

DATA SUMMARY

LOCATION

Date and time	Saturday, 3 December 2011; 15:00 local time
Site	Lillo Aerodrome (Toledo, Spain)

AIRCRAFT

Registration	D-EGSK
Type and model	ROBIN DR-300/180R
Operator	Aeroclub de Toledo

Engines

Type and model	LYCOMING O-360-A3A
Number	1

CREW

Pilot

Age	54 years old
Licence	Private Pilot License (PPL(A)) and glider pilot
Total flight hours	133 h
Flight hours on the type	1:10 h

INJURIES

	Fatal	Serious	Minor/None
Crew			1
Passengers			1
Third persons			

DAMAGE

Aircraft	Significant
Third parties	None

FLIGHT DATA

Operation	General aviation – Private
Phase of flight	Takeoff – Initial climb

REPORT

Date of approval	24th October 2012
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1. FACTUAL INFORMATION

1.1. History of the flight

On 3 December 2011, at around 15:00 local time, a Robin DR300/180R aircraft, registration D-EGSK, took off from runway 30 at the Lillo Aerodrome (Toledo) with two occupants onboard. While on the initial climb, the engine stopped suddenly, forcing the pilot to make an emergency landing on the runway extension. The aircraft's landing gear, wing and nose section (propeller and mount) were seriously damaged. Neither occupant was injured, and both were able to exit the aircraft under their own power.

Prior to using the aircraft to tow gliders, the pilot carried out a preliminary flight for the purpose of checking the aircraft. Before this flight, the aircraft was refueled with 51 l so as to fill the main 110-l capacity tank. The reserve tank was left empty. The main tank and the fuel filter (gascolator) were then drained and the pre-flight inspection and checklists specified in the flight manual were completed. During these checks it was noted that the magneto RPMs differed by about 125, a situation that was corrected by cleaning the spark plugs.

The taxi phase lasted a few minutes as the aircraft proceeded to the threshold of the runway in use in order to take off. As noted earlier, when the aircraft was at an altitude of just 100 ft above the ground, the engine stopped suddenly. In light of the altitude, the pilot verified the position of the controls and the instruments and, noting nothing out of the ordinary, made an emergency landing some 300 m past the end of the runway on a crop field that was practically flat.

1.2. Personnel information

The pilot had a valid private pilot license (PPL(A)) with a single-engine piston (land) rating that was good until 31/12/2013. The class 2 medical certificate was valid until 14/05/2012. He also had linguistic competency and glider pilot certificates, both of which are required for glider towing operations.

1.3. Aircraft information

The Robin DR300/180R aircraft, S/N 653, has two fuel tanks arranged as follows: a 100-l main tank located at the bottom of the center portion of the fuselage, and a 50-l reserve tank located behind the main tank. The two tanks are connected and fuel is transferred by means of gravity.

The aircraft logbook shows that starting on 14 July 2011, the aircraft stopped being used on a regular basis, with only two flights made after that date before the incident flight, both lasting 14 minutes and both on 13 November.

The aircraft had been parked in a metal hangar.

1.3.1. *Maintenance information*

The aircraft had a valid airworthiness certificate and was maintained in accordance with the approved maintenance plan. It had a total of 2,484 flight hours. The last inspection had been a 100-hr check carried out on 12 June 2011 with 2,470 flight hours on the aircraft.

The engine had 905 h since its last overhaul at the time of the incident.

In the time between the overhaul and the incident, the mechanical fuel pump had been replaced with a new one.

1.3.2. *Ignition switch*

The aircraft was equipped with a Bendix magneto selection switch, P/N 10-357290-1A.

During the investigation into the engine stoppage, this device was inspected and found to be protected with a metal screen¹ that covered its entire surface (see Figure 1). The internals were dirty and showed signs of wear. According to the documentation from the last 100-hr check done on the aircraft, this device had been inspected.

This information was conveyed to the Bureau d'Enquêtes et d'Analyses on 27 December 2011, which resulted in the manufacturer issuing a mandatory service bulletin, No. 120102 (see Appendix 1), dated 25 January 2012, with instructions regarding the corrective actions to take with the device.



