



FINAL REPORT

SERIOUS INCIDENT

Occurrence No.: 1709/17

Aircraft: Piper P-32R-301T, OH-IJO

21 July, 2017

EPGD

This Report is a document presenting the position of the State Commission on Aircraft Accidents Investigation concerning circumstances of the air occurrence, its causes and safety recommendations.

The Report was drawn up on the basis of information available on the date of its completion.

The investigation process can not be considered as finally closed. The investigation may be reopened if new information becomes available or new investigation techniques are applied, which may affect the wording related to the causes, circumstances and safety recommendations contained in the Report.

Investigations into air occurrences are carried out in accordance with the applicable international, European Union and domestic legal provisions for prevention purposes only.

The investigation was carried out without the need of application of the legal evidential procedures, applicable for proceedings of other authorities required to take action in connection with an air occurrence.

The Commission does not apportion blame or liability.

In accordance with Article 5 paragraph 5 of the Regulation (EU) No 996/2010 of the European Parliament and of the Council on the investigation and prevention of accidents and incidents in civil aviation [...] and Article 134 of the Act – Aviation Law, the wording used in this Report may not be considered as an indication of the guilty or responsible for the occurrence.

For the above reasons, any use of this Report for any purpose other than air accidents and incidents prevention, can lead to wrong conclusions and interpretations.

This Report was drawn up in the Polish language. Other language versions may be drawn up for information purposes only.

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¹ The format of this report does not exactly follow format given in ICAO Annex 13.

GENERAL INFORMATION

Occurrence reference number:	1709/17			
Type of occurrence :	SERIOUS INCIDENT			
Date of occurrence:	21 July, 2017			
Place of occurrence	EPGD aerodrome			
Type and model of aircraft:	Piper PA-32R-301T Turbo Saratoga aeroplane			
Aircraft registration marks:	OH-IJO			
Aircraft User/Operator:	Private			
Aircraft Commander:	PPL(A)			
Number of victims/injuries	Fatal	Serious	Minor	None
	-	-	-	3
Investigator-in-Charge:	Andrzej Bartosiewicz			
Investigating authority:	State Commission on Aircraft Accidents Investigation (SCAAI)			
Composition of the Investigation Team:	Not appointed			
Document containing results:	SCAAI Final Report			
Recommendations:	None			
Addressees of the recommendations:	Not applicable			
Date of completion of the investigation:	TBD			

SYNOPSIS

On 21 July, 2017, at approximately 11:00 hrs UTC, a crew of Piper PA-32R airplane performing a flight from EPWR to EFHF reported smoke in the cockpit. The crew did not declare EMERGENCY and decided to continue the flight to EPGD, where they landed on RWY 11 at 13:51 hrs UTC and then taxied in TWY L. Smoke and flame were coming out of the engine during taxiing. When the airplane came to rest the crew and a passenger left it, the Airport Fire Brigade extinguished the fire and then the plane was pushed to the grassy sector of the aerodrome in the area of Apron 1. No person involved in the flight suffered any injuries. As a result of the fire, the engine compartment and the engine of the airplane sustained damage. The direct cause of the fire was burnout of an oil hose, which touched the engine exhaust manifold.

1. FACTUAL INFORMATION

1.1. History of the flight, analysis of circumstances and course of occurrence

On 21 July 2017, at approximately 11:00 hrs UTC GAT ACC EPWW BD sector received a notification about smoke in the cockpit from a Piper PA-32R-301T Turbo Saratoga crew. The crew was flying in accordance with IFR/VFR from EPWR to EFHF and at that time was near TUPUR waypoint on FL100. The crew confirmed no intention to declare EMERGENCY and asked for information about nearest aerodromes.

Having received information about EPPO and EPSC, the crew reported their intention to continue the flight towards EPGD, stating that the aircraft was under control. The crew received clearance to perform the flight directly to EPGD. After reaching the sector boundary, the aircraft was transferred to EPGD APP and then to EPGD TWR. The crew did not declare EMERGENCY and did not request fire brigade. Around 13:20 hrs UTC EPGD TWR informed the aerodrome services about the airplane approaching and the situation on its board.

