



**KOMITE NASIONAL KESELAMATAN TRANSPORTASI
REPUBLIC OF INDONESIA**

FINAL

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Aircraft Serious Incident Investigation Report

LOKA Pendidikan dan Pelatihan Penerbang

Cessna 172S; PK-BOB

Blimbingsari Airport, Banyuwangi, East Java

Republic of Indonesia

28 January 2014

2018

This Final Report was published by the Komite Nasional Keselamatan Transportasi (KNKT), Transportation Building, 3rd Floor, Jalan Medan Merdeka Timur No. 5 Jakarta 10110, Indonesia.

The report is based upon the investigation carried out by the KNKT in accordance with Annex 13 to the Convention on International Civil Aviation, the Indonesian Aviation Act (UU No. 1/2009) and Government Regulation (PP No. 62/2013).

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Jakarta, Oktober 2018

**KOMITE NASIONAL
KESELAMATAN TRANSPORTASI
CHAIRMAN**



SOERJANTO TJAHJONO

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ABBREVIATIONS AND DEFINITIONS

CASR	:	Civil Aviation Safety Regulation
DGCA	:	Directorate General Civil Aviation
ICAO	:	International Civil Aviation Organization
Km	:	Kilometer(s)
KNKT	:	Komite Nasional Keselamatan Transportasi
LOKA LP3	:	LOKA <i>Pendidikan dan Pelatihan Penerbangan</i> (Aviation Education and Training)
LT	:	Local Time
UTC	:	Universal Time Coordinate

SYNOPSIS

Based on the Komite Nasional Keselamatan Transportasi (KNKT) Policies and Procedures Manual considering the complexity of the occurrence, the final investigation report of this serious incident is using short report format.

On 28 January 2014 a Cessna 172S registration PK-BOB operated by LOKA Pendidikan dan Pelatihan Penerbang was conducting solo area flight training. Prior to the occurrence the aircraft was airworthy and there was no abnormality reported and the weather reported met the criteria for visual flight.

After returning from the area, and during approach on short final runway 08 at approximately 200 feet, the student pilot observed another aircraft on runway and decided to go around, at the same time the Blimbingsari Tower controller issued landing clearance and the student pilot cancelled the decision to go around and elected to continue landing.

During landing the aircraft bounced two times then student pilot performed go around and during climbing the student pilot heard unusual sound from the engine. On downwind, the student pilot felt difficulty in controlling the aircraft. The aircraft landed safely.

Observations on the runway found that there were two scratch marks at approximate 200 feet from the beginning runway 08. The aircraft examination found the nose wheel tire come out from the hub and both propeller blades tip bent.

The student pilot had total flying hours of 20 hours 32 minutes including 06 hours and 5 minutes on type, the student pilot has been scheduled for 40 minutes flying in the 90 days excluding the serious incident flight.

The investigation had concluded that the Contributing Factor was the decisions changed were made during most critical phase of the flight and occurred in short period of time was a difficult task considering the experience of the student pilot which resulted in improper handling and led to the steep nose down landing attitude.

The Komite Nasional Keselamatan Transportasi (KNKT) issued several safety recommendations addressed to LOKA Pendidikan dan Pelatihan Penerbang.

1 FACTUAL INFORMATION

1.1 History of the Flight

On 28 January 2014, a Cessna 172S registration PK-BOB operated by LOKA Pendidikan dan Pelatihan Penerbang (LOKA LP3) was being operated on a solo area training flight.

Prior to the occurrence the aircraft was airworthy and there was no abnormality reported and the weather reported the wind calm, visibility 10 km and cloud base at 2,000 feet.

The aircraft departed at 0100 UTC¹, (0800 LT) and the student pilot performed exercises in Genteng training area about 40 minutes then returned to Blimbingsari Airport and estimated arrival at 0150 UTC.

When the aircraft was on final approach runway 08 at altitude approximate 200 feet, the student pilot observed another aircraft on runway and decided to go around. At almost the same time, the Blimbingsari Tower controller issued landing clearance and the student pilot elected to continue approach and cancelled the go around.

At the touchdown the aircraft bounced two times, student pilot then performed go around. During climbing the student pilot heard unusual noise from the engine. When the aircraft at downwind, the student pilot felt difficulty to control the aircraft. The aircraft landed safely. During taxi the student pilot felt high vibration until the aircraft stop at the apron.

No one injured in this serious incident. Examination of the aircraft found propeller blades tip bent and the nose wheel tire ripped.

Propeller scratch marks were found on the runway at approximate 200 feet from the beginning runway 08 near the runway center line.

