

**FINAL REPORT OF SERIOUS INCIDENT OF MYANMAR NATIONAL
AIRLINES CESSNA GRAND CARAVAN (Reg: XY-AMC) AT MANAUNG
DOMESTIC AIRPORT ON the 16th of NOVEMBER 2016**

SYNOPSIS

At 09h 02 (Local time) on the 16th of November 2016, Myanmar National Airlines (Reg: XY-AMC) whilst landing roll on the runway-16 of the Manaung Domestic Airport, occurred a runway excursion. On board Cessna Grand Caravan (Reg: XY-AMC) the aircraft were the Pilot in command (PIC), first Officer (FO), cabin crew and 8 passengers.

The plane left Yangon International Airport for Manaung airport at 07h 40(Local time).On the way to Manaung airport the weather was fine. The flight level was 12000ft.The approach was made to runway-16 of Manaung airport. The plane landed on square of the runway at about 1000ft from the threshold. During split seconds the plane sank on the right hand side and deviated from runway centerline .Directional control could not be maintained and the plane veered off the runway ;the nose wheel bobbed down in the soft ground of the runway shoulder at about 2500ft from the threshold and propeller hit the ground ;the plane had to be stopped. The Nose wheel yoke was broken, the right hand wind tip was dented, the propeller was twisted and the right hand main wheel was damaged. No one was injured in the serious incident.

Aircraft Details

Myanmar National Airline

Registered owner and operator	: Myanmar National Airline
Aircraft type	: Cessna Grand Caravan 208B
Nationality	: Republic of the Union of Myanmar
Registration	: XY- AMC
Place of Occurrence	: Manaung Domestic Airport N 18°50' 38.86", E 93 41' 03.11"
Date& Time	: 16 November 2016 at 09h 02 Local time (UTC 02h 32)

Type of operation : Scheduled Passenger Domestic Flight
Phase of operation : Landing roll
Persons on Board : Crew- 3
Passengers- 8

1. FACTUAL INFORMATION

1.1 History of the flight

The route of the Cessna Grand Caravan (XY-AMC) on that day was Yangon- Manaung- Sittwe- Manaung- Yangon.