The plane landed on EPGD RWY 11 at 11:51 hrs UTC, then it taxied via TWY F and then TWY L, where 5 units of firemen were waiting for him. During the taxiing, smoke and flames coming out from the plane's engine were visible. When the airplane came to rest, the crew and the passenger left it unaided and the firemen extinguished the fire (details are given in section 1.14). Then the airplane was pushed to the grassy sector of the aerodrome near Apron 1.

No person involved in the flight was injured. As a result of the fire the engine, its components and compartment sustained damage. The cause of the fire was burnout of the engine oil hose, which led to ignition of leaking oil. Burnout of the oil hose was caused by its direct contact with the engine exhaust manifold, caused by improper mounting of the hose and lack of its heat shield.

1.2. Injuries to persons

Injuries	Crew	Passengers	Others
None	2	1	-

1.3. Damage to aircraft

All damage to the aircraft was caused by the fire of the oil leaking from the melted hose in the engine compartment. The engine compartment, its fairings, hoses and components mounted on the engine were damaged.



Fig.1. Damage to the engine compartment – general view

1.4. Other damage

None.

1.5. Personnel information (crew data)

Pilot flying - male, aged 37, Finnish citizen, holder of PPL(A) issued 24 Feb 2017, valid until 31 Oct 2018, last 2/LAPL medical examination effected 28 Feb 2015, valid until 28 Feb 2020, total flight time approx. 370 h on SEP(L), on the incident type 15 h, flight time on the occurrence day approx. 3 h, last flight prior to the occurrence – 19 Jul 2017 – over 5 h.

Pilot monitoring - male, aged 58, Finnish citizen, holder of PPL(A) and ATPL (frozen), last medical examination effected 14 Sep 2016, valid until 12 Sep 2017, total flight time approx. 7100 h on SEP(L), on the incident type 300 h, last OPC effected 6 Feb 2017.

1.6. Aircraft information

Airframe: single engine, six-seat, cantilever low wing all-metal aeroplane equipped with a tricycle retractable landing gear with a nose wheel.

Manufacturer	Piper Aircraft Corporation
Type	PA-32R-301T
Serial No	32R-8229035
Year of manufacture	1982
Engine	1/ TIO-540 / piston
Certificate of Airworthiness	issued 1 Sep 2011/ valid ---
Airworthiness Review Certificate	valid until 31 Mar 2018
Certificate of Registration	issued 1 Sep 2011
Airframe total flight time since new	2608 h
Airframe flight time since last repair or check	9 h
Flight time to next repair or inspection	41 h
Date of last periodic operations	14 Jul 2017
– type of operation	yearly check/”100h”;
– after total flight time	2599 h
– effected by	maintenance organization – Finland.

The aircraft was purchased by the current owner in 2011 (the former State of registration was UK). After the purchase, the aircraft was inspected in the Finnish PART 145 organization and received a Finnish CofA. Since then, the aircraft has been regularly serviced by certified PART 145 organizations in Finland. In 2014 during maintenance works all flexible hoses on the aircraft were replaced, including the oil hose which was melted/burned out during the incident. Most likely on that occasion the new oil hose was installed incorrectly. However, it has not been determined when and in what circumstances the heat shield of the exhaust manifold (P/N 38469-002) was removed.

After the occurrence the aircraft owner received a confirmation from the aircraft manufacturer that prior to the incident the oil hose had been installed incorrectly and that the heat shield should have been installed.

