STATE COMMISSION ON AIRCRAFT ACCIDENTS INVESTIGATION

Warsaw, 15 October, 2014

Air occurrence reference No:
764/13

FINAL REPORT

on investigation into air occurrence to aircraft of a maximum mass equal to or below 2250 kg[1]

This Report is a document presenting the position of the State Commission on Aircraft Accident Investigation concerning circumstances of the air occurrence, its causes and safety recommendations. The Report is the result of the investigation carried out in accordance with the applicable domestic and international legal provisions for prevention purposes only. The investigation was conducted without the need of application of the legal evidential procedure. In connection with the provisions 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 repealing Directive 94/56/EC (EU Journal of Laws L. 2010.295.35), the wording used in this Report may not be considered as an indication of the person guilty or responsible for the occurrence. The Commission does not apportion blame or liability. In connection with the above, any form of use of this Report for any purpose other than air accidents and serious 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.

Warsaw 2014

[1] *Form and scope of this Report are not in full accordance with the guidance contained in Appendix „Format of the Final Report" to Annex 13 to the Convention on International Civil Aviation*

1. **Type of occurrence:** ACCIDENT.

2. **Investigation conducted by:** SCAAI Investigating Team.

3. **Date and the local time of the occurrence:** 8 June, 2013, 13:45 hrs LMT.

4. **Point of departure and point of intended landing:**
   Toruń (EPTO) aerodrome – Żerniki (EPZE) landing field[2]**.**

5. **Place of the occurrence:** EPZE.

6. **Aircraft:** airplane
   Type: Piper PA28 RT-201 (PA28R)[3]
   Registration marks: PH-ANF;
   Aircraft owner/operator: Kingdom of the Netherlands Aero Club;
   Damage description:[4]

   - *left wing – leading edge tip*

   - *left wing skin*

[2] *Instead of "Żerniki (EPZE) landing field" only ICAO designator: "EPZE" will be used in the following part of the Report.*
[3] *Instead of „Piper PA28 RT-201"only „PA28R" will be used in the following part of the Report.*
[4] *All photos by SCAAI unless otherwise indicated*

left wing – area close to the fuselage

- *main landing gear – left strut broken*

- *propeller*

- *skin of the lower tail part and rudder*

Airplane manufacturer: Piper Aircraft Corporation;

Airframe serial number: 28R-8018004;

Year of manufacture: 1980;

Engine: Lycoming: IO-360 – C1C6 (L-1786-51A);

Propeller: McCauley 2D34C215/90DJA-14E (805107);

Registration Certificate: issued 5 September, 2012;

Airworthiness Certificate: valid until 15 March, 2014;

Aircraft Radio Licence: valid until 6 September 2022;

Third Party Liability Insurance Certificate: valid until 7 January, 2014;

Airframe total flight time since new: 7140 hrs 51 min.

7. **Type of operation:** en-route flight to another aerodrome.
8. **Phase of flight:** landing/landing roll.
9. **Flight conditions:** VFR, VMC, daylight.
10. **Weather factors:**

Aviation forecast of weather for 08 June 2013 (06.00 hrs-18.00 hrs UTC). The weather in the region was formed by a high pressure from the North Sea. Advection: NW at a speed of about 15 km/h, warm and humid air mass of tropical origin of the stable equilibrium changing into unstable equilibrium during the day. Cloud cover: 3-6/8 Ci, Ac, Sc, Cu, during the day isolated Cb. Base: from 2000 to 3300 feet. Visibility: 6-10 km. Phenomena: in the morning mist gradually disappearing, afternoon possible showers. Locally isolated thunderstorms at the base of 2000-1500 feet limiting visibility from 6000 to 3000 meters. Moderate to heavy icing in the Cb, moderate to strong turbulence within Cb range, wind shear and gusts up to 30 knots. Wind: VRB from 3 to 8 knots. Temperature: 24 to 26 °C.

A few minutes before the landing there was a heavy rainfall resulting in wet runway with the local puddles.

Wet runway surface with puddles could have affected braking efficiency**.**

11. **EPZE landing field information:**

11.1. Geographical coordinates: 52° 19' 21.0" N , 017° 02' 27.1"E.

Elevation: 79,5 m (260 ft) AMSL;

Designed for takeoffs and landings, day and night for airplanes and helicopters with a maximum take-off mass equal to or below 5700 kg;

Runway direction: GEO: 239° - 059° (MAG: 235° - 055°);

Grass runway dimensions: length - 618 m (2027 ft), width - 50 m (164 ft);

Concrete (paving blocks) runway dimensions: length - 618 m (2027 ft), width - 18 m (59 ft);

Aids to navigation: none;

The runway has a 50-meter long, illuminated stop way.

