CIVIL AVIATION SAFETY INVESTIGATION
AND ANALYSIS AUTHORITY (SIAA)

FINAL REPORT

of civil aviation safety investigation

CLASSIFICATION	**SERIOUS INCIDENT**
Owner	SC IACĂRII ACROBAŢI SRL
Operator	SC IACĂRII ACROBAŢI SRL
Manufacturer	Aerostar SA
Aircraft type	Yak-52TW
Registration country	LITHUANIA
Registration	LY-WAW
Location	Bănești flight field, Prahova County
Date and time	23.10.2014 / 11:20 LT (08:20 UTC)

No. I 19 - 06
Date: 21.03.2019

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ACKNOWLEDGMENT

This REPORT presents data, analysis, conclusions, and recommendations on civil aviation safety, of the civil aviation safety investigation commission appointed by the General Director of the Civil Aviation Safety Investigation and Analysis Authority.

The civil aviation safety investigation has been conducted in accordance with the provisions of the Government Ordinance no. 51/1999 on the technical investigation of incidents and accidents in civil aviation, approved with amendments and completions by the Law no. 794/2001, of the Regulation (EU) no. 996/2010 of the European Parliament and of the Council from 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation and repealing Directive 94/56/EC, and with the provisions of ICAO Annex 13 to the International Civil Aviation Convention signed at Chicago on 7 December 1944.

The objective of the civil aviation safety investigation is to prevent accidents and incidents, by effective determination of facts, causes and circumstances that led to civil aviation occurrences and to issue recommendations for civil aviation safety and HAS NOT THE PURPOSE of establishing guilt, responsibility or legal liability.

Consequently, the use of this REPORT for purposes other than those relating to the prevention of civil aviation accidents and incidents may lead to erroneous interpretations.

FINAL REPORT

SERIOUS INCIDENT ON LANDING DURING A REPOSITIONING FLIGHT

Aircraft	LY-WAW / Yak-52 TW
Date and time	23.10.2014, at 11:20 LT (08:20 UTC)
Operator	Prieny UAB „TERMIKAS” 170634859
Flight type	Airplane repositioning
Persons onboard	Pilot
Injuries	N/A
Pilot	Flight License: RO.FCL/ATPL/xxxxxx/A
Damages	Substantial damage: propeller's blades – destroyed, engine lower cowl – damaged, flaps and the underside of the wings – damaged
Occurrence location	Bănești flight field, Prahova County

1. HISTORY OF OCCURRENCE

On the morning of 23.10.2014, the pilot scheduled a repositioning flight of a YAK-52 TW aircraft, registered LY-WAW, from Bănești flight field, Prahova county, to Băneasa Airport - Bucharest. According to the pilot's statements, the take-off took place at 11:10 LT. During the flight, the pilot observed a sudden worsening of weather conditions, diminished visibility due to heavy rain and wind in gusts. As a result, the pilot decided to cancel the mission and to return to the flight field where he took-off. The landing was performed on runway 24.

Because of the rapid wind speed increase, which for runway 24 was tail wind, in gusts, the touchdown on the landing field was hard, on two points. According to his statement, in the first moments after touchdown, the pilot considered that, given the speed and the wet surface of the grassy runway, he would not have enough distance to stop the aircraft safely and decided to miss, setting the engine to take-off mode, the flaps remaining in the landing position.

Immediately after the take-off, the pilot appreciated that the engine did not provide the necessary thrust and, in order to avoid the front obstacles in the take-off direction (electric lines and buildings), he turned right and performed a forced landing on the unsettled land in the vicinity of the flight filed. The landing was performed with the landing gear in UP position and was „normal” for this type of maneuver, the airplane stopping after a skidding of several tens of meters, without nosing over.

The aircraft suffered damages to the engine lower cowl, to the flaps and the underside of the wings. The propeller's blades have been destroyed.

Following the event, the pilot did not suffer bodily injuries.

No fire occurred.

No other damages occurred at the incident site.