Mech compl Ref: PN:		SN:32R-8229035						
Job: 25 AD86-26-02 - Moottorin ilmansuodattimen vaihto				Action taken	Tehty	Sign:	MS	Hrs:
Ata: 0				Hours-estimated: 0.00	used:	Sign:	Removed: p/n	S/N:
				Installed: p/n	S/N:	Mech	Insp.	Date:
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Job: 26 RH MLG ulkorenkaan vaihto				Action taken	tehdetty	Sign:	MS	Hrs:
Ata: 0				Hours-estimated: 0.00	used:	Sign:	Removed: p/n	S/N:
				Installed: p/n	S/N:	Mech	Insp.	Date:
Mech compl Ref: PN:		SN:32R-8229035						
Job: 27 MM 761-719 - Moottorin ilmansuodattimen vaihto				Action taken	Tehty	Sign:	MS	Hrs:
Ata: 0				Hours-estimated: 0.00	used:	Sign:	Removed: p/n	S/N:
				Installed: p/n	S/N:	Mech	Insp.	Date:
Mech compl Ref: PN:		SN:32R-8229035						
Job: 28 M3125 - Kierroslukumittarin tarkastus				Action taken	tehty	Sign:		Hrs:
Ata: 0				Hours-estimated: 0.00	used:	Sign:	Removed: p/n	S/N:
				Installed: p/n	S/N:	Mech	Insp.	Date:

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Fig. 2. Task card for maintenance after 100 flight hours which was effected in 2014. The task "replacement of flexible hose in the engine compartment" (*Moottorin ilmansuodattimen vaihto*) and confirmation of its execution "Done" (*Tehty*) are marked with red ellipses.

1.7. Meteorological information

METAR and TAF for EPGD at the incident time were as follow:

METAR EPGD 211200Z 09010KT9999 OVC02015/13 0.1014=;
TAF EPGD 211130Z 2112/2212 09008KT 9999 BKN020 TEMPO 2112/2116 3000 SHRA BKN015CB=.

1.8. Aids to navigation

During the flight ground and airborne navigational aids were operative.

1.9. Communications

During the flight ground and airborne communication means were operative and ensured two-way radio communication between the crew and ground services.

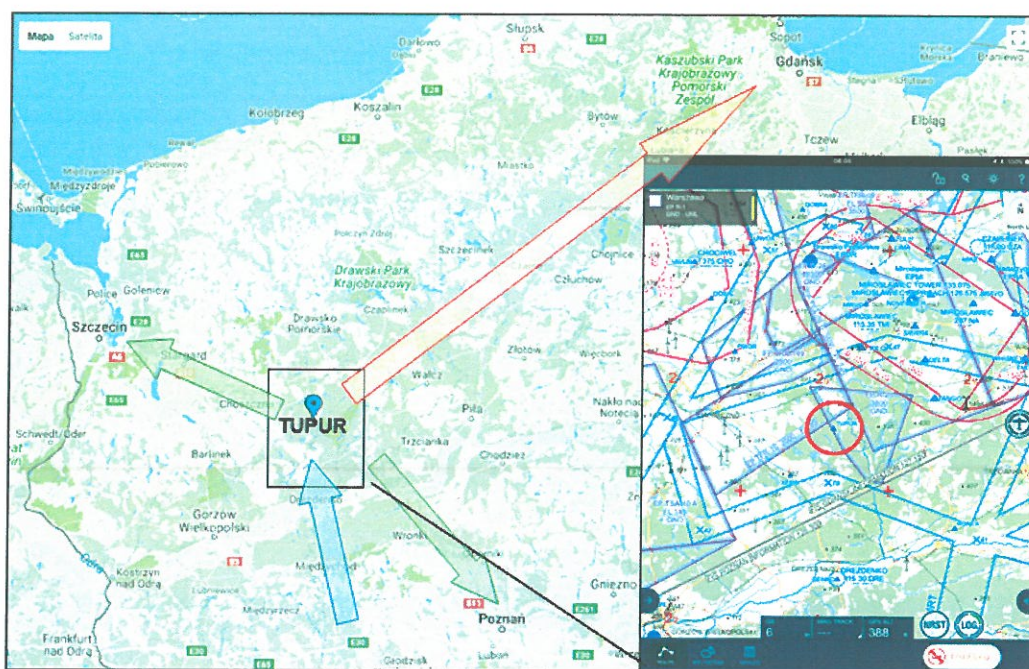


Fig. 3. TUPUR waypoint is the place, where the crew informed EPWW ACC about situation on board. The blue arrow shows the direction of the airplane arrival. The green arrows show the nearest aerodromes indicated by ATC, the red one shows the crew choice.