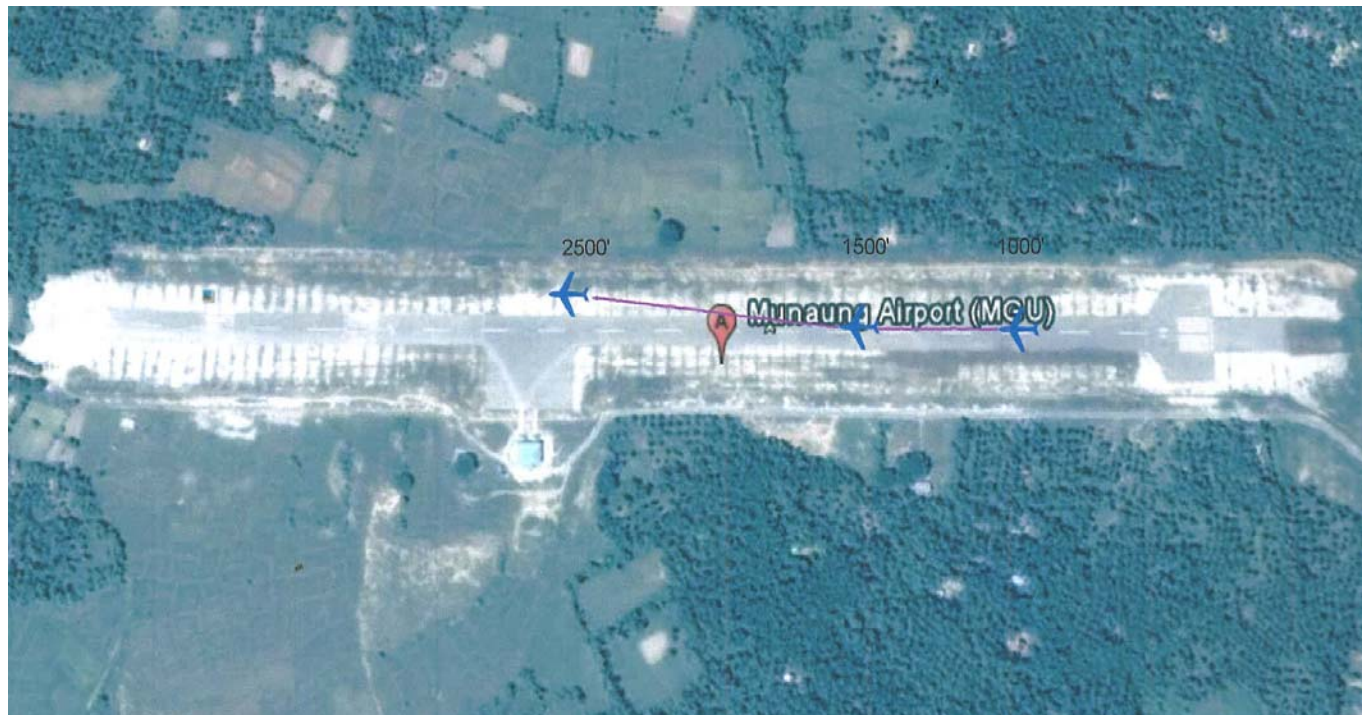


Figure :1 Layout of Incident Site

1.2 Injuries to Persons

1.2.1 Myanmar National Airlines

Injuries	Crew	Passengers	Other	Total
Fatal	0	0	0	0
Serious	0	0	0	0
None	3	8	0	11
Total	3	8	0	11

1.3 Damaged to Aircraft

1.3.1 Myanmar National Airlines (Cessna Grand Caravan208B) (XY-AMC)

- (a) Nose Wheel Yoke was broken.
- (b) Propeller blades were twisted and broken.
- (c) Right Hand(RH) wind tip was dented.
- (d) Right Hand(RH) Main Wheel was damaged



Figure: 2 The aircraft came to rest on the runway shoulder at the edge of the runway



Figure: 3 The aircraft came to rest on the runway shoulder at the edge of the runway



Figure :4 The Nose Wheel bobbed down with broken yoke



Figure : 5 The damaged the right hand Main Wheel



Figure :6 The Closer view of the damaged right hand Main Wheel



Figure :7 The Ground Mark of Right Hand Main Wheel (Viewed from Crash Site to Runway-16)



Figure :8 The Ground Mark of Right Main Wheel (Viewed from Runway-16 to Crash Site)



Figure:9 The Ground Mark of Right Hand Main Wheel (Viewed from Runway-16 to Crash Site)



