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FINAL INVESTIGATION REPORT ON
SERIOUS INCIDENT TO M/s ALLIANCE AIR
ATR-72 AIRCRAFT VT-AIX AT SHIRDI
AIRPORT ON 21/05/2018

FOREWORD

In accordance with Annex 13 to the Convention on International Civil Aviation Organization (ICAO) and Rule 3 of Aircraft (Investigation of Accidents and Incidents), Rules 2017, the sole objective of the investigation of an accident shall be the prevention of accidents and incidents and not to apportion blame or liability.

This document has been prepared based upon the evidences collected during the investigation, opinion obtained from the experts and laboratory examination of various components. Consequently, the use of this report for any purpose other than for the prevention of future accidents or incidents could lead to erroneous interpretations.

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GLOSSARY

AAIB	Aircraft Accident Investigation Bureau, India
AMSL	Above Mean Sea Level
ARC	Airworthiness Review Certificate
ASR	Airport Surveillance Radar
ATC	Air Traffic Control
AUW	All Up Weight
C of A	Certificate of Airworthiness
CAR	Civil Aviation Requirements
CPL	Commercial Pilot License
CVR	Cockpit Voice Recorder
DFDR	Digital Flight data Recorder
DGCA	Directorate General of Civil Aviation
F/O	First Officer
FCOM	Flight Crew Operating Manual
FCTM	Flight Crew Training Manual
FRTOL	Flight Radio Telephone Operators License
hrs	Hours
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ILS	Instrument Landing System
LLZ	Localizer
MEL	Minimum Equipment List
MLG	Main Landing Gear
NDB	Non-Directional Beacon
NLG	Nose Landing Gear
NM	Nautical Miles
PA	Passenger Address
PF	Pilot Flying
PIC	Pilot in Command
PM	Pilot Monitoring
QRH	Quick Reference Handbook
RA	Radio Altitude
RESA	Runway End Safety Area
SB	Service Bulletin
SEP	Safety and Emergency Procedures Manual
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
VOR	VHF Omnidirectional Range
UTC	Coordinated Universal Time

**FINAL INVESTIGATION REPORT ON SERIOUS INCIDENT TO M/s
ALLIANCE AIR ATR-72 AIRCRAFT VT-AIX AT SHIRDI AIRPORT ON
21/05/2018**

- | | |
|------------------------------|---------------------------------------|
| 1. Aircraft Type | : ATR72-600 |
| Nationality | : Indian |
| Registration | : VT –AIX |
| 2. Owner | : M/s Elix Assets 7 Limited |
| 3. Operator | : Alliance Air |
| 4. Pilot – in –Command | : ATPL holder on type, |
| Extent of injuries | : Nil |
| 5. First Officer | : ATPL Holder on type, |
| Extent of injuries | : Nil |
| 6. Place of Incident | : Shirdi Airport |
| 7. Date & Time of Incident | : 21 st May 2018, 1118 UTC |
| 8. Last point of Departure | : Mumbai Airport, Maharashtra |
| 9. Point of intended landing | : Shirdi Airport, Maharashtra |
| 10. Type of operation | : Scheduled Operation |
| 11. Crew on Board | : 04 (Including 02 Cabin Crew) |
| Extent of injuries | : Nil |
| 12. Passengers on Board | : 42 |
| Extent of injuries | : Nil |
| 13. Phase of operation | : Landing Roll |
| 14. Type of incident | : Runway overrun |
| 15. Coordinates of Site | : 019 °41.333' N, 074° 23.402' E |
| 16. Aerodrome elevation | : 1908 feet |

(ALL TIMINGS IN THE REPORT ARE IN UTC)

SUMMARY

On 21.05.2018, M/s Alliance Air ATR 72-212A aircraft VT-AIX while operating a scheduled flight 9I-653 from Mumbai to Shirdi was involved in a serious incident of runway overrun at Shirdi Airport. There were 42 passengers and 04 crew members onboard the aircraft. There was no injury reported to any person on board the aircraft.

The Aircraft took off from Mumbai at 1037 UTC for Shirdi. The Mumbai ATC radar vectored and directly cleared the aircraft for waypoint SEKVI and assigned FL 100 for Shirdi. The crew made the radio contact with the Shirdi ATC and requested weather. The weather reported by ATC was winds 330°/06 and visibility 6 km. As the prevalent weather conditions were above the VFR conditions, the crew requested ATC for a straight in landing for RWY 09 at Shirdi airport which was approved by ATC. Crew were in visual contact with the RWY 09 and commenced the final Approach. At 500 feet (AGL), aircraft was configured for landing while it was still not stabilized. The aircraft bounced twice during landing before settling on the runway. Subsequently, the crew applied reverser after the 'low pitch' light came on twice. Thereafter, maximum braking was applied to stop the aircraft.

However, the crew was not able to stop the aircraft on the runway and aircraft exited the runway and went into RESA which was on gravel area. After the aircraft came to a halt on gravel area, normal evacuation of passengers was carried out by cabin crew.

Occurrence was classified as Serious Incident as per the Aircraft (Investigation of Accidents and Incidents) Rules, 2017. DG, AAIB vide AAIB Order dated 22nd May, 2018 appointed Mr A. X. Joseph, Dy. Director as Investigator-in-Charge and Mr Dinesh Kumar, Air Safety Officer as an Investigator to investigate into the cause of the incident.

In accordance with the provisions of Annex 13, an investigator from BEA, France was appointed as accredited representative to associate with the investigation.

1. FACTUAL INFORMATION

1.1 HISTORY OF THE FLIGHT

On 21/05/2018, M/s Alliance Air ATR72-600 aircraft VT-AIX while operating a scheduled passenger flight 9I-653 from Mumbai to Shirdi was involved in a serious incident of runway overrun at Shirdi airport. There were 02 cockpit crew, 02 cabin crew and 42 passengers onboard the aircraft. The aircraft was under the command of PIC who was duly qualified on type an ATPL holder and co-pilot, ATPL holder who was duly qualified on type as Pilot Monitoring.

This was the first flight of the day for both pilots. Pilot Monitoring had also submitted that this was his first flight to Shirdi airport. As per the flight plan, ETD (Estimated Time of Departure) from Mumbai was 0950 UTC and ETA (Estimated Time of Arrival) at Shirdi was 1034 UTC. The crew reported around 0838 UTC at Mumbai airport and underwent the pre-flight medical. Thereafter, the Flight Dispatcher gave the MET briefing at the dispatch office where PIC requested for the latest METAR for Shirdi. The MET report to operate the aircraft to Shirdi was well within the VFR conditions. The aircraft's Take-off weight was 20186 kgs including 2900 Kgs of fuel.

As per the statement of PIC, the PM was briefed before the take-off and pre departure checklists were followed. The clearance from ATC for pushback was received after a brief delay and subsequently a normal takeoff was carried out. The aircraft took off from Mumbai airport at 1037 UTC. The ATC cleared the aircraft to climb on runway heading till 1700 feet and then turn right heading 360 climbing to FL070.

During initial climb, Auto Pilot disengaged automatically, PIC immediately took over the controls and Auto Pilot was re-engaged. There were repeated events of auto pilot disengagement (around 3 to 4 times), however, finally the crew was able to engage the auto pilot. Apart from this, there was no other event observed during the cruise.

The Mumbai radar controller vectored and cleared the aircraft direct to way point 'SEKVI'. At 1058 UTC, Pilot Monitoring made Radio contact with Shirdi ATC and passed their present position i.e 75 miles short of Shirdi and maintaining assigned FL110, and asked for the latest weather. Initially, Shirdi ATC instructed crew to standby to get the latest weather updates and at 1059 UTC provided the aircraft with weather information which reported wind 330°/06, visibility 6 Km, temperature 40°C, DP 20°C and QNH 1007 hPa. At 1100 UTC, tower again updated the crew with latest MET information wind 350°/10 and crew were asked to report their runway preference. As the visibility was well above the VFR minima, PIC requested for a

straight in approach RWY 09 at Shirdi which was approved by Shirdi ATC. At 32 miles short of Shirdi aerodrome, Mumbai Control advised VT-AIX to descend to FL80 and contact Shirdi ATC.

Shirdi ATC advised the aircraft to report 25 miles inbound. Aircraft reported 25 miles inbound passing FL086. Tower suggested the crew to descent to 5100 feet in VMC, TL 75 and QNH 1007. ATC informed crew to continue descend in VMC with their own discretion and report long final runway 09. At 1115 UTC, crew reported visual contact with the RWY 09 and commenced final approach. At 500 feet, the aircraft Vapp was 125 knts, which was 20 knts above than the ATR FCTM laid down deviations. Subsequently, aircraft was configured for landing. At short finals, tower transmitted the wind update to crew, wind 330°/14 and cleared the aircraft to land. At this point, the wind parameters were not within the company operating limits.

