Air Accident Investigation Unit Ireland

ACCIDENT REPORT
YAK-52, G-CDFE
Ballyboy Airfield, Athboy, Co. Meath, Ireland (EIMH)
24 July 2010 @ 08.12 hrs

An Roinn Iompair Turasóireachta agus Spóirt

Department of Transport, Tourism and Sport

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In accordance with the provisions of SI 460 of 2009, the Chief Inspector of Air Accidents, on 24 July 2010, appointed Mr Thomas Moloney as the Investigator-in-Charge to carry out a Field Investigation into this Accident and prepare a Report. The sole purpose of this Investigation is the prevention of aviation Accidents and Incidents. It is not the purpose of the Investigation to apportion blame or liability.

Aircraft Type and Registration:	YAK-52, G-CDFE
No. and Type of Engines:	1 x Ivchenko Vedeneyev M-14P
Aircraft Serial Number:	855712
Year of Manufacture:	1985
Date and Time (UTC):	24 July 2010 @ 08.12 hrs
Location:	Ballyboy Airfield, Athboy, Co. Meath, Ireland (EIMH)
Type of Operation:	Private
Persons on Board:	Crew - 1 Passengers - 0
Injuries:	Crew - 0 Passengers - 0
Nature of Damage:	Minor
Commander's Licence:	Air Transport Pilot Licence issued by the Irish Aviation Authority (IAA)
Commander's Details:	Male, aged 41 years
Commander's Flying Experience:	9,834 hours, of which 152 were on type
Notification Source:	Pilot
Information Source:	AAIU Report Form submitted by Pilot, AAIU Field Investigation

SYNOPSIS

The Pilot was positioning G-CDFE to Weston Airport from EIMH to attend a briefing of crews participating in an airshow the following day. Shortly after take-off the weather en route deteriorated and the Pilot decided to return to EIMH. The wind slightly favoured Runway (RWY) 11 and he carried out a normal approach and landing. However, braking did not give the desired deceleration and the aircraft overran into the left boundary hedge at taxi speed. The aircraft sustained minor damage and the Pilot was uninjured.

1. FACTUAL INFORMATION

1.1 History of the Flight

The Pilot held a valid single-engine piston rating issued by the IAA and a Display Authorisation issued by the UK Civil Aviation Authority (CAA). He hangared his aircraft at EIMH on the evening of Friday 23 July, having flown in from Scotland to take part in an airshow on the following Sunday. It was his first time using this airfield. On the evening of 23 July, he carried out three local familiarisation sorties in fine weather, all using RWY 29. It was a normal operation, he recalled. The following morning he planned to position his aircraft to Weston for a briefing in relation to the airshow. He obtained the en route forecast from the Internet along with a verbal weather briefing from Weston Tower. He noted, in passing, that the concrete apron at EIMH was dry. As part of the pre take-off routine he carried out power checks up to 70%, holding the aircraft on its brakes, with no abnormalities encountered.

Shortly after becoming airborne, the Pilot decided that he would not continue the flight to Weston due to multiple showers being present en route and he elected to return to his departure airfield. On joining overhead, the windsock showed a light wind mostly across the runway but slightly favouring RWY 11, to which he carried out what he recalled to be a normal approach and landing. During the landing roll, as he stated in his Report, braking failed to achieve the desired deceleration and the aircraft over ran the runway into the left boundary hedge of the airfield at taxi speed. While the aircraft was still moving, the Pilot switched off the ignition and the propeller was stationary prior to contact with the hedge. (**Photo No. 1**).

Photo No. 1: Final resting position of G-CDFE to left of RWY 11

1.2 Weather Conditions

The Pilot reported the forecast meteorological conditions as light south/south-westerly winds, visibility 10+ km and showers. He estimated the actual wind at EIMH as being 170°/05 kts.