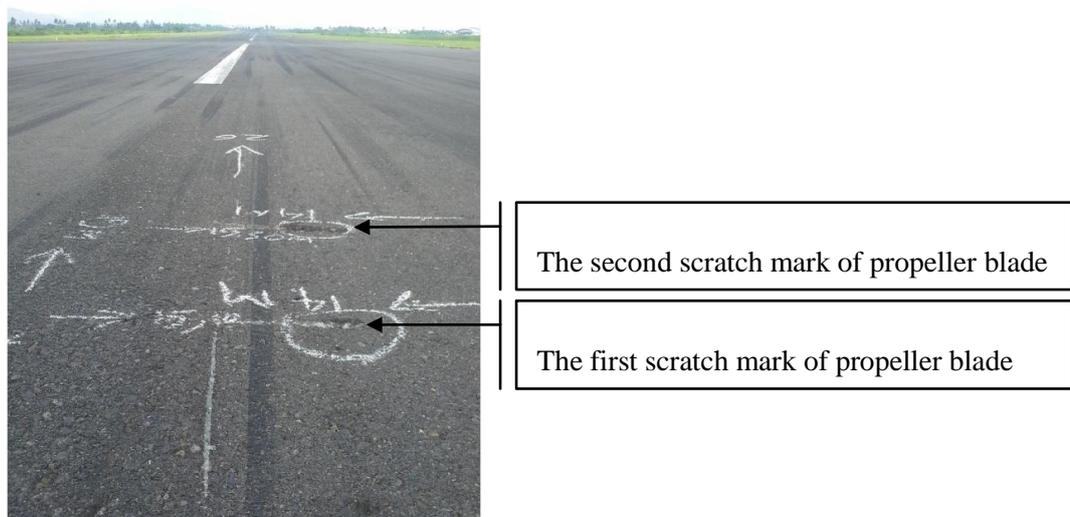


Figure 1: Two propeller scratch marks found on runway 08

¹ 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 2: The aircraft damage observed after aircraft parked

1.2 Personnel Information

The student pilot was 19 years old, joined the flying school since 1 November 2012, and held a second-class medical certificate that valid up to 30 October 2014.

The flight experience according to the document, the pilot recorded total flying hours of 20 hours 32 minutes, total on type of 6 hours 5 minutes, the flight hours on the last 90 days was 40 minutes exclude the serious incident flight which was one hour.

1.3 Aircraft Information

PK-BOB was a Cessna Skyhawk C-172S has serial number 11290, manufactured by Cessna Aircraft Company and has recorded total flight time since new was 55 hours 20 minutes.

The engine installed on the aircraft was manufactured by Lycoming, type/model IO-360-L2A, with the serial number L-35981. The engine has recorded the total time of 55 hours 26 minutes since new. The propeller installed was manufactured by McCauley Propeller.

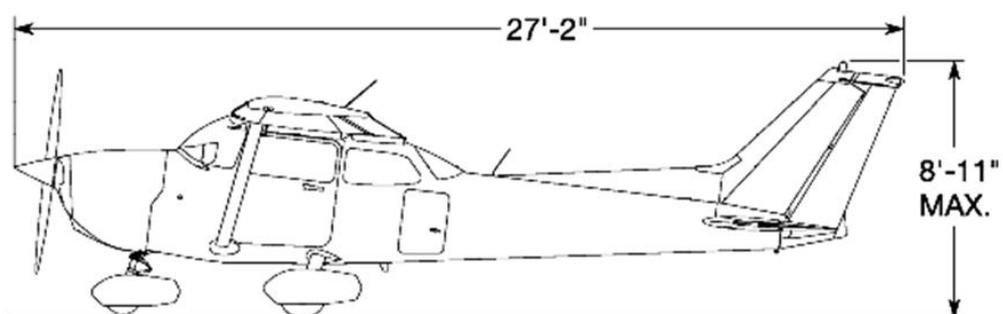


Figure 3: Aircraft dimension

1.4 Aerodrome Information

Blimbingsari Airport located at East Java, at elevation of 105 feet above sea level, and operated by DGCA, and used for the passenger regular and training flights. The runway has asphalt surface direction was 08-26, with runway length of 1800 meters and width of 30 meter.

