



**KOMITE NASIONAL KESELAMATAN TRANSPORTASI  
REPUBLIC OF INDONESIA**

**FINAL**

**KNKT.16.04.09.04**

**Aircraft Serious Incident Investigation Report**

**Global Aviation Flying School**

**Cessna 172 G, PK-TGL**

**Budiarto Airport, Tangerang**

**Republic of Indonesia**

**28 April 2016**



**2017**

This final investigation report was produced by the Komite Nasional Keselamatan Transportasi (KNKT), Transportation Building, 3<sup>rd</sup> Floor, Jalan Medan Merdeka Timur No. 5 Jakarta 10110, Indonesia.

The report is based upon the initial investigation carried out by the KNKT 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. 62/2013).

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## ABBREVIATIONS AND DEFINITIONS

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°C	:	Celsius
ARFF	:	Airport Rescue and Fire Fighting
AWOS	:	Automatic Weather Observation System
C of A	:	Certificate of Airworthiness
C of R	:	Certificate of Registration
in Hg	:	Inch of mercury
km	:	Kilometer
KNKT	:	<i>Komite Nasional Keselamatan Transportasi</i> (National Transportation Safety Committee)
LT	:	Local Time
m	:	Meter
mb	:	Millibar
PSC	:	Pilot School Certificate
SPL	:	Student Pilot License
UTC	:	Universal Time Coordinated

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## SYNOPSIS

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On 28 April 2016, a Cessna 172 G aircraft registered PK-TGL was being operated by Global Aviation Flying School on a solo flight training with intention to conduct six touch and go exercises in Budiarto Airport, Tangerang. On board the aircraft was one student pilot.

The aircraft departed runway 12 and performed three touch and go exercises uneventful.

On fourth touch and go exercise, while turning final at altitude of approximately 550 feet, the student pilot noticed that the aircraft speed was 70 knots.

When the aircraft position was on short final at speed 70 knots with flaps 3, the aircraft position was slightly on the right of final approach path and the student pilot attempted to align the aircraft with the runway.

While the aircraft at above the runway threshold, the speed was approximately 60 knots, the aircraft yawed to the right and the pitch was slightly lower than the normal approach attitude thereafter, the student pilot put the throttle smoothly to idle. The aircraft then touched down on the right side of runway centerline with nose wheel touched first and the aircraft continued moving to the right then stopped outside the runway pavement.

The aircraft stopped out on the right of runway 12 with approximately 305 meters from the beginning runway 12 and 23 meters from runway centerline. Investigation found tire marks on the runway surface prior to the aircraft final position.

Recognizing the occurrence, the Budiarto Tower Controller activated the crash bell and informed the Airport Rescue and Fire Fighting (ARFF) unit. The ARFF personnel immediately deployed to the occurrence site.

Following the occurrence, the student pilot was taken to the nearest medical facility for medical examination and there was no injury or medical issue reported. No one injured on this occurrence and the aircraft was not damage.

There were no technical and/or aircraft system abnormality reported or recorded prior to the occurrence. Therefore, the analysis will not discuss the aircraft serviceability and will discuss the issue on landing technique.

The investigation concluded the contributing factor to this occurrence is focused to regain the directional control of the aircraft had delayed the flare out and lack of the rudder application resulted in the nose wheel touch down first and constant deviation travel away from the runway center line.

At the time of issuing this report, the Komite Nasional Keselamatan Transportasi had been informed any safety actions taken by the airport operator resulting from this occurrence.

Following this occurrence, KNKT issued safety recommendations addressed to Global Aviation Flying School to introduce the student pilots with Approach and Landing Accident Reduction (ALAR) training and stabilize approach criteria and to emphasized a go around shall be made when does not meet the criteria.

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# 1 FACTUAL INFORMATION

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## 1.1 History of the Flight

On 28 April 2016, a Cessna 172 G aircraft registered PK-TGL was being operated by Global Aviation Flying School on a solo flight training with intention to conduct six touch and go exercises in Budiarto Airport<sup>1</sup>, Tangerang. On board the aircraft was one student pilot.

At 1043 LT (0343 UTC<sup>2</sup>), the aircraft taxied to runway 12, the Budiarto aerodrome control tower controller (Budiarto Tower) advised to the student pilot that the surface wind direction was 140° and the velocity was 7 knots, based on wind indicator on Automatic Weather Observation System (AWOS) monitor.

