Transporta nelaimes gadījumu un incidentu izmeklēšanas birojs

Transport Accident and Incident Investigation Bureau of the Republic of Latvia

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FINAL REPORT No. 4-02/ 3-18 (3-2019)

On THE ACCIDENT of AIRCRAFT BUCKER Bu 133C JUNGMEISTER, REGISTRATION SE-AJA ON JULY 8, 2018 AT BAUSKA DISTRICT

The Aircraft Accident and Incident Investigation Bureau of the Republic of Latvia is a governmental, independent of all aviation authorities and, in general, of any other party or entity the interests or missions of which could conflict with the task entrusted to the safety investigation authority or influence its objectivity, organization established by law to investigate and determine the cause or probable cause of accidents and serious incidents that occurred in the civil aviation, as well if necessary for enhancing flight safety incidents. The sole objective of the safety investigation in accordance with Annex 13 to the Convention on International Civil Aviation, the Regulation (EU) No.996/2010 of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in Civil Aviation as well as Cabinet Regulation No.423 of May 31, 2011 "Procedures of Civil Aviation Accident and Incident investigation" is the prevention of future accidents and incidents. The Report shall contain, where appropriate, safety recommendations. **Safety investigation is separate from any judicial or administrative proceedings and Investigation Report is not deal with purpose to apportion blame or liability but only for purpose of the safety enhancement.** The Report shall protect the anonymity of any individual involved in the accident or serious incident.

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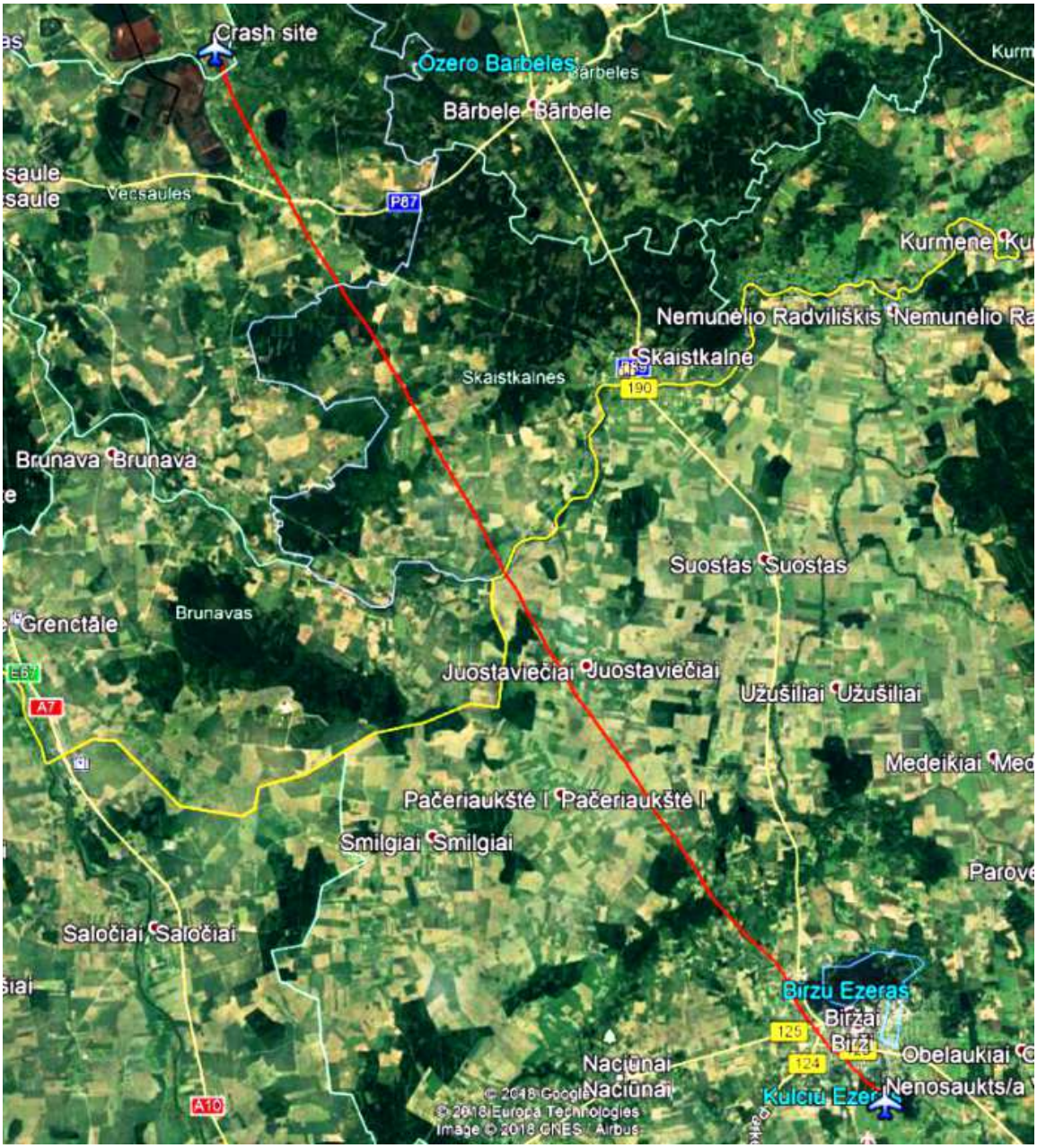
THE ACCIDENT of AIRCRAFT BUCKER Bu 133C JUNGMEISTER, REGISTRATION SE-AJA ON JULY 8, 2018 AT BAUSKA DISTRICT

CONTENTS

Unless stated otherwise all times in this Report are UTC time

On July 8, 2018 three aircraft, two KLEMM 35, reg. Nr.SE-BPU and SE-BPT, as well as Bucher BU 133C Jungmeister, registration SE-AJA took off from BIRZAI airdrome (EYBI), Lithuania with intention to fly to airfield SPILVE (EVRS) Latvia. After entering in the Latvian airspace the pilot of Bucher BU 133C, registration SE-AJA announced that oil pressure is low and took decision to make emergency landing. During a forced landing in the territory of rural municipality “Dāviņi” about 800m from home “Mucenieki” aircraft collided with ground surface (**N56.27.45; E24.26.18**). The pilot - with New Zeeland citizenship status, the sole person on board, was fatally injured. There was not fire. The aircraft was owned by private person with Sweden citizenship status. Day visual meteorological conditions prevailed for the flight.



Picture 1 Flight route

Picture 2 Accident site

At 11:50 local time on July 8, 2018 the Transport Accident and Incident Investigation Bureau (TAIIB) was informed by phone of State fire fighter and rescue service (VUGD) operational manager about occurrence of the aircraft Bucher BU 133C Jungmeister, registration SE-AJA, Sweden.

General information of the accident

Operator	-	Private pilot
Nationality	-	New Zeland
Aircraft Type	-	Bucher BU 133C Jungmeister
Registration	-	SE-AJA
Manufacturer	-	Construcciones Aeronáuticas SA
Owner	-	Private, Sweden
Year of manufacture	-	1943
Place of Accident	-	Rural municipality “Dāviņi”, Bauska district, Latvia;
Date and time	-	July 8, 2018, approximately at 8:50 UTC

Investigation

According to **Article 5. Obligation to investigate,** paragraph 1 of REGULATION (EU) No 996/2010 Of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation TAIIB shall investigate every accident or serious incident involving aircraft other than specified in Annex II to Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency shall be the subject of a safety investigation in the Member State in the territory of which the accident or serious incident occurred.

Aircraft Bucher BU 133C Jungmeister is specified in the categories set out in Annex II to Regulation (EC) No 216/2008, but taking into account that accident has a fatal outcome where foreign State citizen is deadly injured the Transport Accidents & Incidents Investigation Bureau (TAIIB) of the Republic of Latvia as State of Occurrence according to Annex 13, Section 5.1. instituted an investigation into the circumstances of the accident and start to conduct the investigation. The Notification of Accident according to Section 4.1 of Annex 13 was sent to the State of Registry and Operator (SIA of Sweden), State of Manufacture (CIAIAC, Spain), State of engine Manufacture (BFU, Germany).

1. Factual information

1.1. History of the flight

On July 8, 2018 the aircraft Bucher BU 133C Jungmeister, registration SE-AJA took off from BIRZAI airdrome (EYBI), Lithuania together with two aircraft KLEMM 35, reg. Nr.SE-BPU and SE-BPT with intention to fly to airfield SPILVE (EVRS) Latvia. According to the testimonies of pilots flying together with SE-AJA, after entering in the Latvian airspace the pilot of Bucher BU 133C, registration SE-AJA announced problems with oil pressure and took decision to make emergency landing. Aircraft flew in the direction from North to South, made U turn and during a forced landing on the field in the territory of rural municipality "Dāviņi", about 800m from home "Mucenieki" aircraft collided with ground surface (**N56.27.45; E24.26.18**). The pilot suffered fatal injuries. The accident occurred during the daylight time under visual flight conditions.

Picture 3 Area of accident site

1.2. Injuries to persons

Injuries	Crew	Passengers	Total in the aircraft	Others
Fatal	1	-	1	-
Serious	-	-	-	-
Minor	-	-	-	-
None	-	-	-	-
Total	1	-	1	-

1.2. Damage to aircraft

Inspection of the wreckage at the accident site revealed that that the aircraft suffered substantial damage of engine and fuselage.

