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NATIONAL TRANSPORTATION SAFETY COMMITTEE

Aircraft Accident Investigation Report

Indonesia Civil Aviation Institute

Socata TB-10 Tobago; PK-AGM

Banten Bay, Banten

Republic of Indonesia

1 December 2010

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 3rd Floor, Jalan Merdeka Timur No. 5 Jakarta 10110, Indonesia.

The draft report is based upon the investigation carried out by the NTSC in accordance with Annex 13 to the Convention on International Civil Aviation Organization, 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)
LT	:	Local Time
MTOW	:	Maximum Take-off Weight
NM	:	Nautical mile(s)
NTSC / KNKT	:	National Transportation Safety Committee/ *Komite Nasional Keselamatan Transportasi*
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 1 December 2010, a Socata TB-10 Tobago aircraft, registered PK-AGM, operated by Indonesia Civil Aviation Institute (ICAI), conducted a solo cross country flight training with a route planned from Budiarto Airport, Curug Tangerang (WICB) to Radin Inten II Airport, Lampung (WICT) and return. The student pilot was the only occupant on board of the aircraft.

Weather at Budiarto was reported in good condition, 10 km visibility and wind 260 / 7 knots. Radin Inten II weather reported in good condition, with 9 km visibility and wind 260 / 8 knots. The en-route weather information did not contain in the pre-flight briefing.

At 01:26 UTC[1] (08:26 LT), PK-AGM departed Budiarto Airport.

At 01:30, the Budiarto controller instructed the student pilot to contact Jakarta Approach controller. The student pilot contacted Jakarta Approach controller and request for climb to 6500 feet. The aircraft was seen on radar screen at west of west training area at altitude 2000 feet.

The Jakarta Approach controller monitored that the aircraft was on heading North West and entering the takeoff area Soekarno-Hatta International Airport. The controller instructed the student pilot to turn heading South. At that time, the runway in use of Soekarno-Hatta Airport was runway 25 left and right.

The student pilot then requested for intercept radial 300 BTO VOR. The controller instructed to turn right to heading North, as the aircraft has crossed the desired radial.

At 01:56, the pilot requested to return to base (RTB) due to bad weather. The aircraft position as shown on the radar screen was at South East of Merak point and was on right of the desired track. At that time, several aircrafts departed from Soekarno-Hatta Airport requested for heading 270 to avoid weather. The student pilot was instructed to descend to 3500 feet and turn heading 140 degrees, to avoid departure traffic of Soekarno-Hatta Airport.

This communication was the last contact between the aircraft and controller and the aircraft position was on coordinate S 05^{o}.58’.87,6”; E 106^{o}. 08’. 46,0”.

The controller than contacted to Radin Inten controller to inform that PK-AGM was return to Budiarto.

At 01:58, the display on the Jakarta Approach radar screen for PK-AGM shown as ‘flight plan track’, this indicated that the real aircraft position (target) was lost and only the flight plan track appeared on the radar screen.

The aircraft debris were found at Banten Bay around coordinate S 5°. 57', 6,33", E 106°. 7'. 18,04".

There was no other aircraft departure to conduct cross country training for this route.

1 The 24-hour clock used in this report to describe the time of day as specific events occurred, is in Coordinated Universal Time (UTC). Local time, Western Indonesian Standard Time (WIB) is UTC + 7 hours

