

The analysis have demonstrated that the Loctite 262 had been applied on the item "9" but we cannot be sure if it has been tightened as prescribed by the AMM.

In addition the Aircraft Maintenance Manual prescribes to disassembly the shock absorber every 2000 fh (05-20-00 Scheduled Maintenance Checks), while the aircraft has completed about 700 fh (TSN) and the shock absorber was never replaced or disassembled since new.

### 3. Conclusion.

The event was due to the unscrew of the nut (item "9" on figure 1) that made the shock absorber longer than the project requirements.

The analysis on the component demonstrates that the Loctite 262 was applied as prescribed by the AMM.

There is no way to understand if the thread has been tightened as prescribed by the AMM.

### 4. Recommendation.

*Addressee 1:* EASA, Safety Analysis and Research, Postfach 10 12 53, D-50452 Koeln, Germany.

*Addressee 2:* FAA, 800 Independence Avenue, SW Washington, DC 20591.

#### *Text.*

The investigation and the analysis performed demonstrates that the method chosen by Designer to lock the item "9" on the figure 1 appears to be not adequate. In addition it is not possible to inspect it without the removal and disassembly of the whole shock absorber.

On April 2011 the Designer issued the "Recommended Service Bulletin RSB 42-089/1" in order to change a seal on the dumper to get «*more durability in a greater temperature range*». It includes the replacement of the nut mentioned above, with a self locking nut (LN9348), installed with the use of Loctite 262. So the locking system we are speaking about has been just improved. This confirm that the only use of Loctite 262 has been considered not sufficient by Designer.

ANSV - considering the consequences of a main landing gear failure during landing, considering the use of these aircrafts for training purposes that increases the number of landing for each flight (go around and landing training), considering that the "nut" replacement stated on the RSB 42-089/1 is included in another modification and not correctly evidenced to the Operators/Owners - recommends EASA and FAA that:

- an additional inspection should be asked as soon as possible to the Operators/Owner of the aircraft now in operation, in order to check the component for the installation of the item "9" - figure 1, on all dumpers not yet modified as per RSB 42-089/1 (**ANSV-14/351-10/1/A/11**);
- the different choice on the nut locking method stated on the RSB 42-089/1 should become "mandatory" since the previous solution adopted by Designer (application of Loctite 262 only) appears to be not sufficient at all (**ANSV-15/351-10/2/A/11**).

President of ANSV  
(Prof. Bruno Franchi)





R. N. S. V.

Prot. USCITA  
N. 0006251/11  
Data 14/10/2011**SAFETY RECOMMENDATION**

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Safety Analysis and Research  
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Federal Aviation Administration  
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**Subject: accident occurred on Lasa (Bolzano, Italy) airfield to the helicopter AS350 B2, registration marks I-AIRY, on May 16<sup>th</sup>, 2011.**

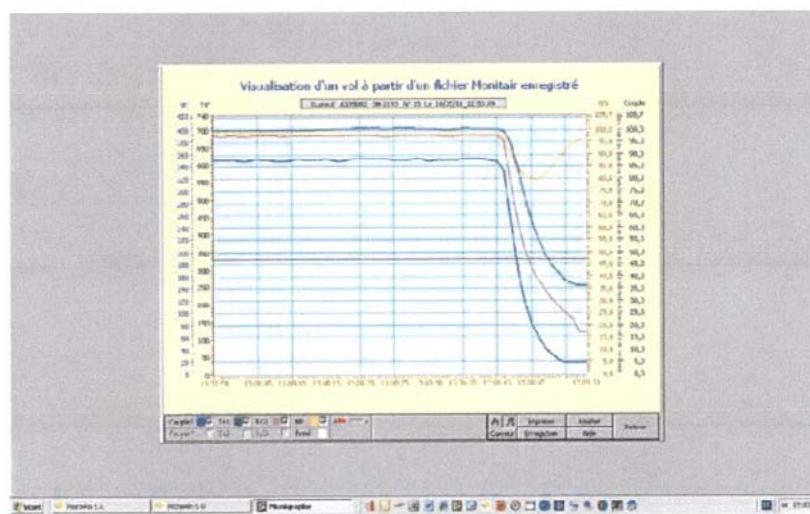
**1. Synopsis.**

On May 16<sup>th</sup>, 2011, the Eurocopter AS350 B2 (picture 1) registration marks I-AIRY was flying from Merano (BZ, Italy) to Curon Venosta (BZ, Italy). During flight at an altitude of about 4.300 ft, the pilot noticed that the "low oil pressure" light came on, accompanied by a yaw jerk to the right, a loud noise and a NR drop with its audio warning. The pilot immediately lowered the collective

