KOMITE NASIONAL KESELAMATAN TRANSPORTASI
REPUBLIC OF INDONESIA

FINAL

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Aircraft Accident Investigation Report

PT. Mandiri Utama Flight Academy

Cessna 172S; PK-MUA

Blimbingsari Airport, Banyuwangi, East Java

Republic of Indonesia

16 January 2017

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 initial 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, August 2018

KOMITE NASIONAL
KESELAMATAN TRANSPORTASI
CHAIRMAN

SOERJANTO TJAHJONO

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ABBREVIATIONS AND DEFINITIONS

ARFF	:	Airport Rescue and Fire Fighting
BMKG	:	*Badan Meteorology Klimatologi dan Geofisika* (Meteorology, Climatology and Geophysics Agency of Indonesia)
C	:	Celcius
CASR	:	Civil Aviation Safety Regulation
C of A	:	Certificate of Airworthiness
C of R	:	Certificate of Registration
DGCA	:	Directorate General of Civil Aviation
Doc.	:	Document
FAA	:	Federal Aviation Administration
ICAO	:	International Civil Aviation Organization
In Hg	:	Inch Hydrargyrum (Mercury)
KNKT	:	*Komite Nasional Keselamatan Transportasi* also known as National Transportation Safety Committee (NTSC)
km	:	kilometer
Km/h	:	Kilometer per hour
LT	:	Local Time
mb	:	milibar
MUFA	:	Mandiri Utama Flight Academy
MOS	:	Manual of Standard
SPL	:	Student Pilot License
TD	:	Dew Point
TT	:	Temperature
UTC	:	Universal Time Coordinated
VMC	:	Visual Meteorological Condition

SYNOPSIS

On 16 January 2017, a Cessna 172S registered PK-MUA operated by PT. Mandiri Utama Flight Academy on a solo flight training area from Blimbingsari Airport (WADY), Banyuwangi to Panggang Bay training area and return to Blimbingsari.

After returned from the area up to the final approach runway 08, the approach was normal refer to the training provided and the student pilot requested for full stop landing.

At 0317 UTC, before touchdown the student pilot flared out and the aircraft ballooning. The student pilot pushed the control column slightly. The aircraft nose down and the propeller hit the runway. The student pilot action to recover the ballooning was contrary to the ballooning recovery technique according to the Airplane Flying Handbook.

The aircraft stopped and fire appeared on the front right side of the aircraft. The student pilot evacuated through the left door.

The wreckage examination found fuel line broken on the right lower fuselage that most likely caused by the impact. The fuel spill from the broken fuel line and the spark that possibly created by the friction of the aircraft part with the runway ignited the fire.

The controller saw the condition and notified the Airport Rescue and Fire Fighting Services (ARFF) by activating the serine and the crash bell. The fire extinguished after about 20 minutes and two foam tenders used more than 6,500 liters water and mixed with foam while it required approximately 400 liters of water for the type of aircraft according to the Manual of Standard (MOS) 139. The amount of extinguishing agent and time required, indicated that the extinguishing process was not effective.

No one injured in this accident and the aircraft destroyed by impact forces and post impact fire.

The investigation concluded that the contributing factors to this accident were:

- The aircraft ballooning recovery technique was contrary to the ballooning recovery technique, resulted in the aircraft nose down during impact the runway, broke the fuel pipe line and initiated fire.
- The fire extinguishing process was not effective resulted in the aircraft destroyed.

The KNKT issued several safety recommendations to PT. Mandiri Utama Flight Academy, Blimbingsari Airport Operator and Directorate General of Civil Aviation (DGCA) to address safety issues identified during the investigation.

1. FACTUAL INFORMATION

1.1 History of the Flight

On 16 January 2017, a Cessna 172S registered PK-MUA operated by PT. Mandiri Utama Flight Academy on a solo flight training area from Blimbingsari Airport (WADY), Banyuwangi[1] to Panggang Bay training area and return to Blimbingsari.

Prior to conduct the flight, the student pilot performed preflight check and there was no abnormality.

At 0915 LT (0215 UTC) it was day time, after the engine started, the student pilot contacted Blimbingsari Tower controller (controller) and requested taxi clearance for area training exercise. The controller provided taxi clearance and training at Panggang Bay area.

At 0235 UTC, the aircraft took off and climbed to altitude 1,000 feet until MUNCAR point. After passed MUNCAR point, the aircraft continued climb to 3,000 feet and proceed to Panggang Bay training area.

At 0255 UTC, the aircraft arrived at Panggang Bay training area and the student pilot made exercises of normal turn, medium turn and slow flight.

At 0303 UTC, the student pilot requested to leave the training area and the controller directed to return to Blimbingsari via MUNCAR point and to descend to 1,500 feet. Thereafter, the student pilot was instructed by the controller to join downwind for landing runway 08.

A few minutes before PK-MUA landing, the controller informed to another aircraft pilot which was on final that the wind was 5 knots from 360 degrees. When PK-MUA was on final and the controller issued the landing clearance without the wind information.