After the commission arrived and performed the on-site investigation procedures, the aircraft was lifted (using a machine) and the landing gear was lowered normally; there were no visible damages to the landing gear. The aircraft was transported, by towing, to the hangar situated on Bănești flight filed.

Fig. 1 Incident site and the approximate route of missed landing

Fig. 2 Place of aircraft stop

Fig. 3 Elements from the propeller's blades remaining on the flight field

Fig. 4 Damaged engine lower cowl and propeller

2. ADDITIONAL INFORMATION

2.1 Meteorological information

For the Ploieşti area, the weather conditions at the time of the occurrence were the following:

- Coverage: totally covered
- Wind: 10-15m/s; variable direction
- Clouds: Cumulonimbus, Stratocumulus or Stratus
- Ceiling base: 300 – 600 m
- Phenomenon: moderate rain showers

2.2 Pilot information

Pilot	Male, 47 years old, Romanian citizen
License	RO.FCL/ATPL/.../A, valid
Medical certificate	Class 1/2, valid
Flight experience	Total flight hours: almost 14 000, out of which 886 on this airplane type

2.2 Aircraft information

Aircraft manufacturer and type	SC Aerostar S.A. / YAK-52 TW
Serial number and manufacture year	05.126.03 / 2005
State and registration mark	Republic of Lithuania, LY-WAW
Owner	S.C. Iacării Acrobați S.R.L.
Total number of flight hours	486 FH

The aircraft is of metal construction, with lower wing, two seats type, with seats displaced in tandem (one behind the other), fitted with an M-14PF piston engine, radial construction, air cooled, supercharged with a mechanical compressor. The propeller is a triple blade type with variable pitch, type MTV-29BC 260.

Used fuel: Tip Avgas 100LL (or 91/96 octanes).

The landing gear is retractable.

Technical specifications

Airplane	**YAK-52 TW**
Engine	M-14PF, 9 cylinders, radial
Power	400 CP/2900 rot./min take-off 360 CP maximum continuously
MTOW	1.366 Kg
Empty weight approximation (including oil & standard avionics)	990 Kg
Standard fuel tank	160 liters (almost 115 Kg)
Maximum reversed flight time	2 min
Maximum admitted speed (retracted landing gear)	420 Km/h
Maximum speed in acrobatic flight	360 Km/h

Stalling speed with retracted flaps	100 Km/h
Optimal gliding speed	160 Km/h
Maximum Autonomy (No Fuel Reserves)	1.000 Km
Maximum flight ceiling	4.000 m
Initial climbing rate	10m/s
Maximum load factor in operation	+7 / -5

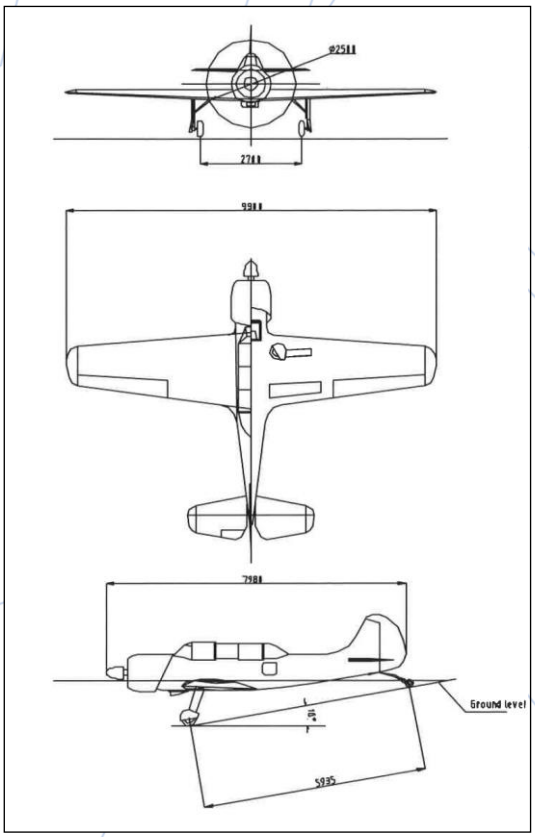

Fig. 5 – YAK52 TW aircraft layout

The analysis bulletins of the fuel and oil samples taken from the incident site reveal:

- normal values of gasoline indices/quality parameters;
- values indicating usage wear for the engine oil.