1.10. Place of occurrence information

The smoke in the cockpit appeared when the airplane was near TUPUR waypoint. The aircraft landed at EPGD aerodrome (54° 22' 48" N, 18° 27' 34" E), where the fire in the engine compartment broke out.

1.11. Flight recorders – none.

1.12. Wreckage and impact information – not applicable.

1.13. Medical and pathological information – no injuries.

1.14. Fire

The course of the fire-fighting operation was drawn up based on aerodrome fire brigade report.

Timing of the firefighting operation:

- | | |
|-----------------------------|------------------------|
| - observation | 13:20 hrs ² |
| - notification to the unit | 13:45 hrs |
| - arrival of the first unit | 13:53 hrs |
| - localization | 14:00 hrs |

² All times in this subparagraph are given in LMT

- removal 14:15 hrs
- return of the last unit 14:30 hrs
- total time of the action 45 min.

Forces and resources involved in the operation:

- aerodrome fire brigade: vehicles - 5 persons - 8
- Border Guard: vehicles - 2 persons - 4
- Police: vehicles - 1 persons - 2
- Airport Protection Service: vehicles - 4 persons - 7

Equipment used for fire-fighting:

- Fire-fighting units:
 - o heavy duty firefighting vehicles - 3
 - o operational cars - 1
 - o medical rescue vehicle -1
- Other units:
 - o passenger cars - 3.

Type of actions effected:

- delivery of extinguishing agents
- cooling of facilities, devices, etc.
- securing the place of occurrence
- moving structure elements, devices, machines
- identification of hazard zones.

Extinguishing agents and water used:

- powder – 75 kg
- water - 2 cubic metres.

Course of the firefighting operations

When the airplane touched down and was taxiing on RWY 11 and TWY F, flames from the engine compartment and smoke obscuring the cockpit were seen. The door to the cockpit was opened. When the aircraft came to rest on TWY L the crew and the passenger left the cockpit immediately and unaided.

The occurrence place was secured. Initially the extinguishing powder from an extinguisher was applied to the engine compartment. At the same time a water and a powder firefighting lines were deployed to cool the aircraft cockpit and to be ready to apply more powder if needed. The lines were deployed from the GCBA Pr 5,5/50/150 car.

Action with a powder extinguisher did not suppress the fire in the engine compartment and only a powder stream applied from the car allowed to extinguish the fire completely. After opening the engine fairings the powder extinguishing stream was applied again to complete the firefighting action. At the same time the water extinguishing stream was applied to cool the cockpit. After extinguishing the fire and consultations with the airport duty officer and the owner the plane was moved from TWY L to a safe position not creating hazard to other aircraft, where the engine was cooled with water stream. The activities were completed at 14:29 hrs and one unit was left at the scene to secure the aircraft.



Fig. 4. Firefighting action on EPGD

1.15. Survival aspects

The crew and the passenger suffered no injuries and left the aircraft unaided.

1.16. Tests and research

A visual inspection of the aircraft at the scene was carried out. As a result of the engine compartment examination it was unambiguously established that the source of the fire

was engine oil leaking from the damaged hose (the nature of the damage is shown in Fig. 5).

