

FINAL REPORT

Aircraft AN-26B; Flight S2-AGZ21

Cox's Bazar, Bangladesh



AN-26B Aircraft of True Aviation Ltd.

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FOREWORD

The AAIG is an independent safety investigation team under the Aircraft Accident Investigation Group of Bangladesh (AAIG-BD). The investigation has been conducted with the sole objective of improving safety and not intended to apportion blame or liability.

As per Chapter 6 sub para 6.3 of ICAO Annex 13, the final draft report was forwarded to the National Bureau for Incidents and Accidents Investigation of Civil Aircraft (NBAAI), Ukraine on 11th November 2016. A reply with certain recommendations has been received from the accredited members on 20th December 2016. The AAIT has incorporated the recommendations received from the NBAAI in the final report.

The document is the final report and has been prepared on the basis of scrutinizing all the information gathered in the course of the investigation with full analysis. The presentation in the document is the final conclusion of the Airplane Accident Investigation Team (AAIT) constructed by the Accident Investigation Group.

1. SYNOPSIS

FATAL ACCIDENT WHILE GOING AROUND WITH ONE ENGINE OPERATIVE

Aircraft	AN-26B
Registration	S2-AGZ
Date and time	09-03-2016 at 0335 UTC
Operator	True Aviation Ltd
Place	Hazrat Shah Amanat International Airport, Chittagong
Type of flight	Commercial Air Transport Revenue operations, Cargo
Persons on board	Captain , co-pilot, Flight Engineer and Navigator
Consequences and damage	Three crew members died and one crew member suffered serious injury. The aircraft was totally destroyed on impact.

On 09 March 2016 around 0335UTC an AN-26B cargo aircraft belonging to True Aviation Ltd, a local domestic cargo carrier while departing for a schedule cargo flight lost an engine on Take Off from Runway 35 at Cox's Bazaar Airport. The aircraft tried to make a single engine landing on the same runway. The aircraft made a Go Around maneuver from short final with one engine inoperative. During the Go Around process the aircraft crashed in sea.

A team from AAIG, CAAB was immediately dispatched to the crash site. The team had visited the crash site and found the aircraft was totally destroyed and submerged in water. Out of four cockpit crew only one survived with serious injury.

All the fatalities and injured crew belongs to the State of Ukraine. As per Annex 13 Para 5.24 the state of Design and the State of manufacturer are entitled to accredited members in the AAIT. Since Ukraine being the State of Design and also the State of Manufacturer, a total of three members were accredited by the State. All the accredited members visited the country from 21st March to 26th March 2016. As per the requirement under the provision of Annex 13 Para 5.25, the team was taken to the crash site and was given all other relevant assistance.

2. ORGANIZATION

On 09-03-2016 The Chairman Civil Aviation Authority of Bangladesh appointed an Aircraft Accident Investigation Team (AAIT) as per recommendation of the Aircraft Accident Investigation Group (AAIG). The information about the accident was immediately notified to all concerned authorities in the State of registry, State of Design, State of Manufacture and ICAO. A three member committee was formed by the AAIG to investigate into the accident.

3. FACTUAL INFORMATION

3.1 History of the flight

On March 9, 2016 one AN -26B aircraft belonging to True Aviation Ltd was operating a schedule cargo flight from a small domestic airport (Cox's Bazar-VGCB) in southern Bangladesh to another domestic airport (Jessore -VGJR) in western Bangladesh, The cargo was Shrimp fries. As per the General Declaration the total cargo quantity was 802 boxes weighing 4800 kg. The airline had filled a flight plan keeping the ETD blank. The flight plan routing was CB W4 CTG W5 JSR at FL 100. All the documents except the load sheet were found properly signed and are in the possession of AAIT.



Figure 1: The ill-fated aircraft's proposed route

According to ATC controller's statement and recorded tape the aircraft requested for startup clearance at 0258z. As per the recordings with ATC the controller passed the visibility information of Jessore Airport as 3km. The aircraft started engines and requested for taxi. The aircraft was cleared to taxi to Runway 35 via taxiway S. The aircraft requested for takeoff clearance and was cleared for Take Off at 0305z. Immediately after airborne the pilot reported engine failure without mentioning initially which engine had failed but later confirming failure of the left engine and requested for immediate return back to Cox's Bazar airport. He was advised by ATC to call left hand down wind. But the control tower spotted the aircraft making a right hand down wind at a very low altitude.

All emergency services were made standby from the ATC. The aircraft called final and requested for landing clearance. For reasons so far unknown the aircraft made a low level Go Around. The controller in the tower saw the aircraft flying at about 400 to 500 feet. The surviving Flight Navigator also confirmed this in his statement. The ATC advised the captain to call left hand down wind. But there was no response from the crew. The ATC repeatedly kept calling the aircraft but there was no response from the crew and total communication was lost. At time 0332z the airport authority came to know through other means that the aircraft had crashed approximately 03km west of the airport.

3.2 INJURIES TO PERSONS

Injuries	Crew	Passengers	Others
Fatal	03	Nil	Nil
Serious	01	Nil	Nil
Minor	None	None	

3.3 DAMAGE TO AIRCRAFT

The aircraft was completely destroyed. Wreckage was dispersed about 03 km inside the sea over a large area.