Figure 1. The aircraft's ignition switch

¹ Inspectors had access to another aircraft of the same model that had the same metal screen covering its ignition switch. If this screen is installed and its bottom part bent in any way, one or both magnetos could be grounded, resulting in the stoppage of the engine.

1.4. Meteorological information

The weather information for the area of the Lillo Aerodrome indicates that the temperature was around 9 °C and the relative humidity was 69%. Visibility conditions were good for flying.

1.5. Tests and research

1.5.1. *Inspection of the wreckage*

An inspection of the aircraft did not reveal any anomalies involving the components or operation of its fuel, electrical or powerplant systems.

2. ANALYSIS

During the initial climb maneuver, while passing through 100 ft AGL, the aircraft's engine stopped suddenly and without warning. There was no sign of any malfunction or loss of power. After doing a quick check of the engine controls and parameters, the pilot decided to land straight in on the field adjacent to the runway.

The inspection and tests conducted on the aircraft after the event did not reveal any system malfunction that could account for the engine stoppage. Also considered was the incorrect use of the aircraft's engine controls or auxiliary systems, a possibility that could not be ruled out by the checks made by the pilot before and after the engine stoppage.

The possibility that ice formed on the carburetor was also considered in light of the prevailing weather conditions and the time that the engine was in operation prior to takeoff, but at no time did the engine hesitate or show signs of decreasing its output.

Investigators also considered the history of the aircraft in terms of its use and the tasks performed prior to the incident flight. In this regard, the aircraft had mostly been out of use since 14 July 2011, making only two short flights in the interim. During this time, the aircraft had been kept in a hangar where the weather conditions in the area result in high temperature fluctuations between day and night. As concerns the tasks performed prior to the flight, the main tank was half full and was not drained before it was refilled, and the reserve tank was empty.

These circumstances would indicate that before the tank was refilled, water had condensed in the tank and when the main tank was topped off, the water formed a

partial emulsion with the fuel². When the mixture was subsequently drained, the emulsion would have been sufficiently homogeneous to hide the presence of water. Then, while the aircraft was on the apron, the emulsion reversed with the water's presence in the fuel supply becoming evident during takeoff and causing the engine to stop.

3. CONCLUSION

3.1. Findings

- The aircraft had a valid airworthiness certificate issued by the State of registration, and was maintained in accordance with its approved maintenance plan.
- The pilot had a valid flight license and the ratings required for the flight, including a linguistic competency certificate.
- An inspection of the aircraft's systems did not reveal any signs of a malfunction.
- During the inspection it was noted that a metal screen had been installed that covered the ignition switch. This resulted in the manufacturer's issuing of a mandatory service bulletin to correct this type of installation.
- Conditions were favorable for water to have formed in the fuel tank (time aircraft was out of service, external temperature changes and partially full fuel tanks).
- The drainage procedure was performed incorrectly since it was carried out after the refueling.

3.2. Causes

The most probable cause of the sudden engine stoppage during the initial climb was the intake of water from the main fuel tank by the engine.

² Fuel-water emulsion: an emulsion is a more or less homogeneous mixture of two immiscible liquids, one of which acts as the dispersed phase (water) and the other as the continuous phase (fuel). Depending on the conditions to which it is subjected, such as shaking, temperature, the volumes of each liquid, and so on, the phases can reverse.

APPENDIX 1
Service bulletin no. 120102



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IMPERATIF MANDATORY	BULLETIN SERVICE SERVICE BULLETIN N° 120102
AVION ROBIN - Système électrique - Sélecteur magnéto AVION ROBIN – Electrical power – Magneto (ignition) switch	ATA : 24
Annule et remplace : sans objet <i>Supersedes: not applicable</i>	

*The English version of this document is a courtesy translation of its original French version.
In case of any difficulty, reference should be made to the French original issue.*

