FINAL REPORT
of civil aviation safety investigation

CLASSIFICATION Accident
Owner Asociația Aeroclubul Bihor
Operator Asociația Aeroclubul Bihor
Manufacturer GROB – Werke GMBH & Co.KG
Aircraft Glider TWIN ASTIR
Registration country Germany
Registration: D-3954
Location: Ineu flight field Bihor County
47º4’43.35”N  22º6´1.75”E
Date and time: 30.04.2017, 18.00 LT

No. A 17 – 15
Date: 22.12.2017
SELF-RELEASE OF TOWING CABLE DURING TAKE-OFF BELOW 50 M

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>TWIN ASTIR glider, D-3954 series 3084</th>
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<tbody>
<tr>
<td>Date and time</td>
<td>30.04.2017, 18.00 LT</td>
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<tr>
<td>Operator</td>
<td>BIHOR AIRCLUB ASSOCIATION</td>
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<tr>
<td>Flight type</td>
<td>Recreational flight</td>
</tr>
<tr>
<td>Persons onboard</td>
<td>Pilot and one passenger</td>
</tr>
<tr>
<td>Victims</td>
<td></td>
</tr>
<tr>
<td>Pilot</td>
<td>Male 25 years old - Valid SPL 1139 glider pilot license</td>
</tr>
<tr>
<td>Co-pilot</td>
<td></td>
</tr>
<tr>
<td>Damage</td>
<td>Substantially damaged aircraft: broken front canopy, broken landing gear, substantially cracked tail</td>
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<tr>
<td>Location</td>
<td>Ineu flight field Bihor County</td>
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<tr>
<td></td>
<td>47º4´43.35”N</td>
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1. HISTORY OF OCCURRENCE

On 30.04.2017, on Ineu flight field Bihor County was organized a recreational flight with the glider TWIN ASTIR type, registered D-3954.

The glider was aligned on runway 33 threshold, prepared/positioned and anchored to the tractor winch launch TOST SW-1302 cable, in order to perform a flight activity. Onboard of the aircraft there were the pilot and one passenger in the front part of the cockpit. After completing the ground briefing and obtaining the take-off clearance from Oradea TWR, the glider tractor towing started in order to take-off.

The glider rolled for take-off, accelerated, detached from the ground in a slight climbing slope, and after a few seconds the pilot no longer continued climbing because the towing tractor cable detached itself from the glider at a height of almost 10 m.

Sensing the lack of thrust, the pilot continued flight on take-off heading in a pretty accentuated descending slope to land on the available remaining runway. Before touchdown, the pilot pulled out the aerodynamic brakes to reduce the vertical approach speed to the ground. Touchdown was rough, near the halfway of take-off runway (fig.1). After the impact, the passenger in the front cockpit, was projected with his head through the canopy due to the detachment of the safety straps in the fastener, suffering minor injuries. The aircraft was substantially damaged, the damages consisting of the landing gear breaking, front canopy breaking and fuselage cracking in the back near the stabilizer (fig.2).
Fig. 1. Impact location

Fig. 2. Glider damages resulted after rough impact with the ground
2. ADDITIONAL INFORMATION

2.1 Aircraft information:

The TWIN ASTIR glider (fig.3) is a high performance one, manufactured in Germany, with double command, with T shaped tail, retractable landing gear, aerodynamic brakes located on the extra-rear of each plan and water tanks in the plans. The glider is equipped with two releasing devices of the towing cable for take-off, one situated in the glider nose for take-off by airplane towing and the other situated in the fuselage bottom part in front of the landing gear for take-off by tractor towing (fig. 4).

The towing cable can be detached from the glider through the pilot’s command of operating the releasing lever situated in the cockpit, through cutting the cable with the guillotine device operated by the tractor operator or through self-release, when the towing cable reaches a necessary angle from the glider for self-detaching (fig. 5).
The glider is made of fiberglass and it is destined to recreational flight and simple acrobatics. It is authorized to fly in VMC and IMC conditions when equipped with the necessary equipment for this type of flight.

The glider D-3954 is registered in Germany and it is the property of Bihor Airclub Association.

Technical data:
- span – 17,5 m
- length – 8,1 m
- height – 1,6 m
- wing surface – 17,8 m²
- max. weight – 650 kg
- min. load front seat – 70 kg
- max. load front seat – 110 kg
- max. load rear seat – 110 kg
- take-off speed – 80-100 km/h
- climbing slope speed – 100-120 km/h
- max. speed in calm air – 250 km/h
- maneuver speed – 170 km/h
- tractor towing max. speed – 120 km/h
- airplane towing max. speed – 170 km/h
- landing slope min. speed – 85-90 km/h
- landing speed – 65-70 km/h
- stall speed with pulled out brakes – 90 km/h
- stall speed with retracted brakes – 80 km/h
2.2 Tractor data

The tractor TOST SW-1382 (fig.6) manufactured in Germany is destined for glider towing in take-off sequence. The tractor body is mounted on a truck carriage, which allows its movement from one place to another by its own means. The tractor has a 285 HP engine for operation which triggers one of the two brake drums it is equipped with at a time. On the brake drums it wraps the towing cable (fig.7) having a 4.5 mm diameter of multifilament type and it has a length of almost 900-1500 m, length that varies depending on the flight field size. Each brake drum is equipped with a guillotine to cut the cable and a distributor that has the role of laying the cable on the drum spiral next to spiral.