Picture 4

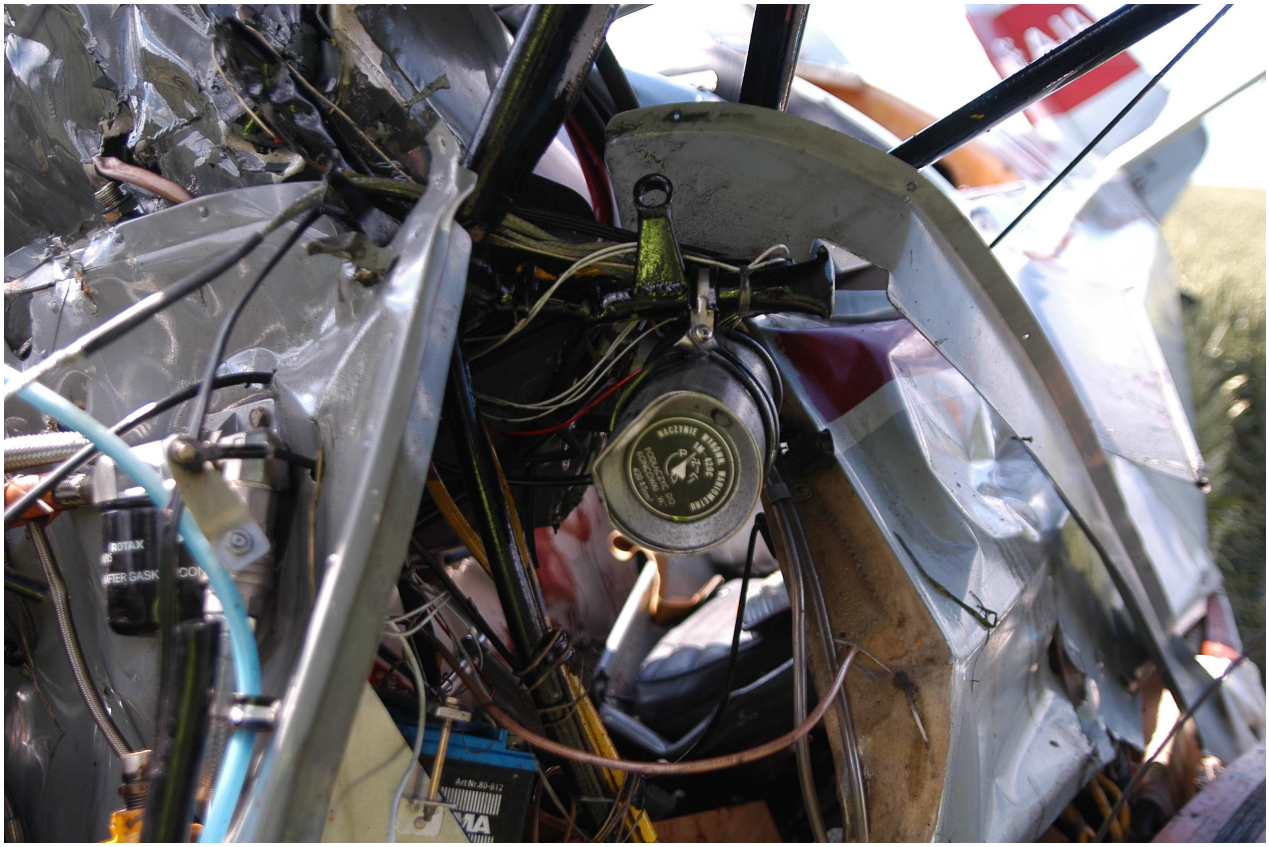
Picture 5

Picture 6

Picture 7

Picture 8

Picture 9



Picture 10

Picture 11

Picture 12

1.4. Other damage

NIL

1. 5. Personnel information

The flight crew certified and qualified for the flight in accordance with existing regulations

PIC	-male, age - 50,
Licence	- PPL(A) No 40558 issued 15.06.1994.
Medical Certificate Class 2	- issued 12.09.2016, valid to 12.09.2018.
Total flying experience	- Documented total flight hours was not found.
Flying experience on aircraft type	- Documented total flight hours on aircraft type was not found.

1.6. Aircraft Information

Aircraft **Bücker Bü 133C Jungmeister** is a single-engine single-seat trainer and aerobatic biplane aircraft produced by the German manufacturer *Bücker Flugzeugbau*.

Manufacturer and Manufacturer's Designation of Aircraft-Construcciones Aeronauticas S.A., Bücker Bü 133C

Year of Manufacture-1943.

Serial No- 41.

Class and Category- Experimental Private.

Registration- Entered on the Swedish aircraft register on April 19, 2017.

Certificate of Registration No- 9368.

Nationality and Registration Marks- SE-AJA.

Owner- private person, Swedish Nationality

Engine Model –Siemens/Bramo SH 14 A4;

Manufacturer- Brandenburgische Motoren GmbH.

Engine Serial No- 28446.

Engine installed on aircraft 15.01.17., total flight time 284.6 h.
.
Total flying time in the day of accident 2h 05min (not added in the aircraft logbook)
Flight time (since last periodic inspection) according to aircraft logbook recordings and data given by owner – approximately 18.3h;

Maintenance activities

Records indicate the aircraft was serviced and maintained in accordance with existing directives.

10.01.2017 engine was delivered by owner to LTB DIRK Bende GmbH for Overhaul (TBO: 600h, flight h 699.46, working order 31/2016) and on 29.01.2017 was issued Authorised Release Certificate LBA Form One 09/2017. Overhaul was performed by authorized technician RSC Licence No 337400/6434
Last periodic inspection (100hrs) on 05.12 2017, total flight time 347,7hrs, 62.1 h since last overhaul. Inspection was performed by authorized technician Licence SE.66.194703160954 issued by Swedish Transport Agency.

1.7. Meteorological information

According to State Ltd "Latvian Environment, Geology and Meteorology Centre" Meteorological observation stations of Bauska (*56°22'45.1'' N; 024°13'18.4'' E)* and Skrīveri (*56°38'33.28'' N; 025°07'41.54'' E)* weather conditions on July 8, 2018 from 10:00 to 13:00 were following:

Bauska

Hour (Latvian summer time)	Hour min. air temperature,°C	Hour average air temperature, °C	Hour max. air temperature, °C	Hour average relative air humidity, %	Hour average wind speed, m/s	Hour average wind direction, azimuth degrees	Hour average wind direction, azimuth degrees	Hour max. wind gusts, m/s
10.00-11.00	17.8	18.8	19.8	66	4.9	309	NW	8.0
11.00-12.00	19.5	20.4	21.3	59	4.9	312	NW	8.4
12.00-13.00	20.9	21.6	22.3	52	5.0	323	NW	8.9

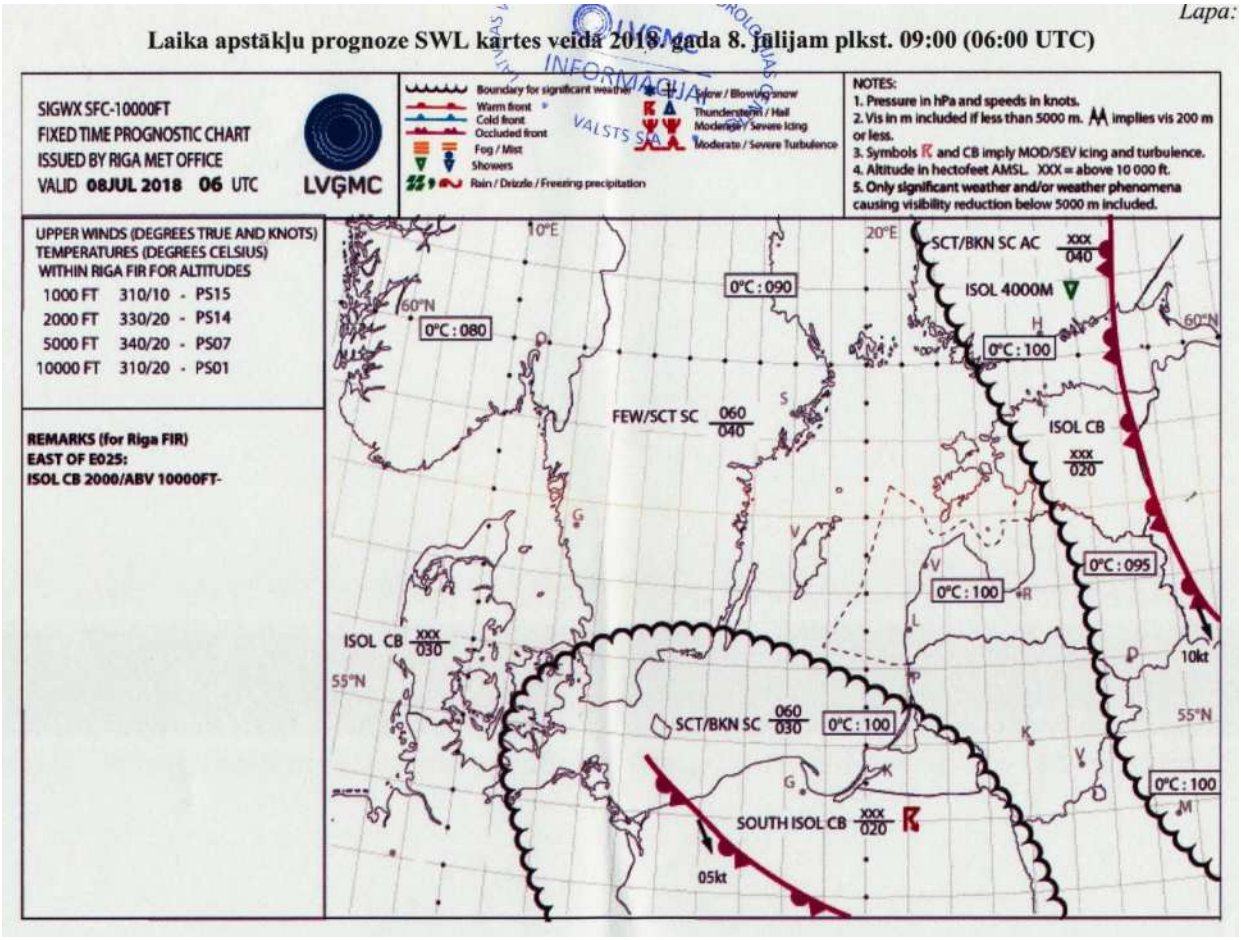
Skrīveri

Deadline for observations	Low clouds, oktas	Total clouds, oktas	Cloud altitude, m	Low cloud form	Middle cloud form	Meteorological visibility, km
9.00	0	1	-	No clouds	High cumulus	20.0
12.00	2	2	1500	Cumulus	No clouds	20.0

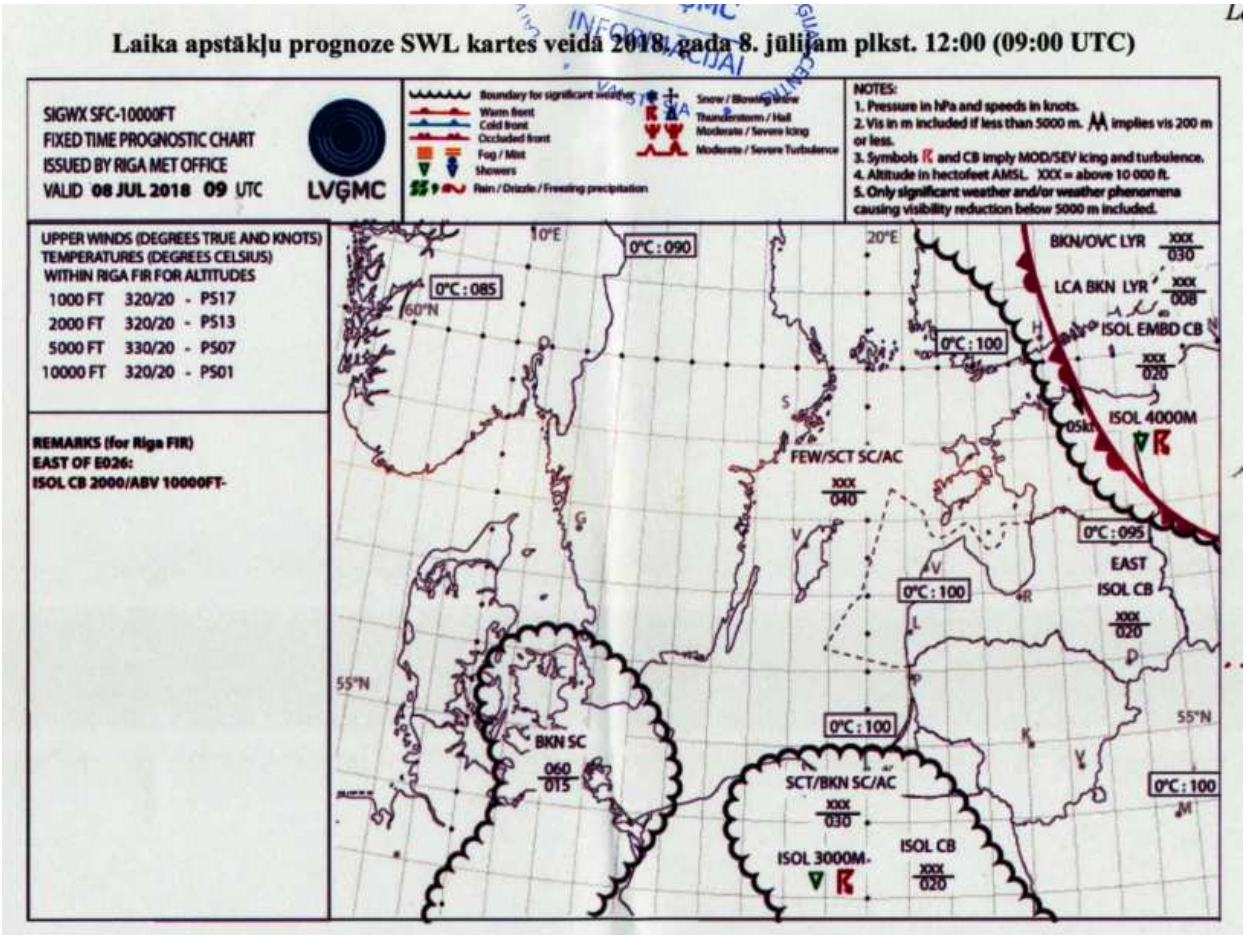
EVRR GAMET VALID **080900/081500**
EVRR RIGA FIR BLW6OI FL1OO
SECN I
SIG SFC VIS:10/15 FOR AREA E OF 3 ISOL 3000M SHRA
SIGWX:10/15 FOR AREA E oF 3 ISOL TS
SIG CLD:FOR AREA E OF 3 ISOL CB 2000/ABV l0000FT AGL
SIGMET APPLICABLE:NIL
SECN II
PSYS:NO MAJOR WX SYSTEM