There was no aircraft system abnormality recorded and reported until the aircraft landing. The student pilot recalled that the approach was on profile refer to the training provided.

At 0317 UTC, before touchdown the student pilot pulled the yoke to flare out for landing and the aircraft ballooning. The student pilot pushed the yoke slightly. The aircraft nose down and the propeller hit the runway.

The aircraft stop approximately 400 meters from the threshold and fire appeared on the front right side of the aircraft. The student pilot was not injured and self-evacuated from the left door.

1 Blimbingsari Airport (WADY), Banyuwangi will be named as Blimbingsari for the purpose of this report.

Figure 1: The sketch of PK-MUA position after stop and catch on fire

Air traffic controller observed the condition then activated the siren and the crash bell. The activation of the airport serine and the crash bell triggered the Airport Rescue and Fire Fighting (ARFF) personnel to deploy to the location. The ambulance which was arrived at the location assisted the student pilot and took to the hospital.

1.2 Damage to Aircraft

The aircraft destroyed as result of impact forces and post impact fire. The fire consumed most part of the fuselage. The detail of the damages was as follow:

- The center fuselage damaged by post impact fire;
- The nose landing gear collapsed;
- The propellers bent and scratch.

Figure 2: Damage to the fuselage

Figure 3: The propeller, engine and engine cowling condition after the accident

1.3 Other Damage

Part of the runway surface at the position of aircraft stop had heat damage.

Figure 4: Heat damage on the runway

1.4 Personnel Information

The student pilot was 18 years old of Indonesian female student pilot, held valid Student Pilot License (SPL) and valid second class medical certificate. The student pilot had total flying hour of 34 hours including 1 hour in the last 24 hours.

The student pilot experienced several time aircraft ballooning during landing. This condition had been identified by the flight instructor and the student pilot had been briefed related to the ballooning recovery.

The accident flight was the fifth solo flight for the student pilot. The first solo flight was conducted on 21 November 2016.

1.5 Aircraft Information

The aircraft was manufactured by Cessna Aircraft Company in United States of America with serial number of 172-58071, registered PK-MUA and had valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R).

The aircraft total hour was 8,764.68 hours since new. The last 100-hour inspection was conducted on 16 December 2016 and the last 50-hour inspection was conducted 5 January 2017.

The engine installed was a Lycoming engine part number IO360L2A and serial number L-34048-51E manufactured by Lycoming Company in United State of America with, the total hour of the engine since new was 1,566.58 hours.

The aircraft was operated within correct weight and balance envelope.

No flight recorder installed and neither it required by the current Indonesia aviation regulation.

1.6 Meteorological Information

The weather reported by *Badan Meteorologi, Klimatologi dan Geofisika* (BMKG – Meteorology, Climatology and Geophysics Agency of Indonesia) at 0300 UTC stated that the area around Blimbingsari airport met the criteria of Visual Meteorological Condition (VMC).

The weather report for Blimbingsari Airport on 16 January 2017 at 0300 UTC, was as follows:

Wind	:	350 / 9 knot
Visibility	:	9 km
Weather	:	Haze
Cloud[2]	:	SCT 1800 feet
TT/TD (°C)	:	27°C / 24 °C
QNH (mb/in Hg)	:	1009/29.82
QFE (mb/in Hg)	:	1005/29.70

1.7 Aerodrome Information

Airport Name	:	Blimbingsari Aiport
Airport Identification	:	WADY
Airport Operator	:	Directorate General of Civil Aviation
Airport Certificate	:	028/SBU-DBU/VIII/2010
Coordinate	:	8°18’38” S 114°20’24” E
Elevation	:	105 feet
Runway Direction	:	08 - 26
Runway Dimension	:	1800 x 30 meters
Surface	:	asphalt

2 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 scattered (SCT) is when the clouds cover 3/8 to 4/8 area of the sky.

