AIRBUS A319-131, G-EUOE	London Heathrow Airport	24 May 2013	Accident

Investigation Synopsis

During takeoff from Runway 27L at London Heathrow Airport, the fan cowl doors from both engines detached from the aircraft, damaging the airframe and a number of aircraft systems. The flight crew elected to return to Heathrow and on the approach to land on Runway 27R, leaking fuel from a damaged fuel pipe on the right engine ignited and an external fire developed. The left engine continued to operate satisfactorily throughout the flight. The right engine was shut down promptly, reducing the intensity of the fire, and the aircraft landed safely. It was brought to a stop on the runway and the emergency services were quickly in attendance. The fire in the right engine was extinguished and the passengers and crew evacuated via the emergency escape slides on the left side of the aircraft.

The investigation determined that a maintenance error had led to the fan cowl doors on both engines being left unlatched following scheduled overnight maintenance on the aircraft. The unlatched condition of the fan cowl doors was not identified prior to the aircraft's departure the next morning. A number of organisational factors were contributory to the maintenance error. The operator has since taken action to address these issues.

This, and numerous other similar events, shows that Airbus A320-family aircraft have a history of departing with the fan cowl doors unlatched. It is also evident that, in practice, the flight crew walk-around inspection is not entirely effective in detecting unlatched fan cowl doors and therefore a design solution is necessary. Enhanced methods of detection through design solutions are being considered by the aircraft manufacturer.

As a result of this investigation, five Safety Recommendations were made concerning: fatigue risk management; fan cowl door position warnings; fan cowl door certification requirements; in-flight damage assessments by cabin crew and aircraft evacuation procedures.

Safety Recommendation 2013-011

Safety Recommendation 2013-011

It is recommended that Airbus formally notifies operators of A320-family aircraft of the fan cowl door loss event on A319 G-EUOE on 24 May 2013, and reiterates the importance of verifying that the fan cowl doors are latched prior to flight by visually checking the position of the latches.

Date Safety Recommendation made: 31 May 2013

LATEST RESPONSE

Response received: 07 June 2013

The Airbus reply consists in transmission to all Airbus operators of an OIT – Operators Information Transmission 999.0029/13 and FOT – Flight Operations Transmission 999.0030/13 reminding the standard procedures, recommendations and available modifications that have been developed to prevent fan cowl loss events.

Safety Recommendation Status	**Closed**
AAIB Assessment	**Adequate**

RESPONSE HISTORY

N/A

(SRIS Reference: GB.SIA-2013-0011)

Safety Recommendation 2015-001

Safety Recommendation 2015-001

It is recommended that the European Aviation Safety Agency publishes amended Acceptable Means of Compliance and Guidance Material in Part 145.A.47(b) of European Commission Regulation (EC) No 2042/2003, containing requirements for the implementation of an effective fatigue risk management system within approved maintenance organisations.

Date Safety Recommendation made: 14 July 2015

LATEST RESPONSE

Response received: 16 October 2024

Regulation (EU) 2021/1963 of 8 November 2021 introduced amendments to Regulation (EU) No 1321/2014, among others, requiring the establishment of a Safety Management System (SMS) in all maintenance organisations approved in accordance with Annex II (Part-145) to Regulation (EU) No 1321/2014. The amendment is applicable as of 2 December 2022, with some transition time until 2 December 2024.

On the 10 May 2022 the European Union Aviation Safety Agency (EASA) published Executive Director Decision 2022/011/R (available at https://www.easa.europa.eu/en/document-library/agency-decisions/ed-decision-2022011r) that provides Acceptable Means of Compliance (AMC) and Guidance Material (GM) to the amended Regulation (EU) No 1321/2014. In particular, AMC1 145.A.47(b) "Production planning" includes a chapter titled "Consideration of Fatigue in the Planning of Maintenance" to ensure that the SMS adequately considers effective fatigue risk management.

As of 2 December 2024, all maintenance organisations approved in accordance with Part-145 must have implemented an SMS, which is expected to include an effective fatigue management.

Additionally, EASA has taken several measures since the subject accident, e.g. publication of Safety Information Bulletin (SIB) 2015-15, which can be downloaded at https://ad.easa.europa.eu/ad/2015-15, to raise awareness about the risk of taking off with unlocked fan cowl doors.

EASA Status:
Closed – Agreement

Safety Recommendation Status **Closed**

AAIB Assessment **Adequate**

Action Status **Planned Action Completed**

RESPONSE HISTORY

Response received: 26 March 2018

The European Plan for Aviation Safety (EPAS) 2018-2022

https://www.easa.europa.eu/sites/default/files/dfu/EASA%20MB%20Decision%2008-2017%20Annex%201%20EPAS%202018-2022.pdf was published on 01 February 2018, and it includes Rulemaking Task 'RMT.0251 'Embodiment of safety management system requirements into Commission Regulations (EU) Nos 1321/2014 and 748/2012', with one of the most important elements being the identification and mitigation of risks, one of which being fatigue.