At time 1118 UTC, ATC controller observed that the aircraft had touched down ahead of the aiming point and bounced twice on the runway before it settled down on the runway. ATC asked the aircraft to confirm all operations normal to which aircraft reported “affirm all operations normal”. At 1119 UTC, crew informed ATC that they had overrun the runway, however, all operations seems to be normal. The aircraft exited the runway 09 end and stopped on RESA at around 111 metres straight from the end of threshold and 29 metres right of the runway centre line. The ATC controller asked PIC to confirm if they were able to move 180. The crew responded “negative” and requested tower to provide vehicle assistance for passengers.

The crew shutdown both engines and instructed cabin crew to open the main door. The normal evacuation of passengers was carried out. However, neither CFT vehicle nor any other assistance reached the incident site during commencement of the deplaning of passengers. The passengers had to wait for 20 minutes at the site for transport vehicle to arrive and to assist them upto the terminal area. All passengers were transported to the terminal building in passenger coaches. There was no fire.

The ATC had issued NOTAM and Runway 09/27 was closed for operations. After the aircraft recovery, NOTAM was withdrawn on 22.05.2018 and the runway was made available for normal operations.

1.2 INJURIES TO PERSONS

INJURIES	CREW	PASSENGERS	OTHERS
FATAL	Nil	Nil	Nil
SERIOUS	Nil	Nil	Nil
MINOR/NONE	04	42	Nil

1.3 DAMAGE TO AIRCRAFT

The aircraft exited the runway end 09 and got stuck into the unpaved surface area available under RESA. However, no visual damage was observed on the aircraft except one nick and flaking of paint between frame 18-19 at zone 100 below the emergency exit window on the fuselage.

1.4 OTHER DAMAGE

NIL

1.5 PERSONNEL INFORMATION

1.5.1 Pilot – in – Command

Age	: 46 Years
ATPL Licence	: Valid
Date of Issue	: 03/02/2014
Valid up to	: 02/02/2021
Category	: ATPL
Class	: Aeroplane
Endorsements as PIC	: 09/11/2017
Date of Med. Exam.	: 16/10/2017
Med. Exam valid upto	: 15/10/2018
FRTO Licence	: Valid
Date of issue	: 31/10/2002
Valid up to	: 08/11/2022
Total flying experience	: 4400:00 HRS
Experience on type	: 498:00 HRS
Experience as PIC on type	: 498:00 HRS
Last flown on type	: 21/05/2018 (ATR-72-600)

Flying details (in Hrs):

Total flying experience during last 180 days	: 488:00
Total flying experience during last 90 days	: 233:00
Total flying experience during last 30 days	: 81:00
Total flying experience during last 07 Days	: 21.53
Total flying experience during last 24 Hours	: 05.10

1.5.2 Co-Pilot

Age	: 49 Years
ATPL Licence	: Valid
Date of Issue	: 14/03/2012
Valid up to	: 21/08/2021
Category	: ATPL
Class	: Aeroplane
Endorsements as P2	: 22/08/2016
Date of Med. Exam.	: 02/11/2017
Med. Exam valid upto	: 01/11/2018
FRTO Licence	: Valid
Date of issue	: 21/07/2014
Valid up to	: 07/07/2019
Total flying experience	: 3370:00 HRS
Experience on type	: 905:33 HRS
Experience as P2 on type	: 905:33 HRS
Last flown on type	: 21/05/2018 (ATR-72-600)

Flying details (in Hrs):

Total flying experience during last 180 days	: 304:35
Total flying experience during last 90 days	: 180:45
Total flying experience during last 30 days	: 64:56
Total flying experience during last 07 Days	: 11:50
Total flying experience during last 24 Hours	: 05:00

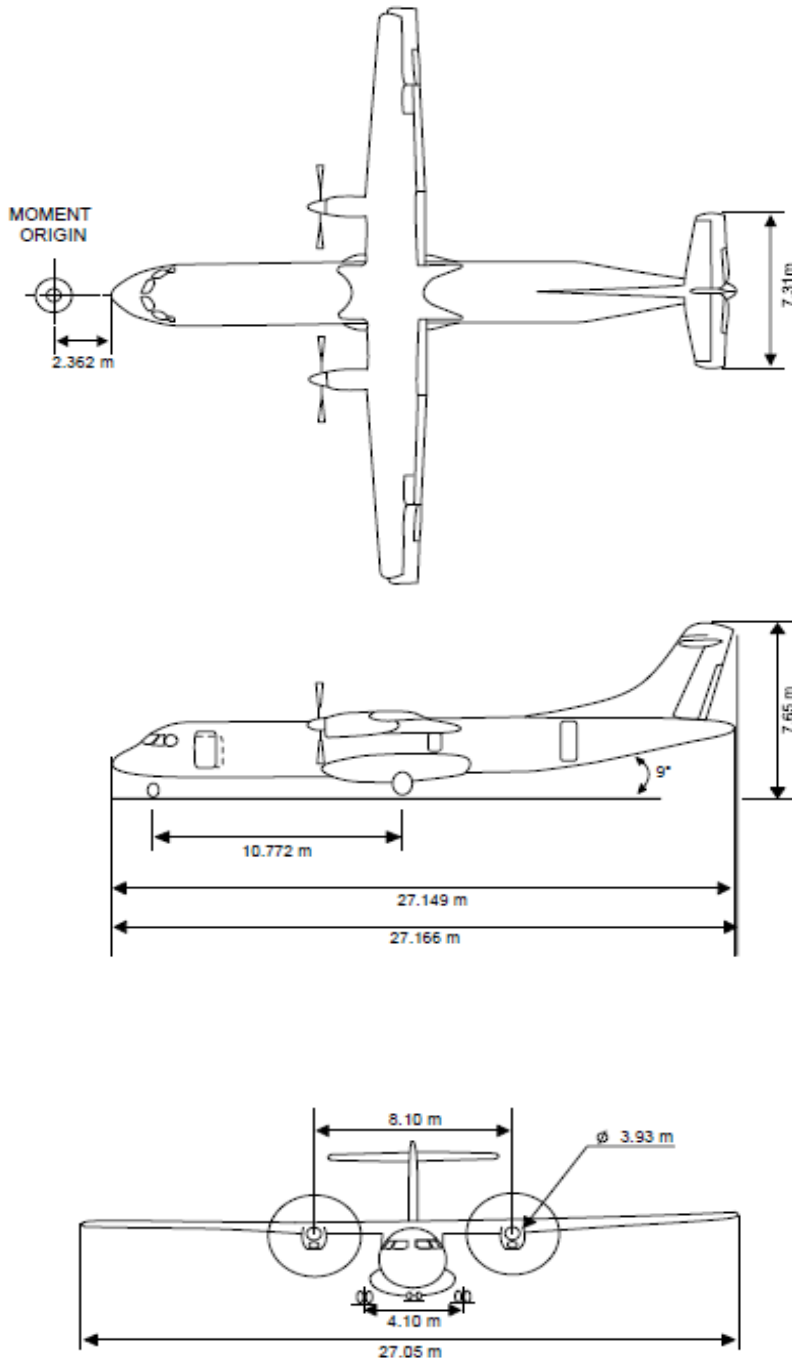
The crew were not involved in any serious incident/accident in the past. They had adequate rest as per the Flight Duty Time Limitations (FDTL) requirement prior to operating the incident flight.

1.6 AIRCRAFT INFORMATION

ATR-72 aircraft is certified in the Transport Category, JAR25 and ICAO Annex 16 for day and night operations, in the following conditions when the appropriate equipment and instruments required by the airworthiness and operating regulations are approved, installed and are in an operable condition:-

- VFR and IFR
- Flight in icing conditions.

- Reverse thrust taxi (single or twin engine)



The ATR-72 is a subsonic, short to medium-range, civil transport aircraft. The aircraft is designed for operation with two pilots and has passenger seating capacity of 70. The aircraft has two Turboprop engines manufactured by M/s Pratt and Whitney.

The aircraft is certified in 'Normal' (Passenger) category, for day and night operation under VFR & IFR. The maximum operating altitude is 25000 feet and maximum take-off weight is 23000 Kgs. The Maximum Landing weight is 22350 kgs. The aircraft length is 27.166 meters, wingspan is 27.050 meters and height of this aircraft is 7.72 meters. The distance between main wheel centre is 4.100 meters. The

distance between engines is 8.100 meters and Engine (Propeller Tip) Ground Clearance is 1.21 meters.

ATR aircraft VT-AIX (MSN 1268) had been manufactured in year 2015. The aircraft was registered with DGCA under the ownership of M/s Elix Assets 7 Limited on 12.04.2016. The aircraft is registered under Category 'A' and the Certificate of Registration No. is 4655/2.

The Certificate of Airworthiness Number 6765 under "Normal category" subdivision Passenger / Mail / Goods was issued by DGCA on 06.05.2016. The specified minimum operating crew is two and the Maximum All up Weight is 23000 Kgs. At the time of incident, the Certificate of Airworthiness was current and Airworthiness Review Certificate valid upto 05.05.2019.