Figure:10 The twisted and damaged propeller

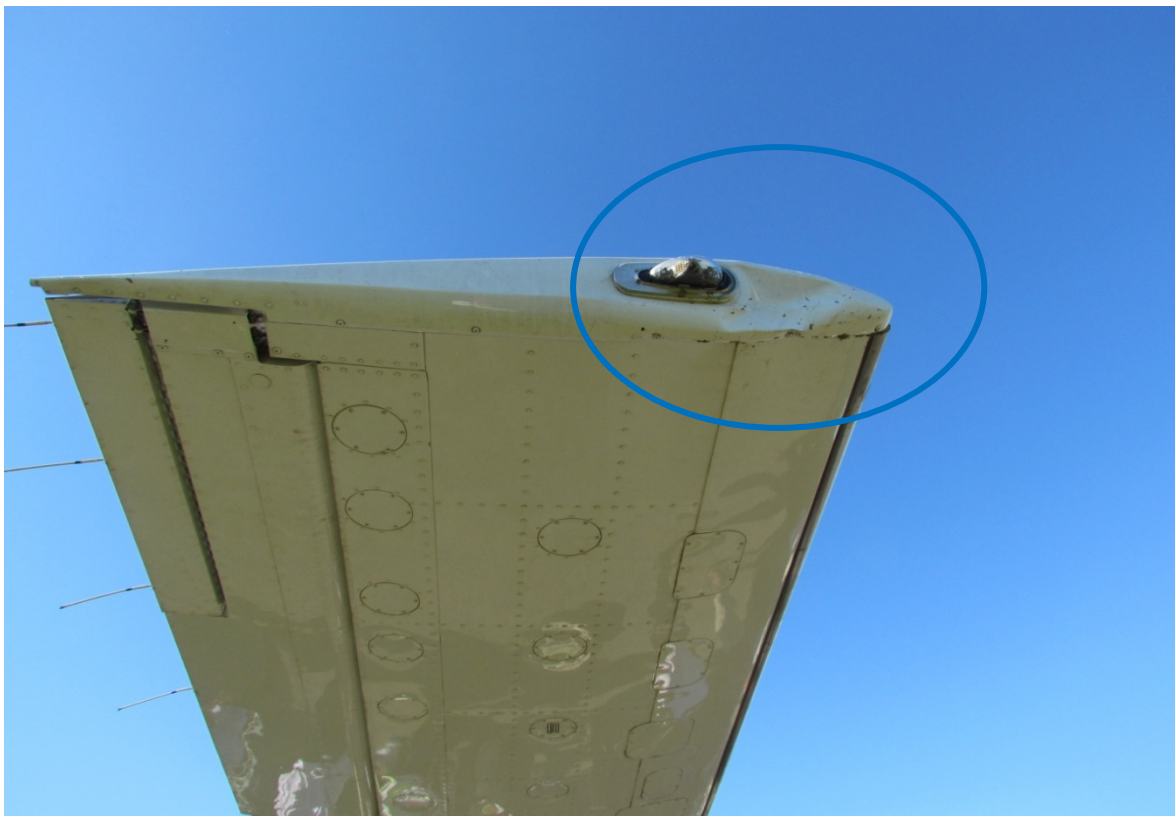


Figure:11 The dented Right Hand wing tip of the aircraft



Figure:12 The 5mm hole and broken valve stem of the inner tube

1.4 Other Damage

There was no other damage due to this serious incident.

1.5 Personnel Information

Pilot in Command (Myanmar National Airlines)

Age	: 38
Licence	: CPL-441
Licence issued date	: 6 th , June, 2014
Total hours	: 2035:09
On type	: 884:39
Medical expire	: 30 th , April, 2017
Line check date	: 30.10.2015
Type rating check date	: 1.10.2016(P Check)

Last 90 days : 129:28
 Last 30 days : 54:41
 Last 24 hours : 4:54

Co-Pilot (Myanmar National Airlines)

Age : 39
 Licence : CPL 469
 Licence issued date : 11.5.2015
 Total hours : 690:11
 On type : 114:26
 Medical expire : 31.5.2017
 Line Check date : 25.8.2015
 Type rating check date : 13.4.2015
 Last 90 days : 41:44
 Last 30 days : 20:41
 Last 24 hours : Nil

1.6 Aircraft information

1.6.1 General

Myanmar National Airlines Aircraft

Manufacture : Cessna
 Type : Cessna Grand Caravan 208B
 Serial number : 5235
 Date of Manufacture : 21 September, 2015
 Total Airframe hours : 501:38
 Certificate of Registration : XY-AMC
 C of A issue date : 21 September 2017
 Last Time Check : OA/100FH, 1C, 200FH, 1C, 1A / 1C2A / 1C
 (14 September 2016)
 Total Flying hours : 501:38

1.7 Meteorological Information

The observation reported at Manaung Domestic Airport on the 16th November at 8:41 (Local Time) was wind calm, visibility 1 to 2mile, Distance Haze, Temperature 26 C,QNH 1001, wind 170/03.At 09:00 ,the wind was 180/03.

1.8 Aid to Navigation

Manaung Domestic Airport was equipped with the following facilities:

YVMN AD 2.19 RADIO NAVIGATION AND LANDING AIDS

Type of aid CAT of ILS/MLS (MAG VAR)	ID	Frequency	Hours of operation	Transmitting antenna coordinates	Elevation of DME transmitting antenna	Remarks
1	2	3	4	5	6	7
NDB	MN	216 kHz	HO	185040.56N 0934109.36E	Not applicable	Em: NONA2A

1.9 Communication

Communication facilities in Manaung Airport was as follows:

As per record the communication on that day was normal.

