

**UNIDADE DE PREVENÇÃO E INVESTIGAÇÃO DE ACIDENTES
COM AERONAVES**

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FINAL ACCIDENT REPORT

(HRH HOLLDINGS - PTY- LTD)

(FALCON 402)

ZU-MDI

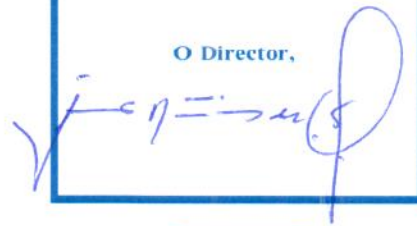
(BAZARUTO AIRSTRIP)

(BAZARUTO-INHASSORO-INHAMBANE)

(02.01.2018)

UPIA Homologo nos
termos do n° 1 da Sub Parte
12.05.115 Regulamento MOZCAR
12 Revisão 1

O Director,



FINAL REPORT N° 780/01/2018

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NOTE:

This report was prepared only for the purpose of accident prevention.

Safety investigation is a process conducted for the purpose of accident prevention which includes collecting and analyzing information, determining causes and, where appropriate, the formulation of safety recommendation.

In accordance with Annex 13 to the Convention on International Civil Aviation to which the Republic of Mozambique is a signatory, the safety investigation is not intended to establish guilt or determination of liability

SYNOPSIS

The accident was immediately notified to the Registry and Operator authorities;

Authority responsible for research is the UPIAA - IACM,

Investigator in Charge: Rafael Matsimbe, and

Accredited Representative: Koketejo Babili

Investigation organization and research work was done in the following ways:

- a) Collection of evidence at the accident site;
- b) Eyewitness auscultation and crew involved in the accident;
- c) Preparation of the preliminary report;
- d) Correction of the facts;
- e) Elaboration of the final report.

Approval of the report will be made by the Mozambican accident investigation authority the UPIAA-Accident Prevention and Investigation Unit with Aircraft;

The Falcon 402 aircraft of ZU-MDI registration, on a presumably charter flight with 09 (nine) passengers on board, on the taking off of runway 20 from Bazaruto to Vilankulos Aerodrome.

During the take - off run, approximately 400m from the beginning of the runway, the aircraft had a considerably, left veering on Rotation after successive attempt to correct the flight trajectory. The aircraft crashed into the bushes and was immobilized/ opposite in the direction of take - off at approximately 60m from the lane center line of the runway after the collision with the trees.

BODY OF THE REPORT

1. FACTUAL INFORMATION

1.1 HISTORY OF THE FLIGHT

The Falcon 402 ZU-MDI registration aircraft on January 2, 2018, at 11:45 hrs. Local time on a presumably charter flight with 09 (nine) passengers on board, on the take-off on runway 20 from Bazaruto to Vilankulos Aerodrome.

During the take - off run approximately 400m from the beginning of the runway, the aircraft had a considerably, left veering on Rotation after successive attempt to correct the flight trajectory. The aircraft crashed into the bushes and was immobilized in the opposite direction of take - off at approximately 60m from the center line of the runway after the collision with the trees (Figure 2).

The aircraft with a capacity of 8 (1 + 7) carried on board 10 (1 + 9);

The pilot may not have fully complied with the Pre-Flight procedures, given the rush that showed in departure allied with deteriorating weather conditions at the destination and the passengers to board for a connecting flight to the Republic of South Africa.

The aircraft started the run of take-off of runway 20 of Bazaruto Island, the meteorological information of the Vilankulos Aerodrome at 11:00 local time, the wind had a direction change between 140 and 210 degrees and the speed of 17 Kts, and it is presumed that at 11:45 local time, these conditions may have influenced the place of occurrence.