![Fig.6 TOST SW-3102 tractor](image1)  ![Fig.7 Drum-cable assembly](image2)

The guillotines operation levers are situated in the tractor cockpit next to the control panel. (fig.8)

![Fig.8 Tractor control panel](image3)

Technical data:
- engine power – 285 HP
- engine max. speed – 3100 rot/min
- cable max. speed – 105 km/h
The performance reached by the glider during towing with an unfolded cable on the length of 800 m:

- take-off min. speed. – 80 km/h   max. – 90 km/h
- climbing slope min. speed. – 100 km/h   max. – 120 km/h
- reached height at min. release. – 270 m   max. – 320 m

2.3 Flight field data

Ineu flight field (fig.9) is placed at 15 km north-east from Oradea City and at 1 km north from the European road E 60 Cluj – Oradea. It has a grass runway, oriented on heading 15/33, given into service to Bihor Airclub Association and it is used to perform flights with gliders and ULM airplanes.

Characteristics of take-off/landing runway:

- runway 33    real heading/magnetic heading - 330º / 333º
- dimension 800 × 40 m, threshold coordinates
  Lat. 47º4´34,70" N
  Long. 22º6´10,20" E
- runway 15    real heading/magnetic heading - 150º / 153º
- dimension 800 × 40 m, threshold coordinates
  Lat. 47º4´56,56" N
  Long. 22º5´50,85" E

2.4 Weather conditions

At the date of the accident occurrence the weather conditions were as follows: CAVOK with wind of 2-3 m/s from 320º.
3. CONCLUSIONS

According to the pilot’s statement, after performing the necessary briefing/checking on ground and obtaining the clearance to take-off, the take-off run, acceleration and detach in towing from tractor went normally. The pilot maintained in climbing slope, the slope angle printed immediately after detaching from ground, angle which was considered by the investigation commission, as small in relation to the take-off procedure in towing by tractor. The established slope angle allowed the glider speed to increase to 110 km/h, higher speed than the towing cable unfolding speed (105 km/h), which caused its tension release and the tow hook cable reaching the self-release angle (fig.4). The towing cable self-release at a relatively small height, aprox.10 m, led to the speed decrease tendency and glider rapid descent. Noticing the towing cable self-release through the lack of thrust, the pilot interrupted the climbing slope and printed to the glider a descending slope to maintain speed and to land on the remaining runway. Given that the relatively high vertical speed was also maintained after the pilot pulled the handle to reduce it, this command not having the desired effect, he operated the removal of aerodynamic braking command, in the immediate vicinity of the ground, trying to reduce the touchdown speed.

NOTE – In the operation manual of TWIN ASTIR glider it is specified that the removal of aerodynamic braking has the effect of glider nose heaviness and it is recommended not to change their position near the ground during landing to avoid a rough runway contact. (FLIGHT HANDBOOK TWIN ASTIR – page 24, chapter IV.10 APPROACH & LANDING)

Increasing the dive angle by removing the aerodynamic brakes and the inefficiency of the stabilizer command to reduce vertical speed, generated a rough contact with the ground, first with the rear part and then with the glider tail (fig.10).

Fig.10 Marks left by the glider after rough contact with the ground
3.1 Findings

a) The pilot had a valid glider pilot license and had a considerable flight experience on this aircraft type.
b) The pilot's medical certificate was valid.
c) According to the toxicological analysis bulletin issued by Oradea Emergency Clinical Hospital, the pilot was not under the influence of alcoholic drinks.
d) The records on maintenance show that the aircraft was equipped and maintained according to regulations and procedures applicable for this aircraft type.
e) The tractor TOST SW-1302 had a valid Operation Certificate, issued by AACR, after the control performed on 27.04.2017.
f) The weather conditions had no influence on the accident occurrence.

3.2 Cause of accident occurrence

The cause of this accident occurrence was the premature self-release of the tractor towing cable at a small height, immediately after the glider detached from the ground.

Favoring causes

1. Maintaining the small slope angle printed at take-off immediately after the glider detach from the ground.
2. Removing the aerodynamic brakes in the immediate vicinity of the ground.

3.3 Recommendations

After the investigation, the commission issues no safety recommendations.

Note: 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 Center, according to legal provisions.