SFC WIND:300/05-1OKT
WIND/T:
1000FT 320/20KT PSl7
2000FT 320/20KT PS13
5000FT 330/2oKT PS07
10000FT 320/20KT PS0l
SFC VIS:10KM
CLD:FEWSCT SC/AC 4000/ABV 10000FT AGL
FZLVL:FOR AREAS S 1 2 FLl00,
FOR AREA 3 FLO95
MNM QNH:
09/I2 1015HPA FOR S, 1013HPA FOR I
1010HPA FOR2, 1009HPA FOR 3
12/15 1015HPA FOR S, 1013HPA FOR 1
1010HPA FOR 2, 1009HPA FOR 3
SEA:T14 HGT 0.5M
OTLK:081500/031800 SAME HAZARDOUS WX=
EVRR GAMET VALID **080600/081200**
EVRR RIGA FIR BLW6OI FL1OO
SECN I
SIG SFC VIS:FOR AREA 3 ISOL 3000M SHRA
SIGWX:O8/12 FOR AREA 3 ISOL TS
SIG CLD:FOR AREA 3 ISOL CB 2000/ABV 10000FT AGL
SIGMET APPLICABLE:NIL
SECN II
PSYS:NO MAJOR WX SYSTEM
SFC WIND:330/05-1OKT
WIND/T:
l000FT 310/l0KT PSl5
2000FT 330/20KT PS14
5000FT 340/2OKT PS07
l0000FT 310/20KT PS01
SFC VIS:IOKM
CLD:SCT SC/AC 4000/9000FT AGL
FZLVL:FOR AREAS S i 2 FL100, FOR AREA 3 FL095
MNM QNH:
06/09 I0I4HPA FOR S, 1013HPA FOR I
1011HPA FOR 2, 109HPA FOR 3
09/12 1014HPA FOR S, 1013HPA FOR 1
1011HPA FOR 2, 1009HPA FOR 3
SEA:T14 HGT 0.5M
OTLK:081200/081 500 HAZARDOUS WX NIL=

Laika apstākļu prognoze SWL kartes veidā 2018. gada 8. jūlijam plkst. 09:00 (06:00 UTC)



Laika apstākļu prognoze SWL kartes veidā 2018. gada 8. jūlijam plkst. 12:00 (09:00 UTC)



1.8. Aids to Navigation

NIL

1.9. Communications

The radio equipment functioned normally and had no relation with the cause of incident.

1.10. Aerodrome information

NIL

1.11. Flight recorders

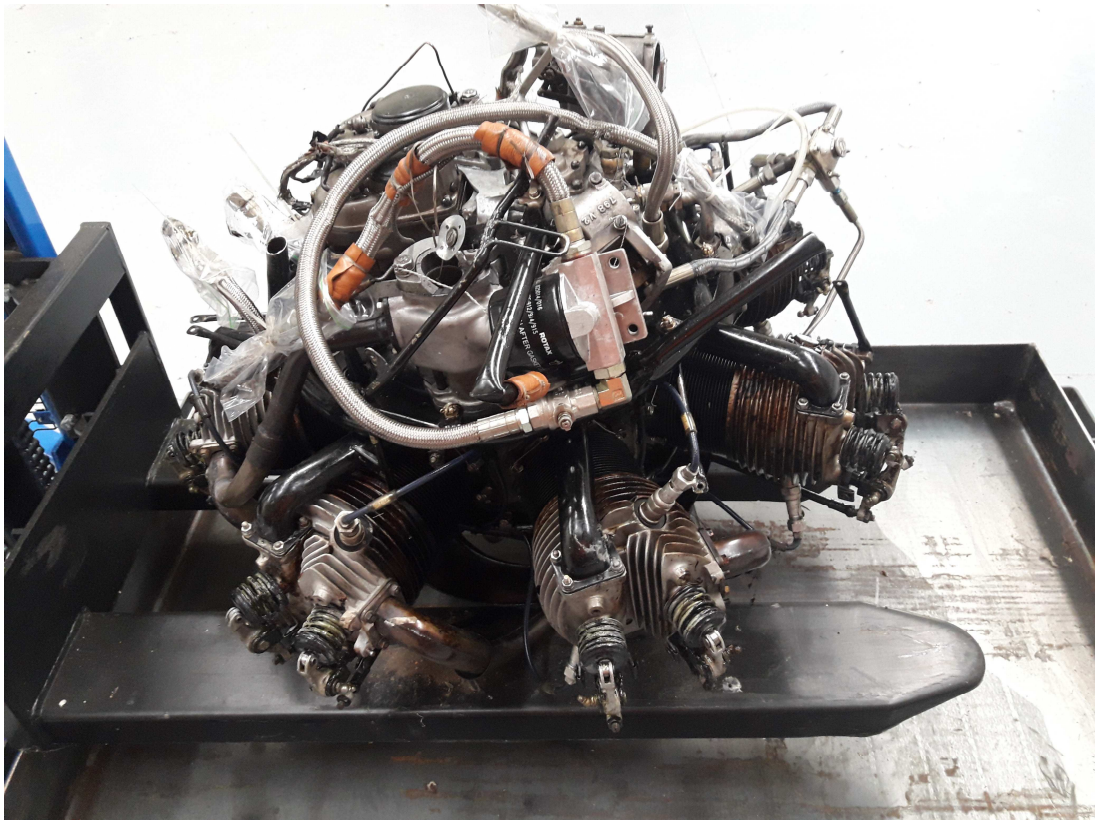
NIL

1.12. Wreckage and impact information

The aircraft was recovered from the accident site to the hangar of Transport Accident Incident Investigation Bureau. Inspection revealed that the front par of aircraft and engine elements sustained substantial damages, landing gear broken, propeller broken, aircraft wings deformed and control elements damaged. Oil tank was damaged and had raptured holes.

Picture 13 Damaged oil tank

In the hangar engine was dismounted and prepared for packing and sending for detailed expertise.



Picture 14 Dismounted engine


SE-AJA

1.13. Medical and pathological information

According to Expert Conclusion No30 issued by National Forensic Expertise Center on August 22, 2018 the Pilot's death came from dull head and body injury with skull fractures, cerebral bruises that complicated traumatic shock, brain and lung edema. In the toxicological investigation of the court in the pilot's blood it was condensed **0.51‰ (permils)** ethyl alcohol. According to Law on Aviation a member of the civil aviation personnel is prohibited from performing his or her functions if he or she is under the influence of alcoholic substances and alcohol concentration in blood exceeds **0.2‰ (permils).**

1.14. Fire

NIL

1.15. Survival aspects

NIL

1.16. Tests and research

Due to damage to the fuel tank the fuel was drained to the ground.

1.16.1. Engine Model –Siemens/Bramo SH 14 A4 investigation

The engine was sent to workshop LTB Dirk Bende GmbH, Germany.

The representatives from the Safety Investigation Authorities TAIIB (LV) and the BFU (DE) were present at LTB Dirk Bende GmbH workshop to witness the investigation of the engine Siemens/Bramo SH 14 A4, s/n 28446. The delivered box with engine and its elements was intact, did not show any signs of un-authorized access and opened in the presence of both representatives.

In the box were found:
Engine: SH14A4 S/No: 28446; LH Magneto: JF7ARS32/9-403-A S/No: 188220;
RH Magneto: JF7ARS32/9-403-A S/No: 188210; LH Carburettor: SUM 798 S/No: 100;
RH Carburettor: SUM S/No: 213; Fuel Pump: DBU KM3 045 S/No: 7757.

Engine Model –Siemens/Bramo SH 14 A4 components inspection

The following damage to engine equipment was detected:

- Both carburettors destroyed;
- Gearbox cracked;
- Engine was not blocked, but rotation of only approximately 20° was possible;
- On several stages of the investigation water was found in the engine;

Checking of ignition point not performed due to engine elements damage, all valve rockers were rotatable, no signs of damage. LH Magnet free rotatable, no visible damage, RH Magnet jamming, cover broken.

RH Magneto jamming, cover broken.

The damages on the engine make it impossible to test run for the detection of the engine failure.

Spark plug checking results

	1	2	3	4	5	6	7
forward	grey	grey	grey	grey	oil	brown	grey
rear	grey	grey	grey	grey	oil	Brown, mud	grey

Spark Plug #6 front

Spark Plug #5

Cylinder and Piston checking results

Cylinder 6 with signs of corrosion

	Piston ring	Inlet valve	Exhaust valve	Cylinder liner
1	rotatable			Cylinder liner surface in a good condition, no scratches, no signs of jamming
2	rotatable			The same condition
3	rotatable			The same condition
4	rotatable			The same condition
5	rotatable			The same condition
6	second ring – jammed, corrosion			The same condition, Severe residuals of corrosion
7	second ring – jammed, corrosion	no visible damage	no visible damage	The same condition, corrosion

Piston #6 with severe plague and corrosion

Piston #6 with severe plague and corrosion

Piston rod assembly disassembling

Crankshaft pin and bushing

All piston rods showed blue colour marks on lower and upper end.