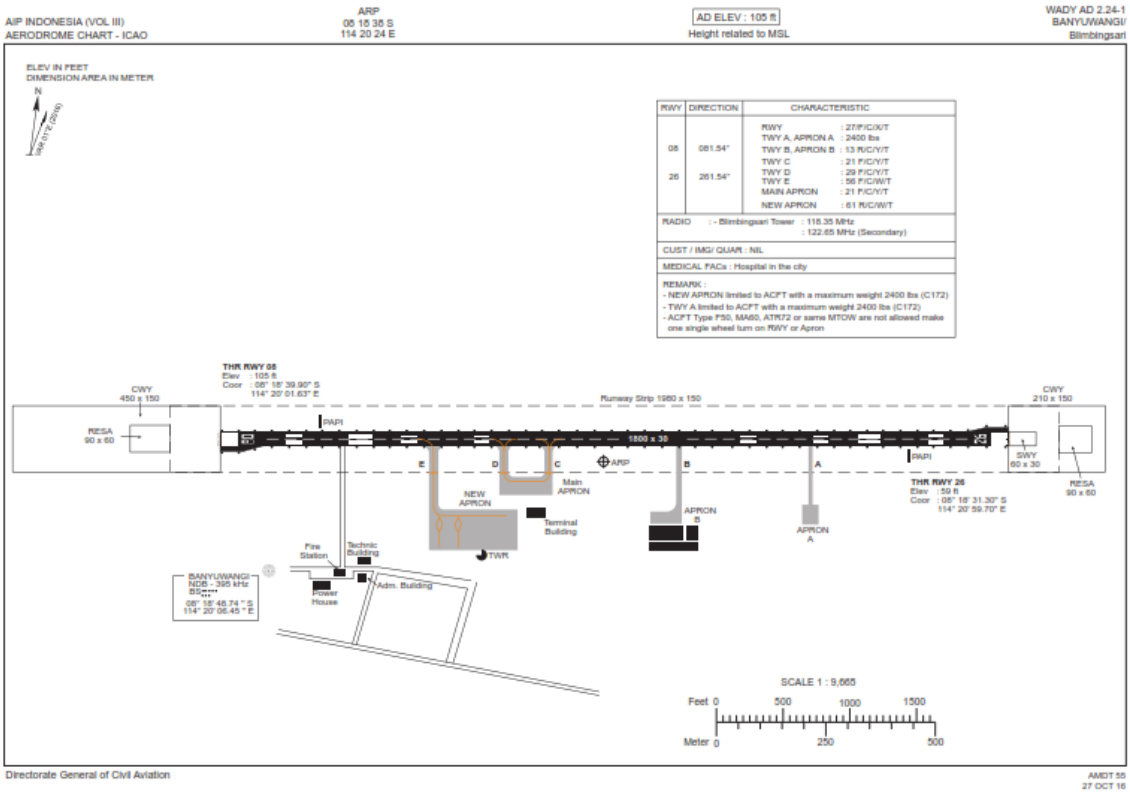

Figure 5: Aerodrome layout

The Blimbingsari Airport was located in Banyuwangi, East Java Indonesia. The airport owned by local government of Banyuwangi regency, operated by Director General of Civil Aviation (DGCA) and was opened for operations in December 2010. The airport served training flights and regular passenger flight up to ATR 72 aircraft.

The Airport Rescue and Fire Fighting (ARFF) of Banyuwangi airport was category 4. The ARFF had one unit foam tender type IV, one unit foam tender type V, one unit rescue car type V, one unit ambulance, and one unit nurse tender. The ARFF consisted of eight fire fighters.

The ARFF had routine monthly program of fire drill by practicing the procedure firefighting in the airport area.

1.8 Wreckage and Impact Information

Several scratch marks found on the runway, including propeller scratch marks, the detail as follows:

- The first mark found approximately of 348 meters from the beginning runway 08
- The second mark found approximately of 77 centimeters from the first mark
- The third mark found approximately of 95 centimeters from the second mark

From the third propeller mark, scratch marks found approximately 50 meters long until the position of the aircraft stopped.

The aircraft stopped at approximately 400 meters from the beginning runway 08 on heading 080°.

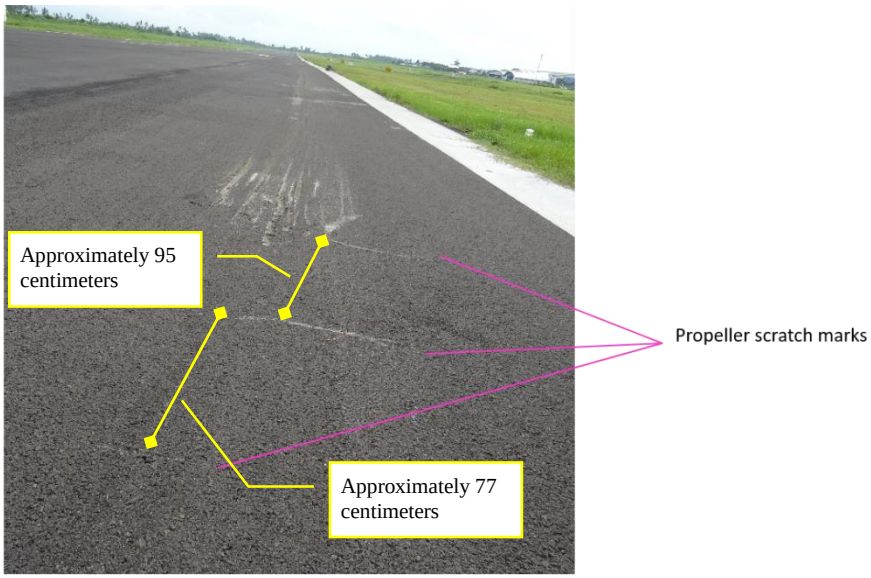

Figure 6: The marks found on the runway

The investigation did not find any abnormality on the flight control cable.

