbound to the airport and commencing an approach.

Nothing more was seen or heard of the aircraft and further attempts at radio contact were unsuccessful. The emergency services were alerted and an extensive search operation was mounted in an area based on the pilot's last transmission. The aircraft wreckage was subsequently located on the sea bed 7.7 nm west-north-west of the airport; there were no survivors.

SAFETY RECOMMENDATION - 2006-101

The European Aviation Safety Agency and Joint Aviation Authorities should review the UK Civil Aviation Authority's proposal to mandate the fitment of Upper Torso Restraints on all seats of existing Transport Category (Passenger) aeroplanes below 5,700 kg being operated for public transport, and consider creating regulation to implement the intent of the proposal.

Response

The Agency has incorporated the proposed recommendation in the draft Implementation Rules for Air Operations of Community Operators [Notice of Proposed Amendment (NPA) 2009-02b].

It is proposed to require aeroplanes with a maximum certificated take-off mass of less than 5,700 kg and with a maximum passenger seating configuration of less than 9, operated for Commercial Air Transport (CAT), to be fitted with a safety harness (upper torso restraint system) for each passenger seat.

Status - Accepted - closed

**Hawker Hurricane
Mk XII (IIB)**

**1nm north-west of
Shoreham Airport,
Sussex**

15 September 2007

Accident

**AAIB Formal Report: 6/2009
FACTOR: F10/2009**

Synopsis

The accident was notified to the Air Accidents Investigation Branch (AAIB) by Shoreham Airport Air Traffic Control (ATC) shortly after it occurred; an AAIB field investigation was commenced immediately.

The Hurricane aircraft was taking part in a flying display and was following another Hurricane in a tail chase. Both aircraft flew past the spectators along the display line at a height of approximately 200 ft before tracking to the north-west and climbing. The lead Hurricane climbed to approximately 1,100 ft above ground level (agl), pitched nose up about 45° and rolled to the left through 270°, before pulling into a right turn to rejoin the display line. The second Hurricane, which was approximately 700 ft agl, pitched nose up about 15°, before rolling to the left. As it reached the inverted position, the roll stopped, the nose dropped and the aircraft entered a steep dive. It struck the ground, fatally injuring the pilot. The aircraft was destroyed by the ground impact and subsequent fire.

The pilot appeared to have attempted to follow the manoeuvre flown by the leading pilot. Although the airspeed was adequate, the aircraft had insufficient nose up pitch attitude at the point of entry to ensure the safe execution of the manoeuvre in the height available. When the aircraft was inverted, the roll stopped, the nose dropped and insufficient height was available to recover from the dive.

The investigation identified the following causal factors:

- 1 The accident probably occurred as a result of the pilot attempting an unplanned rolling manoeuvre.
- 2 When the manoeuvre was commenced, the airspeed was adequate, but the nose up pitch attitude was insufficient to enable the manoeuvre to be completed safely in the height available.

When the roll stopped in the inverted position, the aircraft's nose dropped rapidly and there was insufficient height available for the recovery manoeuvre the pilot attempted.

SAFETY RECOMMENDATION - 2009-052

It is recommended that the UK Civil Aviation Authority requires that the sequence of manoeuvres for a flying display is clearly specified in advance of the display and provided to the display organiser and that the sequence is practised prior to displaying to the public.

Response

The CAA accepts this recommendation. CAP 403 (Eleventh Edition - dated 1 April 2009) requires that:

- a). The Flying Display Director during the planning phase of the event will be required to consider and manage pilot display programmes.
- b). The Flying Director ensures that pilots do not carry out any form of impromptu display.
- c). Participants remain aware that the impromptu, ad hoc, unrehearsed or unplanned should never be attempted.
- d). The Flying Display Director is charged with circulating, prior to the event a written brief to all participants which will include details of manoeuvres to be flown at the event that are known and have been practised (including bad weather 'flat-shows').

e). Pilots are required to have flown or practised at least three full display sequences (at least one of which was flown or practised on the aircraft type to be utilised in the display) in the 90 days preceding the event.

f). On the day of the event, no pilot may take part in the event unless he has participated in the formal Flying Display briefing, either in person or telephonically (if he is not landing at the flying display site).

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-053

It is recommended that the UK Civil Aviation Authority amend the Display Authorisation process to identify the level of aerobatic manoeuvres a pilot is permitted to perform when leading or flying as a member of a tail chase.

Response

The CAA accepts this Recommendation. An amended process is now in place. Display Authorisations issued to pilots who are not allowed to perform aerobatic manoeuvres during tail chases now make this clear. Some 30 pilots who already held Display Authorisations but were not allowed to fly aerobatics during tail chases have had new Display Authorisation issued.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-054

It is recommended that the UK Civil Aviation Authority introduce a recurrent programme of Human Factors training for display pilots. The training should specifically address human performance and its limitations when undertaking display flying and should form part of the Display Authorisation process.

Response

The CAA accepts this recommendation. CAA Document 743 'Civil Air Displays, A Guide for Pilots', which is available on the CAA website, contains Human Factors advice in 'plain English'. The application procedure for a Display Authorisation requires a Display Evaluator to cover Human Factors in the form of personal limitations and the applicant's mental attitude to display flying. Further recurrent training for Human Factors was discussed at the 2009 Display Authorisation Evaluators Seminar held in November 2009. An amendment has been made to CAP 403 'Flying displays and Special Events: A Guide to Safety and Administrative Arrangements' to include a Human Factors reference in the Application Forms.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-055

The UK Civil Aviation Authority should amend CAP 403 to require a pilot to demonstrate competence in each aircraft category to be flown and the level of aerobatic maneuvers to be performed in the specific flying display discipline (solo, formation, tail chase) for which the Display Authorisation is being sought.

Response

The CAA accepts this Recommendation in so far as it is already a requirement in CAP 403, at Ch 6, for a pilot to complete a Display Authorisation flight each time he changes aircraft category. During that flight any specific flying display discipline that the pilot has not previously been authorised to perform will be required to be flown. However, for example, where the pilot has already been granted a DA for formation flying in one category and is an experienced formation pilot, then it might not be considered necessary for his ability to fly in formation in a new category to be demonstrated during a DA flight. Instead the flight would be used to demonstrate his ability to operate the new category of aircraft safely at display heights while performing the manoeuvres included in the display sequence. CAP 403 also covers the requirement for DA renewal on multiple categories of aircraft. However, if the intent of the

Recommendation is that the pilot should be required to demonstrate all flying display disciplines that are to be flown in the new category of aircraft irrespective of his previous experience, then the CAA does not accept the Recommendation as it believes that previous experience should be taken into account.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-056

It is recommended that the UK Civil Aviation Authority (CAA) remind CAP 632 aircraft operators of the need to clearly identify in the Organisational Control Manual the level of initial and recurrent training required and that the CAA should ensure compliance with those requirements.

Response

The CAA accepts this Recommendation. This requirement is in place and is covered in the annual audit of CAP 632 operators.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-057

It is recommended that the UK Civil Aviation Authority conduct periodic reviews of the current operating requirements to ensure that they provide adequate safety for display flying.

Response

The CAA accepts this recommendation. CAP 403 was reviewed in 2008/9 and the 11th edition was published on 1st April 2009. A further review of current operating requirements was undertaken during the 2009 Display Authorisation Evaluator's Seminar held in November 2009 and it was concluded that the current operating requirements were satisfactory. Future seminars will include a review of operating requirements as a standing agenda item. CAP 403 was further reviewed and updated to Edition 12 as of 1 March 2010.

Status - Accepted - closed

Socata TBM700	Alderney Airport	27 March 2008	Accident
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AAIB Bulletin: 5/2009

FACTOR: N/A

Synopsis

The pilot of a TBM 700 landed with three green lights and a red light showing on the landing gear control and indication panel; the nose gear subsequently collapsed during the rollout. The pilot had interpreted the three greens as indicating that the landing gear was locked down, however the red light signifies that the gear is unlocked and takes precedence over the three greens. Although the correct procedure required the landing gear to be operated manually using the hand pump, it was dependent on the pilot recognising that a red warning light signifies that the landing gear is unlocked, even if three greens are displayed concurrently. The lack of clarity in the TBM 700 Pilot's Operating Handbook (POH) regarding the significance of the red warning light was considered to be a causal factor in this accident. One Safety Recommendation is made to improve the clarity of the Emergency Procedures in the TBM 700 POH.

SAFETY RECOMMENDATION - 2009-002

It is recommended that EADS Socata amends the TBM 700 Pilot's Operating Handbook, to clarify that the gear must be extended manually if a continuous red light is showing, even if the green gear lights on the landing gear control and indication panel are lit.

