



Preventing Fan Cowl Door Loss

Fan cowl door loss events are still reported to Airbus. In all cases, the fan cowl doors were not latched closed and secured following a maintenance task.

This article provides an update on the design and procedure improvements introduced on the Airbus fleet to prevent fan cowl door loss events.

This article is an update of the Safety First #14 article, published in 2012.

It provides information to the Operators of the improvements and additional recommendations put in place since 2012.

FAN COWL DOOR LOSS EVENTS STILL OCCUR

Since the previous article published in July 2012, 14 events of loss of fan cowl doors during flight were reported to Airbus (12 events on A320, one on A330 and another on A300 aircraft).

The aircraft had undergone overnight maintenance and, in most of the cases, the fan cowl doors were opened to check the Integrated Drive Generator (IDG) oil level. The morning of the incident, the walkaround inspection did not reveal the opened fan cowls.

Airbus developed several additional devices to prevent fan cowl door loss events by enhancing the prevention means and reducing the number of fan cowl doors openings required by scheduled maintenance. ■

ENHANCED PREVENTION MEANS

Latch Key (A320 CFM56, A320 IAE V2500 and A330neo)

An improved latch with a key and a **REMOVE BEFORE FLIGHT** flag attached to the key (**fig.1**) has been introduced in December 2015 on the A320ceo aircraft. The key is needed to open the latch. When the fan cowl door is opened, the key remains on the latch. It can only be removed if the latch is fully closed. When not used, the latch key has to be stored in the cockpit with the landing gear pin.

The following Airworthiness Directives (ADs) mandate the retrofit of this new lockable latch on A320ceo aircraft equipped with IAE and CFM56 engines:

Engine	SB	AD	AD Compliance date
CFM56-5A/5B	71-1068	EASA 2016-0257	24-MAR-2019
		FAA 2018-05-04	11-MAR-2021
IAE V2500	71-1069	EASA 2016-0053	24-MAR-2019
		FAA 2017-13-10	03-AUG-2020



(fig-1)

Latch with key and "Remove before flight" red flag on A330neo aircraft



INFORMATION

A Monitored Retrofit Campaign was launched by Airbus in August 2018, refer to the RIL SA71M15018054 R02 for more information.

Latch key maintenance tips are available in the ISI 71.00.00062.

A330neo aircraft equipped with RR Trent 7000 engines are also fitted with this latch key device from production line.

Latch Closure Monitoring (A320neo)

Proximity sensors located at each latch monitor the fan cowls position on A320neo aircraft equipped with PW1100 and LEAP-1A engines. The ECAM displays the **ENG1(2) FAN COWL NOT CLSD** caution if the fan cowls are not properly closed.

Mechanical Prevention Flag (A320neo LEAP)

In addition to the cowl position monitoring, a prevention flag extends mechanically from the surface of the left hand fan cowl when the forward latch is opened to warn the ground personnel and the flight crew that the latch is not closed **(fig.2)** on A320neo equipped with CFM LEAP-1A engines.



(fig.2)
Mechanical prevention flag on an A320neo equipped with LEAP engines

Devices to hold open the fan cowl doors when they are lowered (A320 IAE, A320neo PW, A340-500/600 and A330neo)

A U-arrestor device holds the fan cowls in a partially open position when the cowls are lowered on A340 equipped with TRENT 500 engines and on A330neo with TRENT 7000 engines. It is obvious to the operator that the cowls are not fully closed when looking from below or from the side of the cowl. The U-arrestor pin must be pressed to close the fan cowl door **(fig.3)**.



(fig.3)
A330neo U-arrestor

The equivalent function is insured by the “Hold Open Device”, mandated by the AD 2001-381(B), requiring embodiment of the SB A320 71-1028 on A320ceo equipped with V2500 engines.

It is insured by a similar “Push Open Device” on A320neo equipped with PW1100G.

Optional **LATCH COWL BEFORE FLIGHT** flag (A300-600, A310, A330ceo and A340)

Airbus recommends the use of a **LATCH COWL BEFORE FLIGHT** red flag when the fan cowl doors are unlatched on A300-600, A310, A330ceo, A340, A340-500/600 aircraft. This flag can be obtained with the following SBs:

- SB A300-600 71-6030
- SB A310 71-2039
- SB A330 71-3034
- SB A340 71-4009
- SB A340-500/600 71-5005

Latch Access Panel (A350 and A380)

If the fan cowl door latches are left open on the A350 or A380 aircraft, the latch access panel cannot be closed. This will be visible to ground operator or flight crew during an exterior walkaround check **(fig.4)**.