1 FACTUAL INFORMATION

1.1 History of the flight

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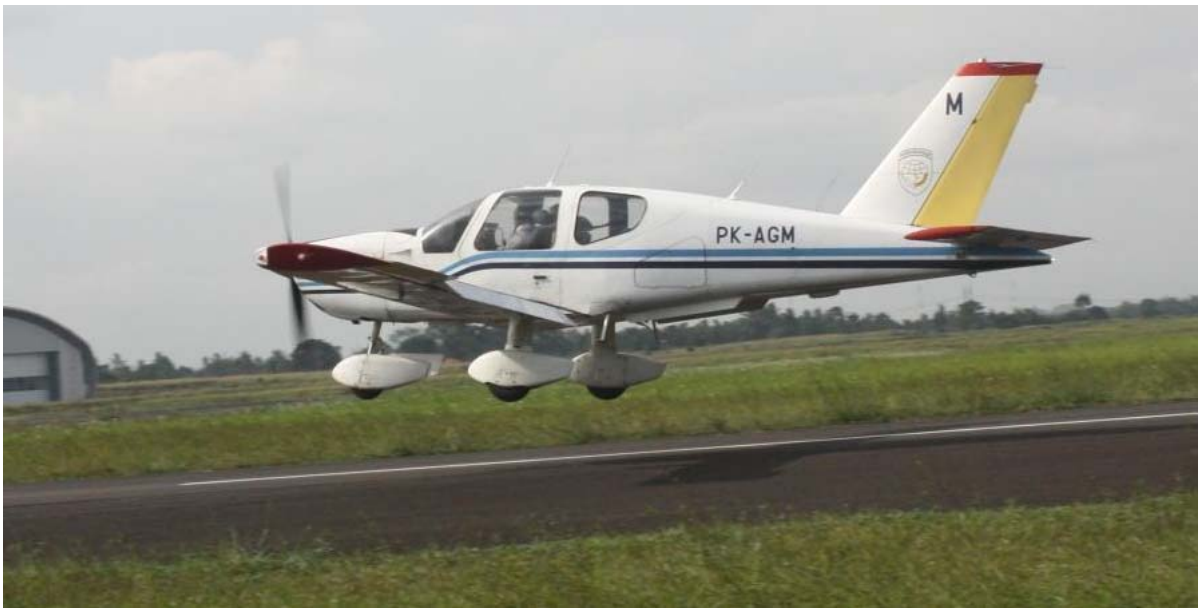


Figure 1: PK-AGM Socata TB-10 Tobago

1.2 Injuries to Persons

Injuries	Flight crew	Passengers	Total in Aircraft
Fatal	1	-	1
Serious	-	-	-
Minor	-	-	-
None	-	-	-
TOTAL	1	-	1

1.3 Damage to Aircraft

The aircraft was substantially damage, most likely due to impact with water.

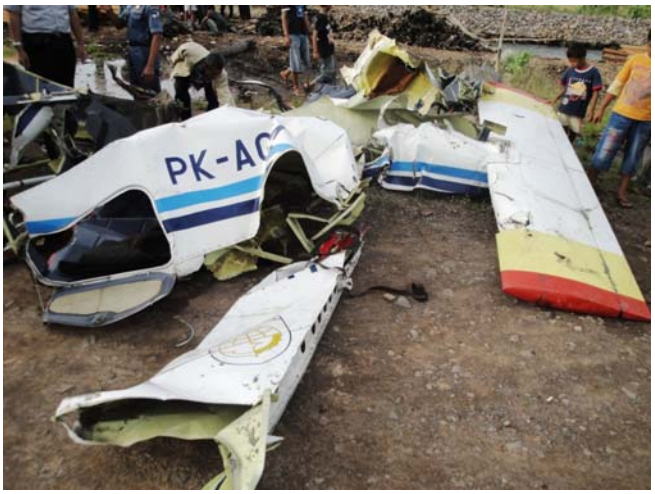


Figure 2: The aircraft wreckage

1.4 Other Damage

There was no other damage related to this accident.

1.5 Personnel Information

1.5.1 Pilot in command (Student Pilot)

Gender	:	Male
Date of birth	:	05 August 1990
Nationality	:	Indonesia
Marital status	:	Single
Date of joining company	:	March 2009 (as a student)
License type	:	Student Pilot Permit
Validity	:	25 March 2012
Aircraft type rating	:	Socata TB-10 Tobago
Medical certificate	:	Second Class
Date of medical examanination	:	25 March 2010
Validity	:	24 March 2011

Flight Time

Total hours	:	55 hours 30 minutes
Last 90 days	:	31 hours 15 minutes
Last 60 days	:	20 hours 25 minutes
Last 24 hours	:	32 minutes

1.6 Aircraft Information

1.6.1 General

Aircraft Registration	:	PK-AGM
Country of Manufacturer	:	France
Manufacturer	:	Socata Avion
Type/ Model	:	Socata TB-10 Tobago
Serial Number	:	1775
Date of Manufacture	:	1996
Certificate of Airworthiness	:	1728
Valid to	:	03 December 2010
Certificate of Registration	:	1728
Valid to	:	26 June 2012
Time Since New	:	2,736 hours 26 minutes
Last Minor Inspection	:	Annual inspection 2712:51 hour dated 10 November 2010

1.6.2 Engine

Engine type	:	Piston engine
Manufacturer	:	Textron Lycoming
Model	:	O-360-A1AD
Serial Number	:	RL-34459-36E
Time Since New	:	734 hours 46 minutes