The cabin destroyed by post impact fire. The tail section was relatively intact including the horizontal and vertical stabilizer. There was no sign of post impact fire on the engine. Some engine parts such as fuel heater and exhaust damaged due to impact.

The fuel line below the right cockpit area was broken most probably due to impact. The figure below showed the position and condition of the broken fuel line.

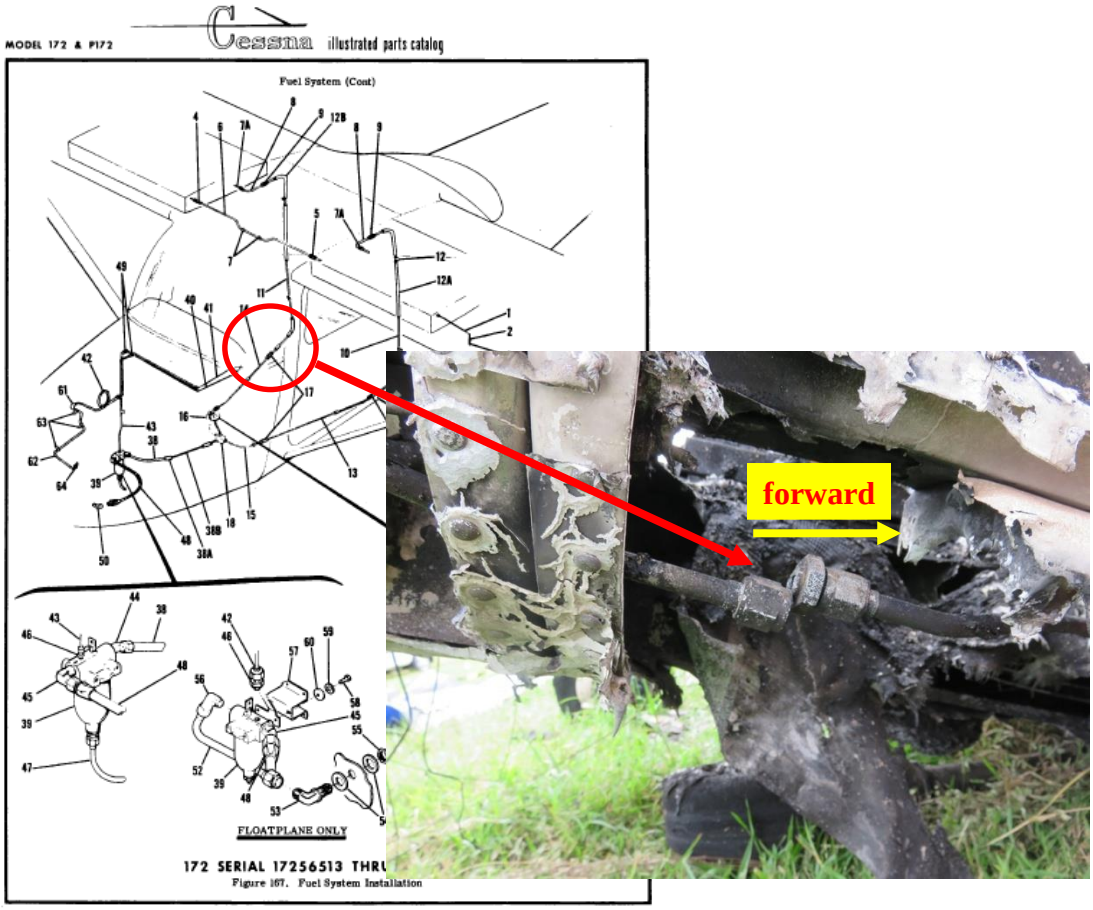

Figure 7: Broken fuel line under the right cockpit seat

1.9 Medical and Pathological Information

The medical examination was performed to the student pilot at the local hospital in Banyuwangi after the accident. The medical report stated that the pilot had minor injury and no special treatment required.

On 17 January 2017, another medical examination to the student pilot was performed by Ministry of Transportation medical team and reported that no indication of drug and alcohol consumption. The examination also reported there was no indication serious injury and the student pilot was in a stable condition.

1.10 Fire

The controller saw that the fire was initiated on the front right side of the aircraft after the aircraft stopped and developed into bigger fire.

The activation of the airport serine and the crash bell triggered the Airport Rescue and Fire Fighting (ARFF) personnel to deploy to the location with one rescue car, one ambulance, and one foam tender type V. The foam tender type V has capacity of 2,500 liters minimum of water and 300 liters minimum of foam.

The ARFF personnel proceed to the accident site via access road provided for the ARFF. The ARFF arrived on the accident site approximately 3 minutes after the accident and immediately attempted to extinguish the fire by sprayed the water and foam. Thereafter, the rescue car returned to the fire station to ask foam tender type IV to the accident site.

After sprayed all of the water from fire truck type V and IV, the fire had not been extinguished. The fire truck type V returned to the fire station and refilled with water then returned to the accident site. The fire extinguished took about 20 minutes after the accident.