3.4 OTHER DAMAGE

Nil

3.5 PERSONNEL INFORMATION

3.5.1 Captain

Male aged 57 years, Ukrainian nationality

a. Air Transport Pilot's Licence (ATPL) No :	TA 001638
b. State of Issue :	Ukraine
c. Date of Issue :	23-09-2005
d. Date of Validation by CAAB :	14-05-2015
e. Validation period	19-05-2016 to 18-08-2016
f. Type rating :	AN-26B

Experience

a.	Total	13315:00 hours
b.	On type	6896: 00 hours
c.	Total hours flown in 2016	152:32 hours

3.5.2 Co Pilot

Male aged 27 years, Ukrainian nationality

a.	Commercial Pilot's Licence (CPL) No	CA 011601
b.	State of Issue	Ukraine
c.	State of Issue	08 th Feb2012
d.	Date of Validation by CAAB	14 th May5-2015
e.	Validation period	17 th May2015to16 th Jul2016
f.	Type rating	AN-26B

Experience

a.	Total hours	1438:00
b.	On Type	1195:00 hours
c.	Total hours flown in 2016	152:32 hours

3.5.3 Flight Engineer

Male: Aged 36 years, Ukrainian nationality

a.	Flight Engineer's Licence No	FE No 001276
b.	State of Issue	Ukraine
c.	Date of Issue	19 th Feb 2003
d.	Date of Validation by CAAB	14 th May 2015
e.	Validation period	17 th May2015 to 16Jul2016
f.	Type rating	AN-26B

Experience

a.	Total	3924:00 hours
b.	On Type	2946:00 hours
c.	Total hours flown in 2016	152:32 hours

3.5.4 Flight Navigator

Male, aged 48 years, Ukrainian nationality

a.	Flight Navigator's Licence no	FN no 010765
b.	State of Issue	Ukraine
c.	Date of Issue	05 th Jul2011
d.	Date of validation	14 th May2015

e.	Validity Period	21 st May2015to20thJu2016
f.	Type rating	AN-26B

Experience

a.	Total	3924:00 hours
b.	On type	2946:00 hours
c.	Total hours flown in 2016	152:32 hours

3.6 AIRCRAFT INFORMATION

Airframe:

Manufacturer	KIEV STATE AVIATION PLANT
Type	AN-26B
Serial number	13408
Registration	S2-AGZ
Date of entering service in Bangladesh	17 th Jul-2014
Entry into service	15 th Feb1984
Airworthiness Certificate No	186
Aircraft Total hours	16379; 32 HOURS
A/C Total Flight Cycle	17299

ENGINES:

Manufacturer: MOTOR SICH

	Engine No1	Engine No2
Serial no	H4823BT141	H434BT022
Total run time	8072 H, 3 rd March 2016	7638 H, 3 rd March 2016
Total hours last Shop Visit	1194 H, 3 rd March 2016	3644 H, 3 rd March 2016
Last Shop Visit	16 th Apr 2012	20 th Nov2015, F4 insp. c/out for engine life extension.

3.6.1 MAINTENANCE

The aircraft uses JET-A-1 Fuel and the refueling is normally done at Chittagong where the aircraft lands only for refueling. Chittagong airport is approximately 50 miles north of Cox's Bazar airport.

The routine maintenance is carried out by engineers locally. Certified engineers are available at Cox's Bazar to sign daily maintenance release.

3.7 Meteorological Information

According to the Met report issued at 0255 Z on 09-03-2016 for Cox's Bazar Airport the weather report was as follows:

a) Wind	calm
b) Visibility	800 Meter
c) Present Weather	Fog
d) QNH	1010
e) Temp	25 deg C

The weather condition was fit for departure of the flight. The accident occurred in broad day light.

3.8 Aids to Navigation

The airport is a small domestic Airport. It has the facility of NDB. There is no ILS at the airport. Only NDB approach charts are available.