At 0353 UTC, the aircraft departed runway 12 and performed three touch and go exercises uneventful.

At 0421 UTC, the student pilot requested the fourth touch and go, then the Budiarto Tower issued clearance for touch and go using runway 12 and joined the right traffic pattern.

On fourth touch and go exercise, while turning final at altitude of approximately 550 feet, the student pilot noticed that the aircraft speed was 70 knots.

When the aircraft position was on short final at speed 70 knots with flaps 3, the aircraft position was slightly on the right of final approach path and the student pilot attempted to align the aircraft with the runway.

At about 0424 UTC, while the aircraft at above the runway threshold, the speed was approximately 60 knots, the aircraft yawed to the right and the pitch was slightly lower than the normal approach attitude thereafter, the student pilot put the throttle smoothly to idle. The aircraft then touched down on the right side of runway centerline with nose wheel touched first and the aircraft continued moving to the right then stopped outside the runway pavement.

Recognizing the occurrence, the Budiarto Tower Controller activated the crash bell and informed the Airport Rescue and Fire Fighting (ARFF) unit. The ARFF personnel immediately deployed to the occurrence site.

Following the occurrence, the student pilot was taken to the nearest medical facility for medical examination and there was no injury or medical issue reported. No one injured on this occurrence and the aircraft was not damage.

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<sup>1</sup> Budiarto Airport, Tangerang will be named as Budiarto for the purpose of this report.

<sup>2</sup> The 24-hours clock in Universal Time Coordinated (UTC) is used in this report to describe the local time as specific events occurred. Local time is UTC+7 hours.



**Figure 1: The last position PK-TGL aircraft after stopped**

## **1.2 Student Pilot Information**

The student pilot was a 26 years old, male Indonesia pilot, held Student Pilot License (SPL) which valid until 5 January 2018 and second class medical certificate which valid until 31 January 2017 without any medical limitation.

The student pilot had total flying hours of 18 hours 55 minutes on Cessna 172. In the last 24 hours, the student pilot had flown for 1 hour, which was the duration for the occurrence flight. The occurrence flight was the third solo flight for the student pilot.

## **1.3 Aircraft Information**

The aircraft was manufactured in United States of America by Cessna Aircraft Company with serial number of 17254855 and the type/model was C 172G. The aircraft was registered PK-TGL and had a valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R). The total hour of the aircraft was 8,819 hours.

The engine installed on the aircraft was a piston engine manufactured by Continental Motors in United States of America with part number of 0-300-D and serial number of 30R724. The total hour of the engine since new was 8,104.21 hours.

The propeller installed on the aircraft was manufactured by McCauley Propeller System in United States of America with part number of 1C172/EM7653 and serial number of AIH44015. The propeller was installed on 2 January 2015, the total hours was 702 hours.

The aircraft was not fitted with any flight recorder. Neither recorder was required by current Indonesian aviation regulations.

There were no technical and/or aircraft system abnormality reported or recorded prior to the occurrence.

## 1.4 Meteorological Information

Weather report for Budiarto Airport, issued by Badan Meteorologi Klimatologi dan Geofisika/BMKG (Meteorology Climatology and Geophysics Agency) station of Budiarto on 28 April 2016 was as follows:

	0400 UTC	0430 UTC	0500 UTC
Wind (°/knots)	130 / 7	140 / 5	160 / 5
Visibility (km)	12	12	12
Weather	Nil	Nil	Nil
Cloud <sup>3</sup>	FEW 2,000 feet	SCT 2,000 feet	SCT 2,000 feet
TT/TD (°C)	32 / 24	33 / 24	34 / 24
QNH (mb/in Hg)	1,010/29.83	1,009/29.84	1,009/29.81
QFE (mb/in Hg)	1,005/29.68	1,004/29.67	1,004/29.65

## 1.5 Aerodrome Information

Airport Name : Budiarto Airport  
Airport Identification : WIRR  
Airport Operator : Directorate General of Civil Aviation  
Coordinate : 06°17'36.57" S, 106°34'05.95" E  
Elevation : 151 feet  
Runway Direction : 12/30  
Runway Length : 1,800 meters  
Runway Width : 45 meter  
Surface : Asphalt

## 1.6 Wreckage and Impact Information

The aircraft stopped out on the right of runway 12 with approximately 305 meters from the beginning runway 12 and 23 meters from runway centerline. Investigation found tire marks on the runway surface prior to the aircraft final position.