The aircraft was holding a valid Aero Mobile License No. A-024/028-RLO (NR) at the time of incident. This aircraft operated under Scheduled Operator's Permit No S-8 which is valid up to 30.04.2023. As on 21.05.2018, the aircraft had logged 4026:44 Airframe Hours and 3281 Cycles.

The ATR72-600 aircraft and its Engines are being maintained as per the maintenance programme consisting of calendar period/ flying hours or Cycles based maintenance as per maintenance programme approved by Regional Airworthiness office, Delhi.

The last major inspection 8A (4000) FH check was carried out at 3864:18 hrs/3142 cycles on 29.04.2018. Subsequently, all lower inspections (Night Halt checks, Layover Checks, Weekly Checks) were carried out as and when due before the incident.

The aircraft was last weighed on 13th Nov, 2015 at ATR facility, Toulouse, and the weight schedule was prepared and duly approved by the office of DDG (NR), DGCA, Delhi. As per the approved weight schedule, the Empty Weight of the aircraft is 13174.522 Kgs. Maximum Usable Fuel Quantity is 5000 Kgs. Maximum payload with fuel tanks full is 4091 Kgs. Empty weight CG is 13.928 meters aft of datum. As there was no major modification affecting weight & balance since last weighing, hence, the next weighing is due on 12th Nov, 2020. Prior to the incident flight, the weight and balance of the aircraft was well within the operating limits.

The left Engine S/N PCE-ED1093 had logged 2889:18 hrs. and 2414 cycles and the right Engine S/N PCE-ED1080 had logged 2326:04 hrs. and 1969 cycles. There was no defect reported on the previous flight.

All concerned Airworthiness Directive, mandatory Service Bulletins, DGCA Mandatory Modifications on this aircraft and its Engine had been complied with as on the date of incident.

1.7 METEOROLOGICAL INFORMATION

The incident occurred at 1118 UTC. The METAR of 1100 UTC was intimated to the crew by the ATC. As per the METAR of 1100 UTC, the following meteorological conditions existed.

Time (IST)	1030 UTC	1100 UTC	1130 UTC
Wind	350/ 06 Knots	330/ 06 Knots	320/ 11 Knots
Visibility	6000 meter	6000 meter	6000 meter
Clouds	NSC	NSC	NSC
Temperature	40 °C	40 °C	39 °C
Dew Point	19 °C	20 °C	20 °C
QNH	1008 hPa	1007 hPa	1007 hPa
QFE	939 hPa	939 hPa	939 hPa

No significant trend was reported by ATC. CVR tape transcript revealed that the wind information was updated three times by Shirdi ATC to the aircraft and the last weather transmission was at 1116 UTC just prior to landing clearance winds were 330°/14.

The METAR indicated visibility above weather minima which was more than 6 km from 1030 UTC to 1130 UTC. There were no significant clouds.

1.8 AIDS TO NAVIGATION

Shirdi Airport Runway 09 is the visual approach runway where no navigation aid for landing is available except PAPI which was operational at the time of landing.

Shirdi Airport is fitted with instruments to record wind speed, direction, temperature and pressure on airfield. Digital indicators are installed in ATC to monitor the readings and to inform the aircraft.

There was only one wind sock, with black and white strips, available on Runway 09/27 which too was installed at the end of Runway 09 which is not clearly visible if aircraft lands on runway 09.

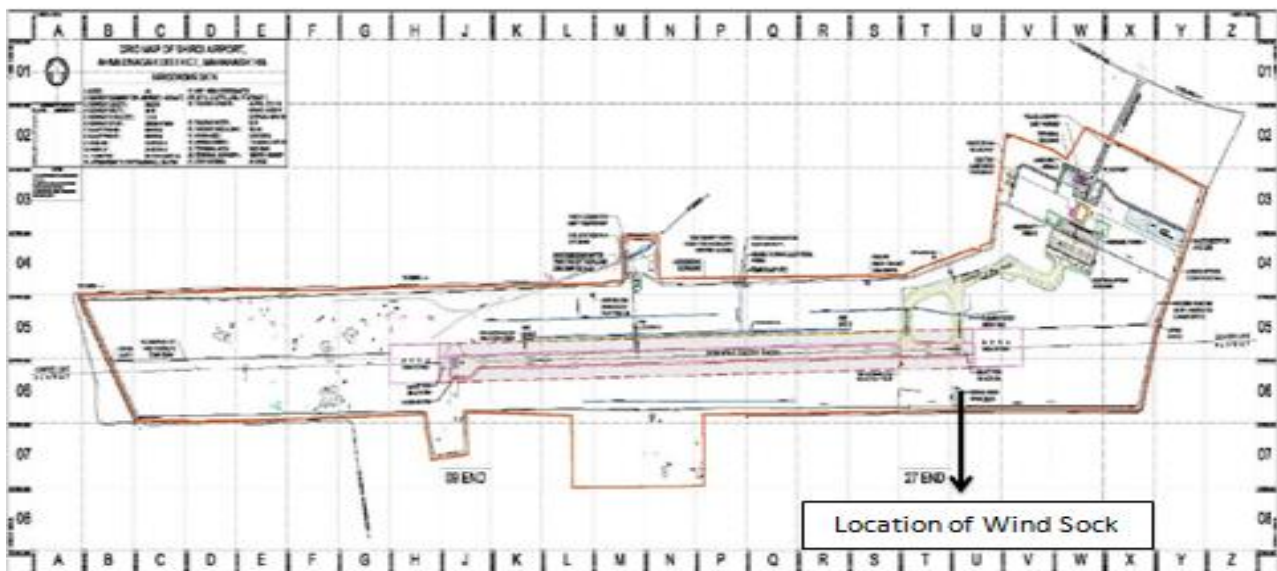
1.9 COMMUNICATIONS

At the time of incident, the aircraft was in contact with Shirdi ATC on frequency 118.45 MHz. From the CVR transcript, it was apparent that there was always two way positive communication between the flight crew and ATC. Aircraft maintained positive communication with the ATC throughout the flight.

1.10 AERODROME INFORMATION

Shirdi Airport is operated by Maharashtra Airport Development Company Ltd. (MADC) and AAI maintains Communication, Navigation and Surveillance (CNS) & Air Traffic Management (ATM) services at the airport. The Shirdi Aerodrome was licensed by DGCA on 21st September, 2017 and present runway is capable of handling Code 3C type aircraft.

The Airport Reference Point is Lat: 19°41'27.33" N Long: 74°22'18.35" E. The elevation of the airport is 1908.60 feet (581.75 metres). Aerodrome Reference Temperature is 38.5 C. Aerodrome beacon is located abeam the Air Traffic Control Tower Building, flashing Green and White, with a frequency of 24 flashes per minute and always kept 'ON' during Aerodrome Operational hours. The aerodrome reference code is 4C.



Grid Map of Shirdi Airport

The IATA Location Identifier Code is SAG and ICAO Location Indicator Code is VASD. Shirdi Airport operates as domestic airport under VFR condition and no night

operation is permitted. The Airport Rescue and Fire Fighting Services was Category ‘6’ and provided by MADC. Precision Approach Path Indicator (PAPI) are available at both ends.

The orientation of the runway is 09/27. Taxiing guidance provided on R/T by ATC as Visual Docking Guidance System (VDGS) is not available. The detail of runway distances is as below;

Runway No.	TORA(M)	TODA (M)	ASDA (M)	LDA (M)	WIDTH (M)	RESA (M)
09	2500	2500	2500	2500	45	240 x150
27	2500	2500	2500	2500	45	240 x150

RESA at the end of Runway 09 was not graded in accordance with the standards laid down in CAR Section 4 and was mainly covered with loose gravels.

Last friction test for runway surface at Shirdi airport was carried out on 10.05.2017 and was within the limits. The PCN for both the runway 09 and 27 calculated was 60F/C/W/T.

The ground calibration of PAPI at runway 09 and 27 side was carried out on 20.07.2017 and found satisfactory.

1.11 FLIGHT RECORDERS

The aircraft was fitted with Solid State Cockpit Voice Recorder & Digital Flight Data Recorder as per the table given below. The recorders showed no signs of damage. Data from both CVR & DFDR were downloaded and analysed after the incident.

No	Unit	Manufacturer	Part Number	Serial Number	Total Duration of available Recording
1	CVR	L3	2100-1020-02	000547135	02 Hrs 04 min 14 sec
2	DFDR	Communication, USA	2100-4045-00	001029515	70 hrs.

