

# Investigation Report

## Identification

Type of Occurrence:	Serious incident
Date:	4 October 2007
Location:	Kassel
Aircraft:	Civil Air Transport
Manufacturer / Model:	Kyiv State Aviation Plant / Antonov An-26B
Injuries to Persons:	None
Damage:	None
Other damage:	Runway threshold lights
Source of Information:	Investigation by BFU
File Reference Number:	BFU EX011-07

## Factual Information

### History of the flight

The Antonov An-26B was on a flight from Stuttgart to Kassel-Calden. The crew of six consisted of the pilot-in-command, the co-pilot, navigator, flight engineer and two loadmasters. The plan was to pick up cargo in Kassel for transport to Liverpool.

The crew made contact with Bremen Radar at 16:40:56<sup>1</sup>. At this point, the aircraft was descending to Flight Level (FL) 100. The crew received instructions to descend

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<sup>1</sup> Unless otherwise specified, all times are indicated in local time

to FL 70. About eight minutes later, the air traffic controller gave instructions to descend to 5,000 ft MSL and passed the altimeter barometric pressure setting (QNH). At 16:49:26 the air traffic controller gave clearance for a *Localizer-DME-Approach* to Runway 22 at Kassel Airport. This was acknowledged by the crew. At 16:49:42 the air traffic controller passed the current weather report for Kassel. At 16:59:15 the crew reported: "...established for localizer runway two two". At this point, the radar controller instructed the crew to make radio contact with Kassel Tower.

The crew contacted the aerodrome Kassel tower controller at 16:59:44: "Kassel Tower, ...on the localizer runway two two", and in response received clearance to land together with the current wind information (340°/ 6 kt).

The Cockpit Voice Recorder (CVR) indicates that, during the entire approach, the pilot flying was given regular verbal updates of the current altitude and speed by another crew member.

The radar trace shows that up to 17:02:39, the aircraft flew at a ground speed of about 140 kt. At this time the aircraft was about 2.5 NM from the runway threshold. Thereafter, the ground speed reduced to about 130 kt.

At 17:03:06, when the radar trace indicates that the aircraft was about 1.5 NM from the runway threshold, the controller gave the crew a wind update via radio as 330° and 5 kt.

Nineteen seconds later the navigator advised the pilot that the altitude was 70 m; three seconds later he reported the altitude as 60 m. At this moment, the CVR recorded the automatic voice warning "Minimums, minimums". Immediately afterwards, the navigator announced the speed as 220 km/h. In the following 14 seconds to aircraft touchdown the altitudes and speeds were announced as: 30 m/225, 20 m/225, 15 m/215 and 5 m/220. One second before the aircraft touchdown the speed was 215 km/h.

The aircraft touched down on the runway at 17:03:47. The CVR recorded a touchdown noise, which was repeated seven times during the next six seconds. Afterwards, the CVR recorded increasing respiration sounds. Twenty-six seconds after the first touchdown sound, there was increasing propeller noise.

The Kassel Tower controller subsequently reported that the aircraft touched down at 17:04 close to Taxiway B, alternating between the two main landing gears and afterwards with the nose gear. The controller said that the aircraft touched down approx. three times, then maintained contact with the runway shortly after the runway half-length markers.

The pilot-in-command subsequently stated he first had the runway in sight about 7 km from the threshold. The final approach had been flown with the flaps set to 38° and landing gear extended, at a speed of about 230 km/h. The pilot further stated that he had pulled back the thrust levers to Idle, that the aircraft had touched down at a speed of about 203 km/h, and following touchdown had decelerated using application of the wheel brakes. He further stated that he had activated 'reverse thrust' about 250 m prior to reaching the end of the runway. When he saw that the aircraft would not come to a stop within the available runway length, and that there were obstacles ahead, he had steered the aircraft to the left and shut down the engines (*emergency switch off*).

The aircraft overshot the runway and came to a stop on the grass area south of the threshold to runway 04.