11.2. Flight procedures:

EPZE landing field is located within the MATZ/MCTR of Krzesiny (EPKS) military airbase. Prior to any flight operation from EPZE AUP/UUP should be referred to regarding EPKS MATZ/MCTR activities, or the relevant information on classification and occupancy of the above airspace should be obtained from the EPKS ATS Reporting Office or FIS Poznań.

Before entering the MATZ/MCTR any aircraft arriving at EPZE must receive ATIS broadcast (128,725 MHz) and establish communication with EPKS TWR. Entering the MATZ/MTCR may occur only through specified waypoints (MIKE KILO, ZULU, ECHO or SIERRA). Crossing the MATZ/MCTR boundary and an approach to Runway

06 or Runway 24 at EPZE may be performed only after receiving clearance from EPKS air traffic controller.

Due to TMA airspace, VFR flights within EPKS MATZ/MTCR may be performed only at an altitude 1500 ft QNH or lower (it is possible that EPKS TWR controller issues a clearance for a lower altitude). An approach to the Runway 06 and Runway 24 is to be performed only from the southern traffic circuit. Particular attention should be paid when approaching to the Runway 06 due to high obstacles and an expressway located in front of the runway threshold.

11.3. Landing field location:

The EPZE landing field is a "difficult" one due to the length of its runway, even if it is hardened with a concrete paving blocks. However, as shown in analysis in the section 16.4 of this Report, the occurrences which took place at this landing field were caused by "human factor" and not by the landing field infrastructure. The length of the Runway 24 is limited by a scarp at the end, which is located in close proximity of the S11 expressway.

S11 expressway – photo taken from the scarp at the end of the Runway 24

Acquisition of the land adjacent to the landing field is recommended. This would allow to extend the Runway 24 length and improve the safety of flight operations.

Approach area at the direction of 239 degrees.

12. **Flight organizer:** private.

13. **Aircraft Commander data:**

Pilot, PPL(A), male, aged 57;
Total flight time: 611 hrs;
Flight time on P28R: 195 hrs;
PPL valid until 15 February 2015;
Ratings: SEP(L) valid until 1 January 2014;
Class 2 Aero - Medical Certificate: valid until 10 March 2014; limitations: AGL, VML, REV.

Summary of the last 10 flights of the PA28R pilot.

No	Date	Aircraft	Route	Flight time
1.	24 May 2013	P28R PHANF	EHRD - EHMZ	40 min
2.	27 October 2012	P28A PHSVP	EHRD - EHRD	55 min
3.	08 December 2012	P28A PHSRP	EHRD - EHRD	55 min
4.	01 June 2013	P28R PHANF	EDBK - EDAV	40 min
5.	02 June 2013	P28R PHANF	EDAV - EDAV	25 min
6.	03 June 2013	P28R PHANF	EDAV - EPBY	1 h 35 min
7.	04 June 2013	P28R PHANF	EYKS - EVRS	1 h 40 min
8.	06 June 2013	P28R PHANF	EVRS - EYPA	1 h 30 min
9.	07 June 2013	P28R PHANF	EPKE - EPTO	1 h 10 min
10.	08 June 2013	P28R PHANF	EPTO - EPZE	50 min

14. **Injuries to the crew and passengers:** None.

15. **Fire:** Fire did not occur.

16. **Survival aspects:**

The pilot and a passenger left the airplane unaided.

16.1. Significant involvement of EPKS Controller should be emphasized. Even though the airplane was a civilian one and it was to land on the civilian landing field the Controller still felt the obligation to provide it with alerting service. Since the Controller did not receive information about PA28R landing, he commenced the search action in order to obtain information about the aircraft situation. After receiving information about the accident the Controller proposed assistance of specialized rescue units from EPKS.

16.2. The aircraft was equipped with an Emergency Locator Transmitter (ELT). Its signals were received by the COSPAS-SARSAT system (messages No. 02764 and No. 02765).

