
Annual Safety Report 2012



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Chief Inspector's Report

I am pleased to introduce the 2012 AAIB Annual Safety Report which includes information on our activity and progress on the status of Safety Recommendations.

The implementation of the Government's Comprehensive Spending Review continued through this year with a reduction of a further three members of staff. However the number of reportable incidents remained on a par with previous years necessitating a focussing of our resource towards events where the greatest flight safety benefit will be made. Meeting our legislative requirement under European Regulation 996/2010 will mean using our discretion as to the depth of the investigation on some events.

During 2011, we were delighted to welcome onto the site at Farnborough, the newly formed Military Air Accidents Investigation Branch (MilAAIB). This is a tri-service organisation fulfilling a similar role to ourselves with UK military aircraft and we look forward to a close but independent working relationship over the years ahead.

Throughout 2011 the AAIB deployed a field team on 45 occasions and investigated 15 fatal accidents responsible for 18 deaths. This included deploying a team to Cayman Brac for a fatal Cessna 210 accident and the English Channel for a Piper PA28 fatality. Further in depth information on this year's activity is included in this report along with that of previous years for comparison.

Overseas, the AAIB deployed to an airship accident in Germany and four other light aircraft accidents in Europe. All these aircraft were registered in the UK which prompted our involvement in assisting the country where the accident occurred.

The AAIB supported two RAF Service Inquiries in 2011 prior to the standing up of the new MilAAIB on 1 April 2011. Sadly it was not long before we were supporting this new organisation with four events throughout the rest of 2011 including two accidents to the Red Arrows' Hawk aircraft.

Overall, commercial air travel continues to get safer with the International Air Transport Association (IATA) stating that 2011 was the safest year on record with less than 500 fatalities worldwide. Interestingly this compares with an 18 month period in the early 1970s when six aircraft on the UK register were lost with a combined total of 417 fatalities.

So, a healthy improvement but as the number of aircraft and complexity of their systems and operating environment all increase, the AAIB will continue to prepare and train for all eventualities.



Keith Conradi



This year saw the 100th anniversary of the publication of the first UK aviation accident report. The accident report, regarding a Flanders monoplane, was published on 8 June 1912 and the Investigator-in-Charge was George Bertram Cockburn.

Introduction

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 Regulation (EU) No 996/2010 of the European Parliament and of the Council of 20 October 2010 and the Civil Aviation (Investigation of Air Accidents and incidents) Regulations 1996. 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 the EASA in 2003. The Agency promotes the highest common standards of safety and environmental protection in civil aviation in Europe and worldwide. It is the centrepiece of a new regulatory system which provides for a single European market in the aviation industry. The agency's responsibilities include expert advice to the EU for drafting new legislation; implementing and monitoring safety rules, including inspections in the Member States; safety analysis and research; type-certification of aircraft and components, as well as the approval of organisations involved in the design of aeronautical products. The EASA also directly approve organisations involved in the manufacture and maintenance of aeronautical products outside of the EU. With the recent extension of the Agency's responsibilities to rulemaking in the fields of air operations, pilot licensing and the oversight of third country (non EU) operators, the European Aviation Safety Agency has enhanced its position as the European point of reference in aviation safety. In a few years, the Agency will also be responsible for safety regulations regarding airports and air traffic management systems.

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 the 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, 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 is 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.

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 eighth report, now published as the AAIB's 'Annual Safety Report', contains additional information concerning accident statistics and the activities of the AAIB. The bulk of the report remains unaltered and details the responses received to AAIB Safety Recommendations made up to and including 31 December 2011.

Statistics

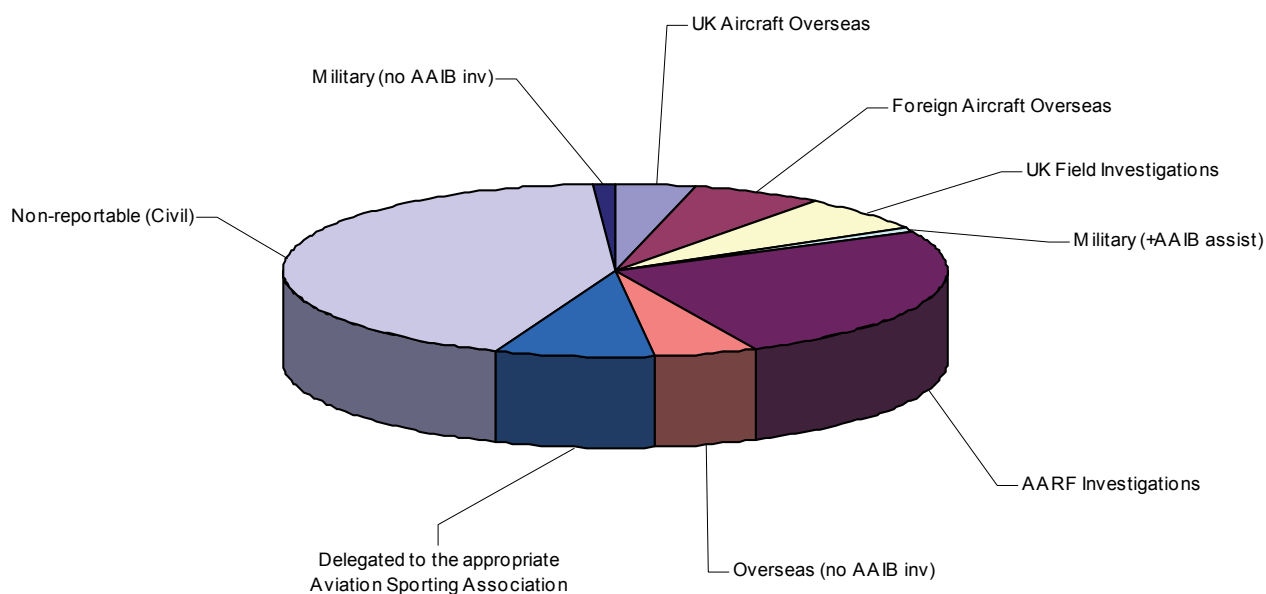
The following pages provide the statistics for 2011, 2010 and 2009, for accidents and serious incidents involving the Air Accidents Investigation Branch.

An explanation of the categories is as follows:

Category	Definition
UK Aircraft overseas	Investigations involving UK registered aircraft, or aircraft registered in one of the UK Overseas Territories or Crown Dependencies, occurring in a Foreign State where the AAIB has participated in the capacity as the Accredited Representative representing the State of Registry in accordance with ICAO Annex 13.
Foreign Aircraft overseas	Accidents and serious incident investigations to Foreign registered aircraft occurring in a Foreign State where the AAIB have participated in the capacity as the Accredited Representative
UK Field Investigations	Investigations involving the deployment of a 'Field' team within the UK or to one of the UK Overseas Territories or Crown Dependencies and those investigations where a team have not deployed but Safety Recommendations are made. Also includes investigations which have been delegated to the AAIB by another State.
Military with AAIB Assistance	Where an MoD Service Inquiry is convened following an accident / serious incident to a Military aircraft and an AAIB Inspector is appointed to assist.
AARF Investigations	Investigations conducted by correspondence only using an Aircraft Accident Report Form (AARF) completed by the aircraft commander.
Overseas (no AAIB)	Notifications to the AAIB of an overseas event which has no AAIB involvement.
Delegations to Sporting Associations	Investigations delegated to the relevant UK Sporting Associations.
Non-reportable (Civil)	Occurrences notified to the AAIB involving civil registered aircraft which do not satisfy the criteria of a reportable accident or serious incident in accordance with the Regulations.
Military (no AAIB inv)	Notifications to the AAIB concerning Military aircraft with no AAIB involvement.

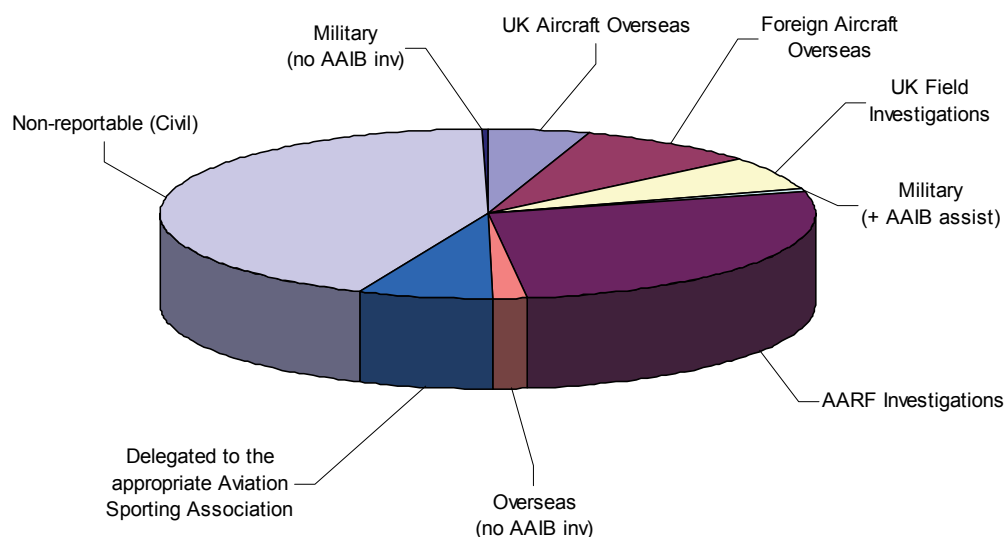
AAIB Notifications 2011

	J	F	M	A	M	J	J	A	S	O	N	D	Total
UK Aircraft Overseas	0	2	0	1	5	4	5	3	2	2	4	3	31
Foreign Aircraft Overseas	5	8	2	3	7	3	9	3	4	3	2	2	51
UK Field Investigations	6	3	5	6	4	5	10	1	4	2	3	3	52
Military (+ AAIB assist)	1	1	0	0	0	0	1	1	1	0	1	0	6
AARF Investigations	6	11	21	21	14	21	34	20	24	15	10	2	199
Overseas (no AAIB inv)	1	7	3	0	2	2	7	3	1	3	3	8	40
Delegated to the appropriate Aviation Sporting Association	2	1	2	6	7	11	8	7	7	8	1	1	61
Non-reportable (Civil)	13	26	22	42	33	34	38	40	24	30	23	15	340
Military (no AAIB inv)	0	0	0	0	0	1	0	0	1	2	4	0	8
Total	34	59	55	79	72	81	112	78	68	65	51	34	788
UK FATAL ACCIDENTS	1	0	2	2	2	0	3	0	1	1	1	1	14
No of DEATHS	2	0	2	3	2	0	3	0	1	1	1	1	16



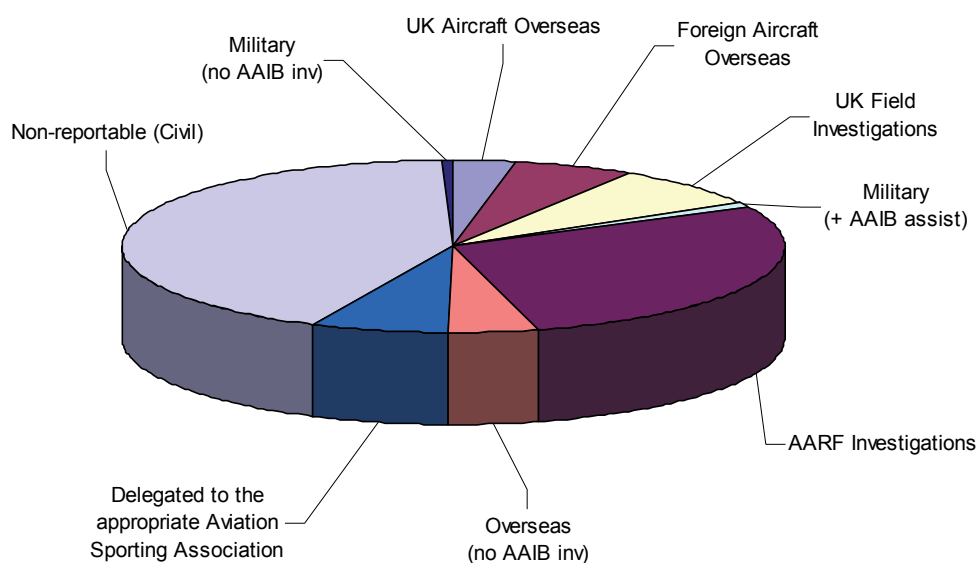
AAIB Notifications 2010

	J	F	M	A	M	J	J	A	S	O	N	D	Total
UK Aircraft Overseas	3	2	3	1	2	6	5	5	3	1	3	3	37
Foreign Aircraft Overseas	8	2	7	5	8	5	3	9	5	3	6	4	65
UK Field Investigations	3	4	1	6	4	7	3	8	4	3	4	1	48
Military (+ AAIB assist)	0	0	1	0	1	1	0	0	0	0	0	0	3
AARF Investigations	6	8	13	25	21	34	19	17	20	16	13	8	200
Overseas (no AAIB inv)	3	0	0	0	1	0	2	1	2	1	1	1	12
Delegated to the appropriate Aviation Sporting Association	0	0	1	7	7	7	7	9	6	4	1	0	49
Non-reportable (Civil)	25	25	32	19	27	28	37	30	32	22	22	20	319
Military (no AAIB inv)	0	1	0	0	0	0	0	1	0	0	0	0	2
Total	48	42	58	63	71	88	76	80	72	50	50	37	735
UK FATAL ACCIDENTS	2	0	0	1	1	1	1	1	1	1	0	0	9
No of DEATHS	3	0	0	2	1	1	2	1	2	3	0	0	15



AAIB Notifications 2009

	J	F	M	A	M	J	J	A	S	O	N	D	Total
UK Aircraft Overseas	3	1	2	1	2	3	4	3	3	1	3	0	26
Foreign Aircraft Overseas	5	4	5	3	3	6	4	3	2	6	2	7	50
UK Field Investigations	6	8	6	4	5	8	8	4	6	5	4	3	67
Military (+ AAIB assist)	0	2	1	0	0	0	2	1	1	0	1	0	8
AARF Investigations	7	13	15	21	33	28	26	29	23	23	12	14	244
Overseas (no AAIB inv)	1	2	2	3	6	1	5	5	3	3	4	3	38
Delegated to the appropriate Aviation Sporting Association	1	0	10	6	4	10	6	10	7	0	3	0	57
Non-reportable (Civil)	39	25	33	29	39	32	29	31	26	35	29	19	366
Military (no AAIB inv)	0	0	0	0	3	0	0	0	0	1	0	0	4
Total	62	55	74	67	95	88	84	86	71	74	58	46	860
UK FATAL ACCIDENTS	1	3	1	3	2	4	2	1	2	1	2	0	22
No of DEATHS	3	6	1	20	2	7	2	1	4	1	2	0	49



Safety Recommendations Report

This is the eighth 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 2011 including the responses to those recommendations received up to and including 30 June 2012 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 2,250kg MTWA and below
4. Microlights
5. Rotorcraft 5,700kg MTWA and above
6. Rotorcraft above 2,250kg and below 5,700kg MTWA
7. Rotorcraft 2,250kg 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 2011 and status:

Number	Status Category					
	1 Accepted CLOSED	2 Rejected OPEN	3 Rejected	4 Partially accepted OPEN	5 Response awaited OPEN	6 Superseded CLOSED
103	39	2	4	8	35	0
% of total	38	2	4	8	34	0

89% of recommendations receiving a response have been accepted or partially accepted.

Note: 15 Safety Recommendations were allocated with recommendation numbers but were withdrawn.

Recommendations within 2012 report by Addressee:

Addressee	Number
Air Safety Support International	1
Airbus Industrie	3
Airport Operator Association	1
ATC Nairobi International Airport	1
ATR France	3
AvCraft	1
BAE Systems	3
BF Goodrich Aerospace	2
BGA	5
BMAA	3
Boeing	3
Bombardier Aerospace	3
British Airways	1
British Rotorcraft Association	1
Cessna Aircraft Company	3
City Airline	1
Direction Generale de l'Aviation Civile (DGAC)	2
EASA	58
Embraer	1
Emerald Airways	1
Eurocopter	7
FAA	23
Flybe	3
Fokker Services BV	1
Gulfstream Aerospace Corporation	1
Heathrow Airport Limited	2
ICAO	4
Icelandic Civil Aviation Administration	1
JAA	5
John A Osborne Airport, Montserrat	3
Jordanian CAA	1
Kenya Airports Authority	4
Mahan Air	3
MD Helicopters	1
Ministry of Transport & Civil Aviation (Afghanistan)	1
NATS	1
Netjets Transpotes Aeros	1
New Piper Aircraft corporation	2
Pratt & Whitney	1
Raytheon Aircraft Company	1
Rolls Royce	1
Swift Aerobatic Display Team	1
Textron Lycoming	1
Turbomeca	2
UK CAA	31
UK Department for Transport	1

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

Aeroplanes > 5,700kg MTWA or above

Airbus A320-231	London Gatwick	20 January 2000	Accident
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AAIB Bulletin: 7/2000

FACTOR: N/A

Synopsis

No.1 engine cowling debris left on runway after take off. Aircraft diverted to Stansted and landed safely on full emergency.

SAFETY RECOMMENDATION – 2000-026

It is recommended that the DGAC mandate aircraft modification aimed at appreciably reducing the likelihood of A320 fan cowl doors inadvertently remaining unlatched after maintenance. It is considered that, while measures to exhort maintenance personnel to ensure that doors are latched and to improve the conspicuity of unfastened latches may assist, they are unlikely to be fully effective and modification aimed at providing obvious indication of unlatched doors is required.

Response

Recommendation treated in ARS71.0014 for A319/320/321.

IAE engines: A modification aiming at improving the visibility of an unlatched fan cowl door has been mandated on May 2nd 2001 by CN 2001-106(b). A second modification aiming at preventing that unlatched cowl doors be closed has been mandated on September 5th 2001 by la CN 2001-381.

CFM engines: DGAC considers that for these engines no modification is to be mandated as the visibility if unlatched fan cowl doors is sufficient. Airbus will nevertheless put forward a modification aiming at improving the visibility of an unlatched fan cowl door. Its implementation will take place on a voluntary basis.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2000-027

It is recommended that, until measures to satisfy the intent of Recommendation No 2000-026 are incorporated, the DGAC and Airbus Industrie recommend A319, A320, A321 and/or A330 aircraft maintenance organisations to record the unlatching and latching of fan cowl doors and to specify a duplicate inspection to confirm latching.

Response

Actions taken for the treatment of recommendation 2000-026 allow closing this recommendation.

We may nevertheless stress the fact that, via OIT 999.0105/00 Airbus reminded the operators on July 13th 2000 that the following procedures shall be followed:

- a) check the closure of fan cowl doors for both engines
- b) check the adjustment of latch engagement tensions

Status - Accepted - closed

**Fokker F27
Mk 500**
**Coventry Airport,
Runway 13**
1 July 2000
Accident
AAIB Bulletin: 4/2001
FACTOR: F27-2001

Synopsis

Aircraft departed runway on landing causing gear collapse.

SAFETY RECOMMENDATION – 2001-002

Fokker Services BV should issue an All Operators Letter or similar, drawing attention to the possibility of ice accretion on the elevator servo capstan in cold humid conditions. Operators should be advised to comply with Fokker SB 100-22-039 (or relevant superseding Service Bulletin) at the earliest practicable opportunity. This introduces a revised capstan groove with less possibility of jamming. Pending the availability of parts, operators should additionally be urged to implement the intent of Service Letter No 134, which calls for greasing of the elevator servo cables at intervals of 250 flying hours.

Response

The issue of an Airworthiness recommendation catalogue article to all Fokker 70/100 operators to recommend accomplishment of the service bulletin has addressed this recommendation.

Status - Accepted - closed

**Boeing
757-300**
Gatwick Airport
3 October 2000
Serious Incident
AAIB Bulletin: 7/2002
FACTOR: N/A

Synopsis

Aircraft burst two tyres on landing.

SAFETY RECOMMENDATION – 2002-013

It is recommended that BF Goodrich Aerospace comprehensively reassess their measures aimed at ensuring that aircraft wheel fusible plugs are correctly tightened and do not loosen in service, consider the need for positive locking of all plugs and valves and revise their requirements as necessary.

Response

Reference 2 requested the status of a recommendation to reassess measures aimed at ensuring fusible plugs are correctly tightened and do not loosen in service, consider the need for positive locking of all plugs and valves, and revise requirements as necessary.

Several measures currently exist to ensure plugs and valves are properly tightened and remain tight in service. First, torque valves for plugs and valves are specified in a single location in the Component Maintenance Manual, to prevent conflicting information in the manual and to provide operators with a clear discrete location for these types of installation instructions. Second, wheel and tire assemblies must undergo a tire pressure retention test before the wheel can be certified for service, providing an opportunity to identify

incorrectly torqued components. Third, regular tire pressure checks required in the Aircraft Maintenance Manuals are carried out by operators allow for the discovery of slow pressure losses in service. Diagnostic procedures in the wheel CMMs allow for the source of the leak to be identified if due to the wheel. Last, service experience gathered by Goodrich on dozens of wheel assemblies does not suggest that positive locking features are required on these programs in service.

Status - Accepted - closed

Boeing 747-436	Heathrow Airport, Stand J2	15 January 2001	Accident
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AAIB Bulletin: 10/2001

FACTOR: F44/2001

Synopsis

No 4 engine nacelle wedged against three trolleys.

SAFETY RECOMMENDATION – 2001-063

Heathrow Airport Limited should standardise wing span markings at the airport and review the use of such markings on multi-choice aprons. Further, the Operational Safety Instruction providing information on stand markings should be amended to reflect accurately the markings in use.

Response

HAL now uses a consistent set of ground markings on multi-use stands. There is an Operational Safety Instruction that gives details of markings on multi-choice aprons.

Status - Accepted - closed

EMB-145EU	Edinburgh	2 March 2001	Accident
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AAIB Bulletin: 8/2002

FACTOR: N/A

Synopsis

Touchdown was made on the main landing gear and the commander gently lowered the nose gear to the runway. As the nose gear touched the runway, both pilots were aware of an "audible high speed noise". The commander considered that it was possibly a burst tyre even though there was no vibration. Fracture of nose landing gear axle.

SAFETY RECOMMENDATION – 2002-009

It is recommended that Embraer and BF Goodrich again review and revise relevant maintenance documentation, relating to the nose landing gear wheel bearings on Embraer EMB-145 aircraft, to remove any ambiguity in the procedures for installing older seals and water deflectors and the newer standard integrated seal/deflectors.

Response

Embraer - No response received.

Response from BF Goodrich:

Reference 1 requested the status of a recommendation to eliminate apparent ambiguity associated with the installation of an improved grease seal on ERJ-145 nose wheel assembly. This question was raised when an operator installed the new and old parts in a wheel assembly simultaneously.

The new grease seal was introduced via Service Bulletin 3-1551-32-2 issued in February 2000. The aforementioned Goodrich Service Bulletin was incorporated into the Component Maintenance Manual (CMM) for the 3-1551 nose wheel assembly in August 2000. The Illustrated Parts List, which defines the parts to be installed for each configuration, follows ATA guidelines by showing the former parts (water deflector shield and seal assembly) as being 'Superseded by Item 30A'. Item 30A in the Illustrated Parts List is defined as the seal assembly (P/N 68-1498) that was introduced in the Service Bulletin, and is shown as 'Supersedes items 27 and 30'.

In short, the CMM does address the request in Reference 1 to eliminate any ambiguity regarding the procedures for installing these components.

Status - Accepted - closed

MD-83	Liverpool Airport	10 May 2001	Accident
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AAIB Bulletin: AAR 4/2003

FACTOR: F38/2003

Synopsis

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

The following causal factors were identified :

1. The right Main Landing Gear (MLG) cylinder failed immediately upon touchdown due to the application of spin-up drag loads on a section of the cylinder containing a major fatigue crack 3.2 mm long and 1.0 mm deep and several other associated smaller cracks.
2. The origins of these fatigue cracks could not be identified but other embryonic cracks were found which were associated with surface irregularities arising from a grit-blasting process during manufacture. Abnormal loading, possibly due to an occurrence of a mode of fore-and-aft vibration known as 'gear walking' is thought to have been responsible, at some time in the aircraft's history, for propagating the cracks to a depth at which continued growth was possible under normal loading. Alternatively, some abnormal loading may have relaxed the beneficial compressive surface stresses induced by shot-peening at the critical section and allowed propagation from the same surface defects.
3. Inspection and other mandatory preventive measures taken following two similar accidents did not prevent the occurrence of this third accident. This was probably due to the small size of cracks which are required to be detected before reaching a critical dimension.

SAFETY RECOMMENDATION – 2003-048

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

Response

The CAA accepts its part of this Recommendation.

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

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

Note: The International Cabin Safety Research Technical Group is a multi national authority group, reporting to a Management Group consisting of members from the UK CAA, FAA and Transport Canada.

The Agency will publish a Safety Information Bulletin to raise awareness of crew members, operators, national aviation authorities on the recommended practices for the 'evacuation of infants and small children down escape slides with minimum delay'.
19/12/2011

EASA acknowledges receipt of this Safety Recommendation. Please be advised that it is under consideration and that the outcome will be communicated to you in due course.
11/10/10

Status - Accepted - closed

Boeing 737-59D	Heathrow Airport, Stand C14	29 August 2001	Incident
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AAIB Bulletin: 12/2001
FACTOR: F3/2002

Synopsis

Baggage trolley struck side of aircraft.

SAFETY RECOMMENDATION – 2001-078

It is recommended that the Airport Operator's Association should examine the feasibility and cost effectiveness of fitting proximity sensors to ground handling vehicles that are routinely required to operate close to aircraft.

Response

We have looked at the general proposal for proximity sensors and, on the advice of specialists with ground handling experience, we received the following:

If they were fitted to selected or even all airside vehicles which regularly service aircraft, the sensors would have to be set to operate on the same degree of accuracy for each aircraft hull (fuselage) type. Different heights may cause them to be triggered at irregular distances, there is a large combination of room for error here depending on vehicle and aircraft type, with the point of the vehicle being lower than the aircraft fuselage for example. Also, when engaged in other operations it is likely they would be set off. E.g. baggage dollies are used in confined spaces such as undercroft, also at inbound baggage carousels, where the alerts might be of use but also an unnecessary hindrance continually going off, causing for them to be ignored. In addition it is common practice at most airports to require a banksman to be present when vehicles are reversing towards aircraft.

Status - Accepted - closed

Embraer 145-EP	On approach to Manchester	25 September 2001	Incident
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AAIB Bulletin: 11/2005

FACTOR: F41/2005

Synopsis

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

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

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

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

SAFETY RECOMMENDATION – 2005-095

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

Response

There are a number of reasons why Rolls-Royce has chosen not to pursue Surge detection and recovery logic on the 3007 engine. Most surge detection and recover schemes rely

heavily on a P3 or a P3/Wf measurement to detect surge. The most important part of surge detection and recovery logic is detecting the surge in the first place. Without a proper detection, the control cannot take the appropriate action to recover. This detection must be robust enough to work when needed and not false trip on a regular basis. As the recovery action normally involves chopping fuel, the pilot is sure to notice large transient changes in an engine and it would be quite a nuisance if false trips occurred frequently. Since a P3 sensor is not available on the 3007, logic would have to be developed that looked at a combination of core deceleration and ITT increase. Since a P3 measurement is considered the best option for detecting surge, any detection scheme that does not involve P3 will be less robust.

