

FINAL

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NATIONAL
TRANSPORTATION
SAFETY
COMMITTEE

Aircraft Accident Investigation Report

**Aero Flyer Institute
Cessna 172 ; PK-HAI
Cakrabhuwana Airport, Cirebon, West Java
Republic of Indonesia**

12 March 2011



NATIONAL TRANSPORTATION SAFETY COMMITTEE
MINISTRY OF TRANSPORTATION
REPUBLIC OF INDONESIA
2011

This Final Report was produced by the National Transportation Safety Committee (NTSC), Ministry of Transportation Building 3th Floor, Jalan Medan Merdeka Timur No. 5 Jakarta 10110, INDONESIA.

The report is based upon the investigation carried out by the NTSC in accordance with Annex 13 to the Convention on International Civil Aviation Organisation, the Indonesian Aviation Act (UU No. 1/2009) and Government Regulation (PP No. 3/2001).

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GLOSSARY OF ABBREVIATIONS

AMSL	: Above Mean Sea Level
ATS	: Air Traffic Service
°C	: Degrees Celsius
CASR	: Civil Aviation Safety Regulation
CPL	: Commercial Pilot License
COM	: Company Operation Manual
CRM	: Cockpit Recourses Management
CSN	: Cycles Since New
DGCA	: Directorate General Civil Aviation
ICAO	: International Civil Aviation Organization
ICAI / STPI	: Indonesia Civil Aviation Institute / Sekolah Tinggi Penerbangan Indonesia
Km	: Kilometer(s)
KNKT / NTSC	: Komite Nasional Keselamatan Transportasi / National Transportation Safety Committee
LT	: Local Time
MTOW	: Maximum Take-off Weight
NM	: Nautical mile(s)
QFE	: Height above airport elevation (or runway threshold elevation) based on local station pressure
QNH	: Altitude above mean sea level based on local station pressure
STC	: Supplemental Type Certificate
TT / TD	: Ambient Temperature / Dew Point
UTC	: Universal Time Coordinate
WIB	: Waktu Indonesia Barat / West Indonesian Standard Time

INTRODUCTION

SYNOPSIS

On 12 March 2011, a Cessna 172 aircraft, registered PK-HAI, was being operated by Aero Flyer Institute on a cross country exercise flight from Cakrabhuwana Airport (WICD), Cirebon, West Java to Budiarto Airport (WICB), Tangerang, Banten.

There were 4 persons on board; one pilot instructor, two students and one mechanic helper.

At 01.11 UTC¹ (08.11 LT) the aircraft request taxi to runway 04, at 01.13 the aircraft on short runway 04 and continue to enter backtrack runway 04.

The aircraft take off at 01.19, the student on the left seat as a pilot flying and the instructor on the right seat monitored the student, the pilot get information from the ATC that the weather condition was good with visibility 6 – 8 Km and wind calm.

During take off role about 235 meters from the beginning runway 04, the aircraft veered to the left. The pilot noticed the movement of the aircraft and tried to return the aircraft back to the runway centreline.

After the aircraft speed reaches about 60 knots, the student pull the control yoke the aircraft pitch up and recovered to the centreline. As the aircraft nose attitude getting higher, the pilot's right seat start move backward. The pilot spontaneously reached his yoke in order to stop his seat shifting, at the same time the student spontaneously pushed the yoke to lower the aircraft nose.

As a result the aircraft pitch getting high following by the stall warning horn comes on and the lower rudder strike to the runway surface. The aircraft veered to the right, then out of the runway, bounced twice and finally stopped by impacted a cliff at 01.19, at coordinate 6° 45' 20" S 108° 33' 26" E.

The forward and twisted force caused the left yoke shaft was broken at the pin hole.

While the crash bell ringing the fire fighters immediately deployed to the accident site. The occupants evacuated from the aircraft by themselves since no one were injured.

No person on board was injured on this accident.

¹ The 24-hour clock is used in this report to describe the local time of day, Waktu Indonesia Barat (WIB) or West Indonesian Standard Time, as particular events occurred. WIB is Coordinated Universal Time (UTC) + 7 hours.