Figure 8: The extinguishing process by the ARFF

The figures below show the aircraft caught fire after landing and after the fire extinguished.

Figure 9: The aircraft condition during the fire and after extinguished

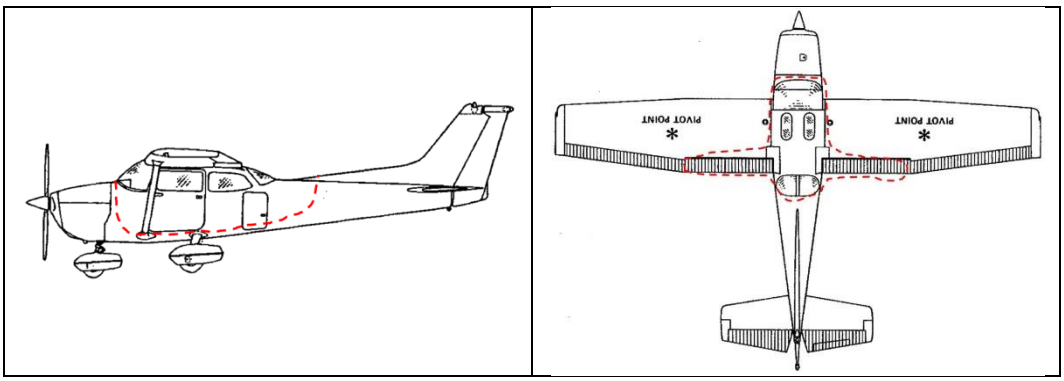

Figure 10: The area of fire damage showed with dash lines

1.11 Survival Aspects

After the aircraft stopped, the student pilot evacuated through the left door. Some other student pilots and the instructors who were standing by in the hangar went to the site to provide assistant to the student pilot.

The ARFF ambulance driver went to the accident site and saw the student pilot walked away from the accident site. The ambulance driver, a flight instructor and two other student pilots assisted the student pilot and took to the hospital.

1.12 Organizational and Management Information

1.12.1 Mandiri Utama Flight Academy (MUFA)

Mandiri Utama Flight Academy (MUFA) was a Pilot School established in October 2012 and owned by PT Surya Aviasi Internasional. MUFA held certificate of approval number 141D-23. The head office was on Rukan Permata Senayan Blok E/36, Jalan Tentara Pelajar, Jakarta. The operational area was in Blimbingsari Airport, Banyuwangi, East Java, Indonesia. MUFA operated two Cessna 172P and three Cessna 172S aircraft.

1.12.2 ICAO Annex Requirement

The requirement of the Airport Rescue and Fire Fighting as described in the ICAO Annex 14 stated:

9.2 Rescue and Firefighting

General

The principal objective of a rescue and firefighting service is to save lives in the event of an aircraft accident or incident occurring at, or in the immediate vicinity of, an aerodrome. The rescue and firefighting service is provided to create and maintain survivable conditions, to provide egress routes for occupants and to initiate the rescue of those occupants unable to make their escape without direct aid. The rescue may require the use of equipment and personnel other than those assessed primarily for rescue and firefighting purposes. The most important factors bearing on effective rescue in a survivable aircraft accident are: the training received, the effectiveness

of the equipment and the speed with which personnel and equipment designated for rescue and fire fighting purposes can be put into use.

Personnel

9.2.42 All rescue and fire fighting personnel shall be properly trained to perform their duties in an efficient manner and shall participate in live fire drills commensurate with the types of aircraft and type of rescue and fire fighting equipment in use at the aerodrome, including pressure-fed fuel fires.

Note 1.— Guidance to assist the appropriate authority in providing proper training is given in Attachment A, Section 18, and the Airport Services Manual (Doc 9137), Part 1.

Note 2.— Fires associated with fuel discharged under very high pressure from a ruptured fuel tank are known as "pressure-fed fuel fires".

9.2.43 The rescue and fire fighting personnel training programme shall include training in human performance, including team coordination.

Note.— Guidance material to design training programmes on human performance and team coordination can be found in the Human Factors Training Manual (Doc 9683).

9.2.45 Recommendation.— In determining the minimum number of rescue and fire fighting personnel required, a task resource analysis should be completed and the level of staffing documented in the Aerodrome Manual.

Note.— Guidance on the use of a task resource analysis can be found in the Airport Services Manual (Doc 9137), Part 1.

1.12.3 ICAO Document 9137

The requirement of aircraft firefighting and rescue procedures in ICAO Doc.9137 part 1 stated:

12.1 Features Common to All Emergencies

12.1.10 A continuous water supply is essential and is usually not available at all points, provisions should be in place to ensure that the required fire flow be maintained. It is important that prearrangements also include additional emergency resources.