Response

On Page 4 of your draft document on line 24 to 26, you wrote "pilots who fly other aircraft types in addition to the TBM and who are not aware of the significance of the red light are therefore more likely to assume that three greens signify that the landing gear is locked down"

During Pilot training, the major emergency procedures are reviewed. Especially this training focuses on the landing gear emergency procedure and the associated warning indication (a red warning light on meaning an unlocked landing gear). See also JOEB TBM700 report for reference (Appendix 1 initial course syllabus page 3). Moreover, the landing gear emergency procedure is applied by the trainee during one of his training flight. Hence, the sentence "pilots...who are not aware of the significance of the red light" can't be held back because of this specific review of the pilot training.

In consequence, we propose to replace line 24 to 26 with "During TBM700 training, landing gear emergency procedures review provides explanation of red light signification. Hence, pilots are supposed to be aware of the procedures to apply in case of red light on."

On page 5, between line 2 and 3, we would add a paragraph: "conclusion", with "despite the indication of a red light showing the landing gear problem, the POH emergency procedure has never been applied, which could have avoid this incident."

Following last years incidents, EADS Socata issued a service letter, SL70-050-32 (see attached files): "procedures related to landing gears" to remind pilots, that it is mandatory to apply the procedures described in the POH and especially any indication discrepancy must lead to manual operation of the landing gear.

Status - Rejected - open

Raytheon 390	En route Copenhagen, Denmark to Farnborough	7 August 2008	Incident
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AAIB Bulletin: 2/2010
FACTOR: N/A

Synopsis

During descent the crew reported experiencing the loss of airspeed information followed by the loss of all three electronic flight instrument system (EFIS) displays. The investigation concluded that the loss of air data information was due to a blockage in the right pitot system caused by moisture ingress which subsequently froze. However, despite exhaustive testing, it was not possible to determine the cause of the loss of all three EFIS displays.

One Safety Recommendation is made.

SAFETY RECOMMENDATION - 2009-109

It is recommended that the Federal Aviation Administration should require Hawker Beechcraft Corporation to review and modify, if necessary, the design of the pitot and static drainage on the Premier 1 aircraft in order that its pitot/static systems cannot become blocked as a result of trapped moisture.

Status - Response Awaited - open

Aeroplanes = or < 2,250kg MTWA

Reims Cessna F152

Meden Vale,
Nottinghamshire

28 October 2006

Accident

AAIB Formal: 1/2008

FACTOR: F4/2008

Synopsis

After approximately 20 minutes of flight the engine rpm started to decrease, with the engine running unevenly and producing severe vibration prior to stopping. The pilot successfully landed the aircraft in a field, with no injury to the occupants. An engineering examination revealed that the No 4 cylinder had separated from the engine due to a fatigue crack that had originated from an external surface corrosion pit. A search of the Civil Aviation Authority's Mandatory Occurrence Reporting database revealed 23 similar events. The Bureau D'Enquetes et D'Analyses Pour La Securite De L'Aviation Civile (BEA) has reports of 34 similar events occurring in France.

SAFETY RECOMMENDATION - 2007-092

It is recommended that the European Aviation Safety Agency (EASA) should amend EASA Part 145 (and Part M as necessary) to require that all EASA Part 145 approved organisations supply the aircraft operator with the records associated with work that they perform on an aircraft, engine, propeller or component.

Response

Annex II to Commission Regulation (EC) No 2042/2003 as last amended by regulation (EC) No 1056/2008, 'Part 145', chapter 145.A.55 (b) already requires maintenance organisations to provide a copy of each certificate of release to service to the aircraft operator, together with a copy of any specific approved repair/modification data used for repairs/modifications carried out as written in the report. In the Acceptable Means of Compliance (AMC) to Part 145 [ref. Executive Director (ED) Decision 2003/19/RM as last amended by Decision 2009/007/R], chapter 145.A.50 (b) states that 'When extensive maintenance has been carried out, it is acceptable for the certificate of release to service to summarise the maintenance so long as there is a unique cross-reference to the work-pack containing full details of maintenance carried out. Dimensional information should be retained in the work-pack record.'

The purpose of this requirement is to make sure that the operator receives all the information required to determine the airworthiness of the aircraft and the next maintenance due. However, it is not mandatory for maintenance organisations to provide to their customers a complete copy of the 'work-pack' of the maintenance performed.

The benefit of requiring all Part 145, Subpart-F organisations and independent Part 66 licence holders for general aviation to implement such instruction for each product, part and appliance has not been proven by the final report to balance the cost which would be induced.

Status - Rejected

SAFETY RECOMMENDATION - 2007-094

It is recommended that the European Aviation Safety Agency review the Airworthiness Directive 1998-225(A) R6 issued by Direction Generale de l'Aviation Civile (DGAC) in France with a view to issuing an EASA Airworthiness Directive to cover this area of concern.

Status - Response Awaited - Open

MCR-01	2, Four Oaks, Highclere, Hants RG20 9PB	11 April 2008	Accident
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AAIB Bulletin: 6/2009
FACTOR: F7/2009

Synopsis

On approach to a small private landing field, the aircraft rolled left and crashed in the garden of a private house. The loss of control was probably caused by loss of airspeed in gusty conditions as the pilot attempted to approach the confined landing area. The investigation found no indication of any mechanical defect that would have contributed to the accident.

SAFETY RECOMMENDATION - 2009-007

It is recommended that the International Civil Aviation Organisation publish a Standard which defines internationally agreed warning placards for application to all aircraft fitted with ballistic parachute recovery systems, that give as clear an indication as possible at the greatest distance reasonable of the dangers posed to first responders to an accident aircraft fitted with a ballistic parachute recovery system.

Response

ICAO believes it would be inappropriate to develop a specific Standard in Annex 8 - Airworthiness of Aircraft before the Federal Aviation Administration, the Civil Aviation Authority and the European Aviation Safety Agency take action with respect to Safety Recommendation 2009-008. After which, ICAO would request the AIRP to reconsider the issue and in developing Standards and Recommended Practices (SARPs) for warning placards, if and where necessary, to indicate the dangers posed to first responders by an aircraft system. Such SARPs may be associated with Notes included in the text, where appropriate, that would give references to harmonized requirements developed by other authorities, particularly in response to Safety Recommendation 2009-008.

Status - Partially Accepted - open

SAFETY RECOMMENDATION - 2009-008

It is recommended that the Federal Aviation Administration, the Civil Aviation Authority and European Aviation Safety Agency, cooperate to require the application of warning placards of a common agreed standard, to be applied to all aircraft fitted with ballistic parachute recovery systems for which they have airworthiness responsibility, to maximise the possibility of first responders being made aware of the danger posed by a live system following an accident. These placards should be applied in such a manner that at least one such placard should remain visible regardless of the stationary attitude of the aircraft.

Response

Both the National Transportation Safety Board (NTSB) and the FAA have put forth earlier recommendations that proposed developing and mandating placards for ballistic parachute systems (BPS). The FAA evaluated these recommendations by gathering responses from affected firefighting organizations about the effectiveness of placarding. The FAA found a lack in general knowledge of or about these systems through their contact with the first responder community. Furthermore, the feedback indicated that application of placards were not complete solutions as they may not be identifiable or may not be understood on an accident aircraft. The first responder community identified that placards would be helpful, but they also noted that training was really needed. As a result, the FAA worked with industry and first responder groups to develop training for first responders to a small aircraft or helicopter accident.

A standardized placard is now in place and required for light sport aircraft with BPS. In 2006, the placard was released and identified as ASTM International Standard F2316-06. The standard

defines how to install and identify a BPS. ASTM F2316-06 requires three different placards placed one on the top of the rocket; one at the point the rocket exits the aircraft, and one near the entry point of the aircraft to identify installation of a BPS (see attachments for the ASTM-compliant placard). The FAA, industry, and first responder participants developed this consensus standard. The ASTM F2316-06 standard complies with American National Standards Institute (ANSI Z535.4) protocols for identification of the hazards. ANSI requirements are similar to international standard ISO 3864 for generic hazard labeling.

The FAA evaluated the mandatory application of placards and determined the proposal did not meet the criteria for issuing a retroactive airworthiness directive for existing Part 23 certificated aircraft equipped with a BPS. The BPS identification does not represent a safety of flight issue, the placards can be easily compromised, and the risk does not meet the required threshold for issuing an airworthiness directive. The FAA is mandating ASTM International F2316-06 compliant placards on new type certificates and on modified aircraft that install a BPS. The FAA issued Special Airworthiness Information Bulletin CE-09-01 on October 21, 2008, recommending the application of standardized placards on BPS-equipped CFR Part 23 aircraft.

Included with this response is a compact disc of the training materials developed by the FAA for first responders. Please note that the material on this disc is draft material and is not intended for distribution. The attached modules will be made available on the internet in coming months. The material was developed with much assistance from manufacturers, aviation industry groups and first responder organizations. In addition to in-depth BPS safety information, the material contains extensive hazard and investigation protocol information for the first responder and other personnel that may encounter a small aircraft or helicopter accident scene. The current material is geared towards an accident in the United States; however, the FAA would be willing to assist in working with the CAA and other authorities throughout the world in developing an international version.