An *aftercast* supplied by the Aviation Services Division of Met Éireann showed that the area lay in a south-westerly flow, with a weak warm frontal surface situated very close to the Athboy area. Nearby observations suggested that the general range for visibility in the vicinity of Athboy was 6 to 10+ km with a risk of 4,000 m. The aftercast stated that radar data showed *"echoes representing light rain or rain and drizzle mixed"* in the vicinity of the airfield. The echoes were not very intense, representing a rainfall rate of between 0.3 and 0.6 mm/hr. It also stated that *"Rainfall accumulations during the hours preceding the incident would have been quite low. In fact the total rainfall accumulations from midnight on the 24th until 0800UTC would, most likely, have approximated to 1mm or less. The majority of that rainfall would have fallen in the hour preceding the incident."*

1.3 Damage to Aircraft

One wooden propeller blade fractured on impact with the boundary hedge. The left wing tip structure was holed and a section of its skin deformed as a result of striking a tree stump in the hedge.

1.4 Aerodrome Information

RWY 11/29 is a grass runway with a published length of 400 m and it is 18 m wide. There is a slight downslope in the RWY 11 direction. Three pairs of white runway identification markers were located at the nominal ends and mid-point of the runway. The distance between the markers at the RWY 29 end and the RWY 11 end was measured at 378 m.

The Investigation walked the runway approximately two hours after the accident had occurred. The distance from the final pair of runway identification markers to the point where G-CDFE came to a halt was measured as 67.8 m, giving a total of 445.8 m from the nominal touch-down point to the final resting point. Tyre tracks created by G-CDFE were clearly visible on the grass surface from a point some 60 m before the final pair of runway markers all the way to the resting point.

The runway was firm underfoot and the grass was cut short. By that time a persistent drizzle had commenced and the grass surface was found to be quite slippery in places in the damp conditions. There was a line of mature trees approximately 300 m, and a hedgerow approximately 100 m, to the west of the touchdown point of RWY 11.

In February 2012, the runway was being extended by the Licensee in a westerly direction into an adjoining field and the hedgerow noted in the previous paragraph has been removed. Subsequent to a take-off accident from RWY 11 in 2009 (AAIU Synoptic Report No. 2009-026 refers), and this accident in 2010, that part of the eastern boundary hedge adjacent to the runway overshoot has been removed to ground level by the Licensee and replaced by a white frangible fence.

1.5 Aircraft Information

The Yak-52 is a two-seat all-metal aerobatic aircraft, powered by a 9-cylinder air-cooled radial engine driving a two-blade wooden propeller. Extensive use is made of pneumatics, with the undercarriage, flaps, engine starter and wheel brakes all being pneumatically actuated. Pressurised air for the pneumatic system is stored in two bottles, and is recharged in flight by an engine-driven compressor. When G-CDFE was inspected later on the day of the accident, the pneumatic system pressure was found to be at the upper end of the normal operating range.

The wheel brakes consist of drums on each of the two main wheels. The brakes are controlled by a handle on the control column as well as by the rudder pedals. A castoring nose-wheel is installed and ground steering is achieved by differential braking. When G-CDFE was recovered to the concrete hard standing after the accident, it was found that the aircraft was held securely once the brakes were applied. The tyres were all in good condition.

When the aircraft was later taken to a repair facility, a system check of the brakes was carried out and no fault was found.

The Yak-52 Pilot's Operating Handbook gives a "Landing run" distance of 975 ft, (297 m).

G-CDFE held a valid Permit to Fly issued by the UK CAA and the IAA had issued the required Permission for the aircraft to fly in Ireland between the 23 and 27 July 2010.

1.6 UK CAA Aircraft Performance Factoring Guidance

The UK CAA produced *"SafetySense Leaflet 7 Aeroplane Performance"*, which is based on information contained in the CAA's Aeronautical Information Circular *"AIC 127/2006, TAKE-OFF, CLIMB AND LANDING PERFORMANCE OF LIGHT AEROPLANES"*. The purpose of the leaflet was to provide performance planning guidance to pilots and the leaflet noted at the outset *"Accidents such as failure to get airborne, collision with obstacles after take-off and over-run on landing occur frequently to light aeroplanes"*. The leaflet provides detailed information on many aspects of performance planning including the use of *"unfactored"* performance data. In a paragraph titled *"Landing – Points to Note"*, SafetySense Leaflet 7 states, *"Landing on a wet surface…can result in increased ground roll, despite increased rolling resistance. Tyre friction reduces, as does the amount of braking possible. Very short wet grass with a firm subsoil will be slippery and can give a 60% distance increase (1.6 factor)."* The leaflet also notes that a downhill slope increases landing distance, giving the example of a 2% slope increasing landing distance from 50 ft by 10%.

