

KOMISI
PENELITIAN PENYEBAB KECELAKAAN
PESAWAT UDARA

DEPARTEMEN PERHUBUNGAN

LAPORAN NO 1/98

Kecelakaan Pesawat Udara
Badan Pendidikan dan Latihan Penerbangan, Curug, Tangerang
SOCATA TB-10 Tobago
PK-AGX
4 Juni 1998

GEDUNG KARBA, LT2, DEPARTEMEN PERHUBUNGAN,
JL MEDAN MERDEKA BARAT 8, JAKARTA 10110

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AIRCRAFT ACCIDENT INVESTIGATION COMMISSION
DEPARTMENT OF COMMUNICATION
GFDUNG KARSA LT2, DEPARTEMEN PERHUBUNGAN JL MEDAN MERDEKA BARAT 8, JAKARTA 10110, PH/FX ++62213517606

Owner	Badan Pendidikan dan Latihan Penerbangan Curug, Tangerang
Operator	Badan Pendidikan dan Latihan Penerbangan Curug, Tangerang
Aircraft Type Registration	Socata TB10 Tobago PK-AGX
Location of Occurrence	Tanjung Mojo, Kabupaten Kendal.
Date	June 24, 1998
Time	08:50 LT

Synopsis

While on a cross-country training flight, from Bandara Udara Budiarto, Tangerang, to Bandara Udara Ahmad Yani, Semarang, the aircraft experienced a powerplant vibration, and was forced to land. The aircraft, a Socata TB10 was completely destroyed.

1 Factual Information

1.1 History of the flight

On the 4th of June 1998, a Socata TB10 with registration number PK-AGX departed for a cross-country training flight from Bandara Udara Budiarto, Tangerang, with destination Bandara Udara Ahmad Yani, Semarang. Time of departure was 23:48 UTC. Persons on-board were the instructor pilot and two student pilots of the Badan Pendidikan dan Latihan Penerbangan, Curug, Tangerang.

During the take-off, climb-to-cruise, and cruise phases, the flight was reported as normal. While on approach descend and passing 5,000 ft from a cruise altitude of 7,500 ft, the pilot reported hearing a loud bang, and felt the aircraft power-plant to vibrate. The pilot attempted to control the vibration by manipulating the engine throttle, while observing the engine parameters. Although the engine parameters showed a normal respond to the pilot's input, the vibration level did not decrease. The pilot reported that the vibration increases with a throttle increase. The pilot then reduced the engine rpm, resulting in a reduction of the vibration level, and the pilot finally maintained the engine rpm at approximately 1,000 rpm. The aircraft could not maintain altitude, and the pilot decided to make an emergency landing, and proceeded an engine failure drill before landing in a cultivated land. Due to obstacles on the ground the aircraft overturned and was completely destroyed. All persons on-board evacuated the aircraft unhurt. There was no ensuing fire.

1.2 Injuries to persons

Injuries	Flight crew	Cabin Crew	Passengers	Total
Fatal	---	---	---	---
Serious	---	---	---	---
Minor / None	3	---	---	3
Total	3	---	---	3

1.3 Damage to aircraft

Aircraft is completely destroyed and beyond repair.

1.4 Other damage

<not applicable>

1.5 Personnel Information

1.5.1 Instructor Pilot

Place and birth-date	██████████ Bogor, 12 April, 1967
Nationality	Indonesian
Certificate	CPL
Number	4490
First Issued	13 March, 1995
Type Rating	C23, PA28, TB10, CN235, C172.
Last Medex	5 December 1997
Total Flight Hours	f 4,000 hrs
Last 90 days	d.n.a.
Last 72 hours	d.n.a.
Last 24 hours	d.n.a.

1.5.2 Student Pilot 1

Place and birth-date	██████████ Jakarta, 29 May 1975
Nationality	Indonesian
Certificate	PPL
Number	d.n.a.
First issued	d.n.a.
Type Rating	TB10
Last Medex	February 1998
Total Flight Hours	93.50 hrs
Last 90 days	d.n.a.
Last 72 hours	d.n.a.
Last 24 hours	d.n.a.

1.5.3 Student Pilot 11

Place and birth-date	██████████ Bandung, 25 August 1975
Nationality	Indonesian
Certificate	PPL
Number	d.n.a.
First Issued	d.n.a.
Type Rating	TB10
Last Medex	February, 1997

Total Flight Hours	96.0 hrs
Last 90 days	d.n.a.
Last 72 hours	d.n.a.
Last 24 hours	d.n.a.