pitch and landed the aircraft in autorotation on Lasa airfield that was directly in front of him. An observer on the ground reported the presence of white smoke from the exhaust pipe. On the ground, the preliminary inspection did not reveal any finding likely to explain the event. Minor damages to the helicopter due to the hit of one of the main rotor blades against the tail boom happened during touch-down. No injuries were reported by the three persons onboard (pilot included).



Picture 1: Eurocopter AS350B2 registration marks I-AIRY.



Picture 2. Data showed by "Monitair".

The "Monitair" system evidenced an in flight shut down of the engine (picture 2).

**2. Technical Investigation.**

First examinations of engine and wreckage performed by Operator and all parties involved in the investigation have shown no discrepancy which could explain the event and no objection to perform a ground run. The ground run evidenced a good operation of the engine up to 83.1% NG on the helicopter.

It was performed an engine boroscope inspection and an engine test on the test bench to the engine manufacturer facilities and no discrepancy was found which could explain the event. In addition was performed an FCU test on the test bench too with same result.

During the release to service actions performed by the Operator on the helicopter, a deep reduction of the fuel flow has been experienced after the “oil to fuel heater” installation point.

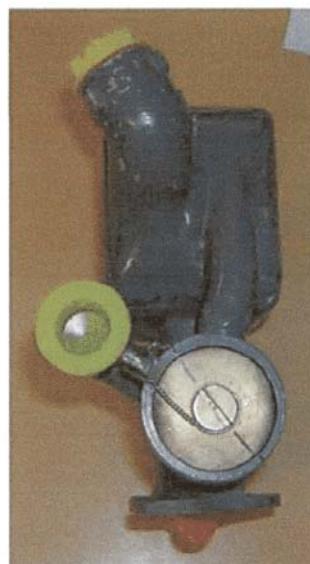
The helicopter is equipped with the “oil to fuel heater” P/N 10544D (P&WC P/N3032708), s/n 1993, that is part of the optional Service Bulletin Nr. 28.00.09.

After that has been planned a fuel filter test and an “oil to fuel heater” test to the helicopter manufacturer facilities.

The test on the fuel filter revealed no discrepancy while the test on the “oil to fuel heater” showed a deep reduction between the fuel in to out pressure:

- test with fuel flow 80l/h: Inlet pressure 30 kPa; Outlet pressure 8 kPa (delta P=22 kPa);
- test with fuel flow 180 l/h: Inlet pressure 122 kPa Outlet pressure 1kPa (delta P=121 kPa).

They are values not acceptable for the normal operation of the engine, so a boroscope inspection has been performed on the first part of the inlet section of the component revealing the presence of pollution and debris (picture 4). Following these new evidences, it has been decided to proceed with a test of the “oil to fuel heater” on an engine test bench equipped with fuel filter and FCU, to the engine manufacturer facilities.



Picture 3: “oil to fuel heater”.



Picture 4: pollution and debris found within the "oil to fuel heater" inlet duct.

The test planned included following actions:

- pre start with booster pumps ON during 30 seconds;
- start: N1 increases until flight idle (fuel flow # 80 l/h);
- take off during 15 seconds: N1 increases until PMD (fuel flow # 220 l/h);
- cruise during 3 minutes: N1 decreases to PMC (fuel flow # 170 l/h).

During these tests the pressure has been monitored upstream and downstream the fuel filter, the FCU and the "oil to fuel heater". The fuel flow and the fuel temperature has been monitored too. The following results have been experienced:

- fuel flow reaches 212 l/h then goes down and the test is stopped;
- FCU inlet pressure is 22 kPa abs (minimum allowable: 120kPa);
- delta P fuel heater 120 kPa at 212 l/h.