18.4 Operational Effectiveness and Standards

18.4.1 As the success of any RFF operations rely very much on teamwork, the importance of building mutual trust and team coordination amongst staff during training cannot be overstressed (Liveware vs. Liveware). Training must therefore be designed to guide RFF personnel towards achieving these objectives.

18.4.2 In order for RFF training to be as realistic as possible, live fire training is crucial in helping RFF personnel acclimatize to a heat and smoke filled environment (Liveware vs. Environment), so that in the event of an actual emergency, RFF personnel will be able to execute their tasks more confidently and effectively. Where

possible, simulators replicating different facades of RFF operations (e.g. vehicle driving and operations; command and control etc.) should be made available for RFF personnel to be trained in a controlled, safe and realistic environment.

1.12.4 Manual of Standard (MOS) CASR Part 139 Volume IV

Chapter 4

The Manual of Standard CASR part 139 volume IV in chapter 4 describe the calculation results of water requirement and discharge rate accordance with the type of aircraft. The type of aircraft for Cesnna 172 extinguish requires quality foam B with approximately 400 liters of water, whereas foam quality requirement C total water requirement approximately 280 liters with discharge rate 271.96 liter/minute.

The MOS 139 was written in local language (Bahasa) and translated into English for the purpose of this report by the investigator.

Chapter 5

Original	English translation
Foam Tender Tipe IV: *Kapasitas tangki air minimal 4000 liter, tangki foam konsentrat minimum 12 persen dari kapasitas tangki air, kapasitas tangki tepung kimia kering (dry chemical powder) 250 kg, kapasitas pompa minimum 3000 liter per menit dan kapasitas pancaran dan kapasitas pancaran utama busa minimum 2000 liter per menit; dilengkapi dengan handlines, nozzle di bawah dan di depan kendaraan, monitor, akselerasi 0 sampai dengan 80 km/jam dalam 25 detik, kecepatan minimum 105 km/jam, jarah pancaran rata-rata (discharge range) minimum 60 meter, jarak pengereman (stop distance) maksimum 12 meter pada kecepatan 32 km/jam.*	Foam Tender Type IV; Water tank capacity of at least 4,000 liters, foam concentrate tank minimum 12 percent of the capacity of the water tank, the capacity of the tank dry chemical powder 250 kg, pump capacity minimum 3,000 liters per minute and the main foam emission capacity minimum 2,000 liters per minute; equipped with handlines, nozzles below and in front of the vehicle, monitor; acceleration 0 to 80 km/h in 25 seconds, minimum speed 105 km/h, distance minimum discharge range of 60 meters, distance braking (stop distance) maximum 12 meters at a speed of 32 km/h.
Foam Tender Tipe V: *Kapasitas tangki air minimal 2.500 liter, tangki foam konsentrat minimum 12 persen dari kapasitas tangki air, kapasitas tangki tepung kimia kering (dry chemical powder) 250 kg, kapasitas pompa minimum 2500 liter per menit dan kapasitas pancaran utama busa minimum 1800 liter per menit ; dilengkapi dengan handlines, nozzle di*	Foam Tender Type V; Minimum water tank capacity 2,500 liters, minimum concentrate foam tank 12 percent of water tank capacity, tank capacity dry chemical powder 250 kg, pump capacity minimum 2,500 liters per minute and the main foam emission capacity minimum of 1,800 liters per minute; equipped with handlines, nozzles below and in front of the

bawah dan di depan kendaraan, monitor, akselerasi 0 sampai dengan 80 km/jam dalam 25 detik, kecepatan minimum 105 km/jam, jarak pancaran rata-rata (discharge range) minimum 60 meter, jarak pengereman (stop distance) maksimum 12 meter pada kecepatan 32 km/jam.	vehicle, monitor; acceleration 0 to 80 km/h in 25 seconds, minimum speed 105 km/h, distance minimum discharge range of 60 meters, distance braking (stop distance) maximum 12 meters at a speed of 32 km/h.

1.13 Additional Information

1.13.1 Airplane Flying Handbook (FAA-H-8083-3B)

The Airplane Flying Handbook (FAA-H-8083-3B) in chapter 8 described the aircraft ballooning during round out (flare).

If the pilot misjudges the rate of sink during a landing and thinks the airplane is descending faster than it should, there is a tendency to increase the pitch attitude and AOA (Angle of Attack) too rapidly.

This not only stops the descent, but actually starts the airplane climbing. This climbing during the round out is known as ballooning. [Figure 8-35] Ballooning is dangerous because the height above the ground is increasing and the airplane is rapidly approaching a stalled condition. The altitude gained in each instance depends on the airspeed or the speed with which the pitch attitude is increased.

Depending on the severity of ballooning, the use of throttle is helpful in cushioning the landing. By adding power, thrust is increased to keep the airspeed from decelerating too rapidly and the wings from suddenly losing lift, but throttle must be closed immediately after touchdown. Remember that torque is created as power is applied, and it is necessary to use rudder pressure to keep the airplane straight as it settles onto the runway.