1 FACTUAL INFORMATION

1.1 History of the flight

On 12 March 2011, a Cessna 172 aircraft, registered PK-HAI, was being operated by Aero Flyer Institute on a cross country exercise flight from Cakrabhuwana Airport (WICD), Cirebon, West Java to Budiarto Airport (WICB), Tangerang, Banten.

There were 4 persons on board; one pilot instructor, two students and one mechanic helper.

At 01.11 the aircraft request taxi to runway 04, at 01.13 the aircraft on short runway 04 and continue to enter backtrack runway 04.

The aircraft took off at 01.19, the student pilot was seated on the left seat as a pilot flying and the instructor on the right seat monitored the student. The pilot obtained information from ATC that the weather conditions were good with visibility 6 – 8 Km and wind calm.

During the takeoff roll, at about 235 meters from the beginning of runway 04, the aircraft veered to the left. The pilot noticed the movement of the aircraft and tried to return the aircraft back to the runway centreline.

After the aircraft speed reached about 60 knots, the student pilot pulled on the control yoke to pitch the aircraft nose up and recover to the centreline. As the aircraft nose attitude increased, the instructor's right seat started to move rearwards. The instructor instinctively reached for his control yoke in order to stop his seat shifting. At the same time, the student spontaneously pushed his control yoke to lower the aircraft nose.

As a result, the aircraft's pitch increased, the stall warning horn activated and the lower rudder contacted the runway surface. The aircraft then veered to the right, and departed the runway, bounced twice and finally stopped by impacting a cliff at 01.19, at coordinate 6° 45' 20'' S 108° 33' 26'' E.

The airport crash bell was activated and the fire fighters immediately deployed to the accident site. The occupants evacuated from the aircraft by themselves.

No person on board was injured on this accident.



Figure 1: The last aircraft position

1.2 Injuries to Persons

Injuries	Instructor Pilot	Student Pilot	Others	Total in Aircraft
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	-	-	-	-
None	1	2	1	4
TOTAL	1	2	1	4

1.3 Damage to Aircraft

The aircraft was substantially damaged. The details of the damages are as follows:

- One of the propeller blade bent to backward;
- Windshield broken;
- Engine mounting shifted to right side of centreline;
- Nose landing gear damage and detached from fuselage;
- Left Control Yoke broken and detached;
- The front right seat detached from the holder;
- Scratch on lower part of the rudder.

1.4 Other Damage

There was no other damage related to this accident.

1.5 Personnel Information

1.5.1 Pilot in command (Pilot Instructor)

Gender	: Male
Date of birth	: 25 April 1986
Nationality	: Indonesia
Marital status	: Single
Date of joining company	: July 2010
License type	: Commercial Pilot License
Validity	: 20 July 2011
Aircraft type rating	: Boeing 737-300/400/500, Cessna 172
Flight instructor certificate	Valid until 6 May 2012
Medical certificate	: First Class
Date of medical examination	: 20 January 2011
Validity	: 20 July 2011
Last proficiency check	: 2 August 2010

Flight Time

Total hours	: 761 hours 06 minutes
Last 90 days	: 76 hours 33 minutes
Last 60 days	: 32 hours 35 minutes
Last 24 hours	: 06 hours 00 minutes
This flight	: -

1.5.2 Student Pilot #1

Gender	: Male
Date of birth	: 15 July 1991
Nationality	: Indonesia
Marital status	: Single
License type	: Student Pilot License
Validity	: 1 September 2011
Medical certificate	: Second Class

Date of medical examination : 30 January 2011
Validity : 30 January 2012

Flight Time

Total hours : 23 hours 09 minutes
Last 90 days : 16 hours 09 minutes
Last 60 days : 12 hours 50 minutes
Last 24 hours : 45 minutes
This flight : -

1.5.3 Student Pilot #2

Gender : Male
Date of birth : 19 January 1986
Nationality : Indonesia
Marital status : Single
License type : PPL
Validity : 31 August 2011
Medical certificate : Second Class
Date of medical examination : 6 September 2010
Validity : 6 September 2011

Flight Time

Total hours : 92 hours 14 minutes
Last 90 days : 45 hours 46 minutes
Last 60 days : 45 hours 46 minutes
Last 24 hours : 03 hours
This flight : -