1.11.1 Cockpit Voice Recorder

The CVR was downloaded and analysed. Checks and procedures were found to be standard. The contents of the CVR for the final phase are as below: -

TIME (UTC)	CALLING UNIT	TRANSMISSION
1058	LLR653	MUMBAI-SHIRDI, LEVEL MAINTAINING 110 PRESENTLY WE ARE 75 MILES FROM SHIRDI LEVEL 150...110 AND ETA SHIRDI WOULD BE 1118. REQUESTING LATEST WEATHER.
1059	TWR	ETA COPIED SIR, LATEST WEATHER AT TIME... STAND BY
1059	TWR	LATEST WEATHER AT 1100 WIND 330 DEG 06 KNOTS, VIS 6KM, T-40, DP-20, QNH 1007. READ BACK QNH
1100	LLR653	1007 AND CONFIRM RWY 09 FOR US
1100	TWR	LATEST WIND 350 DEG 10 KNOTS,REPORT RWY PREFERENCE
1100	LLR653	REQUEST STRAIGHT IN APPROACH RWY 09
1100	TWR	ROGER STRAIGHT-IN APPROACH RWY 09 APPROVED, REPORT RELEASED CONTROL WITH DESCENT TRAFFIC.
1100	LLR653	WILCO
1107	LLR653	WE ARE 32 MILES AND RELEASED BY MUMBAI PASSING 101 CLEARED FOR 80 FURTHER DESCENT WITH YOU.
1109	TWR	REPORT 25 MILES INBOUND SHIRDI
1109	LLR653	WILCO CALL YOU 25 MILES INBOUND SHIRDI
1110	LLR653	25 MILES PASSING 86 FOR 80, REQUESTING FURTHER
1111	TWR	DESCENT TO 5100 FT IN VMC TL 75 QNH 1007
1111	LLR653	DESCENT TO 5100 ON 1007 LLR 653 TL-65
1111	TWR	SAY AGAIN THE LAST PART
1111	LLR653	DESCENT TO 5100 ON 1007
1111	TWR	ROGER SIR DESCENT IN VMC
1111	LLR653	ROGER IN VMC
1114	LLR653	TERRAIN INSIGHT CAN WE DESCENT FURTHER
1114	TWR	AT YOUR OWN DESCRETION CONTINUE DESCENT IN VMC REPORT LONG FINAL RWY 09
1114	LLR653	CALL YOU LONG FINAL RWY 09
1115	LLR653	RWY VISUAL. LONG FINAL FOR RWY 09
1115	TWR	ROGER REPORT FINAL RWY 09
1115	LLR653	CALL YOU FINAL RWY 09
1116	TWR	YOU ARE INSIGHT RWY 09, CLEARED TO LAND WIND 330 DEG 14 KNOTS
1116	LLR653	CLEARED TO LAND LLR653
1118	TWR	CFT1
1119	TWR	LLR 653
1119	LLR653	GO AHEAD
1119	TWR	CONFIRM ALL OPS NORMAL

1119	LLR653	ALL OPS NORMAL
1119	LLR653	WE HAVE JUST GONE OFF RWY BUT EVERYTHING SEEMS TO BE OK
1119	TWR	CONFIRM ABLE TO MOVE 180
1119	LLR653	NEGATIVE
1119	TWR	ROGER
1121	TWR	REPORT IF ANY ASSISTANCE REQUIRED
1123	LLR653	TWR
1123	TWR	LLR653
1123	LLR653	REQUESTING SOME VEHICLE TO PICK UP THE PAX
1124	TWR	WE HAVE INFORMED THE CONCERNED OFFICERS THEY ARE REACHING YOU SOON

1.11.2 Digital Flight Data Recorder

The DFDR was downloaded and was sent to BEA, France for detailed analysis. The report received from BEA, France is as follows:-

1. QNH setting:

The recorded BARO CORRECTED ALTITUDE values stated a landing altitude of 1,904 feet, which was consistent with the airfield elevation.

2. Final approach speed:

The final approach speed was calculated as 105 knots with the prevalent conditions:

$$V_{APP} = V_{mHB30} + \text{Wind Factor.}$$

The Wind Factor is the highest of:

- 1/3 of the head wind velocity
- The full gust

The airplane weight was around 19,800 kg at the landing time. This provided a V_{mHB30} of 105 kt in normal condition as per QRH.

Wind Factor considered nill as no head wind was reported by ATC.

$$\begin{aligned} V_{APP} &= V_{mHB30} (105 \text{ Kts}) + \text{Wind Factor} (0 \text{ Kts}) \\ &= 105 \text{ Kts.} \end{aligned}$$

3. Approach phase:

The approach phase was performed with a final descend from 1,500 feet RA to the runway initiated 4 NM from the runway threshold.

The runway threshold was overflown at a height of 50 feet and an indicated airspeed of 128 kt.

4. Landing distance:

The weight of the aircraft was 19,800 kg or 43,600 lb. The associated actual landing distance on a dry runway as per the FCOM section is 1,900 feet before correction.

ACTUAL LANDING DISTANCE (FT) - SEA LEVEL

NORMAL CONDITIONS - FLAPS 30°

WEIGHT (x 1000 lb)		31	33	35	37	39	41	43	45	47	48.5	49.5	50.7
R U N W A Y C O N D I T I O N B Y	DRY	1730	1730	1730	1730	1790	1840	1900	1960	2030	2080	2110	2150
	WET	2270	2280	2280	2280	2360	2440	2520	2600	2680	2740	2780	2830
	WATER or SLUSH (<1/2 inch)	2230	2330	2440	2540	2660	2770	2890	3010	3120	3210	3270	3340
	COM- PACT SNOW	2380	2480	2590	2690	2800	2900	3000	3100	3200	3280	3330	3390
	ICE	3510	3660	3820	3980	4140	4310	4470	4640	4800	4920	5000	5100

The airfield elevation was 1,900 feet, leading to a correction of

$$\text{Correction}_{\text{Altitude}} = 2\% \times \frac{1,900}{1,000} \times 1,900 = 72 \text{ feet}$$

The computed tailwind was around 15 kt at the time of the touchdown. The associated landing distance correction was then:

$$\text{Correction}_{\text{Tailwind}} = 10\% \times \frac{15}{5} \times 1,900 = 570 \text{ feet}$$

The actual landing distance, taking into account the wind and the airport elevation at the time of the event, was 2,542 feet (1900 ft+570 ft+72 ft) or 775 m.

5. Engines:

At 7NM from the runway threshold, the PIC moved the PL to the Flight Idle position and the air speed values decreased. At an airspeed of 173 kt, the crew extended the flaps to 15° (VFE15 185kt). The engines power management was set to the take-off mode and the landing gear was extended at 1,500 feet Radio Altitude. Thereafter, the crew extended the flaps to 33° and increased engine power. Around 3 NM from the runway threshold, the airspeed stabilized around 120 kt.

When the aircraft was at 0.55 NM from the runway threshold:

- The indicated airspeed increased from 118 kt to 128 kt
- The height decreased from 243 feet to 25 feet
- The vertical rate oscillated between -700 and -900 ft/min, with an average value of 820 ft/min.

6. Landing phase:

The main landing gears were recorded compressed 3 times:

- First touchdown: the vertical acceleration reached 1.6 G
- Second touchdown: the vertical acceleration reached 1.7 G
- Final settling on the runway: the vertical acceleration reached 1.19 G

All landing gear were recorded compressed after the 3rd compression of the main landing gear.

As per the DFDR analysis, the aircraft bounced twice before settling for the final landing.

7. Aircraft Deceleration:

Around 5 seconds after the weight on wheel signal, the brake pressure of the left MLG wheel increased up to the maximum of 3,000 PSI. No failure of the braking system was observed. The braking action was considered as efficient.

As far as the longitudinal control is concerned: -

1. At 0.5 NM after the RWY threshold, the indicated airspeed was around 120 knots with a pitch value of 0°. The power lever were not in the flight idle position.
2. During the following 8 seconds, the pitch values oscillated then between 0 and 3° nose up while the IAS decreased to 105 kt.
3. The PIC retarded the Power Levers to Flight Idle and pitched up, with a deflection of the elevator reaching half of its full range. The pitch increased and reached 5°.

The main landing gears were compressed with a maximum recorded vertical acceleration of 1.6 g. The airplane bounced a first time.

4. The PIC pushed the control column forward and the pitch decreased. The pitch value reached a minimum value of 0° . The IAS was then 102 kt. PIC moved the Power Lever forward (up to 46°) while the IAS was still decreasing. Thereafter, PIC pitched the aircraft again, and pitch value reached around 1° nose up, with an IAS value of 100 kt. The MLG were compressed a second time with a maximum recorded vertical acceleration of 1.7 g. The airplane bounced a second time.
5. The PIC pushed the control column forward again. The pitch decreased and reached -1° . The MLG were compressed, with a vertical acceleration of 1.19 G, at an IAS of 99 kt. The Nose Landing Gear compressed and settled down on the runway. The PIC retarded the PL to Ground Idle. He then pushed the control column and reached the full elevator deflection (pitch down).

1.12 WRECKAGE AND IMPACT INFORMATION

The crew approached runway 09 without taking into the account of high tailwind conditions. The aircraft bounced twice on the runway before settling on the runway. The crew had stated that as a corrective action and to avoid a hard impact on the runway, PIC had increased the engine power to increase the speed. This resulted into aircraft floatation for a longer time and pitch up attitude leading to a longer runway requirement for aircraft deceleration. Subsequently, crew applied reverse pitch and braking but could not manage to stop the aircraft on runway itself.