## Personnel information

### Pilot-in-command (PIC)

The 35 year-old pilot-in-command was a Ukrainian citizen in possession of an Air Transport Pilot's Licence (ATPL) issued by the Ukrainian Civil Aviation Authority on 25 July 2006 and valid to 31 March 2008 with the Type Rating as captain on the An-26. His medical certificate was issued on 10 May 2007, and was valid to 13. June 008 (class 1) and 13 September 2009 (class 2).

The pilot-in-command had a total flight time of about 2,900 hours, of which about 2,700 hours were on the type in question.

### Co-pilot

The 33 year-old co-pilot was a Ukrainian citizen in possession of a Commercial Pilot's Licence (CPL A) issued by the Ukrainian Civil Aviation Authority on 04 May 2006

and valid to 19 March 2008 with the Type Rating as co-pilot on the An-26. His Class 1 medical certificate was issued on 26 March 2007, and was valid to 19 March 2008.

The co-pilot had a total flight time of about 1,200 hours, of which about 1,000 were on the type in question.

## Navigator

The 34 year-old navigator was a Ukrainian citizen and had a Navigator's licence issued by the Ukrainian Civil Aviation Authority on 15 November 2005 and valid to 15 December 2007 with type ratings for the An24/26/30. His medical certificate was valid to 15 December 2006.

## Aircraft information

The An-26B is an all-metal cantilever shoulder-wing aircraft with a loading ramp to the rear fuselage. The aircraft is powered by two turboprop engines and has an Auxiliary Power Unit (APU) RU19A-300 in the right engine nacelle. It is used as a short- and medium-range civil air cargo aircraft.

The aircraft was registered by the Hungarian Civil Aviation Authority and was operated by a Hungarian Air Operator.

Manufacturer:	Kyiv State Aviation Plant
Type:	Antonov An-26B
MSN:	12703
Year of manufacture:	1982
Engines:	AI-24VT
MTOM:	24,000 kg

The aircraft was previously serviced on 21 August 2007 following a total operating time of 16,247 hours (6,081 hours since overhaul) (*technical service check type 20*), since when it had flown 147 hours.

At the time of the landing, the aircraft mass was about 18,100 kg.

The operator had an Air Operator Certificate issued by the Hungarian Civil Aviation Authority on 28 March 2007 and valid to 31 March 2008 for the conduct of cargo flights in Europe, Asia, Africa and the Middle East. The operator had approval for CAT 1 Instrument Flight Rule (IFR) approaches.

## Flight Handbook

Chapter 5 of the Flight Handbook gives the approach configuration for the aircraft at a mass of 18 t, as 38° flaps, speed 192 km/h (Approach Gliding Speed 1,3  $v_{so}$ ) and landing speed as 176 km/h.

Chapter 4.8 of the flight handbook states that, depending upon the mass, the touch-down speed should be between 180 and 200 km/h and that the aircraft should touch down on the main landing gear.

During the approach and landing, the co-pilot's job was, among other things, to monitor the instruments and advise the captain as to any deviation from speed, altitude, track etc. During the approach, the navigator's task was to give regular verbal announcements of speed, altitude and any necessary course corrections.

Chapter 5.8 of the Flight Handbook also gives the distances required to roll out and stop at different aircraft masses and atmospheric conditions. For a landing mass of about 18 t, an air temperature of 17 °C and at an airfield elevation of about 300 m, the roll-out distance was given as about 500 m.

## Meteorological information

The Kassel METAR issued at 16:50 (14:50 UTC) gave the following weather conditions:

Wind:	310° / 7 kt
Visibility:	7 000 m
Cloud:	3-4 Oktas at 2 000 ft 5-7 Oktas at 3 900 ft
Temperature:	17 °C
Dew Point:	13 °C
Barometric Air Pressure (QNH):	1,020 hPa

## Aids to navigation

The instrument approach aids consisted of the KSL NDB-DME and the approach Localizer for the Runway 22. The published Localizer-DME approach was for descent from an initial height of 4,000 ft MSL.

## Communications

The radio communications were recorded by the air traffic control service provider and were available to the BFU for evaluation.

## Aerodrome information

Kassel-Calden Airport has a single 1,500 m long and 30 m wide asphalt runway in the directions 041°/221°. At the time of this incident Runway 22 was in use. The threshold to Runway 22 is at an elevation of 872 ft MSL. The Aerodrome Reference Point (ARP) about 550 m after the threshold to Runway 22, is 907 ft MSL; the threshold to Runway 04 is at an elevation of 898 ft MSL.