The FAA believes that the required standard is in place as ASTM International F2316-06 and further development would be redundant. We consider our action complete and request this recommendation be closed.

The CAA accepts this recommendation. BCAR Section S, the CAA's design requirements for Small Light Aeroplanes, already contains a requirement for an easily distinguishable external warning placard to be fitted to aircraft where the ballistic recovery system is installed, in order to minimise the potential hazard to personnel on the ground. The CAA is currently working with UK General Aviation representative bodies to extend this requirement, for the aircraft for which it has airworthiness responsibility, to require warning placards which would maximise the possibility of first responders being made aware of the danger posed by a live system following an accident such that at least one should remain visible regardless of the stationary attitude of the aircraft. In parallel, the CAA will co-operate with the Federal Aviation Administration and the European Aviation Safety Agency in order to achieve a common standard for the design of these placards.

The CAA has worked with industry to design and produce a suitable placard. These have been distributed to the BMAA and GaSco for allocation to their members operating aircraft with ballistic parachutes fitted. Whilst BCAR Section S already contains a requirement for a placard to be fitted when such systems are installed, the CAA will amend BCAR Section S to include a visual depiction of the placard design that has been agreed. This will be done by December 2010.

The CAA has written to ICAO and EASA to inform them of the UK's work and to recommend International and European adoption of this solution.

Status - Accepted - closed

AAIB Bulletin: 2/2009

FACTOR: F3/2009

Synopsis

The aircraft took off from a farm strip at its maximum authorised weight. It then flew over a small valley and encountered a downdraught. The pilot considered that the aircraft might not clear the far side of the valley so he commenced a forced landing. During the forced landing the right undercarriage leg collapsed and the right wing came into contact with the ground. The aircraft structure failed where the pilot's shoulder harness was attached to the airframe and the pilot sustained minor head injuries.

SAFETY RECOMMENDATION - 2009-001

It is recommended that the Civil Aviation Authority, in conjunction with the Light Aircraft Association, review the design of the shoulder harness attachment on the Evans VP-1 to ensure that the pilot is adequately restrained in the event of an accident.

Response

The Light Aircraft Association, in consultation with the Civil Aviation Authority, reviewed the design of shoulder harness attachment on the Evans VP-1 and provided the following response:

'The Light Aircraft Association have reviewed the design of the shoulder harness attachment on the VP-1 but do not consider that a mandatory design change is appropriate because:

1. As a permit to fly aircraft, full compliance with a design code is not required.
2. The aircraft type has accommodated a substantial history of successful in-service experience, including in the UK, and shoulder harness issues have not previously been a significant safety issue in influencing the outcome of accidents, when they have occurred.
3. In an aircraft of this class and configuration, occupant protection in an accident is inevitably poorer than in a conventional aircraft by virtue of the exposed cockpit and lack of turn-over protection, plus the proximity of the instrument panel to the pilot's face. Due to the latter, even if the shoulder harness had not failed it is considered likely that the pilot's harness will inevitably allow forward head motion as the harness 'takes up the slack'. Furthermore, there is a risk that a more effective shoulder harness in conjunction with the rather minimum turn-over protection could actually increase the danger of a head injury in a turn-over accident. A Topsy Nipper pilot died a few years ago when his head struck the ground in a gentle turn-over accident when he might well have survived if he had been able to slump forward as the aircraft pitched over.
4. The CS-VLA requirements do not specify that the harness attachments must remain intact following an accident in which major airframe disruption occurs, as in this case. It is common with light aircraft to use the attachments for wing and tail as the harness attachments, on the assumption that normally the airframe is still essentially intact at the instant that the shoulder harness is required to contain the pilot at initial impact.'

The CAA accepts this Recommendation and, in conjunction with the Light Aircraft Association, has reviewed the design of the shoulder harness attachment on the Evans VP-1 and considers that the existing design is adequate.

This aircraft type has accumulated a significant service history in which the adequacy of the design of the shoulder harness attachment, to restrain the pilot in the event of an accident, has not been a cause for concern.

Status - Accepted - closed

Extra EA 300/L

Hastingleigh, near
Ashford, Kent

26 May 2008

Accident

AAIB Bulletin: 8/2009

FACTOR: N/A

Synopsis

The aircraft was en-route from a flying display at Southend Airport, to its home base at Shoreham. Due to inclement weather, with a low cloudbase and poor visibility, the pilot planned to fly around the Kent coast, but having encountered better weather than expected when airborne, he set off across the county. Unfortunately the visibility deteriorated and the cloudbase lowered so he decided to abandon his route and re-trace his path. Instead of reversing his course, however, he turned through approximately 270°, and found he was flying up a valley. He elected to carry out a precautionary landing into a field, but lost control of the aircraft on final approach. The aircraft struck the ground at low speed while rolling and banked to the right. Although the airframe remained relatively intact and no ground fire occurred, both occupants were injured, one seriously. Three Safety Recommendations are made.

SAFETY RECOMMENDATION - 2009-013

It is recommended that aircraft manufacturer, Extra-Flugzeugbau GmbH, develop modifications for the Extra 300/L, and other models of similar configuration, to substantially improve the cockpit environments by the addition, for example, of energy absorption provisions for seats and relevant areas of the cockpit, with the aim of reducing the likelihood and severity of occupant injury during an accident.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-014

It is recommended that the European Aviation Safety Agency revise their certification requirements applicable to light aircraft crash survivability, with the aim of reducing occupant injury in otherwise survivable accidents. Detailed consideration should be given, for example, to requiring energy absorption provisions for seats, improved padding of aircraft components that might be impacted by an occupant and the fitment of air bag systems for both crew and passengers.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-015

It is recommended that the European Aviation Safety Agency consider requiring the modification of light aircraft types for which they have airworthiness responsibility, where the extant restraint systems are unlikely to prevent contact of the occupants with hard parts of the aircraft, with the aim of reducing the likelihood and severity of occupant injury in an otherwise survivable accident. Detailed consideration should be given, for example, to requiring energy absorption provisions for seats, improved padding of aircraft components that might be impacted by an occupant, and the fitment of air bag systems for both crew and passengers.

Status - Response Awaited - open

**Acroduster Too
SA750**

**Near Farthing
Corner (Stoneacre
Farm) Airfield, Kent**

26 July 2008

Accident

**AAIB Bulletin: 5/2009
FACTOR: F6/2009**

Synopsis

The aircraft departed from Runway 06 at Farthing Corner Airfield in Kent and was seen to climb to a height of 300-400 ft. The aircraft then turned back towards the airfield and flew in the direction of the hangar complex. As it approached the hangars, the nose pitched up and what appeared to be an aileron roll to the right was commenced. When the aircraft became inverted, the rate of roll appeared to slow or stop momentarily. The roll continued but the manoeuvre then appeared to become more of a barrel roll. The aircraft descended and struck tall trees before impacting the grass surface of an orchard.

Members of the public were quickly on the scene but were unable to release the pilot who received serious burns from the ensuing fire.

SAFETY RECOMMENDATION - 2009-046

It is recommended that the Civil Aviation Authority and the Light Aircraft Association consider introducing a requirement to install a placard adjacent to the cockpit, advising potential rescuers that the aircraft seats are fitted with more than one restraint harness.

Response

The CAA and the LAA accept this Recommendation.

The CAA and the LAA have completed their consideration of the introduction of a requirement to install a placard adjacent to the cockpit advising potential rescuers that the aircraft seats are fitted with more than one restraint harness.

The accident report states that, during the site examination, both the pilot's harness and secondary lap strap were found unfastened. None of the rescuers could recall undoing the lap strap nor was it positively established that the secondary lap strap had been secured. The report recognises that the pilot may equally have been trapped in the cockpit by aircraft structure pressing on his legs.

In circumstances requiring rapid removal of the pilot, such as from an encroaching fire as was the case here, the CAA and LAA consider that a placard is unlikely to have the necessary prominence to warn rescuers of the presence of a second lap strap.

The CAA and LAA conclude, therefore, that the evidence from this accident does not support the introduction of a new requirement.

Status - Accepted - closed

AAIB Bulletin: 4/2008

Factor: N/A

Synopsis

As the crew carried out functional checks of the flight controls while taxiing for takeoff, both left brake pedals became disconnected. It was found that the left wheelbrake master cylinder had detached from the rudder/brake pedal mechanism. The failure was consistent with the effects of previous overload and consequent weakening of the mechanism as a result of inadvertent exceedence of the maximum allowable nosewheel steering angle during ground towing. In this situation, as the primary steering stops were within the pedal mechanism, rather than on the nosewheel leg, the mechanism could be severely overloaded. Damage could both weaken the mechanism and reduce the clearances between its moving parts and other components, potentially preventing operation of the rudder and/or wheelbrake controls, and could remain undetected for a considerable time.