Crew also said that due to unavailability of required runway length, they were not able to take the decision on Go-around. Aircraft overshot the runway 09 and came to a halt on the unpaved surface available under RESA.



Fig: Final rest position of the aircraft

Following are the distances measured according to the DFDR & Ground marks.

1. Distance of aircraft touch down on RWY 09 from threshold: 1595.1 m
2. Distance of aircraft from end of runway 27 in soft ground (after blast pad): 51.4 m
3. Tyre rub marks visible on Runway and upto stop point on RESA: 381.4 m.
4. Maximum Deviation of aircraft w.r.t Runway centre line : 29 m

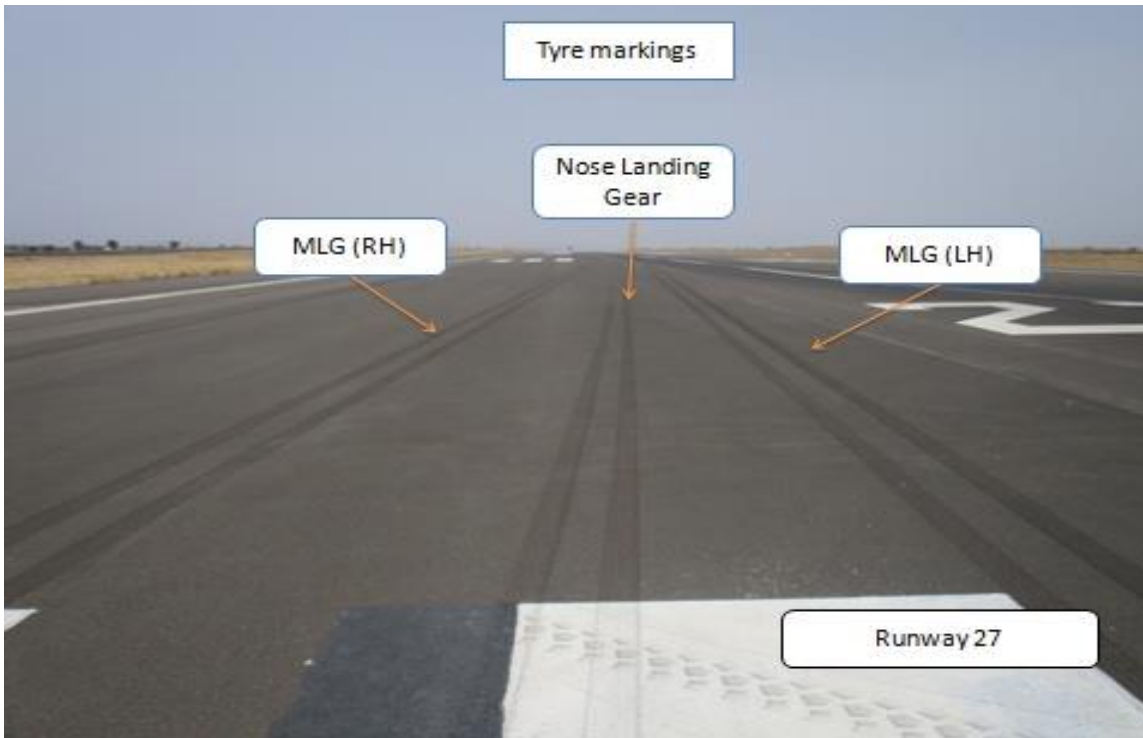


Fig: Landing gear's Tyre markings on runway



Aircraft overshoot the runway



Final rest position of the aircraft

There was no damage to the aircraft. Further, there was no external damage due to overrun other than the runway end lights.

Aircraft was made serviceable and was put back into service after necessary inspections and checks carried out on the aircraft.

1.13 MEDICAL AND PATHOLOGICAL INFORMATION

Prior to operating the flight, the cockpit crew & the cabin crew had undergone pre-flight medicals / Breath analyser test at Mumbai and same was negative. Medical examination of the crew was again carried out after the incident and the same was also found negative.

1.14 FIRE

There was no pre or post impact fire.

1.15 SURVIVAL ASPECTS

The incident was survivable and normal evacuation of passengers was carried out after the incident.

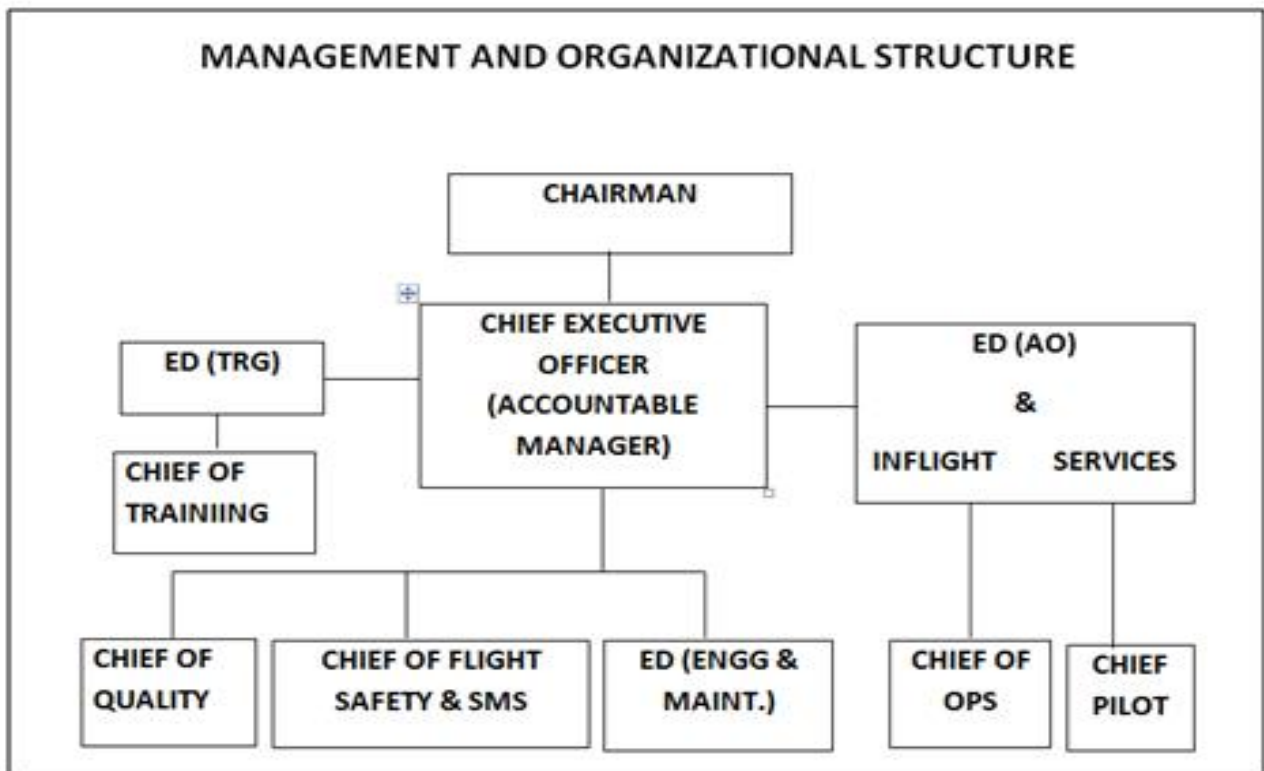
1.16 TESTS AND RESEARCH

NIL.

1.17 ORGANISATION AND MANAGEMENT INFORMATION

M/s Alliance Air had started its operations in April'1996 with B737-200 aircraft. At the time of incident, Alliance Air had a fleet of ATR 72-600 (16 Nos) and ATR 42-320 (01 Nos.) aircraft. Most of the stations operated by the airline are under Regional connectivity. The organisation comes under the umbrella of M/s Air India. The corporate services are also maintained by M/s Air India.

The organisation is headed by CEO who reports directly to the Chairman of M/s Air India. The Executive Director (Ops) and Chief of Flight Safety are accountable for day to day running of the airline and report to CEO. All services pertaining to engineering are out sourced to AIESL (Air India Engineering Services Ltd.) which is a subsidiary of M/s Air India.



Alliance Air has an MOU with M/s Air India for its Ground Handling duties, Airlines Security & management.

1.18 ADDITIONAL INFORMATION

1.18.1 Aircraft Brake System

The four main gear wheels are equipped with multidisc carbon brakes, each one is operated by hydraulically powered pistons.

Two modes are available:-

- i. Normal, controlled by pilot's brake pedals and supplied by green system.
- ii. Emergency and parking controlled by the emergency and parking brake handle and supplied by blue system.

The antiskid system comes into action as soon as the gear is selected down, locked and aircraft speed is above 10 knots. Each wheel and each pair of external or internal wheels are monitored.

The aim of the system is to provide the maximum braking performance by controlling brake pressure in order to minimize wheel slip, brake and tire wear, depending on runway conditions.