This risk leads to a possibility that the surge detection logic could produce false trips that create more of an IFSD risk than the surge events themselves. The risk shown in the attached probability is so low as not to require mitigation, and any such mitigation should not increase the total system risk. The technical complexity of having to rely on secondary indications of surge, such as rate of change of ITT and N2, is the primary reason why Rolls-Royce is electing not to pursue this logic as a product improvement.

Furthermore, while it would be technically possible to develop the algorithms discussed above to detect surge using a combination of N2 and ITT, the current microprocessor used in the 3007 FADEC has neither the memory capacity nor the computational speed to handle any additional tasks. For a surge detection scheme to work, it must run continuously in all loops, which would increase computation time beyond one FADEC cycle time in some loops. This would create an unsafe system, and this concern reinforces the Rolls-Royce decision not to pursue such a system.

Status - Accepted - closed

Challenger 2B16	Birmingham Airport	4 January 2002	Accident
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AAIB Bulletin: AAR 5/2004

FACTOR: F39/2004

Synopsis

Immediately after takeoff from Runway 15 at Birmingham International Airport the aircraft began a rapid left roll, which continued despite the prompt application of full opposite aileron and rudder. The left winglet contacted the runway shoulder, the outboard part of the left wing detached and the aircraft struck the ground inverted, structurally separating the forward fuselage. Fuel released from ruptured tanks ignited and the wreckage slid to a halt on fire; the Airport Fire Service was in attendance less than one minute later. The accident was not survivable.

Numerous possible causes for the uncontrolled roll were identified but all except one were eliminated. It was concluded that the roll had resulted from the left wing stalling at an abnormally low angle of attack due to flow disturbance resulting from frost contamination of the wing. A relatively small degree of wing surface roughness had a major adverse effect on the wing stall characteristics and the stall protection system was ineffective in this situation. Possible asymmetric de-icing by the Auxiliary Power Unit (APU) exhaust gas during pre-flight preparations may have worsened the wing-drop tendency.

N90AG's pilots should have been aware of wing frost during pre-flight preparations but the aircraft was not de-iced and the ice detector system would not have alerted them. It was considered that the judgement and concentration of both pilots may have been impaired by the combined effects of a non-prescription drug, jet-lag and fatigue.

Possible contributory factors were: the inadequate warnings on the drug packaging, Federal Aviation Administration (FAA) guidance material suggesting that polished wing frost was acceptable and melting of the frost on the right wing by the APU exhaust gas.

The investigation identified the following causal factors:

1. The crew did not ensure that N90AG's wings were clear of frost prior to takeoff.
2. Reduction of the wing stall angle of attack, due to the surface roughness associated with frost contamination, to below that which the stall protection system was effective.
3. Possible impairment of crew performance by the combined effects of a non-prescription drug, jet-lag and fatigue.

SAFETY RECOMMENDATION – 2003-057

It is recommended that the Federal Aviation Administration act upon the National Transportation Safety Board Recommendations A-00-4, A-00-5 and A-00-6 and, in particular review the guidance given to flight crew about the dangers of using non-prescription medication.

Response

FINAL RESPONSE OF 11-29-2004:

Disagree. The Federal Aviation Administration (FAA) does not believe the Board's safety recommendation to publish a list of medications "approved" for use by airmen is appropriate. The FAA's current approach to the use of medications by airmen, other than as provided for in 14 CFR Part 67, is to provide general and specific guidance to aviation medical examiners (AME) regarding those medications for which the use during the performance of airman duties presents a safety risk. The AME's are charged with the responsibility to inform airmen of the potential adverse effects of medications and to counsel airmen regarding their use. The FAA has published information for airmen relating to the use of specific over-the-counter medications, as well as to the dangers associated with the use of other prescription medicines. The FAA conducts and participates in aviation safety seminars for airmen where medical issues and use of medications are frequent topics. Airmen are urged to discuss these issues with their physicians and AME's and to identify the adverse effects that may occur with their prescribed medications. Most importantly, airmen are counselled that it may be better to avoid performing aviation duties while medications are required.

Constructing and updating a list of permissible medications for use by airmen would present a formidable and labor-intensive task of questionable benefit. Thousands of prescription and over-the-counter medications are currently on the market, and new medications are approved by the Food and Drug Administration (FDA) every day. To be useful, constant and frequent revision of a list would be required. Resources that would be better spent ensuring the medical qualifications of airmen would have to be diverted to maintenance of the list.

While the FAA recognizes the dangers inherent with the use of many medications, it must also be concerned with the underlying medical condition for which the medication is taken. Medications that are otherwise acceptable for piloting airplanes cannot be considered for use by airmen until the reasons for which they are prescribed are assessed and observation has shown no evidence of adverse side effects or complications. The potential for drug interactions also presents an issue in any effort to establish a list of permissible medications. While certain medications used alone may not be problematic, if used in combination with other drugs, they could endanger safety. It is essential that airmen

discuss their use of medications and the conditions for which they are being used with their physicians or AME's before flying, as encouraged by the FAA. Any list that encourages and facilitates the airman's self-determination of the risks posed by various medical conditions and their treatment raises the potential for error, for inappropriate complacency, and, ultimately, for pilot impairment. The FAA's approach facilitates the safe continuation of piloting duties when innocuous medications are being used, but without confounding the process through misleading publications.

Status - Rejected**SAFETY RECOMMENDATION – 2003-058**

It is recommended that the Federal Aviation Administration take measures to encourage action by the US Food and Drug Administration in line with the National Transportation Safety Board Recommendation, I-00-5, to ensure that over-the-counter medication contains appropriate warning on any associated potential dangers in operating aircraft.

Response

FINAL RESPONSE OF 11-29-2004:

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ultimately, for pilot impairment. The FAA's approach facilitates the safe continuation of piloting duties when innocuous medications are being used, but without confounding the process through misleading publications.

Status - Rejected**SAFETY RECOMMENDATION – 2003-059**

It is recommended that Bombardier Aerospace reassess the fault tolerance of the stall protection system for the Challenger 604 and other aircraft models with a similar system and the measures aimed at verifying its integrity in service.

Response

Since the Birmingham accident, BA has addressed the fault tolerance of the stall protection system for the Challenger 604 and other related aircraft models by introducing mandatory inspections to detect 'flat spots' on AOA sensors across all Challenger 600 series models, introducing a new AOA sensor for Challenger 604 and 605 aircraft which eliminates the 'flat spot' issue, and retrofitting SPCs with modified units having additional monitors. In addition, BA has made, and continues to make, improvements to its corrective action process.

Status - Accepted - closed

Boeing 737-3M8	South of Edinburgh Airport	13 March 2002	Accident
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AAIB Bulletin: 9/2002**FACTOR: N/A****Synopsis**

Both flight crew detected a trace of smoke and a "burning" smell on the flight deck. The commander called the senior cabin attendant to the flight deck to confirm that there were no problems in the cabin. As she entered the flight deck, the burning smell became more apparent and the cabin attendant noticed flames coming from the wall just behind the commander's seat. She immediately applied a fire extinguisher to the fire and the commander declared a 'MAYDAY' and requested vectors to Edinburgh.

SAFETY RECOMMENDATION – 2002-012

The FAA, in conjunction with the manufacturer, should conduct a review of the adequacy of the bonding between all electrically heated devices external to the aircraft structure, for all aircraft types fitted with such devices, including pitot/static probes, static ports, temperature probes and angle of attack sensors, to ensure that, in the event of any malfunction of such devices, that return current will be conducted to a suitable ground in a safe manner.

Response

Following this incident the operator carried out a fleet wide inspection of all the combined pitot/static probes, but no other incipient failures were reported. Additionally, the aircraft manufacturer has undertaken a review of the bonding arrangements of the combined pitot/static probes to prevent further occurrences.

FINAL RESPONSE OF 11-07-2002:

A Boeing 737-3M8 airplane operated by Easy Jet, registry G-EZYB, had reported smoke in the cockpit on a March 13, 2002, flight in the region just south of Edinburgh. According to

the report, Ref. EW/G2002/03/17 in AAIB Bulletin No. 9/2002, the crew responded properly under this emergency condition, vectoring quickly into Edinburgh and preparing passengers for possible hasty deplaning. During the investigation, it was found that the combined pitot/static probe had developed a fault in an internal heater element which had shorted to the case. The path of least resistance to ground in this case on the subject aircraft happened to be the metallic over-braid on the S2 static flexible hose. The overheating of this hose assembly caused the smoke situation reported, and this overheating condition was the result of the internal probe shorting of the heater to the probe body in combination with the degraded bonding between the probe and structure. Air Accidents Investigation Branch (AAIB) safety recommendation 2002-12 suggested that the Federal Aviation Administration (FAA), in conjunction with the manufacturer, should conduct a review of the adequacy of bonding between all electrically heated devices external to aircraft structure. This review was conducted by the Safety Review Board (SRB) and resulted in a safety decision for other affected models, a service bulletin classification, and acceptance as an SRP. The final action as related to the 737 fleet was issuing Service Bulletin 737-34-1170 on September 12, 2002. The operators of all Boeing aircraft have been notified by Service Letter of this event and the SRB action, including Service Bulletin Release schedule for all models, and the newly added inspection tasks required. The Service Bulletin and Service letter are included as attachments.

The Seattle Aircraft Certification Office is completely in agreement with the SRB action in this matter, including the review conducted on all airplane models and the review of corresponding maintenance instructions to include a bonding specification in text. The Boeing Company is drafting a reply to the AAIB which is now in work, and will essentially state that which is presented here.

Boeing Aircraft Co - No response received

Status - Accepted - closed

Fokker F28 Mk 0100	Manchester Airport, parked on 66L	1 April 2002	Serious Incident
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AAIB Bulletin: 3/2003

FACTOR: F07/2003

Synopsis

Smoke at back of aircraft and evacuation.

SAFETY RECOMMENDATION – 2002-043

The CAA and JAA should review the requirements for passenger safety cards to ensure that, for aircraft with overwing exits, the safety card is required to clearly depict the emergency escape route(s) from the cabin, via the wing, to the ground.

Response

The CAA has reviewed the requirements for passenger safety cards contained in Article 14(5)(c) of the Air Navigation Order (ANO) 2000 and in Civil Aviation Publication (CAP) 360, Chapter 6, Section 3 CAT.OP.MPA.170 Passenger briefing in the EASA Opinion 04/2011 on air operations, published 01 June 2011, requires the safety briefing card to contain picture-type instructions to indicate the exits likely to be used by passengers. This rule reflects EU-OPS 1.285 (a)(2) which has been in force since 2008. EU-OPS will be repealed and replaced by the European Regulation for Air Operations.

Rulemaking task RMT.0293 [former OPS.005 (b)] 'Updating EASA OPS implementing rules' is on the Agency's Rulemaking Programme. During this task the acceptable means of compliance (AMC) on passenger briefings will be reviewed to ensure that, for aircraft with overwing exits, the safety card requires to clearly depict the emergency escape routers) from the cabin, via the wing, to the ground. 19/12/2011 EASA acknowledges receipt of this Safety Recommendation. Please be advised that it is under consideration and that the outcome will be communicated to you in due course. 11/10/10

Status - Accepted – closed

HS.748 Series 2A	Italian Alps	14 November 2002	Serious Incident
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AAIB Bulletin: 9/2003

FACTOR: F33/2003

Synopsis

The aircraft was flying between Pisa and Paris when the crew received a Ground Proximity Warning System (GPWS) warning. Reacting to the warning the crew climbed the aircraft to a safe level where they encountered severe airframe icing. The resultant reduction in aircraft performance was such that they were unable to maintain level flight. Flying on or close to stick shaker operation the aircraft was forced to descend below the Safe Clearance Altitude (SCA). ATC vectored the aircraft away from areas of high terrain so that it could continue to descend safely to more benign conditions before continuing to Paris where it landed without further incident.

SAFETY RECOMMENDATION – 2003-061

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

Response

Emerald Airways ceased trading on 12th May 2006 and as such this recommendation is no longer applicable.

Status - No Longer Applicable - closed

Boeing 727-230F	East Midlands Airport	19 November 2002	Serious Incident
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AAIB Bulletin: 12/2003

FACTOR: F3/2004

Synopsis

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

Previous incidents, where JT8D second stage LP compressor blade root fractures have caused the release of a blade from the disk, resulted in a manufacturer's Alert Service

Bulletin (ASB) No 5729 requiring an ultrasonic and fluorescent penetrant inspection of all second stage fan blade roots. The fan blades from this engine had been inspected in accordance with the ASB but this failure occurred before a re-inspection was required. A blade redesign is available through implementation of a further Service Bulletin (SB). There have been no reported failures to modified blades.

SAFETY RECOMMENDATION – 2003-113

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

Response

The Engine and Propeller Directorate agrees in principle with this recommendation. Although data suggests that accomplishment of Pratt & Whitney (P&W) JT8D SB 5866 would further reduce the failure rate, the calculated safety risk based on an already low failure rate does not support mandating SB 5866.

In our previous response, we mentioned that we would work with P&W to revise the compliance category of SB 5866. During our reviews with P&W, it became clear that revising the SB would not result in increased fleet incorporation, since any information listed within an SB is not mandatory unless enforced by an accompanying AD. However, we have decided to revisit Safety Recommendation 03.243 to also address 03.244.

We are reassessing the inspection intervals currently mandated within AD 87-14-01R1. P&W is assisting us with a revised risk analysis, complete with updated assumptions, to determine the inspection intervals required to maintain fleet safety. In addition, we are considering adding a more thorough inspection to better detect cracks. Despite the relatively low risk of failure, the 2003 event at East Midlands airport resulted in adding SB 5866 to this revised AD as optional terminating action for this inspection.

The Engine and Propeller Directorate believes adjusting the inspection requirements of AD 87-14-01R1 and including SB 5866 as terminating action will further reduce an already low failure rate and meet the intent of this safety recommendation. The FAA will provide a follow-up response to this safety recommendation when the NPRM publishes.

Pratt and Whitney - No response received

Status - Accepted - closed

Embraer 135	Norwich Airport, off Runway 27	30 January 2003	Accident
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AAIB Bulletin: 11/2003

FACTOR: F39/2003

Synopsis

After an uneventful flight from Aberdeen, the aircraft landed at Norwich Airport, aquaplaned and overran the slush covered runway. Recommendations are made concerning the measurement of braking action on runways contaminated by slush and Company policy and procedures on landing configuration.

SAFETY RECOMMENDATION – 2003-097

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

Response

Pilot information bulleting released 6th Feb 2003.

SUBJECT: Landing on Slippery Runways

- A well planned and executed approach, flare, and touch down.
- Immediately after touch down, check the ground spoiler deployment when thrust levers are reduced to idle.
- Lower the nose wheel immediately to the runway. It will decrease lift and increase main gear loading.
- Apply brakes with moderate to firm pressure and symmetrically. Then let the anti-skid to its job.
- If no braking action is felt, hydroplaning is probably occurring. Do not apply emergency/parking brake! This will cause the spoilers to close and cut the anti-skid protection.

Note 1: Three conditions must be met for the ground spoilers to open:

- Airplane on the ground.
- Main landing wheels running above 25 knots.
- Both thrust levers angles below 30 degrees or N2 below 56.4%.

Note 2: Anti-Skid Protection

The anti-skid function never applies pressure, but only relieves it. This may cause the differential braking technique to change under some limiting conditions. In these situations, the correct action consists of reducing pedal force on the side opposite the turning direction rather than applying force on the pedal on the inside turn.

Be vigilant in asking for updated braking action reports. If you think that the report is too old or conditions have changed from what you had planned for, then go around!

Status - Accepted - closed

**Boeing
757-236****Enroute from
Heathrow****7 September 2003****Serious Incident****AAIB Formal: AAR 3/2005****FACTOR: F43/2005**

Synopsis

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

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

The following immediate causal factors were identified:

1. The tasks of refitting the panels to the right wing and correctly certifying for the work carried out were not performed to the required airworthiness standard.
2. Ineffective supervision of maintenance staff had allowed working practices to develop that had compromised the level of airworthiness control and had become accepted as the 'norm'.
3. There was a culture, both on the ramp and in the maintenance hangar, which was not effective in ensuring that maintenance staff operated within the scope of their company authorisation and in accordance with approved instructions.
4. The maintenance planning and task instructions, relating to oil servicing on the Boeing 757 fleet, were inappropriate and did not ensure compliance with the approved instructions.
5. The Airline's Quality Assurance Programme was not effective in highlighting these unsatisfactory maintenance practices.

SAFETY RECOMMENDATION – 2005-123

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

Response

The Agency is conducting a rulemaking task RMT.0222 [former Multi Disciplinary Measures (MDM).020] 'Definition of "critical systems"' which aims at improving regulation to better protect against potential errors which might occur when performing maintenance tasks that

are critical to safety. Continuing airworthiness management organisations and maintenance organisations should assess whether the maintenance tasks, including removal and installation of such flap panels, could be classified as a critical maintenance task and therefore be subject of precautions that will be proposed under this task.

The Terms of Reference MDM.020 issue 4 is dated 11 May 2009 and available on EASA Website. The main objectives of this task are:

- to improve safety by reducing the possibility of having undetected maintenance errors following maintenance work deemed critical to safety;
- to provide stakeholders with a methodology or key criteria in order to identify critical maintenance tasks.

Status - Accepted - closed

Airbus A320-214	Gatwick Airport	15 January 2005	Accident
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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 – 2005-073

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

Response

EASA in the scope of the Continued Airworthiness gets regular feedback from the manufacturers on the status of reported deficiencies. In the light of the preceding and of the recommendations sent by Civil Aviation Safety Investigation Authorities, the EASA ensures that all corrective actions are introduced to a timescale commensurate with the risk. The specific case of reported failures of the nose wheel bearings on the A319/A320/A321 series of aircraft has led to preventive measures. Airbus has asked the nose landing gear (N LG) wheel supplier to review the NLG bearings installation and to define improvements to prevent grease starvation or contamination.

This has resulted in the definition of an improved bearing seal featuring a "double lip" seal and a new retaining ring for both bearings. All wheels manufactured after September 2005 have this new seal. This new seal assembly is proposed for in-service aircraft through Goodrich Service Bulletin (SB) 3-1531-32-4 and can only be fitted on Goodrich wheels part number (PN) 3-1531. Airbus S6 32-1118 that has been issued on 30 March 1994 introduces wheels PN 3-1531. Goodrich wheels PN 3-1470 are no more produced; the current wheels in production since main serial number (MSN) 378 have PN 3-1531. According to operator reports, among the 377 aircraft delivered with wheel PN 3-1470, 54 aircraft have embodied 56 32-1118 and additional 89 embodiments are planned. Through

the continued airworthiness process the EASA will ensure the consideration of the introduction of this new wheel and seal on attrition basis. 19/12/2011

Status - Accepted - closed

Dornier 328-100	London City Airport	20 February 2005	Serious Incident
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AAIB Bulletin: 2/2006

FACTOR: F12/2006

Synopsis

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

SAFETY RECOMMENDATION – 2005-139

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

Response

Referring to a letter sent to my CEO dated 2 February 2012 about an incident with a Dornier 328 at London City Airport on 20 February 2005 please note that a respective information has been incorporated in the Airplane Operating Manual (AOM) to comply with the AAIB Safety Recommendation.

The immediate action (AOM TR 10-014, dated 24 July 2006) was presented to EASA during a regular Airworthiness Review Meeting (ARM) in 2006 and the airworthiness issue was closed during this meeting. In the meantime the AOM TR has been turned into a regular page of the manual.

Status - Accepted - closed

Avro 146-RJ100
**London City
Airport**
29 March 2005
Incident
AAIB Bulletin: 11/2006
FACTOR: F44/2006

Synopsis

The First Officer had stabilised the aircraft on an ILS approach, at night, to Runway 10. At 400 ft the commander sighted the runway lights, took control in accordance with the Operator's procedures and disconnected the autopilot and autothrottle. During the landing flare the rate of descent appeared to be high and the commander corrected this by increasing the pitch attitude. The aircraft touched down at a body angle that exceeded the safe limit, causing the underside of the rear fuselage to contact the runway surface.

SAFETY RECOMMENDATION – 2006-095

It is recommended that BAE Systems review the work jointly undertaken with the operator regarding tail strike prevention with a view to promulgating the information to other operators.

Response

With regard to Safety Recommendation 2006-095, I can confirm that BAE Systems shared the findings of the investigation carried out in conjunction with the operator over two operator conferences back in 2008. These presentations were sent to the full AVRO 146-RJ operators list at the time and not just the conference attendees. Furthermore, based on the work carried out with the operator, BAE Systems added the following recommendation in the AVRO 146-RJ Flight Crew Operations Manual (FCOM) Volume 3 Part 1 Chapter 4 Topic 9 Page 25:

Avoidance of Tailstrike on AVRO RJ100 Aircraft

It is recommended that a procedure be established whereby the PNF calls 'attitude' if the pitch attitude on the PFD exceeds 5° nose-up during the later part of the approach and landing. In response, PF should stop the increase in pitch attitude and consider a go-around if necessary.

Status - Accepted - closed

Airbus A320-211
**Runway 14 Leeds
Bradford**
18 May 2005
Accident
AAIB Formal: AAR 6/2007
FACTOR: F37/2007

Synopsis

While landing on Runway 14 at Leeds Bradford Airport the aircraft touched down just beyond the end of the marked touchdown zone with low autobrake selected. Manual wheel braking commenced shortly after mainwheel touchdown. At a groundspeed of around 70 kt the brakes ceased operating, for about 17 seconds. A pronounced dip in the runway surface initially prevented the pilots from seeing the runway end. When it became apparent to the commander that it would not be possible to stop before the end of the runway, he deliberately did not select alternate braking, as this would have caused loss of nosewheel steering, but instead used nosewheel steering to turn the aircraft sharply to the

right. The aircraft skidded sideways and came to a halt with its nosewheels off the runway, shortly before the end of the paved surface and the start of a steep down slope.

The cause of the braking loss could not be positively established but it was consistent with the effects of excessive noise in the electrical signals from the mainwheel tachometers used to sense groundspeed. Two of the tachometer driveshafts were found bent and it was known that this encouraged a resonant condition that could cause tachometer signal errors above the groundspeed at which they would be detected by the aircraft's monitoring systems. Should the condition affect both main landing gears simultaneously, the brake control system logic could generate an erroneous aircraft reference speed, which could activate the anti-skid system and release the brakes. Fluctuation in the signal errors would prevent the system from detecting and correcting the braking loss or providing a warning to the crew.

It was found that there were a number of other known anomalies with the brake control and monitoring system that could cause either brake failure or locking of the wheels, some of which had resulted in previous incidents and accidents. The aircraft manufacturer and the Airworthiness Authority had defined and implemented corrective actions, and redesigned tachometer driveshafts and updated software intended to correct some of the faults were available, but had not been incorporated on a substantial number of aircraft, including JY-JAR. The findings raised concerns about the aircraft manufacturer's procedures intended to ensure design quality and continued airworthiness.

The investigation identified the following causal factors:

1. Excessive wheel tachometer signal noise, caused by a bent tachometer driveshaft on each main landing gear assembly, resulted in loss of braking using the Normal system.
2. Inadequate fault tolerance within the brake control system led to the sustained loss of Normal braking during the landing ground roll.
3. There was no flight deck indication of brake system malfunction, and this delayed the crew's recognition of the loss of braking.
4. There was a lack of effective action to fully rectify brake system anomalies apparent from previous incidents and accidents.

Seven Safety Recommendations were made.

SAFETY RECOMMENDATION – 2007-012

The Jordanian Civil Aviation Authority should ensure that aircraft operators under their jurisdiction have procedures in place to ensure the continued airworthiness of mandatory flight recorders.

Response

I would like to inform you that CARC complied with the SAFETY RECOMMENDATION 2007-012 through compliance with, and implementation of:

- JCAR OPS 1.160 "Preservation, production and use of flight recorder recordings",
- JCAR OPS 1.037 Accident prevention and flight safety program, and
- JCAR M.302 "Maintenance Program"

I. CARC mandates the implementation of an accident prevention and flight safety program through various measures, one of which is a flight data monitoring program for those aeroplanes in excess of 27,000 kg MCTOM. Flight data monitoring (FDM) is the proactive use of digital flight data from routine operations to improve aviation safety that shall be non-punitive and contain adequate safeguards to protect the source(s) of the data.

II. CARC approves a maintenance program for the aircraft registered in Jordan, and where the following inspections/checks are mandatory to ensure the continued airworthiness of mandatory flight recorders:

- a. verify all required aircraft parameters are recorded properly on the flight data recorder,
- b. replace the digital flight data recorder underwater locator beacon (ulb) and operationally check the ulb at the manufacturer's ulb life limit,
- c. operationally check the digital flight data recorder underwater locator beacon.

In addition that the aircraft was deregistered from our civil registry on 7 Dec. 2005

Status - Accepted - closed

SAFETY RECOMMENDATION – 2007-015

The European Aviation Safety Agency should require the expeditious replacement of the long hollow titanium tachometer driveshaft in the braking systems of the A320 family of aircraft with a driveshaft of improved design.

Response

EASA in the scope of the Continued Airworthiness gets regular feedback from the manufacturers of the status of reported deficiencies. In the light of the preceding and of the recommendations sent by Civil Aviation Safety Investigation Authorities, the EASA ensures that corrective actions are introduced. The specific case of reported loss of braking on Airbus A320 series of aircraft has been investigated by Airbus and conclusions for the whole fleet have been shared with the Agency (ref. Airworthiness Review Sheet 32.0071). A modification has been developed to replace the 'hollow titanium' shaft by a 'plainsteel tapering' drive shaft in production. These will be replaced at a time of maintenance when wear and tear is detected to be present.

Status - Rejected - open

SAFETY RECOMMENDATION – 2007-016

The European Aviation Safety Agency should ensure the replacement of software Standards 7 or 9 with Standard 9.1 or a proven later version, in those remaining Airbus A319 and A320 brake and steering control units not yet so modified.

Response

EASA issues Airworthiness Directive (AD) 2008-0048 "Landing Gear - Braking and Steering Control Unit (BSCU) - Modification/Replacement" on 28 February 2008 mandating the modification or replacement of the BSCU standard 7. 9 and 9.1 by BSCY standard 10 on A319, A320 and A321 aircraft.

Status - Accepted - closed

Dash 8	Near Leeds, West Yorkshire	4 August 2005	Incident
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AAIB Bulletin: 4/2007

FACTOR: F20/2007

Synopsis

Shortly after initiating a descent, an oily smell was noticed on the flight deck, almost immediately followed by a smoke build-up in the flight deck and cabin. The flight crew carried out the initial part of the smoke checklist procedure, declared an emergency and carried out a diversion. The cabin crew members donned smoke hoods, which caused appreciable communication difficulties, and prepared the cabin for an emergency landing. After landing, an emergency evacuation was carried out, without injury.