1.6 Aircraft information

1.6.1 Airframe

Type	Socata TB-10
Manufacturer	Socata Grotipe Aerospatiale
Owner	Badan Pendidikan dan Latihan Penerbangan Curug
Registration	PK-AGX
Serial Number	1702
Registration Number	1739
Total Flight Hours	902.00 hrs TSN (status at 29.05.98)
CoA	February 17, 1999
CoR	February 17, 1999
STKM	2,000 hours
Radio Permit	March 07, 1998
Last inspection	May 28, 1998, 9th time 100 hr at 899.5 hrs
TSN	

1.6.2 Power Plant

Type	Lycoming 0-360-AIAD
Serial Number	L 33788-36A
Total Engine Hours	902.45 hrs TSN (status at 29.05.96)

1.6.3 Propeller

Type	Hartzell HC-C2YK-IBF/F7666A-2)
Serial number	CH.31420A
Flight hours	902.00 hrs (status at 29.05.98)

1.7 Meteorological Information

Wind	Calm	
Visibility	9 km	
Present Weather	Haze	
Base Cloud	2,300 ft	
Temperature / Dew Point Temperature		28 °C / 25 °C
QNH	1012.3 mbs	29.89 inches
QFE	1011.9 mbs	29.88 inches.

1.8 Aids to navigation

<not applicable>

1.9 Communications

<not applicable>

1.10 Aerodrome information

<not applicable>

1.11 Flight recorders

<not applicable>

1.12 Wreckage and impact information

The aircraft was found upside down in a cultivated and uneven land area. No detailed information was available on the damage of the airframe, wings and empennage, as the aircraft was immediately transported to the Bandara Udara Budiarto in Tangerang. No evidence of fire was found on the parts or components of the wreckage. The propeller was salvaged. One propeller blade tip was found broken off, while the other one was bent backwards.

1.13 Medical information

All persons on-board were evacuated unhurt.

1.14 Fire

<not applicable>

1.15 Survival aspects

The evacuation of the persons on-board was successful.

1.16 Organizational and management information

<not applicable>

1.17 Tests and research

A metallurgical investigation was done at the Metallurgical Laboratory of the Institut Teknologi Bandung. The propeller blade was broken at approximately 81% of the blade length (Photograph 1). Tests revealed a fatigue crack growing from a small damaged point at the leading edge of the blade, due to either an embedded impurity, or caused by a foreign object hitting the blade (Photographs 2). Metallurgical test revealed that a crack originating at the nick on the propeller leading edge, grew in size and propagating backwards towards the trailing edge, until it reached the point at which the remaining residual strength of the blade was too low to sustain mechanical and aerodynamic forces, causing the blade to break off (Photographs 3 and 4)

2 Analysis

A power plant vibration occurred at an altitude of 5,000 ft while descending from a cruise altitude of 7,500 feet. Apparently this vibration was caused by an imbalance of the propeller forces, due to one propeller tip breaking off in flight. The vibration was probably caused by this imbalance.

3 Conclusions

3.1 Findings

Fatigue crack propagating from an irregularity at the leading edge of one propeller and causing the blade tip to break off, resulted in an imbalance of mechanical and aerodynamic forces. This imbalance caused a severe power plant vibration, forcing the pilot to reduce engine rpm. The aircraft could not maintain altitude, and the pilot was forced to make an emergency landing.

3.2 Significant factors

Inspection

Post accident procedures

3.3 Safety actions and recommendations

- (1) It is strongly recommended that the Badan Pendidikan dan Latihan Penerbangan (Curug, Tangerang) immediately inspect the remaining fleet's propellers for possible propeller damage and or cracks.
- (2) It is recommended that inspection for any surface damage found on propellers shall be done through strict inspection procedures using crack detecting techniques.
- (3) Furthermore it is recommended that the fleet's propellers should be inspected regularly on a periodic base, if possible before each flight for possible damage by foreign objects or by handling during maintenance. If currently there is no procedure existing, a mandatory pre-flight propeller damage inspection procedure shall be devised and adopted to be strictly followed by pilot's and line maintenance technicians.

Appendices

Photographs 1, 2, 3, 4