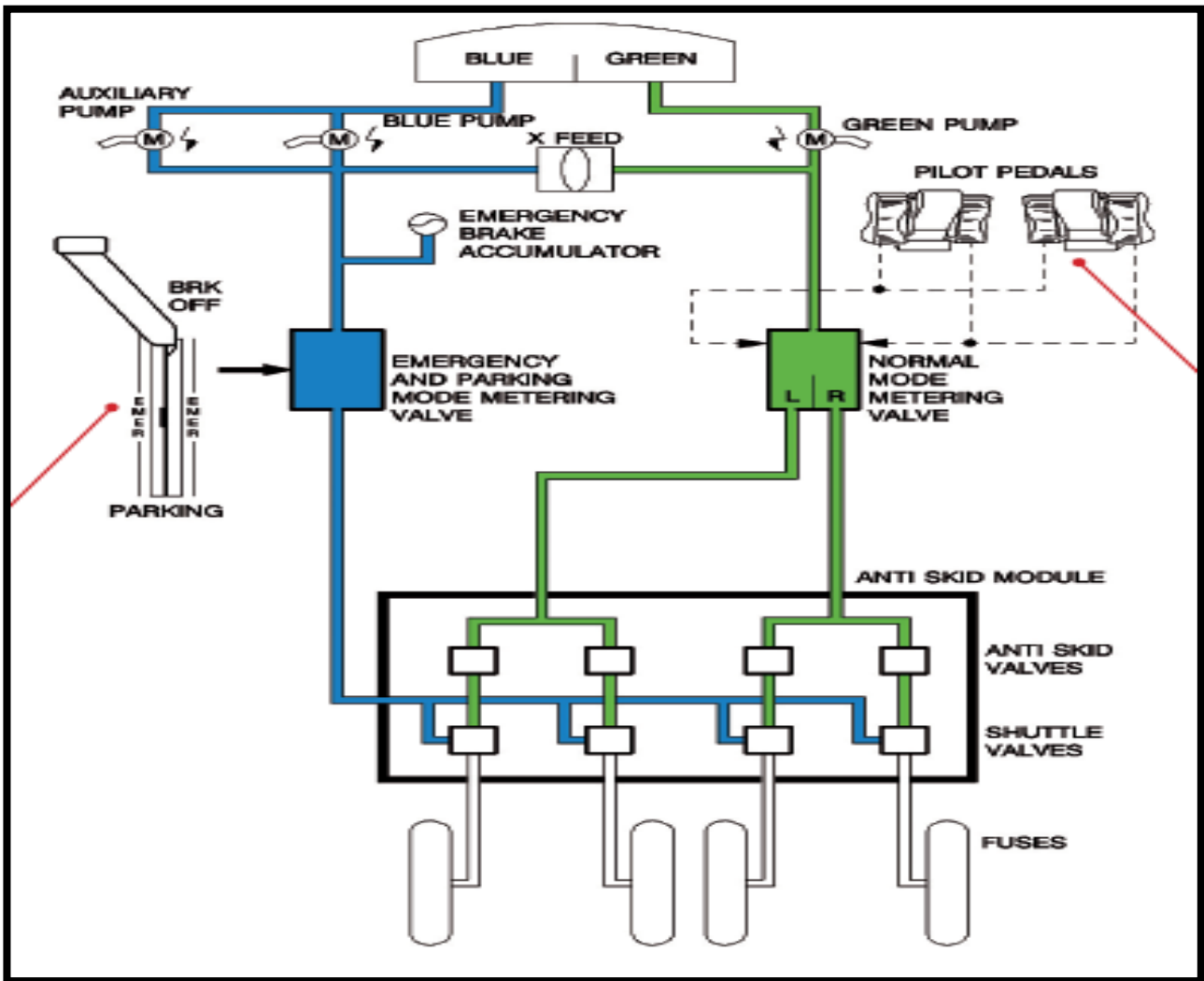


Fig: Brakes schematic

At main gear compression, the braking action is inhibited as long as wheel speed is below 35 kt or for 5s, in order to preclude inadvertent brake application prior to wheel spin up on low friction pavements or with light wheel vertical loading.

For proper braking action, tyre pressure should be in limit along with the tyre bead conditions. Physical condition of both main landing gears and the tyres were checked and found satisfactory. Moreover, calculated pressure in each tyre was in the permissible limits. Calculated pressure for each tyre was as follows:-

LH Main Landing Gear		Nose Landing Gear		RH Main Landing Gear	
Portside	STBD side	Portside	STBD side	Portside	STBD side
123 psi	124 psi	65 psi	64 psi	120 psi	125 psi



The condition of the tyres and their pressure were checked after the incident and the same was found within the limits.

1.18.2: FCOM extract

Wind Limitations:

As per the FCOM, tailwind limitation for ATR 72 aircraft during Takeoff and Landing is:

Tailwind limit.....15 kt

According to ATR FCOM, the V_{APP} was calculated as 105 kt.

However, the approach phase was performed at a speed greater than 120 kt and final descent was initiated from 1,500 ft Radio Altitude to the runway when the aircraft was at 4 NM from the runway threshold.

The runway threshold was overflown at a height of 50 feet and speed of 128 kt.

The landing was done with a tail wind gusting from 11 to 21 kt. The touchdown occurred with a tail wind of around 15 kt.

The ATIS information (ATC transcript) did not provide any information relative to gusts. The last meteorological information provided by the controller was “wind 330°/14 kt”. As no head wind was reported while landing on RWY 09, the wind factor was nil.

1.18.3: Airport Infrastructure

Shirdi airport is operated by the Maharashtra Airport Development Company Ltd. (MADC) and Communication Navigation Surveillance (CNS) & Air Traffic Control (ATC) at the airport is being managed by the Airports Authority of India.

- PAPI on runway 09/27
- One wind sock at runway 27

Shirdi airport is operated under VFR only due to non-availability of VOR, DME and ILS facility at the airport.

Shirdi Airport was fitted with wind speed, direction, temperature and pressure sensors on airfield. Digital indicators are installed in ATC. It was seen that the calibration validity of those sensors were not available with the office of Airports Authority of India. However, the wind values computed from the airplane recorded parameters were consistent the wind values provided by the ATC to the crew.

1.18.4: Go-around Procedures

As per ATR FCOM, ATR72 aircraft shall meet the stabilisation criteria during approach and landing phase and crew should plan for go-around if following criteria is not met:-

Stabilization criteria:-

Approaches must be stabilized:

- 1000 ft AAL in IMC conditions
- 500 ft AAL in VMC conditions
- 300 ft AAL following circle-to-land

An approach is considered stabilized when all of the following criteria are met:-

- Lateral path (Loc, Radial or RNAV path) is tracked
- Landing configuration is established
- Energy management:-
 - Vertical path (Glide, Altitude versus Distance or RNAV path) is tracked
 - Power setting is consistent with appropriate aircraft weight, Head/Tail wind component and vertical guidance requirements
 - Speed and pitch attitude are relevant to actual conditions
 - Briefing and checklists are completed

Deviations:-

Only small deviations are allowed if immediately called out and corrected:

- Altitude during initial approach: ± 100 ft

- Lateral guidance on final approach segment: half LOC scale deviation for precision approach or $\pm 5^\circ$ on radial for conventional non precision approach or 015 NM for RNAV approaches
- Vertical path on final approach segment: half GS scale deviation or + 200/-0 ft for non precision approaches
- Altitude deviation at DA or MDA: 0 ft
- Speed 0/+10 kt

Only small adjustments in pitch and/or heading are allowed to stay on track:

- Maximum sink rate is 1000 ft per minute
- Maximum rate of descent adjustments are ± 300 ft per minute from target rate
- Bank angles are no more than 15°
- Localizer guidance adjustments are done within heading bug width
- GS guidance adjustments must be within $\pm 2^\circ$ of pitch change

All deviations must be called out loud by PM or PF(whoever identifies deviation first) using the following call outs:

Flight events	Situation	PM call outs	PF orders
1000 FTAAL IMC	Stabilised	1000 FT, Stabilised	We continue
	Unstabilised	1000 FT, Go around	Go-around, Set Power, Flaps one notch
500 FT AAL VMC	Stabilised	500 FT, Stabilised	We continue
	Unstabilised	500 FT, Go around	Go-around, Set Power, Flaps one notch
300 FT AAL CIRCLE TO LAND	Stabilised	300 FT, Stabilised	We continue
	Unstabilised	300 FT, Go around	Go-around, Set Power, Flaps one notch

In addition to above, ATR FCOM has also suggested that during landing, in case of significant bounce, a go-around should be considered.

1.18.5: Go-around procedure in case of bounce landing

As per the DGCA Operations Circular 09/2017, following are the general guidelines laid down to recover from a bounce landing:-

Bounce Recovery – Rejected Landing

A rejected landing (also called an aborted landing) is a go-around maneuver initiated after touchdown of the main landing gear. A rejected landing is a challenging maneuver and typically is recommended only when an aircraft bounces more than approximately five feet (1.5 meters) off the runway after touchdown.