Piston rod assembly- blue colour marks on lower and upper end

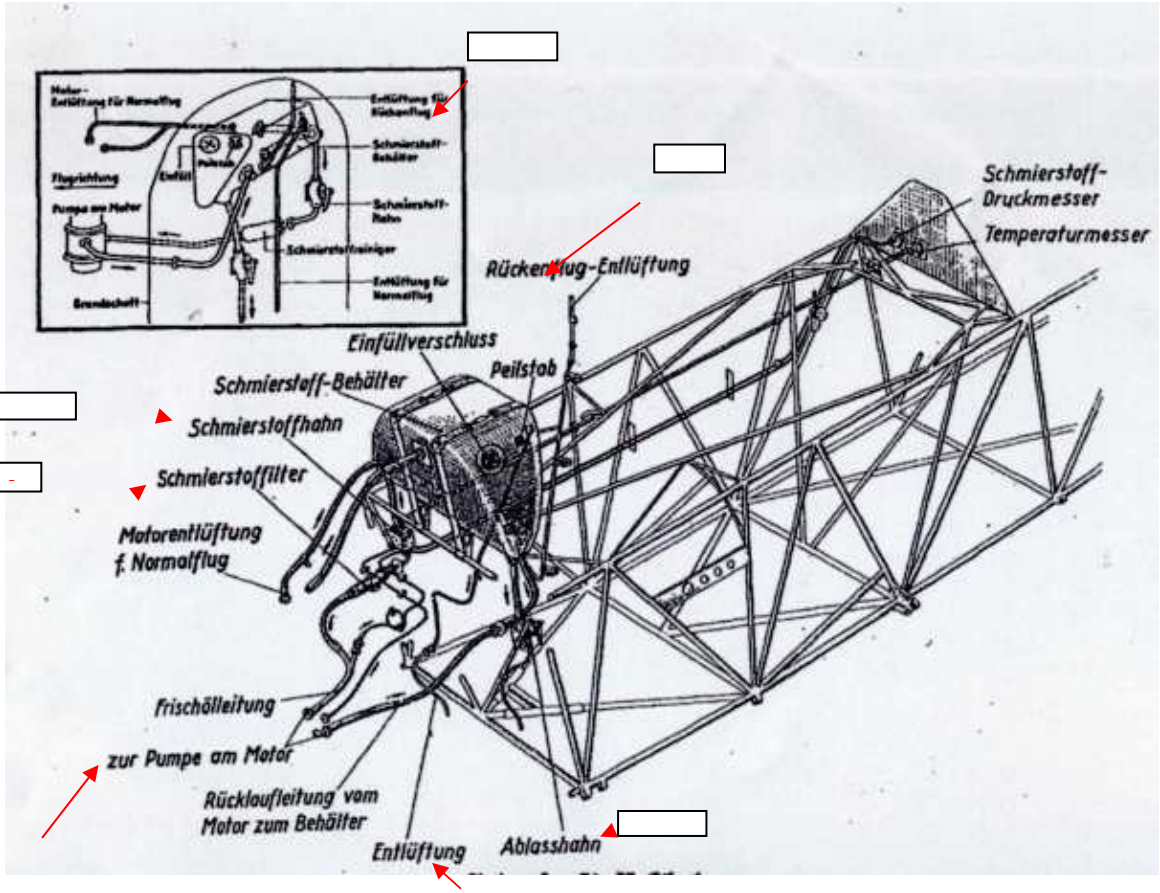
Crankshaft pin and bushing (magnified view)

Crankshaft pin and loose / front bushing of the big end bearing of the main piston rod. The front bushing of the big end bearing of the main piston rod was loose but fixed with the crankshaft. It showed severe wear. The rear bushing was fixed to the main piston rod but in a deflected (turned)

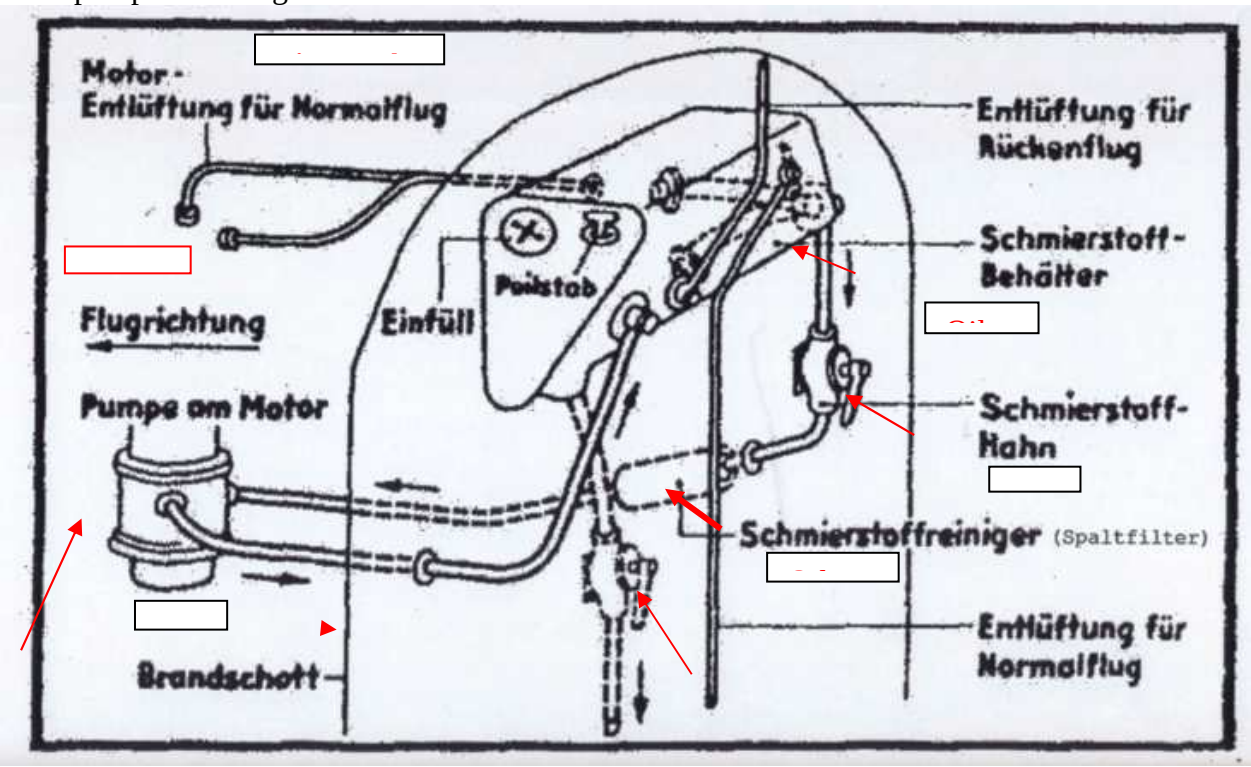
position (approximately 30ˆ). **Thus, the lubrication orifices (holes) were also shifted about 30 degrees respectively.**

New part: bushing of the big end bearing of the main piston rod with oil orifice in correct position

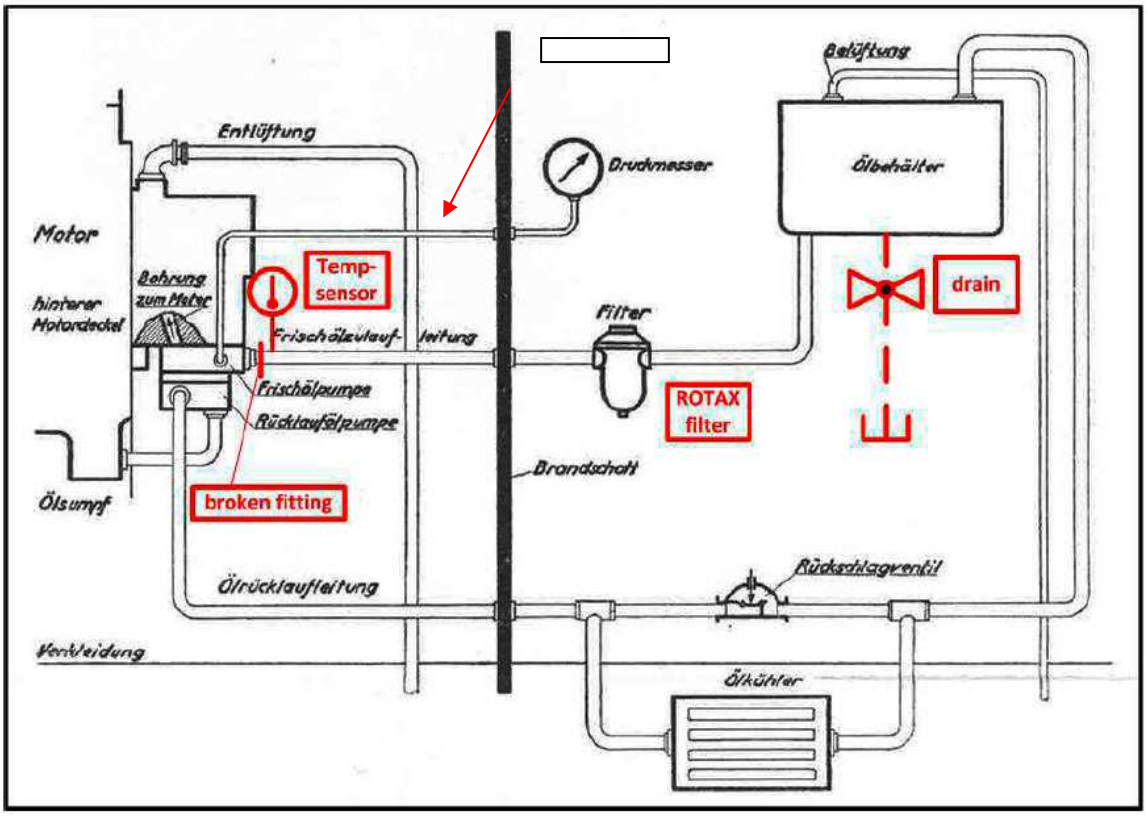
Oil system (schmierstoffanlag)