The smoke was found to be the result of fatigue cracking of a compressor support member of the No 2 engine. This had led to damage to an oil seal, allowing oil to leak into the bleed air supplying one of the air conditioning units. Fleet modification action aimed at preventing fatigue cracking of the component and at improving the affected oil seal was completed on all of the operator's fleet by July 2006.

No means of rapidly ascertaining the source of the smoke was available to the crew. Carrying out the subsequent actions prescribed in the checklist would have stopped the supply of smoke but the procedure was relatively protracted and could not be completed because of a high flight crew workload associated with the diversion.

SAFETY RECOMMENDATION – 2007-002

It is recommended that the EASA consider requiring, for all large aeroplanes operating for the purposes of commercial air transport, a system to enable the flight crew to identify rapidly the source of smoke by providing a flight deck warning of smoke or oil mist in the air delivered from each air conditioning unit.

Response

The Agency has performed a review on the subject of cabin air contamination by engine/auxiliary power unit (APU) lubricating fluids, through rulemaking task 25.035. An Advanced Notice of Proposed Amendment (A-NPA) 2009-10 was published on 28 September 2009 along with on-line questionnaires, and the corresponding Comment Response Document (CRD) 2009-10 was published on 28 May 2011.

Based on the knowledge and evidences in the safety and health domains gathered during task 25.035, the Agency has decided not to launch rulemaking measures on this subject. This conclusion is confirmed in EASA Executive Director (ED) Decision 2012/001/R which was published on 10 February 2012 on the EASA Website.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2007-003

It is recommended that the FAA consider requiring, for all large aeroplanes operating for the purposes of commercial air transport, a system to enable the flight crew to identify rapidly the source of smoke by providing a flight deck warning of smoke or oil mist in the air delivered from each air conditioning unit.

Response

INTERIM RESPONSE OF 05-29-2009:

We will address this Safety Recommendation issuing a Special Airworthiness Information Bulletin (SAIB) initiated in response to Safety Recommendations 06.103 thru 06.106. Title 14 Code of Federal Regulations (CFR) Section §25.1529 Instructions for Continued Airworthiness (ICA), Amendment 25-54, requires that sufficient information, essential to the continued airworthiness of the aircraft, must be provided for each required product. The SAIB reminds manufacturers of smoke detectors, manufacturers of commercial airplanes, registered owners or operators of transport category airplanes that per §25.1529, sufficient information, which is essential to the continued airworthiness of the aircraft, must be provided for each required product. These ICAs must provide the recommended periods at which the smoke detectors should be cleaned, inspected, adjusted, tested, and lubricated, and the degree of inspection, the applicable wear tolerances, and associated work recommended at these periods.

FINAL RESPONSE OF 11-06-2009:

As indicated in our initial response to FAA Safety Recommendation 07.058, dated May 2009, we indicated that a special airworthiness information bulletin (SAIB) could be developed' to address the cause of the event in lieu of requiring complex and costly design changes. We have completed a draft of a special airworthiness information bulletin (SAIB) to address contamination of the cabin air supply. Here is a summary from our draft SAIB:

- To prevent exposure to contaminants in the event of smoke, fumes, vapors, or odor in the cabin, the flight crew must don oxygen masks and land the airplane at the nearest suitable airport.
- Visually inspect the environmental control systems, including flight deck and cabin air supply, for signs of contaminants (droplets, wet surfaces, sticky residue, etc.).
- If fluid is present, find the source of the leakage or contaminant and repair any discrepancies prior to further flight.
- If contaminant is found inside the environmental control systems, remove all fluid and residue, or replace contaminated components (e.g., filters) prior to further flight.

Upon reviewing these proposed recommendations, we came to realize that operators should already have these procedures, or equivalent procedures, in place through the instructions for continued airworthiness (ICAs) for the aircraft involved in the incidents leading to the safety recommendation. We now believe that it is not beneficial, and may in fact be confusing, to publish the SAIB "recommending" procedures that should already be "required." We have determined not to publish the SAIB because (1) we do not know how inspectors would be able to use the SAIB to improve operator and maintenance adherence to the existing ICAs, and (2) we are not aware of any plan to collect data from operators and maintenance facilities to objectively demonstrate that the SAIB improved adherence to the ICAs.

We plan no further action with regard to this SR and ask that it be closed.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2007-004

It is recommended that for all large aeroplanes operating for the purposes of commercial air transport, the UK CAA and the EASA should take such steps, procedural or technical, as are necessary to improve the reliability and availability of communications between flight

and cabin crews, including the reliability of communications equipment and associated power supplies in both normal and emergency configurations.

Response

The CAA accepts this recommendation. As a first step to improving the reliability and availability of communications between flight and cabin crews, in both normal and emergency configurations, the CAA believes that a review is needed of the crew interphone system power supply configuration on all large aeroplanes. As this review and approval of any modifications arising from the review, is design related it is an activity that falls entirely within the responsibility of the European Aviation Safety Agency to instigate. Therefore, the CAA wrote to EASA on 4 May 2007 supporting the AAIB position and requesting that it initiates such a review.

Status - Accepted - closed

DHC-8-311	Aberdeen Airport, Stand 8	7 October 2005	Accident
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AAIB Bulletin: 11/2006

FACTOR: F45/2006

Synopsis

The DHC-8 aircraft was parked on stand, all the passengers were on board and the engines had been started. Shortly after the Ground Power Unit (GPU) cables had been disconnected from the aircraft, and with nobody in the cab, the GPU moved forward and struck the rotating propeller on the right engine before coming to rest against the fuselage. All the occupants exited the aircraft through the passenger door and no one was injured.

The investigation identified a number of maintenance issues with the GPU. No issues were revealed with either the serviceability or operation of the aircraft, and hence this report is focussed on the GPU.

SAFETY RECOMMENDATION – 2006-092

It is recommended that British Airways review their operations at Aberdeen Airport to ensure that airside vehicles are maintained in accordance with the appropriate manufacturer's recommended servicing schedule and to ensure that their defect reporting system for ground vehicles operates effectively.

Response

The Airport Manager at Aberdeen responded as follows:

8 August 2006

I can confirm that a revised maintenance schedule has been put in place at Aberdeen for all vehicles, including the GPUs. All vehicles are serviced at three and six monthly intervals in accordance with the maintenance sheets provided by LEX, which are based on the appropriate manufacturers recommended servicing schedule. The defect reporting system has been also reviewed and written instructions have been issued accordingly.

A monthly review on progress is conducted by us and the plans/schedule are updated as required.

Status - Accepted - closed

Dornier 328-110	Isle of Man (Ronaldsway) Airport	28 November 2005	Incident
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AAIB Bulletin: 10/2006
FACTOR: F38/2006

Synopsis

The aircraft had a covering of frost and was de-iced/anti-iced using a heated mixture of Type II+ de icing fluid and water. The commander commenced the takeoff run and at the calculated rotation speed pulled the control column aft. The aircraft did not appear to rotate in response to the control input and he abandoned the takeoff. The aircraft was brought to a stop on the runway.

The probable cause of the incident was the incorrect V_1/V_R speed selected. Contamination must have been present on the tail surfaces because the aircraft would not rotate at the 'normal' rotation speed for its configuration and load but it was not possible to determine whether the contaminant was ice or thickened fluid. The problem may have occurred because fluid was sprayed from the trailing edge towards the leading edge. Two Safety Recommendations were made.

SAFETY RECOMMENDATION – 2006-072

The Joint Aviation Authorities should contact all Dornier 328 Type Rating Training Organisations within JAA member States and emphasise the need to train pilots to use icing speeds following de-icing/anti-icing with thickened fluids, even when in non-icing conditions.

Response

EASA issued on 23 February 2011, the Safety Information Bulletin (SIB) 2010-26R1 'Potential Performance Degradation of Anti-icing Fluids - Reduced Holdover Times'. The SIB is meant to address the intent of the Safety Recommendation.

Status - Accepted - closed

Airbus A310	On approach to Birmingham International Airport	23 February 2006	Serious Incident
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AAIB Formal: AAR 7/2007
FACTOR: N/A

Synopsis

Air Traffic Control at Birmingham International Airport notified this serious incident to the Air Accidents Investigation Branch (AAIB) at 1240 hrs on 23 February 2006.

The aircraft was on a scheduled flight from Tehran, Iran, to Birmingham International Airport in the United Kingdom (UK). Following an uneventful flight, the aircraft was radar vectored for a Localiser/DME approach to Runway 33. The aircraft commenced a descent from 2,000 ft to the published minimum descent altitude of 740 ft whilst still 11 nm from the runway threshold. At a point 6 nm from the runway the aircraft had descended to an altitude of 660 ft, which was 164 ft agl. The radar controller noted this descent profile and, through the tower controller, issued an immediate climb instruction. However, the crew had

already commenced a missed approach, which they initiated when they received a GPWS alert. The aircraft was radar vectored for a second approach during which the flight crew again initiated an early descent. On this occasion, the radar controller instructed the crew to maintain their altitude and the crew successfully completed the approach. The aircraft landed safely from the second approach.

SAFETY RECOMMENDATION – 2007-109

It is recommended that Mahan Air should develop operating procedures for the presence of additional flight crew members occupying a seat on the flight deck.

Response

On receiving the AAIB Report in November 2007 we immediately set up an action plan to address the underlying cause(s) of incident to our A310, F-OJHI in Birmingham, keeping in mind the AAIB Safety Recommendations. We are happy to announce that the extensive efforts expended on the subject came to full fruition in few months time such that when Mahan Air was audited by an EUC assessment team on June16-20/2008, the corrective actions taken were termed, quote"...The Airline successfully identified the principal causes of the incident. The Airline, using its Risk Management and Accident Prevention Program, has implemented the following changes..." unquote.

- 1: Crew resources management (CRM) training for all training pilots and line pilots, based on Civil Aviation Procedures CAP737 (UK CAA) and ICAO human factors, the training department now conducts integrated cabin crew and flight deck training. Areas specific to the flight crew which have been addressed include command authority gradient, and command CRM training.
- 2: A revision of Standard Operation Procedures (SOP), part of which now included constant decent approaches for all non-precision approaches, a revision of altimeter setting procedure, decent and approach briefings, and increased awareness of the responsibilities of the pilot monitoring.
- 3: New policy on additional pilot on the flight deck ,if any additional pilots are positioned on the flight deck, they are briefed not to intervene in the operation of the aircraft unless a risk to flight safety exists.
- 4: Additional Radio Telephonic (RT) training for all crews.

Referring to your safety recommendation 2007-109 please be advised the in respect to prevention of feature incidents an operational Directive was issued and strongly begin close watch, and also strictly imposed by the related flight captain.

Referring to your safety recommendation 2007-110 as mentioned above CRM course is now one of our main courses during type training as well as general CRM courses.

Referring to your safety recommendation 2007-111 A review was accomplished by the operation department to expand FMS database for correction and implementation of the required Navigation and let down charts which made a noticeable and honorable changes in our performance in Birmingham Airport as we could receive the Birmingham track keeping award in 2009 and invited to receive the same for year 2010.

Once again I would like to thank you and your colleagues regarding the safety recommendations which caused recognition of the weaknesses and improvement to achieve higher level of standards. your acknowledge would be highly appreciated.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2007-110

It is recommended that Mahan Air should conduct a thorough review of its CRM training programme to ensure that it is both appropriate for their needs and produces consistent and acceptable results.

Response

On receiving the AAIB Report in November 2007 we immediately set up an action plan to address the underlying cause(s) of incident to our A310, F-OJHI in Birmingham, keeping in mind the AAIB Safety Recommendations. We are happy to announce that the extensive efforts expended on the subject came to full fruition in few months time such that when Mahan Air was audited by an EUC assessment team on June16-20/2008, the corrective actions taken were termed, quote"...The Airline successfully identified the principal causes of the incident. The Airline, using its Risk Management and Accident Prevention Program, has implemented the following changes..." unquote.

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Once again I would like to thank you and your colleagues regarding the safety recommendations which caused recognition of the weaknesses and improvement to achieve higher level of standards. your acknowledge would be highly appreciated.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2007-111

It is recommended that Mahan Air should expand its FMS database to include all approaches relevant to their route structure.

Response

On receiving the AAIB Report in November 2007 we immediately set up an action plan to address the underlying cause(s) of incident to our A310, F-OJHI in Birmingham, keeping in mind the AAIB Safety Recommendations. We are happy to announce that the extensive efforts expended on the subject came to full fruition in few months time such that when Mahan Air was audited by an EUC assessment team on June16-20/2008, the corrective actions taken were termed, quote"...The Airline successfully identified the principal causes of the incident. The Airline, using its Risk Management and Accident Prevention Program, has implemented the following changes..." unquote.

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Status - Accepted - closed

Dornier 328	Near Sumburgh Airport, Shetland	11 June 2006	Serious Incident
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AAIB Bulletin: 3/2007
FACTOR: F19/2007

Synopsis

During a visual approach to Sumburgh Airport, the aircraft encountered worsening weather conditions and inadvertently flew into close proximity with the terrain. The crew were alerted to the situation by on-board equipment, but the commander did not respond to the 'PULL UP' warnings it generated. The approach was continued and a safe landing made at the airport. The investigation identified a number of organisational, training and human factors issues which contributed to the crew's incorrect response to the situation. Two

recommendations were made, concerning crew training and regulatory oversight of the aircraft operator.

SAFETY RECOMMENDATION – 2006-130

The Joint Aviation Authorities should review the training requirements for flights crews operating aircraft required to be equipped with a predictive terrain hazard warning function, with a view to ensuring that such crews are adequately trained in its use, interpretation and response.

Response

Commission Regulation (EU) No 1178/2011 of 3 November 2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council covers Ground Proximity Warning System training.

The upcoming Executive Director (ED) Decision related to EASA Opinion 04/2011 on air operations will contain Guidance Material (GM) for Terrain Awareness Warning System (TAWS) [ie Enhanced Ground Proximity Warning System (EGPWS)] Flight Crew training programmes.

Rulemaking task RMT.0188 and RMT.0189 [former FCL.002 (a) and (b)] 'Updating EASA Implementing Rules', will transpose the Joint Aviation Authorities (JAA) learning objectives, which explicitly include training on EGPWS, into the European regulations structure. 19/12/2011.

EASA acknowledges receipt of this Safety Recommendation. Please be advised that it is under consideration and that the outcome will be communicated to you in due course. 11/10/2010

Status - Accepted - closed

SAFETY RECOMMENDATION – 2006-131

The Icelandic Civil Aviation Administration should conduct a safety audit of Landsflug ehf (City Star Airlines) in the light of the shortcomings identified during the investigation into this serious incident.

Response

Safety Audit was performed shortly after the incident and regularly thereafter.

The operator ceased all operation in January 2008.

Status - Accepted - closed

Airbus A319-111	Overhead Brest, France	15 September 2006	Serious Incident
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AAIB Formal: AAR 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 – 2008-086

It is recommended that the EASA require Airbus to modify the Airbus A320-series Master Minimum Equipment List (MMEL) to require an operator, prior to dispatch, to attempt to identify the fault that rendered an Integrated Drive Generator (IDG) inoperative and to prohibit dispatch with an IDG inoperative for those faults whose recurrence could result in significant disruption of aircraft systems.

Response

Following the situation experienced by this aeroplane, the consequences on the aircraft systems and the crew workload were reviewed and deemed severe enough to recommend checking the manual in relation to the alternating current essential feed (AC ESS FEED) alternative supply function in case of dispatch with an Integrated Drive Generator (IDG) inoperative.

In addition to clearing the latent failure of the AC ESS FEED alternate supply function, which might be pre-existing before the dispatch, it was considered that performing this check will also have the effect of re-familiarising flight crews with this function, should they need it in flight.

In conclusion, the dispatch with an IDG inoperative (MMEL Item AC Main Generation #1) was reviewed and revised. The corresponding MMEL Temporary Revisions references are:

TR 01-24/01M - Issue 01

TR 01-24/02M - Issue 01

TR 01-24/03M - Issue 01

Status - Accepted - closed

SAFETY RECOMMENDATION – 2008-087

It is recommended that the EASA require Airbus to revise the A320-series Master Minimum Equipment List to include a requirement to check for correct operation of the AC ESS FEED changeover function prior to dispatch with a main generator inoperative.

Response

As a result of the Safety Recommendation 2008-086, it is agreed with Airbus to update the Master Minimum Equipment List (MMEL), so as to include an operational check of the manual AC ESS FEED alternate supply function when dispatching under MMEL item Alternating Current (AC) Main Generation #1.

Dispatching under MMEL item AC Main Generation #2 is disregarded since the next worst-case failures in flight do not specifically impair the AC ESS and DC ESS bus bars power supply, compared to the aircraft full-up configuration.

Based on further aircraft design considerations, it is agreed with Airbus to make this operational check only applicable to aircraft not being fitted:

- with Generator Control Unit (GCU) Standard 5.2 or
- with automatic AC ESS FEED alternate supply function or
- with power supply segregated Audio Management Units (AMU)

This is based on the following rationale:

- The situation experienced by A319 G-EZAC was resulting from a logic of the GCU Standard 5.1, when deferring the aircraft with one AC Main Generation inoperative. Robustness of the GCU internal logic is improved by the implementation of the Standard 5.2
- The automatic AC ESS FEED alternate supply function, when installed, is considered as a significant mitigation factor upon loss of AC BUS #1.
- Although the functional effects on the aircraft were not limited to total loss of radio-communications, this failure condition is considered as a factor to the severity of the overall situation experienced by A319 G-EZAC.

The MMEL was revised accordingly. The associated MMEL Temporary Revisions references are:

TR 01-24/01M - Issue 01

TR 01-24/02M - Issue 01

TR 01-24/03M - Issue 01

Status - Accepted - closed

SAFETY RECOMMENDATION – 2008-089

It is recommended that the EASA and the FAA review their measures for monitoring and approving component repair organisations to ensure they have systems in place to identify units with an excessive service rejection rate of recurrent faults.

Response

A new Rulemaking Task has been added to the Rulemaking Programme. The objective of this task will be to upgrade the existing regulation EC 2042/2003 to require maintenance organisations putting in place procedures for identification and control of components with recurrent faults.

Federal Aviation Administration (FAA) - No response received

Status - Accepted - closed

SAFETY RECOMMENDATION – 2008-091

It is recommended that Airbus re-evaluate its systems for achieving adequate design quality for aircraft systems to include the possibility that flight crews may not always perform the required corrective actions and to ensure that the initial failure probability and/or hazard assessments are revised in the light of in-service experience.

Response

No response from Airbus

Status - Withdrawn

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.

Response

INTERIM RESPONSE OF 09-22-2009:

We have received FAA Safety Recommendation 09.138 and have assigned it to Air Carrier Branch.

We requested the Seattle Aircraft Evaluation Group (SEA-AEG) to investigate the area discussed by this recommendation. They informed us a letter was sent to Boeing for review. As of September 3, the SEA-AEG has not received a response.

We will provide you our response to FAA Safety Recommendation 09.138 by November 6.

Status - Accepted - closed

Raytheon Hawker 800XP-H25B	After departure, London City Airport	31 October 2006	Incident
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AAIB Bulletin: 1/2008

FACTOR: F3/2008

Synopsis

This aircraft experienced significant navigation problems after taking off from London City Airport (LCY) and was unable to comply with the Standard Instrument Departure (SID). The crew were able to recover heading information after approximately 10 minutes and landed back at LCY without incident. It transpired that several similar incidents had previously occurred with other aircraft and there have been similar incidents subsequent to this one. The cause of the problem was identified as strong magnetic anomalies in the holding area for Runway 28. Six Safety Recommendations have been made.

SAFETY RECOMMENDATION – 2007-119

It is recommended that ICAO amend Annex 14 to highlight the importance of ensuring that no airport infrastructure is allowed to alter significantly the local earth's magnetic field density in areas where aircraft hold prior to departure.

Response

The response you received from ICAO on 04/02/2008 was:

'In this regard, I am pleased to inform you that the Air Navigation Commission will study the issue raised in the safety recommendation further and develop new specifications, if necessary, for inclusion in Annex 14, Volume I.'

The follow up feedback related to this action is:

The issue was referred to the Aerodromes Panel for further study. After coordination among different working groups of the panel, it was proposed that relevant guidance material would be developed for inclusion in Doc 9157, Aerodrome Design Manual, Part 3 — Pavements. Besides the guidance material, if necessary, proposed amendments to SARPs will be developed as well for inclusion in Annex 14, Volume I.

Status - Partially Accepted - open

ATR42-300**London Stansted
Airport****18 January 2007****Serious Incident****AAIB Bulletin: 8/2008****FACTOR: N/A****Synopsis**

Soon after takeoff from London Stansted Airport the aircraft developed a yawing motion which persisted as a yawing/rolling motion of varying severity. The yaw damper could not be engaged. An emergency was declared and the aircraft returned to Stansted. No mechanical fault was found which would have caused the motion, although an undetected and intermittent fault affecting components within the rudder control system could have degraded the aircraft's handling characteristics with the yaw damper not engaged, as could a takeoff with the rudder control system incorrectly configured. The nature of the motion and observed control deflections were such that an inadvertent and inappropriate rudder input by a pilot would have been required for the oscillations to persist. Four Safety Recommendations were made, concerning operational advice to flight crews and ongoing serviceability checks for Flight Data Recorders (FDRs).

SAFETY RECOMMENDATION – 2008-020

The European Aviation Safety Agency should require that, prior to the first flight of the day, the built-in test features on the flight deck for the Cockpit voice recorder, Flight Data Recorder and Flight Data Acquisition Unit, when installed, should be monitored to ensure correct operation.

Response

Rulemaking Task OPS.063 (a) Before first flight of the day require the built-in test features of any installed Cabin Voice Recorder (CVR)/Flight Data Recorder (fdr)/Flight Data Acquisition Unit (FDAU) to be monitored for correct operation is identified in the 2010-2013 Rulemaking Programme and will address the issue.

Status - Accepted - closed**Boeing 747-436
and
Airbus A340-311****London Heathrow
Airport****15 October 2007****Serious Incident****AAIB Bulletin: 4/2010****FACTOR: N/A****Synopsis**

A ground collision occurred when an Airbus A340 attempted to pass a Boeing 747 that was stationary on an adjoining taxiway, at night. Various factors contributed to the incident including the challenge faced by the crews of these large aircraft in assessing wing tip clearances, their interpretation of ATC instructions and the taxiway design.

SAFETY RECOMMENDATION – 2010-010

It is recommended that Heathrow Airport Limited improve the effectiveness of the warnings issued to pilots of manoeuvring aircraft to clarify that clearance from other aircraft is not assured in all circumstances, regardless of the ATC taxi clearance.

Response

HAL changed the script within the AIP and ATC changed the ATIS recorded message about wingtip clearance within the holding areas.

The AIP currently states, at page AD 2-EGLL-1-10, 2 Ground Movement, a General, at v and vi respectively.....

Flight crew are reminded of the extreme importance of maintaining a careful lookout at all times and are at all times responsible for wing top clearance. The taxiway lighting system is an aid to pilots when operating on the manoeuvring area during darkness or poor visibility. Notwithstanding the taxiway lighting system, pilots continue to remain responsible for wing tip clearance.

In promulgated holding areas, ATC may require aircraft to pass each other. Avoidance of other aircraft is the responsibility of the flight crew involved. If doubt exists as to whether other aircraft can safely be overtaken, aircraft must stop, advise ATC, and request ATC for alternative instructions.

I'm fairly sure that para v was added as a direct result of the incident (not least because it matches the incident circumstances exactly!). I think that para 6 was already in there, but may have been reinforced.

Status - Accepted - closed

Boeing 777-236	Short of threshold to Runway 27L, London Heathrow Airport	17 January 2008	Accident
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AAIB Formal: AAR 2/2010

FACTOR:

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 G-YMMM had been in maintenance for two days, during which the left engine EEC was replaced and left engine ground runs carried out.

SAFETY RECOMMENDATION – 2009-030

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.

Response

This is an initial response to FAA Safety Recommendations 09.047 and 09.048, which were issued on April 8, 2009.

We received FAA Safety Recommendations 09.047 and 09.048 on April 14, 2009.

The Agency identified for project launch during the period 2011-2013 the study on "Fuel anti-ice additives for civil jets" and for which the purpose is the evaluation of generalised use of fuel anti-ice additives onto commercial aircraft. These projects will address the intent of the Safety Recommendation.

Status - Accepted - closed

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.

Response

This is an initial response to FAA Safety Recommendations 09.047 and 09.048, which were issued on April 8, 2009.

We received FAA Safety Recommendations 09.047 and 09.048 on April 14, 2009.

The project "Water in Aviation fuel under cold temperature Conditions" (WAFCOLT) launched in 2010 addresses a survey on existing data (including manufacturers data) and laboratory testing for the formation and characterisation of ice crystals in aviation jet fuel. The scope of the study covers the review and analysis of existing data on water/ice presence in aviation turbine fuels (Jet A-1 and A) followed by small-scale testing of a set of fuel samples to characterise the formation of ice crystals and the properties in generic environment(s) representative of atmospheric conditions encountered during long-haul flights. The project addresses the intent of the Safety Recommendation.

Status - Accepted - closed

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.

Response

EASA coordinates with the Federal Aviation Administration (FAA) a plan of actions, which encompasses several dedicated research studies relating to system-level tests on ice accumulation. The Agency identified the project "Ice accretion and release in fuel systems" as to be launched in the near term future. A main element of the project will be Scale-level testing in an environmental chamber to observe ice accumulation and shedding in representative aircraft fuel system components. This project will address the intent of the Safety Recommendation.

Status - Accepted - closed

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.

Response

The European Organisation for Civil Aviation Equipment (EUROCAE) Working Group 90 considered this recommendation when preparing the revision of EUROCAE Document 112 "Minimum Operational Performance Specification for Crash Protected Airborne Recorder Systems".

This parameter has been added to the list of parameters required for aeroplanes' engines. EASA will take this into account in rulemaking tasks RMT.0308 and RMT.0309 (former OPS.023(a) and (b)) entitled "FDRs - alignment with ED-112", which are on the Agency's Rulemaking Programme.

Status - Accepted – closed

Jetstream 4102	Climbing through FL90	9 April 2008	Serious 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.

Response

For the most likely occurrences the checklist provides adequate instructions to flight crews for flight control restrictions. Whilst, in this instance, the cause of the restriction was most likely environmental rather than mechanical, the crew would have had little means of enabling that assessment from the cockpit; other than their suspicion it was due to the aircraft not being de-iced. The commander's diagnosis turned out to be correct, but his ability to establish that position was not determined from the cues available to the crew. It is BAE Systems' view that, in the majority of likely conditions, flight crews will be unsure of the actual cause of a flight control restriction and, because it intends to take account of any manner of control restriction, the checklist is entirely appropriate.

Status - Accepted - closed

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.