1.6 Aircraft Information

1.6.1 General

Aircraft Registration : PK-HAI
Country of Manufacturer : USA
Manufacturer : Cessna
Type/ Model : C 172 P
Serial Number : 17274834
Year of Manufacture : 1981
Certificate of Airworthiness : 2759

Valid to : 23 May 2011
Certificate of Registration : 2759
Valid to : 23 May 2011
Time Since New (TSN) : 15,249 hours 25 minutes
Last Inspection : 400 hours inspection

1.6.2 Engine

Engine type : Piston engine
Manufacturer : Textron Lycoming
Model : O-320-D2J
Serial Number : L-13773-39A
Time Since New : 10,364 hours 22 minutes
Cycle Since New : 842.42 cycles

1.6.3 Weight and Balance

The aircraft was being operated within the approved weight and balance limitations.

1.7 Meteorological Information

Cakrabhuwana Airport, Cirebon at 01.00 UTC

Wind : Calm
Visibility : 6 - 8 km
Weather : Nil

These data based on visual observations by the ATC on duty.

1.8 Aids to Navigation

Not relevant to this accident.

1.9 Communications

At the time of the occurrence all the communication between the flight crew and air traffic control was normal. This is considered not relevant to this accident.

1.10 Aerodrome Information

Aerodrome Code : CBN / WICD

Airport Name	: Cakrabhuwana Airport
Airport Address	: Jl. Jend. Sudirman, Cirebon 45144, West Jawa, Indonesia
Airport Authority	: Directorate General of Civil Aviation
Aerodrome Category	: Class IV
Airport Service	: Aerodrome Control Services (ADC)
Type of Traffic Permitted	: VFR
Coordinates	: 06° 45' 22" S, 108° 32' 18" E
Elevation	: 83 feet
Runway Length	: 1,400 meters
Runway Width	: 30 meters
Stop way	: 60 meters (RWY 04) 30 meters (RWY 22)
Azimuth	: 04 / 22

1.11 Flight Recorders

The aircraft was not fitted with a flight data recorder (FDR) or cockpit voice recorder (CVR). Neither recorder was required by current Indonesian civil aviation regulations.

1.12 Wreckage and Impact Information

During take-off roll about 235 meters from the beginning runway 04, the aircraft moved to the left starting from the blue mark of paint on the runway. After the aircraft nose pitched up and veered to the right, the aircraft bounced twice on the grass. The aircraft finally stopped by impacting a cliff about 60 meters from the runway centreline and 530 meters from beginning runway 04.

The final direction of aircraft was about 140 degrees, and coordinate 6° 45' 20" S 108° 32' 36" E.

There was blue mark indicated the Rudder lower section contacted the ground.

1.12.1 Yoke Failure Examination

Examination of the failed left yoke control shaft indicated a fresh overstress failure due to a sudden bending force on the left yoke at the point where the control lock pin is inserted.



Figure 2: The broken Left yoke.

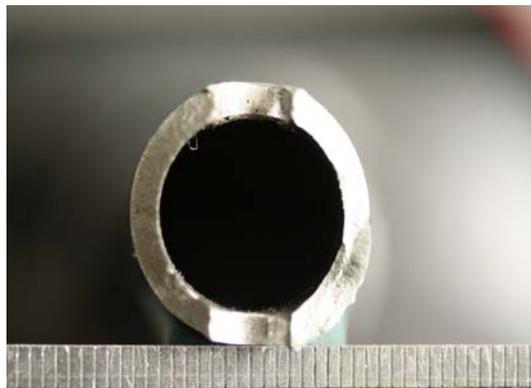


Figure 3: Failure on the left yoke control shaft.

1.12.2 Instructor pilot's bushing-seat stop examination

An examination of the instructor's seat locking pin showed that it had not been secured correctly in the seat track.

An examination of the failed instructor's right bushing-seat front stop indicated a fresh overstress failure as a result of contact by the seat when the aircraft impacted the cliff (Figure 4).



Figure 4: The broken forward bushing-seat stop

1.13 Medical and Pathological Information

Not relevant to this accident.