Therefore the FCU begins to cavitate at PMC, and at PMD HP pump self suction is not possible any more (fuel flow drops). The FCU inlet pressure is out of limit beyond flight idle.

After that the maintenance tasks required by the maintenance program for the "oil to fuel heater" component have been investigated. They are related only to a general visual inspection or to the hi/low temperature switch test (AMM 28-93-00, 6-1 – interval 600FH/24M; AMM 28-93-00, 5-1 – interval 1200FH/48M). Therefore, if the inspections required are "ok", is not requested any additional check on the fuel flow or any cleaning procedure. For example the component tested has been installed on the helicopter for about 11593 fh, since 1989 (22 years) and its fuel flow capacity has never been tested during this time.

### 3. Conclusion.

The abnormal pressure drop inside the fuel heater induced cavitation phenomena on the FCU and explains the engine in flight shut down.

The lack of maintenance task on the fuel flow test or on a scheduled cleaning related to the "oil to fuel heater" appears to be linked to the conditions of the component.

**4. Recommendation.**

*Addressee:* EASA, Safety Analysis and Research, Postfach 10 12 53, D-50452 Koeln, Germany.

*Addressee:* FAA, 800 Independence Avenue, SW Washington, DC 20591.

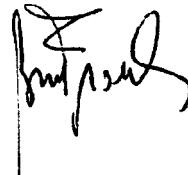
*Text*

The investigation and the analysis performed demonstrate that the “oil to fuel heater” clogging was the cause of the engine in flight shut down. The lack of specific maintenance task on it has contributed to make not possible to discover the problem before the event.

ANSV - considering the consequences of an “in flight shut down” on a single engine helicopter, considering the main use of this helicopter type for aerial work purposes and within mountain environment that get worse the risk management related to “in flight shut down” events, considering that the installation of the “oil to fuel heater” is an “optional service bulletin” for the helicopter type in subject - recommends EASA and FAA that:

- an additional inspection should be asked as soon as possible to the Operators/Owners of the helicopter type in subject now in operation (equipped with the optional Service Bulletin Nr. 28.00.09), in order to check the “oil to fuel heater” component for pollution presence and for correct fuel flow values (ANSV-16/726-11/1/A/11);
- a scheduled check should be implemented within the maintenance program of the helicopter type in subject (equipped with the optional Service Bulletin Nr. 28.00.09) in order to check the fuel flow of the “oil to fuel heater” component during its operative life and in order to perform its cleaning (ANSV-17/726-11/2/A/11).

President of ANSV  
(Prof. Bruno Franchi)





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Data 30/11/2011  


### **SAFETY RECOMMENDATION**

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800 Independence Avenue, SW  
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**Subject: accident occurred on Palermo airport to the aircraft Airbus A319 registration marks EI-EDM, on September 24th, 2010.**

#### **1. Synopsis.**

At 18.08 UTC, during final approach for runway 07 with adverse meteorological conditions on Palermo airport, aircraft collided with terrain immediately before the beginning of the runway (figure 1), hit the opposite RWY localiser antenna, slid on the wet runway with main gear collapsed for about 900 meters before stopping out of the left side of the runway. Passengers evacuation was performed. Aircraft was severely damaged, very minor injuries to persons onboard.

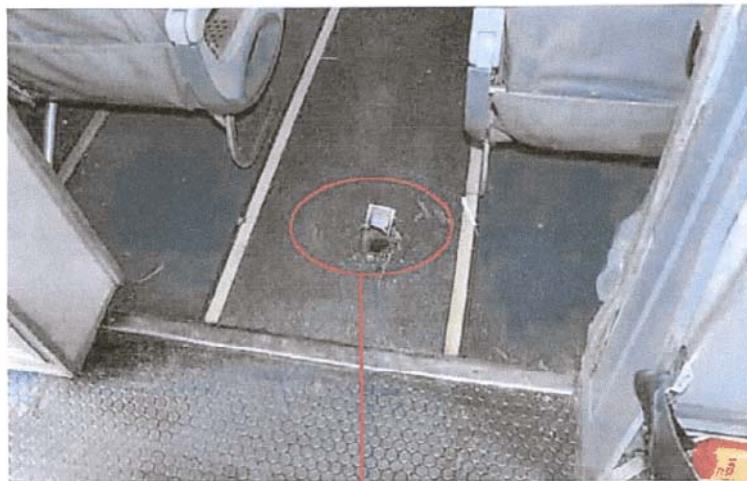


Figure 1: aircraft tracking.