1.6.3 Propeller

Propeller type	:	Variable pitch
Manufacturer	:	Hartzell Propeller Inc.
Type	:	HC-C2YK-1BF
Serial Number	:	CH 31451 A

1.6.4 Weight and Balance

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

1.7 Meteorological Information

Budiarto Airport, Curug weather at 01.00 UTC

Wind	:	260 / 07
Visibility	:	> 10 km
Weather	:	Nil
Cloud	:	2/8 Scatter 020
TT / TD	:	26^{o} C / 23^{o} C
QNH	:	1007 mbs
QFE	:	1002 mbs

There is a Meteorology Station Class 3 facility in Budiarto Airport. The Meteorology Station issued a weather forecast for take-off and landing. The scheduled student pilot only gets a meteorology forecast sheet before flight; they did not get any weather brief from the instructors or meteorology officer.

Merak Area at 01.00 UTC

Wind	:	Calm
Visibility	:	5 km
Weather	:	Rain
Cloud	:	5/8 Scatter 005
TT / TD	:	-
QNH	:	1005 mbs
QFE	:	-

Merak Area at 02.00 UTC

Wind	:	Calm
Visibility	:	6 km
Weather	:	Rain
Cloud	:	5/8 Scatter 005
TT / TD	:	-
QNH	:	1006 mbs
QFE	:	-

Weather condition Merak area at 00.30 - 02.30 UTC extracted from Bureau of Meteorology Australia information, as follows:

- At 3000 feet, wind southwest about 15 km/hr thunderstorm rain and turbulence.
- Between 3000 - 12,000 feet, wind northwest about 10-40 km/hr thunderstorm rain and turbulence.

Raden Inten II Airport at 01.00 UTC

Wind	:	260 / 08
Visibility	:	9 km
Weather	:	-
Cloud	:	Scatter 020
TT / TD	:	-
QNH	:	-
QFE	:	-

1.8 Aids to Navigation

Not relevant to this accident.

1.9 Communications

All communication between the aircraft and the controller was reported in good condition and recorded at Jakarta Approach ground base recorder. Communication considered not relevant to this accident.

1.10 Aerodrome Information

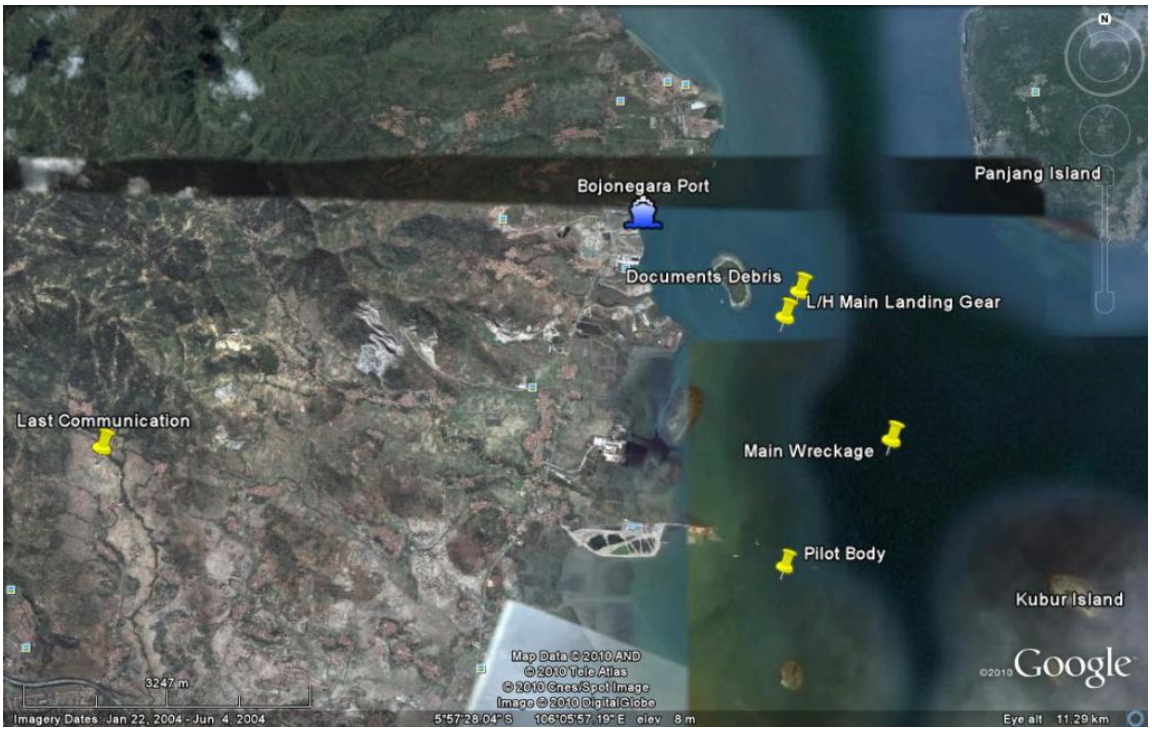
Not relevant to this accident.