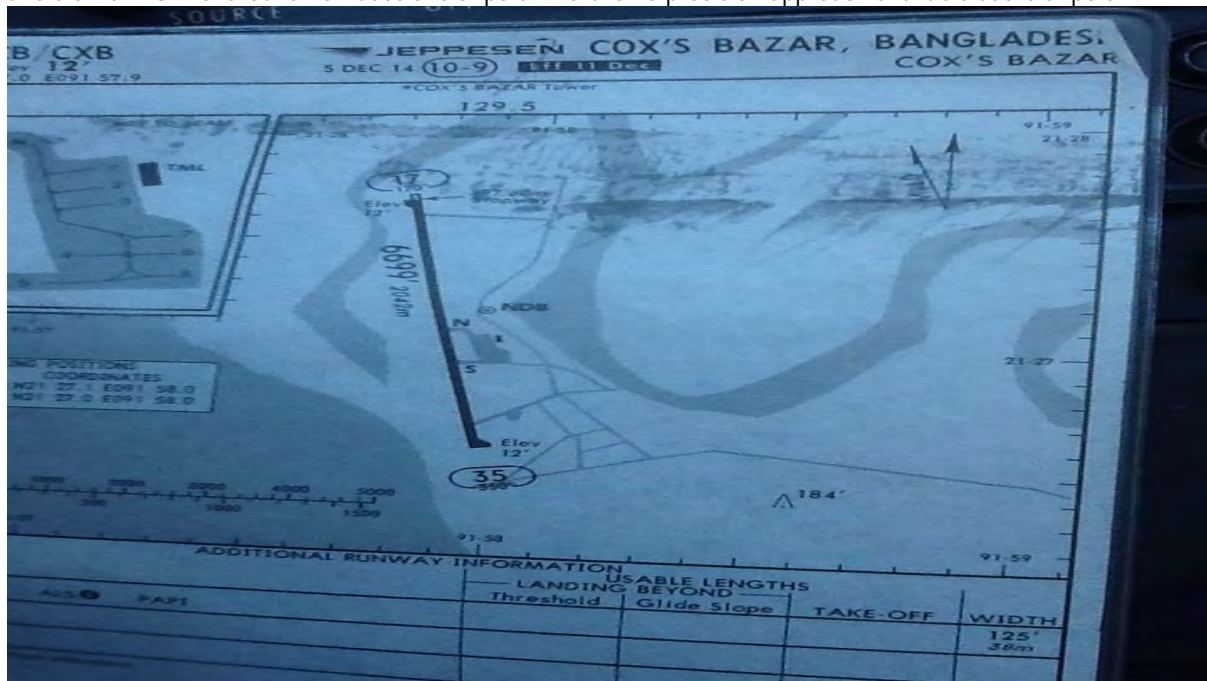
3.9 COMMUNICATION

3.9.1 Air Traffic Management

The functional entities involved in Air Traffic Management in Bangladesh are under the Ministry of Civil Aviation & Tourism, an autonomous body under the Ministry. There is also a great deal of co operation between civil and military in the Air Traffic Management.

3.10 Airdrome Information

The airport in Cox's Bazaar is located near the sea beach. It is a resort city in southern Bangladesh. The runway is 6699 feet long and 125 feet wide. The runway is hard concrete surface. The runway has a PCN 19.. Normally small aircraft with AWW of around 25T uses this airport. There is no precision approach available at the airport.



3.11 Notam

There was no NOTAM affecting the operations of the flight

3.12 Dangerous Goods on Board

Nil

3.13 Air Traffic Control

The aircraft was always in communication with Cox's Bazar ATC until Go Around. Cox's Bazar tower was the only controlling authority at the time of the accident.

3.14 Other Traffic

According to information received from the ATC Cox's Bazar there was only one aircraft departing for the same destination carrying similar cargo at the departure time of this ill fated flight.

3.15 ATC Transcript

Cox's Bazar ATC has provided the recordings and a transcript of the radio communications of the controller and flight S2-AGZ21 until the aircraft lost contact. The transcript is attached herewith in Appendix 2.

3.16 Flight Recorders

The Flight Data Recorder and the Cockpit Voice Recorder was recovered from the site in the same day of the accident. Both the item was apparently not damaged externally. Both equipment are of Ukrainian origin. Since the aircraft was quite old, no details were available of their make and serial number.

As no facility was available locally for the read out, the FDR and CVR was carried in person to the National Bureau of Air Accident and Incidents Investigation with Civil Aircraft in Kiev and handed over on 11-04-2016.

According to NBAAI the read out from CVR was not possible due to internal damage to the equipment. The FDR was apparently in good shape. The FDR data was decoded and an animation version of the aircraft in flight was sent by the NBAAI.



Photo 1 : Cockpit Voice Recorder



Photo 2 : Flight Recorder

3.17 WRECKAGE AND IMPACT INFORMATION

Wreckage Distribution : On visit to the crashed site on the day of the accident the aircraft debris was found half submerged in sea water. During high tide the debris went totally under water. The pieces of the aircraft were seen spread over a large area in the shallow water during the low tide. Some parts were brought to the shore on the following day. Some photographs are also attached with this report as evidence. The visiting representative from the engine manufacturer from Ukraine had carried out baroscopic inspection of the failed left engine. The report is enclosed as Appendix 4.

PHOTOS OF THE WRECKAGE





3.18 Medical and Pathological Information

The post mortem for Flight Engineer was performed on 9th March 2016 at the local hospital. The post mortem for the captain and First Officer were performed on 10th March 2016 at the same hospital. In all three cases the cause of death was reported due to head injury on impact. The post mortem report is shown in Appendix 6.

The Flight Navigator was admitted in local hospital with multiple injuries due to impact. He has since recovered and returned to his home country. There was no report of drug or alcohol consumption prior to the flight.

3.19 Fire

No evidence of any fire

3.20 Survival Aspects

On hearing about the accident the airport authorities immediately started the search and rescue for the aircraft and the crew. The aircraft was located approximately 03km west of the airport half submerged in water and was totally destroyed. The crew was rescued by local fishermen before the rescue team could arrive. Doctors with the rescue team had found three crew dead. The fourth injured crew was immediately rushed to the local hospital and later shifted to Dhaka for better treatment.

3.21 Tests and Research

Nil

3.22 Organizational and Management Information

True Aviation limited, AOC # 17 is a Commercial Cargo Air Transport Operator formed on 6th June 2013. It is a non-scheduled cargo transporter, carries baby shrimps from CXB to JSR. Its operation and maintenance base is at Cox's Bazaar airport. Initially it started its operation under Wet Lease agreement with 'International Joint Stock Aviation Company- URGA' by 02 (two) AN-26B aircraft. These same two aircraft are then registered in CAAB on 17th July 2014 under Dry Lease agreement with URGA. Unfortunately, one of its aircraft S2-AGZ crashed on 9th March 2016 and now it has only one aircraft, S2-AGA.

Total man power is 30 including two pilots, one navigator, one flight engineer and two ground engineers.