17. **Course and analysis of the occurrence:**

17.1. Course of the occurrence:

On the day of the occurrence three airplanes, among them PA28R, performed flights from EPTO aerodrome to the EPZE landing field. PA28R performed the flight as the second one. According to the applicable procedures of the EPKS MATZ/MCTR the aircraft

reported successively to the EPKS TWR in the area of “KILO” waypoint in order to obtain clearance for a flight through the MATZ/MCTR.

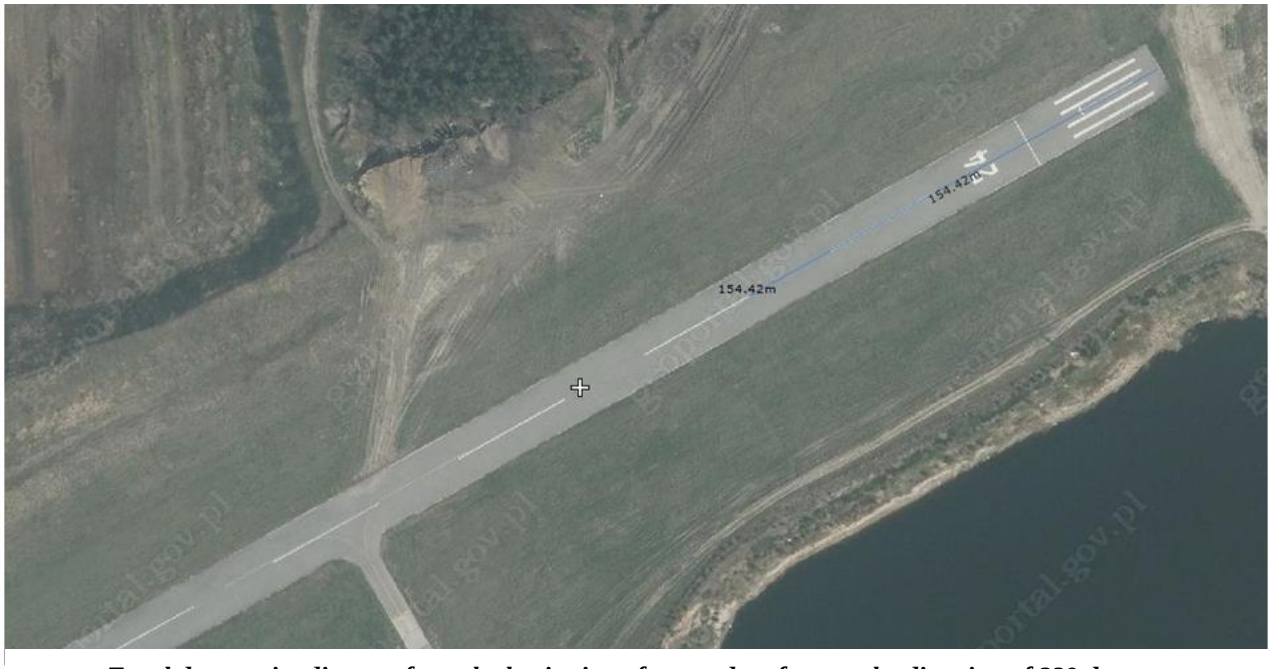
The pilot of the first airplane asked EPKS Controller about rain at the aerodrome and was informed that at that time it was not raining at the EPKS. The same pilot informed EPKS TWR that he observed rainfall between his current position and EPZE. A few seconds after the last correspondence related to the rain another pilot, who took off from EPZE informed about a storm over the landing field and water on the runway, which in his opinion could have remained there a few minutes.

At 13:35 hrs the PA28R pilot as the second one established communication with EPKS TWR. At that time he was 3 NM from “KILO” waypoint. PA28R pilot received clearance to continue a VFR flight within EPKS MATZ/MCTR at an altitude not higher than 1500 feet QNH. After passage of the “KILO" waypoint PA28R pilot reported that fact and asked EPKS Controller about wind direction and speed at EPKS. He received the required information (140 degrees, 4 knots). Then the PA28R pilot informed EPKS Controller about the EPZE landing field in sight. Next EPKS Controller informed PA28R pilot about current wind direction and speed at EPKS (150 degrees, 3 knots) and asked him for reporting on landing.

Then the third airplane approaching “KILO” established communication with the EPKS TWR. When the last of the three airplanes reported its position on final, EPKS TWR Controller asked PA-28R pilot for his current position. Due to lack of response from the PA-28R pilot the Controller asked a pilot waiting for take off at EPZE about PA-28R. The pilot promised to provide him with some information. EPKS Controller was still trying to establish communication with PA-28R. One of the pilots informed him about a possible crash of PA28R. Then the pilot who promised information, informed the Controller that PA28R rolled off the runway and that the pilot and the passenger left the aircraft unaided without any injury.