When ballooning is excessive, it is best to execute a go around immediately, do not attempt to salvage the landing. Power must be applied before the airplane enters a stalled condition.

The pilot must be extremely cautious of ballooning when there is a crosswind present because the crosswind correction may be inadvertently released or it may become inadequate. Because of the lower airspeed after ballooning, the crosswind affects the airplane more. Consequently, the wing has to be lowered even further to compensate for the increased drift. It is imperative that the pilot makes certain that the appropriate wing is down and that directional control is maintained with opposite rudder. If there is any doubt, or the airplane starts to drift, execute a go-around.

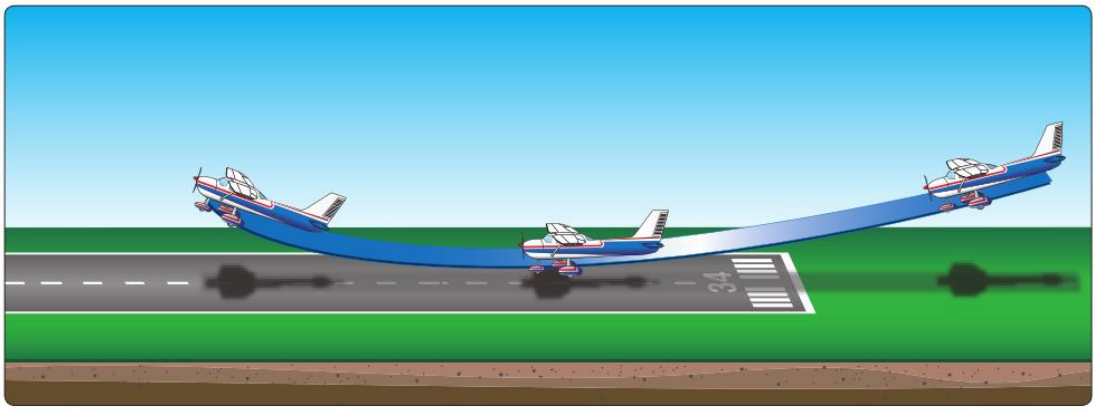

Figure 8-35. *Ballooning during roundout.*

Figure 11: The illustration of aircraft ballooning

1.14 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.

2. ANALYSIS

The aircraft caught fire after landing. There was no aircraft system abnormality found prior to the accident. The investigation considered aircraft serviceability was not issue in this accident. Therefore, the analysis will discuss the relevant issues associated with the pilot understanding to the aircraft landing process, fire initiation and the fire extinguishing process.

2.1 Pilot Understanding for Approaches and Landing

The student pilot recalled that the landing approach was on profile refer to the training provided. Before touchdown the student pilot pulled the yoke to flare out for landing and the aircraft ballooning.

The Airplane Flying Handbook (FAA-H-8083-3B) stated that if the pilot misjudges the rate of sink during a landing and thinks the airplane is descending faster than it should, there is a tendency to increase the pitch attitude and AOA (Angle of Attack) too rapidly. This condition will stop the aircraft descending and the aircraft start climbing. This climbing during flare out is known as ballooning. The altitude is increasing and the aircraft approaching stall condition. The use of throttle is helpful in cushioning the landing. By adding power, thrust is increased to keep the airspeed from decelerating too rapidly and the wings from suddenly losing lift, but throttle must be closed immediately after touchdown.

During the aircraft ballooning, the student pilot slightly pushed the yoke in the attempt to landing. If the aircraft ballooning, the altitude will increase and the speed will decrease. The action to recover this condition is by adding power to prevent the aircraft stall. The student pilot action pushing the yoke when the aircraft speed has been decreased resulted to the aircraft nose down and the propeller hit the runway.

The student pilot experienced several time aircraft ballooning during landing. This condition had been identified by the flight instructor and the student pilot had been briefed related to the ballooning recovery. The student pilot action to recover the ballooning in this accident flight was not according to the ballooning recovery technique, indicated that the corrective training to the student pilot was not effective.

2.2 Fire initiation

Three propeller marks found on the runway and from the third propeller mark, scratch marks found approximately 50 meters long until the position of the aircraft stopped. The propeller found bent, the lower engine cowling scratch and the nose landing gear collapsed.

These marks indicated that the aircraft nose down at an angle that enabling the propeller strike to the runway. The scratch marks found approximately 50 meters long indicated that the nose landing gear had collapsed. This also indicated by the scratch on the lower engine cowling.

The wreckage examination found fuel line broken on the right lower fuselage that most likely caused by the impact. The fuel spill from the broken fuel line and the spark that possibly created by the friction of the aircraft part with the runway might have ignited the fire.

The controller saw that the fire was initiated at the right lower fuselage and developed to bigger fire. The position of the origin of fire consistent with the location of the broken fuel line. The rapid growing of fire caused by the fuel spillage on the broken fuel line.