1.2 INJURIES TO PERSONS

Injuries	Crew	Passengers	Others
Fatal	0	0	0
Graves	0	3	0
Minor/None	1	6	0

1.2 DAMAGE TO AIRCRAFT

As a result of the accident the following damages were recorded:

- The aircraft was totally destroyed without great possibilities of recovery (Figures 8, 9, 10, 11 and 12).
- Trains of broken landings.
- Leading and trailing edges of damaged wings (Figure 10).
- Damaged vertical and horizontal stabilizers.
- Aircraft propeller blades warped due to the rotating clash with soil and shrubs (Figure 9).
- Broken windscreen and side windows due to the crash and the dashboard was moved out of the aircraft cabin (Figure 13).
- Out-board of split wings.

1.4 OTHER DAMAGES

None

1.5 PERSONNEL INFORMATION

1.5.1 Pilot in Commander

- a) Nationality: South-African
- b) Gender: Male
- c) Age: 47 years
- d) Type of licence: CPL (A)
- e) Type qualification:
 - MEA (L), SEA (L), Turbine,
 - PIC BE20, N6, X335(Falcon 420)
- f) Last mandatory check: 17.05.2017
- g) Total experience: 3291.2 Hrs.
- h) Total experience in aircraft type: 215.3 Hrs.
- i) Total hours in the last 90 days: 7.8 Hrs.
- j) Hours flown in the type of aircraft in the last 90 days: 7.8 Hrs.

1.6 AIRCRAFT INFORMATION

1.6.1 The aircraft is a Falcon - 402

- a) Serial Number: 402/06
- b) Description of the aircraft: X 335
- b) Registration: ZU-MDI
- c) Owner: HRH HOLDINGS (PTY) LTD
- d) Operator: HRH HOLDINGS (PTY) LTD
- e) Authority to Fly: AW01901 CA 24-C-02, Permit N° ZU-MDI; Issued at 14.09.2016 and valid until 13/09/2018
- f) Registration Certificate N°: 81/ZU-MDI/2
- g) Radio Station License N°:540-144/7
- h) Certificate of release to service issued by AERO CLUB OF S.A. (Approved Person 244 on 12/09/2017 and expires when completing 1098.5 flight hours or until 12/09/2018 whichever occurs first.
- i) Total Hours: 1068.89 Hrs

1.6.2 Engine

- a) Brand: Walter
- b) Type: Dienech M601 D Turbine
- c) Serial Number: Unknown
- d) Total Hours: 1022.24 Hrs
- e) Total hours since last overhaul: Unknown

1.6.4 Propeller

- a) Brand: Unknown
- b) Type: Avia V50B propeller
- c) Serial Number: Unknown
- d) Total Hours: 580.04 Hrs
- e) Total hours since last overhaul: Unknown

1.6.6 Weighing and Centering

Date of last weighing and centering: 31 March 2017

1.6.7 Type of Fuel

JET A1

1.7 METEOROLOGICAL INFORMATION

Based on the Meteorological Information reported through the Vilankulos Aerodrome Weather Observation report, in the period between 09:00 to 10:00 UTC, there was a deterioration of weather in terms of the Direction and Intensity of Wind, as well as the reduction of visibility and development of Clouds of the type Cumulonimbus and strong Thunderstorms according to the METAR of the day of the accident.

This fact may have precipitated the pilot to take the flight to the Vilankulos aerodrome before the conditions for the realization of VFR flights were no longer applied.

1.8 AIDS TO NAVIGATION

The Bazaruto Airstrip serves aircraft operating in VFR and has no Navigation Aid Radio.

1.9 COMUNICATIONS

No Air-Ground or Ground-to-Ground communications were established between the aircraft and the Vilankulos Aerodrome ATS Unit or between the Aerodrome Manager and the ATS Unit of that Aerodrome to alert and notify the occurrence.

1.10 AERODROME INFORMATION

The Bazaruto Airstrip has the following location and the following Physical characteristics:

Coordinates:

25° 32' 43.94''S

35° 28' 21.72''E

Elevation----- 6 mts

Length-----1500 mts

Width-----15 mts

Orientation-----02/20

There are trees in the obstacle-free areas and the perimeter sealing of the aerodrome is damaged.