17.2. Analysis of the final approach.

A few minutes before the landing there was a heavy rainfall at the landing field resulting in wet runway with the local puddles. After entering the EPZE area the pilot began landing approach procedure by performing a turn on the short approach. A short distance to the runway threshold resulted in lack of stabilization on the final and improper planning of the touchdown point. The touchdown occurred at the distance of about 100 meters from the Runway 24 threshold i.e. about 150 m from the beginning of a paved surface.



Touchdown point distance from the beginning of a paved surface on the direction of 239 degrees.

Touchdown point distance from the Runway 24 threshold

Final - distance of about 780 m from Runway 24 threshold (view from a cockpit)

Flight over the beginning of the paved surface (view from the landing field plane)

Flight over the beginning of the paved surface (view from a cockpit)

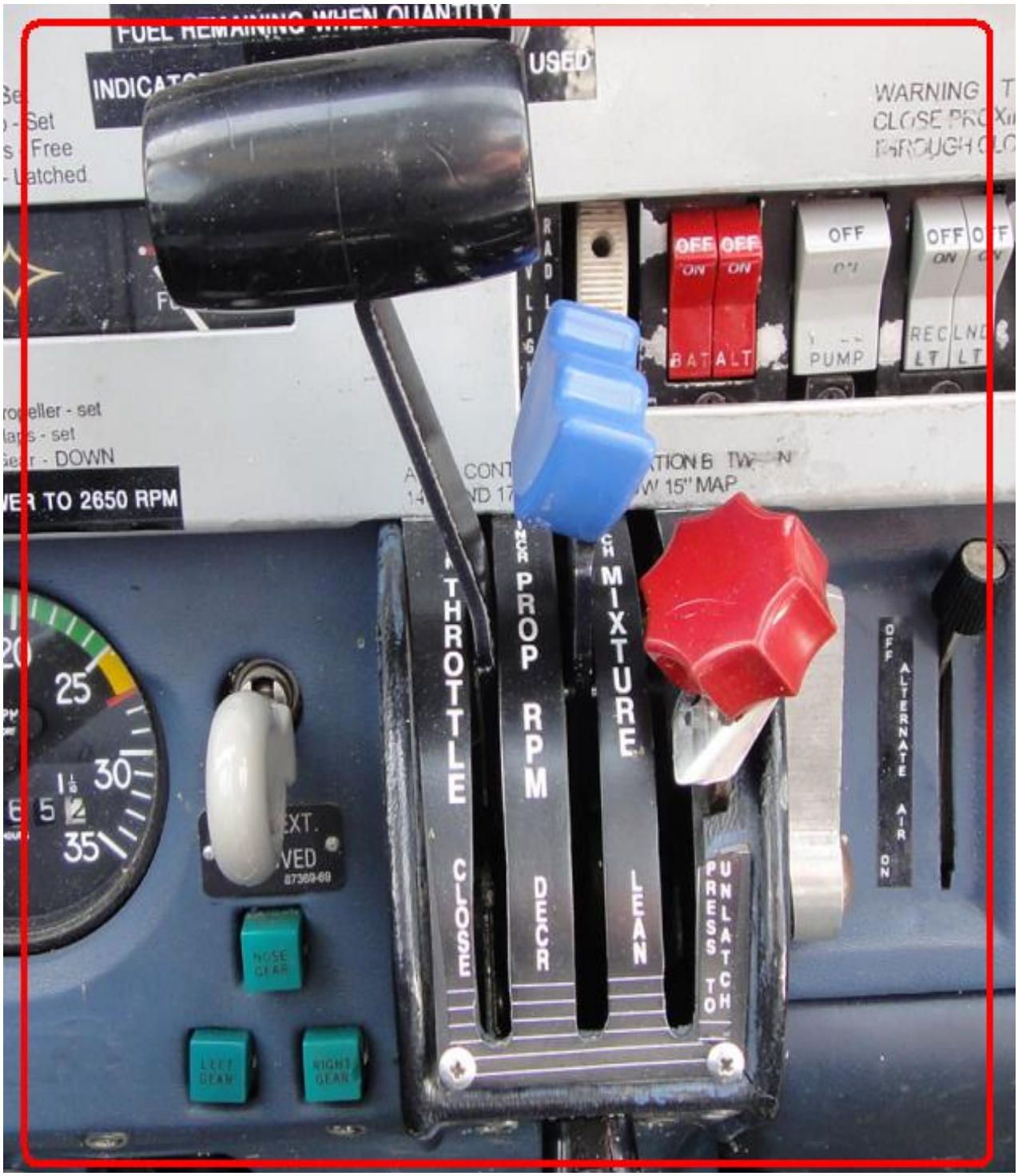
Touchdown (view from the landing field plane)