The aircraft manufacturer had taken a number of measures aimed at reducing the likelihood of the pedal mechanism being damaged during towing. A relatively minor aircraft modification could probably eliminate the possibility of such damage. Three Safety Recommendations are made.

SAFETY RECOMMENDATION - 2008-008

It is recommended that EASA require the development of modifications for the Slingsby Advanced Composites Ltd T67 aircraft, aimed at eliminating the possibility that forces generated during towing could cause undetected damage to the rudder/brake pedal mechanism.

Response

The Safety Recommendation arises from an early Slingsby assessment of the rudder Pedak problems. Since that time Slingsby have established a number of additional possible contributory factors including incorrect use of unapproved tow bar with a tow vehicle, incorrect assembly of handed rudder support brackets and reduced strength floor structure.

Slingsby have since produced clarification in SB 187 and 188 Issue 4 (mandated by EASA AD 2009-0013 dated January 2009), the need to use an Slingsby approved tow bar that incorporates a weak link to protect the rudder circuit, and clarified the position at which specific rudder support brackets are to be used. Issue 5 of SB 187 and 189 are now the subject of a further EASA Airworthiness Directive that mandates the implementation of Mod bulletin M919 to introduce additional cloth layers under the floor at the position of the left hand rudder pedals.

EASA considers that the required actions, by means of AS 2009-0218 dated 12 October 2009, meet the intent of this safety recommendation.

Status - Accepted - closed

Extra EA 300	On the Runway at White Waltham Airfield	12 September 2008	Accident
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AAIB Bulletin: 2/2010
FACTOR: N/A

Synopsis

During the landing roll the left landing gear leg fractured, which caused the wheel assembly to detach from the leg. Examination of the failure revealed that the lower area of the composite leg had weakened over a period of time, due to the brake calliper abrading the paint and outer layer of the glass fabric reinforced composite material. This caused cracks to develop and propagate in the cotton flock-filled composite material in the area of the metal flange plate, as a result of lateral flexing of the leg. This abrading and cracking of the composite material allowed contaminants into the plywood core and, over time, caused the plywood to swell. This swelling caused further cracking of the composite material, weakening the lower leg in the area of the wheel attachment, which resulted in a lateral failure.

SAFETY RECOMMENDATION - 2009-108

It is recommended that the Luftfahrt-Bundesamt (LBA) review the continued airworthiness of the main landing gear fitted to Extra EA 300 aircraft to ensure the integrity of the outer layer of the cotton-flock filled epoxy resin film.

Status - Response Awaited - open

Extra EA 230	White Waltham Airfield, Berkshire	10 October 2008	Accident
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AAIB Bulletin: 1/2010
FACTOR: N/A

Synopsis

While taxiing to the holding point the right landing gear leg fractured, which resulted in the right wing tip contacting the ground and the aircraft pivoting to the right. Metallurgical examination of the failure of the right landing gear showed that the fracture was as the result of a fatigue crack that had initiated from a small corrosion pit.

SAFETY RECOMMENDATION - 2009-104

It is recommended that EXTRA GmbH review the continued airworthiness of the main landing gear fitted to the Extra EA 230 aircraft, to ensure adequate protection measures to reduce the occurrence of corrosion pitting.

Status - Response Awaited - open

**Grob G115E
Standard Cirrus**

**Sutton Courtenay /
Drayton / South of
Abingdon**

14 June 2009

Accident

AAIB Formal Report: 5/2010

FACTOR: N/A

Synopsis

A Grob 115E Tutor aircraft, operated by the Royal Air Force (RAF), was undertaking a cadet air experience flight from RAF Benson. The visibility was good and the aircraft was conducting aerobatics, in uncontrolled airspace, when it collided with a glider. The left wing of the Tutor struck the fin of the glider causing the tail section to break away. The glider pilot parachuted to safety. The Tutor entered a spiral / spinning manoeuvre before diving steeply into the ground. The Tutor pilot and cadet were both fatally injured.

The Tutor pilot had a long term medical condition, which restricted the movement of his head and affected his ability to conduct an effective look out; this condition also made him more vulnerable to impact fractures of the spine. Following the collision it is probable that the Tutor remained controllable, suggesting that the pilot had become incapacitated.

The cadet's harness had been released and the canopy operating handle had been moved to the open position before the Tutor impacted the ground. The canopy jettison mechanism had not been operated.

SAFETY RECOMMENDATION - 2009-079

It is recommended that No 1 Elementary Flying Training School of the Royal Air Force review the passenger safety brief relevant to the Grob GE115E (Tutor) to ensure that passengers are briefed on the circumstances when the harness Quick Release Fitting may be released and the procedure to operate and jettison the canopy, when sat in the aircraft immediately prior to the flight.

Response

I confirm that the recommendation had coincidentally been enacted by No 1 Elementary Flying Training School (EFTS) prior to receipt of your letter, as the issue had been highlighted within the EFTS flying community. The following direction was provided by No 1 EFTS Headquarters on 21 July 2009, to all Air Experience Flying (AEF) Flight Commanders:

SAFETY EGRESS TRAINING

With immediate effect: on all cadet sorties, and prior to take-off, Aircraft Commanders are to include a re-enforcement of the abandonment procedures outlined in the Tutor Safety Video. This review is to include:

- How to release the seat harness
- How to jettison the canopy
- How to locate and operate the parachuting D-ring
- How to egress the ac.

The requirement for aircraft commanders to conduct this re-enforcement procedure will be included in the next change to Training Group Orders, thereby ensuring its permanence.

Status - Accepted - closed

Microlights

Flight Design CTSW	Saddleworth Moor, Lancashire	8 October 2008	Accident
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AAIB Bulletin: 11/2009

FACTOR: N/A

Synopsis

The pilot was flying from Manchester Barton to Shacklewell Lodge, a small private airstrip near RAF Cottesmore. To the east of Manchester the aircraft descended rapidly and crashed into the ground at Saddleworth Moor, probably as a result of a loss of control following an inadvertent entry into cloud. One Safety Recommendation is made, concerning baggage restraints.

SAFETY RECOMMENDATION - 2009-101

It is recommended that P&M Aviation/Flight Design review the design of the current baggage restraints in the CTSW design, to ensure that it provides effective restraint of all stowed baggage.

Response

We have received draft report EW/C2008/10/01 concerning an accident to a CTSW on Saddleworth Moor. Although we think it unlikely that loose baggage was a factor in this accident, We accept the safety recommendation and are reviewing the design of the baggage restraint in the CTSW and CT2K aircraft.

Status - Accepted - closed

Rotorcraft > 5,700kg MTWA or above

AS332L2

Aberdeen Airport,
Scotland

20 November 2007

Incident

AAIB Bulletin: 2/2009

FACTOR: N/A

Synopsis

A Training Captain was conducting an Operational Proficiency Check (OPC); the pilot under training was required to demonstrate a clear area rejected takeoff. The helicopter was equipped with a Training Idle System (TIS) which was in use to simulate a failure of the left engine. The helicopter took off along Runway 16 at Aberdeen; at about 28 kt the commander simulated a failure of the left engine and the takeoff was rejected. The pilot flared the helicopter to reduce speed and descended towards the runway. As the collective control lever was raised to reduce the rate of descent, the overspeed protection system shut down the right engine. Rotor rpm (RRPM) decayed rapidly and the helicopter touched down firmly before RRPM could be restored.

The right engine freewheel unit had failed causing that engine to overspeed; this was contained by the overspeed protection system shutting down the engine.

SAFETY RECOMMENDATION - 2009-003

It is recommended that Eurocopter should review the operation of the Training Idle System on the AS332 L2 helicopter in the event of the failure of the operating engine. Eurocopter should ensure that the behaviour of the helicopter in terms of NR recovery and any height loss are included in the Flight Manual Supplement, Supp 3. The correct pilot technique for managing such an event should also be included. This information should be based on flight test data.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-004

It is recommended that the European Aviation Safety Agency should review the accuracy of Flight Manual information covering Training Idle Systems fitted to all helicopter types or models. They should ensure that the information on the system, the behaviour of the helicopter and the correct pilot technique to be employed in the event of the operating engine failing are correctly documented.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-005

It is recommended that the European Aviation Safety Agency should require that when a helicopter is fitted with a Training Idle System, or similar system, the effects of a failure of the operating engine are determined during the flight test and certification process.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-006

It is recommended that the European Aviation Safety Agency should ensure that where a Training Idle System is fitted to a flight simulator the handling qualities and performance of the helicopter, following the failure of the operating engine, are accurately modelled.