to the pump on the engine ventilation



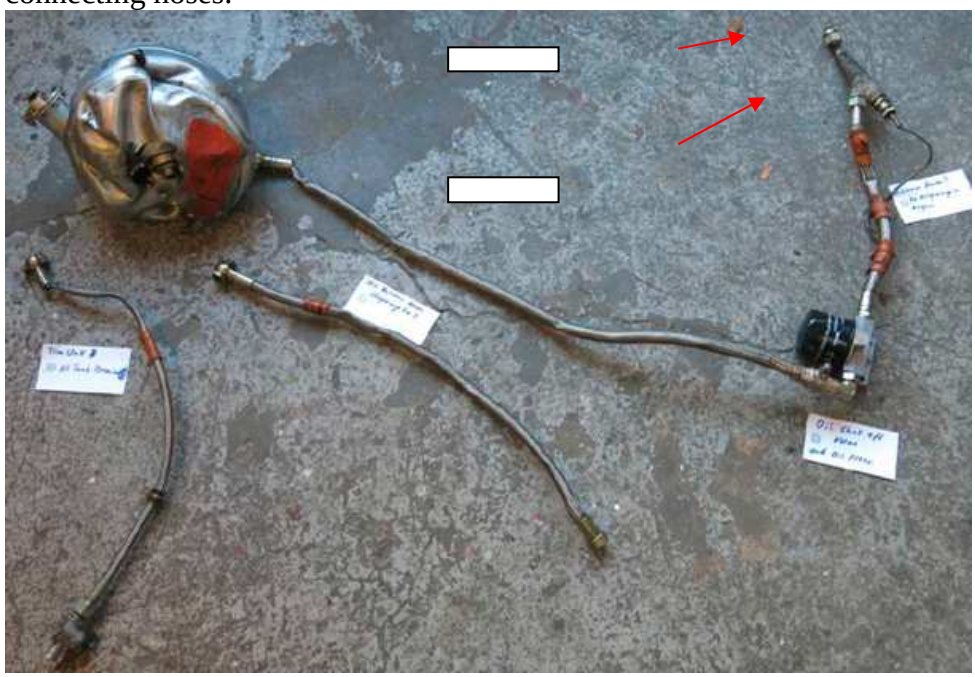
Pump to engine Drain cock

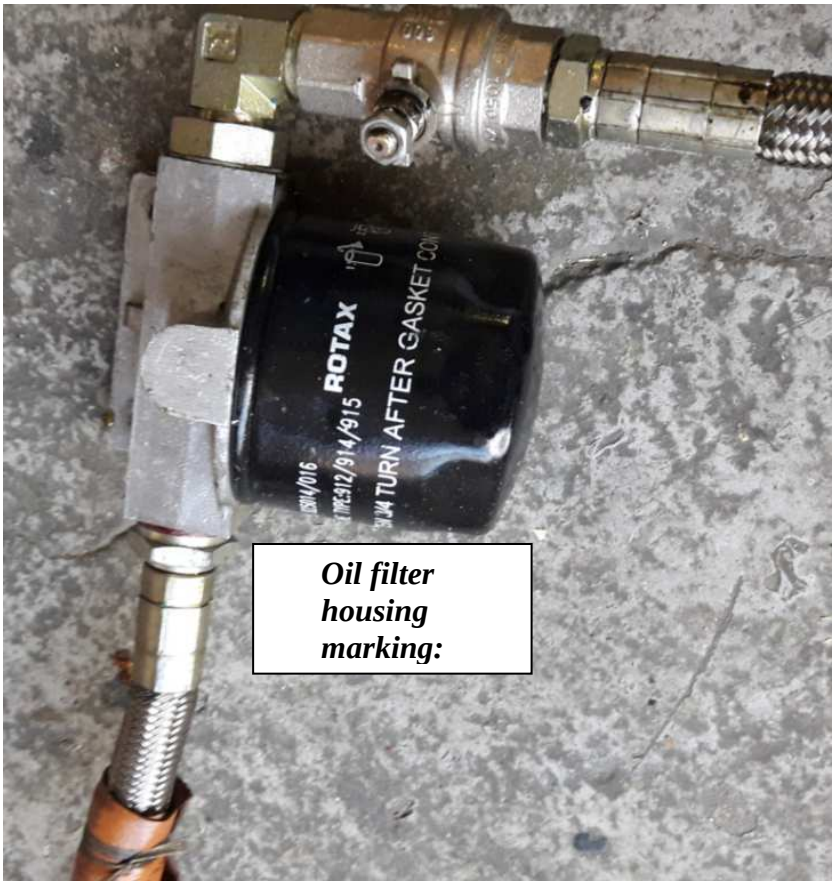


Actual oil system was different to the drawing - additional installation of an oil temp sensor and of a drain valve on the oil tank. Installation of a non-standard oil filter (ROTAX, Part No: 825014/016) (see drawing - parts in red). Connecting hoses were non-standard. Oil tank was seriously damaged.

Delivered parts of oil system for investigation consisted of:

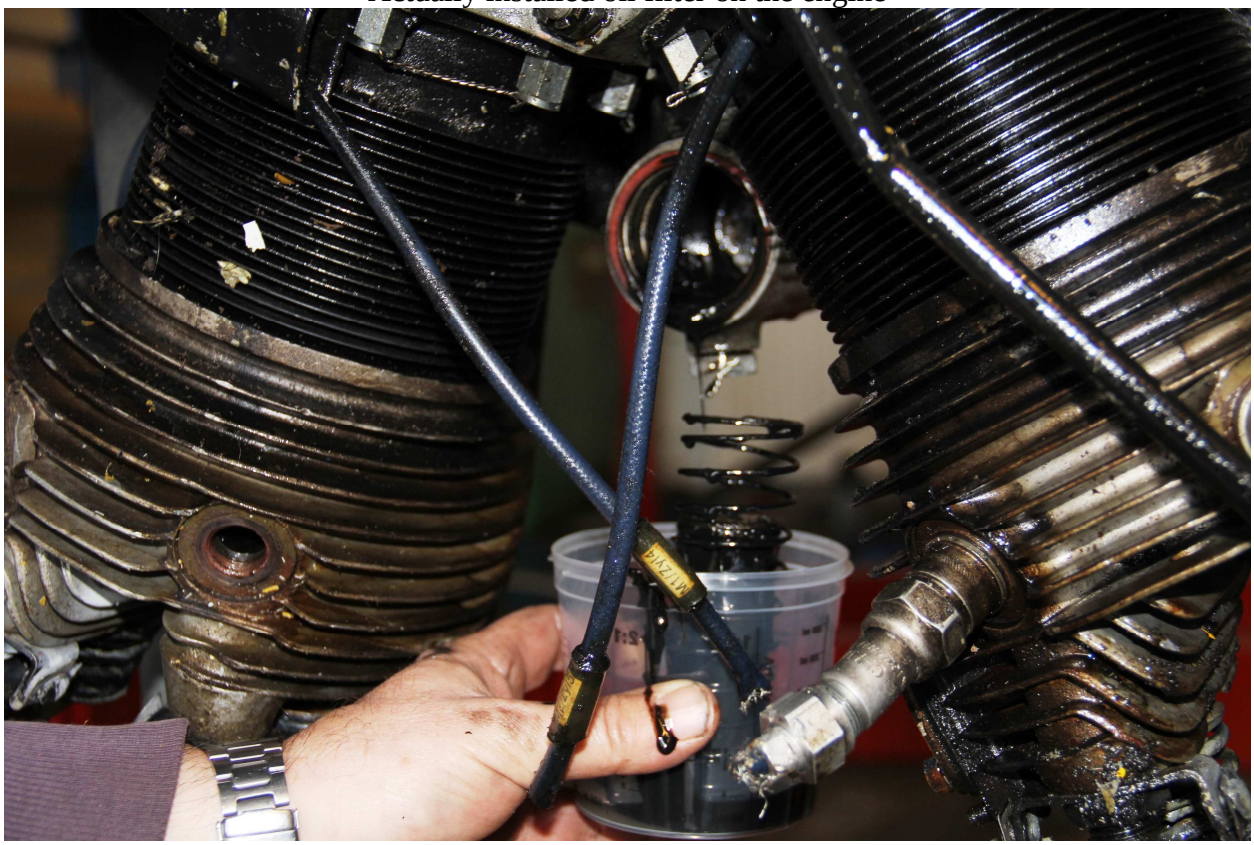
- oil tank;
- oil pump;
- oil filters (coarse, fine);
- temperature sensor;
- oil tank drain valve;
- connecting hoses.



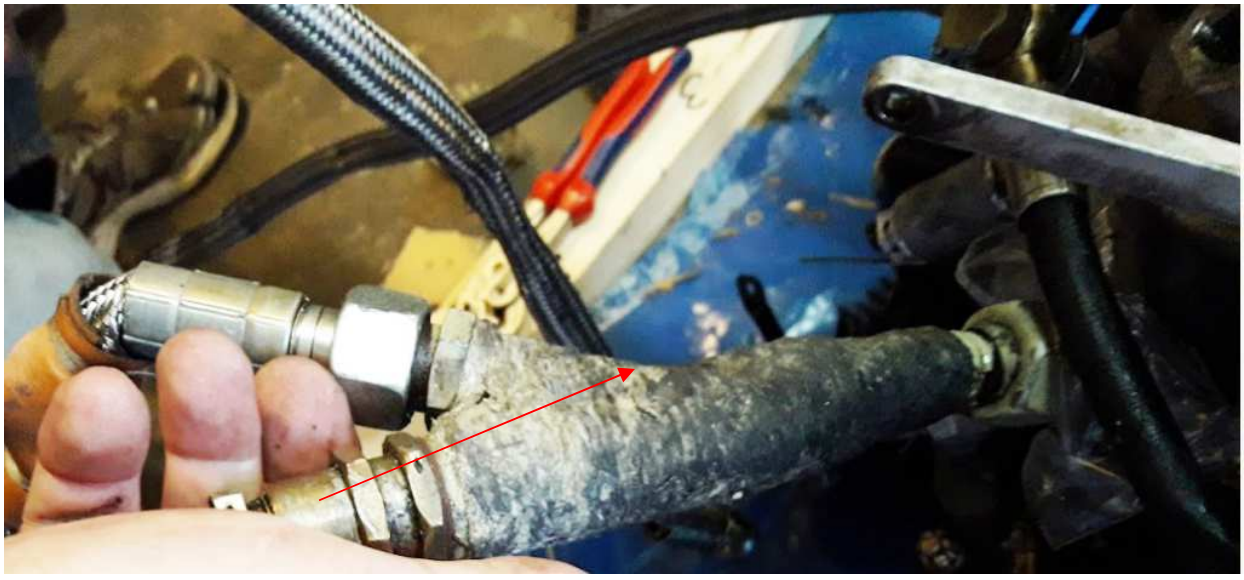


Oil filter housing marking:

Actually installed oil filter on the engine



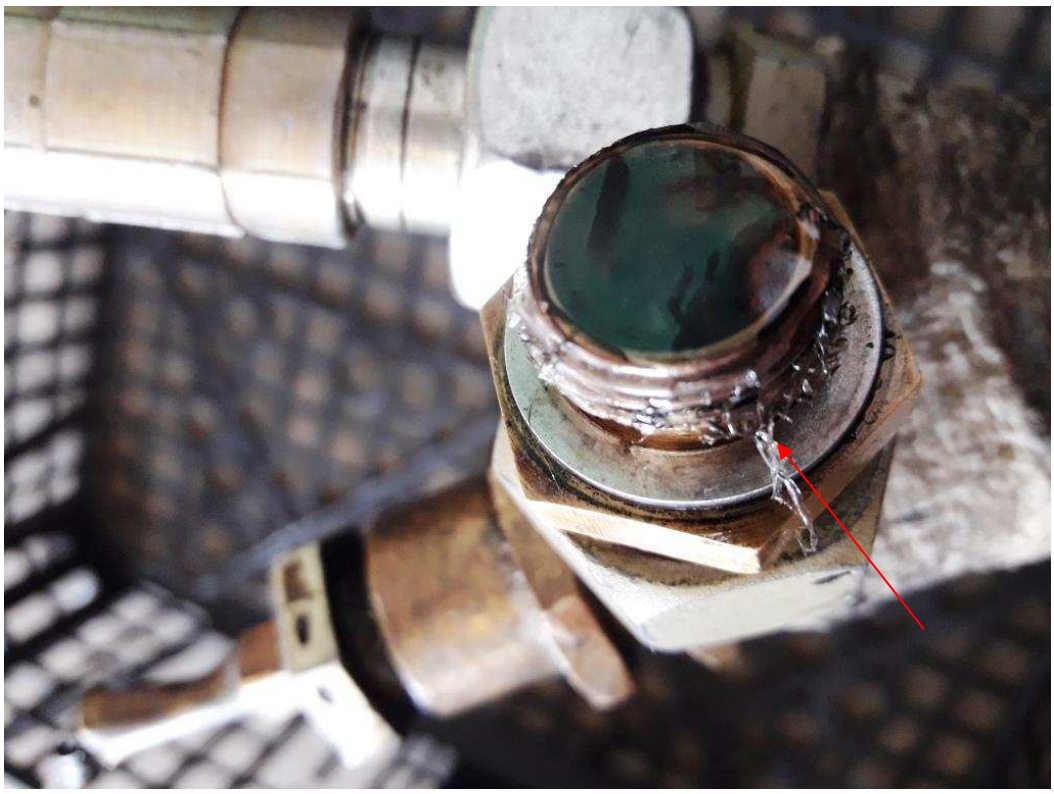
Coarse filter was loose and not secured. There was a noticeable amount of water in filter housing. There were found metallic particles in the filter – mostly bronze colour.