The scope of RMT.0251 covers initial and continuing airworthiness. The associated Terms of Reference were published on 12 July 2017 and the next deliverable, a Notice of Proposed Amendment, is planned to be published in the second quarter of 2018.

AAIB Assessment – Partially Adequate Open

Response received: 05 October 2015

The Agency is working on Rulemaking Task RMT.0251 (MDM.055) which is intended to introduce Safety Management (SMS) requirements for Part- 145 organisations with one of the most important elements being the identification and mitigation of risks one of which is fatigue.

The envisaged timeline for this task is to issue an NPA in 2017, with a final Opinion for 2018.

AAIB Assessment – Partially Adequate Open

(SRIS Reference: GB.SIA-2015-0001)

Safety Recommendation 2015-002

Safety Recommendation 2015-002

It is recommended that the European Aviation Safety Agency requires Airbus to modify A320-family aircraft to incorporate a reliable means of warning when the fan cowl doors are unlatched.

Date Safety Recommendation made: 14 July 2015

LATEST RESPONSE

Response received: 29 April 2016

In March 2016 EASA issued the Airworthiness Directives (ADs) 2016-0053 and 2016-0069, making mandatory the retrofit installation of new Fan Cowl Door (FCD) front latch and keeper assembly, respectively for IAE and CFM engines. This new design introduced a specific key necessary to un-latch the FCD that cannot be removed unless the FCD front latch is safely closed. The key, after removal, must be stowed in the flight deck at a specific location, as instructed in the applicable Aircraft Maintenance Manual, the Applicable Flight Crew Operating Manual has been amended accordingly.

Safety Recommendation Status **Closed**

AAIB Assessment **Partially Adequate**

RESPONSE HISTORY

Response received: 05 October 2015

Airbus has developed a warning flag, as a design solution for retrofit, that will be more obvious to maintenance crews and pilots to indicate when the fan cowl doors are not properly closed. This flag solution will be available for retrofit for the majority of single aisle fleet in service. An EASA airworthiness directive is planned before the end of 2015 to mandate the implementation of this design change.

AAIB Assessment – Partially Adequate Open

(SRIS Reference: GB.SIA-2015-0002)

Safety Recommendation 2015-003

Safety Recommendation 2015-003

It is recommended that the European Aviation Safety Agency amends Certification Specification 25.901(c), Acceptable Means of Compliance (AMC) 25.901(c) and AMC 25.1193, to include fan cowl doors in the System Safety Assessment for the engine installation and requires compliance with these amended requirements during the certification of modifications to existing products and the initial certification of new designs.

Date Safety Recommendation made: 14 July 2015

LATEST RESPONSE

Response received: 02 July 2018

Based on the lessons learnt from in-service events, the Agency introduced in 2013 a new Certification Review Item (CRI) providing Special Conditions (SC) for the retention of engine cowls.

This SC has been applied since 2013 on several large aeroplane certification projects where the design of the cowling and its installation have similarities with the aeroplanes subject to the in-service events of engine cowl separation.

Building on this SC, the Agency has published Notice of Proposed Amendment (NPA) 2017-12 dated 24 July 2017 in order to implement the content of this SC in the Certification Specifications for large aeroplanes CS-25.

Following the NPA consultation, EASA issued amendment 21 of CS-25, dated 27 March 2018, which includes the following provisions.

CS 25.1193 (e)(4) requires engine cowlings to be designed in order to minimise the risk of in-flight opening or loss that could prevent continued safe flight and landing.

CS 25.1193 (f) requires the cowling retention system to:

(1) keep the cowling closed and secured under the operational loads following either of the following conditions:
(i) improper fastening of any single latching, locking, or other retention device, or
(ii) the failure of any single latch or hinge;
(2) have readily accessible means to close and secure the cowling that do not require excessive force or manual dexterity; and
(3) have a reliable means for effectively verifying that the cowling is secured prior to each take-off.

AMC 25.1193(e)(4) and (f) provides guidance and acceptable means of compliance.

With the exception of CS 25.1193(f)(1), which prescribes some minimum load carrying capabilities of the retention system, the new specifications are not prescriptive. The applicant has the possibility to analyse all the aspects and risks inherent to its aeroplane architecture, in particular the powerplant installation, and then propose appropriate design features.

Compliance with the new certification specifications will be required for new designs, as well as for changes to existing designs if applicable in accordance with point 21.A.101 of Annex I (Part-21) to Commission Regulation (EU) No 748/2012.

These new provisions allow for certification of fan cowl doors designs which adequately protect against the risk of fan cowl door loss. In particular, human errors, and more generally human factors, are addressed in the AMC material.