3. ANALYSIS

On the grassy surface designated as a runway, just before the take-off for the touch-and-go manoeuvre, the commission members found pieces of the propeller's blades and traces of cuttings on the grassy surface, in a helical form, specific for situations when the propeller touches the ground.

The analysis of the aircraft evolution led to the conclusion that incident occurred due to failure of the engine's propeller during landing at a high speed, after the rough touchdown on two points, during the precipitated landing with the rear wind in gusts. The damage to the propeller's blades led to the loss of its performances, which has forced the pilot to abandon the manoeuvre of continuing the take-off and to initiate a forced landing. The inefficiency of the propulsion group (engine-propeller) in the first phase of the take-off determined the pilot turn right (to avoid the obstacles on the heading) and to land on the the unsettled ground.

When he decided to perform a forced landing, according to his own statement, the pilot enabled the landing gear retraction, in order to comply with the airplane manufacturer's instructions related to landing on an unknown field (approaching an area with high vegetation and continued with plowed surfaces).

Note. For compliance, a representative page from Yak-52 Operations Manual is presented below, with the recommended instructions/maneuvers in case of engine failure, immediately after the take-off:

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WARNING: By deflecting the ailerons contrary to the rotation or by increasing the engine running condition may lead to the impossibility of taking the airplane out of the flat spin.
At the third volute of the flat spinning the airplane loses approx. 1970-2300 ft (600-700 m) o altitude (when recovering in horizontal flight), and the delay for recovery may be at most tw volutes.
When performing the flat spinning, one should take into account that upon the transition to a very tight volute the elevator is re-stabilized, and the forces on the stick change into pressure forces.
Upon recovery from the flat spinning the forces on the stick are about 40 kgf and the forces on the swing bar of 100 kgf.

5. IN-FLIGHT EMERGENCY CASES

5.1. PILOT'S ACTIONS IN CASE OF ENGINE SHUT DOWN DURING FLIGHT

5.1.1. If the engine stops in climbing, before the first turn do as follows:
- bring the airplane in gliding flight;
- retract the landing gear;
- shut up the fire cock;
- switch off the magneto, the storage battery and the ignition;
- open the canopy.

The landing is performed straight ahead. If it is obvious that the straight landing endangers the pilot's life due to the possibility of hitting an obstacle, the pilot must change the landing direction.
5.1.2. If the engine stops in circuit flight or during aerobatics, the pilot must act as per the airfield specific instructions and in accordance with point 5.16.
5.1.3. If the engine stops during inverted flight:
- perform a half-rolling and bring the airplane in normal flight;

Fig. 6 – Extract from the Flight manual

In the opinion of the investigation commission, the pilot informed about the meteorological conditions at the destination point, but he mistakenly estimated their evolution at the take-off place. Moreover, the investigation commission considers the decision to take-off as being erroneous but considers the pilot decisions that determined the aircraft evolution after the propeller's blades hit the ground as being very good and taken in a timely manner, thus preventing a possible evolution with much more serious finality.

4. Conclusions

The cause of the serious incident was the engine propellers damage during landing at a high speed, after the rough touchdown on two points, in a runway area that no longer allowed to stop the aircraft safely.

The favoring cause for this occurrence was the flight initiation without a careful assessment of the evolution of the meteorological conditions in the area.

5. SAFETY RECOMMENDATIONS

The investigation commission issues no safety recommendations for this incident.

Observation: **The documents and analysis objects used for the issuance of the flight safety investigation Report are confidential and are archived at the Civil Aviation Safety Investigation and Analysis Authority, according to legal provisions.**