Temperature sensor with broken fitting

Fitting on the oil pump (to oil filter) was broken. The fitting was loose and there was a plastic cover foil on the fitting over the throat.

Broken fitting on the oil pump (to oil filter)



The fitting over the throat was covered with plastic foil and roped up with metallic wire

1.17. Organizational and management information

NIL

1.18. Additional information

LTB Bende have a crankshaft and piston rods in stock which showed the same colour marks, wear and rotation of the piston rod bearing.

Investigators carried out an experiment to check the oil flow rate through the engine-mounted filter (ROTAX) and the original filter of the engine manufacturer. The flow rate of the original filter and the ROTAX filter was checked by taking 500ml of oil (Total Aero 120), flowed through both filters and time has been taken.
The results were following:

- **original filter**: 1min 40 sec;
- **ROTAX filter**: not measurable due to very low flow, ca. 20 ml in 30 min

1.19. Useful or effective investigation techniques

NIL

2. Analysis

2.1. General

The analysis by the investigation has focused on the following areas:

2.1.1. Individual (pilot) action;

There was not found information that indicates any mechanical defect or aircraft systems malfunction before aircraft takeoff nor was there any direct implication of the aviation systems, facilities, or services available.

On 07.07.2018 aircraft flew Birzai (EYBI) to Paluknis (EYVP), duration of fly 1h 15min. On 08.07.18 aircraft flew from Paluknis (EYVP) to Birzai (EYBI), duration of fly 1h 35min., and then from Birzai (EYBI) with intention to land at Spilve (EVRS), approximate duration of flight 30 min before accident.

Flight route before accident

According to the testimonies of pilots flying together with SE-AJA, after approximately 30 min of flight to be short of Bauska in the Latvian airspace the pilot of Bucher BU 133C, registration SE-AJA announced that there are problems with oil pressure. Pilots of other aircraft witnessed that radio communication between aircraft was poor quality therefore it could not to approve what actually pilot of SE-AJA said “low oil pressure”, “lost oil pressure” or “no oil pressure”. Irregardless of what pilot announced he took decision to make emergency landing. Aircraft flight direction before intention to land was from North to South, pilot decided to make U turn, probably lost speed, not coped with aircraft piloting and the aircraft collided with ground surface (**N56.27.45; E24.26.18**).

Taking into account that the oil pressure drop, the pilot took the right decision to carry out emergency landing on the field but there were possible piloting errors during the turn.

No witnesses for the aircraft position in the air before collision with ground as well as directly at the moment of collision. According to point of collision and damage to the aircraft, the angle of the collision was quite steep. Considering the damage to the propeller and its traces on the ground, it seems that the airplane engine was running but with partial power.

Weather was considered not to have been a causal factor in this accident. Rather, it was seen that the circumstances of the accident were principally affected by operational factors which occurred during the descent.

The accident occurred during the daylight time under visual flight conditions. Hour average wind direction was North West, hour average wind speed was 5m/s and hour max wind gusts 9 m/s. Meteorological visibility 20 km. Cloud altitude 1500m.

2.1.2. Inspection the aircraft engine (model Siemens/Bramo SH 14 A4, serial number 28446)

During engine inspection there was no single mechanical failure found which may cause a loss of engine power. The engine showed clear traces of overheating and limited lubrication on the piston rod bearings.

During an accident investigation of a Bucker 133”Jungmeister it was stated that an oil filter “ROTAX” installed on the aircraft fire bulkhead is not in compliance with type certification of the Siemens/Bramo Sh 14 A4 engine and as result could be possible the limited oil flow if filter is installed in the suction line.

Due to the deflected (turned) position of the bushings the lubrication of the big end bearing (crankshaft) and small end bearing (piston) was interrupted as a result the engine had failed due to reduced lubricant (oil) supply.

The light brown colour on the exhaust tubes # 2-4 could be explained by a more lean mixture of RH carburettor.

There was clear indication the presence of the water inside engine because after crash the State Fire and Rescue Services staff covered aircraft with water to secure accident site from spilled fuel around aircraft due to damaged aircraft fuel tank.

The presence of water inside the engine and as result with severe plague and corrosion of Piston #6 and spark plug #6 also is the result of aircraft processing with water after crash.

The investigation revealed that the plastic foil over the throat of the broken fitting was covered and roped up with metallic wire during preparation of the aircraft for transportation to hangar to avoid oil leakage.

The aircraft SE-AJA oil system modification was equipped with a separate oil tap with handle. According to information given by aircraft owner such modification of the oil system was approved by the United Kingdom CAA. No supporting documentation was provided neither to investigation nor the Maintenance Organization LTB Dirk Bende GmbH, Germany.

At the disposal of TAIIB was not aircraft Flight manual or checklists determined pilot preflight actions. Such oil system modification could be dangerous in case if pilot don’t follow

checklist (if in reality such checklist exist) and don't open oil tap with handle and the engine can start run without oil tank connected.

There are opinion that in practice this type of engine can run 30-40 min without oil pressure, but such conclusion don't approved in the engine technical documentation.

In case if the aircraft oil system is equipped with oil filter not in compliance with type certification of the Siemens/Bramo Sh 14 A4 engine and as result could be possible the limited oil flow if oil filter limit the flow but there are proper oil pressure indication it is possible that aircraft engine has timely sufficient oil flow and pressure, however, such situation cannot be stable and is dangerous from the point of view of flight safety.

2.1.3. Human factors

Investigation shall indicate that according to Expert Conclusion No30 issued by National Forensic Expertise Center there was stated that in the pilot's blood it was condensed **0.51‰ (permils)** ethyl alcohol which could impress the physiological and psychological factors in complicated situation during emergency landing that could be considered as causal in this accident.

3. Conclusion

3.1. Findings

- **The findings during engine inspection reflect the cause of engine failure -** due to reduced lubricant (oil) supply **that resulted loss of engine power;**

- Because the loss of power occurred when the aircraft was on final approach to the landing area, at low airspeed performing U turn and low height the pilot didn't the pilot did not cope with piloting of the aircraft ;

- The oil filter "ROTAX" installed on the aircraft fire bulkhead was not in compliance with type certification of the Siemens/Bramo Sh 14 A4 engine;

- Due to the deflected (turned) position of the bushings the lubrication of the big end bearing (crankshaft) and small end bearing (piston) was interrupted as a result the engine had failed due to reduced lubricant (oil) supply;

- Piston #6 and spark plug #6 was covered with severe plague and corrosion;

- There was clear indication of presence the water inside the engine, the cause of water ingress is processing aircraft with water to secure of fire due to spilled fuel from damaged aircraft fuel tank;

- There was a noticeable amount of water in filter housing and were found metallic particles in the filter – mostly bronze colour;

- In the pilot's blood it was condensed **0.51‰ (permils)** ethyl alcohol;

- According to Law on Aviation a member of the civil aviation personnel is prohibited from performing his or her functions if he or she is under the influence of alcoholic substances and alcohol concentration in blood exceeds **0.2‰ (permils);**

- The pilot had valid PPL(A) licence and Medical Certificate

- The aircraft was serviced and maintained in accordance with existing directives;

- The accident occurred during the daylight time under visual flight conditions.

3.2. Causes

3.2.1. Direct cause

The probable direct cause of the accident the aircraft Bucher BU 133C “Jungmeister”, registration SE-AJA was the pilot's capability did not cope with piloting of the aircraft in complicated situation during emergency landing.

3.2.2. Root cause

- The root cause of the accident aircraft Bucher BU 133C “Jungmeister”, registration SE-AJA was engine failure due to reduced lubricant (oil) supply to engine oil system;

3.2.3. Contributing causes

Loss of power when the aircraft was on final approach to the landing area, at low airspeed and low height above uneven ground.

The pilot’s physiological and psychological factors in complicated situation during emergency landing

3.2.4. Safety initiatives during the investigation

During the course of the investigation the following safety actions were issued:

The German CAA (Luftfahrt-Bundesamt, LBA) issued Airworthiness Directive (AD) D-2019-003 based on the results of investigation findings.

Subject: ATA 71, 79 Powerplant/Lubrication System- Engine failure due to unapproved modification of the Engine Lubrication System-Inspection/Repair.

Required Actions:

1. The oil filters of the affected aircraft must be inspected. All installed oil filters must be in compliance with the type certification of the aircraft.
2. All oil filters which are not in compliance with the type certification of the aircraft must be replaced. Information about approved oil filters can be found in the declared manufacturer’s spare part list.

The necessary actions described must be performed before the next flight.

4. Safety Recommendations

Transport Accident Incident Investigation Bureau didn’t issue Safety Recommendations.

July 19, 2019 Riga

Investigator in charge: Visvaldis Trubs

Director of Aircraft Accident
and Incident Investigation Bureau Ivars Alfreds Gaveika

APPENDICES

Appendix1 Maintenance program

Sid. 1 av 3	**UNDERHÅLLSPROGRAM** **BILAGA 4 till AMP Bu 133C-AJA** **100-tim tillsyn / Årstillsyn**	G.TID FPL 346,7
Aonr.:		G.TID MOT 64,1
Dat. 17/3 08	**SE-AJA**	G.TID PROP 238,1

Ref: Technical Specification and Operating Instructions Bu-133 ; Instruction Manual Siemens Sh 14A

Important: Read all inspection requirements paragraphs prior to using these charts.