Response

EASA supports the intent of this safety recommendation and has sent a letter to all member states' National Aviation Authorities (NAA's) [reference JSA/AKL/C(3) 2010(D)50381 on 21 January 2010] to highlight this safety recommendation. And specifically to recommend that:

Where Full Flight Simulators and Flight Training Devices are fitted with an One Engine Inoperative (OEI) Training mode, the helicopter handling qualities and performances, the behaviour of the engine and the man machine interface must be accurately modelled. The failure of the operative engine during OEI training should also be taken into account.

Europeans Aviation Safety Agency is recommending to NAA's to ensure that Flight Simulator Training Devices (FSTD) fitted with an OEI Training mode are compliant with the above before any qualification.

Status - Accepted - closed

EC225 LP	Approximately 500 metres south of the ETAP platform in the North Sea Central Area	18 February 2009	Accident
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AAIB Special Bulletin: S3/2009
FACTOR: F9/2009

Synopsis

The helicopter was approaching its destination, the ETAP oil production platform located 132 nm east of Aberdeen, at night, when it was seen by observers on the platform to strike the surface of the sea. The helicopter remained afloat, all the occupants escaped into two liferafts and all were subsequently rescued. Although the accident was observed from the ETAP platform and a Search and Rescue (SAR) operation was initiated immediately, it was some time before the passengers and crew were located.

Following the arrival of the first SAR helicopter in the vicinity of the ETAP platform, 27 minutes elapsed before the occupied liferafts were identified approximately 400 m from the platform. The search was hampered by the darkness, fog and the weakness/absence of homing signals on the emergency frequencies 121.5 MHz and 243.0 MHz, although survival equipment designed to transmit on both these frequencies had been activated by the crew. The liferafts were finally located by a combination of aircraft weather radar, visual guidance from personnel on the ETAP platform and a weak signal on 121.5 MHz.

SAFETY RECOMMENDATION - 2009-064

It is recommended that the Civil Aviation Authority review the carriage and use in commercial air transport helicopters of any radio location devices which do not form part of the aircraft's certificated equipment.

Response

The CAA accepts this recommendation. The CAA has reviewed the carriage and use of radio location devices, such as Personal Location Beacons (PLB), in commercial air transport helicopters which do not form part of the aircraft's required equipment. The review has led to the development of CAA guidance material, already circulated to industry under cover of AIRCOM 2009/08, that enables operators to determine whether specific devices are acceptable for carriage.

Acceptance of these devices is predicated on establishing a low risk of their inadvertent activation or by on-aircraft testing to show that transmissions from such devices do not cause interference with the aircraft or its systems.

These radio location devices are not intended for use on board the aircraft, being part of the offshore industry's overall safety strategy, and CAA's responsibilities are limited to the determination that the carriage and use of such devices does not cause interference with the aircraft or its systems. However, the CAA recognises that such devices may be used as a

locating device for search and rescue purposes and has therefore issued guidance to operators to help ensure that the transmissions from these devices do not compromise the operation of any Emergency Locator Transmitters (ELTs) required by the relevant aviation operating rules.

In addition, the CAA has issued a Flight Operations Communication (FODCOM 22/2009) which highlights the need for training in the use of emergency equipment such as ELT/PLB devices.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-065

It is recommended that the Civil Aviation Authority advise the European Aviation Safety Agency of the outcome of the review on the carriage and use in commercial air transport helicopters of any radio location devices which do not form part of the aircraft's certificated equipment.

Response

The CAA accepts this recommendation and has written to EASA on the subject of PLBs and provided a copy of both the AIRCOM and the FODCOM.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-066

It is recommended that European Aviation Safety Agency require manufacturers of Emergency Locator Transmitters (ELTs)/Personal Locator Beacons (PLBs) units to add details, where absent, of the correct use of the antenna to the instructions annotated on the body of such beacons.

Response

1) Review of applicable requirements:

Regarding standards applicable to portable ELTs, ED-62 2.8.3 (ED-62A 2.7.3) already requires clear instructions for use on outside of the case. No standard change is considered necessary.

2) Design review of portable ELT's

EASA has made a design review of portable Emergency Locator Transmitters (ELTs), which are either Survival or Automatic Portable ELTs. One of the objectives was to check that clear instructions are provided on the ELT at least in simple English language. Even though it can not be assumed that all passengers are able to read and understand English instructions, especially in a post crash condition, it is considered that this is the best way to communicate on how to use the unit especially when additional pictograms are provided.

The results have shown that only one manufacturer uses an extendable antenna. Further instructions regarding the need to extend the antenna are now provided on newly produced units. No retroactive change to the units already in the field has been requested as the manufacturer demonstrated that even with the not extended antenna the ICAO minimum requirement having a radiation of at least peak effective radiated power (PERP) of 50 mW is achieved. The transmitter does have a minimum output power of 100 mW as requested by ED-62 and the ETSO. EASA will monitor the situation to determine if the ICAO recommended reduced output power is sufficient for the final rescue operation or not.

Other manufacturers use an automatic erectable antenna. The erection is activated automatically when the unit is exposed to water or retracted from the fixture. Instructions for manual activation are provided on the unit as well.

For automatic Portable (AP) ELTs it is common practice to provide a separate antenna for the portable use. Instructions are provided how to disconnect the aircraft integrated antenna and how to connect the antenna provided separately for the portable use.

The issue raised by investigators is noted and was addressed. Consequently no further action is required.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-067

It is recommended that the Civil Aviation Authority ensure that all aspects of Emergency Locator Transmitter (ELT)/Personal Locator Beacon (PLB) operation, particularly correct deployment of the antenna, are included and given appropriate emphasis in initial and recurrent commercial air transport flight crew training, as applicable.

Response

The CAA accepts this Recommendation and has reminded operators that it is their responsibility to provide training to aircraft crews which should include relevant aspects of ELT/PLB use. The CAA has published FODCOM 22/2009 which highlights the pertinent circumstances of this accident and reminds operators to ensure that appropriate aspects of ELT/PLB operation are included and given due emphasis in initial and recurrent crew training. This includes specific guidance for flight crew training. The text of the FODCOM will eventually be included in CAP 768.

FODCOM 22/2009 Training in the Use of Emergency Equipment was published on 21 July 2009. It will be reviewed in July 2010 and either kept as an "active" FODCOM, or withdrawn and the content published in CAP 789 (superseding CAP 768).

Status - Accepted - closed

AS332L2	Approx 11 miles NE of Peterhead, Scotland	1 April 2009	Accident
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AAIB Special Bulletin: S5/2009
FACTOR: N/A

Synopsis

The helicopter was operating a return scheduled passenger flight from Aberdeen to the Miller Oil Platform, situated in the North Sea approximately 145 nm north-east of Aberdeen. When it arrived from its previous flight to the Bruce Platform, approximately 190 nm north-east of Aberdeen, a 'rotors running' crew change was carried out. The helicopter was serviceable except for a deferred defect affecting a part of its ice detection system. The daily in-flight checks had already been completed satisfactorily by the off-going crew. The helicopter was refuelled, the passengers boarded, and it lifted off at 1040 hrs. The helicopter landed on the Miller platform, after an uneventful flight, at 1149 hrs, where it was refuelled again with the rotors-running. When the refuelling was complete, fourteen passengers boarded the helicopter for the return flight to Aberdeen. The weather conditions were benign with light south to south-easterly winds, good visibility with generally clear skies but with occasional broken cloud at 5,000 to 6,000 ft. Flying conditions were reported as smooth and the sea was calm.

The helicopter lifted from the Miller Platform at 1203 hrs and climbed to 2,000 ft, tracking inbound towards Aberdeen. Recorded information on the combined Cockpit Voice and Flight Data Recorder (CVFDR) shows that the crew were engaged in routine cockpit activities and there were no operational abnormalities. At 1254 hrs the co-pilot made a routine call on the company operating frequency stating that the helicopter was serviceable and the ETA was 1314 hrs. Twelve seconds later, one of the pilots made a brief MAYDAY call on the ATC frequency. This was followed by a similar call that included some position information, from the other pilot. The radar controller at Aberdeen acknowledged the MAYDAY call and tried unsuccessfully to contact the crew. He then asked the crew of another helicopter, outbound on a similar routing, to examine the sea in the area of the last radar position.

Recorded radar information showed the helicopter flying inbound towards Aberdeen at 2,000 ft, climbing momentarily to 2,200 ft and then turning right and descending rapidly. Surface visibility was good and an eye witness, working on a supply vessel approximately 2 nm from the accident site, heard the helicopter and saw it descend rapidly before it hit the surface of the sea. Immediately after impact he saw the four main rotor blades, still connected at their hub, strike the water. Around this time, he also heard two bangs close together. He immediately raised the alarm and the ship turned towards the accident site, which by now was marked by a rising column of grey then black smoke. The ship launched a fast rescue boat whilst making way towards the scene. The crew of this boat and the helicopter arrived promptly on the scene to discover an area of disturbed water, roughly 150 m in diameter containing debris from the helicopter. Other search and rescue vessels, aircraft and helicopters arrived on scene within 40 minutes. All persons on board were fatally injured.