The wind sleeve is obstructed by trees, which can influence the actual direction and intensity of the wind.

The pavement, of asphalt type presents good conditions for the operation of aircrafts

1.11 FLIGHT REGISTERS

Not Aplicable

1.12 WRECKAGE AND IMPACT INFORMATION

See item 1.3

1.13 MEDICAL AND PATHOLOGICAL INFORMATION

All the occupants were rescued and had the proper assistance in a private clinic in Vilankulos.

1.14 FIRE

There was no fire

1.15 SURVIVAL ASPECTS

The evacuation was rapid with the help of the population

1.16 TESTS AND RESEARCH

It was not necessary

1.17 ORGANIZATIONAL AND MANAGEMENT INFORMATION

There was a weak coordination of the aircraft operator and the organizational system of the runway manager that provided the late communication of the accident to the IACM-UPIAA Mozambican Research Authority.

1.18 ADDITIONAL INFORMATION

The aircraft with Registration Certificate No. 81 / ZU-MDI / 2, issued by the South African Aeronautical Authority, with registration and ZU-MDI registration is of Falcon 402 type, serial number 402/6 designed and built by DMI ENGINEERING (PTY) LTD, with Flight Authorization / PERMIT No. ZU - MDI, valid until 13.09.2018, is of Amateur Construction Category.

These aircraft of Category Amateur Construction in general are for sports and recreation flights and not to carry passengers, so perhaps in his request of 19.12.2017, he mentioned that he was going to make a private flight with 1 (one) crew member and 0 (zero) Passengers (without passengers) on the FAKN-FQVL-BAZARUTO ISLAND-FAKN route, and it was in these terms that the Authorization No. 2207 / DTA / 2937/2017 was granted on 20.12.2017 for the purpose of private flight, one passengers between 23 and 28.12.2017 with an increase of 3 (three) days, and without traffic rights between FQVL-Bazaruto Island - FQVL, except that on 02.01.2018, the day of the accident, the aircraft had 9 (nine) passengers and 1 (one) crew member on board.

The aircraft made the last Annual Inspection on 12.09.2017, at AERO CLUB of South Africa, by a Technician with stamp N°244 and the next Inspection was scheduled for 10.02.2018.

At the time of writing this report, the AMO had not yet sent the package of the last Inspection.

1.19 USEFUL OR EFFECTIVE INVESTIGATION TECHNIQUES

No expertise was required

2. ANALYSIS

The Falcon 402 ZU-MDI registration aircraft on January 2, 2018 local time, on a presumably charter flight, with nine (9) passengers on board instead of 8 (1 + 7) according to the aircraft capacity, started the take-off of runway 20 from Bazaruto Island to Vilankulos aerodrome and the meteorological information at this location at 11:00 local time was characterized by wind with a direction variation between 140 and 210 degrees and the speed of 17 Kts and it is presumed that local 11: 45Hrs,

these conditions may have influenced the location of the occurrence.

The pilot may not have fully complied with the pre-Flight procedures given the hurry that showed in the allied departure the weather conditions at the destination were deteriorating and the passengers to board had a connecting flight to the Republic of South Africa so that may have been distracted during the pre-flight inspection factor that may have contributed to the removal of the Lock (safety lever) of the Vertical Stabilizer.

This last factor is considered to be decisive for the accident.

Probably may not have removed the Lock from the Upright Stabilizer, which caused the Upright to remain in place and could not give directional control.

The fact that the vertical stabilizer be fixed did not allow the pilot to counteract the effects of torque and treadmill and could correct the trajectory, coupled with the fact that the aircraft was probably overweight or in the limit as the plane was gaining speed during the take-off run, there was a greater tendency to roll left, which meant that during the race the pilot had to constantly try to correct the aircraft's trajectory, since it had an increasing tendency to roll to the left, which culminated in the loss of control of the aircraft after the rotation.