APPLICABILITE

EFFECTIVITY

Modèles - Models							Numéro de série - Serial number
TC 34	TC 40	TC42	TC 45	TC 61	TC 172	TC 178	
DR 200	DR220	DR253	DR 340	HR100/200	R 3009/140	ATA	Tous All
DR250	DR220A	DR253B	DR 315	HR100/200B	R 3009/140	ATA	
DR250-160	DR221		DR 360	HR100/210	R 3009/140	ATA	
DR250B	DR220B		DR 380	HR100/210D	R 3009/140D		
DR250B-160	DR220AB		DR 300/108	HR100/285TIARA	R 3009/140		
	DR221B		DR 300/180 R	HR100/250TR	R 3009/140S		
			DR 300/140	HR100/285C	R 3009/140		
			DR 300/125	R1180T			
			DR 400/125	R1180TD			
			DR 400/140				
			DR 400/160				
			DR 400/180				
			DR 400/180 R				
			DR 400/2 + 2				
			DR 300/120				
			DR 400/120				
			DR 400/125 i				
			DR 400/140 B				
			DR 400/120 A				
			DR 400/160 D				
			DR 400/120 D				
			DR 400/140 S				
			DR 400/140				
			DR 400 RP				
			DR 400 NGI				
			DR 400/200 R				
			DR 400/500				
			DR400/140B				
			avec S.C. EASA 10014219				



DELAI D'APPLICATION

Les instructions techniques doivent être effectuées au plus tard dans les 50 prochaines heures ou dans les trois mois, à la première des deux échéances.

RAISON

Ce BS fait suite à un accident au décollage.

Si, pour une raison quelconque, le blindage du contacteur/sélecteur magnéto est déformé, les contacts peuvent être mis à la masse ce qui mène à un arrêt moteur.

Ce blindage est désormais inutile du fait de l'amélioration des radios et équipements électriques et n'est plus installé depuis les années 1980.

DESCRIPTION

Le BS impose le contrôle visuel du sélecteur magnéto en face arrière du pupitre afin de vérifier si le sélecteur est muni ou non d'un blindage autour.

- Si l'avion n'est pas concerné : aucune action.
- Si l'avion est concerné : appliquer les « INSTRUCTIONS TECHNIQUES ».

MAIN D'ŒUVRE

Les instructions contenues dans ce Bulletin Service ne peuvent être mises en œuvre que par une personne/organisation autorisée par son Autorité de tutelle.

REFERENCES

Evènement de navigabilité EN 37036

DOCUMENTATION AFFECTEE

- Lettre Service 7 : « Liste des BS/LS ».

TIME OF COMPLIANCE

Accomplishment instructions must be performed within the next 50 hours or within three months, whichever comes first.

REASON

This SB follows on from an accident during take-off.

If, for any reason, the shielding metal screen protecting the magneto switch is distorted, the switch terminals may be grounded which leads to an engine shutdown.

Due to improvement of radios and electrical equipments, this screen shield has not been necessary and no longer installed since the 80s.

DESCRIPTION

This SB imposes to visually inspect the magneto switch at the rear side of the lower instrument panel to check if the switch is fitted or not with a screen shield (casing).

- *If airplane is not concerned, nothing to do.*
- *If airplane is concerned, perform the "ACCOMPLISHMENT INSTRUCTIONS".*

MANPOWER

The instructions in this Service Bulletin are only to be implemented by an individual/organization authorized by the relevant supervisory Authority.

REFERENCES

Airworthiness occurrence EN 37036

PUBLICATIONS AFFECTED

- *Service Letter 7: "SB/SL list".*



RETOUR D'INFORMATION

Nous vous demandons de bien vouloir informer le Bureau Navigabilité de CEAPR des résultats de l'inspection et de la mise en œuvre éventuelle de la modification décrite dans le présent Bulletin Service. Vous pouvez utiliser le courrier postal, la télécopie, le courrier électronique ou le site web de CEAPR : information sur la première page du présent Bulletin Service.

INSTRUCTIONS TECHNIQUES

1. Généralité

Avant 1985, les sélecteurs magnétos étaient munis d'un blindage.

