PRELIMINARY AIRCRAFT ACCIDENT REPORT

A02/19

18 APRIL 2019

ACCIDENT INVOLVING BD100 CHALLENGER REGISTRATION 9M-TST AT SULTAN ABDUL AZIZ SHAH AIRPORT, SUBANG, SELANGOR 18 MARCH 2019

AIR ACCIDENT INVESTIGATION BUREAU

MINISTRY OF TRANSPORT

MALAYSIA

INTRODUCTION

The Air Accident Investigation Bureau of Malaysia

The Air Accident Investigation Bureau of Malaysia (AAIB) is the air accidents and incidents investigation authority in Malaysia that is responsibled to the Ministry of Transport. Its mission is to promote aviation safety through the conduct of independent and objective investigation into air accidents and serious incidents.

The AAIB conducts the investigations in accordance with Annex 13 to the Chicago Convention and Malaysian Civil Aviation Regulations 2016. The AAIB will adhere to ICAO's stated objective when it carries out the investigations:

"The sole objective of the investigation of an accident or incident shall be the prevention of accidents and incidents. It is not the purpose of this activity to apportion blame or liability."

Accordingly, it is inappropriate that AAIB's reports should be used to assign fault or blame or determine liability, since neither the investigation nor the reporting process has been undertaken for that purpose.

This report contains a statement of facts which have been determined up to the time of issue. It must be regarded as tentative, and is subjected to alteration or correction if additional evidence becomes available.

AIRCRAFT ACCIDENT/SERIOUS INCIDENT REPORT

Aircraft Type	**:**	**Bombardier**
Model	**:**	**BD100-1A10**
Owner	**:**	**Berjaya Air**
Nationality	**:**	**Malaysian**
Year of Manufacture	**:**	**23 Nov 2006**
Aircraft Registration	**:**	**9M-TST**
Serial Number	**:**	**20135**
State of Registration	**:**	**Malaysia**
State of Operator	**:**	**Malaysia**
Place and State of Occurrence	**:**	**Sultan Abdul Aziz Shah International Airport, Subang 03 08'.0"N, 101 33'.1"E**
Date and Time of Occurrence	**:**	**18 Mac 2019 – 03.11 LT**

All times in this report are Local Time (LT) (UTC +8 hours)

TABLE OF CONTENTS

SYNOPSIS

An aircraft BD100-1A01 with registration 9M-TST has been cleared to land on Runway 15 of Sultan Abdul Aziz Shah Airport, Subang by Subang Control Tower. Pilot in Command made an ILS approach for landing and subsequently landed safely. On deceleration, pilot felt the aircraft hit something on the runway. Once the aircraft stopped abeam taxiway Foxtrot, the Executive Cabin Crew visually inspected the aircraft through the window and observed the leading edge of left Wing was badly damage. After checking the aircraft instrumentation and observed no abnormality to aircraft operation, Pilot in Command decided to taxi to Bay 38 for passengers to disembark.

Meanwhile, three workers who were on the runway made a narrow escape by clearing their painting equipment and drove their vehicle away from the runway when the aircraft was on final approach for landing,. As the three workers considered the aircraft was too close to them, they tried to warn the escorting vehicle (which was hit by the aircraft) about the aircraft making a landing but was not successful. The escorting vehicle was approximately 1200 meters away from the threshold of Runway 15 and 30 meters behind the worker's vehicle..

The workers then drove to the Airport Fire Rescue Service (AFRS) to inform them about the accident and requested assistance. One AFRS vehicle, after being cleared by Subang Control Tower proceeded to the accident site, found the driver of the ill-fated vehicle unconscious and still in the driver's seat.

After removing the driver's side door, AFRS crew managed to free the badly injured driver and transferred him onto a vehicle which then transported him to the nearest hospital, Sime Darby Hospital. The driver was pronounced dead in the evening of the following day, 19 Mac 2019.