Arbeten att utföra	**Sign**	**Contr.**
Förberedelse	XXXXXX	XXXXXX
Kontrollera och notera eventuella anmärkningar		
Runddrag motorn 3 till 4 varv		
Starta och varmkör motorn och notera motorvärden		
Demontera motorkåpor		
Palla upp flygplanet på domkrafter med 30 kg barlast I aktern		
Propeller	XXXXXX	XXXXXX
Kontrollera propellern med avseende på skador och slitage		
Kontrollera propellertracking 100 mm in på bladet. Max kast 2 mm		
Momentdrag propellern och lås bultarna		
Kontrollera att propellernav sitter fast på axeln och inte är skadat		
Flygplanskrov	XXXXXX	XXXXXX
Kontrollera beklädnad för skador och kondition		
Kontrollera rörstomme för sprickor, deformationer och korrosion		
Kontrollera stringers och formlister för skador och montering		
Vid behov, öppna upp i bakkropp för närmare kontroll		
Kontrollera vindruta för sprickor, sikt och infästning		
Kabin	XXXXXX	XXXXXX
Kontrollera sittbrunn m.a.p. skador och infästning		
Kontrollera fastbindningsremmar för skador, infästning och låsning		
Kontrollera samtliga reglage m.a.p. infästning, rörlighet och säkring		
Vingar	XXXXXX	XXXXXX
Kontrollera beklädnadens kondition avseende skador, stenskott och målning		
Kontrollera spryglar, infästningar och spännstag för skador och montering		
Kontrollera anslutningar för skador och montering		
Kontrollera skevrodrens spryglar, beklädnad, anslutningar, lagringar, glapp och låsningar		
Kontrollera skevrodrens stötstänger och roderok för montering, skador och glapp		
Kontrollera trimplåtar för montering och skador		
Stjärtparti	XXXXXX	XXXXXX
Kontrollera beklädnad för skador, kondition och målning		
Kontrollera fena och sidroder m.a.p. skador i profilrör, lagringar och montering		
Kontrollera stbilisator och höjdroder m.a.p. skador i profilrör, lagringar och montering		
Styrverk	XXXXXX	XXXXXX
Kontrollera styrspak med lagringar, stötstänger,roderok, linor, montering och linspänning		

SANEMTS
Transporta nelaimes gadījumu un incidentu izmeklēšanas birojs
Datums: 08.08.2011
Nr. 260

Kontrollera pedalställ med lagringar, stötstänger, roderok, linor, montering och linspänning		
Landställ	XXXXXX	XXXXXX
Demontera hjulen och besiktiga fälgar och bultar för skador och korrosion		
Kontrollera landställsbeklädnad m.a.p. skador, montering och målning		
Demontera fjäderbenen och tappa ur oljan		
Tag ur fjädrar för kontroll av ev. fjäderbrott, fjäderlängd eller andra skador		
Återmontera fjädar, fyll på olja och återmontera fjäderbenen till landställen och lås anslutningar		
Kontrollera rengör hjullager, återinfetta och montera tillbaka lagren		
Kontrollera däckens förslitning, byt vid behov.		
Återmontera hjulen och kontrollera däckstryck		
Rengör och kontrollera bromsbeläggens förslitning, byt vid behov		
Kontrollera bromswirarna och justera bromsarna		
Funktionsprova bromsarna		
Kontrollera sporrställets infästning och besiktiga för skador		
Demontera sporrhjul och besiktiga däcksförslitning, hjullager. Byt vid behov		
Infetta och återmontera hjulet		
Bränslesystem	XXXXXX	XXXXXX
Kontrollera bensintanken m.a.p. skador, täthet och montering. Kontrollera tanken invändigt med lampa och spegel		
Kontrollera tankens mätdon m.a.p. montering och skador		
Kontrollera sugslangens rörlighet, kondition och genomföring samt täthet		
Demontera bränslefilter och besiktiga för föroreningar och skador. Rengör och återmontera filtret. Lås samt kontrollera tätheten.		
Besiktiga samtliga ledningar m.a.p. montering, skador och täthet		
Besiktiga handbränslepumpen m.a.p. funktion, skador och montering		
Instrumentering	XXXXXX	XXXXXX
Kontrollera instrumentbrädan m.a.p. montering, skador och upphängningsdämpare		
Besiktiga pitotröret m.a.p. skador renhet och montering		
Besiktiga statiskt uttag m.a.p. renhet och skador		
Kontrollera ledningar och anslutningar m.a.p. skador, montering och täthet		
Kontrollera höjd- och fartmätarens kalibreringstid		
Kontrollera samtliga instrument m.a.p. skador och montering		
Kontrollera att instrumentens gränsmarkeringar är läsbara		
Smörjning	XXXXXX	XXXXXX
Smörj flygplanet i enlighet med smörjschema		
Motor	XXXXXX	XXXXXX
Jorda magneterna och demontera magnetkablarna från tändstiften		
Kontrollera motorn utvändigt m.a.p. olje och bränsleläckage eller andra skador		
Tag ur ett stift ur varje cylinder och utför läckprov. Inmatningstryck 80 psi Cyl 1. 78 Cyl 2. 77 Cyl 3. 78 Cyl 4. 78 Cyl 5. 77 Cyl 6. 78 Cyl 7. 78		
Demontera övriga tändstift.		
Kontrollera vevhus och cylindrar m.a.p. färgskador och överhettning		
Tappa av oljan varm genom fin silduk		
Kontrollera oljan m.a.p. föroreningar		
Demontera, besiktiga och rengör oljefilter		
Kontrollera oljetank och ledningar m.a.p. skador, montering och täthet		
Kontrollera påfyllningssil		

Remove, inspect and clean oil filter

Avluftningsventil demonteras och funktionskontrolleras		
Påfyll ny olja enl. specifikation		
Vevhus	XXXXXX	XXXXXX
Kontrollera vevhuset m.a.p. skador samt att skruvar och muttrar ej lossnat		
Kontrollera främre delen av vevaxeln för sprickbildning och att vevaxeltätningen håller tätt		
Cylindrar	XXXXXX	XXXXXX
Kontrollera cylindrar med styrningar och ventiler m.a.p. skador och förslitning		
Kontrollera cylindertoppen m.a.p. sprickbildning		
Kontrollera att cylindermuttrar ej lossnat		
Kontrollera ventilfjädrar m.a.p. ventilfjäderbrott		
Kontrollera vipparmar m.a.p. skador och ventilspel. Ventilspel kall motor 0,2 mm		
Smörj samtliga vipparmar och stötstänger med vipparmsfett		
Kontrollera insugningsrör m.a.p. sprickor, deformationer, andra skador och montering		
Kontrollera avgassystemet m.a.p. sprickor, överhettning, skador och montering		
Bränslesystem	XXXXXX	XXXXXX
Kontrollera bränslepump och förgasare m.a.p. montering, tillstånd, skdor och täthet		
Kontrollera förgasarens inloppsfilter m.a.p. skador renhet och montering		
Kontrollera samtliga bränsleledningar m.a.p. montering, skador, genomföringar och täthet		
Tändsystem	XXXXXX	XXXXXX
Rengör tändstiften justera gap och prova stiften under tryck. Tändstiftgap 0,4 mm. Byt stift vid behov.		
Montera stiften och anslut tändkablarna.		
Kontrollera magneternas jordkablar och anslutningar		
Kontrollera magneternas montering och inställning till motorn		
Besiktiga och rengör brytarspetsarna		
Kontrollera brytarspelet. 0,3 – 0,4 mm		
Demontera fördelarlocket och kontrollera m.a.p. sprickor eller överslag		
Rengör och besiktiga fördelarrotor		
Smörj magneternas smörjpunkter		
Återmontera fördelarlocket		
Avslut	XXXXXX	XXXXXX
Kontrollera att alla berörda AD:n, SB:n är utförda		
Tag ned flygplanet från domkrafterna		
Återmontera samtliga motorplåtar och andra åtkomstluckor		
Varmkör motorn och kontrollera att inga bränsle eller oljeläckor förekommer		
Redovisa tillsynen i berörda journaler		

----SLUT----

Appendix2 Maintenance records

14

UNDERHÅLL - MODIFIERING *Maintenance - Alteration*

Datum *Date*	Gångtid *Time*: Efter grund-översyn *Since major overhaul*	Gångtid *Time*: Total *Total*	Luftvärdighetsdirektiv. Större inspektioner. Reparationer. Komponentbyten. Långtidskonserveringar. Översyner. Modifieringar. Lfv besiktn. *Airworthiness Directives. Major inspections. Repairs. Change of components. Preservations for long term storage. Overhauls. Alterations. The Authoritys inspections.*	Åtgärden utförd av *The action effected by*: Namnteckning *Signature*	Åtgärden utförd av *The action effected by*: Tillstånd MM-Nr *RSC/Licence No*
23.02.17	0	699:46	Engine Overhaul performed in accordance to the manuals See Work report EBA 47 0057 No: 31/2016 and EBA Release 09/2017	Bende. [illegible]	337400/6434
171205	62.1		100 tim tillsyn utförd	B.Olafsson	Benedikt Olafsson SE-4703160954

UNDERHÅLL - MODIFIERING
Maintenance - Modifications

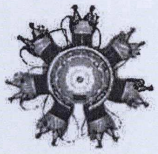
Datum *Date*	Total gångtid *Total time*	Periodiska tillsyner. Reparationer. Motor- Propeller- och andra komponentbyten. Långtidskonservering. Översyner. Modifieringar. Luftfartsstyrelsens besiktningar. *Periodically Inspections. Change of Engine, Propeller and other components. Preservation for long term storage. Overhauls. Modifications. Authority inspections.*	Åtgärden utförd av - *The action effected by*: Namnteckning *Signature*	Åtgärden utförd av - *The action effected by*: Underhållsinstans *Maintenance org.*
980212	415	Reparation av vänster vinge efter fågelkollision utförd enl. Ao nr 36 - 70	Nils Jönsson	SE-145-0000
990601	502	100 timmars tillsyn utförd enl. tillverkarens underhållsprogram P-00-100 EXEMPEL	R. Jacobsson	AUB 000
000715	598	100 timmars tillsyn utförd enl. tillverkarens underhållsprogram P-00-100	B. Mekman	SE- ....
170515	284.6	FÖR HOPMONT. EFTER MARKTRANSPORT. ÖVERSEDD MOTOR SH 14 A4 S/N 28-46. INST. NY EXT PROP E04 S/N 15521. NY BRANDSÄKRING HÖR AND 3417 S/N B74 1045 36. FÖR LÅST OCH NYA LÅCK HANDLINGAR UPPRÄTTADE. 100-TIM TILLSYN UTFÖRD	[illegible]	Alf Eriksson SE4707*91419
171205	346.7	100 Tim tillsyn(årstillsyn) utförd	B.Olafsson	Benedikt Olafsson SE-4703160954

Appendix 3

LTB Dirk Bende GmbH
LBA-Genehmigung: LBA.MF.0097

Order-Nr.: 31 / 2016

Königswinter, den 02.02.2017



Working Report

Manufactor: Brandenburgische Motoren GmbH	Incoming date: 10.01.2017
Model: SH 14 A4	
Serial-No.: 28446	Airplane Bücker 133C Jungmeister..
Owner: Hakan Wijkander	G-BZTJ