1.5 Excerpt from Cessna 172S Manual

The General Cessna 172S Landing Criteria

- *Maintain a constant angle glide path.*
- *Maintain final approach speed until round out (flare) at approx. 10' to 20' above the runway.*
- *Reduce throttle to touch down with the engine idling and the airplane at minimum controllable airspeed within the first 1,000' of the runway.*
- *Touch down on the main gear, with the wheels straddling the centerline.*
- *Maintain a pitch attitude after touchdown that prevents the nose wheel from slamming down by increasing aft elevator as the airplane slows.*

Good Planning and Good Landing

A good landing is a result of good planning, when planning an approach and landing, decide on the type of approach and landing (visual or instrument, short-field, soft-field, etc). Decide on the flap setting, the final approach speed, the aiming point, and where the airplane will touch down on the runway surface.

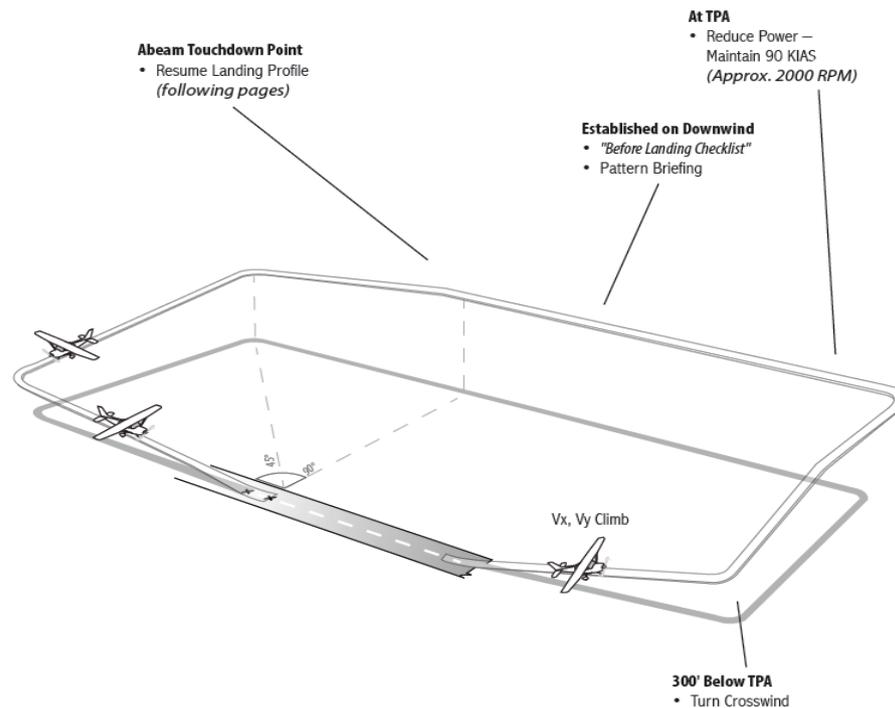


Figure 4: General Normal Circuit Pattern and Go Around procedure for Cessna 172S

Go Around Philosophy

Go around decision to execute a go-around is both prudent and encouraged anytime the outcome of an approach or landing becomes uncertain. It considers the use of a go-around under such conditions as an indication of good judgement and cockpit discipline on the part of the pilot.

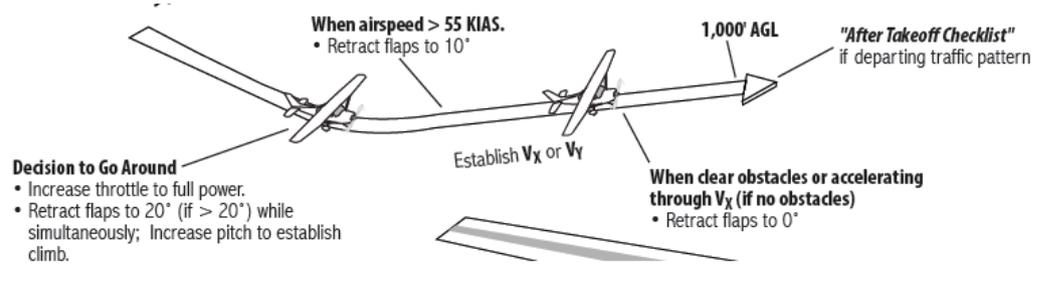


Figure 5: Go Around procedure

1.6 Bouncing during touchdown (FAA Airplane Flying Handbook 2004 8-30/31)

When the airplane contacts the ground with a sharp impact as the result of an improper attitude or an excessive rate of sink, it tends to bounce back into the air. Though the airplane's tires and shock struts provide some springing action, the airplane does not bounce like a rubber ball. Instead, it rebounds into the air because the wing's angle of attack was abruptly increased, producing a sudden addition of lift. The abrupt change in angle of attack is the result of inertia instantly forcing the airplane's tail downward when the main wheels contact the ground sharply.