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 Safety Regulations (CASR).

1.12 Wreckage and Impact Information

The aircraft wreckage spread about 6 km-square between Panjang Island and Kubur Island on Banten bay. The SAR operation team did not recover propeller, right wing, cockpit instrument panel and nose landing gear.



Satellite photograph courtesy of Google Earth

Figure 3: Wreckage distribution map

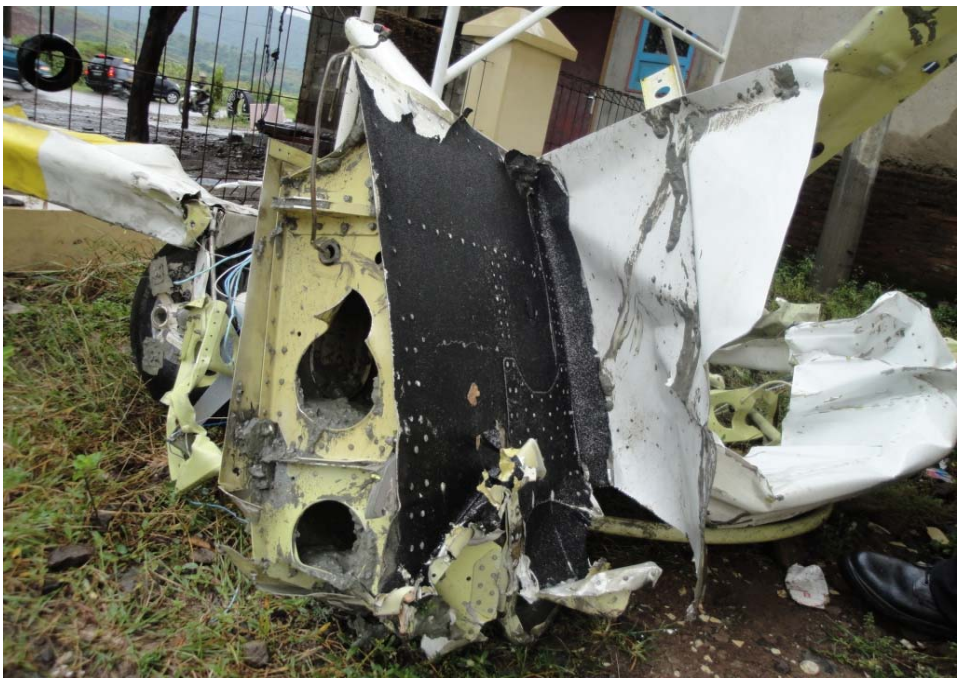


Figure 4: The left wing root

The leading edge of the left wing root dent at nearly 90 degrees to the wing spar.

Figure 5: Broken propeller shaft

The propeller was detached from its shaft. The propeller shaft was broken at approximately 45 degrees fracture plane. It indicated that the propeller was still powered at the time of impact.

1.13 Medical and Pathological Information

No medical examination was conducted on the student pilot remain body.

1.14 Fire

There was no indication of pre or post impact fire.

1.15 Survival Aspects

After receiving the information that the PK-AGM has disappear from Jakarta Approach radar, a search operation was iniciated. The search activities were conducted by 2 aircrafts namely PK-AGK (another ICAI Socata TB-10 Tobago aircraft) and PK-AVA (Bell 206) departed from Budiarto Airport.

At 11.45 LT (04.45 UTC), ICAI received information from the Indonesia Marine Police that local fishermen found some debris floated at Banten Bay on coordinate 5°57'6.33"S; 106° 7'18.04"E. The debris found were:

- Aircraft Sun shade
- A seat cushion
- Navigation chart
- Some pilot sketch of flight route
- Student Pilot License

On 2 December 2010, the SAR team found some wreckage and the student pilot body.