2. ANALYSIS

The three familiarisation sorties which were carried out the evening before the accident were in fine dry weather using RWY 29, which has a slight uphill gradient. These take-offs and landings were thus carried out in the opposite direction to the subsequent over-run landing. There was little overnight rain and nothing suggested to the Pilot that he needed extra vigilance regarding a wet or damp runway. His pre take-off power check was done on the brakes which held the aircraft in place, as expected. The Pilot's subsequent decision to return to EIMH was prompted by several showers which he would have encountered en route to Weston. This was a prudent course of action. The Pilot then made what was his first approach and landing on RWY 11. He described the approach and landing as being normal. However, the subsequent heavy braking action, which was evident from the tyre tracks clearly visible on the runway surface, was significantly compromised by the damp grass runway surface due to the light rain which had fallen before the accident and possibly from early morning dew.

CAA SafetySense Leaflet 7 describes how landing on short wet grass with a firm subsoil can give a landing distance increase of 60%. These conditions were very similar to those which the Pilot of G-CDFE encountered during the landing. Adding a factor of 60% to the published Yak-52 landing distance of 297 m gives a total of 475.2 m. The actual distance from the markers at the RWY 11 touch-down point to the final resting position of G-CDFE was measured as 445.8 m. Thus, the length of runway available was probably inadequate for the aircraft type in the conditions which were encountered on the day.

In addition, the light wind estimated at 5 kts was blowing at an angle of 60° to RWY 11, resulting in a headwind component of just 2.5 kts on landing. The slight downhill slope was also a factor in the failure of the aircraft to stop on the runway.

In summary, it is probable that a combination of poor braking action on the damp grass, slack wind conditions and the slight downhill slope led to the runway over-run and the impact with the airfield boundary. The Pilot's decision to switch off the ignition and thus stop the propeller, minimised damage to the aircraft.

3. CONCLUSIONS

(a) Findings

1. The Pilot was properly licenced and qualified to carry out the flight.
2. The aircraft held a valid UK CAA Permit to Fly and the required IAA Permission to fly in Ireland.
3. The aircraft was serviceable, with no reported brake faults before or after the accident.
4. The damp condition of the grass runway surface as well as the slight downhill slope compromised deceleration of the aircraft notwithstanding the firm braking action of the Pilot. A minimal headwind component on landing was also a factor.
5. The landing distance available was probably inadequate for the aircraft type in the conditions encountered on the day.
6. By shutting down his engine prior to impact with the hedgerow, the Pilot minimised the damage to his aircraft.

(b) Probable Cause

The aircraft overran RWY 11 and impacted with the airfield boundary hedge due to poor braking action encountered on the damp grass runway surface.

(c) Contributory Factor(s)

1. The slight downslope on RWY 11.
2. The minimal headwind on landing.

4. SAFETY RECOMMENDATIONS

This Investigation does not sustain any Safety Recommendations.

-END-

In accordance with Annex 13 to the International Civil Aviation Organisation Convention, Regulation (EU) No 996/2010, and Statutory Instrument No. 460 of 2009, Air Navigation (Notification and Investigation of Accidents, Serious Incidents and Incidents) Regulation, 2009, the sole purpose of these investigations is to prevent aviation accidents and serious incidents. It is not the purpose of any such accident investigation and the associated investigation report to apportion blame or liability.

A safety recommendation shall in no case create a presumption of blame or liability for an occurrence.

Produced by the Air Accident Investigation Unit

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