Response

Failure of the tail-plane de-icing system is a specific condition, in which the tailplane can lose its effectiveness due to ice accretion on the leading edge. Limiting landing flap deployment is intended to cater for this situation. Leading edge contamination by ice usually results from in-flight icing, rather than ground icing. The effect of ground icing, and the resulting contamination of the tailplane surface, is more likely to restrict elevator control movement, rather than cause tailplane stall.

Therefore, in the case of a pitch control restriction, it is important that the flight crew's primary action is to follow the emergency and abnormal checklist procedures for 'pitch control jam', after which it may be necessary to consider limiting landing flap, depending on the severity of the control issues; but that would be secondary factor for the crew to assess.

Status - Accepted - closed

Airbus A340-313	Nairobi Airport, Kenya	27 April 2008	Serious 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.

Response

The training of air traffic controllers on the AWOS system could not been done in December 2011 because the system became unserviceable. Birds damaged some of the sensors and replacement spares had to be ordered. The spares have now been received and the technicians expect to have the system working before the end of the week. Meanwhile a training programme is being worked on and training should commence in due course.

Status - Partially Accepted - 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.

Response

The recommendation was accepted and KAA is in the process of acquiring a photometric machine that will be used in runway lighting maintenance.

Status - Partially Accepted - 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.

Response

The recommendation was accepted and runway edge lights will be repositioned to comply with ICAO Standards. The tender for consultancy services has already been awarded to M/s NACO Limited who are now preparing the tender documents for the works.

Status - Partially Accepted - 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.

Response

The recommendation was accepted and NOTAM NO. HKJK-A0126/10 dated 25th May 2010 issued. The NOTAM has since been cancelled and AIP Supplement S18/10 issued.

Status - Accepted - closed

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.

Response

The last rubber removal exercise was carried out from 29th February to 14th May 2010. Comprehensive rubber removal will be dealt with during runway refurbishment works that are being designed by M/s NACO Limited. Thereafter, routine testing to monitor runway friction levels will be implemented.

Status - Partially Accepted - open

ERJ 190-200 LR	40 nm North-West of Wallesey	1 August 2008	Serious Incident
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AAIB Bulletin: 6/2010

FACTOR: N/A

Synopsis

The aircraft was operating a scheduled passenger transport flight with the No 2 air conditioning pack inoperative, as permitted by the Minimum Equipment List (MEL). Whilst en route, a failure of the No 1 Air Cycle Machine (ACM) occurred, releasing smoke and fumes into the aircraft. A MAYDAY was declared and an expeditious diversion was carried out. After donning oxygen masks the pilots had great difficulty communicating with each other, ATC and cabin crew, because of technical problems with the masks. During the emergency evacuation the right overwing emergency exit door became jammed and unusable. Passengers who evacuated via the left overwing exit were unaware of how to get from the wing down to the ground.

Two Safety Recommendations are made as a result of this investigation.

SAFETY RECOMMENDATION – 2010-007

It is recommended that the European Aviation Safety Agency review the design, contrast and conspicuity of wing surface markings associated with emergency exits on Public Transport aircraft, with the aim of ensuring that the route be taken from wing to ground is marked unambiguously.

Response

EASA acknowledges receipt of this Safety Recommendation.

In the current Certification Specifications (CS) 25, paragraph CS 25.810 (c) requires that an escape route is established for each over-wing emergency exit; the escape route must meet given minimum criterion of width, reflectance and surface-to-marking ratio.

The Agency accepts to review ways of improvement of these specifications and a dedicated Rulemaking Task (25.075) has been provisioned in the Rulemaking Programme Inventory.

In addition, the Agency notes that during the evacuation of this incident, the passengers using the emergency over-wing escape route were surprised and confused by the height of the step to go down from the wing to the ground. Thus the Agency will also consider this aspect in its review of cabin safety improvements; a recent study done for the Agency recommended to review the appropriateness of the current 6 feet height criteria about which assisting means shall be provided.

Status - Accepted - closed

Airbus A330-243**Montego Bay,
Jamaica****28 October 2008****Serious Incident****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.

Response

Feasibility of such system has not yet been demonstrated. This item has been proposed to be added to the European Organization for Civil Aviation Equipment (EUROCAE) Technical Work Programme. It is expected that a working group of experts will review the state of the art on the feasibility of such system. If it appears that technology is available, then the working group would propose a standard.

Status - Accepted - closed**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.

Response

No standard exists and the feasibility of such system has not yet been demonstrated. Nevertheless this item has been proposed to be added to the European Organization for Civil Aviation Equipment (EUROCAE) Technical Work Programme. It is expected that a working group of experts will review the state of the art on the feasibility of such system. If it appears that technology is available, then the working group would propose a standard. The EASA does not intend to establish a certification specification at this time.

Status - Partially Accepted - open

Boeing 737-73V**West of Norwich,
Norfolk****12 January 2009****Serious Incident****AAIB Bulletin: 9/2010****FACTOR: N/A****Synopsis**

A flight control manual reversion check² was being conducted as part of a post-maintenance check flight. During the check, the aircraft pitched rapidly nose-down, descending approximately 9,000 ft before control was recovered. A number of maintenance and airworthiness check issues were identified and six Safety Recommendations have been made.

SAFETY RECOMMENDATION – 2010-072

It is recommended that the European Aviation Safety Agency review the regulations and guidance in OPS 1, Part M and Part 145 to ensure they adequately address complex, multi-tier, sub-contract maintenance and operational arrangements. The need for assessment of the overall organisational structure, interfaces, procedures, roles, responsibilities and qualifications/competency of key personnel across all sub contract levels within such arrangements should be highlighted.

Response

Operations and maintenance Rules (AMC.OPS.1.035) already require operators and maintenance organisations to include their subcontracted activities under their quality system. However, the rulemaking task 145.012 'Part-145 Single and Multiple Release'. Initiated in 2006, already tried to address this issue. However, as described in the Opinion 06/2010 issued by the Agency on 29 November 2010, this task did not generate any change to the guidance material (GM) due to the opposition to the proposed changes from a significant number of competent authorities and stakeholders and to the fact that the task was mainly addressing Part-145 responsibilities and an additional new focus needed to be placed also on the Continuing Airworthiness Management Organisation (CAMO) responsibilities. As a consequence, a rulemaking task has been created, RMT.0217 (former M.029) 'Additional guidance on the CAMO responsibilities' which will cover Part-145 and CAMO responsibilities and addresses the intent of this recommendation.

In addition, rulemaking task RMT.0251 (former MDM.055) 'Embodiment of Safety Management System (SMS) requirements into and adaption of Regulation (EC) No 2042/2003 for the implementation of a State Safety Plan' will mandate implementation of hazard identification and risk management, where any hazards stemming from such complex, multi-tier constellations should also be identified and assessed. This is further supported by using the same approach throughout operational and Continuing Airworthiness/Maintenance rules when it comes to implementing a safety Management System (SMS) (same/similar rules for operators, CAMOs Part 145s).

Status - Accepted - closed**SAFETY RECOMMENDATION – 2010-073**

It is recommended that the European Aviation Safety Agency require AOC operators to have, and comply with, a detailed procedure and a controlled test schedule and record of findings for briefing, conducting and debriefing check flights that assess or demonstrate the serviceability or airworthiness of an aircraft.

Response

The Agency is initiating a Rulemaking Task on a Multi Disciplinary Measure (MDM.097) to address the continuing airworthiness and operational aspects, including crew competence, of maintenance check flights (this new task will jointly combine the task on maintenance (M.009) and operations (OPS.075) in relation with maintenance check flights as described in the rulemaking plan for 2011). The safety recommendation will be considered during the development of this Rulemaking Task.

In the meantime, the Agency plans to issue a Safety Information Bulletin (SIB) providing information and recommendations for the performance of functional check flights, which include maintenance check flights.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2010-075

It is recommended that the European Aviation Safety Agency provide guidance on minimum crew proficiency requirements and recommended crew composition and training for those undertaking check flights that assess or demonstrate the serviceability or airworthiness of an aircraft.

Response

The Agency is initiating a Rulemaking Task on a Multi Disciplinary Measure (MDM.097) to address the continuing airworthiness and operational aspects, including crew competence, of maintenance check flights (this new task will jointly combine the task on maintenance (M.009) and operations (OPS.075) in relation with maintenance check flights as described in the rulemaking plan for 2011). This safety recommendation will be considered during the development of this Rulemaking Task.

In the meantime, the Agency plans to issue a Safety Information Bulletin (SIB) providing information and recommendations for the performance of functional check flights, which include maintenance check flights.

Status - Accepted - closed

Falcon 2000	Biggin Hill Airport, Kent	11 November 2009	Incident
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AAIB Bulletin: 12/2010

FACTOR: N/A

Synopsis

The aircraft had been undergoing a technical investigation to identify the cause of a braking defect. A flight crew were requested by the on-site maintenance team to carry out high speed taxi trials as part of the troubleshooting process. The crew conducted a series of seven accelerate/stop runs along the main runway, at gradually increasing reject speeds. At the commencement of the eighth run, the crew felt that a tyre had deflated and brought the aircraft to a stop. They were informed by ATC that there was a fire under the left wing; the crew and passengers then abandoned the aircraft safely. The fire was caused by damage to the brakes from excessive temperature, this released hydraulic fluid under pressure, which then ignited. Four Safety Recommendations have been made as a result of the investigation.

SAFETY RECOMMENDATION – 2010-064

It is recommended that NetJets Transportes Aéreos introduce maintenance procedures which document the tasks, roles and responsibilities of all maintenance personnel when requesting and participating in operational/functional check flights or flight crew operated ground tests.

Response

In response to Safety Recommendation 2010-064 issued to NetJets Transportes Aéreos in AAIB Bulletin 12/2010 (Ref. EW/C2009/11/03), I would like to draw your attention to the workflow diagram on page 8 of our Maintenance procedure NJMP1.15 (see attachment) which, “document[s] the tasks, roles and responsibilities of all maintenance personnel when requesting and participating in operational/functional check flights or flight crew operated ground tests”.

Status - Accepted - closed

Dash 8	Near Bristol Airport	24 April 2010	Serious Incident
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AAIB Bulletin: 6/2011

FACTOR: 04/2011

Synopsis

After a base maintenance check at Exeter the aircraft was flown uneventfully to East Midlands to be re-painted. During the return flight to Exeter the right engine suffered a significant oil leak and lost oil pressure, so the flight crew shut it down. Subsequently, the crew noticed the left engine also leaking oil, with a fluctuating oil pressure, so they initiated a diversion to Bristol, where they landed safely. The oil leaks were traced to damaged O-ring seals within the oil cooler fittings on both engines. Both oil coolers had been removed and refitted during the base maintenance check at Exeter. It was probably during re-installation that the O-ring seals were damaged. A number of factors led to this damage and to missed oil leak checks. Six Safety Recommendations are made.

SAFETY RECOMMENDATION – 2011-014

It is recommended that Flybe Aviation Services revise their practices and procedures to ensure that their repair instructions are adequately details and specify the necessary access and removal requirements.

Response

Flybe Aviation Services - No response received

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-015

It is recommended that Bombardier Inc. amend the Aircraft Maintenance Manual for the DHC-8-100 series to emphasise the correct procedure for securing the inlet and outlet pipes to the engine oil coolers, including the method for tightening the associated knurled nuts.

Response

Bombardier Aerospace (Shorts) - No response received

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-016

It is recommended that Flybe Aviation Services review their defect rectification processes to ensure that important safety checks, such as oil leak checks, are not omitted.

Response

Flybe Aviation Services - No response received

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-017

It is recommended that Flybe Aviation Services remind all staff of the importance of investigating the source of every engine oil leak.

Response

Flybe Aviation Services - No response received

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-018

It is recommended that the European Aviation Safety Agency expand the advisory or guidance material in Annex II (Part 145) of European Commission Regulation (EC) No. 2042/2003 on how approved maintenance organisations should manage and monitor the risk of maintenance engineer fatigue as part of their requirement to take human performance limitations into account.

Response

As part of the implementation of the International Civil Aviation Organisation (ICAO) standards on "Safety Management System" (SMS), maintenance organisations will be required to implement a system to identify hazards, to assess associated risks and to take appropriate mitigation action (ICAO standard 8.7.3.3 (Annex 6 Part I)). The agency will address the relevant ICAO SMS standards for Regulation (EC) No. 2042/2003 by means of rulemaking task RMT.0251 (former MDM.055). In the framework of this rulemaking task the Agency will identify the need for additional requirements, acceptable means of compliance and guidance material to properly consider human factors in maintenance and continuing airworthiness management. Maintenance staff fatigue will be addressed as part of this review. The Terms of Reference (ToR) was published on 18 July 2011 on the EASA Website; it includes the reference to this Safety Recommendation.

Status - Partially Accepted - open

SAFETY RECOMMENDATION – 2011-019

It is recommended that the Civil Aviation Authority include the following areas in the Part 145 audits of Flybe Aviation Services: practices and procedures for detailing repair instructions, identification of safety critical tasks, planning of defect rectification and management of maintenance engineer fatigue.

Response

The CAA accepts this recommendation and has enhanced its oversight of Flybe Aviation Services, with particular focus on their practices and procedures for detailing repair instructions, identification of safety critical tasks and planning of defect rectification. A series of audits and product samples have been carried out to verify the adequacy of the

Flybe Aviation Services procedures. This oversight will continue to be applied as Flybe Aviation Services continues its ongoing review and refinement of the task management process.

In the absence of a requirement for AMOs to manage maintenance engineer fatigue and pending any formal expansion of advisory and guidance material from EASA in Part 145 to explain how this should be accomplished (in response to Safety Recommendation 2011-018), the CAA will monitor the organisation's response to issues relating to shift working and potential impact on engineering staff through its audit of the Flybe Aviation Services' production and manpower planning processes.

Status - Accepted - closed

DC-8-63 HF	Manston Airport, Kent	11 August 2010	Serious Incident
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AAIB Bulletin: 5/2011

FACTOR: N/A

Synopsis

During the takeoff the aircraft's tail skid struck the end of Runway 28 at Manston, and also the soft ground beyond. An approach light for the reciprocal runway was destroyed by the aircraft's main landing gear. Post-incident calculations showed that the aircraft weight was more than 25,000 lb above the maximum allowable takeoff weight for the prevailing conditions. The investigation highlighted a number of procedural failings by the flight crew, a lack of currency in line operations and a lack of operational oversight and control by the aircraft operator and the regulatory authority in the Islamic Republic of Afghanistan. Four Safety Recommendations have been made.

SAFETY RECOMMENDATION – 2011-006

It is recommended that the Ministry of Transport and Civil Aviation (MoTCA) review its processes for the regulatory oversight of commercial aircraft operators based in the Islamic Republic of Afghanistan.

Response

Ministry of Transport and Civil Aviation (Afghanistan) - No response received

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-007

It is recommended that the International Civil Aviation Organisation (ICAO) establish an alternative to the USOAP (Universal Safety Oversight Audit Programme) procedure for those states, such as the Islamic Republic of Afghanistan, where security, or other, concerns prevent regular on-site auditing.

Response

I wish to inform you that USOAP was mandated under ICAO Assembly Resolution A35-6. The scope of the audits was to address all safety-related ICAO Annexes and limited to audit States' oversight capability and not the industry such as air operators and other service providers. The six-year audit cycle commenced in January 2005 and ended in December 2010. During this audit cycle, 180 of 190 ICAO Member States were audited. The remaining Member States that did not receive an audit was mainly due to two reasons:

- 1) the United Nations (UN) uses a security level index to determine and guide UN agencies on the level of security and the precautions required to be taken by UN personnel when conducting UN missions. Unfortunately, during the six-year USOAP cycle, the UN security level in some States, including Afghanistan, was too high for ICAO to conduct an audit; and
- 2) USOAP also relies on experts from ICAO Member States trained as USOAP auditors to perform audits. Member States second experts on a short-term basis for the duration of the audit and their salary is paid for by their respective government. It is neither feasible nor advisable to contact an audit in a State where the UN security level is high.

Cognizant that a USOAP audit cannot be performed at this time, ICAO has entered into technical cooperation projects with Afghanistan in order to provide assistance in the field of civil aviation as well as to perform assessment of its international carriers, with the goal of providing assistance and guidance to resolve their deficiencies.

I trust that the foregoing information meets with the intent of the safety recommendations of the Air Accidents Investigation Branch.

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-008

It is recommended that the International Civil Aviation Organisation (ICAO) conduct an aviation safety oversight audit of the Islamic Republic of Afghanistan.

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-009

It is recommended that the UK Department for Transport (DfT) review their process for the issue of permits to aircraft operators where the ICAO auditing system does not provide an appropriate level of confidence in the State's regulatory oversight.

Response

The Department has made the following changes to the permit process with immediate effect:

1. The DfT Permit Database has been adapted to immediately flag up any permit applications from airlines whose home state has either not yet had a USOAP audit or the audit results indicate an inadequate level of safety oversight.
2. In the event of an Alert being triggered (described above) the DfT will request that the CAA conduct a Technical Review of the documents supporting the application.
3. Following this review, if required, the CAA will request the AOC holder and/or the Competent Authority to provide any additional information they deem necessary to demonstrate compliance with international standards.
4. If a permit is subsequently granted, it should only be issued providing the AOC holder is ramp inspected under the SAFA programme prior to first departure from a UK airfield. The applicant must provide accurate arrival and departure details 48hrs prior to operation or the permit will be withdrawn. No departure on a commercial service will be permitted without a SAFA having been carried out.
5. In the event a permit is not granted on safety grounds, the DfT will inform the European Commission as required under Regulation 2111/2005

I would wish to make you aware that the process described above would be a temporary arrangement as the European Commission is about to introduce new legislation in respect of safety approvals for third country operators. It is expected that the new Regulation will come into force sometime during 2012, at which time the European Aviation Safety Agency (EASA) would become directly responsible for issuing safety approvals for third country aircraft operating to the EU including the UK.

Status - Accepted - closed

Boeing 757-28A	Nouakchott Airport, Mauritania	25 August 2010	Serious Incident
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AAIB Bulletin: 6/2011

FACTOR: N/A

Synopsis

The aircraft was in the cruise at FL370 when the flight crew noticed an increase in both engine vibration levels. They selected the Engine Anti-Icing (EAI) ON but the vibration levels continued to increase gradually. The crew decided to carry out an ice shedding procedure, which was described in their operations manual (OM). As thrust was reduced on the left engine its vibration increased rapidly to the maximum level shown on the EICAS. The crew attempted to restore the thrust but the engine did not respond normally to the thrust lever movement. A descent was made to a lower level and a diversion to Nouakchott was initiated. The engine recovered at some time during the descent and a normal two engine approach and landing was made.

The left engine is considered to have entered a surge or stall condition following the action of retarding the thrust lever and then increasing thrust. There was no damage evident within the engine and the vibration condition was attributed by the engine manufacturer to an asymmetric ice build up under the spinner fairing. The manufacturer's Fan Ice Removal procedure as described in the OM was found to be inappropriate for the prevailing conditions. Three Safety Recommendations are made.

SAFETY RECOMMENDATION – 2011-020

It is recommended that the Civil Aviation Authority ensures that United Kingdom operators have procedures for preventing the loss of Cockpit Voice Recorder and Flight Data Recorder recordings, following an occurrence subject to mandatory reporting, in accordance with legislative requirements of EU-OPS 1.160 and EU-OPS 1.085.

Response

The CAA accepts this recommendation in so far as it will remind operators of the legislative requirement of OPS 1.160 and 1.085. This will require them to have procedures in place to prevent the loss of Cockpit and Flight Data Recorder recordings and that these procedures need to be robust, coordinated across the operation and fully prescribed in relevant Operations and Maintenance Manuals. This reminder will be in a Safety Notice which will be published before the end of July 2011.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2011-021

It is recommended that Boeing advises all operators utilising the Flight Data Recorder 757-2 Data Frame of the need to correct the conversion of the left and right engine vibration parameters.

Response

Boeing Commercial Airplanes - No response received

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-022

It is recommended that Boeing provides updated documentation that corrects the Flight Data Recording 757-2 Data Frame conversion information for the left and right engine parameters.

Response

Boeing Commercial Airplanes - No response received

Status - Response Awaited - open

Cessna 680	During climb, after departure from London Luton Airport	30 September 2010	Serious Incident
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AAIB Bulletin: 8/2011

FACTOR: 6/2011

Synopsis

The crew experienced an uncommanded transfer of fuel from the right to the left fuel tank after following the checklist procedures for a left main electrical bus fault indication. The aircraft subsequently became left wing heavy and exceeded the lateral imbalance limits. It returned to Luton Airport where a flapless landing was completed without further incident. As a result of this incident, Special Bulletin S1/2010 was published on 8 October 2010, containing two Safety Recommendations. The investigation established that the isolation of the left main bus had caused a false fuel cross-feed command which resulted in the uncommanded fuel transfer. The aircraft manufacturer has published a temporary flight crew procedure to mitigate the effects of a recurrence and has also issued a service bulletin to incorporate a design solution.

Eight further Safety Recommendations are made in this bulletin, relating to aircraft certification processes and flight recorder documentation.

SAFETY RECOMMENDATION – 2011-023

It is recommended that the Federal Aviation Administration (FAA) reviews the certification process for the Cessna Citation 680 Sovereign with the Cessna Aircraft Company to ensure that adherence to approved checklist procedures does not result in an unsafe aircraft configuration.

Response

We worked with Cessna Aircraft Company to re-examine the Airplane Flight Manual (AFM) and the procedure in question. We concluded that the process for development and certification of the AFM and checklist procedures is robust and results in a document that is effective and appropriate for operation of the aircraft.

Approved checklist procedures contained in the AFM are developed through an established process and coordinated with the Aircraft Certification Office during the certification phase of the program. The following provides a high-level summary of this process:

The process begins with a draft AFM from the time the prototype airplane first flies and procedures are evaluated throughout the development and certification program and continues while the airplane is in service. Each procedure is evaluated considering the expected operating envelope of the airplane. Different scenarios for entering procedures as well as different conditional paths contained within procedures are assessed. These evaluations take a variety of forms including on-airplane tests, simulator tests, and engineering evaluation. Failure conditions that can be simulated in flight are accomplished in flight. AFM procedures associated with failure conditions that cannot be accomplished in flight are assessed in a representative flight simulator, on a test bench, or by engineering evaluation. All of these evaluations are accomplished with consideration to the design of the airplane, and use the proposed AFM procedures. If necessary, the proposed procedures are revised and incorporated into the final AFM prior to its approval. The FAA is involved in the review of AFM and checklist procedures during the certification flight test program and reviews the proposed AFM prior to approval.

In the unlikely event that an airplane system does not function in the manner the design is intended, a procedure evaluated during the engineering assessment could have unintended consequences. Every effort is made to avoid such circumstances; however, should such a condition be discovered, our process provides for immediate action to develop and distribute any required changes to all operators of the affected aircraft. Cessna continually works with their operators and training partners as well as applying lessons learned on other programs to identify any procedural issues so that we can improve the accuracy and usability of our AFM procedures.

The incident involved with FAA Safety Recommendation 11.165 resulted in Cessna establishing more detailed failure mode testing to identify unintended operation associated with electrical bus failures. This ensures emergency and abnormal AFM procedures adequately address these failures. Current and future development programs will incorporate these new test requirements.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2011-024

It is recommended that the Civil Aviation Authority ensure that UK operators of aircraft equipped with flight data recorders hold and maintain controlled documentation that satisfies the intent of Cap 731 and complies with the requirements of EU-OPS 1.160 (a) (4) (ii).

Response

The CAA accepts this recommendation. The CAA has enhanced its procedures to require UK operators of aircraft equipped with flight data recorders, for which the type certificate holder already provides documentation that satisfies the intent of CAP 731 and complies with the requirements of EU-OPS 1.160 (a)(4)(ii), to identify the data applicable to their aircraft types and either hold and maintain the documentation, or demonstrate the formal

delegation of holding and maintaining that data to a third party (i.e the organisation responsible for replay or a group arrangement).

Once the actions of safety recommendations 2011-026 have been addressed, the CAA will also be able to require UK operators of the remaining aircraft types equipped with flight data recorders which are under the jurisdiction of EASA and FAA, to either hold and maintain controlled documentation that satisfies the intent of CAP 731 and complies with the requirements of EU-OPS 1.160(a)(4)(ii).

Status - Accepted - closed

SAFETY RECOMMENDATION – 2011-025

It is recommended that the Civil Aviation Authority include in their processes associated with the issuing of Air Operator Certificates a check to ensure that the operator's procedures comply with requirements of EU-OPS 1.160 (a) (4) (ii).

Response

The CAA accepts this recommendation. The CAA has revised its processes to check that the procedures an operator has in relation to the continued airworthiness of his aircraft include controlled documents enabling FDR data to be retrieved and converted into engineering units. In addition, on 17 August 2011 the CAA published Safety Notice SN-2011/011 'Prevention of The Loss of Recordings from Cockpit Voice and Flight Data Recorders' and this includes information associated with the requirements of EU-OPS 1.160(a)(4)(ii)

Status - Accepted - closed

SAFETY RECOMMENDATION – 2011-026

It is recommended that the European Aviation Safety Agency ensures that design organisations under their jurisdiction responsible for approvals affecting Flight Data Recorder (FDR) installations, hold the documentation required for decoding the FDR data, and that the documentation is to a suitable standard and available to operators.

Response

EASA acknowledges receipt of this Safety Recommendation. Please be advised that it is under consideration and that the outcome will be communicated to you in due course.

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-027

It is recommended that the European Aviation Safety Agency review their certification requirements, guidance and procedures to ensure that controlled documentation, sufficient to satisfy operator flight data recorder documentation requirements, are explicitly part of the type certification and supplemental type certification processes where flight data recorded installations are involved.

Response

Part 21 (Annex to Commission Regulation (EC) 1702/2003) and CS-25 (Certification Specifications for Large Aeroplanes) require the type certificate (TC) (or supplemental type certificate (STC)) holder to provide instructions for continued airworthiness and this is considered applicable to flight data recorders (FDR).

Nevertheless the Agency accepts to review ways of improvement of the certification specifications to better indicate that the TC (or STC) holder has to provide the adequate documentation to the operator or owner of the aircraft, which should include:

- the necessary information to convert FDR raw data into engineering units, and
- FDR maintenance requirements.

This subject will be treated as part of rulemaking task RMT.0268 (former MDM.068) dealing with revision of FDR and cockpit voice recorder (CVR) certification specifications. This task is currently part of the Agency's Rulemaking Programme inventory.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2011-028

It is recommended that the Federal Aviation Administration ensure that controlled documentation, sufficient to satisfy operator flight data recorded documentation requirements, is part of the type certification and supplemental type certification processes where flight data recorder installations are involved.

Response

To ensure controlled Flight Data Recorder (FDR) correlation documentation is provided at type certificate (TC) and supplemental type certification (STC), the FAA requires TC and STC applicants to comply with Title 14, Code of Federal Regulations (14 CFR) 25.1301 for demonstrating intended function. This section requires the installed FDR system be of a kind and design appropriate for its intended function. The intended function of the FDR is to meet the operating rules in 14 CFR 121.344, with 14 CFR 121.344(j) specifically requiring the specified controlled documentation. Therefore, the documentation required by 14 CFR 121.344(j) is required as part of the FDR system certification basis.