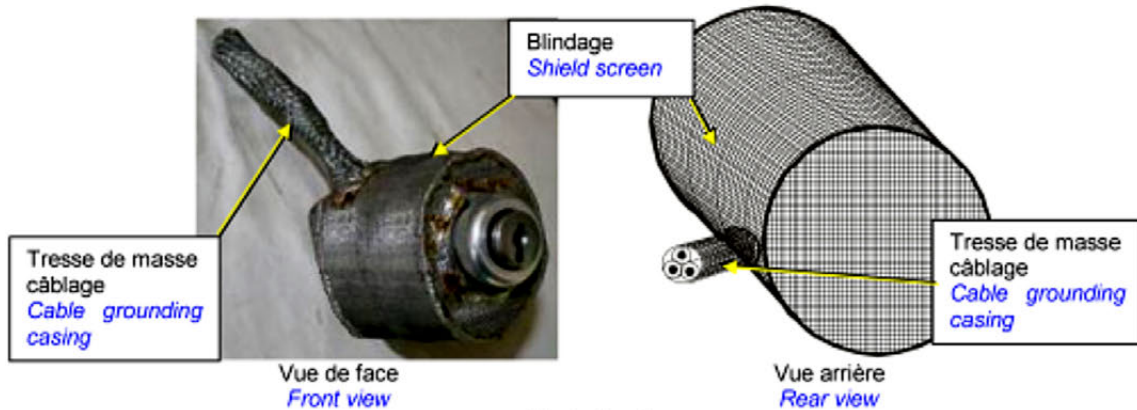


Illustration 1
Exemple de montage concerné – *Example of concerned installation*

2. Inspection

Effectuer une inspection visuelle pour vérifier si le contacteur/sélecteur magnéto est équipé du blindage de protection.

S'il n'y a pas de blindage, remise en service de l'avion.

En cas de blindage, voir §3 suivant.

FEEDBACK

Please inform CEAPR Airworthiness Office about the implementation of the inspection/change described in this Service Bulletin.

You may use postal mail, fax, e-mail or CEAPR web page: details on the first page of this Service Bulletin.

ACCOMPLISHMENT INSTRUCTIONS

General

Before 1985, magneto switches were protected with a shield screen.

Inspection

Visually inspect the magneto switch at the rear side of the lower instrument panel to check if the switch is fitted or not with a screen shield (casing).

If there is no screen shield, return airplane to service.

When there is a screen shield, refer to following §3.



3. Modification/échange

Deux possibilités :

- modification du sélecteur
- ou
- échange du sélecteur

Modification

- Déposer le sélecteur.
- Découper la tresse autour des fils.
- Retirer le blindage du sélecteur.
- Sur la tresse autour des fils, étamer la partie découpée pour s'assurer que la tresse restante ne pourra pas s'effiloche et faire une mise à la masse des contacts.
- Mettre, par-dessus la tresse, un morceau de gaine thermo rétractable.

Echange

- Echanger le sélecteur magnéto par un neuf.
- Dans ce cas la tresse autour des fils sera découpée et étamée pour s'assurer que la tresse restante ne pourra ni s'effiloche ni mettre à la masse les contacts.
- Mettre, par-dessus la tresse, un morceau de gaine thermo rétractable.

Modification/replacement

Two possibilities :

- modification of the switch*
- or*
- replacement of the switch*

Modification

- Remove the switch.*
- Cut the cable shield casing*
- Remove the screen shield from the switch*
- On the cables grounding casing, put some tin at the cut area to make sure it cannot fray and ground the terminals.*
- Install a piece of heat shrink tubing over the cable shield casing.*

Replacement

- Replace the magneto switch with a new one*
- In this case, cut and tin the cables grounding casing to make sure it will neither fray nor ground the terminals.*
- Install a piece of heat shrink tubing over the cable shield casing.*

INFORMATION SUR LE MATERIEL

MATERIAL INFORMATION

Référence P/N	Quantité Qty	Dénomination <i>Key word</i>	Instructions/remarques <i>Remarks</i>
67.11.04.000	1	Sélecteur magnéto à clef <i>Keyed ignition switch</i>	
67.36.90.050	1	Sélecteur magnétos à clef avec démarreur <i>Keyed ignition switch with starter position</i>	

Pour les prix en vigueur et les délais de livraison, contacter CEAPR.
Contact CEAPR for current prices and delivery time.