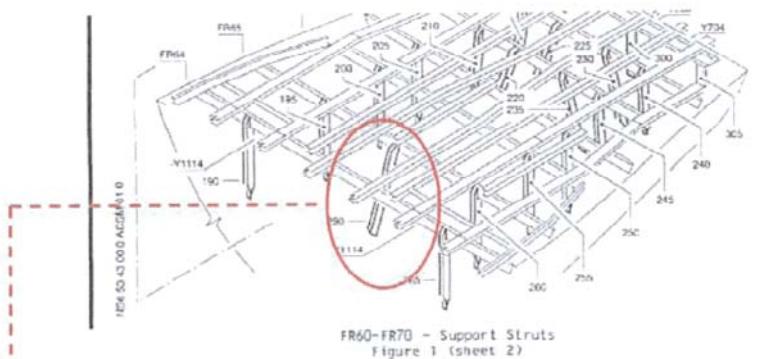
## 2. Technical investigation.

During the ongoing investigation it has been determined that the frame “*cross beam FR65*” (picture 1 and figure 2) had penetrated the floor just in correspondence of the rear part of the escape way of the pax cabin. There is some statements who let us know that passengers fell to the ground during the cabin evacuation due to the presence of part of the FR65 coming out from the cabin floor, deeply slowing down the operation.

The pax cabin has showed a consistent grade of impact suppressor and only the FR65 damage became dangerous for survivability with specific mention to the passenger evacuation (picture 2).



Picture 1: *cross beam FR65.*



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A319 STRUCTURAL REPAIR MANUAL						
ITEM	NOMENCLATURE	SPECIFICATION AND/OR SECTION CODE	THICKNESS IN MM (IN.) AND/OR PART NUMBER	I C	ACTION OR REPAIR	STATUS (MOD/PROP) SB/RC
2750	Support, cross-beam FR62 assy		053472262030			A36386K10546AZ
280	Support, cross-beam FR61 assy		053472261002			A26903K4946DJ
280A	Support, cross-beam FR61 assy		053472261004	01		A27117K5351C2
280B	Support, cross-beam FR61 assy		053472261008			A36386K10546AY
280C	Support, cross-beam FR61 assy		053472261014			A36386K10546AZ
280D	Support, cross-beam FR61 assy		053472261016			A36386K10546AZ
285	Support, cross-beam FR60 assy		053472260002			A26903K4946ER
285A	Support, cross-beam FR60 assy		053472260006	01		A27117K5351FU
285B	Support, cross-beam FR60 assy		053472260014			
290	Support, cross-beam FR65 assy		053472265006			
295	Strut, drag RH	T762 LN9073AK16	053570304201 1.6 (0.063)			
300	Strut, drag middle	T761 LN9073AK16	053570318200 1.6 (0.063)			

Figure 2: cross beam FR65 - Structural repair manual.



The NTSB issued on last year the Safety Recommendations A-10-92 addressed to EASA and A-10-77 addressed to FAA related to same component we are speaking about, following the investigation on the accident occurred in USA on January 15th, 2009, in which an A320-214 ditched on the Hudson River. On this accident the “cross beam FR65” come out from the pax cabin floor in the same way showed in picture 1 and the flight attendant B sustained a deep V-shaped laceration to her left shin during the accident. In that case, after ditching, people leave the aircraft from the wing and forward emergency exits due to the pitch up position of the aircraft in the river (picture 3).



Picture 3: emergency exit used on the Hudson River accident occurred on Jan 15, 2009.

For this reason the presence of the FR65 on the rear pax cabin floor did not slow down the evacuation. On the contrary, on the Palermo accident passengers used mostly the aft emergency exits because they were at ground level due to the main gear collapse (the aircraft was in a pitch up position too but on ground).