The severity of the bounce depends on the airspeed at the moment of contact and the degree to which the angle of attack or pitch attitude was increased. Since a bounce occurs when the airplane makes contact with the ground before the proper touchdown attitude is attained, it is almost invariably accompanied by the application of excessive back-elevator pressure.

This is usually the result of the pilot realizing too late that the airplane is not in the proper attitude and attempting to establish it just as the second touchdown occurs.

The corrective action for a bounce is the same as for ballooning and similarly depends on its severity. When it is very slight and there is no extreme change in the airplane's pitch attitude, a follow-up landing may be executed by applying sufficient power to cushion the subsequent touchdown, and smoothly adjusting the pitch to the proper touchdown attitude.

When a bounce is severe, the safest procedure is to EXECUTE A GO-AROUND IMMEDIATELY. No attempt to salvage the landing should be made. Full power should be applied while simultaneously maintaining directional control and lowering the nose to a safe climb attitude. The go-around procedure should be continued even though the airplane may descend and another bounce may be encountered. It would be extremely foolish to attempt a landing from a bad bounce since airspeed diminishes very rapidly in the nose-high attitude, and a stall may occur before a subsequent touchdown could be made.

1.7 Organizational and Management Information

The LOKA Pendidikan dan Pelatihan Penerbang head office was located at Jalan Jemur Andayani 1 no 73, Surabaya. LOKA LP3 has been approved to conduct pilot flight training in accordance CASR 141 since 2012. The LOKA LP3 operated two types of aircraft consisted of TB 10 Tobago and Cessna 172 S.

The LOKA LP3 has two manuals which were Training Procedure Manual (published at 2012) and Safety Management Manual (published at 2014). Both manuals have been approved by the DGCA.

2 ANALYSIS

The aircraft was not installed with flight recorder therefore, the investigation utilized the information gathered from the interviews, general flight technique, damage found on the aircraft, and relevant aircraft and operator manuals.

The investigation did not find any evidence related to the aircraft serviceability. The analysis will discuss the relevant issues resulting in bounce landing and propellers hit the runway. Therefore, the analysis focused on;

1. Decision to continue approach
2. Approach path angle and landing technique.

2.1 Decision to continue approach

The student pilot has joined the flying school since 1 November 2012. Observation on the flight log book, shows that the student pilots has total flying hours of 20 hours 32 minutes including 6 hours 5 minutes on Cessna 172S. The records also showed 40 minutes flight hour for the last 90 days. This considered as low flying experience.

The low flying experience and including experience on type that was approximately 6 hours which consisted of 40 minutes in the last 90 days, might have influenced the adequacy of student pilot skill required to handle particular circumstance especially in a dynamic environment changes and judgment in electing proper decision making.

The approach for landing phase is the most critical phases of the flight which requires precision of aircraft handling to meet certain targets such as speed, path and runway center line. The approach landing phase requires pilot attention and concentration combined with skill and experience. The approach landing phase is the most stressful condition for pilot with low experience.

The aircraft was on final approach runway 08 at altitude approximate 200 feet, when the student pilot observed another aircraft on runway and decided to go around. At almost the same time, the controller issued landing clearance, and the student pilot changed the decision and elected to continue landing. The landing clearance provided by controller might be intended to avoid two aircraft on the climb out area at the same time. The landing clearance might be interpreted by the student pilot as instruction to land and elected to cancel the go around decision.

The decision was changed at altitude approximately 200 feet. Considering normal approach path, the time from this position to landing would be less than one minute. The student pilot required to take correct action in order to put the aircraft on proper approach and land, within this period of time. It requires skill and technique to be able to perform the landing safely. The adequate skill and technique might be adopted through experience.

The recorded total flying hours of the student pilot was approximately 20 hours including 6 hours on type. The student pilot only flew 40 minutes on the last 90 days excluding the serious incident flight. Low experience flying combined with long period of not flying without refreshing, might have degraded the student pilot skill.

The student pilot changed the decision from landing the aircraft, changed to go around and after received landing clearance the decision changed back to landing.

These decision changes were made during most critical phase of the flight and occurred in short period of time. Considering the experience of the student pilot, this condition considered as difficult task and resulted in improper handling which led to the abnormal landing attitude.

2.2 Approach path angle and landing technique

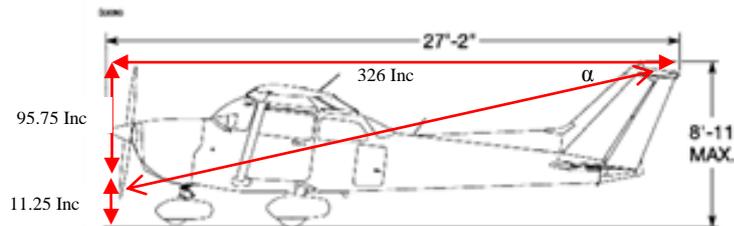
Refers to the previous analysis, at approximately 200 feet the pilot changed the decision from landing to go around and back to landing.