Touchdown (view from a cockpit - passenger seat)

Probably due to the short distance to the runway threshold the pilot had little time for the proper procedure before landing. He failed to execute the following actions prescribed in the Flight Manual:

- turn on the electric fuel pump;
- set the propeller at about 2600 rev/min - it is necessary to provide sufficient thrust if there is a need to go-around as well as to protect the propeller against excessive speed if the throttle would be suddenly opened;
- set mix on "rich" in order to guarantee maximum acceleration in the event of necessity to re-open the throttle.

The above actions, if executed, would had allowed a safe go-around.



View of the engine control levers and the fuel pump switch in the "OFF" position

The pilot executed the landing approach with flaps retracted which is shown on the three photos below:

The aircraft touchdown was performed at a high speed (on three points) which caused that the pilot could not apply the control wheel (move elevator up) to increase the wheels pressure on the ground and thereby increase braking efficiency. The pilot stated that he applied a pulse braking, but SCAAI materials show that after touchdown, which occurred approximately 100 m from the beginning of the runway the airplane was not slowing down for about 200 m and was moving at a speed of about 125 km/h.

Taking into account that the runway length was 618 and the fact that it was wet, the pilot should have performed landing with the flaps extended to 40 degrees. The best technique for landing on a short runway is landing with full flaps at low speed and power setting allowing the required approach profile. As mentioned above mix must be "rich" and the fuel pump must be turned on. Air speed must be reduced in the flare phase and the airplane contact with the ground should be at a speed close to the stalling speed. After touching the ground the nose wheel should be held off the ground. When the airplane decelerates , the front wheel should be gently lowered to the ground, and then brakes should be applied. Braking is the most effective when the control wheel is pulled but the nose wheel is still on the ground. In this way the pressure on the main landing gear wheels increases.

In the last phase of the landing roll the pilot attempted to pull the control wheel in order to push down the main landing gear wheels as well as to pull over to the right, short of the end of Runway 24. However, due to a relatively high roll speed the airplane travelled through a strip of land and hit the edge of the scarp with its nose wheel and the left strut of the main landing gear. As a result the airplane was rotated in the direction of the runway axis and fell down the slope located between the landing field and the S11 expressway – photo below (SCAAI).

Traces of continuous braking on locked brakes are visible on the runway surface: the left tire track - 77 m long, beginning 46,5 m from the Runway 06 threshold, the right tire track – 55 m long, beginning 29 m from the Runway 06 threshold.

17.3. Analysis of the brake system.

Due to information from the pilot that the airplane had problems with the brake system, it was checked, as well as condition of the tires. Visual inspection of the tires did not show any signs of improper condition, as well as the condition of the brake pads was within permissible limits.

Left tire of the main landing gear

Left tire of the main landing gear

Brake pads

Breaking of the left strut of the main landing gear caused leakage of fluid from the brake system, nevertheless during an experiment it was possible to determine that the brake system worked properly and a resistance was perceptible when pushing the brake pedals.

The Investigating Team asked also a maintenance organization about the recent review and a check of the brake system. In response (Attachment No. 1) the Investigating Team was informed that on 03 June, 2013 in the framework of a technical inspection efficiency of the brakes was checked and it was found that the system worked properly.

17.4. Analysis of the safety of flight operations at EPZE.

Four accidents (including this one) at EPZE are recorded in the SCAAI occurrences register. They occurred: 21 September 2003, 04 August 2007 and 17 April 2010). The causes of the above accidents were errors in piloting technique - human factor. Only the Final Report on the accident on 21 September 2003 contains a reference to the infrastructure of the landing field (at that time having the status of "another place adapted for takeoffs and landings – Żerniki") – it referred to a body of water located in the immediate proximity of the runway. Currently the above body of water does not exist.