4. ANALYSIS

- a) The An-26B aircraft was on a schedule commercial cargo flight from Cox's Bazar to Jessore (VGCB to VGJR). This was the first flight of the day and the aircraft was serviceable without any MEL.
- b) The crew had proper rest as per records kept by the operator. The weather condition was acceptable for the flight. During the Take Off roll the aircraft lost initial power from takeoff power to cruise power in the left engine at around 80 km/hr. The crew continued the Take Off despite the engine problem. Immediately after airborne the left engine had fully failed.
- c) The crew had taken off from runway 35 but after the engine failure the crew initially tried to land back in opposite direction runway 17. The crew could not align the aircraft with the runway 17 and discontinued the approach.
- d) Then pilots decided to make an approach for runway 35. The control tower had cleared them accordingly. The aircraft was flying a right hand downwind at around 1000 feet with a IAS of 300km/hr in clean configuration.
- e) According to the available data and statements, the aircraft was fully configured for landing and stable at around 3.5 NM from the runway. But at 1.2 NM for reasons unknown the captain decided to Go Around.

During the process of Go Around the aircraft had crashed at approximately 3 km west of the airport into the sea.

The AAIT has received animation of the flight path from the NBAAI, Ukraine. No data could be revealed from the CVR. Transcript of communication between the cockpit and the captain of the ill fated aircraft is enclosed as Appendix 2.

5. CONCLUSIONS

5.1 Findings

- a) The aircraft had valid Certificate of Airworthiness;
- b) The crew had valid licenses with appropriate ratings and medical fitness certificate to operate the flight. The Captain was the Pilot flying.
- c) The reported weather condition was within limitation for operating the flight.
- d) The load sheet for the flight shows the aircraft was carrying the maximum payload of 4800kg.
- e) There was no load sheet available to verify aircraft's load, fuel or Take Off weight. The operator on enquiry informed that the load sheet was on board the aircraft and perished with the aircraft when it crashed. As per regulations three copies must be prepared before departure. One copy is to be left at the departing station, second copy is to be retained with the flight document and one copy is to be kept at the arriving station.
- f) The FDR report shows that during Take Off roll the left engine lost power to cruise mode at 80 km/h .The left engine lost full power within 60 seconds after initial loss of thrust during the take off roll.
- g) The aircraft lift off speed with full all up weight is between 195-200 km/h.
- h) As per the FDR report submitted by NBAAI the reason given for engine failure is due to a drop in oil pressure in the torque meter system.
- i) As per Navigator's statement the captain initially tried to maneuver the aircraft to land in Runway 17 but was unable to line up with the runway. The FDR report also shows that the crew made an eight shape maneuver after takeoff.
- j) The captain discontinued the approach and joined right down wind at an altitude of 300 meter with a speed of 300 km/hr. The surviving navigator could not explain as to why the captain decided to make a Go Around though the aircraft was stable and more or less in line with Runway 35 with full landing configuration and approximately 3.5 NM from the runway end. The FDR report also shows that the crew made an eight shape maneuver after takeoff.
- k) No data could be detected from CVR due to absence of synchronization signal.
- l) As per the Navigator's statement the captain decided to Go Around at about 100 meter and at approximately 1.2 nm from the runway.
- m) A video footage taken from the ground shows that the during Go Around process the under carriage was retracted. The FDR report shows that the flaps were also retracted in phases to fully up position.
- n) As per the statement of the Navigator and also analysis of the FDR report the IAS at this stage was at approximately 225 Km/hr and the aircraft was flying at an altitude of 100 meter.
- o) The Navigator's last monitored altitude of the aircraft was 20 meter at an IAS of 215 km/hr.
- p) It was also reported by the Navigator in his statement that the crew found it difficult to control the aircraft in finals.

5.2 Causes

- a) Failure to initiate a rejected take off during take off roll following the indication of engine failure;
- b) Failure to adhere to the company SOP following the detection of the engine failure during take off;
- c) Considering the poor visibility at Cox's Bazar Airport, diverting to the alternate airfield Chittagong Airport located only 50 nm away that has the provision for full ILS approach facility. This could have helped the crew in carrying out a proper one engine out precision approach landing;
- d) The aircraft flew at a speed much lower than the clean configuration speed. The aircraft flew at 225 km/h in clean configuration whereas the minimum clean configuration speed is 290 km/hr.
- e) As per the FDR data the aircraft stalled while making a turn towards the side of the failed engine at a very low altitude;

5.3 SAFETY RECOMMENDATIONS

- a) All relevant flight crews of AN-26 aircraft need to be properly trained to coup up with engine failure procedure during and immediately after take off;
- b) Emphasis should be given during CRM Courses for decision making process;
- c) Maintenance status of all AN-26 aircraft shall be enhanced to ensure prevention of engine failure occurrences at any stage of flight.

DECLARATION BY AAIG-BD

Pursuant to Para 6.5 of ICAO Annex 13, the Aircraft Accident Investigation Group of Bangladesh (AAIG-BD), as the Authority conducting the investigation, hereby makes public of this Investigation Report together with the Safety Recommendations for in the interest of accident prevention.