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<sup>3</sup> Cloud amount is assessed in total which is the estimated total apparent area of the sky covered with cloud. The international unit for reporting cloud amount for Few (FEW) is when the clouds cover 1/8 area of the sky and scattered (SCT) is when the clouds cover 3/8 to 4/8 area of the sky.



**Figure 2: The illustration of the serious incident site**



**Figure 3: The wheel marks and aircraft position after stopped**

## 1.7 Organizational and Management Information

Aircraft Owner and Operator : Global Aviation Flying School  
Address : Terminal Building No. A32 / DK Lt. 2  
Halim Perdanakusuma International Airport  
Jakarta 12610  
Certificate Number : PSC 141/022

## 1.8 Corkscrew Effect

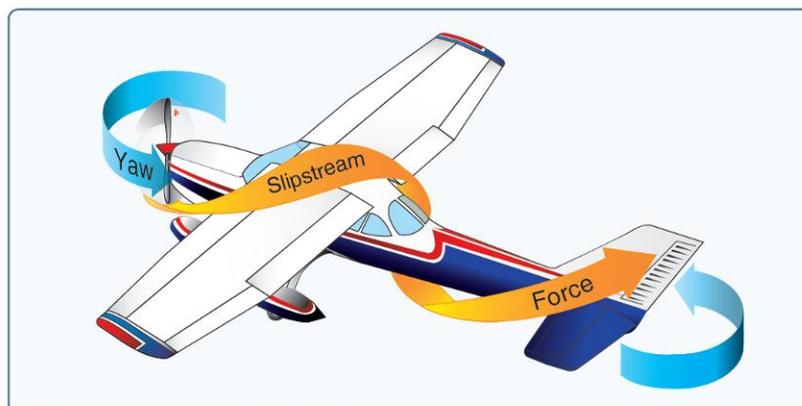
The following explanation of corkscrew effect was taken from Pilot's Handbook of Aeronautical Knowledge (page 5-31)<sup>4</sup>.

*The high-speed rotation of an aircraft propeller gives a corkscrew or spiraling rotation to the slipstream. At high propeller speeds and low forward speed (as in the takeoffs and approaches to power-on stalls), this spiraling rotation is very compact and exerts a strong sideward force on the aircraft's vertical tail surface. [Figure 5-48]*

*When this spiraling slipstream strikes the vertical fin, it causes a yawing moment about the aircraft's vertical axis. The more compact the spiral, the more prominent this force is. As the forward speed increases, however, the spiral elongates and becomes less effective. The corkscrew flow of the slipstream also causes a rolling moment around the longitudinal axis.*

*Note that this rolling moment caused by the corkscrew flow of the slipstream is to the right, while the yawing moment caused by torque reaction is to the left—in effect one may be counteracting the other. However, these forces vary greatly and it is the pilot's responsibility to apply proper corrective action by use of the flight controls at all times.*

*These forces must be counteracted regardless of which is the most prominent at the time.*



**Figure 5-48.** Corkscrewing slipstream.

<sup>4</sup> Federal Aviation Administration. (2016). Pilot's Handbook of Aeronautical Knowledge. The document can be found in the following link [https://www.faa.gov/regulations\\_policies/handbooks\\_manuals/aviation/phak/](https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak/)

## **1.9 Useful or Effective Investigation Techniques**

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

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## 2 ANALYSIS

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The factual information indicated that there was no report or record of aircraft system malfunction, therefore, the analysis will not discuss the aircraft serviceability and will discuss the issue on landing technique.

The aircraft departed and joined right pattern runway 12. When the aircraft position was on short final at speed 70 knots, the aircraft position was slightly on the right of final approach path and the student pilot attempted to align with the runway, and rolled the aircraft to the left.

At above runway threshold with the aircraft speed approximately of 60 knots, the aircraft yawed to the right and the pitch was slightly lower than the normal approach attitude, thereafter, the student pilot closed the throttle smoothly and the aircraft touched down on the right of runway centerline with the nose wheel first. The nose wheel touchdown first indicated lack or late of flare out.

The reduced power of the aircraft made the aircraft tend to yaw to the right as a result of the corkscrew effect reduced and required rudder application to eliminate the yaw effect.

The tire marks found on the runway prior the aircraft exited the runway pavement indicated that the brake was applied. The tire marks showed the aircraft travelled constantly deviate from the runway. The constant travel to the right might be caused by the yaw effect during the power reduction.