1.0 FACTUAL INFORMATION

1.1 History of Flight

On 18 March 2019, the aircraft, BD100-1A01 bearing registration 9M-TST with a total of 12 persons on board from Jaipur, India was on final approach for Runway 15 at Sultan Abdul Aziz Shah Airport, Subang. Upon getting

clearance to land at 03.08 Local Time (LT) from Subang Control Tower on frequency 118.2 MHz, without any restriction, the aircraft continued the approach for the landing. At 03.11 LT the aircraft landed safely on Runway 15. During landing roll, as the aircraft decelerated at the speed of 90 to 100 knots, the crew felt the aircraft hit something on the runway.

Based on the recording traced from the Cockpit Voice Recorder (CVR), the crew exclaimed "*we hit something*" and did not suggest what had really happened to the aircraft. Pilot in Command stopped the aircraft on the runway adjacent to taxiway Foxtrot for the Cabin Executive to do a visual inspection. Cabin Executive reported that the left wing was badly damaged. . There was no abnormality to the aircraft operation and the Pilot in Command decided to continue taxi to Bay 38 at the main terminal via taxiway Foxtrot. All passengers were disembarked for immigration clearance. All crew and passengers did not suffer any injury.

Upon inspection on the wing of the aircraft, the leading edge of the port wing were severely damaged and stuck with metal parts belong to the roof of the vehicle (Perodua Kembara), which was still on the runway at that time. The vehicle was being used by the MAHB (Malaysia Airports Holdings Berhad) technician as an escort to the runway painting vehicle. The Perodua Kembara's registration was BHL 3442.

AFRS rushed to the location of accident and arrived at 03.21 LT. AFRS reported that the vehicle was badly damaged and lost its entire roof. The vehicle was located approximately 1200 meter from the threshold of Runway 15. The driver (technician) was found stuck in the driver's seat of the car with his head severely injured. He was removed from the vehicle and transported to Sime Darby Hospital nearby at 03.41 LT. He was later pronounced death by the doctor in the evening of 19 March 2019.

1.2 Runway Activities Prior to the Aircraft Landing

The Duty Air Traffic Controller (named as Shift 2) had allowed a vehicle to enter the threshold area of Runway 15 at time 12.50 LT for lighting

maintenance work. All communications between the vehicle and the tower was on walkie talkie.

Subsequently at 01.00 LT two vehicles comprising an escort vehicle and a maintenance vehicle carrying three workers from the contractor were allowed by Duty Air Traffic Controller to enter the runway via threshold Runway 15 to do the painting for runway centreline. All communications between the escorting vehicle and the Control tower were through the walkie talkie. The contractor's vehicle did not have any means of communications with the control tower.

At 02.15 LT, tower controller (Shift 2) received a request to vacate the runway from the lighting maintenance vehicle through walkie talkie as their work has been completed. Based on this last communication at time 02.15 LT, the Air Traffic Controller on duty (Shift 2) has recorded in the tower logbook that maintenance works on the runway has been completed and **all** vehicles had vacated the runway despite there were two other vehicles still on the runway doing painting works.

The contractor workers doing the painting works explained that they started painting the runway centreline from threshold Runway 15 and moved towards threshold Runway 33. They were using the contractor's vehicle moving along the centreline and initially the escorting vehicle followed them closely behind. After a while, the workers realised the escorting vehicle was static as far as approximately 30 meters behind with no apparent reason obvious to them. The controller on duty (Shift 2) handed over his shift at 03.00 LT to another controller (Shift 3) with the information that no more works on the runway (as recorded in the log book). There was also no indication of Work In Progress as a reminder on the flight progress strip bay at the tower console.

9M-TST reported his position to tower controller (Shift 3) at 9 miles final Runway 15 for ILS approach at 03.08 LT. After looking out on the runway to check whether there was any abnormal activities or unusual lighting (to indicate vehicles present on the runway), clearance for landing was given to 9M-TST after the controller (Shift 3)was sure that the runway was clear for the aircraft to make a landing.