LIST OF APPENDICES

- Appendix 1 : Transcript of ATC tapes
- Appendix 2 : FDR data report
- Appendix 3 : Engineering Study of the decoder
- Appendix 4 : Boroscopic report

Appendix 1 : TRANSCRIPT OF ATC TAPES

Radio Communication Between Tower and Crew An-26B S2-AGZ 09.03.2016 Cox's Bazaar (Bangladesh)			
Time	T/P	Contents	Remarks
02.55.22	P	Cox's Tower, Alpha Golf Zulu Two One, Assalamu Alaikum.	PIC S2-AGZ
	T	Alpha Golf Zulu Two One, Walaikum Assalam, Go ahead.	
	P	Alpha Golf Zulu Two One, in Two minutes, Insha Allah, we will complete Loading and request start up.	PIC S2-AGZ
	T	Alpha Golf Zulu Two One, at present, Jessore visibility Three Thousand meters. Confirm, like to start up now?	
	P	In Two minutes, in Two minutes, Sir	PIC S2-AGZ
		Cox's tower, Bismillah Two Zero Seven, request start up sequence.	Bismillah Airlines (P)
	T	Stand by.	
	T	Alpha Golf Zulu Two One, say again.	
	P	Alpha Golf Zulu Two One, in Two minutes, we will be starting up. Confirm it's number One for departure?	PIC S2-AGZ
	T	Affirm. You'll be number One.	
	P	<i>Illegibly (неразборчиво)</i> In Two minutes, we will start up.	PIC S2-AGZ
	T	Copied.	
02.58.43	P	Cox's, Sierra Two Alpha Golf Zulu Two One, Assalamu Alaikum.	Nav S2-AGZ
	T	Alpha Golf Zulu Two One, Walaikum Assalam, Go ahead.	
	P	Request start up, destination Jessore.	Nav S2-AGZ
	T	Start up approved, temperature Two Five, time Five Eight.	
	P	Starting up, Alpha Golf Zulu Two One.	Nav S2-AGZ
		Серёра (Russian language. "Serge?")	PIC S2-AGZ
02.59.25		Серёра (Russian language. "Serge?")	PIC S2-AGZ
		Запуск, запуск просим. (Russian language. "We are requesting for start up")	2 nd a/c of True Aviation
02.59.39		Cox Bazar, Siera Two Alpha Golf Alpha Zero One, <i>illegibly (неразборчиво)</i>	2 nd a/c of True Aviation
	T	Alpha Golf Alpha Zero One, go ahead.	
		Alpha Golf Alpha Zero One, request start up in Five minutes.	2 nd a/c of True Aviation
	T	Stand by for start up and also stand by for sequence.	
		Standing by start up for sequence. Number Two for sequences?	2 nd a/c of True Aviation
		_Cox Bazar, Confirm, number Two for sequences?	2 nd a/c of True Aviation

	T	You are number Three instart up sequence. Stand by.	
		Number Three?	2 nd a/c of True Aviation
	T	Affirm.	
	T	Bismillah Two Zero Seven, Cox's, you will be number Two.	
		Roger. Copied, Bismillah Two Zero Seven, number Two.	Bismillah Airlines (P)
09.01.03		Cox's Tower, Bismillah Two Zero Seven.	Bismillah Airlines (P)
	T	Bismillah Two Zero Seven, Cox's, go ahead.	
		(Bismillah Pilot talks in local languages and advices to take clearance little later.)	
	T	Confirm, like to be number Three?	
		Roger, Roger, we will update.	Bismillah Airlines (P)
	T	Copied.	
	T	Sierra Two Alpha Golf Alpha Zero One, Cox's.	
		What is the present visibility of the Cox's?	Bismillah Airlines (P)
	T	At present, visibility One thousand Five hundred meters.	
		One thousand Five hundred, copied, stand by.	Bismillah Airlines (P)
		Cepëra (Russian language. "Serge?")	
	T	Alpha Golf Alpha Zero One, Cox's.	
03.02.07	P	Cox's, Alpha Golf Zulu Two One, request taxi.	Nav S2-AGZ
	T	_Alpha Golf Zulu Two One, taxi via Sierra, Holding point Three Five, QNH One Zero One Zero.	
	P	One Zero One Zero, Taxi via Sierra to hold point Three Five, Alpha Golf Zulu Two One,	Nav S2-AGZ
03.02.37	P	Alpha Golf Zulu Two One, request enter back track line up runway Three Five.	Nav S2-AGZ
	T	Back track line up Three Five and stand by for ATC	
	P	Back track line up Three Five, standing by for ATC, Alpha Golf Zulu Two One.	Nav S2-AGZ
		Cox's Bismillah Two Zero Seven.	Bismillah Airlines (P)
	T	Bismillah Two Zero Seven, Cox's, go ahead.	
		(Bismillah Pilot talks in local languages) Sir, we will maintain our sequence. Since visibility is good, we will be number Two.	Bismillah Airlines (P)
	T	Copied.	
	T	Alpha Golf Zulu Two One, ATC clearance available.	
	P	Go ahead, Alpha Golf Zulu Two One.	Nav S2-AGZ
	T	Chittagong is cleared to Jessore. Whisky Four, Whisky Five, climb and cruise Flight level One Zero Zero.	
	P	Cleared to Jessore, Whisky Four, Whisky Five, climb Flight level One Zero Zero, Alpha Golf Zulu Two One.	Nav S2-AGZ
	T	That's correct, line up runway Three Five, report ready for departure.	
	P	Lining up Three Five, next call ready, Alpha Golf Zulu Two One.	Nav S2-AGZ
		Cox's, Bismillah Two Zero Seven, request push back.	Bismillah Airlines (P)
	T	_Two Zero Seven, push back approved, push _to face south.	