Additionally, Faa Advisory Circular 20-141B, Airworthiness and Operational Approval of Digital Flight Data Recorder Systems, dated August 17, 2010, paragraph 2-14 and Appendix 1, clarifies that FDR controlled documentation is required as part of the TC or STC holder's Instructions for Continued Airworthiness (ICA).

In addition to the FDR system certification requirements, the FAA improved oversight and inspection criteria for ensuring 14 CFR part 121 operators comply with the FRD system documentation requirements 14 CFR 121.344(j). On June 1, 2011, the FAA published a revision to the Flight Standards Information Management Systems, Air Transportation Oversight System, Data Collection Tool Master List, Element Performance Inspection and Safety Attribute Inspection criteria. Among the changes in this revision, the FAA requires its inspector to verify the operator maintains a document used to convert FDR recorded values to corresponding engineering units or discrete states. The FAA also established correlation between the values being recorded by the flight data recorder and the corresponding values being measured.

Engineering Report AES-680-177, initial release dated February 10, 2011, is referenced in Cessna's ICA and is available to its operators upon request. This report provides data stream format and correlation documentation of the Honeywell EPIC system ARIC 717 data bus to the L-3 Communications FA 2100 FDR. As a result of this incident and in accordance with the ICA, Cessna generated and issued the 680 Citation Sovereign FDR data stream and format document for the ensuing investigation.

The FAA believes the existence of appropriate FDR system regulations, FAA inspector oversight criteria, and guidance material ensuring controlled documentation as part of the TC and STC processes is sufficient.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2011-029

It is recommended that the European Aviation Safety Agency provides guidance detailing the standards for the flight data recorder documentation required for the certification of systems or system changes associated with flight data recorders.

Response

In response to Safety Recommendation UNKG-2011-027 the Agency accepts to review ways of improvement of the certification specifications to better indicate that the type certificate (TC) (supplemental type certificate (STC)) holder has to provide the adequate flight data recorder (FDR) documentation to the operator or owner of the aircraft. This subject will be treated as part of rulemaking task RMT. 0268 (former MDM.068) dealing with revision of FDR and cockpit voice recorders (CVR) certification specifications.

In this framework, the Agency will also review the existing FDR documentation standards and will provide guidance in the certification specifications.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2011-030

It is recommended that Cessna Aircraft Company issue controlled documents, applicable to Cessna aircraft equipped with flight data recorders, that satisfy the EU-OPS 1.160 (a) (4) (ii) requirement, and make them available to all operators of the applicable aircraft. Furthermore, it is recommended that the documentation issued should follow the guidance given in Federal Aviation Administration document AC 20-141B and UK Civil Aviation Authority document CAP 731.

Response

Cessna has issued controlled documents AES-680-177 for the model 680 and AES-750-161 for the model 750 which fully define the Flight Data Recorder parameters. These documents support compliance with EU-OPS 1.160 (a)(4)(ii) and will be provided, at no extra charge, to any operator requesting them. Going forward, Cessna will include complete parameter information with each FDRs Instructions for Continued Airworthiness (ICA) for each model. A full set of ICA documents is provided to every operator at the time of delivery and any updates to ICA are made available through our online source Cesview. Guidance provided in FAA AC 20-141B and UK CAA CAP 731 will be used to aid in defining format and content.

Status - Response Awaited - open

DHC-8-402
**Bournemouth
Airport, Dorset**
30 November 2010
Incident
AAIB Bulletin: 9/2011
FACTOR: N/A
Synopsis

As the aircraft approached touchdown following a flapless approach, the pilot increased the pitch attitude to control the rate of descent and the tail of the aircraft struck the runway.

SAFETY RECOMMENDATION – 2011-081

It is recommended that Bombardier Aerospace amends the DHC-8-402 Dash 8 emergency checklist section concerning abnormal flap landings to reflect their advice that power will be maintained until main wheel contact.

Response

Bombardier Aerospace (Shorts) - No response received

Status - Response Awaited - open
Cessna 750
Doncaster Airport
9 December 2010
Accident
AAIB Bulletin: 10/2011
FACTOR: N/A
Synopsis

The aircraft was positioning to Doncaster Airport for minor maintenance. Shortly after a normal touchdown, the right main landing gear trailing link failed and both mainwheels on that side detached. The aircraft slid to a halt just off the right side of the paved surface. The link failed due to a long stress corrosion crack and a Safety Recommendation is made for frequent visual inspection of the links for the presence of such cracks.

SAFETY RECOMMENDATION – 2011-072

It is recommended that the Cessna Aircraft Company amends the Maintenance Schedule for the Model 750 Citation X aircraft to include a suitably frequent external visual inspection of the MLG trailing link upper surface for cracks.

Response

Cessna Aircraft Company - No response received

Status - Response Awaited - open

Airbus A319-131**On approach to
London Heathrow****17 December 2010****Serious Incident****AAIB Bulletin: 4/2012****FACTOR: N/A****Synopsis**

On approach to London Heathrow Airport, in IMC and icing conditions, there was a loss of communication between the Probe Heat Computers (PHC) and the Centralised Fault Display System (CFDS). The associated Electronic Centralized Aircraft Monitoring (ECAM) actions required the crew to select ADR3 as the data source for the commander's instruments.

Later, on final approach to Runway 27L, the aircraft suffered a loss of displayed airspeed information on both the commander's and the standby flight instruments. The crew carried out a go-around using the 'Unreliable Speed Indication' procedure from the Quick Reference Handbook (QRH).

The investigation concluded that the loss of displayed airspeed information resulted from a combination of:

- a loss of communication between the Probe Heat Computers (PHC) and the Centralised Fault Display System (CFDS),
- icing of the standby pitot probe resulting in the loss of indicated airspeed displayed on the commander's and standby instruments.

One Safety Recommendation was made.

SAFETY RECOMMENDATION – 2011-099

It is recommended that Airbus amend the UNRELIABLE SPEED INDIC/ADR CHECK procedure in the A320 Quick Reference Handbook and the Flight Crew Operating Manual to ensure that it meets the requirements for all phases of flight.

Response

Airbus has extended the review to the whole Airbus fleet, including the A320 family (involved in this incident), the A330/A340 family, and the A380. The A300/A300-600/A310 family is not affected. All details are provided here after.

For the affected programs, the amended procedures instruct to retract one flap and maintain configuration 3 when the unreliable airspeed situation is encountered in configuration FULL.

The amendment has been introduced in May12 revision of A320 and A330/A340 families FCOM Flight Crew Operating Manual and associated QRH Quick Reference Handbook.

Status - Response Awaited - open

Gulfstream-G150	RAF Northolt	6 February 2011	Serious Incident
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AAIB Bulletin: 12/2011
FACTOR: N/A

Synopsis

A takeoff was attempted from Runway 25 at Northolt Airport, London. When the commander pulled the control column back to rotate at rotation speed, V_R , and subsequently fully back, the aircraft only pitched up to 1° . The takeoff was rejected just before V_2 , full braking was applied and the aircraft came to a stop at the end of the paved surface. A fire broke out around the left mainwheels which was suppressed quickly by the Rescue and Fire Fighting Service (RFFS).

The flight data showed that the aircraft's acceleration during the takeoff roll was below normal but the investigation did not reveal any technical fault with the aircraft. The most likely explanation for the lack of acceleration and rotation was that the brakes were being applied during the takeoff, probably as a result of inadvertent braking application by the commander, which caused a reduction in acceleration and a nose-down pitching moment sufficient to prevent the aircraft from rotating. However, it could not be ruled out that another factor had caused partial brake operation.

One Safety Recommendation is made, concerning the provision of flight data recorder conversion information.

SAFETY RECOMMENDATION – 2011-085

It is recommended that the Gulfstream Aerospace Corporation issue flight data recorder engineering unit conversion information for G150 aircraft in a single document that follows the guidance given in Federal Aviation Administration AC 20-141B and UK Civil Aviation Authority CAP 731.

Response

Gulfstream has a program underway that will amend the current Flight Data Recorder STC package to certify additional parameters that is scheduled to be completed in 3Q2013. During the course of this project the means to readily provide the recommended engineering conversion information in a single document will be accomplished.

Status - Response Awaited - open

ATR72-202	Edinburgh Airport	15 March 2011	Serious Incident
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AAIB Bulletin: 7/2012
FACTOR: N/A

Synopsis

On the first flight following a maintenance check, the aircraft experienced an uncommanded yaw resulting in a roll to the left as it accelerated through 185 kt. Directional control was regained and subsequent cockpit indications identified a fault with the rudder Travel Limitation Unit (TLU). The aircraft returned to Edinburgh Airport, where it landed safely. The investigation into this serious incident was conducted in conjunction with the Air Accident Investigation Unit (AAIU) of Ireland and the 'Bureau d'Enquêtes et d'Analyses pour la sécurité de l'aviation civile' (BEA) of France. The investigation established that a cam on the rudder TLU mechanism had been removed and incorrectly refitted during the

maintenance check. As a result of this incident AAIB Special Bulletin S1/2011, containing three Safety Recommendations, was published on 15 April 2011. Since this incident the aircraft manufacturer and the engineering organisation have taken safety actions to minimise the possibility of a similar event recurring. Two further Safety Recommendations are made in this final report.

SAFETY RECOMMENDATION – 2011-010

It is recommended that ATR immediately informs all operators of ATR aircraft equipped with a Travel Limitation Unit that it is possible to install the cams on the rear rudder quadrant shaft in the incorrect orientation.

Response

ATR France - No response received

Status - Accepted - closed

SAFETY RECOMMENDATION – 2011-011

It is recommended that ATR amends all relevant Aircraft Maintenance Manual tasks to include a warning to highlight that the cams on the rear rudder quadrant shaft can be installed incorrectly.

Response

The two AMM tasks which were the subject of Safety Recommendations (2011-011 and 2011-012) in Special Bulletin S1/2011 have been updated, copies of the updated AMM tasks attached:

- Removal and Installation of TLU Mechanism Assy – has now been amended to include a caution which states “Record the exact position of the cam (13) compared to the position of cam (15)”
- Operational Test of Rudder Travel Limiter Unit – has now been amended to include a note which states “Press and hold PTT pushbutton switch (187WW) for 30 seconds. Operate rudder pedals from stop to stop and check that rudder deflection is limited and symmetrical with respect to the neutral position. Make sure that no TLU faults are indicated.”

Status - Accepted - closed

SAFETY RECOMMENDATION – 2011-012

It is recommended that the ATR amends the Aircraft Maintenance Manual task 'Operational Test of the Rudder Travel Limitation Unit' to state that (1) the test should be carried out for a minimum of 30 seconds and (2) should an asymmetric restriction of the rudder pedals be detected or if the FLT CTL light illuminates, further inspection of the TLU system should be conducted.

Response

The two AMM tasks which were the subject of Safety Recommendations (2011-011 and 2011-012) in Special Bulletin S1/2011 have been updated, copies of the updated AMM tasks attached:

- Removal and Installation of TLU Mechanism Assy – has now been amended to include a caution which states “Record the exact position of the cam (13) compared to the position of cam (15)”

- Operational Test of Rudder Travel Limiter Unit – has now been amended to include a note which states “Press and hold PTT pushbutton switch (187WW) for 30 seconds. Operate rudder pedals from stop to stop and check that rudder deflection is limited and symmetrical with respect to the neutral position. Make sure that no TLU faults are indicated.”

Status - Accepted - closed

Douglas AD-4N and Commonwealth CA-18 Mk 22	Near Duxford Aerodrome, Cambridgeshire	10 July 2011	Accident
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AAIB Bulletin: 2/2012

FACTOR: 1/2012

Synopsis

The pilot of a P-51 Mustang was leading a ‘Vic’ (Vee) formation of three aircraft participating in an airshow at Duxford. On his left was a Douglas Skyraider and on his right was another P-51 Mustang. On a signal from the leader, the formation carried out a ‘break’ manoeuvre to the left. During the left turn the Skyraider and the leading Mustang collided. The Mustang pilot was forced to abandon his aircraft and descended by parachute to a safe landing; the Skyraider pilot was able to land his aircraft at Duxford.

The accident occurred after the Skyraider pilot had lost sight of his leader and continued to make a tighter turn than his leader’s aircraft, which had slowed down. This caused their respective flight paths to converge, resulting in the collision.

SAFETY RECOMMENDATION – 2011-083

It is recommended that the Civil Aviation Authority considers, where a parachute is worn as safety equipment, whether the provision of an automatic means of operating the parachute would provide a safety benefit.

Response

The CAA accepts this recommendation and will take further advice and enter discussions with those operators involved in flying displays before deciding on any appropriate actions. The first opportunity to do so will be the Display Authorisation Examiner’s seminar which will take place on 7th March at RNAS Yeovilton and on the following day at the industry organised Warbirds Display seminar. We understand that the pilot involved in the accident from which this recommendation arose, who successfully bailed out, will be attending the Warbird seminar to present on his experience. We will also need to discuss this recommendation with the British Gliding Association, whose members routinely use parachutes, to ensure any safety improvement actions or advice is consistent. The CAA expects to complete these discussions and deliberations before the end of May 2012.

Status - Accepted - closed

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

EC135 T1	Muirkirk, East Ayrshire	17 February 2002	Accident
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AAIB Bulletin: 8/2003
FACTOR: F30/2003

Synopsis

Disorientation after AFCS disengaged and hit terrain.

SAFETY RECOMMENDATION – 2003-050

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

Response

The CAA accepts this Recommendation.

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

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

Status - Accepted - closed

Beech 200	12 nm north-east of Clacton	23 July 2002	Incident
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AAIB Bulletin: 7/2003
FACTOR: F23/2003

Synopsis

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

SAFETY RECOMMENDATION – 2003-036

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

Response

The FAA department responsible for progressing Safety Recommendations did not receive the original AAIB Safety Recommendation No 2003-036. However, in November 2007, a similar Safety Recommendation, relating to the airworthiness of the Beechcraft 200 main cabin door securing mechanism, was made by an FAA Inspector as a result of an investigation into the in-flight detachment of a door. As a result of that safety recommendation Hawker Beechcraft included revised door rigging instructions in the Beechcraft maintenance manual. The Super King Air 200 Series and Super King Air B300IB3000 maintenance Manual revisions were dated 1 May 2010.

Raytheon - No response received

Status - Accepted - closed

Piper PA-31	In sea 54 miles west of Barbados	18 May 2003	Incident
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AAIB Bulletin: 11/2003

FACTOR: F42/2003

Synopsis

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

SAFETY RECOMMENDATION – 2003-077

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

Response

The certification basis of the subject aircraft (Piper PA-31 Navajo, serial number 31-7812117, tail number G-ILEA) is described in Type Certification Data Sheet No. A20SO, which is available on the FAA website.

Relevant details are as follows:

Type Certificate No. A20SO issued March 6, 1978, (originally issued February 24, 1966, under Type Certificate A8EA) obtained by the manufacturer under the delegation option authorization.

Date of Type Certificate application March 15, 1962.

CAR 3 effective May 15, 1956, through Amendment 3-8, effective December 18, 1962; and FAR 23.205, 23.1545, 23.1563 and 23.1585 as amended by Amendment 23-3, effective November 11, 1965; and FAR 23.1557(c) as amended by Amendment 23-7, effective September 14, 1969.

The certification basis for this aircraft did not require ditching. Accordingly, this aircraft was not certified for ditching.

Status - Accepted - closed

Britten Norman BN2B-26 Islander	7.7 nm west-north- west of Campbeltown Airport, Argyll	15 March 2005	Accident
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AAIB Formal: AAR 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 EASA Opinion 04/2011 on air operations, published 01 June 2011, requires 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 seat belt with upper torso restraint system for each passenger seat. If the maximum passenger seating configuration is 9 or more, a seat belt but no upper torso restraint system is required [refer to paragraph CAT.IDE.A.205(a)(3) and (4)].

JAA Headquarters - No response received

Status - Accepted - closed

Cessna Citation 500	Romsey Close, Farnborough, Kent	30 March 2008	Accident
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AAIB Formal: AAR 3/2010

FACTOR: N/A

Synopsis

Biggin Hill Airport notified the Air Accidents Investigation Branch (AAIB) of the accident on 30 March 2008 and the investigation began the same day.

The aircraft departed Biggin Hill for a private flight to Pau, France but shortly after takeoff initiated a return to Biggin Hill after reporting engine vibration. During the downwind leg for Runway 21, the aircraft descended. The flightcrew reported a major power problem just before it struck the side of a house. An intense fire developed. None of the two flight crew and three passengers survived.

The following contributory factors were identified:

1. It is probable that a mechanical failure within the air cycle machine caused the vibration which led to the crew attempting to return to the departure airfield.
2. A missing rivet head on the left engine fuel shut-off lever may have led to an inadvertent shutdown of that engine.
3. Approximately 70 seconds prior to impact, neither engine was producing any thrust.
4. A relight attempt on the second engine was probably started before the relit first engine had reached idle speed, resulting in insufficient time for enough thrust to be developed to arrest the aircraft's rate of descent before ground impact.

Three Safety Recommendations have been made.

SAFETY RECOMMENDATION – 2010-014

It is recommended that the Federal Aviation Administration require that Cessna Aircraft Inc introduce a scheduled inspection of the Cessna Citation 1 throttle quadrant assembly to ensure the integrity of the riveted joints securing the fuel shut-off levers to the throttle levers.

Response**INTERIM RESPONSE OF 08-09-2010:**

We have received FAA Safety Recommendations 10.134 and have assigned it to Air Carrier Maintenance Branch.

We have requested the Kansas City Aircraft Evaluation Group (MKC AEG) to investigate the area discussed by this recommendation, review the appropriateness of implementing this recommendation, and respond to our office by September 10, 2010.

We will provide you our response to FAA Safety Recommendations 10.134 by September 14, 2010.

INTERIM RESPONSE OF 11-09-2010:

We have received FAA Safety Recommendation 10.134 and have assigned it to Air Carrier Maintenance Branch.

We have requested that the Kansas City Aircraft Evaluation Group (MKC-AEG) investigate the area discussed by this recommendation, review the appropriateness of implementing this recommendation, and respond to our office by September 14, 2010. We have not yet received a response from MKC-AEG.

We are requesting a 90-day extension and will provide you our response to FAA Safety Recommendation 10.134, by January 17, 2011.

FINAL RESPONSE OF 02-08-2011:

FAA Response: A maintenance inspector assigned to the Kansas City Aircraft Evaluation Group (MKC AEG) contacted the Airworthiness Manager from Cessna Aircraft Company to discuss this recommendation. Cessna provided documentation stating there is no specific inspection of the individual rivets attaching idle cutoff lever. However, the idle levers are inspected during the Phase 5 inspection of the General Pedestal Area, which occurs every 1200 hours or 36 months, whichever occurs first. The AEG reviewed the maintenance manual and confirmed that a general visual inspection for the identified rivet joint area is called out in two areas in the maintenance manual.

AFS-300, as well as the MKC AEG, believes with the verification that an inspection of the area is required at the Phase 5 inspection, additional scheduled inspections are not necessary. We therefore consider this recommendation closed and no further action is planned.

We would like to thank Inspector Keith Conradi for his diligent efforts and continued interest in aviation safety.

Status - Rejected

Socata TBM850**Birmingham
Airport****12 January 2011****Serious Incident****AAIB Bulletin: 10/2011****FACTOR: F5/2011****Synopsis**

Following a loss of communications on approach due to a frequency mis-selection by the pilot, the TBM 850 passed over the top of an aircraft holding on the Birmingham Airport Runway 15 starter extension and landed. No injuries or damage occurred. Four Safety Recommendations are made.

SAFETY RECOMMENDATION – 2011-073

It is recommended that the Civil Aviation Authority resolve the conflicting expectations of flight crews and air traffic controllers following a loss of communications during approach.

Response

The CAA accepts this recommendation. The CAA will review and publish revised requirements to support the national elements of the Loss of communications procedures. This action will be completed by 30 April 2012. Following the publication of the revised Loss of Communication procedures, the CAA will issue appropriate instructions and guidance to ensure both flight crews and air traffic controllers use the same expectations in their planning following a loss of communications during approach. This action will be completed by 31 August 2012.

Status - Accepted - closed**SAFETY RECOMMENDATION – 2011-074**

It is recommended that the Civil Aviation Authority review the risk assessment of the hazards associated with clearing aircraft to line up ahead of landing traffic.

Response

The CAA accepts this recommendation insofar as it is the responsibility of Air Navigation Service Providers to undertake adequate risk assessment of the hazards associated with clearing aircraft to line up ahead of landing traffic. The CAA will ensure that, commensurate with the action taken in response to Safety Recommendation 2011-073, Air Navigation Service Providers' operational procedures and associated safety assurance, provide effective mitigation of the relevant hazard relating to the clearing of aircraft to line up ahead of landing traffic which will achieve the intent of the Safety Recommendation. This action, which is dependent on the completion of the CAA's action in response to Safety Recommendation 2011-073 (because the National Radio Failure and Lost Communications procedures provide the policy on which the relevant operational procedures are based), will be completed by 30 October 2012.

Status - Accepted - closed**SAFETY RECOMMENDATION – 2011-075**

It is recommended that NATS review the content of the Birmingham Airport Automated Terminal Information System to ensure that it is clear and concise, and includes the type of approach to be expected.

Response

NATS has considered the AAIB Safety Recommendation Number 2011-075 and accepts it fully.

The above recommendation requires a software change to the ATIS which will be completed during November; the type of approach expected will be the first message on the ATIS. The length and quality of all other messages are being reviewed to shorten where possible and to remove the different voices. Most of the changes will take place in November to coincide with changes to Hectopascals from Millibars.

In addition I have circulated the AAIB report to all NATS Units and recommended that they all review the length and content of their ATIS messages.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2011-076

It is recommended that the Civil Aviation Authority review the most appropriate means of providing the visual instructions for which pilots are required to maintain a watch in accordance with Rule 45(6)(b) of the UK Air Navigation Order.

Response

The CAA accepts this recommendation and will review and, if required, publish revised national safety regulatory requirements on visual instructions to pilots or drivers to determine whether they promote the most effective way to address the risk of loss of R/T communication with pilots and requirements such as ICAO SARPS, the SERA and EASA Regulations. The CAA will require those ATC units that do not currently have visual signalling devices to conduct, document and submit to the CAA a safety assessment on how the hazards associated with the loss of RT communication with pilots or drivers are mitigated effectively. An update report on progress will be provided by September 2012.

Status - Accepted - closed

Britten Norman BN2A-26 Islander	Montserrat Airport	22 May 2011	Serious Incident
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AAIB Bulletin: 5/2012

FACTOR: N/A

Synopsis

The aircraft skidded after the pilot applied the brakes while landing on Runway 28 at Montserrat. As a result the pilot performed a touch-and-go and positioned for another approach to Runway 28. On landing after the second approach the aircraft skidded again when brakes were applied, and the pilot continued with the landing roll. However, believing there was insufficient runway remaining in which to stop the aircraft the pilot steered it onto a grass verge in an attempt to stop it before the end of the prepared surface. The aircraft came to rest beside the runway 46 m from its end. There were no injuries to the passengers and no damage to the aircraft. This was the pilot's first landing on Runway 28. No faults with the aircraft's brakes or braking system were found and there was no evidence that the aircraft had hydroplaned. An accurate runway friction assessment could not be obtained, but there had not been any pilot reports of poor friction prior to or after the incident. It was probable that a tailwind and/or a high touchdown airspeed caused the runway excursion. Issues identified by the investigation were pilot training, wind

measurements, the aerodrome's weather limits, the APAPI approach angle, obstructions on the approach and the runway environment.

SAFETY RECOMMENDATION – 2011-077

The operator of John A Osborne Airport, Montserrat, should install a windsock and anemometer adjacent to the Runway 28 threshold.

Response

Action completed in respect of the installation of a windsock adjacent to the Runway 28 threshold. Subject to the availability of funding, the installation of an anemometer is expected to be completed by 31st March 2013.

Status - Partially Accepted - open

SAFETY RECOMMENDATION – 2011-078

The operator of John A Osborne Airport, Montserrat, in consultation with Air Safety Support International, should revise its operations manual to permit pilots to operate only to and from the runway on which they have been flight checked.

Response

Full action has taken in respect of this safety recommendation; 'instructions for the use of the John A. Osborne Airport' were issued and published in July 2011.

Status - Partially Accepted - open

SAFETY RECOMMENDATION – 2011-079

The operator of John A Osborne Airport, Montserrat should ensure that a runway friction assessment is carried out at the earliest opportunity by a qualified person using suitable equipment.

Response

Action taken on this safety recommendation regarding runway friction measurements.

Status - Partially Accepted - open

Aeroplanes = or < 2,250kg MTWA

Piper PA-28-161	Wolverhampton Air Park	30 June 2001	Accident
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AAIB Bulletin: 7/2003

FACTOR: F20/2003

Synopsis

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

SAFETY RECOMMENDATION – 2003-069

It is recommended that the FAA require Textron Lycoming to take measures to substantially reduce the incidence of excessive wear to the valve operating mechanism of the Lycoming O-320-D3G engine and all other affected engine models. Measures considered should include advising or requiring usage of the oil additive in engines not covered by Mandatory Service Bulletin No 446D, advising on engine starting procedures and re-emphasising use of the correct grade of oil for the prevailing ambient temperature.

Response

FINAL RESPONSE OF 09-22-2003:

Background: This safety recommendation results from an accident investigation involving a Piper PA28-161 with an O-320-D3G engine that lost all power 1,865 hours after a factory rebuild in 1997 and 693 hours after a top overhaul in 1999. Four new cylinder heads manufactured by Engine Components Incorporated (ECI) under a Parts Manufacturing Approval (PMA) were installed during the 1999 top overhaul. The report attributes the power loss to a substantial crack in head of the No. 1 cylinder that progressed, "around most of the cylinder head circumference allowing the crack to open up and vent the cylinder." Failure of the ECI cylinder assembly occurred 693 hours after being installed as part of atop overhaul.

Disassembly inspection of the engine revealed severe distress to the valve operating mechanism, severe wear to the camshaft lobes and the follower bodies had extensive surface pitting on the face contacting the cam. The investigation report concluded that the most likely cause of the excessive wear was insufficient lubrication. The report also stated that similar problems had been found during other AAIB investigations.

All the issues raised by this safety recommendation have been previously addressed by Lycoming or FAA publications;

- ECI cylinder head cracking on Lycoming O-320 series engines

FAA investigation of other failed ECI cylinder heads installed on Lycoming O-320 engines revealed a thin-wall condition in the area of the exhaust port. This condition may result in cracking of the cylinder head and possible loss of engine power. The FAA issued Special Airworthiness Bulletin (SAIB) No. NE-O1-32, dated July 18, 2001, to recommend inspection of ECI PMA cylinder heads installed on Lycoming O-320 engines.