SAFETY RECOMMENDATION - 2009-048

It is Recommended that Eurocopter issue an Alert Service Bulletin to require all operators of AS332L2 helicopters to implement a regime of additional inspections and enhanced monitoring to ensure the continued airworthiness of the main rotor gearbox epicyclic module.

Response

See response to Safety Rec 2009-051. AD 2009-0099-E superseeds two previous AD's released as a result of this recommendation and 2009-048 and 2009-049.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-049

It is Recommended that the European Aviation Safety Agency (EASA) evaluate the efficacy of the Eurocopter programme of additional inspections and enhanced monitoring and, when satisfied, make the Eurocopter Alert Service Bulletin mandatory by issuing an Airworthiness Directive with immediate effect.

Response

EASA issued on 11/04/2009 the Emergency Airworthiness Directive AD 2009-0087-E for AS332 and EC225 helicopters related to Main Rotor Drive, Magnetic Plug of Main Gear Box Epicyclic Reduction Gear Module-Check.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-050

It is Recommended that Eurocopter improve the gearbox monitoring and warning systems on the AS332L2 helicopter so as to identify degradation and provide adequate alerts.

Response

See response to Safety Rec 2009-051. AD 2009-0099-E superseeds two previous AD's released as a result of this recommendation and 2009-048 and 2009-049.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-051

It is recommended that Eurocopter, with the European Aviation Safety Agency (EASA), develop and implement an inspection of the internal components of the main rotor gearbox epicyclic module for all AS332L2 and EC225LP helicopters as a matter of urgency to ensure the continued airworthiness of the main rotor gearbox. This inspection is in addition to that specified in EASA Emergency Airworthiness Directive 2009-0087-E, and should be made mandatory with immediate effect by an additional EASA Emergency Airworthiness Directive.

Response

EASA have issued three Airworthiness Directives (AD) for the AS232 L2 and EC225 helicopters. The first two have been superseded by AD 2009-0099-E, which now requires inspection of the main gearbox epicyclic module for metal particles and embodiment of a modification to improve the likelihood of chip detection. EASA believe that these actions are appropriate to address the conditions which have so far been identified by the accident investigation. Should the investigation identify additional information regarding the cause of this accident, EASA will evaluate the need to take further mandatory action.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-074

It is recommended that the European Aviation Safety Agency, in conjunction with Eurocopter, review the instructions and procedures contained in the Standard Practices Procedure MTC 20.08.08.601 section of the EC225LP and AS332L2 helicopters Aircraft Maintenance Manual, to ensure that correct identification of the type of magnetic particles found within the oil system of the power transmission system is maximised.

Response

As part of the process following G-REDL accident, Eurocopter have revised contents of the Standard Practices Manual by issuing Safety Information Notice (SIN) 2075-S-60 rev. 0 (09 July 2009). This adds procedures to enhance detection of exceptional events that might lead to incipient fatigue crack or even fracture.

The SIN has been endorsed by EASA via Safety Information Bulletin (SIB) No. 2009-27, issued on 21 August 2009.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-075

It is recommended that the European Aviation Safety Agency, in conjunction with Eurocopter, urgently review the design, operational life and inspection processes of the planet gears used in the epicyclic module of the Main Rotor Gearbox installed in AS332L2 and EC225LP helicopters, with the intention of minimising the potential of any cracks progressing to failure during the service life of the gears.

Status - Response Awaited - open

Rotorcraft <> 2,250kg and 5,700kg MTWA

Sikorsky S-76B	Approaching Coventry Airport	22 November 2007	Incident
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AAIB Bulletin: 4/2009

FACTOR: N/A

Synopsis

During cruise, whilst operating on a night positioning flight, the aircraft's auxiliary heater system overheated, melting the surrounding ducting and progressively filling the cockpit with smoke. The crew declared an emergency and expedited their landing, the smoke and heat subsided once the aircraft had been shut down on the ground. The electronic control box for the heater was removed and subsequently confirmed to have failed, probably disabling the overheat protection and cockpit controls for the system. One Safety Recommendation is made.

SAFETY RECOMMENDATION - 2009-033

It is recommended that the Federal Aviation Administration require Sikorsky Aircraft to provide the flight crew with the means to isolate the 115 volt ac power supply to the auxiliary heater elements in the event of failure of the cabin Environmental Control System (ECS) controller fitted in S-76B helicopters, and that the power supply to the auxiliary heater is disabled until that means is provided.

Response

The S-76B Rotorcraft Flight Manual (RFM) SA 4047-76B-1, Part 1, Section III, Emergency Procedure for Electrical Fire provides procedures for isolating and removing the 115-volt AC power from both auxiliary heater elements by securing the AC generator. Essential AC powered avionics will continue to function by the AC inverter(s). Also, the S-76B RFM Supplement (SA 4047-76B-1, S-23), Environmental Control Systems Normal Procedures, contains a system description section that identifies two 15-amp 115-volt AC circuit breakers, labeled as LT CABIN HEAT and RT CABIN HEAT. The RFM Supplement explains that pulling either circuit breaker will remove power from the corresponding auxiliary heater element. Either of these procedures will remove AC power from the auxiliary heater elements even if the ECS controller failed in a high heat commanded condition, which matches the ECS controller failure described in the SR.

In summary, since the procedures to isolate and remove the 115-volt AC power to the auxiliary heater elements were already provided when the system was designed, installed, and certified under STC SH2428SO, no action is necessary.

Status - Rejected

Rotorcraft = or < 2,250kg MTWA

SA 341G Gazelle

Rudding Park,
Harrogate, North
Yorkshire

26 January 2008

Accident

AAIB Bulletin: 11/2009

FACTOR: F1/2010

Synopsis

The pilot, who was experienced in fixed-wing aircraft but newly-qualified in helicopters, was undertaking a helicopter flight with a passenger, in gusty wind conditions. He was seen flying slowly, at a low level, near a chalet he owned in the grounds of an hotel when the aircraft was seen to spin around, before pitching up and falling to the ground, fatally injuring the two occupants.

It is considered that the pilot lost control of the helicopter whilst flying at low forward airspeed in strong and gusty wind conditions. The investigation revealed inconsistencies, and probable deficiencies, in the training of the pilot and inconsistencies, and possible deficiencies, in his subsequent PPL(H) Skills Test.

Deficiencies in the aircraft's maintenance were also identified, although these are not considered causal or contributory to the accident.

SAFETY RECOMMENDATION - 2009-084

It is recommended that the Serbian Civil Aviation Department review its oversight and audit system to ensure that aviation maintenance organisations in Serbia release to service only items for which they have the correct approvals.

Status - Response Awaited - open

SAFETY RECOMMENDATION - 2009-085

It is recommended that the Civil Aviation Authority conduct an audit of Serbian-registered aircraft in the UK to ensure that they meet the requirements of the Air Navigation Order.

Response

The CAA accepts this recommendation and will conduct the recommended inspection under the auspices of the Europe wide Safety Assessment of Foreign Aircraft (SAFA) programme.

The CAA conducted sample inspections of two Serbian registered Gazelle aircraft based in the UK. The inspections did not reveal any significant airworthiness issues or safety concerns. In addition, the CAA wrote to the Serbian Civil Aviation Department asking for clarification on the status of those UK based Gazelle helicopters that were known to be from an ex-military background.

The Serbian CAD has since issued a letter grounding a number of Gazelle helicopters and the CAA is satisfied that the actions taken address the immediate concerns arising from the accident. It is also understood that the Serbian CAD has suspended the maintenance approval held by the organisation cited in the AAIB report.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-086

It is recommended that the Civil Aviation Authority introduce periodic audits of Registered Training Facility (RTF) organisations to ensure appropriate private pilot training standards are being met at the current time and with the introduction of EASA FCL regulation.

Response

The CAA accepts this recommendation. New European regulations (EASA FCL) for pilot licensing are currently being developed and contain regulations that would require all training organisations, including Registered Training Facilities (RTF), to become approved organisations. All such approved organisations will be subject both to investigation before an approval is granted, and to periodic audits thereafter. Implementation of EASA FCL is currently expected to be circa 2013.

In the meantime the CAA will review its arrangements for the oversight of RTFs to ensure appropriate private pilot training standards are being met. This review will be completed by the end of June 2010.

CAA has carried out a review of the current Registered Training Facility (RTF) registration process and concluded that until EASA regulations apply, CAA cannot instigate a programme of routine oversight, as this is not provided for in the current JAR-FCL. However, where intelligence (such as MORs or other reports) suggests that standards are not acceptable, CAA will undertake an investigation.

CAA has looked at enhancing the registration process and has implemented a change that now excludes PPL training on Turbine Powered Helicopters. In future training in this type of aircraft will only be permitted at approved Flight training organisations (FTO). CAA has also implemented a new application form that all current RTFs will be required to complete to verify the details of their organisation. These details will be checked as part of any necessary investigations.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-087

It is recommended that the Civil Aviation Authority allocate examiners for the conduct of PPL Skills Tests.