		Push to face south, push back approved, Bismillah Two Zero Seven.	Bismillah Airlines (P)
03.04.14	P	Alpha Golf Zulu Two One, ready for departure.	Nav S2-AGZ
	T	Alpha Golf Zulu Two One, wind calm, cleared for Take Off, Runway Three Five.	
	P	Cleared for Take Off _ Three Five, Alpha Golf Zulu Two One.	Nav S2-AGZ
03.05.36	T	Bismillah Two Zero Seven, Cox's.	
03.05.46	T	Alpha Golf Zulu Two One, airborne Zero Five past _ hour. Report in contact with Chittagong.	
	P	Report in contact with Chittagong, Alpha Golf Zulu Two One.	Nav S2-AGZ
		Cox Bazar, Sierra Two Alpha Golf Alpha Zero One.	2 nd a/c of True Aviation
	T	_Alpha Golf Alpha Zero One, Cox's, go ahead.	
		Request start up.	2 nd a/c of True Aviation
	T	Stand by forstart up. You will be number Three.	
		Copied.	2 nd a/c of True Aviation
03.06.19	P	Alpha Golf Zulu Two One, left..., left engine failure..., come back to Cox Bazar, one engine.	Nav S2-AGZ
	T	Copied. Report left hand downwind Runway Three Five.	
	P	Next call.	Nav S2-AGZ
03.07.20		Cox's tower, Good morning, Alpha Foxtrot Xray One Zero One.	Another A/C
	T	Sierra Two Alpha Golf Zulu Two One, request your type of emergency.	
03.07.47	T	Alpha Golf Zulu Two One, Cox's.	
03.08.03	T	Alpha Golf Zulu Two One, Cox's	
	P	Ready to land	Nav S2-AGZ
	T	Cleared to land runway.... Confirm, number One Seven?	
09.08.30		(EMERGENCY SERVICE or another a/c SPEAKING IN LOCAL LANGUAGE): Control Tower, we have taken position in November holding point.	
	T	Stay in November holding point.	
		OK	Emergency Service or another a/c
03.08.59	T	Alpha Golf Zulu Two One, report final runway Three Five.	
	P	Next for final Three Five, Alpha Golf Zulu.	Nav S2-AGZ
	T	Calling Emergency Service or another a/c in local language: stay in south position, stay in south taxiway.	
		Copied.	Emergency Service or another a/c
	T	Ok, Stay in now in November.	
03.10.13	T	Alpha Golf Zulu Two One, wind calm, report final.	
	P	Next call final, Alpha Golf Zulu.	Nav S2-AGZ
03.11.04	P	Alpha Golf Zulu. Stand by. Five miles turning final.	
03.11.18	T	Alpha Golf Zulu Two One, wind Two Seven., now calm, check gear down and locked, cleared to land Three Five.	
	P	Cleared to land Three Five, Alpha Golf _Two One,	Nav S2-AGZ
03.13.35	P	Cox's Tower, Bismillah Two Zero Seven, request start up and temperature and	Bismillah Airlines

		QNH also.	(P)
	T	Stand by, stand by.	
	P	Standing by, Bismillah Two Zero Seven.	Bismillah Airlines (P)
03.14.01	T	Alpha Golf Zulu Two One, go around.	
	T	Report downwind runway Three Five.	
03.15.03	T	Alpha Golf Zulu Two One, Cox's	
	T	Alpha Golf Zulu Two One, Cox's	
	P	Go ahead.	Nav S2-AGZ
	T	Request your type of emergency.	
	P	
	T	Alpha Golf Zulu Two One, Cox's	
03.16.07	T	Alpha Golf Zulu Two One, report position.	
	T	Alpha Golf Zulu Two One, Cox's	
	T	Alpha Golf Zulu Two One, Cox's	
	T	_Alpha Golf Zulu Two One, If you read report final, runway You can use any runway.	
03.17.39	T	Alpha Golf Zulu Two One, Cox's	
	T	Alpha Golf Zulu Two One, Cox's	
	T	Sierra Two Alpha Golf Zulu Two One, Cox's	
	T	If you read, report final.	
	T	Runway is now clear. Report final.	
03.18.36	T	Sierra Two Alpha Golf Zulu Two One, Cox's	
	T	_Alpha Golf Zulu Two One, Cox's	
03.19.13	T	Sierra Two Alpha Golf Zulu Two One, Cox's.	
03.19.47	T	Sierra Two Alpha Golf Zulu Two One, Cox's	
03.20.09		Вова, ответь(Russian language. "Vova, respond")	2 nd a/c of True Aviation
		Вова(Russian language. "Vova"). Alpha Golf Alpha Zero One.	2 nd a/c of True Aviation
	T	Alpha Golf Alpha Zero One, go ahead.	
		I'm calling with Zulu	2 nd a/c of True Aviation
	T	Stand by.	
		Вова, ответь(Russian language. "Vova, respond")	2 nd a/c of True Aviation
03.21.13	T	Sierra Two Alpha Golf Zulu Two One, Cox's.	
	T	Alpha Golf Zulu Two One, Cox's.	
		Вова, ответь(Russian language. "Vova, respond")	2 nd a/c of True Aviation
	T	Sierra Two Alpha Golf Zulu Two One, Cox's.	
03.22.45	T	Sierra Two Alpha Golf Zulu Two One, how do you read?	
03.23.31	T	Sierra Two Alpha Golf Zulu Two One, how do you read?	
03.25.03		Вова, ответь(Russian language. "Vova, respond")	2 nd a/c of True Aviation
	T	Alpha Golf Zulu Two One, confirm calling.	
	T	Alpha Golf Zulu Two One, confirm calling.	
03.27.22	T	Sierra Two Alpha Golf Zulu Two One, Cox's.	
03.29.22		Вова, ответь(Russian language. "Vova, respond")	2 nd a/c of True