With the aircraft heading was slightly to the right and touched on the right of runway centerline, it shortened the available distance for deceleration. In addition, the delay of the main wheel contacted to the runway resulted in the delay of brake application.

The correction of the approach path resulted in the lack of rudder application to counter the corkscrew affect during power reduction and late of flare out. It was most likely that the student pilot focused to regain the directional control of the aircraft and resulted in the delay of flare out and lack of the rudder application.

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## 3 CONCLUSIONS

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### 3.1 Findings<sup>5</sup>

According to factual information during the investigation, the Komite Nasional Keselamatan Transportasi identified initial findings as follows:

1. The aircraft had a valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R). There were no technical and/or aircraft system abnormality reported or recorded prior to the occurrence.
2. The student pilot held valid license and medical certificate.
3. The flight was a solo flight exercise with intention to conduct six touches and go exercise and was the third solo for the student. The three touch and go exercises were uneventful.
4. When the aircraft position was on short final, the aircraft position was slightly on the right of runway centerline extension and the student pilot attempted to recover the aircraft to the left.
5. At above the runway threshold, the speed was approximately 60 knots, the pitch was slightly lower than the normal approach attitude thereafter, the student pilot put the throttle smoothly to idle. The reduced power of the aircraft made the aircraft tend to yaw to the right as a result of the corkscrew effect reduced and required rudder application to eliminate the yaw effect.
6. The aircraft then touched down on the right side of runway centerline with nose wheel touched first and the aircraft continued moving to the right then stopped outside the runway pavement. The nose wheel touchdown first indicated lack or late of flare out.
7. The tire marks found on the runway prior the aircraft exited the runway pavement indicated that the brake was applied. The tire marks showed the aircraft travelled constantly deviate from the runway. The constant travel to the right might be caused by the yaw effect during the power reduction.
8. With the aircraft heading was slightly to the right and touched on the right of runway centerline, it shortened the available distance for deceleration. In addition, the delay of the main wheel contacted to the runway resulted in the delay of brake application.
9. The correction of the approach path resulted in the lack of rudder application to counter the corkscrew affect during power reduction and late of flare out. It most likely that the student pilot focused to regain the directional control of the aircraft and resulted in the delay of flare out and lack of the rudder application.

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<sup>5</sup> Findings are statements of all significant conditions, events or circumstances in the accident sequence. The findings are significant steps in the accident sequence, but they are not always causal, or indicate deficiencies. Some findings point out the conditions that pre-existed the accident sequence, but they are usually essential to the understanding of the occurrence, usually in chronological order.

### **3.2 Contributing Factors<sup>6</sup>**

Focused to regain the directional control of the aircraft had delayed the flare out and lack of the rudder application resulted in the nose wheel touch down first and constant deviation travel away from the runway center line.

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<sup>6</sup> Contributing Factors is defined as events that might cause the occurrence. In the case that the event did not occur then the accident might not happen or result in a less severe occurrence.

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## **4 SAFETY ACTION**

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At the time of issuing this report, the Komite Nasional Keselamatan Transportasi had been informed any safety actions taken by the airport operator resulting from this occurrence. The Budiarto Airport operator advised flying schools which are operating in Budiarto Airport:

- To conduct safety awareness training for student pilot;
- To introduce Approach and Landing Accident Reduction (ALAR) training and stabilize approach criteria to student pilot and emphasize to make go around when does not meet the criteria.

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## **5 SAFETY RECOMMENDATIONS**

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The Komite Nasional Keselamatan Transportasi (KNKT) issued safety recommendations to address safety issues identified in this report to the Global Aviation Flying School.

- The aircraft did not align with the final approach path and focusing to regain the directional control of the aircraft had delayed the flare out and lack of the rudder application therefore KNKT recommends to introduce the student pilots with Approach and Landing Accident Reduction (ALAR) training and stabilize approach criteria and to emphasized a go around shall be made when does not meet the criteria.

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## 6 APPENDICES

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### 6.1 Budiarto Airport Comments

No	Reference Chapter, Page, Paragraph	Proposed Amendment	Reason For Proposed Change	Remarks
1.	Chapter 1.5. Aerodrome Information, page 3	Coordinate: 06°17'36 <del>36</del> <b>36.57</b> "S, 106°34'06 <del>06</del> <b>05.95</b> " E Runway Width: <del>30 meter</del> <b>45 meter</b>	Correction of airport coordinate and runway width.	<b>Accepted</b>



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