3. CONCLUSIONS

3.1 THE MOST PROBABLE CAUSE OF THE ACCIDENT

The most likely cause of this accident was Human Failure,

The fact that the pilot has exceeded the aircraft's capacity from 8 (1 + 7) to 10 (1 + 9), associated with prevailing meteorological conditions, may have influenced the attitude of the aircraft during take-off;

The fact that the pilot did not properly follow the pre-flight procedures, given the hurry he showed at departure and being

distracted at the time of the pre-flight inspection may have contributed to forgetting to remove the lock) of the Vertical Stabilizer.

This last factor was decisive for the accident.

The fact that the pilot probably did not remove the Lock of the Vertical Stabilizer caused it to remain fixed in its position and could not give the directional control to the aircraft.

4. SAFETY RECOMMENDATIONS

4.1 Safety Recommendation sent to the Directorate of Air Navigation Services of the IACM, through ref 06 / AIG / 900/2018, of 09.02.2018, to reinforce the warning sent to the managers of the Bazaruto Airstrip through refº 016 / IACM / DINA-001/900/2018 and for preliminary preventive measures, such as verification of compliance with recommended limits of proximity to existing residences near the runway, immediate closure and compliance with items 4.1.1, 4.1.2 and 4.1.3.

- Action taken and implemented, the track was closed, and NOTAMNQ C0001 / 18 was issued, on January 16, 2018, and a team of two (2) IACM Inspectors and one (1) DPTC - Inhambane Technician traveled to Bazaruto Island for the proper Bazaruto Airstrip inspections.

4.1.1- Bazaruto Airstrip managers to reset the runway seal perform an immediate clean-up in the obstacle-free zones, including around the wind sleeve;

- Partially closed action, with elaboration of corrective action plan, minimization of safety conditions through a runway Work Safety Contract and explanatory meetings with local community.

4.1.2- The Runway managers shall ensure communication with ATC bodies and other competent authorities, for the exchange of information and safe and efficient conduct of flights;

- Action partially closed, the responsible for the Bazaruto Airstrip benefited from DINA / IACM - oriented training.

4.1.3- The Aerodrome managers must verify if the flights performed are in accordance with the terms of the authorizations and / or certifications granted and if they have the list of passengers boarded and disembarked from the aircraft;

- Open action in process

4.2- Safety recommendation sent to the IACM Flight Safety Services, through ref. 08 / AIG / 900/2018, of February 13, 2018, to take preliminary measures to ensure that all operators and pilots of aircraft operating in the national territory bear original documents.

- Action taken and implemented, ramp inspections are regularly carried out by the IACM Inspectors to the foreign air operators, in accordance with the regulation MOZ-CAR 129.06 and the respective results are communicated to the Authorities of the states of registration and operation of the aircraft where they are detected not conformities.

4.3- Safety Recommendation sent to the Legal Office of the IACM, through ref. 07 / AIG / 900/2018, of February 13, 2018 for analysis from the legislative point of view on the legality of passenger transport with airplanes of amateur construction category in the national territory and the fulfilment of Authorizations, issued by the Economic Regulation Direction of IACM.

- Open action in process.

4.4- Notify the IACM Economic Regulation Department to improve coordination with other areas prior to the issuance of the requested authorization.

- Open action in process.

ABBREVIATIONS

- **UPIAA** - Unidade de Prevenção e Investigação de Acidentes com Aeronaves (Mozambican Accident Investigation Authority -in the process of being created).
- **IACM** - Instituto de Aviação Civil de Moçambique (Civil Aviation Authority of Mozambique).
- **PIC** - Pilot In Comand.
- **MEA (L)** - Multi - Engine - Airplane.
- **SEA (L)** - Single - Engine - Airplane.
- **UTC** - Coordinated Universal Time.
- **METAR** - Aerodrome Routine Meteorological Report.
- **VFR** - Visual Flight Rules.
- **ATS** - Air Traffic Services.
- **mts** - Meters.
- **ATC** - Air Traffic Control.
- **FQVL** - Vilankulo Aerodrome call sign.
- **FAKN** - Kruguer Park Aerodrome call sign.
- **DTA** - IACM, Air Transport Department.
- **DPTC** - Provincial Directorate of Transport and Communication.
- **DINA /IACM-** Directorate of Infraestrutures and Air Navigation of the IACM.