- "...advising or requiring usage of the oil additive in engines not covered by Mandatory Service Bulletin No. 446D..."

Lycoming Service Instruction (SI) 1409B, dated March 10, 1999, provides for the use of the LW-16702 Oil Additive in all engines except for installations that utilize a friction clutch and a common engine oil system for the transmission and clutch assembly. The original of this SI was dated September 25, 1981.

FAA SAM No. NE-00-22, dated May 23, 2000, lists 3 oils that contain the same antiwear additive as the Lycoming LW-16702 and meet the requirements of Lycoming Service Bulletin (SB) 446D. In addition, these oils have been approved as an Alternate Method of Compliance (AMOC) to AD 80-04-0382.

- "...re-emphasizing use of the correct grade of oil for the prevailing ambient temperature."

Lycoming SI 1014M contains a chart listing the oil grade to be used at various ambient temperatures as well as additional oil recommendations for engine break-in, operation and oil changes. This information is also contained in the Engine Operator's Manual.

- "...advising on engine starting procedures..."

The Lycoming Flyer Key Reprints (a compilation of articles from the Textron Lycoming "Flyer" Newsletter) has many articles on engine operation and maintenance that includes; Cold Weather Operations and Engine Starting Suggestions. This information is also contained in the Engine Operator's Manual.

The Lycoming Flyer Key Reprints also contains articles on the as stated previously, all the issues raised by safety recommendation 03.143 have been addressed by Lycoming or FAA publications and the Engine and Propeller Directorate asks that it be closed.

Status - Accepted - closed

**Piper PA-25-235 &
Glider****South-east of
Aston Down
Airfield****14 September
2001****Accident****AAIB Bulletin: 2/2003****FACTOR: 05/2003****Synopsis**

Glider and aircraft had midair collision - 1 fatality.

SAFETY RECOMMENDATION – 2002-026

It is recommended that the BGA advise gliding clubs, who use aerotows as a means of launching gliders, to review their procedures with a view to ensuring that appropriate separation between powered aircraft and gliders is maintained under all operating conditions and that best use is made of external lighting on tug aircraft to enhance conspicuity.

Response

Although the associated detailed records are unavailable pre-May 2004 we have been assured that this recommendation has been completed.

Status - Accepted - closed**SAFETY RECOMMENDATION – 2002-027**

It is recommended that the BGA review the use of radio procedures to be used by tug aircraft and those gliders fitted with radios, with a view to improving the awareness of all pilots, involved in glider operations, of the presence of other aircraft in the vicinity of airfields involved in glider operations.

Response

Although the associated detailed records are unavailable pre May-2004 we have been assured that this recommendation has been completed.

Status - Accepted - closed**SAFETY RECOMMENDATION – 2002-028**

It is recommended that the BGA oversee the introduction of a standard core syllabus for the training of tug pilots and ensure that all BGA approved tug pilots, who wish to maintain their tug pilot status, carry out their bi-annual PPL SEP rating renewal with a CAA authorised BGA tug instructor.

Response

This Recommendation is not addressed to the CAA, nevertheless, the BGA's response will be considered and any necessary CAA follow-up action implemented.

Although the associated detailed records are unavailable pre-May 2004 we have been assured that this recommendation has been completed by the BGA.

Status - Accepted - closed

Piper PA-30**1 mile from
Wolverhampton
Airport****8 March 2002****Accident****AAIB Bulletin: 4/2003****FACTOR: F12/2003****Synopsis**

Engine failure on finals due water in wrinkly tanks.

SAFETY RECOMMENDATION – 2003-010

It is recommended to the New Piper Aircraft Corporation that Part B of Service Letter No 851 should be re-issued to include a warning of the possibility of bladder tank distortion and the consequent retention of water in the bladder tanks when aircraft are parked for extended periods of time with part-filled fuel tanks.

Response

Piper agrees that this maintenance procedure is important for continued Operational Safety. Piper will incorporate this information directly into the Maintenance Manual, with publication expected to be accomplished before the end of the first quarter of 2012 (that is, prior to April 1, 2012).

Status - Accepted – closed**Scheibe SF25E-E****Chipping Glider
Club near Preston****15 February 2003****Accident****AAIB Bulletin: 9/2003****FACTOR: F35/2003****Synopsis**

On takeoff, the tailwheel became entangled with one of two cables, which had been laid for glider launches. The cable remained attached to the tailwheel and the aircraft crashed; both pilots received fatal injuries. Prior to takeoff, the commander had been informed that the cables were laid out. Club rules allowed him to approve a takeoff in that situation.

SAFETY RECOMMENDATION – 2003-075

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

Response

Although the associated detailed records are unavailable pre May 2004 we have been assured that this recommendation has been completed.

Status - Accepted - closed

Yak-50	North Weald Airfield	22 August 2003	Accident
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AAIB Bulletin: 2/2004
FACTOR: F14/2004

Synopsis

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

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

SAFETY RECOMMENDATION – 2003-102

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

Response

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

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

In the absence of specific recommendations by the manufacturer relating to the use of particular corrosion-inhibiting compounds in pneumatic system reservoirs the CAA consider that the clarification in the MPD provides sufficient inspection and test requirements without the need to specify corrosion protection. The CAA has contacted Yakovlev for further advice on this matter. As stated in the MPD, the CAA also considers that the proof-pressure testing of pneumatic system reservoirs should be carried out at periods

specifically recommended by the manufacturer or in the absence of such advice at periods not exceeding five years.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2003-103

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

Response

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

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

Status - Accepted – closed

Reims Cessna F152	Meden Vale, Nottinghamshire	28 January 2006	Accident
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AAIB Bulletin: 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 – 2007-091

It is recommended that the European Aviation Safety Agency (EASA) amend EASA Part 145 (and Part M as necessary) to require that maintenance and overhaul records that are referred to in airframe, engine and propeller log books, and component record cards, are deemed to be part of that log book or record card and are retained until the aircraft, engine, propeller or component has been destroyed or permanently removed from service.

Response

The Terms of Reference (ToR) for Rulemaking Task RMT.0276 (former MDM.076) 'Technical Records', was published on 28 November 2011 on the EASA Website. This Safety Recommendation will be considered within the framework of this rulemaking task.

Status - Accepted - closed

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.

Response

EASA addressed this subject with the FAA Primary certificating Authority for the concerned engines - and the Type Certificate Holder Lycoming which have shown that no such occurrences had been reported in the USA. The defect in question - cylinder barrel circumferential crack - originates from a corrosion pit on an external cylinder base plate. It is assumed that such corrosion had been made possible during overseas shipment or storage because of improper corrosion prevention treatment.

To inform maintainers and operators about this issue, EASA published the Safety Information Bulletin (SIB) No.2009-24 on 06 Aug.09. This SIB contains instructions to be done so as to detect crack initiations in engines with cylinders of non-improved design. EASA considers that SIB No.2009-24 meets the intent of Safety Recommendation.

Status - Accepted - closed

Piper PA-28R-201T	9 nm south of Oban (North Connel) Airport, Argyll and Butte, Scotland	9 April 2007	Accident
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AAIB Bulletin: 6/2008**FACTOR: F9/2008****Synopsis**

The commander was planning to return to Andrewsfield Airfield, Essex, from Oban Airport after a weekend of touring with his family. The weather was poor. The aircraft departed Oban at 1035 hrs and the Air/Ground operator lost sight of it shortly thereafter due to the poor visibility as it headed west at approximately 1,000 ft amsl. Nothing was subsequently heard from the aircraft by any other ATC agency. The wreckage of the aircraft was discovered the following day in the hills, 9 nm south of Oban Airfield, by a farmer. No technical fault with the aircraft was found apart from evidence of a pre-impact failure of the vacuum pump which would have caused the Attitude Indicator to become unreliable. The characteristics of the final flight path, particularly the high airspeed, the rapid descent and the rate of turn, were consistent with a loss of control following spatial disorientation in IMC. The vacuum pump failure, the commander's lack of instrument flying training and his apparent high blood alcohol level, all contributed to the spatial disorientation.

SAFETY RECOMMENDATION – 2008-004

The European Aviation Safety Agency (EASA) should mandate compliance with vacuum maintenance and replacement requirements, to ensure that aircraft fitted with vacuum driven Attitude Indicators can be safely operated in Instrument Meteorological Conditions when such aircraft are certified to do so.

Response

According to EU Regulations, only Airworthiness Directives (ADs) and requirements contained in the Airworthiness Limitation Section (ALS) of the Instructions for Continuing Airworthiness (ICAs) issued by the Design Approval Holder are considered mandatory. Other ICAs and information other than ICAs (such as the Service Letter SL58A described in the Accident Investigation Report) are not considered mandatory. Nevertheless, this non-mandatory information needs to be evaluated and taken into account by the aircraft operator/owner when defining the Aircraft Maintenance Programme.

The Agency understands that this may pose a safety problem if this "non-mandatory" information is deemed to be critical for the continuing airworthiness of the aircraft. However, it is the opinion of the Agency that this concern is not limited only to the particular case of vacuum-driven Attitude Indicators, but also to other components and maintenance tasks. As a consequence, the opinion of the Agency is that any rule change needs to be evaluated with a wider scope in mind, and this is what is currently being done through rulemaking task RMT.0252 (former MDM.056) 'Instructions for Continuing Airworthiness'. Furthermore, in this task the evaluation is being performed together with the Federal Aviation Administration (FAA) and Transport Canada (TCCA) in order to harmonize approaches.

Status - Accepted – closed

Piper PA-28-140	0.5 nm south-west of Isle of Wight/ Sandown Airport	5 August 2007	Accident
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AAIB Bulletin: 10/2008

FACTOR: N/A

Synopsis

The aircraft departed from Runway 23, with four people on board, on a flight to Pontivy, France. Its takeoff ground roll was noticeably long and, having lifted off, G-AVRP climbed to about 50 ft agl and maintained that height as it flew over rising ground beyond the end of the runway. As it approached trees at the top of the rising ground, the aircraft was seen to pitch up and clear the trees before its nose dropped and it descended out of sight. The aircraft struck another line of trees and crashed into a field. The aircraft rapidly caught fire. The fire was extinguished by the Airport Fire-fighting and Rescue Service (FFRS). All the occupants of the aircraft died in the accident and the aircraft was destroyed.

It was established that the aircraft's predicted performance, at its estimated takeoff weight and in the prevailing conditions, should have enabled a successful departure. Its failure to do so may have been the result of reduced engine power, a tailwind component, a greater takeoff weight than estimated, an incorrect piloting technique during takeoff or a combination of some or all of these factors.

SAFETY RECOMMENDATION – 2008-051

It is recommended that the European Aviation Safety Agency amend that part of the Regulations dealing with Continuing Airworthiness so that aircraft under their jurisdiction will require a periodic performance assessment.

Response

A request to European Safety Investigation Authorities was made on 26 October 2009, asking for any available data related to accidents/incidents involving aircraft with Maximum Take-off Weight (MTOW) less or equal to 2250 kg, during which a reduction in the expected/predicted aircraft performance resulted in being identified as a contributing factor to an event. This survey was focused on performance lessening due to ageing.

The result was that none of the Safety Investigation Authorities identified ageing performance degradation leading to similar accidents/incidents.

However, as a recognition to the issue deserving further attention Rulemaking Task 21.055 was included in the Agency's Rulemaking Programme under which the issue is planned to be revisited and relevant risks analysed in view of the more recent development.

Status - Rejected - open

Extra EA 300/L	Hastingleigh, near Ashford, Kent	26 April 2008	Accident
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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 – 2009-014

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.

Response

Certification Specifications (CS) are already provided for protection of occupants in case of emergency landing. In the case of CS-23 for light aeroplanes certification:

- CS 23.561 requires structural design precautions to minimise injuries under given static inertia loads, including turnover and landing gear retracted scenarios.
- CS 23.562 requires dynamic tests of the seat/restraint systems and provides of a maximum head injury criteria to be considered when contact with adjacent components or structures can occur.

In addition, CS 23.785 provides specific design requirements for seats, berths, litters, safety belts and shoulder harnesses to protect the occupants, and it requires that areas surrounding each seat are free of injurious objects which may be impacted by the torso of the head.

The Agency accepts to review potential improvements of occupants protection specifications for light aeroplanes involved in survivable accidents and a dedicated new Rulemaking Task (MDM.090) is created in the Rulemaking Programme Inventory. Both Certification Specifications and retroactive requirements options should be analysed. The Rulemaking Group will consider the improvement options proposed under this recommendation.

Status - Accepted - closed

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.

Response

The Agency accepts to review potential improvements of occupants protection specifications for light aeroplanes involved in survivable accidents and a dedicated new Rulemaking Task (MDM.090) is created in the Rulemaking Programme Inventory.

Both Certification Specifications and retroactive requirements options should be analysed.

The Rulemaking Group will consider the improvement options proposed under this recommendation.

Status - Accepted - closed

Aero AT-3 R100	Old Sarum Airfield, Wiltshire	12 June 2009	Serious Incident
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AAIB Bulletin: 9/2010

FACTOR: N/A

Synopsis

After engine start the aircraft moved forward and to the left and struck a fuel bowser, despite the pilot applying pressure to the toe brakes. It is probable that the parking brake lever had inadvertently been moved to the ON position, when the pilot exited the aircraft to refuel it, without hydraulic pressure being applied to the brakes at the time. This rendered the toe brakes inoperative, and prevented the pilot from being able to stop the aircraft. The AAIB makes three Safety Recommendations addressing the parking brake system design and information provided to the pilot about its limitations.

SAFETY RECOMMENDATION – 2010-053

It is recommended that the European Aviation Safety Agency (EASA) require that the AERO AT-3 brake system be modified such that the toe brakes remain functional regardless of whether the parking brake is off or on.

Response

There are a number of other aircraft designs with similar characteristics and the advantage of having toe brakes operative while the parking brake is 'on' is not clear. The design of the parking brake lever has been improved to reduce the chances of inadvertent selection (EASA minor modification approval number 10032661).

The Type Certificate Holder (TCH), AERO, has issued revisions to the AT-3 AFM to clarify the recommended explanations and warnings.

Status - Rejected**SAFETY RECOMMENDATION – 2010-054**

It is recommended that the European Aviation Safety Agency (EASA) require AERO Sp to update the Flight Manual for the AERO AT-3 to explain the operation of the braking system clearly and to include a warning that the toe brakes become inoperative when the parking brake lever is selected on.

Response

The Type Certificate Holder (TCH), AERO, has issued revisions to the AT-3 AFM to clarify the recommended explanations and warnings.

Status - Accepted - closed**SAFETY RECOMMENDATION – 2010-055**

It is recommended that the European Aviation Safety Agency (EASA) require AERO Sp to provide warning placards, to be installed in all affected AERO AT-3 aircraft, which state that the toe brakes become inoperative when the parking brake lever is selected on.

Response

The aircraft is fitted with placards that warn of incorrect use and advise the pilot of the status of the 'parking brake'.

Status - Accepted - closed

**Grob G115E
and
Standard Cirrus****Sutton Courtenay /
Drayton / South of
Abingdon****14 June 2009****Accident****AAIB Formal: AAR 5/2010****FACTOR: 04/2010****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.

The accident was notified to the Air Accidents Investigation Branch (AAIB) at 1350 hrs on 14 June 2009 and an AAIB field investigation was commenced immediately. The investigation was conducted by:

The investigation identified the following causal and contributory factors:

Causal factor:

Neither pilot saw each other in sufficient time to avoid the collision.

Contributory factors:

1. The Tutor pilot's medical condition, Ankylosing Spondylitis, limited his ability to conduct an effective look out.
2. The high density of traffic, in an area of uncontrolled airspace increased the risk of a collision.

SAFETY RECOMMENDATION – 2010-034

It is recommended that the European Aviation Safety Agency review the certification of the canopy jettison system on the Grob 115 E, to ensure that it complies with the requirements of CS 23.807 with specific regard to the jettison characteristics up to VDO and simplicity and ease of operation.

Response

The review of the canopy jettison system was carried out by Grob Aircraft by reference to their report "SR-G115E-520002" dated 5 March 2009. This report details the compliance with 23.807(b)(5), (c) for post-Mod MAM1078-107 (Major Change) canopies.

Status - Accepted - closed

Extra EA 300/L**Methley Bridge,
West Yorkshire****19 June 2010****Accident****AAIB Bulletin: 2/2011****FACTOR: 02/2011****Synopsis**

The aircraft was performing an approved flying display at a local boatyard. The pilot did not follow the display routine he normally practised and he flew five turns in a flat spin where he would normally have flown two. The pilot initiated recovery from the spin at 690 ft, when he should have initiated recovery above 1,300 ft. The aircraft flew into the ground and the pilot died on impact. The engineering investigation concluded that the aircraft was serviceable prior to the accident.

Two Safety Recommendations are made.

SAFETY RECOMMENDATION – 2011-001

It is recommended that the Civil Aviation Authority amend CAP 403 to advise that only in exceptional circumstances should a pilot be authorised to conduct aerobatic displays in the Unlimited category upon first assessment for an aerobatic display authorisation.

Response

The CAA accepts this Recommendation and is in the process of amending CAP 403 which will include an amendment advising that only in exceptional circumstances should a pilot be authorised to conduct aerobatic displays in the Unlimited category upon first assessment for an aerobatic display authorisation. The amendment is expected to be in place by the end of April 2011.

Status - Accepted - closed**SAFETY RECOMMENDATION – 2011-002**

It is recommended that the Civil Aviation Authority consider introducing a mentoring process for pilots who have received their first Display Authorisation.

Response

The CAA accepts this Recommendation and has discussed the use of a mentoring process with industry. The proposal will be discussed further during the Display Authorisation Examiners seminar to be held at Brooklands on 9 Mar 11. Guidance on a mentoring process will be included in the revised CAP403 due to be published in April 2011.

Status - Accepted - closed

Microlights

Mainair Blade	Abbey Farm Alby Hill Norwich	2 January 2002	Accident
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AAIB Bulletin: 10/2002

FACTOR: N/A

Synopsis

Aircraft took off with frost on wing and during a low left turn, the left wing tip contacted the ground and the aircraft crashed into a field.

SAFETY RECOMMENDATION – 2002-020

The BMAA should seek the best means available to bring to the attention of pilots of microlight aircraft the circumstances of this accident and seasonally consider reminding them of the dangers of attempting to fly with wings contaminated by frost or rain, however insignificant the contamination may appear to be.

Response

The BMAA will publish the full text of this accident in the next BMAA Accident Survey, it will be inserted as a supplement to the bi-monthly Microlight Flying magazine sent to all current BMAA members.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2002-021

The BMAA should recommend to its members the wearing of helmets which comply with the EN 966 standard for impact resistance.

Response

The BMAA will recommend to all current BMAA members, that flying helmets should comply with the requirements of EN966. The BMAA will in addition use the annual revalidation of the permit to fly remind.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2002-022

The BMAA should encourage manufacturers of microlight aircraft, who have limitations and operational requirements relating to the safe operation of their aircraft interspersed throughout their manual, to include, in a suitably prominent position and with suitable highlighting where necessary, a dedicated section re-iterating all the aircraft limitations and operational requirements.

Response

The BMAA will mail all current microlight aircraft manufacturers encouraging them to introduce a dedicated flight limitation, operational and safety related requirement page in the aircraft operator manual.

Status - Accepted - closed

Rotorcraft > 5,700kg MTWA or above

Agusta AW139	The North Sea, 65 nm north-east of North Denes Heliport	23 December 2008	Serious Incident
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AAIB Bulletin: 10/2010
FACTOR: N/A

Synopsis

Whilst on a flight from North Denes Heliport to a North Sea drilling platform, the aircraft's crew alerting system displayed a VNE MISCOMPARE message. This was followed by the loss of No 2 engine indications and other aircraft system parameters. The No 1 engine parameters indicated normal operation and the crew elected to return to North Denes Heliport. Whilst still in cloud, the crew received indications that there was a fire in the baggage compartment at the rear of the aircraft. The commander then lost all altitude, airspeed and vertical speed information from his Primary Flight Display. Once below cloud, another company helicopter flew alongside and confirmed that there was no evidence of fire and a safe landing ensued.

The spurious warnings and the loss of indications were found to be due to corrosion in an avionic module. The corrosion had occurred due to the module cabinet being cooled by unfiltered, non-conditioned air drawn from intakes on the fuselage underside. The situation was exacerbated by the helicopter being operated in a maritime environment.

One Safety Recommendation is made.

SAFETY RECOMMENDATION – 2010-077

It is recommended that the European Aviation Safety Agency mandate the embodiment of the AgustaWestland Bollettino Tecnico BT AW139-166 on all short nose versions of the AgustaWestland AW139.

Response

EASA issued on 21/09/2010 the Airworthiness Directive AD 2010-0189 for AB139 and AW139 helicopters related to Navigation - Modular Avionic Unit - Inspection /Replacement/Modification, which covers the intent of the Safety Recommendation.

Status - Accepted - closed

EC225 LP**The ETAP Central
Production Facility
Platform in the
North Sea****18 February 2009****Accident****AAIB Formal: AAR 1/2011****FACTOR: F9/2009****Synopsis**

The Helicopter departed Aberdeen Airport at 1742 hrs on a scheduled flight to the Eastern Trough Area Project (ETAP). The flight consisted of three sectors with the first landing being made, at night, on the ETAP Central Production Facility platform. Weather conditions at the platform deteriorated after the aircraft departed Aberdeen; the visibility and cloud base were estimated as being 0.5 nm and 500 ft respectively. At 1835 hrs the flight crew made a visual approach to the platform during which the helicopter descended and impacted the surface of the sea. The helicopter remained upright, supported by its flotation equipment which had inflated automatically. All those onboard were able to evacuate the helicopter into its life rafts. Both air and maritime Search and Rescue (SAR) assets were used to recover the survivors.

The investigation identified the following causal factors:

1. The crew's perception of the relative position and orientation of the helicopter to the platform during the final approach was erroneous. Neither crew member was aware that the helicopter was descending towards the surface of the sea. This was probably due to the effects of oculogravic and somatogravic illusions combined with both pilots being focussed on the platform and not monitoring the flight instruments.
2. The visual picture was possibly confused by a reflection of the platform in the sea.
3. The two radio altimeter based height alert warnings did not activate. The fixed 100 ft alert failed to activate due to a malfunction of the Terrain Awareness and Warning System (TAWS) and the selectable 150 ft alert would also have failed to activate for the same reason, had it not already been suspended by the crew. The pilots were not aware of the TAWS malfunction.
4. There was no specified night visual approach profile on which the crew could base their approach and minimum heights, and stabilised approach criteria were not specified.

SAFETY RECOMMENDATION – 2011-049

It is recommended that the Civil Aviation Authority re-emphasises to Oil and Gas UK that they adopt the guidance in Civil Aviation Publication (CAP) 437, entitled Offshore Helicopter Landing Areas - Guidance on Standards, insofar as personnel who are required to conduct weather observations from vessels and platforms equipped for helicopter offshore operations are suitably trained, qualified and provided with equipment that can accurately measure the cloud base and visibility, in order to provide more accurate weather reports to helicopter operators.

Response

The CAA accepts this recommendation and will by way of a letter re-emphasise to offshore helicopter operators and to Oil and Gas UK the guidance contained in CAP 437 on the provisions for accurate weather observations for helicopter offshore operations. The letter will be set by the end of October 2011.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2011-050

It is recommended that the Civil Aviation Authority encourages commercial air transport helicopter operators to make optimum use of Automatic Flight Control Systems.

Response

The CAA accepts this Recommendation and will through the means of an Information Notice encourage all commercial air transport helicopter operators to make optimum use of Automatic Flight Control Systems. The Information Notice will be published by the end of October 2011.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2011-051

It is recommended that the Civil Aviation Authority ensures that commercial air transport offshore helicopter operators define specific offshore approach profiles, which include the parameters for a stabilised approach and the corrective action to be taken in the event of an unstable approach.

Response

The CAA accepts this Recommendation in so far as it will review all commercial air transport offshore helicopter operators' operations manuals to ensure that they detail specific offshore approach profiles, including stable approach parameters, and the corrective action to be taken if an approach becomes unstable. This action will be completed by the end of October 2011.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2011-052

It is recommended that the Civil Aviation Authority commissions a project to study the visual illusions that may be generated during offshore approaches to vessels or offshore installations, in poor visibility and at night, and publicises the findings.

Response

The CAA does not accept this Recommendation. The CAA believes that retrofit of the new helideck lighting system covered by Recommendation 2011-053 will significantly reduce the potential for visual illusions. In combination with adherence to revised approach procedures, ideally using GPS instrument guidance (refer to Recommendation 2008-033) and associated approach profiles, the hazard presented by visual illusions will be adequately addressed in the CAA's view. The CAA is also leading a joint industry project to improve helicopter Terrain Awareness Warning Systems (HTAWS) which will address Recommendations 2011-060, 062 and 063. HTAWS has the potential to provide an effective safety net to underpin the helideck lighting and GPS approach initiatives. In view of the foregoing, the CAA considers a study of visual illusions to be unnecessary but will

recommend to offshore operators that the information contained in this AAIB Report is disseminated amongst crews.

Status - Rejected**SAFETY RECOMMENDATION – 2011-053**

It is recommended that the Civil Aviation Authority (CAA) amends Civil Aviation Publication (CAP) 437, Offshore Helicopter Landing Areas - Guidance on Standards, to encourage operators of vessels and offshore installations, equipped with helidecks, to adopt the new lighting standard, for which a draft specification has been published in Appendix E of CAP 437, once the specification has been finalised.

Response

The CAA accepts this Recommendation and will ammend CAP 437 once the specification has been finalised and encourage operators of vessels and offshore installations to apply these standards. The specification is expected to be defined by April 2012 after which the CAP will be amended.

Status - Accepted - closed**SAFETY RECOMMENDATION – 2011-054**

It is recommended that the Civil Aviation Authority reviews the procedures specified by commercial air transport helicopter operators as to when a crew may or should suspend a radio altimeter aural or visual height warning.

Response

The CAA accepts this Recommendation and will review the procedures specified by commercial air transport helicopter operators in their operations manuals as to when a crew may, or should, suspend a radio altimeter aural or visual height warning. This action will be completed by the end of October 2011.

Status - Accepted - closed**SAFETY RECOMMENDATION – 2011-055**

It is recommended that the Civil Aviation Authority reviews commercial air transport offshore helicopter operators' procedures to ensure that an appropriate defined response is specified when a height warning is activated.

Response

The CAA accepts this Recommendation and will review commercial air transport offshore helicopter operators' operations manuals to ensure that they include procedures specifying an appropriate defined response when a height warning is activated. The action will be completed by the end of October 2011.

Status - Accepted - closed**SAFETY RECOMMENDATION – 2011-056**

It is recommended that the Civil Aviation Authority reviews the procedures set out by commercial air transport offshore helicopter operators to ensure that a member of the flight crew monitors the flight instruments during an approach in order to ensure a safe flight path.