			Aviation
03.32.21		Вова, ответь(Russian language. "Vova, respond")	2 nd a/c of True Aviation
03.38.33		LOCAL LANGUAGE	

Note:

- a. T = Control Tower
- b. P = Pilot of the ill-fated aircraft
- c. Bismillah Airways = A local cargo carrier
- d. Alpha Foxtrot X-ray 121 = A local cargo carrier
- e. PIC S2-AGZ = supposedly, Pilot-in-command S2-AGZ
- f. Nav S2-AGZ = supposedly, Navigator S2-AGZ = Vova
- g. Serge = supposedly, Pilot-in-command S2-AGA
- h. Discrepancies found in the provided extract of the radio communication between the crew and the controller is highlighted in the red color.

APPENDIX 2 : FDR DATA REPORT

Description of Decoded Data from Recorders of An26 S2-AGZ Aircraft Crashed on 09.03.2016 at Cox's Bazar Airport

1. FDR Information

MSRP-12-96 FDR decoding results are shown in Fig. 1.

Taking into account the fact that FDR of MSRP-12-96 type has no channel for recording the astronomical time and synchronization signals with other information sources; the time scale in the decoded data has a conventional (approximate) nature.

The main points of the flight are plotted on the charts by dashed vertical lines (cross sections) numbered 1 to 21. The list of cross sections with indication of the conventional time is provided in a lower part of the chart sheet (Fig. 1.)

A short description of flight events (the time is indicated in a conventional scale):

- A take-off run began at 08:57:32
- At the very beginning of the take-off run (08:57:36), at the speed less than 80 km/h, the engine the oil pressure in the engine torque meter system spontaneously decreased from the take-off value of 94 kg/sq. cm (according to the engine torque meter) down to 65 kg/sq. cm.
- The take-off run was continued, and, at the speed of 195 – 200 km/h, the aircraft lift up took place at 08:58:04.5
- At the initial stage of climb (up to 100 m above the runway level), a gradual reduction of the oil pressure in the engine torque meter system began (from 65 down to 20 kg/sq. cm according to the engine torque meter)

- At 08:59:23.5, the left engine feathering motor switched on, and the engine was stopped.
- Further, the aircraft path was "eight"-shaped to make a runway alignment with the runway heading for the purpose of an attempt to land with one failed engine.
- The wing-flap system was retracted after the take-off, but was extended during approach for crash landing. At that, the flap position was 30 degrees. The flap position determination was conducted on the basis of indirect indicators, because no direct recording of a wing-flap and landing gear position is made at An26 aircraft.
- At runway alignment, for a reason, which is not possible to establish on the basis of FDR record, the missed approach procedure with one failed engine was initiated. The right engine was switched to the take-off mode at 09:07:21.5
- The flap retraction was conducted in small portions, after yet another flap retraction, development of the stall began at 09:08:41.
- A landing gear position cannot be determined accurately because of absence of "Landing Gear Retraction" signal recording at An26 airplanes.
- Accuracy of the barometric altitude recording for ideal conditions on the new equipment is 80 m, and, taking into account a real condition of MSRP-12-96 recording system and altitude sensor, it can be evaluated as 500 m. Therefore, no conclusions have been made as regards the aircraft position by altitude.