When 9M-TST descended lower and approached closer on its final approach, the leader of the contractor's worker saw the landing light of the aircraft approaching and realised that there was an aircraft coming in for a landing. Fearing of the danger, all three workers boarded their vehicle and drove away from the runway. While making a 180-degree turn, the driver realised the escorting vehicle was still static at the same last position. Based on witness' statement they flashed the headlight of the vehicle several times to attract the attention of the driver of the escort vehicle.. No response was observed from the driver of the escort vehicle, and as the aircraft was getting closer to them, the contractor's driver drove their vehicle away from the runway and stop at taxiway Foxtrot to give way for the aircraft to land.

After the aircraft had landed safely, while decelerating with a speed between 90 to 100 knots, the Pilot in Command felt that his aircraft hit something on the runway.

1.3 Injuries to person

Injuries	Crew	Passenger	Others
Fatal	Nil	Nil	1
Serious	Nil	Nil	Nil
Minor	Nil	Nil	Nil
None	4	8	Nil

1.4 Damages to aircraft

Severe damage to LH mid wing leading edge and front Spar.

Picture 1 – Mid wing leading edge's damages with parts of the vehicle Perodua Kembara'sroof stuck to it.

Severe damage to LH mid wing leading edge

Picture 2 – LH mid wing leading edge

Lower wing surface and fuel panel dented and numerous gauges and scratches on upper and lower areas of the wing surface.

Picture 3 – Damages to the lower wing surface.

Damages to the trailing edge flaps and flaps carriage.

Picture 4 – Trailing edge flaps and flaps carrier

Damages to the trailing edge flaps and flaps carriage.

Picture 5 - Trailing edge flaps and flaps carrier

Comparison between left wing (top) and right wing (bottom) of the aircraft

Picture 6 - The flaparon of the Left Wing was badly damaged as compared to the Right Wing Flaparon

1.5 Other damages.

One ground vehicle severely damaged after being hit by the aircraft. The vehicle's roof was totally ripped off and parts of the roof stuck on the left wing leading edge of the aircraft.

The vehicle was hit by the aircraft from the rear. The top parts were ripped off totally with some parts stuck to the left wing of the aircraft.

Picture 7 - Perodua Kembara belonged to MAHB

AFRS had to cut off and removed the driver's side door in order to remove the victim from the vehicle

Picture 8 – The driver's seat was in reclining position

The top part of the vehicle

Picture 9 – The roof was totally ripped of from the vehicle

1.6 Personal Information

1.6.1 Captain

Status	Commander
Nationality	Malaysian
Age	37 years old
Gender	Male
Licence Type	ATPL (2893)
Licence Validity	Valid until 30 April 2019
Total Hours Operating on BD100	582 hrs 33 mins
Total Flying Hours	7039 hrs 13 mins
Rest Period Since Last Flight	> 24 hours
Medical Expiry Date	Class 1 ATPL / 30 April 2019

1.7 Aircraft Information

CofA No.	N/A
CofA Expiry Date	11 May 2019
CofR No.	AR/17/151
CofR Expiry Date	11 May 2020

	Left Engine	Right Engine
Engine Serial Number	P118387	P11838
Time Since New	2888:08	2888:08
Time Since Overhaul (TSO)	New	New
Time Since Fitted (TSF)	2888:08	2888:08
Cycle Since New (CSN)	2305	2301
Cycle Since Overhaul (CSO)	New	New
Cycle Since Fitted (CSF)	2305	2301
Date Fitted	03 Oct 2006	03 Oct 2006
Time Between Overhaul	O/C	O/C

1.8 Meteorological Information

The weather forecasted by Malaysian Meteorological Department for 02.00 LT was fine weather with no wind and visibility approximately 7000 meters. Pilot received the weather information through the Automatic Terminal Information System ATIS. On final approach, pilot reported the visibility was more than 10 km with no prevailing weather.