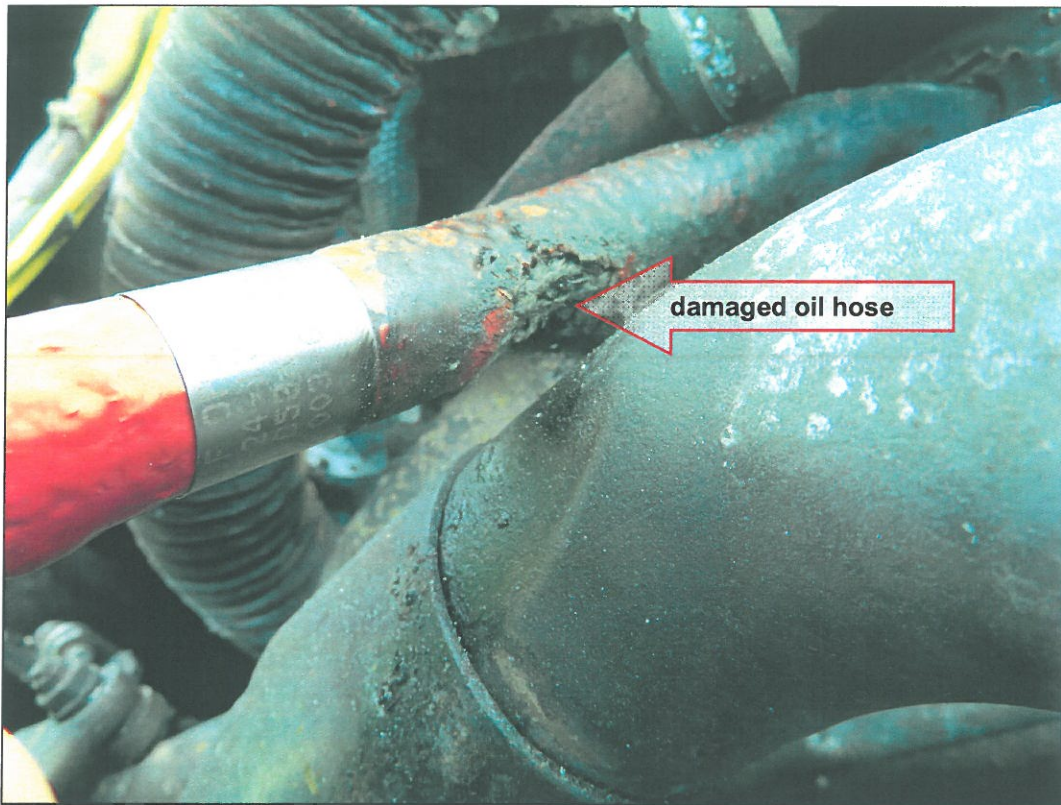


Fig. 5. Engine compartment with marked damage to the oil hose

The aircraft maintenance documentation was analyzed and it was found that shortly before the incident the airplane successfully passed yearly/"100h" inspection in a certified maintenance organization.

A "100h" inspection includes, among others, check of oil hoses and their connectors for leakage, protection, abrasions, dents and cracks. Fig. 6 shows the engine compartment during the inspection mentioned above. It clearly visible that the oil hose was located in immediate vicinity of the exhaust manifold and that the heat shield was not installed on the manifold.

The aircraft was released for flight with the oil hose improperly installed and without the heat shield on the manifold (correctly installed hose with the heat shield installed on the manifold is shown in Fig. 7).

The last replacement of the engine oil hoses was effected in January 2014 by a certified maintenance organization.

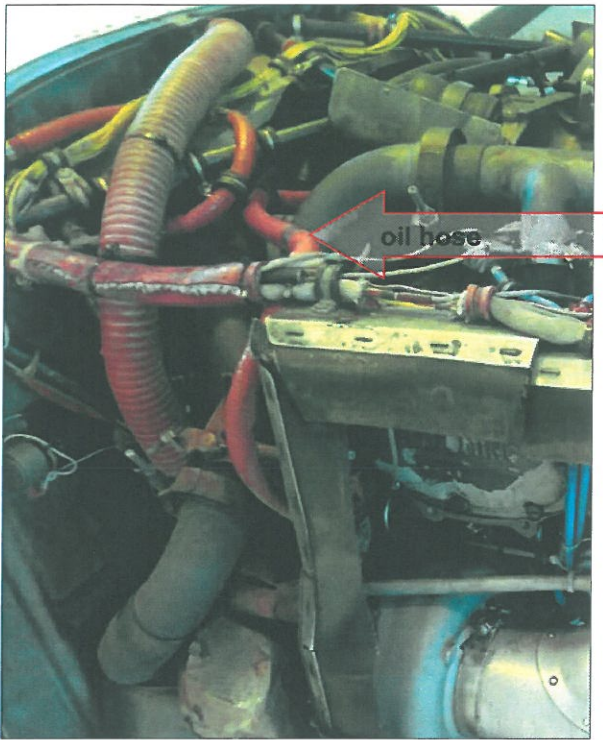


Fig. 6. Engine with the oil hose installed over the exhaust manifold (incorrect installation)