There was a Precision Approach Path Indicator (PAPI) for Runway 22. The system was set to an angle of 3°.

The airport has a control zone extending to 2,700 ft MSL.

The airport was certificated for ICAO fire protection category 4 (5 and 6 on request).

## Flight recorders

The aircraft was equipped with a flight data recorder (DFDR) BUR-4-1 and a Cockpit Voice Recorder (CVR) MARS-BM. Both recorders were available for evaluation. The record on the DFDR could not be evaluated.

The radar trace was recorded and available to the BFU for evaluation.

## Wreckage and impact information

The aircraft overran Runway 22 by about 42 m and came to a halt 47 m south of the runway centreline. The fuselage nose pointed in the direction of about 120°. The air-

craft had sunk up to the wheel rims in soft grass soil. No damage was found to the aircraft.



View of the aircraft in its final position

Photo: BFU

Tyre tracks on the runway showed that the aircraft had touched down with both main landing gears about 400 metres after the threshold to Runway 22, about 50 m after the intersection with Taxiway B. The tyre tracks were interrupted several times between the first touchdown marks and the intersection with Taxiway D. From the intersection with Taxiway D to the end of the runway, the tyre tracks were continuous. The grassy overrun area at the end of the runway bore tracks for both main landing gears and the nose gear, describing an arc in a southerly direction. The nose gear track ran over a threshold light plinth for Runway 04. The lamp that had been fitted there was found broken about 15 m southwest of the plinth.

## Fire

There was no fire.

## Analysis

No technical defects were found in the aircraft during the investigation; nor had the crew reported any defects.

The weather conditions had no effect upon this serious incident.

The crew had the necessary licenses and ratings required for conduct of the flight. The pilot-in-command was experienced on the type in question.

Evaluation of the radar data revealed no significant deviation from the overflight altitudes during the approach as compared with the vertical profile for the published Localizer-DME approach. However, the CVR recordings and statements made by the crew show that the aircraft approach speed was approx. 230 km/h and thus about 20 percent faster than the speed published in the flight handbook for an aircraft at low weight. Shortly after descending through an altitude of 60 m above ground the aircraft was still doing 220 km/h, which is clearly faster (15 %) than the defined 192 km/h. One second before touchdown the navigator announced the speed as 215 km/h; it shows that the aircraft was still considerably faster than the speed specified in the handbook. The BFU is of the opinion that, it is very probable that the speed was above the 203 km/h stated by the pilot-in-command.

The higher approach and touchdown speeds resulted in the aircraft first touching down 400 m after the threshold to the 1,500 m long runway, then bouncing a number of times until it had reached the halfway mark, then remaining in stable contact with the ground. The remaining runway length of 750 m was still much longer than the rollout distance specified (500 m) in the handbook. The pilot stated that he had at first not activated the 'reverse thrust', relying on wheel braking action alone. Because of the domed runway profile, the pilot had not been able to see the end of Runway 22 from the time the aircraft touched down until reaching the runway halfway markings. When, on reaching the end of Runway 22, he activated the 'reverse thrust', it was too late to come to a halt on the runway.



## Conclusions

This serious incident is due to the fact that:

- the aircraft continued the approach with excessive speed
- the aircraft did not touch down at the beginning of the runway
- following touchdown, full use was not made of the available braking action.

Investigator in charge: Jens Friedemann

Field investigation: Axel Rokohl, Jens Friedemann

Braunschweig: 10.09.2010

This investigation was conducted in accordance with the Federal German Law Relating to the Investigation into Accidents and Incidents Associated with the Operation of Civil Aircraft (Flugunfall-Untersuchungs-Gesetz - FIUUG) of 26 August 1998.

The sole objective of the investigation is to prevent future accidents and incidents. The investigation does not seek to ascertain blame or apportion legal liability for any claims that may arise.

The present document is the translation of the German Investigation Report. Although efforts were made to translate it as accurate as possible, discrepancies may occur. In this case the German version is authentic.

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