1.9 Aid to Navigation

Pilot made an ILS approach to Runway 15 SAAS Airport Subang with a guidance of PAPI for landing.

1.10 Communication

Communication between aircraft and Subang Tower was on Frequency 118.2 Megahertz (MHz).But communication between Subang Tower and vehicles were using walkie talkie (communication using walkie talkie were not recorded on the Air Traffic communication system). Communication between tower

and 9M-TST, Coordination between Tower and Control Centre, tower and AFRS were recorded and the transcript made available by the Air Traffic Control unit in SAAS Airport, Subang.

1.11 Aerodrome information

Sultan Abdul Aziz Shah Airport, Subang (WMSA) Latitude 030752N Longitude 1013253E with an elevation of 89 feet. Runway 15 was used for the landing with no abnormality on the surface condition. 3780 feet of runway length available for the landing (LDA). Runway 15 was equipped with Precision Approach Cat 1 Lighting system with PAPI. Runway edge lights were equipped with controllable intensity.

1.12 Flight Recorders

The Cockpit Voice Recorder was impounded and downloading was done at AAIB Flight Recorder Lab on 18 Mac 2019. Transcript from Air Traffic control also has been secured.

1.13 Impact information

The layout of the airfield and the diagrammatic location of accident as per Appendix A

1.14 Medical and pathological information

Nil.

1.15 Fire

Nil.

1.16 Survival Aspect

Not applicable.

1.17 Test and research

Not Applicable

1.18 Organisational and Management information

ATC services at SAAS Airport, Subang provided by Civil Aviation Authority of Malaysia (CAAM). The Aerodrome Control consisted of Tower Supervisor, Aerodrome Control, Surface Movement Control, Assistant Surface Movement Control and Assistant Tower/Coordinator. During the time range of before and after the accident, Aerodrome Control manning had been reduced to one controller per shift for one and a half hour on each rotation from 12.00 am until 6.00 am in a system named as “Break Shift”. The “Break Shift” roster divided among the four controllers rostered for the night shift.

Malaysia Airports Holdings Berhad (MAHB) is the organisation responsible for the maintenance of the airport such as the runway lighting, runway marking and other facilities within SAAS Airport, Subang. All maintenance works for the runway needs to be coordinated between MAHB and Control Tower.

1.19 Additional Information

Nil.

1.20 Useful or Effective Investigation Techniques

Nil.

2.0 ANALYSIS

To be included in the Final Report.

3.0 CONCLUSIONS

3.1 Findings

3.1.1 Landing Clearance

The Aircrew were properly licenced and the landing was done legitimately after achieving landing clearance from Subang ATC Tower.

3.1.2 Air Traffic Control shift system

'Break Shift' involves only one Air Traffic Officer on duty after midnight until 6.00 am. AAIB will further investigate on the application of single controller per shift system.

3.1.3 Communication between Air Traffic and working party

Thorough investigation will be conducted on SOP for communications between the Control Tower and maintenance vehicle using walkie talkie instead of Very High Frequency (VHF) radio communication.

3.1.4 Standard Operating Procedure for vehicle operating on the runway

In-depth investigation on the SOP for vehicles operating on the runway will be conducted especially on special equipment that needs to be in the vehicle when it enters the runway, such as radio communication equipment and rotating beacon.

3.2 Probable Cause

To be determined later.

4.0 Safety Recommendation

To be included in the Final report

Chief Inspector

AAIB

Ministry of Transport

APPENDIX A

9M-TST ACCIDENT ON 18 MAC 2019
PICTORIAL NARATIVE OF EVENTS

1	Initial Position and movement of vehicles from Threshold Runway 15 (Not to Scale)

2	Vehicles position when aircraft on short final (Not to scale)

3	Contractor's vehicle making a turn and vacated the runway (Not to Scale)

4	The escort vehicle hit by the aircraft (Not to Scale)