Response

The CAA does not accept this recommendation. Since 20th September 2008, responsibility for rulemaking for the matters addressed in this recommendation has passed to EASA under Regulation (EC) 216/2008. It is suggested therefore that this recommendation be re-issued as a recommendation to EASA.

The new European regulations (EASA FCL), currently being finalised, will not provide for EASA or the National Authorities to allocate examiners for the conduct of PPL Skills Tests.

EASA FCL, as currently proposed, entitles any person who complies with the requirements to be granted an examiner rating and to exercise the privileges of that rating. The only restriction on the tests that an examiner may conduct will be that an examiner shall not test an applicant to whom they have previously given instruction.

Status - Rejected

SAFETY RECOMMENDATION - 2009-088

It is recommended that the Civil Aviation Authority review the training requirements for 'loss of tail rotor effectiveness' and ensure it is covered in written exam papers.

Response

The CAA accepts this recommendation. The CAA will review the training requirements for "loss of tail rotor effectiveness" and ensure that it is included in written exam papers. This review will be completed by June 2010.

New questions have been written that focus upon "loss of tail rotor effectiveness" and have now been incorporated into the PPL examination question bank.

Status - Accepted - closed

Gazelle HT.Mk3

**Langley Hill Farm,
Winchcombe,
Gloucestershire**

1 November 2008

Accident

AAIB Bulletin: 10/2009

FACTOR: F12/2009

Synopsis

The aircraft was en-route from a private site near Tamworth, Staffordshire, to a maintenance facility near Royal Naval Air Station (RNAS) Yeovilton, Somerset. As it approached Langley Hill, near Winchcombe, Gloucestershire, it appears to have unintentionally entered IMC and subsequently impacted the hillside. All three occupants were fatally injured.

SAFETY RECOMMENDATION - 2009-089

It is recommended that the Civil Aviation Authority review how the restrictions on occupancy of ex-military Permit to Fly Gazelle helicopters are notified.

Response

The Civil Aviation Authority (CAA) accepts this Recommendation and has reviewed its policy with regard to occupancy in ex-military aircraft, taking into account a wider review of all aircraft types. The CAA's conclusion was that a revised policy on occupancy should be established. There are a number of aircraft types operating on Permits to Fly which were previously civil type certificated or are amateur built yet, in some cases, these aircraft can carry four people. For ex-military aircraft which have a civil certificated counterpart, such as a Gazelle, the CAA considered that, as the design between the variants was broadly comparable, there should be comparability in the permitted occupancy, providing the CAA can be satisfied with the build standard, in service experience, maintenance history and component lives. In certain circumstances the CAA may permit greater occupancy for military versions of civil types.

The CAA also reviewed the placard which is required to be fitted to an aircraft operating on the Permit to Fly. The generic placard required under Article 11(7) of the Air Navigation Order states 'The aircraft has not been certified to an International Requirement'. The limitations on occupancy are normally defined on the Permit to Fly. The CAA believes that for amateur built aircraft this is sufficient. However, for ex-military aircraft the CAA will adopt a revised wording which will reflect the aircraft's military design background and the limitations on its use. The revised occupancy limitations will continue to be shown on the Permit to Fly. The CAA believes that the most effective way of ensuring that occupants are aware of the limitations and the occupancy warning is to add a provision to Article 11 that requires the aircraft commander to ensure that the aircraft shall not be operated in contravention of any of the conditions on the Permit to Fly and that all occupants are aware of the occupancy warning.

The earliest possible revision of the Air Navigation Order being October 2010, the implementation of revised wording for an ex-military aircraft placard will be achieved through a General Exemption to the Air Navigation Order Article 11(7), Airworthiness Approval Note (AAN) and Mandatory Permit Directive (MPD) pending the necessary changes to the Legislation. This is expected to be in place by August 2010.

Status - Accepted - closed

Others

Cameron A-300	Croxton, Staffordshire	7 August 2008	Accident
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AAIB Bulletin: 3/2009

FACTOR: F5/2009

Synopsis

After a firm landing in a field, the balloon bounced twice before coming to rest on its side. During the landing one of the passengers was injured. She later discovered her knee suffered a fracture in the landing. Two Safety Recommendations have been made

SAFETY RECOMMENDATION - 2009-011

It is recommended that the Civil Aviation Authority, in conjunction with the British Balloon and Airship Club require balloon baskets certified for Public Transport flights, where practicable, to contain dense foam seating blocks and additional padding to reduce the effect of impact with the basket structure.

Response

The CAA accepts this recommendation. The CAA will, in conjunction with the British Balloon and Airship Club, require balloon baskets certified for Public Transport flights, where practicable, to contain dense foam seating blocks and additional padding to reduce the effect of impact with the basket structure. As this requirement is only practicable for the compartmented baskets used for most balloon Public Transport flights, CAA discussions with the BBAC, the British Association of Balloon Operators and UK balloon manufacturers will be focussed accordingly.

These focussed discussions and associated activity are planned to be completed by March 2010.

The CAA has both engaged with EASA over the associated recommendation made to the Agency and has had discussions with UK balloon operators, consultative bodies and UK balloon manufacturers concerning Recommendation 2009-11, culminating in a final stakeholder meeting in late February 2010. The overall consensus from the meeting and earlier discussions was that dense foam seating blocks and extra padding were not a universal panacea in preventing the effects of impact with the basket structure. Nevertheless, there were situations and basket types where the use of such extra materials would be of benefit. In such cases operators would be encouraged to use such materials. Additional aspects concerning passenger briefings, passenger position (especially for landing), pilot decision making and pilot training (particularly with regard to large balloons) were also issues believed to be relevant in relation to minimising accident and injury to those undertaking passenger flights in balloons. The CAA, with industry, will address these issues and create revised guidance material as necessary by March 2011.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-012

It is recommended that European Aviation Safety Agency require new balloon baskets certified for Public Transport flights, to contain dense foam seating blocks and additional padding to reduce the effect of impact with the basket structure.

Response

It is agreed that European Aviation Safety Agency require padding (including the fuel cells). Certification Specification 31HB.59 addresses padding.

Seat foam blocks, however, are only used during the short phase of the landing. They cannot be stowed away and they reduce all other flight phases that occupants ground floor standing area. They can also invite occupants to step on the blocks, significantly reducing the internal basket rim height.

Around 30% of the UK Air Operator's Certificate (AOC) balloons regularly use seat foam blocks. Some operators would not fly without them, some think they are unsafe. The feedback received from the use of seat foam blocks do not support an amendment to CS-31, as proposed by the recommendation.

Status - Accepted - closed

Rotorsport UK MT-03	On approach to Runway 27R, 500 m out, Manchester City Airport Barton	9 October 2008	Accident
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AAIB Bulletin: 9/2009

FACTOR: F11/2009

Synopsis

The aircraft had insufficient usable fuel for the intended flight. When a nose-down attitude for descent was selected on final approach, the engine was starved of fuel and stopped. The pilot realised that the aircraft could not reach the aerodrome and elected to carry out a forced landing in the nearest suitable field. After manoeuvring to avoid some houses he was left with insufficient airspeed to arrest the rate of descent. During the subsequent hard landing the pilot and his passenger suffered serious back injuries. The aircraft sustained significant damage but there was no fire.

SAFETY RECOMMENDATION - 2009-082

It is recommended that the Civil Aviation Authority amend the British Civil Airworthiness Requirements, Section T to make optimum use of energy absorbing materials in the construction of gyroplane seat structures, to reduce the possibility of spinal or other serious injuries to an occupant in a minor crash landing.

Response

The CAA accepts this recommendation. The CAA will draft proposals to amend CAP 643 British Civil Airworthiness Requirements (BCAR) Section T - Light Gyroplanes and a paper outlining the proposals will be presented at the next BCAR Section T Working Group meeting on 25 November 2009.

The CAA has prepared a draft paper proposing to amend the contents of BCAR Section T (Light Gyroplanes), specifically the Interpretative Material at AMC T 678 a). This paper was presented at the BCAR Section T working group meeting on 18 May 2010 and will now progress through to consultation as a formal change to BCAR Section T.

Status - Accepted - closed

SAFETY RECOMMENDATION - 2009-083

It is recommended that the Civil Aviation Authority promote the benefits of fitting energy absorbing seating foam to microlights and gyroplanes.

Response

The CAA will promote the benefits of fitting energy absorbing seating foam to microlights and gyroplanes where this may be reasonably done. This will be done by including salient points of this accident and Recommendation in a GASIL article and by including the topic as a briefing item during "GA Safety Evenings". The briefing item will be included as soon as possible in the current schedule, and the GASIL article has been written and will be published before December 2009.