On 3 December 2010, some more wreckage was found. After the debris was confirmed from the PK-AGM, the search operation was terminated. The operation did not recover propeller, right wing, nose landing gear, and cockpit instrument panel.

The pilot seat was found detached from the fuselage. The student pilot body was found at a distance from the pilot seat.

1.16 Tests and Research

Not relevant for this investigation.

1.17 Organisational and Management Information

Aircraft Owner	:	Indonesian Civil Aviation Institute
Aircraft Operator	:	Indonesian Civil Aviation Institute
Address	:	Budiarto Airport, Curug, Tangerang
Operator Certificate Number	:	141/001

Indonesian Civil Aviation Institute (ICAI) or *Sekolah Tinggi Penerbangan Indonesia* (STPI) is a government own aviation institute, located in Budiarto Airport, Curug, Tangerang. ICAI provide training for pilot, engineer and ATC.

The pilot training stages are pre-solo, Private Pilot License (PPL) and Commercial Pilot License (CPL).

The PPL stage syllabus, consist of aerial works, circuit pattern, emergency, radio instrument and short cross country.

The normal and routine short cross country route was Budiarto Airport to Radin Inten Airport with flight time about one hour.

Detail of the PPL syllabus can be found in the appendix of this report.

1.18 Additional Information

1.18.1 Emergency Locator Transmitter (ELT)

The aircraft was fitted with a Jolliet Electronique Emergency Locator Transmitter (ELT) part number JE-2-1978-0-12882. This ELT works on 121.5 Mhz and 243.0 Mhz. There was no station received the distress signal from the aircraft. It was found that the ELT battery has expired at 1 August 2010.

Refer to the ICAI letter no. 402A/AU.506/STPI-2011 dated 2 May 2001, ICAI verified that the ELT installed in PK-AGM was inspected by ICAI's Radio Instrument Workshop Unit at 25 July 2011 in according with Jolliet JE-2 Manual. They conducted ELT operation test, self ELT test and battery test. The test result of ELT battery shown normal operation then ICAI's Radio Instrument Workshop Unit decided to extend the ELT battery life for the next six months, or until 1 January 2011.

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

2.1 Analysis based on event

At first contact with Jakarta Approach controller the aircraft was seen on radar screen at west of west training area (radial 270 BTO VOR). The aircraft then flew on heading North West and was entering the takeoff area Soekarno-Hatta International Airport. The controller instructed the student pilot to turn heading South. The student pilot then requested for intercepting radial 300 BTO VOR and the controller instructed to turn right to heading North.

The aircraft had crossed radial 300 BTO VOR two times, prior to enter Soekarno-Hatta takeoff area and when flew on heading South. This showed that the student pilot was not familiar with instrument flying, especially on the radial concept. Even-though, in the PPL training syllabus, it already included radio instrument flying.

The last communication between the student pilot and the controller stated that the student pilot intended to return to Budiarto as the weather was bad. Two minutes later the controller noticed that the aircraft had disappeared from the radar screen.

The information in the briefing given to the student pilot prior to flight did not include the weather on route from Budiarto to Radin Inten.

A student pilot with less experience on instrument flying might have difficulty to fly in Instrument Meteorological Condition (IMC) especially in turbulence weather that increased the pilot task.

The aircraft wreckage was found at the sea, North East of track from Budiarto to Merak point.

The aircraft was substantially damaged. This indicated that the aircraft impacted with high speed. The recovered wing structure of the left wing root deformed severely at the spar. This indicated that the aircraft impacted at relatively high angle. The high speed and high angle at impact indicated that the aircraft was at a spin dive.

The propeller was detached from its shaft and was still powered at the time of impact. It indicated that the engine was still running at the time of impact.

The pilot seat was found detached from the fuselage. It indicated that the high impact forces disintegrated the fuselage.

2.2 Preflight Briefing

In the PPL training syllabus, included General Instrument and Radio Instrument. The syllabus consisted of mass briefing and flying exercise.

The flying exercise for general instrument consist of pitch indication, bank and directional indication, straight and level, rate one turn, scan, and penetration. The total time for this exercise is one hour.

The flying exercise for radio instrument flying consists of interception/homing, tracking/bracketing, and time distance check. The total time for this exercise is one hour.

The objective of having general and radio instrument trainings was to introduce them matter to the student pilot at PPL stage. Therefore it is not intended to assume PPL student pilot to fly on Instrument Light Rule (IFR).