(fig.4)

Engine of an A350 with fan cowl door latch access panel open

CAUTION markings

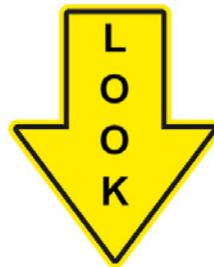
Additional markings with arrows pointing toward the latches **(fig.5)** are there to remind the ground staff to check the latches are engaged and correctly secured on A320ceo aircraft. They can be installed through:

- VSB RA32071-161 on CFM56-5A/5B
- VSB NAC-71-0330 on IAE V2500

These are optional SBs and therefore they are not installed on production aircraft.

Decals with cautions located at eye level ensure that fan cowl doors are closed and correctly latched before flight **(fig.6)** on A320 aircraft. They are installed on recent A320ceo production aircraft and on A320neo. They can also be installed by retrofit with the following VSBs:

- VSB RA32071-117 on CFM56-5A/5B
- VSB NAC-71-0235 on IAE V2500 ■



(fig.5)

Arrows pointing toward the latches



(fig.6)

Eye level decal with cautions



(fig.7)

Latches voluntarily left in an obvious unlatched position



BEST PRACTICE

The latches should be left in a position so that it is obvious that they are not engaged if the fan cowl is lowered. This helps to identify any cowls that are not latched and secured.

As a good practice, the fan cowl doors should be latched as soon as they are lowered.

MAINTENANCE EVOLUTION

Update of AMM: Introduction of a Logbook Entry (all aircraft)

Airbus revised the AMM TASK “Opening/Closing of the Fan Cowls” on all Airbus aircraft to introduce a logbook entry that informs the flight crew that the fan cowl doors have been previously opened. This will alert the flight crew that they should confirm that the fan cowl doors are correctly closed during their exterior walkaround.

IDG access door

Additional technical solutions were also developed to reduce the number of fan cowl doors openings.

An optional IDG access door is available on A320ceo aircraft equipped with CFM56-5A/5B engines. IDG oil level can be checked via this access door without opening the fan cowl doors. A320neo LEAP, A330ceo RR Trent 700 and A340-500/600 RR Trent 500 are already equipped with this IDG access door **(fig.8)**.



(fig.8)

IDG oil access door on A320neo LEAP

Increased interval for IDG oil level check

To reduce the frequency of fan cowl door opening for aircraft not equipped with the IDG access door, Airbus demonstrated that the IDG oil level check interval could be extended from 150 FH to 300 FH (or 2 months) on CFM56-5A/5B and IAE V2500 engines.

IDG Remote Oil Level Sensor (ROLS)

A Remote Oil Level Sensor (ROLS) monitors the IDG oil level and an IDG LOW OIL LEVEL ECAM alert will appear when servicing is required. With this monitoring, the inspection interval is longer **(fig.9)**.

(fig.9)

Summary of maintenance solutions

AIRCRAFT	ENGINE MODEL	ROLS	IDG/VFG OIL LEVEL INSPECTION INTERVAL (FH)	IDG VIEWING DOOR/ACCESS PANEL
A320CEO	CFM56-5A	-	Increase from 150 to 300	VSB RA32071-100 (Option)
	CFM56-5B			VSB RA32071-158 (Option)
	V2500	-	Increase from 150 to 300	-
A320NEO	CFM LEAP-1A	-	300	Standard
	PW1100G	Y	800	-
A330CEO	RR Trent 700	Y	800	Standard
	GE CF6-80E1	Y	800	-
	PW4000	Y	800	-
A330NEO	RR Trent 7000	Y	800	-
A340-200/300	CFM56-5C	Y	800	-
A340-500/600	RR Trent 500	Y	800	Standard
A380	RR Trent 900	Y	2 500	-
A380	EA GP 7200	Y	2 500	-
A350	RR Trent XWB	Y	2 500	-
A300	CF6-50	-	100	Standard
A310	CF6-80A	-	100	
A310 and A300-600	CF6-80C2	-	100	On Thrust Reverser
	JT9D-7R4	-	100	
	PW4000	-	100	

Inspection of latch paint condition (A320ceo)

