FINAL REPORT
of civil aviation safety investigation

CLASSIFICATION
Owner: Flight Service SRL
Operator: Flight Service SRL
Manufacturer: Corvus Hungary-Corvus Fusion
Aircraft: Corvus Fusion
Registration country: ITALY
Registration: I-B 367
Location: Sărata locality, Bacău County
Date and time: 09.05.2013 / 08:55 LT

ACCIDENT
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Nose landing gear failure during landing

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>Corvus Fusion I-B 367</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date and time</td>
<td>09.05.2013 / 08:55</td>
</tr>
<tr>
<td>Operator</td>
<td>Flight Service SRL</td>
</tr>
<tr>
<td>Flight type</td>
<td>Flight for own interest</td>
</tr>
<tr>
<td>Persons onboard</td>
<td>Pilot</td>
</tr>
<tr>
<td>Victims</td>
<td>-</td>
</tr>
<tr>
<td>Pilot</td>
<td>ULM pilot instructor license, valid</td>
</tr>
<tr>
<td>Damages</td>
<td>The aircraft suffered substantial damage</td>
</tr>
<tr>
<td>Location</td>
<td>Airfield in Sărata locality, Bacău County</td>
</tr>
<tr>
<td>Coordinates:</td>
<td>Latitude: 46°31'55.54&quot;N</td>
</tr>
<tr>
<td></td>
<td>Longitude: 26°53'27.64&quot;E</td>
</tr>
</tbody>
</table>

1. HISTORY OF OCCURRENCE

On 09.05.2013, the ultralight aircraft type Corvus Fusion, registered I-B 367, private operated, took-off at 08.50 LT from the Sărata airfield, Bacău County, in order to perform a flight for own interest.

Take-off was performed after the pilot received the flight clearance in CTA BACĂU from the air control tower of Bacău “George Enescu” International Airport.

According to the pilot’s statement, after take-off, the aircraft climbed up to an altitude of almost 1500 ft., then it made a left turn in order to perform a crossover to the airfield’s vertical. From the witnesses’ statements, it appears that while exiting from the turn it was heard a loud noise followed by an aircraft' rapid descent towards the airfield.

The pilot decided to perform an emergency landing due to a strong vibration of the aircraft, which came, as was found later, after the fracturing and detachment of a propeller blade from the hub. The missing blade was found at almost 2 Km from the airfield, in the grassy area of Bacău Airport (at 100 m abeam from the runway half) – see Fig. 1.

During landing, after the aircraft’s touchdown in two points (on main wheels), it followed a rough contact with the nose wheel, which led to the nose landing gear failure. The aircraft continued to roll on the main wheels and the engine’s low cowl until it stopped.
The pilot suffered no injuries.

Wreckage location:  
Latitude  46°31'55.54" N  
Longitude  26°53'27.64" E  
Elevation  180 m

After this occurrence the aircraft was damaged.
2. ADDITIONAL INFORMATION

2.1 Crew information

<table>
<thead>
<tr>
<th>Pilot (Instructor)</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>License</td>
<td>ULM pilot instructor license, valid until 25.02.2015</td>
</tr>
<tr>
<td>Medical certificate</td>
<td>Type medical record, valid until 01.08.2013</td>
</tr>
<tr>
<td>Flight experience</td>
<td>1300 h /320 h on ULM / 13 h on this type</td>
</tr>
<tr>
<td>Work time</td>
<td>N/A</td>
</tr>
<tr>
<td>Rest time</td>
<td>Rest time could not be determined</td>
</tr>
</tbody>
</table>

2.2 Aircraft information

<table>
<thead>
<tr>
<th>Manufacturer and aircraft type</th>
<th>Corvus Hungary-Corvus Fusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial number and manufacturing year</td>
<td>CH-11-001/ 2011</td>
</tr>
<tr>
<td>Manufacturing year</td>
<td>2011</td>
</tr>
<tr>
<td>Registration state and mark</td>
<td>Italy / I-B 367</td>
</tr>
<tr>
<td>Owner</td>
<td>Flight Service SRL</td>
</tr>
<tr>
<td>Operator</td>
<td>Flight Service SRL</td>
</tr>
<tr>
<td>Total number of hours</td>
<td>17 h 31 m</td>
</tr>
</tbody>
</table>

Until the accident occurrence on 09.05.2013 the aircraft performed 17 h and 31 minutes of flight. On November 29, 2012, a technical team from the manufacturer went to the owner’s headquarters to replace the Dynon Sky View equipment and the voltage regulator. It was also replaced the propeller, the initial one with the series 29062 was replaced with another one of the same type having the series 31062. From the time of propeller’s replacement until the date of the accident occurrence, the aircraft operated 7 h and 17 minutes.

The weather conditions at the time of the accident occurrence were as follows: wind 1-2m/s, heading 100°, temperature 25° C, visibility over 10 Km.