In this accident case, the weather en-route information was available in the meteorology office of Budiarto Airport, but it was not briefed to the student pilot. It was later known that the weather condition was Instrument Meteorological Condition (IMC). In this situation the PPL student pilot would not qualified to fly in IFR.

The cross country flight for PPL should be conducted in Visual Flight Rules (VFR). Information of the en-route weather could assure that the VFR could be performed along the flight. In the case of VFR could not be performed for the whole flight, the cross country flight should be cancelled.

3 CONCLUSIONS

3.1 Findings

The investigation determines several findings.

- This flight was a solo VFR cross country flight;
- The aircraft was airworthy prior to flight;
- The student pilot has a valid license and medical certificate and 55,5 hours total flights including 19,5 hours solo flight;
- There was a pre-flight briefing consist of weather information of Budiarto and Radin Inten, there was no information of weather en-route;
- Weather en-route information available at the Curug Meteorological office;
- The weather en-route was IMC;
- The student pilot was not familiar with instrument flying;
- The training syllabus on general and radio instrument were performed in one hour activity as introduction for the PPL stage;
- The aircraft impact at high speed and high angle attitude;
- The aircraft was uncontrolled at the time of impact. The fact that the high speed and the high angle at impact indicated that the aircraft was at a spin dive;
- The engine was the still running at the time of impact.

3.2 Causes

- The aircraft was at spin dive at the time of impact. This situation was due to the student pilot was not familiar with IFR which was required when the aircraft encountered IMC.
- The training syllabus on general and radio instrument were intended as an introduction in the PPL stage.
- The pre-flight briefing did not include information of weather en-route, which was available at the Curug Meteorology Office.

4 SAFETY ACTION

4.1 Indonesia Civil Aviation Institute

Refer to Indonesia Civil Aviation Institute (ICAI) letter no. 402A/AU.506/STPI-2011 dated 2 May 2001, the Indonesia Civil Aviation Institute (ICAI) informed the National Transportation Safety Committee that they issued safety actions, as follows:

a. The ICAI have a computer set with internet connections in the Head of Pilot Training Department to download the weather forecast and satellite image. In the near future, ICAI will equipped a computer set with internet connections in the Briefing room to download the weather forecast and satellite image on flight routes.

b. The ICAI has stated their Flight Operation Officer (FOO) and instructors will conduct surveillance during the student flight schedule. Flight Operation Officer (FOO) and instructors will conduct a briefings about weather forecasts and satellite images to the students before their flight.

c. The ICAI has provided an additional guidance and class related to the students to improve their knowledge and understanding of visual and instrument flight rules. The additional classes included additional training in instrument flight training simulators for "upset and unusual position recovery" phase.

The ICAI also revised their PPL syllabus as follows:

Excersice Stage	Before the accident	After the accident
General Instrument	3 hours	5 hours
Radio Instrument	1 hour	3 hours
Cross Country Flight (WICB - WICT - WICB)	1 Dual, 1 SS, 1 Solo	1 Dual, 3 SS

Note: SS = Solo Under Surveillance

4.2 Curug Meteorology Office

Refer to Curug Meteoroly Office letter number UM.0013/CUR/186/V/2011, the Curug Meteorology Office informed the National Transportation Safety Committee that they issued safety actions, as follows:

a. The Curug Meteoroly Office coordinates with the ICAI, other flying school and Budiarto airport about Curug Meteoroly Office facilities and functions.

b. The Curug Meteoroly Office provided and briefs all pilots that uses Budiarto Airport area, about weather forecast before their flight.

5 SAFETY RECOMMENDATIONS

On 11 April 2011, the National transportation Safety Committee sent the Draft Aircraft Accident Investigation Report Socata TB-10 Tobago Reg. PK-AGM, and issued the safety recommendations to address safety issues identified in this report, as follows:

5.1 Recommendations to Indonesia Civil Aviation Institute

The National Transportation Safety Committee recommends that the Indonesia Civil Aviation Institute to

- Provide facility to access weather satellite in flight operation office, for the instructors and student pilots to get current information about weather before conducts a flight;
- Conduct a weather forecast brief to all pilot or student pilots before flight;
- Improve the student pilot knowledge about visual flight rules;
- Any flight planned as a visual flight should be performed in accordance with Visual Flight Rules (VFR).

5.2 Recommendations to Curug Meteorology Office

The National Transportation Safety Committee recommends that the Curug Meteorology Office to conduct a weather forecast brief to all pilots including student pilots before flight.