APPENDICES

Photographs (Runway and the aircraft after the accident)

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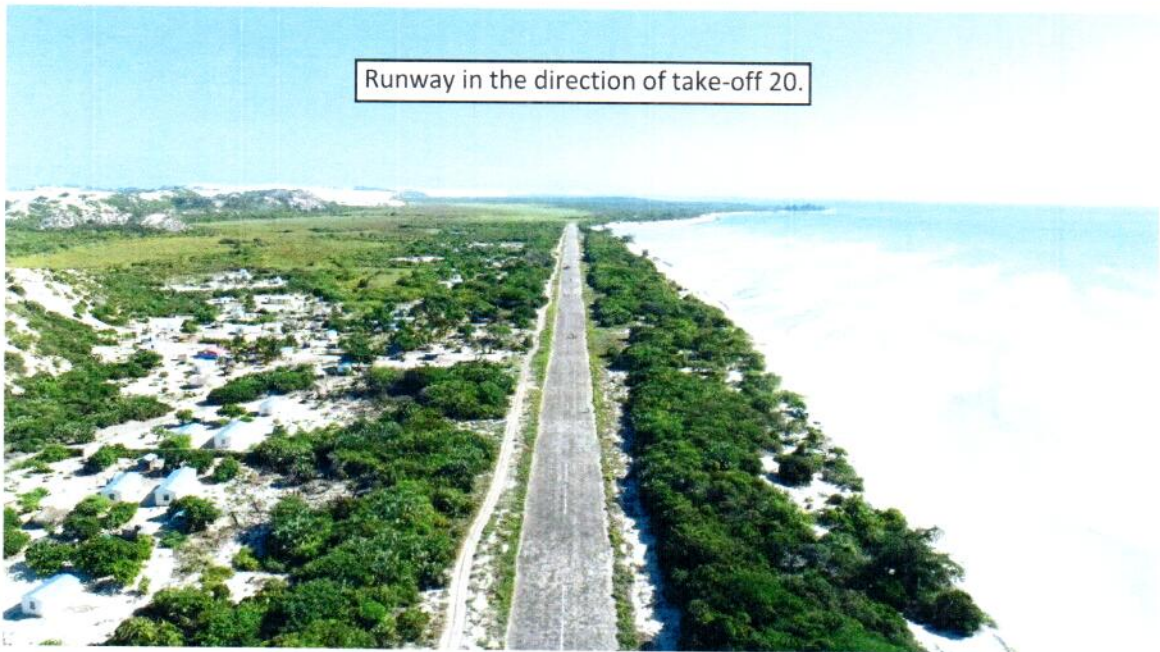
APPENDICES

Photographs (Runway and the aircraft after the accident)

Aerial photos









Approaching the accident site



General view of aircraft

Fuselage from front.



Left and right wings





Aircraft viewed from Rear.