### 3. Conclusion.

The position of the only evidenced damage of the pax cabin (FR65 coming out from the baggage compartment) has hindered and deeply slowed down the evacuation to the aft emergency exits and for this reason it represents one important safety issue. Same damage due to same structural component (FR65 *cross beam*) has been experienced on the Hudson River accident occurred on January 15<sup>th</sup>, 2009 (where a deep V-shaped laceration was sustained by the flight attendant as a result of the cross beam position).

Therefore injuries can be caused by the presence of the cross beam in the passenger compartment and in addition it could deeply slow down the evacuation procedure.

### 4. Recommendation.

*Addressee 1:* EASA, Safety Analysis and Research, Postfach 10 12 53, D-50452 Koeln, Germany.

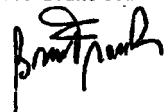
*Addressee 2:* FAA, 800 Independence Avenue, SW Washington, DC 20591.

*Text.*

ANSV - considering the consequences on the survivability aspects of the pax cabin damage due to the “*cross beam FR65*” structural component (injuries can be caused by its present, after penetration, in the passenger compartment and in addition it could deeply slow down the evacuation procedure), considering the Safety Recommendations issued by NTSB on same component (A-10-92 addressed to EASA and A-10-77 addressed to FAA), considering the FAA and EASA response on them regarding the action ongoing by the manufacturer to “redesign of the *vertical beam* FR65 such that it would break instead of penetrating the floor of the aft cabin”, considering that the modification mentioned will be proposed as “product improvement” and “retrofit” - recommends EASA and FAA that:

- the aim of such modification is to avoid to establish unsafe condition for passengers and for this reason the modification must be proposed as “mandatory” on all A320-family fleet now in operation (as prescribed by EASA Part 21A.3B – «a document issued or adopted by EASA ... which mandates actions to be performed on an aircraft to restore an acceptable level of safety, when evidence shows that the safety level of this aircraft may be otherwise compromised») (ANSV-18/1836-10/1/A/11).

President of ANSV  
(Prof. Bruno Franchi)



**Incidente occorso all'aeromobile Sukhoi Su-31M marche I-JECT, in località Cascina Stampa-Cusago (MI), 26 agosto 2009.****RACCOMANDAZIONE ANSV-19/1061-09/1/A/11**

**Motivazione:** tenuto conto delle dimensioni della zona acrobatica “Gaggiano”, lo spazio verticale utile per uscire dalla “vite” in cui era venuto a trovarsi l’I-JECT dopo l’esecuzione del “frullino” risultava notevolmente inferiore rispetto a quello minimo suggerito dal Manuale di volo del velivolo. La zona acrobatica prescelta per effettuare l’attività di volo acrobatico non appariva quindi idonea in relazione alle caratteristiche di manovra dell’aeromobile ed alle stesse raccomandazioni contenute nel suo Manuale di volo.

**Destinatari:** ENAC e Aero Club d’Italia.

**Testo:** l’ANSV raccomanda all’ENAC ed all’Aero Club d’Italia, per quanto di rispettiva competenza, di sensibilizzare i piloti che effettuano attività di volo acrobatico sulle potenziali pericolosità nell’utilizzazione di zone acrobatiche che, seppure dedicate specificatamente a tale attività, possiedano caratteristiche e limitazioni non compatibili con le esigenze di manovra dell’aeromobile utilizzato.

**RACCOMANDAZIONE ANSV-20/1061-09/2/A/11**

**Motivazione:** la zona acrobatica “Gaggiano” non appare adeguata alle esigenze di tutela della pubblica incolumità dei terzi in superficie, sia perché si estende in parte su agglomerati urbani densamente popolati, sia perché la stessa, avendo la propria base a 500 piedi AGL, finisce per consentire il sorvolo di detti agglomerati urbani a quote inferiori a quelle ordinariamente previste dalla normativa vigente.

**Destinatario:** ENAC.

**Testo:** l’ANSV raccomanda - previa effettuazione di una ricognizione sulla localizzazione delle zone acrobatiche esistenti in Italia - di valutare lo spostamento altrove di quelle che insistano, anche parzialmente, su insediamenti urbani, in un’ottica di tutela della pubblica incolumità dei terzi in superficie.