In the Investigating Team opinion, taking into account the number of operations performed at EPZE and the number of air occurrences, the flight safety is at an acceptable level.

However, taking into account the location and length of the EPZE runway the Investigating Team formulated safety recommendations.

18. Commission findings:

1. The airplane had the required documentation to perform the flight.
2. The pilot had the required documentation to perform the flight.
3. Aircraft take-off mass was within the permissible limits.
4. As a result of the accident the pilot and passenger suffered no injuries.
5. The airplane brake system was efficient and the condition of the brake pads and tires was appropriate.
6. The pilot was tested for alcohol content in the breath - result 0,00 mg/l.
7. The runway was wet with the local puddles.
8. Lack of stabilization on the final approach for landing.
9. The airplane was not properly configured for landing and probable go-around.
10. The proper operation of the air traffic personnel of the EPKS TWR.

19. Causes of the accident:

1. Improper configuration of the airplane to landing.
2. Non-stabilized approach to landing.
3. Landing with overshooting.
4. Touchdown on three points.

20. Factors contributing to the occurrence of the accident:

Wet runway surface with local puddles after a heavy rainfall.

21. Proposed safety recommendations:

The pilot's parent organization

In order to prevent similar occurrences in the future familiarize pilots associated in the organization with the results of the investigation and discuss the errors.

EPZE landing field management

The Commission suggests to apply to the President of the Agricultural Property Agency with a request to approve acquisition of the land adjacent to the landing field. This would allow to extend the Runway 24 length which would contribute to improvement of the flight operations safety.

President of the Agricultural Property Agency

In order to improve the flight operations safety at the EPZE landing field SCAAI suggests approval of acquisition of the land adjacent to the landing field in order to extend the Runway 24 length.

Commission comment:

Behavior of the EPKS TWR staff is a positive example of the proper operation of the air traffic personnel who, even after information from the pilot about his visual contact with the landing field, continued monitoring the flight and after information about the accident offered assistance of specialist services.

22. Attachments:

No. 1: Information from the Maintenance Organization

Investigation of the accident was conducted by the SCAAI Investigating Team composed of:

MSc (Eng.) Bogdan Fydrych - Investigator-in-Charge

MSc (Eng.) Jacek Bogatko - Team Member

BA Robert Ochwat - Team Member

signature illegible

(stamp and signature of the SCAAI Investigator-in-Charge)

Attachment No. 1

Transal Aero Services BV

Logentry

Date: 03-06-2013 W.O. nr: 2013127 Seq. nr: 13

A/C registration: PH-ANF A/C type: PA28RT-201 A/C serial nr: 28R-8018004 A/C Total time: 7140:51
Owner: Aviation Maintenance Rotterdam B.V.

Engines Manufacturer, Pn, Sn and total time:
IO-360-C1C6 L-17186-51A 1822:34

Propellers Manufacturer, Pn , Sn and total time:
McCauley 2D34C215/90DJA-14E 805107 313:49

Work Done: I.a.w. TAS AMP PH-ANF Version 00-3

1	Both brakes seems to be sloppy	System flushed, checked and found servicable.	0:45
2	Battery and box inspection Action: Check/visual Due [date]: 15-04-2013 Due [hrs]: 50:00 (@TT Ac: 7140:51)	Checked and found OK.	0:15
3	Monthley ELT self test Action: Test Due [date]: 15-04-2013	Checked and found OK.	
4	Fire extinguisher inspection and weight check Action: Weight check Pn: SEE INPSECTION LIST AMP !!! Due [date]: 14-04-2013	Checked and found OK. Weight 1162gr.	
5	Control of critical tasks carried out i.a.w WI17.	Performed WI 17	

Deferred items:

1 Oil Flex hoses eng. comp.(cooler)

Action: Renew
Pn: Oil flex hoses eng.
Due [hrs]: 80:51 (@TT Ac: 7110:00)
Due [hrs]: 79:47 (@TT Ac: 7111:04)
Due [hrs]: 78:25 (@TT Ac: 7112:26)
Due [hrs]: 27:51 (@TT Ac: 7163:00)
Due [hrs]: 50:00 (@TT Ac: 7140:51)

This certifies that the work specified except as otherwise specified was carried out in accordance with PART-145 and in respect to that work the aircraft/aircraft component is considered ready for release to service.
Transal Aero Services B.V. Zeeland Airport, EASA Certificate of recognition: NL.145.1327
Signed: Date: 3-6-13 Stamped