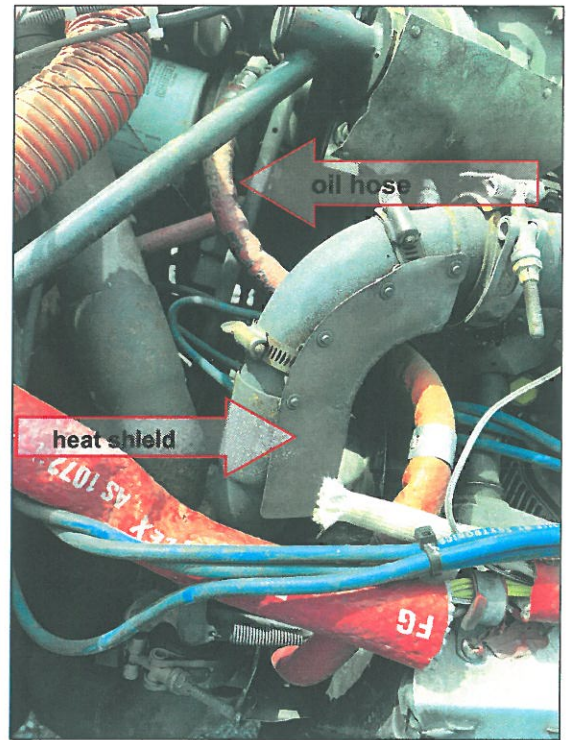


Fig. 7. Engine with the oil hose installed under the exhaust manifold and the heat shield (correct installation)

1.17. Organizational and management information – not applicable

1.18. Additional information - none

1.19. Useful or effective investigation techniques

Standard investigation techniques were applied during the investigation.

2. CONCLUSIONS

2.1. Commission findings

1. The flight crew had required authorizations to perform the flight and valid aero-medical assessments.
2. Weather had no impact on the incident occurrence.
3. In 2014 all flexible hoses in the aircraft engine compartment were replaced.
4. During the replacement of hoses in the engine compartment, one of them was installed incorrectly – it was the hose which was burned out during the occurrence.
5. For over 3 years the airplane was flying with the engine oil system hose installed incorrectly.

6. The airplane was regularly inspected by certified maintenance organizations.
7. None of the organizations servicing the aircraft after 2014 noticed the oil system hose installed incorrectly and the lack of the heat shield.
8. Immediately prior to arrival to Poland, the aircraft underwent an annual/"100h" periodic operation.
9. When the smoke appeared in the cockpit, the crew made decision to continue the flight to EPGD.
10. During taxiing in EPGD a fire broke out in the engine compartment.
11. The firefighting operation was carried out immediately after the airplane vacating RWY11 and coming to rest.
12. None of the persons on board was injured.

2.2. Causes of the serious incident

1. Incorrect installation of the hose of the engine oil system.
2. Lack of the heat shield on the exhaust manifold.
3. Lack of reaction to the lack of the heat shield and improperly installed oil hose from the organizations servicing the aircraft.

2.3. Factor contributing to the occurrence:

The crew decision to continue the flight to EPGD instead of to the nearest active aerodrome.

3. SAFETY RECOMMENDATIONS

After conclusion of the investigation SCAAI has not formulated safety recommendations.

THE END

Investigator-in-Charge

CZŁONEK
Państwowej Komisji
Badania Wypadków Lotniczych


mgr inż. Andrzej Bartosiewicz