Bouncing and Bounce Recovery

Bouncing during a landing usually is the result of one or more of the following factors:-

- Excessive sink rate;
- Late flare initiation;
- Incorrect flare technique;
- Excessive airspeed; and/or,
- Power-on touchdown (preventing the automatic extension of ground spoilers, as applicable).

The bounce-recovery technique varies with each aircraft type and with the height reached during the bounce.

Recovery from a Light Bounce (Five Feet or Less)

When a light bounce occurs, a typical recovery technique can be applied explained below: -

- Do not increase the pitch attitude because this could lead to a tail strike;
- Continue the landing;
- Use power as required to soften the second touchdown; and,
- Be aware of the increased landing distance.

Recovery from a High Bounce (More Than Five Feet)

- When a more severe bounce occurs, do not attempt to land, because the remaining runway may be insufficient for a safe landing.
- The following go-around technique can be applied:-
 - Maintain or establish a normal landing pitch attitude;
 - Initiate a go-around by activating the go-around levers/ switches and advancing the throttle levers to the go-around thrust position;
 - Maintain the landing flaps configuration or set a different flaps configuration, as required by the aircraft operating manual (AOM)/quick reference handbook (QRH).
 - Be prepared for a second touchdown;
 - Be alert to apply forward pressure on the control column and reset the pitch trim as the engines spool up (particularly with underwing-mounted engines);

- When safely established in the go-around and when no risk remains of touchdown (steady positive rate of climb), follow normal go-around procedures; and,
- Reengage automation, as desired, to reduce workload.

Commitment to a Full-stop Landing

Landing incidents and accidents have demonstrated that after the thrust reversers have been deployed (even at reverse idle), the landing must be completed to a full stop because a successful go-around may not be possible.

Commitment to Go Around

If a go-around is elected, the flight crew must be committed to conduct the go-around. The crew must not change the go-around decision and must not retard the throttle levers in an attempt to complete the landing.

1.18. USEFUL OR EFFECTIVE INVESTIGATION TECHNIQUES

NIL.

2. ANALYSIS

2.1 SERVICEABILITY OF THE AIRCRAFT

The aircraft had a valid Certificate of Airworthiness on the day of incident. The scrutiny of the Airframe Log book revealed that as on 21st May 2018, the aircraft had completed 4026:44 Airframe hours and 3281 cycles whereas Engine # 1 had logged 2889:18 hrs, 2414 cycles and Engine # 2 had logged 2326:04 hrs. and 1969 cycles since new.

Scrutiny of the snag register revealed that no snag was reported on the aircraft prior to the incident flight. There was no MEL on the aircraft prior to the flight. The aircraft weight & balance was well within the operating limits for the flight.

The aircraft and its engines were maintained as per the Maintenance Program consisting of calendar period/ flying Hours or Cycles based maintenance as per maintenance program approved by DGCA.

From the above, it is inferred that the serviceability of the aircraft is not a factor to the incident.

2.2 WEATHER

The Met report issued between 1110 UTC and 1130 UTC on the day of incident indicated a temperature of 40 °C with visibility of more than 06 Km and wind varying from 330°/06 to 320°/11.

The ATIS information to the aircraft did not provide any information relative to wind gusts. The last meteorological information provided by the controller at 1116 UTC was “wind 330°/14 knots”. The aircraft landed at Shirdi at around 1117 UTC.

Analysis of DFDR data showed that the landing occurred with a tail wind gusting from 11 to 21 Kt and touchdown occurred with a tail wind of around 15 Kt which was above the company operating limitations.

From the above, it is inferred that the selection of runway 09 for landing despite high tailwind conditions increased the probability of a longitudinal runway excursion and it is a contributory factor to the incident.

2.3 SELECTION OF RUNWAY

Aircraft took off from Mumbai at 1037 UTC and was Radar vectored directly to waypoint ‘SEKVI’ for Shirdi. Aircraft came in contact with Shirdi ATC at around 1058 UTC. The PIC continued for runway 09 as the reported visibility and winds were within the requirements. At 1100 UTC, ATC informed the crew that winds were now 350°/10 Knots and requested to report for runway preference. The PIC requested for straight in approach runway 09 which was approved by the Shirdi ATC.

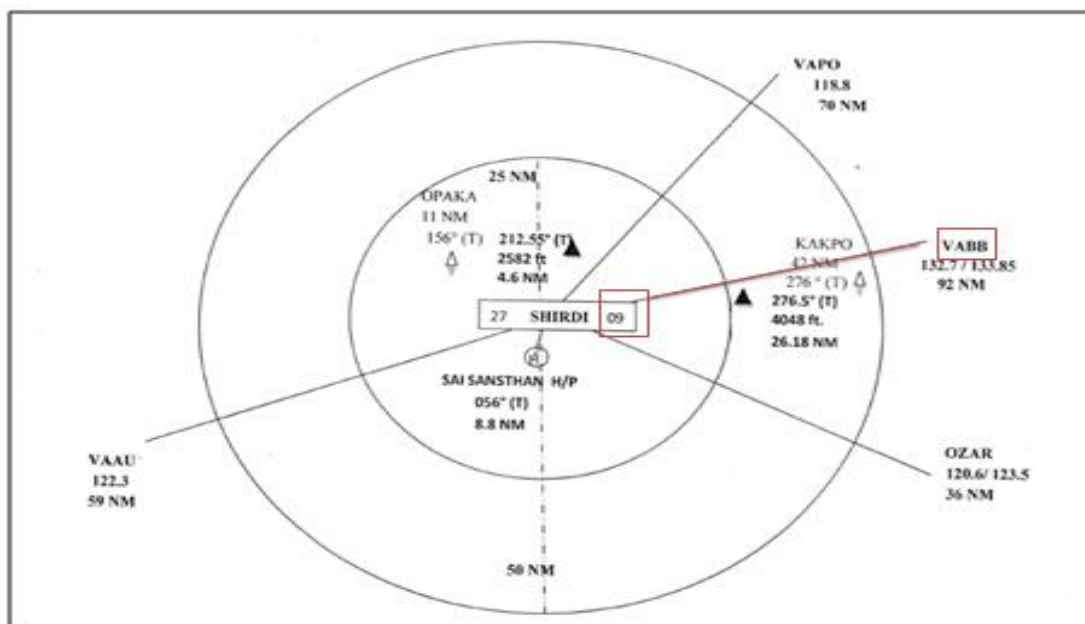


Fig: Direct approach VT-AIX followed for Shirdi Airfield

From the above figure, it is evident that when aircraft approach towards Shirdi from Mumbai, runway 09 is straight in approach and reduces the flight time.



The flight 9I-653 was scheduled for departure to Mumbai at 0950 UTC, however the flight eventually departed Mumbai at 1037 UTC and was running behind the schedule. For landing on runway 27, the crew had to follow the circuit which is longer in path and would have increased the flight time.

Further, if an aircraft lands on runway 09, aircraft is not required to backtrack and it reaches the apron area which is at end of the runway 09.

From the above, it is inferred that the possibility of continuing the approach for runway 09 by the crew to reduce the flight time and also the transit time at Shirdi cannot be ruled out as they were running behind schedule.

2.4 HANDLING OF THE AIRCRAFT

As per the company approved “Operations Manual”, the tailwind limitations is restricted to 13 knots. As per the ATC tape transcript, the PIC of the flight was updated with the current wind which was 330°/14 knots. The prevailing winds were above the limitations prescribed in the company “Operations Manual”.

The aircraft approached the runway threshold 09 at a height of 50 feet with a vertical rate of descent more than 800 ft/min and with a pitch of -2.5°. About 926 meter after the runway threshold, the aircraft speed did not wash off and was still around 120 kt, with a pitch value of 0° and the power lever were not in the flight idle position. Thereafter, the PIC retarded the Power Levers to Flight Idle and increased pitch to 5°. As the pitch increased the aircraft contacted the runway as main landing gear were

compressed with a maximum recorded vertical acceleration of 1.6 g, however the airplane bounced as the speed had not washed off due tail winds.

As the aircraft bounced, the PIC pushed the control column forward and the pitch decreased. The pitch value reached a minimum value of 0° and the speed was then 102 kt. The PIC then moved the power levers forward resulting into pitching up of the aircraft while the aircraft speed was still decreasing. This caused the aircraft to bounce a second time with a maximum recorded vertical acceleration of 1.7 g.

As the aircraft bounced, the PIC pushed the control column forward, the pitch decreased and reached -1° and the MLG were compressed, with a vertical acceleration of 1.19 G, and the nose landing gear also touched the runway. The PIC immediately retarded the power levers to Ground Idle and pushed the control column and reached the full elevator deflection (pitch down).

After touchdown, the PIC applied full brakes and reversers to stop the aircraft on the runway, however, the remaining length of runway was not sufficient to stop the aircraft on the runway as the speed had not washed off effectively after touchdown due to the tailwind component. The aircraft eventually exited the runway and entered the RESA.