2.3 Fire Fighting

The ARFF personnel deployed to the location with one foam tender type IV, one foam tender type V, and one ambulance. Both foam tenders have total capacity of 6,500 liters water and minimum of 780 liters of foam. The total water pump capacity was 5,500 liters per minute and total foam emission capacity of 3,800 liters per minute.

Based on Manual of Standard (MOS) CASR Part 139 Volume IV, to extinguish a Cessna 172 type aircraft requires approximately 400 liters of water mixed with quality foam B, and when foam quality C was used, total water requirement approximately 280 liters with discharge rate 271.96 liters/minute.

The amount of water and foam carried by the ARFF was much more than the required. After sprayed all of water on both foam tenders, the fire had not been extinguished. The fire truck type V returned to the fire station to refill the water then returned to the accident site. The fire extinguished took about 20 minutes. The aircraft destroyed as result of impact forces and post impact fire. The amount of extinguishing agent and time required, indicated that the extinguishing process was not effective.

Based on the picture when the ARFF discharged the fire agent, showed that the foam tender was spraying at a distance approximately 15 meters and against the wind. These conditions resulted in the extinguisher agent blown by the wind and less extinguisher agent reached the fire base, hence reduced the extinguishing effectiveness.

The ARFF had routine monthly program of fire drill by practicing the procedure firefighting in the airport area. The ICAO Doc 9137 required the RFF training to be as realistic as possible, which is crucial in helping RFF personnel acclimatize to a heat and smoke filled environment, so that in the event of an actual emergency, RFF personnel will be able to execute their tasks more confidently and effectively.

Ineffective fire extinguishing process might be an indication of ARFF personnel training was inadequate to handle the actual emergency.

3. CONCLUSION

3.1 Findings[4]

According to factual information during the investigation, the findings are as follows:

1. The aircraft had valid Certificate of Airworthiness, Certificate of Registration and was operated within the correct weight and balance envelope. No aircraft system malfunction reported before the occurrence. The investigation considered aircraft serviceability was not issue in this accident.
2. The pilot held valid license and medical certificate;
3. Before touchdown, the aircraft ballooning and the student pilot pushed the yoke slightly and the aircraft nose down and the propeller hit the runway. The student pilot action pushing the yoke when the aircraft speed has been decreased resulted to the aircraft nose down and the propeller hit the runway.
4. The student pilot experienced several times aircraft ballooning during landing. This condition had been identified by the flight instructor and the student pilot had been briefed related to the ballooning recovery.
5. The student pilot action to recover the ballooning was contrary to the ballooning recovery technique, indicated that the corrective training to the student pilot was not effective.
6. The fuel line on the right lower fuselage was found broken that most likely caused by the impact. The fuel spill from the broken fuel line and the spark of the friction of the aircraft part to the runway might have ignited the fire.
7. The ARFF deployed two fire trucks carried amount of water of 6,500 liters and foam minimum of 780 liters which was much more than the required of 400 liters. The fire extinguished took about 20 minutes. The amount of extinguishing agent and time required, indicated that the extinguishing process was not effective.
8. The distance and wind conditions resulted in the extinguisher agent blown by the wind and turned into water particles and less extinguisher agent reached the fire base, hence reduced the extinguishing effectiveness.
9. Ineffective fire extinguishing was an indication ARFF personnel training was inadequate to handle the actual emergency.

4 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[5]

The aircraft ballooning recovery technique was contrary to the ballooning recovery technique, resulted in the aircraft nose down during impact the runway, broke the fuel pipe line and initiated fire.

The fire extinguishing process was not effective resulted in the aircraft destroyed.

5 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 report, the Komite Nasional Keselamatan Transportasi (KNKT) had not been informed of any safety actions resulting from this occurrence.

5. SAFETY RECOMMENDATIONS

As result of this investigation, the Komite Nasional Keselamatan Transportasi (KNKT) issue safety recommendations to address safety issues identified in this investigation.

5.1 Mandiri Utama Flight Academy (MUFA)

The student pilot experienced several times aircraft ballooning during landing. This condition had been identified by the flight instructor and the student pilot had been briefed related to the ballooning recovery. The student pilot action to recover the ballooning was contrary to the ballooning recovery technique, indicated that the corrective training to the student pilot was not effective.

04.O-2018-02.1

KNKT recommend to improve the training including demonstration to ensure student pilots understanding of correct approach and landing technique.

5.2 Blimbingsari Airport Operator

The amount of extinguishing agent and time required to extinguish the fire indicated that the extinguishing process was not effective. Ineffective fire extinguishing was an indication ARFF personnel training was inadequate to handle the actual emergency.

04.B-2018-02.2

KNKT recommend to improve the rescue and firefighting personnel training to ensure the personnel ability to handle the actual emergency.

5.3 Directorate General of Civil Aviation (DGCA)

04.R-2018-02.3

Ineffectiveness of fire extinguishing process in Banyuwangi Airport may also occur in other airports. KNKT recommend to review oversight process to ensure the ARFF ability for extinguishing the fire effectively.

6. APPENDICES

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