To improve the latch visibility, they are covered with fluorescent paint. The condition of the paint on the latches needs to be checked every 7 500 FH (or every 24 months) on A320ceo aircraft in accordance with the Maintenance Planning Document. ■

Engine	MPD TASK	AMM TASK	VSB
CFM56- 5A/5B	711000-C6-1	71-13-13-220-802	RA32071-11
V2500	711000-I6-1	71-13-00-210-802	NAC-71-0227



(fig.10)

Fan cowl door latch with damaged paint

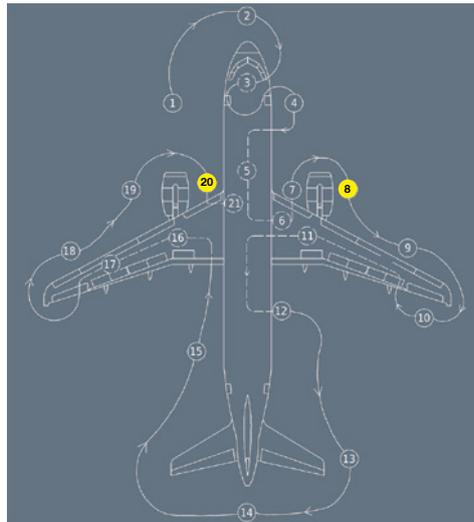
EXTERIOR WALKAROUND

Updated FCOM Procedures

Airbus updated the exterior walkaround section of the FCOM Standard Operating Procedures for all aircraft by introducing additional steps in the walkaround (**fig.11**). This change requests that the correct latching of the fan cowls is now checked from both sides of each engine.

(fig.11)

Additional steps at stations 20 and 8 in the exterior walkaround of the A320 FCOM



“ The exterior walkaround is one of the last opportunities to detect incorrectly latched fan cowl doors before flight ”

A last detection opportunity before the flight

The exterior walkaround is one of the last opportunities to detect incorrectly latched fan cowl doors before flight. The flight crew must pay particular attention to check the fan cowl doors are correctly latched.

The most effective way to confirm that all latch handles are correctly engaged and flush with the fan cowls is to crouch down to get a good line of sight with the latches. The flight crew needs to check on both sides of the engine to confirm there is no gap around the cowl and all latches are secured (**fig.12 and fig.13**). Use a torch light if the lighting conditions are poor or if the inspection is done by night. ■



(fig.12)

The flight crew should crouch down to correctly check the fan cowl door latching



(fig.13)

Incorrect latching: The latches are not flush with the nacelle and there is a small gap around the cowl

CONTRIBUTORS:**Xavier JOLIVET**

Director Product Safety
Product Safety

Hubert GANS

Propulsion Systems Integration
Engineer
Engineering Engine Integration

Laurent BEL

DCS Propulsion System
CoC Powerplant

Thibaut JOATHON

Nacelle Engineering Support
Customer Engineering Support

With thanks to:**Eric DELMAS**

The incorrect latching of the fan cowl doors following maintenance, added by a failure to detect this condition on the pre-flight exterior walkaround are the common causes in all fan cowl door loss events reported to Airbus.

Several prevention means have been implemented in addition to the solutions described in the Safety first article published in July 2012. These include:

- Latch with key and “Remove before flight” red flag (all except A320neo) - NEW
- Cockpit information (ECAM alert) on A320neo - NEW
- Prevention flag on A320neo LEAP-1A - NEW
- U-arrestor on A330neo (NEW) and A340-500/600
- Latch Access Panel on A380 and A350
- Remote Oil Level Sensor on IDG

Operational improvements have also been introduced:

- Increase of the IDG oil level check inspection interval on A320ceo - NEW
- Creation of a Log book entry after a fan cowl door opening/closing procedure – NEW
- Additional step in the exterior walkaround to duplicate the check of fan cowl latches – NEW
- New entry in the Preventing Identified Risks (PIR) section of the FCTM

As of today, aircraft equipped with these modifications have not experienced a fan cowl door loss event.

Incorporating these preventive devices, with the operational improvements, supported by the increased awareness of flight crews and maintenance personnel, are thus key elements to preventing such events.

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Safety first

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Contributions, comment and feedback are welcome. Enquiries related to this publication should be addressed to:

Airbus
Product Safety department (GS)

1, rond point Maurice Bellonte
31707 Blagnac Cedex - France
Fax: +33(0)5 61 93 44 29

safetycommunication@airbus.com

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