The field on which the flight activity was performed corresponds, according to the provisions of the Romanian Government Decision No. 912 from 25.08.2010, to other fields than certified aerodromes from which take-off and landing of civil aircraft can be performed.
The airfield has a grassy runway with the dimensions of 400 x 25 m, heading $120^\circ - 300^\circ$ and it is marked with white panels. The airfield left limit is a concrete fence.

### 2.3 Wreckage and impact information

The aircraft was found at the lateral-right limit of the airfield’s runway end (heading $300^\circ$) being oriented at almost $30^\circ - 40^\circ$ to the right from the runway centerline.
Fig. 5 – Aircraft's approximate trajectory after ground contact

As a consequence of the nose landing gear failure, the aircraft rolled, till stopping, for 42 m on the main wheels and the engine’s low cowl.

There were found the following damage/failures:

1. Blade missing from propeller’s hub;

Fig. 6 – Missing blade

After finding that a blade was missing from the propeller’s hub, in order to recover it, the investigation commission searched the area adjacent to the runway portion, from where the aircraft touched down the ground till its stop. The blade wasn’t found, but neither was found marks on the ground to prove that it has broken on ground contact.
After analyzing the fragments of the blade piece remaining on the propeller’s hub, but also considering the pilot statement regarding the moment when the vibration start, the investigation commission decided to organize an extensive action in order to find the missing blade.

This was found at almost 2 Km from the place where the aircraft stopped.

![Fig. 7 – Detached propeller’s blade](image)

2. Detachment of right part of the aircraft’s canopy fixing device from the fuselage due to vibration;

![Fig. 8 – Canopy’s fixing device](image)

3. Detachment of Pitot tube from the underneath of the left wing;
4. Damage of propeller’s spinner.
2.4 Tests and research

On June 5, 2013, the damaged propeller, type SR 3000J S/N: BJ-31062 was inspected by its manufacturer, the Czech company WOODCOMP. This is a propeller with three blades with electric variable adjustable pitch, the blades being of composite and wood. This propeller is certified by Light Aircraft Association authority in the Czech Republic; file ULL - 04/2004.

Below there are presented some steps of the manufacturer’s expertise.

This propeller was manufactured by WOODCOMP and sold to the Hungarian company Corvus. According to the aircraft manufacturer, the propeller was used with UL POWER 260 ISA engine on an aircraft type Corvus Fusion.

The propeller was accompanied by the documents issued by WOODCOMP (namely the propeller’s logbook, the operation manual, the warranty certificate). There is no record of the propeller’s damage in these documents.

Fig. 9 – Propeller’s inspection

**Blade with serial no. 31062 C 11/2012, position on hub RT- C23 - Position C on the hub.** The blade is mounted on the propeller’s hub, without visible deterioration of blade’s root. The blade’s root is fixed in the duralumin base without damage. The normal use wear is present on the leading edge.

**Blade with serial no. 31062 A 11/2012, position on hub RT-A23, Position A on the hub.** The blade is broken from its basis, from the inside of its duralumin base. The direction and inclination of the broken wooden fibers correspond to the blade’s shock breakage which has been subjected to overloading with an excessive bending moment.
Blade with serial no. 31062 B 11/2012, position on hub RT-B23 – Position B on the hub. The blade is mounted on the propeller’s hub, without visible damage of blade’s root. The blade’s root is fixed in the duralumin base without damage. The blade’s front face presents multiple and deep scratches caused by a mechanical deterioration which can appear when the propeller is not rotating.

There were also inspected the bases of the two unaffected blades in order to determine if these parts shows initial or advanced cracks in the same place as the broken blade. The inspection was performed after cutting the blades' bases.
According to the preliminary analysis of the information available up to now, the propeller’s manufacturer determined the main cause of the blade’s separation as its overloading with an excessive bending moment. This caused the blade’s deterioration in its most critical area.

According to the propeller manufacturer’s report it is impossible to determine the event that caused this overloading. According to the manufacturers experience, such cases appeared in the past, for example when a car hit a parked aircraft; when the nose landing gear accidentally closed while the aircraft was on the ground, which led to the propeller’s contact with the ground; during airplanes’ careless maneuvering etc.

3. CONCLUSIONS

3.1 Findings

The investigation commission of the accident that took place on 09.05.2013 involving the aircraft type Corvus Fusion, registered I-B 367, found the following:

1. The pilot had an ULM pilot instructor license, valid until 25.02.2015.
2. The aircraft was not certified, registered in Italy.
3. One of the three propeller’s blades detached during the flight.
4. The blade broke due to its overloading with an excessive bending moment.
5. It could not be exactly determined the event which caused the overloading of the broken blade.

3.2 Cause of accident

The cause of the accident was the rough contact with the ground of the nose landing gear, which led the landing gear’s failure, after performing an emergency landing decided after detachment of a blade from the propeller’s hub during flight.

4. SAFETY RECOMMENDATIONS

After the investigation, the investigation commission issues no safety recommendations.

Note: This report was elaborated based on the information available in the investigation file on the date of appointing the present investigation commission, as well as based on the additional information obtained by the new commission.

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 Authority, according to legal provisions.