From the above, it is inferred that the contributory factors to the incident were the continuation of the approach and landing while the aircraft was not stabilised and the conditions were not suitable to stop the aircraft on the runway.

2.5 DFDR ANALYSIS

The DFDR analysis was carried out and following are salient observations: -

Time	Event	Distance (m) from first touch down	Distance (m) from RWY threshold	Remaining distance (m) on runway	Remaining distance (m) on paved surface
11:18:34.8	1st MLG compression	0	1,595.1	904.9	964.9
11:18:37.7	2nd MLG compression	191	1,786.1	713.9	773.9
11:18:39.2	3rd MLG compression	288	1,883.1	616.9	676.9
11:18:39.4	NLG compression	301	1,896.1	603.9	663.9

11:18:44	Braking applied	586	2,181.1	318.9	378.9
11:18:54.2	LG no more compressed	964.9	2,560	-60	0
11:19:02.5	Airplane stopped	1,016.3	2,611.4	-111.4	-51.4

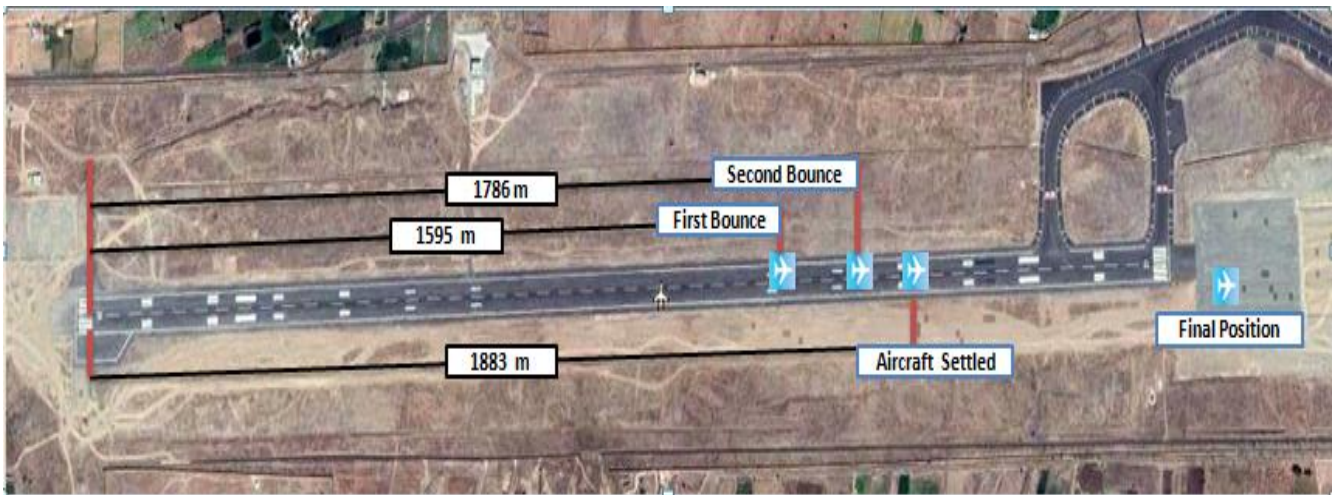


Fig: Landing profile of the aircraft VT-AIX

- a. The actual landing distance required, taking into account the wind and the airport elevation at the time of the event, was 2,542 feet or 775 m.
- b. The runway threshold was overflowed by the aircraft at a height of 50 feet and at an indicated airspeed of 128 kt.
- c. The QNH settings were correctly set at 1,007 hPa .
- d. Finally, at 1116 UTC, during landing clearance, tower updated the aircraft with wind 330°/14 knots.
- e. The aircraft made its first contact with the runway at 1595 meters away from the threshold point and bounced. The aircraft made second touchdown at around 1786 metres away from the threshold point of runway 09.
- f. The aircraft finally settled down on the runway at around 1883 metres from the threshold. At this time, only 604 metres of runway was left to stop the aircraft which was less than the required runway length to stop the aircraft.
- g. At 1119 UTC, crew reported to ATC that aircraft had overshot the runway and is unable to move 180.
- h. The airplane responded to the PIC inputs throughout the event.
- i. No failure of the braking system was observed. The braking action was effective.

2.6 CIRCUMSTANCES LEADING TO THE INCIDENT

The aircraft departed to Shirdi from Mumbai behind schedule and eventually got airborne at 1037 UTC. At around 75 miles short of Shirdi, crew requested Shirdi ATC

to provide the latest weather. Shirdi ATC passed the updated MET information as wind 350°/ 10 knots and asked the crew to convey their runway preference. The PIC requested straight in approach runway 09 which was approved by the Shirdi ATC. At short finals, the ATC once again updated wind information 330°/14 knots. As the aircraft was behind schedule and the PIC wanted to reduce the flight time, the PIC continued approach for runway 09 even though he was aware of the fact that the tailwinds were higher than the prescribed company minima. Moreover, approach for runway 27 would have taken longer time which requires a long back tracking which would have further delayed the flight.

The aircraft approached the runway threshold 09 at a height of 50 feet with high tailwinds and the Power Levers were not in Flight Idle. As the speed had not washed off, the aircraft floated over the runway. The PIC realised and retarded the Power Levers to Flight Idle and increased pitch to 5 degrees, this caused the aircraft to sink, however, the speed of the aircraft had not washed off. As a result, the aircraft bounced. The PIC then increased power and pitched up the aircraft. This again caused the aircraft to bounce for the second time. As the aircraft bounced, the PIC pushed the control column forward, the pitch decreased and the aircraft settled on the runway.

As per the prevailing conditions, the distance required to stop the aircraft on the runway was around 775 metres. However, when the aircraft landed on the runway only 604 metres were left for the aircraft to stop. Even though the PIC applied full brakes, the aircraft did not stop on the runway and eventually exited the runway and entered the RESA due tailwind component.

3. CONCLUSIONS

3.1 FINDINGS

1. The Certificate of Airworthiness, Certificate of Registration and Certificate of Flight Release of the aircraft were current/valid on the date of incident.
2. Both pilots were qualified on the type to operate the flight.
3. The aircraft was behind its schedule and took off from Mumbai at 1037 UTC instead of its scheduled departure of 0950 UTC.
4. The visual approach for runway 09 under VFR condition was carried out. PIC informed ATC about his preference for runway 09.
5. Only one wind sock was available on Runway 09/27 which too was installed at the end of runway 09.
6. Initial MET information passed to the aircraft was visibility 6000 meters with winds 330°/06 knots.

7. The last meteorological information provided by the controller was “wind 330°/14 knots”.
8. As per DFDR, on final approach for landing, tail wind was gusting from 11 to 21 knots and the touchdown was performed at a tail wind of around 15 kts.
9. As per the company “Operation Manual”, the tailwind restriction for landing is 13 knots.
10. The approach phase was performed at a speed greater than 120 kt and the final descent was initiated from 1,500 feet Radio Altitude.
11. The runway threshold was overflowed at a height of 50 feet and a speed of 128 kt.
12. The aircraft bounced twice during landing.
13. The aircraft finally settled on the runway on the third attempt at around 1883 metres from the threshold. At this time, only 604 metres of runway was left to stop the aircraft against 775m required to stop the aircraft at that point in time.
14. Around 5 seconds after the weight on wheel signal, the brake pressure of the left MLG wheel increased to the maximum of 3,000 PSI.
15. No failure of the braking system of the aircraft was observed and the propellers went into reverse mode during 10 seconds, without reaching the full reverse position.
16. Aircraft’s longitudinal excursion inside the RESA area was 51.4 m and offset distance from the runway centreline was 29 m.
17. The aircraft sustained no damage.
18. Normal evacuation of the passengers was carried out by the cabin crew from the main door (L2).
19. There was no injury to any of the occupants onboard the aircraft.
20. There was no post incident fire.
21. The emergency services were not activated in timely manner after the overrun of the aircraft as per the “Standard Operating Procedure”.

3.2 PROBABLE CAUSE OF THE INCIDENT

The crew while attempting to land under high tailwind conditions, bounced twice and made a delayed touchdown which eventually resulted into runway overrun.

Contributory factor:

- i. The runway selection by the crew, probably to save time, had tailwinds during approach and landing.*
- ii. The continuation of the approach while aircraft was not stabilised.*
- iii. The continuation of the landing while conditions were not suitable to stop the aircraft on the runway.*

4. SAFETY RECOMMENDATIONS

4.1 DGCA may advise M/s Alliance Air to issue an ‘Operation Circular’ highlighting the incident and advising crew to strictly adhere to all operating limitations as approved in the company “Operations Manual”.

4.2 The airport emergency services at Shirdi airport under the control of MADDC should be audited to check their preparedness to handle emergency situations.



(Dinesh Kumar)
Investigator



(A.X. Joseph)
Investigator-In-Charge
VT-AIX

Date: 03-09-2019

Place: New Delhi