YVMN AD 2.18 ATS COMMUNICATION FACILITIES

Service designation	Call sign	Channel	Hours of operation	Remarks
1	2	3	4	5
MANAUNG TOWER	MANAUNG TOWER: EN	118.7 MHz	HO	Nil

YVMN AD 2.19 RADIO NAVIGATION AND LANDING AIDS

Type of aid CAT of ILS/MLS (MAG VAR)	ID	Frequency	Hours of operation	Transmitting antenna coordinates	Elevation of DME transmitting antenna	Remarks
1	2	3	4	5	6	7
NDB	MN	216 kHz	HO	185040.56N 0934109.36E	Not applicable	Em: NONA2A

1.10 Aerodrome Information

Manaung Domestic Airport has one main runway 16/34 with a length of 4000 ft and wide of 100 ft at an elevation of 33ft above mean sea level. The airport has an ATC control tower, controlling class E airspace.

The aerodrome category for fire fighting is CAT2.

1.11 Recorders

There was limited recorded data in the CVDR and it did not contain any parameters related to the condition of the tyres. As such, the investigation team was unable to determine if the right tyre was deflated before the aircraft landed.

No aircraft system defect or anomaly was observed in the recorded flight data parameters.



Figure: 13 Cockpit Voice Data Recorder (CVDR)



Figure: 14 Cockpit Voice Data Recorder(CVDR)

1.12 Wreckage, Site and Impact Information

The coordinates of accident site is Latitude N 18 °50' 38.86", Longitude E 93 41' 03.11". When Myanmar Aircraft Investigation Bureau (MAIB) investigators arrived at the occurrence site, the aircraft was on the apron of Manaung Airport . The incident aircraft had to be removed for normal operation.

Measurements and photographs were taken of the site; ground marks and tracks were inspected and casual interviews were conducted among witnesses.

1.13 Medical and Pathological Information

No one was injured. And the Pilot in command (PIC) and First Officer (FO)of Cessna Grand Caravan 208B were sent to hospital for medical examination. There were no evidence of any relevant medical factors that could affect the performance of the pilots.

1.14 Fire

There was no fire before, during and after the accident.

1.15 Survival Aspects

As soon as the occurrence happened, all the cabin crew reviewed the outside situation, let the passengers on board get out of the aircraft and sent them to the airport terminal. Fire fighters were on stand-by and got ready to initiate their rescue operation.

1.16 Test and research

The Cessna Grand Caravan 208B was jacked up and the brakes and rudder control was tested. It was found that these system were working properly. The brake fluid was found to be during proper limit.

1.17 Organizational and Management Information

1.17.1 Myanmar National Airlines

Myanmar National Airlines (MNA) headed by Chief Executive Officer (CEO) is the national flag carrier of Myanmar and has the most extensive network in the country and international schedule flight to Singapore, Chanmai, Hongkong as well. It had 17 number of fleet such as Embraer-190, Boeing 737-800, ATR-72-600 and Cessna Grand Caravan. There was a Brakes & Wheel Section under Engineering & Maintenance Department in which installation and maintenance of aircraft wheels assembly were made. It was observed that tire and inner tubes were well-kept on shelves in a air-condition room with well-maintained temperature and relative humidity(RH).They were doing maintenance in conformity with Myanmar Civil Aviation Requirement (Part 145 and Part M).

1.17.2 Air Traffic Control

Department of Civil Aviation is the air traffic control service provider at Manaung Airport.