The benefits of fitting energy absorbing foam to microlights and gyroplanes continues to be a briefing / discussion item during "GA Safety Evenings". The GASIL article was published in the November 2009 issue and remains available on the CAA Web site.

Status - Accepted - closed

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Boeing 737-3Q8	Bournemouth Airport	23 Sep 2007	Incident	13
Boeing 777-236	Short of threshold to RWY 27L, London Heathrow Airport	17 Jan 2008	Accident	15
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Airbus A340-313	Nairobi Airport, Kenya	27 Apr 2008	Incident	19
Boeing 767-324	Manchester Airport	9 May 2008	Incident	20
Airbus A321-211	Manchester Airport	18 Jul 2008	Incident	21
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2009-001	Evans VP-1	Near Farley Farm Airfield, Winchester	20 Apr 2008	34
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2009-008	MCR-01	2, Four Oaks, Highclere, Hants RG20 9PB	11 Apr 2008	32
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2009-043	Boeing 737-3Q8	Bournemouth Airport	23 Sep 2007	14
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2009-045	Boeing 737-3Q8	Bournemouth Airport	23 Sep 2007	15
2009-046	Acroduster Too SA750	Near Farthing Corner (Stoneacre Farm) Airfield, Kent	26 Jul 2008	36
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2009-054	Hawker Hurricane Mk XII (IIB)	1nm north-west of Shoreham Airport, Sussex	15 Sep 2007	28
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2009-056	Hawker Hurricane Mk XII (IIB)	1nm north-west of Shoreham Airport, Sussex	15 Sep 2007	29
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2009-060	Airbus A321-211	Manchester Airport	18 Jul 2008	21
2009-061	Airbus A321-211	Manchester Airport	18 Jul 2008	21
2009-062	Airbus A321-211	Manchester Airport	18 Jul 2008	23
2009-063	Airbus A319-111	Overhead Brest, France	15 Sep 2006	5
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2009-065	EC225 LP	Approximately 500 metres south of the ETAP platform in the North Sea Central Area	18 Feb 2009	43
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2009-073	Airbus A340-313	Nairobi Airport, Kenya	27 Apr 2008	20
2009-074	AS332L2	Approx 11 miles NE of Peterhead, Scotland	1 Apr 2009	46
2009-075	AS332L2	Approx 11 miles NE of Peterhead, Scotland	1 Apr 2009	46
2009-077	Jetstream 4102	Climbing through FL90	9 Apr 2008	19
2009-078	Jetstream 4102	Climbing through FL90	9 Apr 2008	19
2009-079	Grob G115E Standard Cirrus	Sutton Courtenay / Drayton / South of Abingdon	14 Jun 2009	39
2009-080	Airbus A330-243	Montego Bay, Jamaica	28 Oct 2008	24
2009-081	Airbus A330-243	Montego Bay, Jamaica	28 Oct 2008	24
2009-082	Rotorsport UK MT-03	On approach to Runway 27R, 500 m out, Manchester City Airport Barton	9 Oct 2008	52
2009-083	Rotorsport UK MT-03	On approach to Runway 27R, 500 m out, Manchester City Airport Barton	9 Oct 2008	53
2009-084	SA 341G Gazelle	Rudding Park, Harrogate, North Yorkshire	26 Jan 2008	48
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2009-088	SA 341G Gazelle	Rudding Park, Harrogate, North Yorkshire	26 Jan 2008	49
2009-089	Gazelle HT.Mk3	Langley Hill Farm, Winchcombe, Gloucestershire	1 Nov 2008	50
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2009-094	Boeing 777-236	Short of threshold to RWY 27L, London Heathrow Airport	17 Jan 2008	17
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2009-099	Boeing 777-236	Short of threshold to RWY 27L, London Heathrow Airport	17 Jan 2008	18
2009-100	Boeing 777-236	Short of threshold to RWY 27L, London Heathrow Airport	17 Jan 2008	18
2009-101	Flight Design CTSW	Saddleworth Moor, Lancashire	8 Oct 2008	40
2009-104	Extra EA 230	White Waltham Airfield, Berkshire	10 Oct 2008	38
2009-108	Extra EA 300	On the Runway at White Waltham Airfield	12 Sep 2008	38
2009-109	Raytheon 390	En route Copenhagen, Denmark to Farnborough	7 Aug 2008	30

GLOSSARY OF ABBREVIATIONS

aal	above airfield level	lb	pound(s)
ACAS	Airborne Collision Avoidance System	LP	low pressure
ACARS	Automatic Communications And Reporting System	LAA	Light Aircraft Association
ADF	Automatic Direction Finding equipment	LDA	Landing Distance Available
AFIS(O)	Aerodrome Flight Information Service (Officer)	LPC	Licence Proficiency Check
AFRS	Aerodrome Fire & Rescue Service	m	metre(s)
agl	above ground level	mb	millibar(s)
AIC	Aeronautical Information Circular	MDA	Minimum Descent Altitude
amsl	above mean sea level	METAR	a timed aerodrome meteorological report
AOM	Aerodrome Operating Minima	min	minutes
APU	Auxiliary Power Unit	mm	millimetre(s)
ASI	airspeed indicator	mph	miles per hour
ATC(C)(O)	Air Traffic Control (Centre)(Officer)	MTWA	Maximum Total Weight Authorised
ATIS	Automatic Terminal Information System	N	Newtons
ATPL	Airline Transport Pilot's Licence	N_R	Main rotor rotation speed (rotorcraft)
BMAA	British Microlight Aircraft Association	N_g	Gas generator rotation speed (rotorcraft)
BGA	British Gliding Association	N_1	engine fan or LP compressor speed
BBAC	British Balloon and Airship Club	NDB	Non-Directional radio Beacon
BHPA	British Hang Gliding & Paragliding Association	nm	nautical mile(s)
CAA	Civil Aviation Authority	NOTAM	Notice to Airmen
CAVOK	Ceiling And Visibility OK (for VFR flight)	OAT	Outside Air Temperature
CAS	calibrated airspeed	OPC	Operator Proficiency Check
CG	Centre of Gravity	PAPI	Precision Approach Path Indicator
cm	centimetre(s)	PF	Pilot Flying
cc	cubic centimetres	PIC	Pilot in Command
°C,F,M,T	Celsius, Fahrenheit, magnetic, true	PNF	Pilot Not Flying
DGAC	Direction Général à l'Aviation Civile	POH	Pilot's Operating Handbook
DME	Distance Measuring Equipment	PPL	Private Pilot's Licence
EAS	equivalent airspeed	psi	pounds per square inch
EASA	European Aviation Safety Agency	QFE	altimeter pressure setting to indicate height above aerodrome
ECAM	Electronic Centralised Aircraft Monitoring	QNH	altimeter pressure setting to indicate elevation amsl
EGPWS	Enhanced GPWS	RA	Resolution Advisory
EGT	Exhaust Gas Temperature	rpm	revolutions per minute
EICAS	Engine Indication and Crew Alerting System	RTF	radiotelephony
EPR	Engine Pressure Ratio	RVR	Runway Visual Range
ETA	Estimated Time of Arrival	SAR	Search and Rescue
ETD	Estimated Time of Departure	SB	Service Bulletin
FAA	Federal Aviation Administration (USA)	SSR	Secondary Surveillance Radar
FIR	Flight Information Region	TA	Traffic Advisory
FL	Flight Level	TAF	Terminal Aerodrome Forecast
ft	feet	TAS	true airspeed
ft/min	feet per minute	TAWS	Terrain Awareness and Warning System
g	acceleration due to Earth's gravity	TCAS	Traffic Collision Avoidance System
GPS	Global Positioning System	TGT	Turbine Gas Temperature
GPWS	Ground Proximity Warning System	TODA	Takeoff Distance Available
hrs	hours (clock time as in 1200 hrs)	UHF	Ultra High Frequency
HP	high pressure	USG	US gallons
hPa	hectopascal (equivalent unit to mb)	UTC	Co-ordinated Universal Time (GMT)
IAS	indicated airspeed	V	Volt(s)
IFR	Instrument Flight Rules	V_1	Takeoff decision speed
ILS	Instrument Landing System	V_2	Takeoff safety speed
IMC	Instrument Meteorological Conditions	V_R	Rotation speed
IP	Intermediate Pressure	V_{REF}	Reference airspeed (approach)
IR	Instrument Rating	V_{NE}	Never Exceed airspeed
ISA	International Standard Atmosphere	VASI	Visual Approach Slope Indicator
kg	kilogram(s)	VFR	Visual Flight Rules
KCAS	knots calibrated airspeed	VHF	Very High Frequency
KIAS	knots indicated airspeed	VMC	Visual Meteorological Conditions
KTAS	knots true airspeed	VOR	VHF Omnidirectional radio Range
km	kilometre(s)		
kt	knot(s)		
KTAS	knots true airspeed		