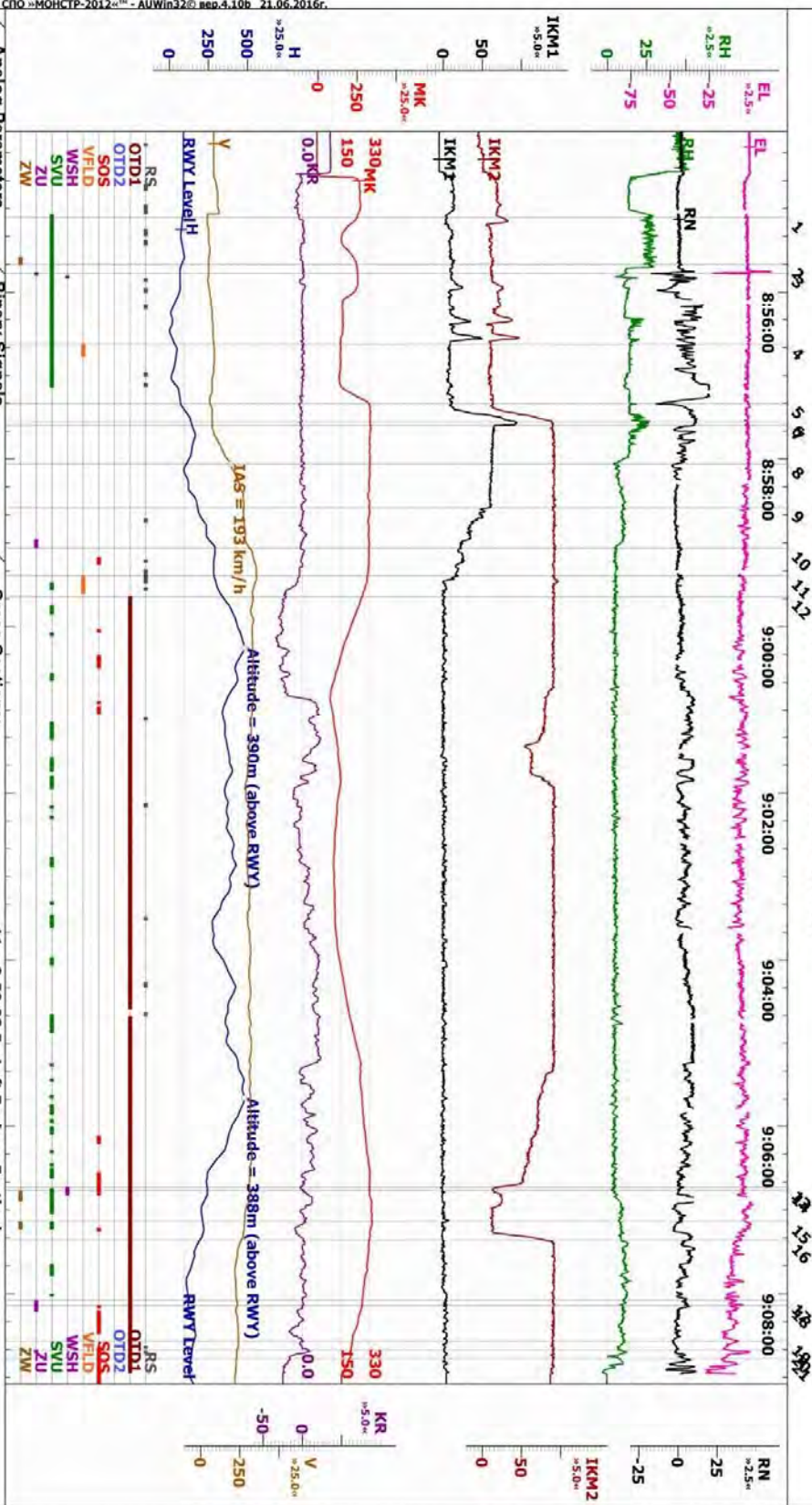
2. CVR Information

The record sections, which are related to the investigated flight, were not detected in a record of MS-61 tape recorder medium of the aircraft. Synchronization of the voice information, which has been received from the controller's tape recorder, with FDR information has not been made due to the absence of synchronization signals between these sources.

3. 3D Reconstruction

Executive Summary:

- The final stage of the reconstruction does not demonstrate the aircraft position by altitude for the reason stated in Section 1.
- The landing gears are shown constantly extended for the reason of absence of signals, by which their actual position could be determined.



Binary Signals	Cross Sections:
WSH: Landing Gear Is Extending	1. 8:55:06.4 - FDR ready
RS: Radio Transmitter Keying	2. 8:55:40.2 - Flaps Extended
SOS: EGPWS Signal	3. 8:55:46.2 - Control Surfaces Check
ZU: Flaps are Retracting	4. 8:56:38.0 - Feathering Check
ZW: Flaps are Extending	5. 8:57:20.2 - RWY 35
OTD1: Left Engine Negative Power	6. 8:57:33.5 - Full Throttle
OTD2: Right Engine Negative Power	7. 8:57:36.2 - Left Engine - Loss of Power to Cruise Mode
SVU: Propeller Unlatched	8. 8:58:03.5 - Rotation
VFLD: Feathering Pump Operate	9. 8:58:34.8 - Left Engine - Beginning of Full Step
	10. 8:59:03.8 - Flaps Retracted
	11. 8:59:23.5 - Left Engine - Feathering
	12. 8:59:38.5 - Left Engine - Failure Signal
	13. 9:06:43.5 - LG Extending
	14. 9:06:46.2 - Flaps Extending 1st Step
	15. 9:07:08.2 - Flaps Extending 2nd Step
	16. 9:07:21.9 - Right Engine TO Mode
	17. 9:08:04.8 - Flap Retracting 1st Step
	18. 9:08:08.5 - Flaps Retracting 2nd Step (presumably)
	19. 9:08:34.2 - Flaps Retracting 3rd Step (presumably)
	20. 9:08:40.5 - Flaps Retracting Last Step
	21. 9:08:46.2 - Stalling of Aircraft

Осмотр газо-воздушного тракта двигателя АИ-26ВТ № Н4823ВТ141 при помощи гибкого видео эндоскопа представителем конструкторского бюро разработчика двигателя.

Произведен осмотр камеры сгорания, соплового аппарата и рабочих лопаток 1 ступени турбины с помощью гибкого эндоскопа – видимых повреждений не обнаружено.

Осмотрены направляющие и рабочие лопатки 10-й ступени компрессора – видимых повреждений не обнаружено (см. фото).

После проведения указанных работ, определить причину выключения двигателя в полете с флюгированием воздушного винта, по причине ухода масла из двигателя (со слов штурмана) - не удалось.

Дальнейшее рассмотрение причин отказа двигателя, возможно после расшифровки СОК.

Inspection of gas-air path of the engine AI-26W N4823VT141 number using a flexible video endoscope representative of the design bureau of the engine developer.

Inspect the combustion chamber, the nozzle apparatus and the rotor blades of a turbine stage 1 with a flexible endoscope - visible damage is detected.

Inspection and guide blades of the 10th stage of the compressor - visible damage is detected (see photo.).

After these works, determine the cause of the engine shutdown in flight with feathering propeller, due to the care of the engine oil (according to the navigator) - failed.

Further consideration of the causes of engine failure, possibly after decoding FDR and CVR.

Направляющие и рабочие лопатки 10-й ступени компрессора



Справляющие и рабочие лопатки первой ступени турбины

END