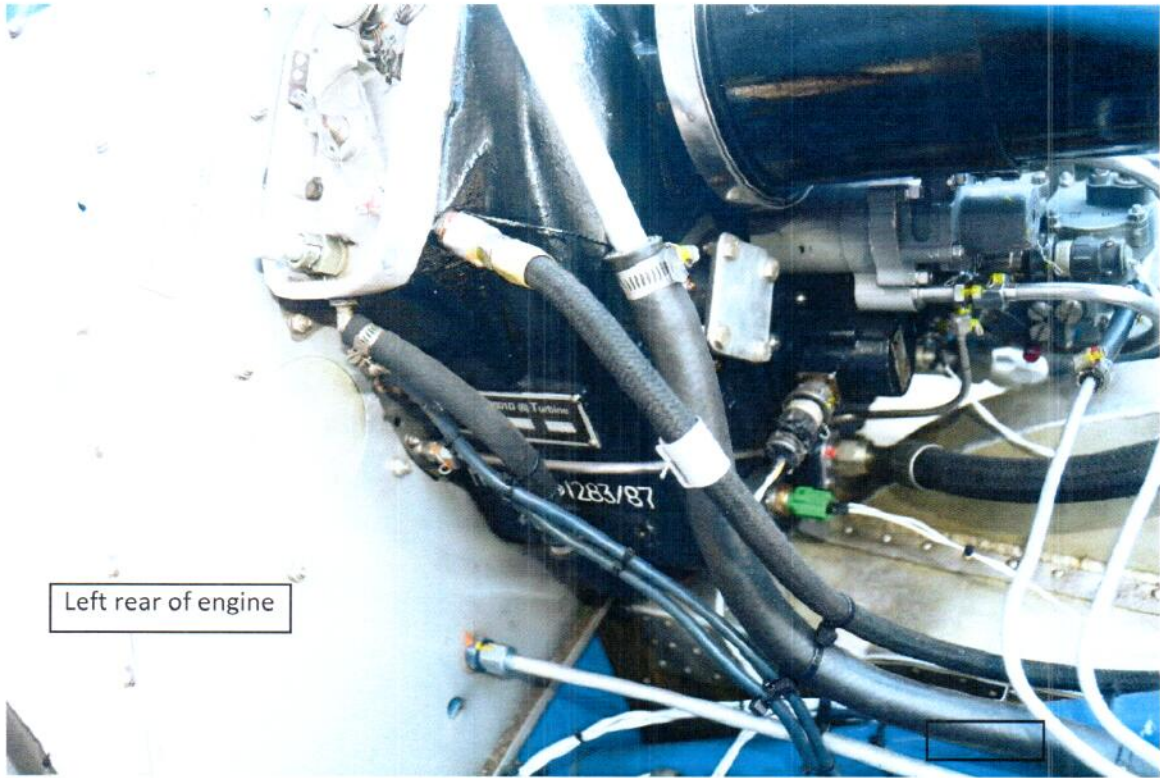
Aircraft viewed from left



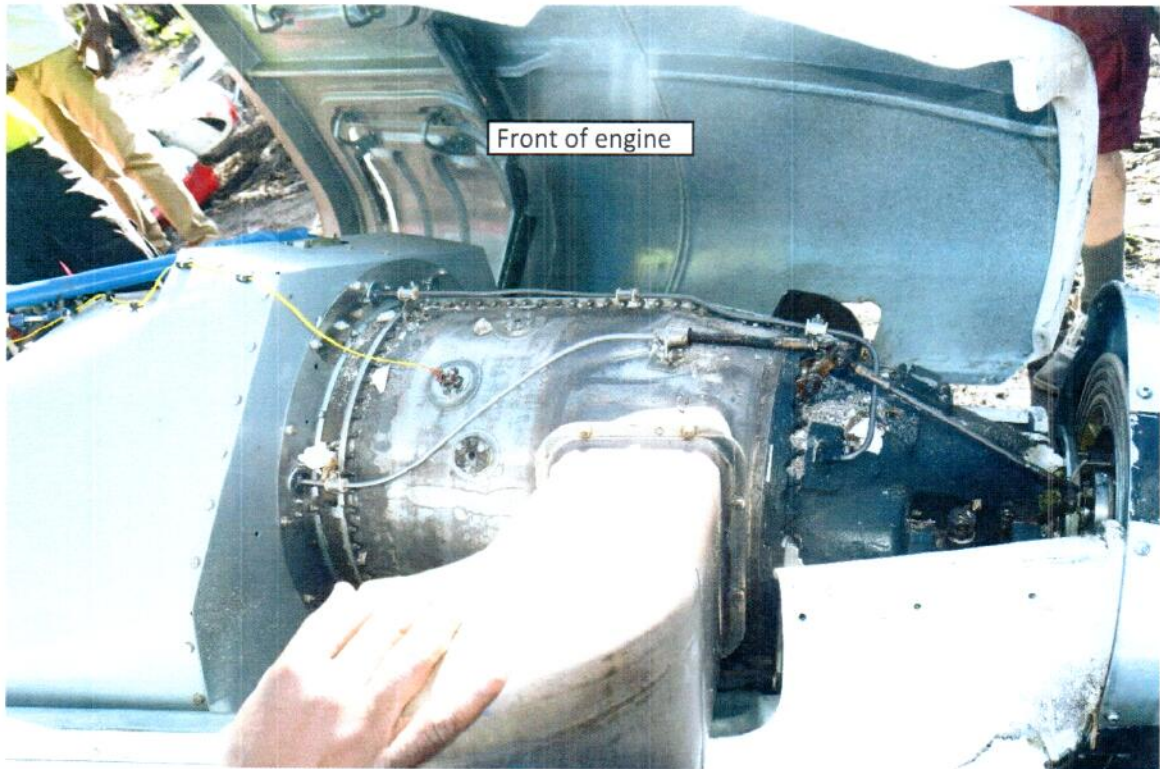