1.14 Fire

There was no indication of pre or post impact fire.

1.15 Survival Aspects

After receiving information from ATC, the fire brigade immediately deployed a rescue car and ambulance to take all occupants to the nearby hospital for initial examination.

1.16 Tests and Research

To be include on final report.

1.17 Organisational and Management Information

Aircraft Owner : Aero Flyer Institute
Aircraft Operator : Aero Flyer Institute
Address : Komplek Pergudangan Bandara Mas
Blok A-10/No. 7, Neglasari
Tangerang 15127 - Indonesia
Operator Certificate Number : 141/003

1.18 Additional Information

One week before this accident, the NTSC commenced an investigation into another accident involving Aero Flyer Institute Cessna 172 registration PK-HAF dated 4 March 2011. Please refer to NTSC investigation report KNKT.11.03.08.04.

1.19 Useful or Effective Investigation Techniques

The investigation is being conducted in accordance with the NTSC approved policies and procedures, and in accordance with the standards and recommended practices of Annex 13 to the Chicago Convention.

2 ANALYSIS

During take off roll about 235 meters from the beginning runway 04, the aircraft move to the left. The pilot noticed the movement of the aircraft and instructed the student to turn the aircraft back to the runway centreline.

After the aircraft speed reached about 60 knots, the student pulled the control yoke to pitch the aircraft nose up and recover to the runway centreline. As the aircraft nose attitude increased, the instructor's right seat started to move backward as a result of the seat locking pin not being correctly engaged in the seat track. The instructor instinctively reached for his control yoke in order to stop his seat shifting. At the same time, the student spontaneously pushed on the yoke to lower the aircraft nose.

As a result the aircraft pitch getting high the stall warning horn activated and the lower rudder contacted the runway surface. The aircraft then veered to the right, then departed the runway to the right, bounced twice and finally stopped by impacting a cliff.

The student pilot's yoke had failed in overstress indicating a sudden force on the left yoke at the point where the control lock pin is inserted.

The right pilot's bushing-seat front stop track failure indicated a shear force as a result of the seat forward movement when the aircraft stopped suddenly.

3 CONCLUSIONS

3.1 Finding

- The aircraft was airworthy prior to the departure.
- The flight instructor's seat was not secured correctly prior to takeoff.
- One of the propeller blades bent to backward.
- The windshield broken.
- Engine mounting shifted to right side of centreline.
- Nose landing gear damage and detached from fuselage.
- Left Control Yoke broken and detached.
- The front right seat detached from the holder.
- Scratch on lower part of the rudder.
- Lower rudder paint mark on the runway.

3.2 Causes

Control of the aircraft was lost as a result of the flight instructor's seat moving rearward and instinctively reaching the control yolk to stop his movement. The student pilot attempted to control the aircraft and pushed on his control yoke, fracturing the yoke shaft.

The instructor's seat had not been secured correctly prior to the takeoff.

4 SAFETY ACTIONS AND RECOMMENDATIONS

At the time of issuing this Preliminary Accident Investigation Report,

4.1 Aero Flyer Institute

The Aero Flyer Institute has been performed safety actions related to this accident as follows:

1. Briefing and indoctrination of Standard Operating Procedure for the flight instructor.
2. Recurrent training on the principles of flight and flight technique subject.
3. Improve standard flight training, conducted flight training and proficiency check for the flight instructor.
4. Review of requirement for the flight instructor.

4.2 Directorate General Civil Aviation

Directorate General Civil Aviation has been performed reviewing the SOP, Standard flight training, standard proficiency, and requirement in the Aero Flyer Institute

5 SAFETY RECOMMENDATIONS

As a result of this investigation, the National Transportation Safety Committee issued safety recommendations to address safety issues identified in this report, as follows:

5.1 The Aero Flyer Institute

The National Transportation Safety Committee recommends that the Aero Flyer Institute to ensure the pilot to check and re-check the security locked within seating.

5.2 Directorate General Civil Aviation:

The National Transportation Safety Committee recommends that the Directorate General Civil Aviation to review the materials and test-related qualification training, knowledge and application about principles of flight for the flying school pilots in Indonesia.