CS 25.1193(f)(3), although not prescriptive, requests a means for effectively verifying that the fan cowls are secured prior to take-off. One of the means, but not the only means, which can be used by applicants is a remote indication system of the fan cowl latches condition, for which the corresponding system safety assessment will be required. This means has for instance been applied on the A320 NEO family of aeroplane.

However, other approaches without remote indication systems have also proven to ensure an adequate level of safety, and therefore the Agency did not consider that such a system should be universally mandated.

The Agency considers that the above actions fulfil the intent of the safety recommendation.

Safety Recommendation Status **Closed**

AAIB Assessment **Partially Adequate**

RESPONSE HISTORY

Response received: 24 October 2017

Based on the lessons learnt from in-service events, the Agency introduced, in 2013, a new Certification Review Item (CRI) providing a Special Condition (SC) for the retention of engine cowls.

The SC requires a cowling design that minimises any in-flight opening or loss of cowling. It also provides some requirements for the retention system of each openable or removable cowling:

- Keep the cowling closed and secured under the operational loads and after improper fastening of any single latching, locking, or other retention device, or the failure of single latch or hinge;

- Have readily accessible means of closing and securing the cowling that do not require excessive force or manual dexterity; and

- Have a reliable means for effectively verifying that the cowling is secured prior to each take-off.

This SC has been applied since 2013 on several large aeroplane certification projects where the design of the cowling and its installation have similarities with the aeroplanes subject to the inservice events of engine cowl separation.

Compliance with the new specifications is required for new designs, as well as for changes to existing designs if applicable in accordance with point 21.A.101 of Annex I (Part-21) to Commission Regulation (EU) 748/2012

Building on this SC, the Agency has published Notice of Proposed Amendment (NPA) 2017-12, dated 24 July 2017, related to EASA Rulemaking Task (RMT) 0673, in order to implement the content of this SC in the Certification Specifications for large aeroplanes CS-25. The NPA proposes to amend CS 25.1193 (Cowling and nacelle skin) in a consistent manner with the above SC, and also to create corresponding Acceptable Means of Compliance (new AMC 25.1193€(4) and (f)).

AAIB Assessment – Not Adequate Open

Response received: 05 October 2015

Based on the lessons learnt from in-service events, the Agency introduced, in 2013, a new Certification Review Item (CRI) providing Special Conditions (SC) for the retention of engine cowls.

The SC requires a cowling design that minimizes any inflight opening or loss of cowling. It also provides some requirements for the retention system of each openable or removable cowling:

• Keep the cowling closed and secured under the operational loads and after improper fastening of any single latching, locking, or other retention device, or the failure of single latch or hinge;

• Have readily accessible means of closing and securing the cowling that do not require excessive force or manual dexterity; and

• Have a reliable means for effectively verifying that the cowling is secured prior to each take-off.

This Special Condition has been applied since 2013, on several large aeroplane certification projects where the design of the cowling and its installation have similarities with the aeroplanes subject to the in-service events of engine cowl separation.

The Agency plans an amendment of CS-25 to introduce such new provisions aiming at better protecting against the risk of engine cowls separation.

AAIB Assessment – Partially Adequate Open

(SRIS Reference: GB.SIA-2015-0003)

Safety Recommendation 2015-004

Safety Recommendation 2015-004

It is recommended that British Airways Plc reviews, and amends as appropriate, its pilot and cabin crew training, policies and procedures regarding in-flight damage assessments and reporting by cabin crew in light of the lessons learned from the G-EUOE fan cowl door loss event.

Date Safety Recommendation made: 14 July 2015

LATEST RESPONSE

Response received: 27 November 2015

Recommendation 2015-004, to review training, policies and procedures for in flight damage has resulted in a change to the British Airways Operations Manual Part A. This amendment was published on 29th October 2015, becoming effective from 12th November 2015.

Safety Recommendation Status **Closed**

AAIB Assessment **Adequate**

RESPONSE HISTORY

N/A

(SRIS Reference: GB.SIA-2015-0004)

Safety Recommendation 2015-005

Safety Recommendation 2015-005

It is recommended that British Airways Plc reviews its evacuation procedures and training to take account of the potential risks of leaving engines running during on-ground emergencies.

Date Safety Recommendation made: 14 July 2015

LATEST RESPONSE

Response received: 27 November 2015

The recommendation 2015-005, to review the evacuation procedures has been completed; however the action remains open as a result of a recommendation in the British Airways investigation into the evacuation of the 777-200 in Las Vegas in September 2015. British Airways feels it appropriate to conclude the work on the 777-200 recommendation and apply the learnings from both events as a single action.

Safety Recommendation Status **Open**

AAIB Assessment **Partially Adequate**

RESPONSE HISTORY

N/A

(SRIS Reference: GB.SIA-2015-0005)