Response

The CAA accepts this Recommendation and will review commercial air transport offshore helicopter operators' operations manuals procedures to ensure that they include the requirement for a member of the flight crew to monitor the flight instruments during an approach in order to ensure a safe flight path. This action will be completed by the end of October 2011.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2011-057

It is recommended that the International Civil Aviation Organisation introduces a Standard for crash protected recordings of the operational status of Airborne Collision Avoidance System (ACAS) and Terrain Awareness and Warning System (TAWS) equipment, where fitted, on helicopters required to carry a flight data recorder.

Response

I wish to inform you that this issue will be referred to the Flight Recorder Panel for consideration during the next meeting of the Working Group of the Whole (WG/WHL/5) planned for 2012.

I trust that the foregoing information meets with the intent of the safety recommendations of the Air Accidents Investigation Branch.

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-058

It is recommended that the European Aviation Safety Agency requires that crews of helicopters, fitted with a Terrain Awareness and Warning System, be provided with an immediate indication when the system becomes inoperative, fails, is inhibited or selected OFF.

Response

EASA acknowledges receipt of this Safety Recommendation. Please be advised that it is under consideration and that the outcome will be communicated to you in due course.

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-059

It is recommended that the European Aviation Safety Agency reviews the acceptability of crew operated ON/OFF controls which can disable mandatory helicopter audio voice warnings.

Response

EASA acknowledges receipt of this Safety Recommendation. Please be advised that it is under consideration and that the outcome will be communicated to you in due course.

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-060

It is recommended that the Civil Aviation Authority reviews the guidance in Civil Aviation Publication (CAP) 562, Civil Aircraft Airworthiness Information and Procedures, Part 11, Leaflet 11-35, Radio Altimeters and AVADs for Helicopters, regarding the pre-set audio height warning that is triggered by the radio altimeter and may not be altered in flight, to ensure that crews are provided with adequate warning to take corrective action.

Response

The CAA accepts this Recommendation and will, by 31 October 2011, review the guidance in Civil Aviation Publication (CAP) 562 Civil Aircraft Airworthiness Information and Procedures, regarding the content of the leaflet "Radio Altimeters and AVADs for Helicopters" (Leaflet 11-35 is now relocated in Book 2 as Leaflet 34-30) concerning the pre-set audio height warning that is triggered by the radio altimeter, to ensure that crews are provided with adequate warning to take corrective action.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2011-061

It is recommended that the European Aviation Safety Agency ensures that helicopter performance is taken into consideration when determining the timeliness of warnings generated by Helicopter Terrain Awareness and Warning Systems.

Response

EASA acknowledges receipt of this Safety Recommendation. Please be advised that it is under consideration and that the outcome will be communicated to you in due course.

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-062

It is recommended that the European Aviation Safety Agency reviews the frequency of nuisance warnings generated by Terrain Awareness and Warning System equipment in offshore helicopter operations and takes appropriate action to improve the integrity of the system.

Response

EASA acknowledges receipt of this Safety Recommendation. Please be advised that it is under consideration and that the outcome will be communicated to you in due course.

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-063

It is recommended that the European Aviation Safety Agency, in conjunction with the Federal Aviation Administration, defines standards governing the content, accuracy and presentation of obstacles in the Terrain Awareness and Warning System obstacle database for helicopters operating in the offshore environment.

Response

FAA response

This response is a two-part response. First, the FAA discusses the standards for terrain and obstacles databases. Second, we discuss the update of terrain and obstacle data.

Terrain and Obstacle Database Standards.

Standards for content, accuracy, and presentation of obstacles for helicopters are defined in RTCA/DO-309, Minimum Operational Performance Standards for Helicopter Terrain Awareness and Warning System (HTAWS) Airborne Equipment, and the processing of the terrain and obstacle data must comply with RTCA/DO-200A, Standards for Processing Aeronautical Data.

RTCA/DO-309, paragraph 2.2.4, outlines requirements for HTAWS terrain and obstacle databases. HTAWS databases are required to meet the internationally accepted standards of RTCA/DO-200A or EUROCAE/ED-76. Furthermore, RTCA/DO-309 requires the HTAWS manufacturer to demonstrate the accuracy and resolution of the databases is suitable for the intended operation.

RTCA/DO-200A and EUROCAE/ED-76 provide robust standards for developing and producing aeronautical databases. They have wide acceptance within the aviation industry and are endorsed by the FAA as an acceptable means of ensuring data quality and integrity. RTCA/DO-200A defines the process in which operators provide the data quality requirements. Data quality requirements are originated by the operator, sent to the avionics manufacturer, then the data services provider, and finally the State.

Updating Terrain and Obstacle Databases:

The process of collecting terrain and obstacle data begins at the governmental body level, where ICAO Contracting States compile and transmit aeronautical data through their Aeronautical Information Publication (AIP) in accordance with ICAO Annex 15 requirements. Terrain and obstacle data included in aeronautical databases originates from State authorities. Avionics vendors, database providers, and operators are dependent on the State authority to provide accurate, accurate data. The TAWS and HTAWS standards require the databases to be updatable, so the most current data can be provided and utilized. With publication of FAA AC 20-153A, the FAA clarified that terrain and obstacle data updates can be accomplished under the letter of authorization (LOA) process, thus making the process of updating terrain and obstacle databases easier.

Conclusion:

The FAA believes the existing HTAWS and database processing standards adequately define the criteria for content, accuracy, and presentation of obstacles. The FAA believes appropriate measures to update terrain and obstacle data exist. Changes to existing data quality requirements need to originate from operators and manufacturers, in accordance with RTCA/DO-200A. At this time, the FAA plans no further action in response to FAA Safety Recommendation 11.212.

EASA response

EASA acknowledges receipt of this Safety Recommendation. Please be advised that it is under consideration and that the outcome will be communicated to you in due course.

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-064

It is recommended that the European Aviation Safety Agency establishes the feasibility of recording, in crash protected memory, status indications from each avionic system on an aircraft.

Response

EASA acknowledges receipt of this Safety Recommendation. Please be advised that it is under consideration and that the outcome will be communicated to you in due course.

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-065

It is recommended that the European Aviation Safety Agency considers amending certification requirements for rotorcraft, that are certified in accordance with ditching provisions, to include a means of automatically inflating emergency flotation equipment following water entry.

Response

A rulemaking task was initiated in May 2012 (Reference: RMT.0120 (former 27&29.008)), which aims to undertake a broad review of helicopter ditching, water impact events and subsequent occupant survivability. A determination will be made on how certification rules and guidance material can best be developed to further enhance helicopter safety. Automatic float inflation was one of the many safety enhancements to be identified during earlier work and an assessment of the safety/impact benefits is an integral part of this task. Both future and retroactive certification requirement are being considered.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2011-066

It is recommended that the European Aviation Safety Agency modifies European Technical Standard Order (ETSO) 2C70a and ETSO 2C505 to include a requirement for multi-seat life rafts, that do not automatically deploy their Sea Anchor, to include a label, visible from within the inflated life raft, reminding the occupants when to deploy the Sea Anchor.

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-067

It is recommended that the Federal Aviation Administration modifies Technical Standard Order (TSO) C70a to include a requirement for multi-seat life rafts, that do not automatically deploy their Sea Anchor, to include a label, visible from within the inflated raft, reminding the occupants when to deploy the Sea Anchor.

Response

AIR-100 is currently in the process of revising the standard requirements TSO-C70a. AIR-100 is working with the SAE S9- Cabin Safety Provisions Committee on the development of a new standard, Aerospace Standard (AS) 1356, that is intended to be used by the FAA in the next revision of TSO-C70a. We will review and evaluate FAA Safety Recommendation 11.213 for inclusion into the next revision of TSO-C70a.

We will provide your office with our response to Safety Recommendation 11.213 prior to (6/22/2012).

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-068

It is recommended that the European Aviation Safety Agency requires Eurocopter to review the design of the fairings below the boarding steps on AS 332 and EC225 series helicopters to reduce the possibility of fairings shattering during survivable water impact and presenting sharp projections capable of damaging life rafts.

Response

EASA acknowledges receipt of this Safety Recommendation. Please be advised that it is under consideration and that the outcome will be communicated to you in due course.

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-069

It is recommended that the European Aviation Safety Agency, in conjunction with the Federal Aviation Administration, review the design requirements and advisory material for helicopters to require 'delethalisation' of the fuselage to prevent damage to deploying and floating life rafts following a survivable water impact.

Response

EASA

Ditching, as defined in Advisory Circular (AC) 29.801, is an emergency landing on water, deliberately executed, with the intent of abandoning the rotorcraft as soon as practical. Ditching structural design considerations are based on a limited ditching envelope with a descent rate of 300 ft/min, and acceptable means of compliance aims to ensure that probable damage to the airframe within this envelope is fully considered. Furthermore, AC 29.1411 (Safety Equipment - General) addresses the accessibility and stowage of safety equipment, including life raft, and additional guidance was included in AC 29-2C at Change 3 (September 2008), which specifically relates to protection of life raft from damage due to fuselage projections. This event cannot be considered a ditching in the accepted design definition, as the water impact was not a deliberate act on the part of the pilot and the descent rate at impact was 1,380 ft/min, which is considerably beyond the ditching envelope.

However, it is recognised that survivable water impact events beyond the ditching envelope do occur and having survival equipment that can properly function in such cases would lead to enhanced safety. The Agency will launch a rulemaking task RMT.0120 (former 27&29.008) 'Ditching Occupant Survivability' on ditching, water impact and survivability, to review and amend the rotorcraft certification specifications CS-27 and CS-29. This rulemaking task will consider multiple facets of the problem, including structural design aspects and expansion of the ditching envelope.

FAA

The current requirements of 14 CFR 27.1411 and 29.1411 require stowage provisions that protect the required safety equipment from inadvertent damage. In addition, the advisory guidance for Advisory Circulars (ACs) 27-1 and 29-2 was updated in 2006 to include additional information for Sections Acs 27.1411 and 29.1411 to include a paragraph that states:

"Service experience has shown that the following deployment, liferafts are susceptible to damage while in the water adjacent to the helicopter due to projections on the exterior of the helicopter such as antennas, overboard vents, guttering, etc. Projections likely to cause damage to a deployed liferaft should be modified or suitably projected to minimize the likelihood of their causing damage to a deployed liferaft. Relevant maintenance information should also provide procedures for maintaining such protection for rotorcraft equipped with liferafts."

This change was due to the harmonization activity between the FAA and the Joint Aviation Authorities, subsequently replaced by EASA. EASA and FAA are harmonized in the requirements and advisory guidance for normal (part 27) and transport (part 29) category helicopters.

We believe that the current design requirements and advisory material satisfy the intent of the SR, and we plan no further action.

Status - Partially Accepted - open

SAFETY RECOMMENDATION – 2011-070

It is recommended that the European Aviation Safety Agency ensures that a requirement is developed for all emergency equipment, stowed in deployable survival bags, to be capable of being easily accessed and utilised by the gloved hands of a life raft occupant whilst in challenging survival situations when a life raft may be subject to considerable motion in cold, wet and dark conditions.

Response

EASA acknowledges receipt of this Safety Recommendation. Please be advised that it is under consideration and that the outcome will be communicated to you in due course.

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-071

It is recommended that the European Aviation Safety Agency reviews the location and design of the components and installation features of Automatically Deployable Emergency Locator Transmitters and Crash Position Indicator units, when required to be fitted to offshore helicopters, to ensure the reliability of operation of such units during and after water impacts.

Response

A rulemaking task was initiated in May 2012 (Reference: RMT.0120 (former 27&29.008)), which aims to undertake a broad review of helicopter ditching, water impact events and subsequent occupant survivability. A determination will be made on how certification rules and guidance material can best be developed to further enhance helicopter safety. The installation and functioning of all types of Emergency Locator Transmitters following water impact events is an integral part of this task. Both future and retroactive certification requirement are being considered.

Status - Accepted - closed

AS332L2**Approx 11 miles
NE of Peterhead,
Scotland****1 April 2009****Accident****AAIB Formal: AAR 2/2011****FACTOR: F9/2011****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 – 2009-051

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 AS332 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.

Eurocopter - No response received

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.

Response

EASA in collaboration with Eurocopter have performed a detailed design review of the AS332L2 planet gears, including a review of possible failure modes, fatigue substantiation, manufacturing and maintenance processes. The review of the fatigue substantiation has addressed the following: extensive static and fatigue testing, gear hardness and carburisation layer identification, crack propagation assessment, compilation of relevant data and analysis vs. AS332L2 and EC225LP airworthiness certification requirements. The results presented by Eurocopter confirm an infinite fatigue life for planet gears with Finite Element Model (FEM) modeling accounting for surface carburization layer.

Because the root cause of this accident has not yet been identified, it has not been possible to identify a terminating airworthiness action with respect of the failure mode experienced. However, based on the current investigation findings, EASA considers that no further airworthiness actions are necessary at this time, and that the interim situation is adequately addressed by EASA Airworthiness Directive 2009-0099-E. Nevertheless, EASA will maintain a high level of involvement and continue its work in close cooperation with all involved parties in order to mandate further action as deemed necessary, in the event of any new investigation findings.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2011-032

It is recommended that, in addition to the current methods of gearbox condition monitoring on the AS332 L2 and EC225, Eurocopter should introduce further means of identifying in-service gearbox component degradation, such as debris analysis of the main gearbox oil.

Response

Based on FMECA (Failure Mode Effect and Criticality Analysis) and confirmed by the experience, two types of debris can be generated by gearbox deterioration:

- 3D-particles (volume) or 2D-particles (surface): these types of particles are usually generated by degradation of high-loaded functional surfaces like bearing races or gear tooth (spalling, scale, flaking ...) or by part breakages.
- Wear particles: these types of abrasive particles are usually caused by abnormal high-contact of surfaces (fretting, micro-pitting...) and are generally in suspension in the oil.

A third type of debris can be found in gearboxes is associated with the manufacturing process (swarf...), the assembly process (piece of lockwire, fragment of cotter pin...), or maintenance actions (leading to introduction of foreign objects). All these debris are considered as some 3D or 2D particles.

Because the types of these generated particles are very different, adapted monitoring means must be used in order to monitor each type.

Two monitoring means are presently available to detect such debris:

- Magnetic plugs: these collect the particles and are visually inspected in order to detect 3D or 2D debris, but they can also collect wear particles. An electrical system can be added in order to give an in-service information of particle presence (warning on pilot on instrument panel and/or HUMS system for the maintenance) as soon as the particle(s) collected is (are) able to close the bridge between the two electrical parts of a magnetic plug. All Eurocopter fleet gearboxes are equipped with magnetic plugs (manual or electrical ones) and this is the main monitoring means to detect internal gearbox component degradation (they are also associated to the oil filter cartridge inspection).
- Spectrometric Oil Analysis Program (SOAP): this is used to monitor evolution of the concentration of different metals or else (particle per million) in suspension in the lubricant. It requires following of a dedicated and strict procedure to take periodically a volume of oil in defined conditions (warm and mixed oil taken with specific equipment by qualified personnel with a qualified process) and sending it to qualified laboratory.

SOAP is a monitoring means that is well known to Eurocopter and its principle is described in EC Technical Publications (Standard Practice Manual WC 20.08.02.601 attached). SOAP is considered by Eurocopter as an optional and additional monitoring means. SOAP can be used to monitor the evolution, between two oil replacements, of metallic material concentration or possibly some other material (like mineral) which are in suspension in the oil. SOAP can trigger the requirement of a close monitoring of the main monitoring means (magnetic plugs and filter) if certain dedicated thresholds are exceeded.

This means was introduced in the past during the development of SA 330 (Puma) and at the beginning of AS 332 (Super-Puma) production because the technologies used (bolted assemblies, machining without grinding, etc.) sometimes produced wear particles. This is no longer the case as a result of modern technologies used on the AS332 L2 and EC225 main gear boxes (Electron beam welding instead of bolted assemblies) and manufacturing processes (super finishing, grinding) which generate parts more reliable regarding wear degradation.

Despite the fact that these old technologies could generate some wear particles relevant to SOAP, the experience of Eurocopter demonstrates that this means was not efficient and that, in practice, it had led to many unjustified removals of gear boxes with unnecessarily interference to flight operations and wasted maintenance costs. Against this background, Eurocopter so issued Service Letter 759-00-86 in 1986 25/06/1986.

It also has to be noted that SOAP is not adapted to detect 3D or 2D particles because such particles are not in suspension in the oil. So SOAP is not adapted to detect spalling.

In addition, the magnetic plugs are able to detect incipient spalling at a level where, even if the whole volume of particles generated was in suspension in the oil, the concentration would not be detectable by SOAP taking in account the important oil volume in a main gear box.

Eurocopter considers that magnetic plugs and/or chip detectors are the most efficient means to detect gearbox internal failure modes, and that they are sufficient to ensure the flight safety so that further means of identifying in-service gearbox component degradation, such as debris analysis of the main gearbox oil, are not necessary. Here, it is relevant to note that the particle detection capability of the sump and epicyclic plugs has been enhanced by the removal of the ring of magnets from the lower area of the epicyclic module.”

Status - Rejected

SAFETY RECOMMENDATION – 2011-033

It is recommended that Eurocopter review their Continued Airworthiness programme to ensure that components critical to the integrity of the AS332 L2 and EC225 helicopter transmission, which are found to be beyond serviceable limits are examined so that the full nature of any defect is understood.

Response

It is recommended that Eurocopter review their Continued Airworthiness programme to ensure that components critical to the integrity of the AS332 L2 and EC225 helicopter transmission, which are found to be beyond serviceable limits are examined so that the full nature of any defect is understood.

The examination of the critical components found beyond serviceable limits has been a part of the Eurocopter Continued Airworthiness Process for several decades. This doesn't mean that all parts found to be beyond their serviceable limits are subject to a deep laboratory examination. It means that all parts which, on inspection/detection, are found with an unknown degradation mode or with known degradation mode but beyond what is expected are subjected to a more in-depth analysis.

When, after initial inspection, such situation is reported to the Eurocopter Technical Support, an In Service Incident Report (ISIR) is issued and analyzed in the frame of the Continued Airworthiness Progress involving most of the Eurocopter Directorates (Airworthiness Department, Design Office lead functions, Technical Support, Flight Test, Quality...). The Continued Airworthiness Board performs a risk analysis for each ISIR, defines if laboratory investigations, tests and calculations are necessary and decides on protective and corrective measures when necessary.

- 1/ The first step of this process is the collection of such events which can be discovered by the Operators or by the Repair and Overhaul centers world-wide. The necessity to report technical occurrences toward the manufacturer is permanently reminded through different ways:
 - In each aircraft Maintenance Program Generalities
 - In the Information Notice 2046-I-00 “Occurrence Reporting” which is also reminded in the Safety page of the Eurocopter website.

- In the "Eurocopter technical and publications services network information manual" used by the broad Eurocopter network.
- During seminars and numerous customer meetings.

Additional ways are specifically dedicated to the world-wide Eurocopter approved D-level R&O centers (Repair Stations):

- Each contract signed between Eurocopter and a D-level center specifies the application of EI (Eurocopter Instruction) 050 19-031 "Technical Requirements for the EUROCOPTER D-level Centers / Dynamic & Hydraulic Components and Blades".
- The Repair Letter n° 213 sent to all approved D-level centers to remind the requirement to inform Eurocopter of "any difficulty, incident or anomaly discovered, likely to affect the safety or airworthiness of an aircraft". This Repair Letter n° 213 which is also attached refers to EI 050 19-031.
- Training VDI (Visual and Dimensional Inspection) given to all new D-level centers mechanics.
- These EC approved D-level R&O centers are audited every 2 years and the process is reminded each time a mechanic comes in Eurocopter for training (Protocol Audit F050 17-001-3 / §A.4.1)

A dedicated Technical Support team is in place in the Eurocopter Dynamic Components R&O center (DERH). This team is in charge of the first step of investigation, reporting, and is part of the SMS MRO (Safety Management System Maintenance Repair and Overhaul). The SMS MRO is in place and has been approved by the EASA: Information to relevant people of issues found by mechanics (Quality issue, abnormal degradations...).

Eurocopter is also working on a Web tool which will permit to follow the Repair and Overhaul activities of all approved D-level centers. It will then be possible to question each D-level centers on the origin of the identified degradation (A/C, event circumstances...) and ask for dynamic components for investigation.

- 2/ The second step is the analysis as described here above including the laboratory investigation with the objective of understanding the origin of the degradation and also to confirm that the maintenance program is able to detect the ongoing degradation before reaching failure which, itself, could lead to a critical situation. Depending on the result of this analysis and the risk associated with the degradation, new measures can be implemented regarding the design, the manufacturing process or the maintenance program.

Following the issuing of this Safety Recommendation, Eurocopter's Continued Airworthiness Process has been explained again to, and considered by, the EASA and subsequently validated by it.

Eurocopter considers that the Continuing Airworthiness process currently in place provides sufficient assurance and warranty that components critical to the integrity of all helicopter transmission which are found to be beyond serviceable limits are examined so that the full nature of any defect is understood.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2011-034

It is recommended that the European Aviation Safety Agency (EASA) review helicopter Type Certificate Holder's procedures for evaluating defective parts to ensure that they satisfy the continued airworthiness requirements of EASA Part 21.A.3.

Response

EASA acknowledges receipt of this Safety Recommendation. Please be advised that it is under consideration and that the outcome will be communicated to you in due course.

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-035

It is recommended that the Federal Aviation Administration review helicopter Type Certificate Holder's procedures for evaluating defective parts to ensure that they satisfy the continued airworthiness requirements of Federal Aviation Regulation Part 21.3.0.

Response

A review of the process verifies that Type certificate (TC) Holders' procedures for evaluating defective parts satisfy the continued airworthiness requirements of 14 CFR 21.03. Procedures for evaluating defective parts are further contained in the Instructions for Continued Airworthiness Instructions required by 14 CFR 21.50 and must be submitted to and accepted by the FAA. In addition, TC holders that have an Organisation Designation Authorisation are required to have an FAA approved manual that documents their procedures for reporting any failure, malfunction, or defect in any product or article covered by 14 CFR 21.3.

We believe the FAA's current process ensures that all TC holders have procedures in place for evaluating defective parts to ensure the requirements of 14 CFR 21.3 are satisfied.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2011-036

It is recommended that the European Aviation Safety Agency (EASA) re-evaluate the continued airworthiness of the main rotor gearbox fitted to the AS332 L2 and EC225 helicopters to ensure that it satisfies the requirements of Certification Specification (CS) 29.571 and EASA Notice of Proposed Amendment 2010-06.

Response

EASA acknowledges receipt of this Safety Recommendation. Please be advised that it is under consideration and that the outcome will be communicated to you in due course.

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-041

It is recommended that the European Aviation Safety Agency research methods for improving the detection of component degradation in helicopter epicyclic planet gear bearings.

Response

EASA acknowledges receipt of this Safety Recommendation. Please be advised that it is under consideration and that the outcome will be communicated to you in due course.

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-042

It is recommended that the Civil Aviation Authority update CAP 753 to include a process where operators receive detailed component condition reports in a timely manner to allow effective feedback as to the operation of the Vibration Health Monitoring system.

Response

The CAA does not accept this Recommendation. Whilst the CAA fully supports the need for component findings to be fed back into the qualification of any VHM system and to update CAP 753, the regulation of initial and continued airworthiness in the UK is subject to EASA codes Part 21, CS 29, Part M, and Part 145. These define the requirements in respect of occurrence reporting, investigation reports, data collection, analysis and corrective actions to assure continued airworthiness. EASA is to amend CS-29 as a result of NPA 2010-12 "Vibration Health Monitoring"; CAA commented on this NPA, emphasising the need for a method for component findings to be fed back into the qualification of any VHM system. Rather than amend CAP 753, therefore, the CAA continues to believe that the focus should be maintained on this EASA work and suggests that the Safety Recommendation be made to EASA.

The CAA will, of course, continue to monitor, and provide comment as appropriate to the EASA rulemaking activities and will review and, where appropriate, amend CAP 753 to address changes made by EASA, and as considered necessary by CAA.

Status - Rejected - open

SAFETY RECOMMENDATION – 2011-043

It is recommended that Eurocopter introduce a means of warning the flight crew, of the AS332 L2 helicopter, in the event of an epicyclic magnetic chip detector activation.

Response

Eurocopter's monitoring objective for all critical parts is to ensure that a degradation will be detected early, well before possible failure with a sufficient safety margin, through the maintenance program and in-service monitoring means.

An Instrument Panel CHIP warning is required according to the following regulation requirements:

FAR 29.1305 a-22 or JAR 29.1305 a-23: power plant instruments. Warning or caution devices to signal to the flight crew when ferromagnetic particles are detected by the chip detector are required by 29.1337 (e).

This requirement was introduced by FAR 29 Amendment 26. The AS332 L2 is certified according to FAR 29 amendment 24. Consequently, no instrument panel CHIP warning is required. Nonetheless, the AS 332 L2 family is equipped with a main gearbox sump chip detector that is connected to the flight instrument warning panel. As a result, the AS332 L2 is compliant with, and exceeds, the requirements of the applicable regulation.

In the case of G-REDL, it is pertinent to note that one week/36 flying hours before the accident, warning of activation of the epicyclic magnetic chip detector was given in the form

of numerous HUMS alarms, beyond which a particle coming from the failed planed gear was physically discovered. At that time, the manufacturer maintenance documentation specified that as soon as any particle is found on the epicyclic magnetic plug regardless of the type and size of the particle, opening of the epicyclic module and collection of the particles on the separator plate magnets should be done.

Experience shows that each time a spalling particle is discovered on the magnetic plug, the opening of the epicyclic module has led to removal of epicyclic module from service.

When considering the benefit of in-flight warning for the crew, it is relevant to be mindful of the fact that Eurocopter has improved the system of magnetic particle detection through introduction of requirements for 10 flight hours visual inspection of the epicyclic magnetic plug and mandatory removal of the magnets from the epicyclic module particle collector (MOD 07-52522) through the EASB n° 05.00.81 for AS 332 L2 and n° 05A017 for EC 225 LP. These Eurocopter EASB have been followed by EASA EAD.

The experience accumulated on the relevant fleet since application of these modifications has confirmed that the removal of the magnets has improved the magnetic particle detection capacity of the main gear box detectors and particularly the detector at the bottom of the gearbox which is already connected to the flight instrument warning panel, thus providing an improved means of warning the flight crew.

Particles can be collected by an electrical magnetic plug without creating the bridge leading to generate an electrical warning. In practice, this means that particles could be present on the magnetic plug a more or less long time before the appearance of a cockpit warning. Eurocopter considers it better for maintenance personnel to have an early warning of the presence of particles rather relying on a system that gives the flight crew warning through illumination of a CHIP warning light in flight.

Complementary measures:

- to reduce the interval of the visual inspection of the electrical magnetic plugs (whether or not connected to a warning light on the instrument panel) in order to give the possibility to the mechanics to be able to detect as soon as possible the presence of some chips and so to establish and eliminate their cause before the flight crew may be facing with illumination of the CHIP warning light in flight; and
- to standardize the interval of the inspection and render the visual inspection of all the magnetic plugs mandatory on all aircraft versions; will be introduced soon by Eurocopter by means of Alert Service Bulletin (ASB) for the SUPER PUMA fleet (ASB n° 05.00.84 for AS 332 L2 and n° 05A029 for the EC 225 LP fleet).
- 25h** for magnetic plugs, electrical or not with no indication on instrument panel
- 50h** for magnetic plugs with electrical information given on instrument panel

These changes have been approved by the EASA.