Refer to Cessna manuals titled 'Bouncing during Touchdown' *when the airplane contacts the ground with a sharp impact as the result of an improper attitude or an excessive rate of sink, it tends to bounce back into the air. Though the airplane's tires and shock struts provide some springing action, the airplane does not bounce like a rubber ball. Instead, it rebounds into the air because the wing's angle of attack was abruptly increased, producing a sudden addition of lift. The abrupt change in angle of attack is the result of inertia instantly forcing the airplane's tail downward when the main wheels contact the ground sharply.*

Observation on the damage of propeller blades and the nose tire found that the blades bent for more than 40° and the nose tire ripped. It indicated that on touchdown the propellers and the nose tire hit the runway surface. It was consistent with the two propeller scratch marks found at approximately 200 feet of the beginning runway 08.

Refer to the aircraft dimension and application of simple formula $\tan \alpha^\circ = 95.75 \text{ Inc}$ divided by 326 Inc resulted 16° , and this means that the propeller tips might contact to the ground at an angle approximately 16° pitch down.

An illustration of the propeller ground clearance vs the aircraft pitch angle relative to runway surface for measurement of pitch angle shows in the figure below.



The steep angle approach of approximately 16° and resulted to the propeller contacted the runway surface.

3 CONCLUSIONS

3.1 Findings

According to factual information gathered during the investigation, the KNKT founded any findings were listed as follows:

1. The aircraft was airworthy prior to the occurrence and was operated within the weight and balance envelope. There was no report or record that the aircraft had system abnormality during the flight from take-off until the time of the occurrence.
2. The pilot was a student pilot held a valid licence has recorded total flying hours of 20 hours 32 minutes including total on type of 6 hours 5 minutes, and the flight hours on the last 90 days was 40 minutes excluding the serious incident flight. The total experience can be classified as low experience.
3. When the aircraft was on final at approximately 200 feet, the student pilot observed that another aircraft was on runway and decided to go around which was changed to continue approach after the controller issued landing clearance.
4. These decision changes were made during most critical phase of the flight and occurred in short period of time. Considering the experience of the student pilot, this condition considered as difficult task and resulted in improper handling which led to the abnormal landing attitude.
5. Two propeller scratch marks were found at approximate 200 feet from the beginning runway 08. Observation on the aircraft found the nose wheel tire ripped and both propeller blades tip bent. Indicated that the aircraft had steep nose down attitude during landing.
6. The ‘Go Around Philosophy’ describes in the Cessna manual stated that the decision to execute a go-around is both prudent and encouraged anytime the outcome of an approach or landing becomes uncertain.

3.2 Contributing Factors²

The decisions changed were made during most critical phase of the flight and occurred in short period of time was a difficult task considering the experience of the student pilot which resulted in improper handling and led to the steep nose down landing attitude.

² “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.

4 SAFETY ACTION

At the time of issuing this final investigation report, the Komite Nasional Keselamatan Transportasi (KNKT) has not been informed of any safety actions resulting from this occurrence.

5 SAFETY RECOMMENDATIONS

The investigation identified safety issues which related to the decision making and flight judgment in a dynamic environment changes especially in the critical condition. Therefore, the Komite Nasional Keselamatan Transportasi (KNKT) issued several safety recommendations addressed to LOKA Pendidikan dan Pelatihan Penerbang.

- **04.O-2018-04.01**

The student pilot changed the decision from landing the aircraft, changed to go around and after received landing clearance the decision changed back to landing. The decision changes were made on short final which is the most critical phase of the flight and occurred in short period of time. Considering the experience of the student pilot, this condition considered as difficult task and resulted in improper handling which led to the abnormal landing attitude. KNKT recommends:

To emphasize student pilots has sufficient knowledge and skill to make the correct decision especially when safe landing cannot be made.

- **04.O-2018-04.02**

The recorded total flying hours of the student pilot was approximately 20 hours including 6 hours on type. The student pilot only flew 40 minutes on the last 90 days excluding the serious incident flight. Low experience flying combined with long period of not flying without refreshing, might have degraded the student pilot skill. The degraded flying skill, might resulted in inability to control the aircraft on abnormal situation. KNKT recommends:

To ensure that the student pilots who have been prolong absence off the flight duty are provided with a special treatment prior to be scheduled for a solo flight.

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