



Statens haverikommission
Swedish Accident Investigation Board

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Report RL 2004:02e

**Accident involving aircraft LY-KAE at Målöga,
Gråbo, O county, Sweden, 27 August 2003**

Dnr L-44/03

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Translated from the original Swedish by Tim Crosfield, at the request of the Swedish Accident Investigation Board.

In the event of discrepancies between the English and the Swedish texts, the Swedish version is to be considered the authoritative version.

The report is also available on our website: www.havkom.se

Civil Aviation Administration

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Sweden

Report RL 2004:02e

The Swedish Accident Investigation Board, (SHK) has investigated an accident that occurred on 27 August 2003, in Målöga, Gråbo, O county, involving an aircraft with identification LY-KAE.

In accordance with section 14 of The Ordinance on the Investigation of Accidents (1990:717) the Board herewith submits a final report on the investigation.

Göran Rosvall

Dan Åkerman

Appendix 1

Excerpt from cert. of reg. regarding the pilot (Civil Aviation Authority only)

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Report completed 2004-01-21

<i>Aircraft: registration, type</i>	LY-KAE, PZL-MIELEC (Antonov) AN-2
<i>Class, airworthiness</i>	Special, valid certificate of airworthiness
<i>Owner/operator</i>	Private ownership
<i>Time of occurrence</i>	27-08-2003, 17.30 h, in daylight. <i>Note:</i> All times given refer to Swedish summer time (UTC + 2 hours)
<i>Place</i>	Målöga, Gråbo, O county, Sweden (pos 5749N 01213E; 55 m above sea level)
<i>Type of flight</i>	Private
<i>Weather</i>	According to SMHI's (Swedish Meteorological & Hydrological Institute) analysis: northerly wind approx 10 kts, good visibility, probably no cloud under 5 000 ft., poss. 4-7/8 Cu/Cb, base 3 000 ft., temp./dew point 10/8 °C, QNH 1003 hPa
<i>Numbers on board: crew</i>	1
<i>passengers</i>	1
<i>Personal injuries</i>	None
<i>Damage to aircraft</i>	Extensive
<i>Other damage</i>	None
<i>Pilot:</i>	
<i>Sex, age, certificate</i>	Man, 59 yrs., A, Lithuanian validation,
<i>Total flying hours</i>	1450, of which 73 on type
<i>Flying hours previous 90 days</i>	34, of which 19 on type
<i>Number of landings, previous 90 days</i>	53, of which 32 on type

The Accident Investigation Board (SHK) was informed on 27 August 2003 that an accident had occurred involving an aircraft with identification LY-KAE at Målöga, Gråbo, O county, Sweden at 17.30 h on the same day.

The accident has been investigated by SHK represented by Göran Rosvall, Chairman and Dan Åkerman, Chief Investigator.

The investigation was followed by Daniel Hummerdal, representing the Swedish Civil Aviation Administration.

Course of events, etc.

The pilot had made a local flight with a passenger from the district. On landing, which was performed with a tailwind component, the aircraft nosed over. Those on board were able to leave the aircraft unhurt. Fire did not break out.

The lower right wing of the aircraft and the tailplane and rudder were damaged, as was the propeller.

Målöga is a private grass airfield approximately 310 m long and 300 m wide. The takeoff and landing directions are 240°/60° (runways 24/06). The airfield rises appreciably towards the end of runway 24. At the end of the airfield on this runway there is a thin line of trees approximately 10 m. high. At the end of the airfield on runway 06 there is a single tree also about 10 m. high. Across the runways there are a number of strips of loose sand approximately 1–2 m broad along the runways and about 20 m. at right angles to them. These strips lie along the runway at intervals of approximately 30 m. Along the southern side of the field there runs a wooded ridge.

The above circumstances dictate that takeoff is normally from runway 06 and downhill, with landing in the opposite direction on runway 24. Thus on the flight in question the takeoff was with a headwind while the landing was with a tailwind. Touchdown was approximately 125 m. into runway 24. During the subsequent braking the aircraft nosed over. The tracks made by the main wheels were about 80 m. in length and their appearance indicated that the wheels were locked from touchdown or shortly thereafter until the aircraft nosed over. No track from the tail wheel could be observed. According to the pilot's own statement he braked too hard after touchdown.

Type AN-2 is a large single-engined biplane that can accommodate a maximum of 12 passengers. For VFR flying the crew must consist of a pilot and a navigator or flight mechanic.

LY-KAE is registered in Lithuania for operation according to Lithuanian regulations. In the present case this means that the Swedish requirements of landing distance available from a height of 15 m do not apply and landing performance must be based on the landing roll taken from the flight manual.

The aircraft's flight manual, section 4-00, Normal Procedures, ch. 13 point 6, states that: "Sudden braking directly after touch-down may lead to airplane turnover. Braking must be smooth and done in a few phases." Further:

"Acceptable range of CG position: 17-32 % MAC"

"Recommended range of CG position: 23-27 % MAC"

The actual CG position was approximately 20 % MAC.

The flight manual contains particulars only of landing roll distances.

On this occasion according to SMHI there was a northerly wind of approximately 10 kts, corresponding to approximately 5 m/s. The tailwind component in the direction of runway 240° is then approximately 2.5 m/s.

The aircraft's landing weight was approximately 4175 kg.

For the weight and wind circumstances in question, the landing distance will be approximately 125 m (extrapolated for a somewhat larger tailwind component than what the diagram in the flight handbook shows). Measurements at the accident site show that touchdown was about 125 m into the runway. The remaining available length of the airfield was thus 310-125=approx. 185 m.

Opinion

The investigation indicates that braking after touchdown was done too early and too hard. The centre of gravity of the aircraft was relatively far forward, reinforcing the tendency to flip over its nose during hard braking.

The reason why the pilot braked so hard following touchdown was probably that touchdown occurred further into the runway than he had anticipated. However, according to SHK's calculations the remaining runway length was sufficient, with a margin of almost 50%. This may possibly indicate that the pilot had not planned the flight adequately and was hence unclear as to how far into the runway he could safely touch down.

The pilot's assessment of the suitability of the airfield in the wind then prevailing was hampered by the fact that the flight manual contained no particulars of landing distance from a height of 15 m. While the only obstacle to his approach was a single tree, its position was such that the pilot had to take it into account during his landing.

The flight did not meet the minimum crew requirement. In SHK's opinion, however, this did not affect the course of events.

The pilot's Swedish A certificate was validated (accepted) by the Lithuanian civil aviation authorities and the pilot was thereby qualified to undertake the flight.

The accident was caused by the fact that braking after touchdown started too early and was too hard.

A contributory factor was that the pilot's planning of his landing was hampered by the lack of information, in the flight handbook, on the landing distance from a height of 15 m.