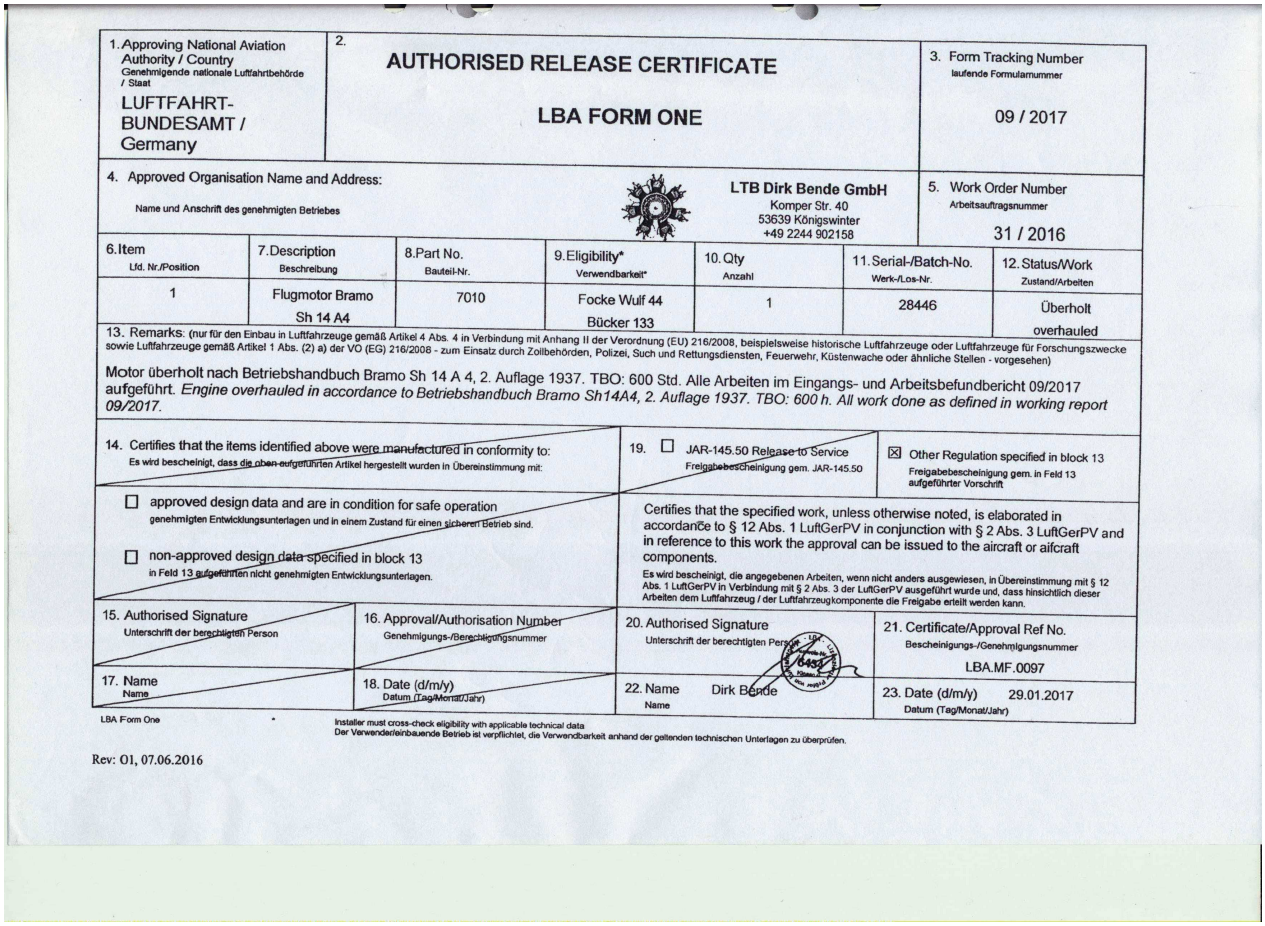
Befund:
(Äußerer Zustand, Fehlteile, Beanstandungen usw.)

Motor vom Kunden angeliefert,
Engine delivered by owner
Motor hat die TBO von 600 Std. erreicht – Grundüberholung ist durchzuführen
Engine has reached TBO – 600 h and has to be overhauled
Nach Rücksprache mit dem Kunden werden die Magnete, Benzinpumpe, Zylinder und Ansaugrohre vom Motor: SH 14 A4, Seriennr. 26477 montiert – auch diese Bauteile wurden grundüberholt.
After talking to the owner: Magnetos, fuelpump, cylinders and manifolds will be taken from engine SH 14 A43, Serialno. 26477 and mounted after overhaul.

Work done by			Checked by		
02.02.2017	Rüb		02.02.2017	Bende	
Date	Mechanic	Sign	Date	Inspector	Sign

REV: 002, 01.08.2016

Appendix 4 Release Cerificate to Service



1. Approving National Aviation Authority / Country Genehmigende nationale Luftfahrtbehörde / Staat	2. AUTHORISED RELEASE CERTIFICATE LBA FORM ONE	3. Form Tracking Number laufende Formularnummer
LUFTFAHRT-BUNDESAMT / Germany		09 / 2017

4. Approved Organisation Name and Address: Name und Anschrift des genehmigten Betriebes	5. Work Order Number Arbeitsauftragsnummer
LTB Dirk Bende GmbH Komper Str. 40 53639 Königswinter +49 2244 902158	31 / 2016

6. Item Lfd. Nr./Position	7. Description Beschreibung	8. Part No. Bauteil-Nr.	9. Eligibility* Verwendbarkeit*	10. Qty Anzahl	11. Serial-/Batch-No. Werk-/Los-Nr.	12. Status/Work Zustand/Arbeiten
1	Flugmotor Bramo Sh 14 A4	7010	Focke Wulf 44 Bücker 133	1	28446	Überholt overhauled

13. Remarks: (nur für den Einbau in Luftfahrzeuge gemäß Artikel 4 Abs. 4 in Verbindung mit Anhang II der Verordnung (EU) 216/2008, beispielsweise historische Luftfahrzeuge oder Luftfahrzeuge für Forschungszwecke sowie Luftfahrzeuge gemäß Artikel 1 Abs. (2) a) der VO (EG) 216/2008 - zum Einsatz durch Zollbehörden, Polizei, Such und Rettungsdiensten, Feuerwehr, Küstenwache oder ähnliche Stellen - vorgesehen)

Motor überholt nach Betriebshandbuch Bramo Sh 14 A 4, 2. Auflage 1937. TBO: 600 Std. Alle Arbeiten im Eingangs- und Arbeitsbefundbericht 09/2017 aufgeführt. *Engine overhauled in accordance to Betriebshandbuch Bramo Sh14A4, 2. Auflage 1937. TBO: 600 h. All work done as defined in working report 09/2017.*

14. Certifies that the items identified above were manufactured in conformity to: Es wird bescheinigt, dass die oben aufgeführten Artikel hergestellt wurden in Übereinstimmung mit:	19. ☐ JAR-145.50 Release to Service Freigabebescheinigung gem. JAR-145.50	☒ Other Regulation specified in block 13 Freigabebescheinigung gem. in Feld 13 aufgeführter Vorschrift
☐ approved design data and are in condition for safe operation genehmigten Entwicklungsunterlagen und in einem Zustand für einen sicheren Betrieb sind. ☐ non-approved design data specified in block 13 in Feld 13 aufgeführten nicht genehmigten Entwicklungsunterlagen.	Certifies that the specified work, unless otherwise noted, is elaborated in accordance to § 12 Abs. 1 LuftGerPV in conjunction with § 2 Abs. 3 LuftGerPV and in reference to this work the approval can be issued to the aircraft or aifcraft components. Es wird bescheinigt, die angegebenen Arbeiten, wenn nicht anders ausgewiesen, in Übereinstimmung mit § 12 Abs. 1 LuftGerPV in Verbindung mit § 2 Abs. 3 der LuftGerPV ausgeführt wurde und, dass hinsichtlich dieser Arbeiten dem Luftfahrzeug / der Luftfahrzeugkomponente die Freigabe erteilt werden kann.	

15. Authorised Signature Unterschrift der berechtigten Person	16. Approval/Authorisation Number Genehmigungs-/Berechtigungsnummer	20. Authorised Signature Unterschrift der berechtigten Person	21. Certificate/Approval Ref No. Bescheinigungs-/Genehmigungsnummer
17. Name Name	18. Date (d/m/y) Datum (Tag/Monat/Jahr)	22. Name Name Dirk Bende	23. Date (d/m/y) Datum (Tag/Monat/Jahr) 29.01.2017

LBA Form One

Installer must cross-check eligibility with applicable technical data
Der Verwender/einbauende Betrieb ist verpflichtet, die Verwendbarkeit anhand der geltenden technischen Unterlagen zu überprüfen.

Rev: 01, 07.06.2016

Appendix 5 Airworthiness Directive

Airworthiness Directive

D-2019-003

Luftfahrt-Bundesamt
- Sektion T23 –
Airworthiness Directives
38144 Braunschweig
- G E R M A N Y -
Fax: +49-531-2355-5298
email: ad@LBA.de

BÜCKER

Effective Date: 11.01.2019

Applicability:

Kind of aeronautical product:	Airplane
TC-Holder	Bücker Flugzeugbau GmbH
Manufacturer:	Bücker Flugzeugbau GmbH, Dornier (Switzerland), Josef Bitz, Wolf Hirth,
Type:	Bücker Bü 133,
Models:	All Bü 133 C "Jungmeister" Models
Serial Numbers:	This Airworthiness Directive is addressed to all aircraft of the mentioned Type/Model on which the radial engine model SIEMENS/BRAMO Sh 14 A 4 is installed.
Type Certificate No.:	582

Revision Status:
Initial Issue

Airworthiness Directive of Foreign Authority:
-none-

Subject:
(ATA 71, 79) Powerplant / Lubrication System - Engine failure due to unapproved modification of the Engine Lubrication System - Inspection / Repair

During an accident investigation of a Bücker 133 "Jungmeister" an oil filter installed on the fire bulkhead has been detected which was not in compliance with type certification of the SIEMENS/BRAMO Sh 14 A4 engine.
Measurements in the unapproved modified lubrication system have shown that the oil flow rate was significantly below the manufacturer specifications. Based on these findings, it was established that the engine had failed due to reduced rate of lubricant supply.

Since further unapproved modification of the engine lubrication system in other aircraft of this type cannot be ruled out, the Luftfahrt-Bundesamt has decided an investigation of all affected aircraft.

Required Action(s) and Compliance Time(s):
In the scope of this Airworthiness Directive the following actions must be performed:

(1) The oil filters of the affected aircraft must be inspected. All installed oil filters must be in compliance with the type certification of the aircraft.

(2) All oil filters which are not in compliance with the type certification of the aircraft must be replaced. Information about approved oil filters can be found in the declared manufacturer's spare parts list.

The necessary actions described must be performed before the next flight.

Related Technical Dokuments:
Note: The application of the following editions or revisions of the mentioned related documents is admitted, if, in accordance with the Airworthiness Directive of the foreign authority, explicitely permitted or if approved by the foreign authority with regard to the referenced Airworthiness Directive.

BRAMO-Werke Sh 14 A4 Betriebsvorschriften (Operating Regulations), issue September 1936
BRAMO-Werke Sh 14 A4 Werkzeuge und Zubehör (Tools and Accessories), issue February 1937
Bücker Bü 133 C Baubeschreibung (Aircraft Specifications), issue January 1937
Bücker Bü 133 C Ersatzteilliste (Parts Catalogue), issue March 1938