Instrument panel



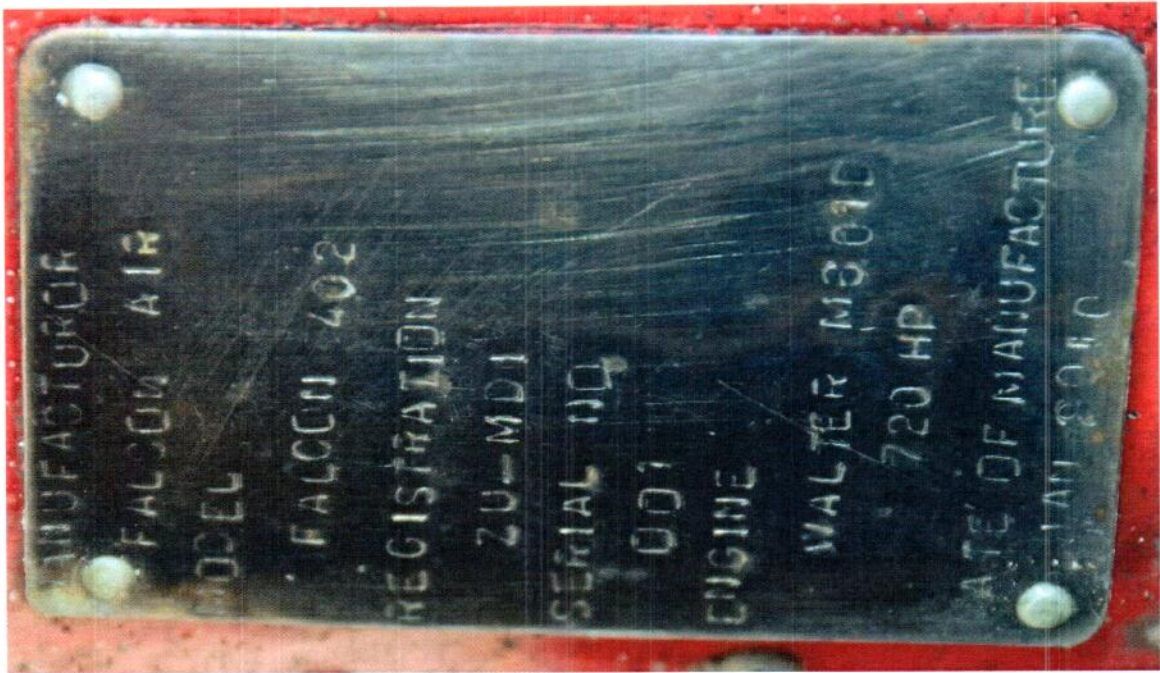
Rear of engine



Left rear of engine



Front of engine



Data plate