1.18 Additional Information

1.18.1 Testimony of Myanmar National Airlines Pilot

He stated he was flying the flight number UB 241, Yangon– Manaung - Sittwe - Manaung - Yangon route. The flight level was 12000 ft. The weather was fine on the way. He got a contact with the Manaung Control tower 50 nm away from Manaung Airport. He got the weather information; wind direction 170°, 8 knots to 10 knots, Runway 16. Before landing check was made and then he joined approach runway-16. Approach speed was 95 knots. Normal landing was made. After landing check was made. He noticed that the plane sank onto the right hand side and deviated from the runway centerline to the right hand side so he tried to recover it. Meanwhile, the nose wheel bobbed down in the soft soil on the runway shoulder and propeller came to hit the soil. He stopped the engine according to the procedure and asked the cabin crew to disembark the passengers and sent them to the terminal. And then he reported about

it to his management on the phone.

1.18.2 Testimony of Myanmar National Airlines First Officer

He stated that the route on that day was Yangon – Manaung- Sittwe- Manaung-Yangon route. He started to leave Yangon airport at (01:10 UTC).The flight level was 12000ft and on the way to Manaung the weather was fine. About 10nm to Manaung airport the flight level was 3000ft.At that time the weather provided by the Manaung was visibility 1 to 2 miles, wind direction 170,8knots to 10knots,runway 16.Before landing check was made and then approach was made to runway-16.While on approach the call out was made. The plane touched down as usual and moved on. After landing check was made. He noticed that he felt that the plane deviated from the runway centre line. So he gave warning the pilot for Brake Check. He himself helped apply the brake as much as he could. The nose wheel bobbed down and the propeller hit the ground. He got off and checked the aircraft and reported to the pilot.

2 ANALYSIS

2.1 Introduction

The analysis by the investigation team has focused on the following areas:

- a) Individual/ team action
- b) Weather condition
- c) Flight recorder data analysis
- d) Runway Condition
- e) Standard Operation Procedures and Crew response

2.2 Individual/ Team Action

2.2.1 Flight Crew

Both the pilot-in-command (PIC) and First Officer(FO) had operated into Manaung Airport many times and were familiar with the runway condition and airport facilities. The PIC had (884:39) hours on type and total flying hours (2035:09) and the first officer (FO) (114:26) hours on type and total flying hours (690:11) respectively. Their licenses were valid.

2.3 Weather Condition

The weather was not the factor that the pilot in command (PIC) could not maintain the directional control .

2.4 Flight Recorder Data Analysis

There was no damage observed to the flight recorders. The interface pins for both recorders were checked and they appeared to be in good condition.

The data downloaded from the CVDR was of good quality and comprised flight 16 data parameters and cockpit voice information recorded during the occurrence. No aircraft system defect or anomaly was observed in the recorded flight data parameters.

2.5 Aerodrome Condition

There were runway centerline marking, runway edge marking , touch down zone markings, threshold markings on the runway of Manaung airport. It was discovered that there was no rubber contamination and pop corns on the touch down zone area .The runway condition was dry at the time of occurrence.

2.6 Operation Procedures

According to the abnormal procedure(Landing with a Flat Main Tire) ,*"Maintain Directional Control using brake on wheel with inflated tire as required."* the pilot must maintain the directional control.

3 CONCLUSIONS

3.1 Findings

From the evidence available, the following findings are made. These findings should not be read as apportioning blame or liability to any particular organization or individual:

- a) The two pilots were experienced, and had enough rest hours and familiar with Manaung Airport.
- b) The inner tube (850-10, P/N GL 85525B) being used by the operator was different from Cessna 208B illustrated part catalog(IPC) and alternative parts.
- c) Aircraft engine, control surface, brake system and navigation systems were working normally.
- d) The maximum landing weight was 8500 lb(3863.63 Kg);the landing weight on the flight was 7732lb(3514.5 Kg);it was within the limit.
- e) The pilot in command (PIC) could not maintain the directional control while the plane deviated from the runway centreline.

3.2 Primary Cause

The pilot in command (PIC) could not maintain the directional control while on landing roll with a flat main wheel.

4 SAFETY RECOMMENDATIONS

To reduce and eliminate of accidents and serious incidents, MAIB recommended the followings:

- 4.1 The pilots undergo the training regarding abnormal landing especially a landing with a flat tire in a simulator or a live aircraft.
- 4.2 Recommended inner tubes by the Aircraft manufacture should be used.

Investigator -in -charge