Based on the measures already taken and the experience accumulated since their introduction (less damaged surfaces observed when particles are detected), Eurocopter considers that flight-safety is ensured and that the introduction of a means of warning the flight crew specifically in the event of an epicyclic magnetic chip detector activation is unnecessary.

Nevertheless, and despite of these facts, Eurocopter will propose to introduce as an option, the connection of an epicyclic magnetic plug warning to a light on the instrument panel, upon customer request.

Status - Rejected

SAFETY RECOMMENDATION – 2011-045

It is recommended that the European Aviation Safety Agency require the 'crash sensor' in helicopters, fitted to stop a Cockpit Voice Recorder in the event of an accident, to comply with EUROCAE ED62A.

Response

This item is added to the list of issues to be treated under rulemaking task RMT.0268 For amendment of certification specifications and rulemaking task RMT.0076 For retroactive requirements. These two tasks are currently identified in the inventory list of the Agency's Rulemaking Programme.

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-046

It is recommended that the Federal Aviation Administration require the 'crash sensor' in helicopters, fitted to stop a Cockpit Voice Recorder in the event of an accident, to comply with RTCA DO204A.

Response

There is no regulatory basis in 14 CFR parts 27 and 29 to require a 'crash sensor' be installed in Cockpit Voice Recorders (CVR), which are installed in rotorcraft. The reference to RTCA DO204A is for Emergency Locator Transmitter (ELT) and not CVRs. To mandate that CVRs be equipped with a similar 'crash sensor' as those required per RTCA DO204A for ELTs would require rulemaking. Based on our risk analysis, we do not believe that such mandatory action is justified.

Status - Rejected - open

SAFETY RECOMMENDATION – 2011-047

It is recommended that the Civil Aviation Authority update CAP 739, and include in any future Helicopter Flight Data Monitoring advisory material, guidance to minimise the use of memory buffers in recording hardware, to reduce the possibility of data loss.

Response

The CAA accepts this Recommendation and will include advice on minimising the use of memory buffers in Flight Data Monitoring (FDM) recording hardware. This advice will be published in the Autumn 2012 update of CAP739: Flight Data Monitoring – A Guide to Good Practice. The major update to this CAP will, for the first time, include Helicopter FDM. Both Rotary and Fixed-wing sections will refer to the issue of memory buffers.

The CAA will also take every opportunity to make FDM equipment manufacturers and operators running FDM programmes aware of the issue, specifically:-

The CAA will brief the membership of the UK FDM Operators Meeting which includes both Rotary and Fixed Wing Operators. This process has already started and will be expanded to include all UK AOC holders required to have FDM programmes.

This action will be complete by 31 January 2012.

The CAA will contact FDM Quick Access Recorder manufacturers to inform them of the concern and also obtain information on the scale of the issue in current equipment.

This action will be complete by 31 January 2012.

Status - Accepted - closed

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

SA365N	Approximately 450 m South-SE of the North Morecambe gas platform, Morecambe Bay, Irish Sea	27 December 2006	Accident
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AAIB Formal: AAR 7/2008

FACTOR: F12/2008

Synopsis

The London Air Traffic Control Centre notified the Air Accidents Investigation Branch of the accident at 1906 hrs on 27 December 2006; the investigation commenced the next day.

The helicopter departed Blackpool at 1800 hrs on a scheduled flight consisting of eight sectors within the Morecambe Bay gas field. The first two sectors were completed without incident but, when preparing to land on the North Morecambe platform, in the dark, the helicopter flew past the platform and struck the surface of the sea. The fuselage disintegrated on impact and the majority of the structure suank. Two fast response craft from a multipurpose standby vessel, which was on position close to the platform, arrived at the scene of the accident 16 minutes later. There were no survivors amongst the five passengers or two crew.

The investigation identified the following contributory factors:

1. The co-pilot was flying an approach to the North Morecambe platform at night, in challenging weather conditions, when he lost control of the helicopter. He requested assistance from the commander. The transfer of control was not handled precisely and the commander did not take control until approximately four seconds after the initial request for help. The commander's initial actions to recover the helicopter were correct but the helicopter descended into the sea.
2. The approach profile flown by the co-pilot suggests a problem in assessing the correct approach angle, probably because of the limited visual cues available to him. The paucity of instrument cross-checks and lack of evidence of monitoring by the commander were symptomatic of Standard Operating Procedures that provided insufficient guidance to the crews when operating in such conditions.
3. An appropriate training device for the SA365N was available but it was not used; the extensive benefits of conducting training and checking in such an environment were therefore missed. The co-pilot was flying an approach to the North Morecambe platform at night, in poor weather conditions, when he lost control of the helicopter. He requested assistance from the commander. The transfer of control was not handled precisely and the commander did not take control until approximately four seconds after the initial request for help. The commander's initial actions to recover the helicopter were correct but the helicopter subsequently descended into the sea.

SAFETY RECOMMENDATION – 2008-033

It is recommended that the European Aviation Safety Agency ensure that research into instrument landing systems that would assist helicopter crews to monitor their approaches to oil and gas platforms in poor visual flying conditions and at night is completed without delay.

Response

One research project conducted by the Galileo Supervisory Authority (GSA) entitled 'Helicopters Deploy Global Navigation Satellite System (GNSS) in Europe (HEDGE)' and supported by the Civil Aviation Authority of the United Kingdom (definition of flight precedence) addresses the issue of off-shore operations in poor visual conditions through the provision of horizontal and vertical guidance from a GNSS sensor used in combination to other sensors. The Agency is regularly informed on the project results.

Status - Partially Accepted - open

AS350B2	Rear of Jerviswood House, Newstedings Farm, Lanark	15 September 2007	Accident
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AAIB Bulletin: 2/2009
FACTOR: F4/2009

Synopsis

The helicopter crashed in a wooded valley while manoeuvring at high speed and low height. The helicopter was intact when it crashed, and the available evidence indicated that the engine was delivering power: although no technical reason was found to explain the accident, a technical fault could not be ruled out entirely. The cause of the accident was not positively determined; however, it is probable that the pilot attempted a demanding manoeuvre, during which the helicopter deviated from his intended flight path, whether due to the pilot exceeding the permitted manoeuvring limits, mis-judgement, disorientation, distraction or a combination of such events. There were indications that the pilot had started a recovery but, with insufficient height in which to complete it, the helicopter struck trees in the valley and crashed, killing all four occupants.

SAFETY RECOMMENDATION – 2008-067

It is recommended that Eurocopter review current operational information and advice about the servo transparency phenomenon. This should be with a view to including a warning in applicable Flight Manuals that the associated uncommanded right roll and possible pitch-up, if encountered by an aircraft manoeuvring in a right turn, have the potential to cause a significant deviation from the intended flight path which, if encountered in close proximity to terrain or obstacles, could be hazardous.

Response

Per our reference b) Eurocopter has previously provided our comments and disagreement with the Safety Recommendation in the draft report on the subject accident. Most of these comments were neither considered nor added in the annex of the Final Report. You will find, below, Eurocopter's answer to your published Safety Recommendation 2008-067.

The reports states that the "servo transparency phenomenon" is a potential contributing factor although it is an assumption and not proven. Eurocopter would like to restate its objection to the use of the word "considerable" on page 100 of the report to describe "the force to counter the uncommanded maneuver". Eurocopter has intentionally flown aircraft into these conditions and never experienced control loads that were "considerable". This word implies that the induced loads could exceed "human possibilities" which is not correct. Indeed, several flight tests were performed in the past concerning this phenomenon and substantiated that the onset of servo transparency is progressive. That is, the pilot feels the progressive increase of the aerodynamic load beyond the servo control capability. As the

difference starts from “zero” the pilot gradually feels that he has to increase effort on the cyclic stick (as the pilot increases the severity of the maneuver). So, the solution is within the hands of the pilot which is to reduce the severity of the activity.

The Flight Manual Section 2, Chapter 7.3 (Limitation Section) and Section 4, Chapter 7.3 (Normal Operations) give a clear and unambiguous explanation of the phenomenon and the pilot’s recovery actions. In addition, a dedicated Service Letter # 1648-29-03 was issued by Eurocopter. This is an in depth discussion of servo transparency.

The Flight Manual Section 4, Chapter 7.3 originally had a small description of servo transparency which included the comment “presents no danger”. This was modified after the Service Letter was issued to include the content of the Service Letter. This revision was in place at the time of the accident.

As described in these different documents (the AAIB report, Flight Manual, Service Letter) the onset of servo transparency is based on several factors in play at the same time including true air speed, density altitude and load factor. Eurocopter understands that the pilot may have little control over the helicopter’s weight and mission altitude but he or she is completely aware of the airspeed and nature of the maneuver and can reduce either or both of them.

Eurocopter shares your concern in this Final Report that flying at low altitude and high speed is inherently risky. It increases the aircraft’s exposure to hazards (such as birds) and reduces the pilot’s options including the time available to respond to an unforeseen event.

Eurocopter considers that a warning in the Flight Manual about the hazardous consequences of the onset of servo transparency in close proximity to terrain could have a negative effect on safety. Indeed, should pilots operate at high speed and close to the ground and not encounter servo transparency, then this minimizes the importance of both the transparency phenomenon and the risky maneuver.

In closing, Eurocopter considers that the Flight Manual is sufficiently explicit in its presentation of the servo transparency phenomenon and cannot agree with your warning proposal in the Safety Recommendation 2008-067.

Status - Rejected

EC135 T2**East of North
Weald Airfield,
Essex****16 September 2007****Accident****AAIB Bulletin: 9/2008****FACTOR: N/A****Synopsis**

The pilot and his passenger were returning to the UK from Europe. Whilst passing through the Stanstead control zone, the helicopter had an event during which the auto trim in the Automatic Flight System disengaged and the helicopter pitched nose down. The pilot, believing he had a double engine failure, entered autorotation. During the landing flare the tail of the helicopter struck the ground first, severing the Fenestron drive. The helicopter subsequently rolled on to its side and was extensively damaged. The occupants escaped without injuries.

SAFETY RECOMMENDATION – 2008-038

It is recommended that Eurocopter review the design of the Stability Augmentation System (SAS) DCPL switch on the EC135 helicopter to reduce the likelihood of inadvertent de-activation of the SAS.

Response

After thorough consideration of the above mentioned AAIB Recommendation Eurocopter Deutschland GmbH (ECD) concluded on the subject as follows.

ECD is of the opinion that an inadvertent deactivation of the SAS system by pressing the AP/SAS DCOPL switch on the cyclic stick is highly unlikely in subject accident.

The aircraft was at normal cruise speed when the dull thud was heard. In this flight state the cyclic stick is in almost full forward position. Therefore an inadvertent pressing of the AP/SAS DCPL with e.g. an elbow or a magazine seems almost impossible.

In all other events known to ECD the switch was intentionally pressed, because it was confused with another switch like the AP mode decouple switch which is also situated on the cyclic stick. Therefore it was not accidentally activated because of an inadequate guard. Therefore ECD concludes that the existing protected ring is a means that adequately prevents an inadvertent pressing of the switch.

Nevertheless ECD will consider changes in the switch design in future development to adopt the thoughts raised by the AAIB. The trade-off between protection against inadvertent activation and the requirements raised in EASA CS 27 Paragraphs 672 and 1329 needs to be balanced thoroughly.

Status - Accepted - closed

AS365N3**Norwich Airport****18 April 2011****Incident****AAIB Bulletin: 4/2012****FACTOR: N/A****Synopsis**

Following a normal despatch and engine start for a routine offshore flight, the ground engineer monitoring the helicopter's departure noticed flames emanating from the No 1 engine. As there was no dedicated means for ground staff to inform ATC of the incident, in order to alert the crew, the ground engineer chased the helicopter along the taxiway to attract the crew's attention and communicate with them using hand signals. The crew shutdown the helicopter and the passengers were evacuated. The ground engineer extinguished a small oil-fed fire in the engine bay with a handheld fire extinguisher from the cockpit. Two Safety Recommendations have been made.

SAFETY RECOMMENDATION – 2011-095

It is recommended that Turbomeca add a caution to the Arriel 2C Maintenance Manual to highlight the consequences of rotating the gas-generator rear-bearing oil ducts during removal or refitting of the flanged unions and to publish suitable technical advice to operators to raise awareness of this risk.

Response

Turbomeca, France - No response received

Status - Response Awaited - open**SAFETY RECOMMENDATION – 2011-096**

It is recommended that Turbomeca amend the approved maintenance program for Arriel 2C engines, to ensure that the concurrent replacing of the o-rings on the gas-generator rear-bearing oil ducts is not performed on both engines of a helicopter, in order to reduce the risk of an oil loss on both engines during a flight.

Response

Turbomeca, France - No response received

Status - Response Awaited - open

Rotorcraft = or < 2,250kg MTWA**Hughes 369E****Glastonbury,
Somerset****19 June 2011****Accident****AAIB Bulletin: 2/2012****FACTOR: N/A****Synopsis**

While flying in the cruise at an altitude of 2,200 ft amsl, it is probable that the helicopter sustained a mechanical failure that resulted in the loss of pitch control to one of the tail rotor blades. During the subsequent attempt to land in a field, the airspeed reduced to the point where directional control of the helicopter seems to have been insufficient to maintain heading. At a height of approximately 50 ft, the helicopter yawed rapidly to the right before the rotation ceased and it developed a high rate of descent. The helicopter struck the ground heavily and was destroyed. The pilot survived but sustained serious injuries. There was no fire.

The investigation established the presence of fatigue cracks emanating from corrosion pits on the tail rotor blade pitch horn on one blade, which led to its failure. Also, the associated tail rotor pitch link had failed. The sequence of the two failures could not be established but either could explain the helicopter's behaviour before it crashed. Neither the failed section of this tail rotor blade pitch horn nor the associated pitch link were recovered from the accident site.

Four Safety Recommendations are made.

SAFETY RECOMMENDATION – 2011-100

It is recommended that the Federal Aviation Administration review Helicopter Technology Company's service life and approved maintenance programme, with regards to the inspection for corrosion, for tail rotor blades fitted to the MD 369 series of helicopters that have a pocket in the pitch horn (Part number 500P3100-101), to ensure their continued airworthiness.

Response

We received the subject safety recommendation on February 14, 2012.

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-101

It is recommended that the Federal Aviation Administration requires that Helicopter Technology Company ensures that there is an effective layer of shot peening on the pitch horns of in service tail rotor blades (Part number 500P3100-101) fitted to MD 369 helicopters.

Response

We received the subject safety recommendation on February 14, 2012.

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-102

It is recommended that the Federal Aviation Administration requires that MD Helicopters ensures that an effective layer of shot peening is maintained on the pitch links fitted to MD 369 helicopters.

Response

We received the subject safety recommendation on February 14, 2012.

Status - Response Awaited - open

SAFETY RECOMMENDATION – 2011-103

It is recommended that MD Helicopters, in consultation with Helicopter Technology Company, updates the advice in the MD 369 helicopter Maintenance, Overhaul and Corrosion Manuals, with regard to the removal of corrosion and restoration of the surface finish and material properties on the tail rotor blades and pitch links, to ensure that the information is appropriate.

Response

MD Helicopters Inc (prev McDonnell Douglas Heli) - No response received.

Status - Response Awaited - open

Others

Slingsby Glider Dart 15	Sutton Bank, near Thirsk, Yorkshire	30 August 2006	Accident
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AAIB Bulletin: 3/2007
FACTOR: F17/2007

Synopsis

During a local flight from a hill-top gliding site, the glider descended in weak ridge lift until it was too low to land safely back at the airfield. However, the pilot appears to have made an attempt to do so and, whilst turning at low height and low speed, lost control of the glider. It crashed on the steep slope just below the ridge line, and the pilot sustained injuries from which he later died.

SAFETY RECOMMENDATION – 2007-001

The British Gliding Association should review the guidance it gives to its associated gliding clubs in respect of the briefing requirements for visiting pilots, with a view to ensuring that such pilots are adequately briefed on all aspects of site operations.

Response

British Gliding Association (BGA) - No response received

Status - Accepted - closed

SZD-24-4A	Bicester Airfield, Oxfordshire	8 August 2010	Accident
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AAIB Bulletin: 5/2011
FACTOR: N/A

Synopsis

During the second winch launch of the day, the wings of the glider separated from the fuselage. The pilot sustained fatal injuries in the resulting impact. The investigation determined that when the aircraft was rigged, the lower bevel bolt of the wing main fitting had not fully engaged with the lower lug stack of the main spar joint and it was not possible to detect this condition. As a consequence, when the glider became airborne, the partially secured joint was unable to sustain the wing bending moments associated with the winch launch and the lower bevel bolt failed. This allowed the lower attachment lugs to disengage and the wings to fold upwards and separate from the fuselage. Two Safety Recommendations have been made as a result of the investigation.

SAFETY RECOMMENDATION – 2011-003

It is recommended that the European Aviation Safety Agency require that the Type Certificate holder of the Foka 4 introduce a means of determining that the lower bevel bolt is fully engaged in the lower lug stack during rigging.

Response

This accident stems from inadequate training, using the wrong tool and the wrong rigging procedure. Use of the correct procedures and the correct tool ensures that the lower bevel bolt is fully engaged in the lower stack during rigging. The Agency has issued Safety Information Bulletin (SIB) 2011-11 on 25 May 2011. This addresses all models of the SZD-24, -32 and -36 sailplanes and all other types that may have similar wing attachment philosophy. The service experience of the last 50 years shows that there is no design deficiency with this type of aircraft type.

Status - Partially Accepted - open

SAFETY RECOMMENDATION – 2011-004

It is recommended that the European Aviation Safety Agency require that the Type Certificate holders of aircraft with a similar wing attachment philosophy to the Foka 4 ensure that there is a means of determining that both the bevel bolts are fully engaged in the lug stack during rigging.

Response

The Agency partially agrees this recommendation but disagrees with the involvement of 'type certificate holders of aircraft with similar wing attachment philosophy to the Foka 4'. The Agency accepts, however, the principle of the recommendation and has issued Safety Information Bulletin (SIB) 2011-11 on 25 May 2011. This addresses all models of the SZD-24, -32 and -36 sailplanes and all other types that may have similar wing attachment philosophy.

Status - Partially Accepted - open

Swift S-1	Shoreham Airfield, West Sussex	22 August 2010	Accident
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AAIB Bulletin: 7/2011

FACTOR: N/A

Synopsis

The glider was in a low level final turn to land when it stalled, departed controlled flight and crashed onto the runway. One Safety Recommendation was made.

SAFETY RECOMMENDATION – 2011-031

It is recommended that the Swift Aerobatic Display Team assess prior to each display the conditions required for the glider to land safely when it releases from the tug.

Response

Swift Aerobatic Display Team - No response received

Status - Response Awaited - open

Magni M24C	North of Hilltop Way, near Old Sarum Airfield, Wiltshire	28 April 2011	Accident
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AAIB Bulletin: 10/2011

FACTOR: 08/2011

Synopsis

The pilot departed Old Sarum Airfield for a local flight in his M24C gyroplane and shortly after it became airborne the 'gull wing' door was seen to open to the horizontal position. The pilot made a radio call that he had a problem with the door and intended to return to the airfield. The aircraft continued around the circuit until the end of the downwind leg, where the pilot appeared to position the aircraft to land in a field. At the end of the flight the engine noise was heard to reduce and the aircraft was seen to roll to the left before it crashed into the field and caught fire. The investigation established that at the start of the flight the pilot's door appeared to be closed but the latching mechanism had not locked the door in the closed position.

As a result of the findings of the investigation a number of safety actions were taken by the aircraft manufacturer's UK representative and the Civil Aviation Authority. One Safety Recommendation is made to the Civil Aviation Authority.

SAFETY RECOMMENDATION – 2011-082

It is recommended that the Civil Aviation Authority amend the requirements of BCAR Section T, to minimise the likelihood of an aircraft door inadvertently opening in flight.

Response

The CAA accepts this recommendation and is in the process of developing the necessary changes to BCAR T to minimise the likelihood of an aircraft door inadvertently opening in flight.. The change will be proposed at the next meeting of the BCAR T Working Group and will, subject to public consultation, be incorporated in Section T by March 2013.

Status - Accepted - closed

Rotorsport UK MTOSport	Shell Island Campsite, Llanbedr, Gwynedd, North Wales	27 June 2011	Accident
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AAIB Bulletin: 2/2012

FACTOR: F2/2012

Synopsis

The pilot selected a field which was shorter than that required for departure. Despite there being no fault with the gyroplane, it struck a wall shortly after becoming airborne before crashing. The gyroplane was extensively damaged but neither occupant was injured. A number of similar accidents have highlighted the need to enhance pilot understanding of gyroplane performance. Two Safety Recommendations are made.

SAFETY RECOMMENDATION – 2011-097

It is recommended that the Civil Aviation Authority emphasise to gyroplane operators the need to consider field suitability and gyroplane specific performance, including the safety factors to apply, when planning a flight.

Response

The CAA accepts this recommendation and will in due course provide material that includes specific gyroplane guidance. Currently the General Aviation Safety Promotion specialist is working with the CAA's Flight Department to either amend the existing Safety Sense Leaflet on aircraft performance to include gyroplanes or to produce a separate leaflet aimed solely at Gyroplane pilots. Input has been received from the British Rotorcraft Association Chairman and is being reviewed to this end. This revised or new material is expected to be published by the end of May 2012.

Status - Accepted - closed

SAFETY RECOMMENDATION – 2011-098

It is recommended that the Civil Aviation Authority, in conjunction with the British Rotorcraft Association, review the Private Pilot's Licence (Gyroplane) syllabus to ensure that students receive adequate tuition and examination on the takeoff and landing performance of gyroplanes.

Response

The CAA accepts this recommendation. The CAA has been working with the British Rotorcraft Association to develop training and testing requirements for the purpose of obtaining the Private Pilot Licence (Gyroplanes). These requirements will be published in CAA Standards Document 44. In preparing this document, account has been taken of recent AAIB recommendations. Standards Document 44 will be published on the CAA website in March 2012.

Status - Accepted - closed

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Boeing 747-436	Heathrow Airport, Stand J2	15 Jan 2001	Accident	13
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Challenger 2B16	Birmingham Airport	4 Jan 2002	Accident	17
Boeing 737-3M8	South of Edinburgh Airport	13 Mar 2002	Accident	20
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Boeing 727-230F	East Midlands Airport	19 Nov 2002	Incident	22
Embraer 135	Norwich Airport, off Runway 27	30 Jan 2003	Accident	23
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Airbus A320-211	Runway 14 Leeds Bradford	18 May 2005	Accident	28
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Dornier 328-110	Isle of Man (Ronaldsway) Airport	28 Nov 2005	Incident	34
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Boeing 757-204	Stansted Airport	22 Oct 2006	Incident	41
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Boeing 757-28A	Nouakchott Airport, Mauritania	25 Aug 2010	Incident	57
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DHC-8-402	Bournemouth Airport, Dorset	30 Nov 2010	Incident	63
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Britten Norman BN2B-26 Islander	7.7 nm west-north-west of Cambeltown Airport, Argyll	15 Mar 2005	Accident	70
Cessna Citation 500	Romsey Close, Farnborough, Kent	30 Mar 2008	Accident	71
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Yak-50	North Weald Airfield	22 Aug 2003	Accident	80
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Piper PA-28R-201T	9 nm south of Oban (North Connel) Airport, Argyll and Butte, Scotland	9 Apr 2007	Accident	82
Piper PA-28-140	0.5 nm south-west of Isle of Wight/Sandown Airport	5 Aug 2007	Accident	83
Extra EA 300/L	Hastingleigh, near Ashford, Kent	26 Apr 2008	Accident	84
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Magni M24C	North of Hilltop Way, near Old Sarum Airfield, Wiltshire	28 Apr 2011	Accident	118
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2001-063	Boeing 747-436	Heathrow Airport, Stand J2	15 Jan 2001	13
2001-078	Boeing 737-59D	Heathrow Airport, Stand C14	29 Aug 2001	15
2002-009	EMB-145EU	Edinburgh	2 Mar 2001	13
2002-012	Boeing 737-3M8	South of Edinburgh Airport	13 Mar 2002	20
2002-013	Boeing 757-300	Gatwick Airport	3 Oct 2000	12
2002-020	Mainair Blade	Abbey Farm, Alby Hill, Norwich	2 Jan 2002	89
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2002-043	Fokker F28 Mk 0100	Manchester Airport, parked on 66L	1 April 2002	21
2003-010	Piper PA-30	1 mile from Wolverhampton Airport	8 Mar 2002	79
2003-036	Beech 200	12 nm north-east of Clacton	23 Jul 2002	68
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2003-061	HS.748 Series 2A	Italian Alps	14 Nov 2002	22
2003-069	Piper PA-28-161	Wolverhampton Air Park	30 Jun 2001	76
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2003-077	Piper PA-31	In sea 54 miles west of Barbados	18 May 2003	69
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2006-131	Dornier 328	Near Sumburgh Airport, Shetland	11 Jun 2006	38
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2007-119	Raytheon Hawker 800XP-H25B	After departure from London City Airport	31 Oct 2006	42
2008-004	Piper PA-28R-201T	9 nm south of Oban (North Connel) Airport, Argyll and Butte, Scotland	9 Apr 2007	82
2008-020	ATR42-300	London Stansted Airport	18 Jan 2007	43
2008-033	SA365N	Approximately 450 m South-SE of the North Morecambe gas platform, Morecambe Bay, Irish Sea	27 Dec 2006	109
2008-038	EC135 T2	East of North Weald Airfield, Essex	16 Sep 2007	112
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2009-077	Jetstream 4102	Climbing through FL90	9 Apr 2008	46
2009-078	Jetstream 4102	Climbing through FL90	9 Apr 2008	47
2009-080	Airbus A330-243	Montego Bay, Jamaica	28 Oct 2008	50
2009-081	Airbus A330-243	Montego Bay, Jamaica	28 Oct 2008	50
2009-091	Boeing 777-236	Short of threshold to Runway 27L, London Heathrow Airport	17 Jan 2008	46
2010-007	ERJ 190-200 LR	40 nm North-West of Wallesey	1 Aug 2008	49
2010-010	Boeing 747-436 and Airbus A340-311	London Heathrow Airport	15 Oct 2007	43
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2010-075	Boeing 737-73V	West of Norwich, Norfolk	12 Jan 2009	52
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2011-002	Extra EA 300/L	Methley Bridge, West Yorkshire	19 Jun 2010	88
2011-003	SZD-24-4A	Bicester Airfield, Oxfordshire	8 Aug 2010	116
2011-004	SZD-24-4A	Bicester Airfield, Oxfordshire	8 Aug 2010	117
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GLOSSARY OF ABBREVIATIONS

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

