



PAKISTAN CIVIL AVIATION AUTHORITY
(SAFETY & INVESTIGATION BOARD)



ACCIDENT TO M/S MULTAN FLYING CLUB
CESSNA – 150 AIRCRAFT
REG # AP-BAS ON 01st SEPTEMBER 2012 AT
MULTAN INTERNATIONAL AIRPORT, MULTAN

INVESTIGATION REPORT

ACCIDENT OF M/S MULTAN FLYING CLUB, CESSNA – 150 AIRCRAFT, REG. # AP-BAS ON 01ST SEPTEMBER 2012 AT MIAP, MULTAN

Synopsis

On 01 September 2012, Multan Flying Club, Aircraft Cessna-150, Registration Number AP-BAS was scheduled to fly a solo circuit and landing training flight at Multan. Student Pilot (Captain of aircraft) Muhammad Waqas Tarar (PPL # 3057) took off at 0936 UTC for the said training flight. The reported weather was well within the parameters of solo circuit and landing training flight. The training flight remained uneventful during first touch and go landing. During the second touch and go landing practice, at flare out height the aircraft ballooned. To correct the variation the student pilot moved the control column slightly forward which resulted in three pointer landing and aircraft got airborne again. Now the captain of aircraft lowered the nose of aircraft which resulted in touching of nose wheel first on runway surface. After the bouncing of aircraft on nose wheel, it entered into porpoise and at one stage, the propeller of engine along with left and right wing tips came in contact with the runway surface. The aircraft experienced extreme loading on its structure which resulted in deformation of main landing gears and buckling of fuselage just behind the main landing gears area. Student pilot as per his experience made his efforts to control the aircraft but finally aircraft stopped on left wing tip, left main landing gear and nose of aircraft touching the ground. The aircraft came to a halt after travelling 1200 ft from its first touchdown point. Captain of aircraft did not receive any minor / major injury. However, the aircraft received apparent structural damage on fuselage, nose landing gear, main landing gears, engine propeller, left and right wing tips.

Investigation Authority

DG CAA issued notification vide Letter No HQCAA/1910/354/SIB/556 date 13 September, 2012 and authorised Safety & Investigation Board, PCAA to investigate the accident is attached as Appendix "A". No state was requested to appoint accredited representative.

1. FACTUAL INFORMATION

- 1.1 **History of the Flight:** The Cessna 150 AP-BAS had flown a circuit and landing training flight in the morning on 01 September, 2012 with a flying time of 01:10 hrs at Multan before under taking a solo circuit and landing training flight.
- 1.2 **Injuries to Persons:** Captain of aircraft did not receive any minor / major injury.
- 1.3 **Damage to Aircraft:** Aircraft received apparent structural damage on fuselage, nose landing gear, main landing gears, engine propeller, left and right wing tips.

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1.4 **Flight Crew Information:** The under training pilot was the captain of aircraft at the time of occurrence. The extracts of Flying Log Book of Captain of aircraft are attached as Appendix "B". The detailed data of Cockpit Crew is as under:

- Muhammad Waqas Tarar : Under Training Student Pilot
- Date of Birth : 28 January, 1991
- Medical Validity Date : 31 August, 2013
- Flying Experience C-150 : 75:25 Hrs
- Flying Experience C-172 : 02:55 Hrs
- SPL No : 3706
- PPL No : 3057

1.5 **Aircraft Information:** The Cessna-150F aircraft was inducted at Multan Flying Club on 16 October 1990. The detailed aircraft and engine related data is appended below:

1.6 **Aircraft:**

- Aircraft Make : Cessna
- Type of Aircraft : 150F
- Manufacturing Date : 1966
- Serial No : 64342
- Aircraft Registration : AP-BAS
- Aircraft Hours : 15679:25 Hrs

1.7 **Engine:**

- Engine type / model : CONTINENTAL O-200A
- Engine Serial No : 285346-R
- Date of Manufacturing : 15 July, 1995
(re-built by Teledyne Continental Motors)
- Date of Overhaul : 18 October, 2010
- Date of Installation : 30 December, 2010
- Engine TBO : 1800 Hrs / yrs
- Engine hours after overhaul : 679:40 Hrs

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1.8 **Propeller:**

- Propeller type / model : McCauley (Fixed Pitch) / 1A100
- Propeller Serial No : G5449
- Propeller Hours : 1770:25 hrs
- Installed on AP-BAS : 02 July, 2009

1.9 **Meteorological information:** The weather reported by local Met Office at 0900 UTC was; visibility 5 km, haze, wind 0900 / 06 kts. The temperature / Dew Point was 38⁰ / 25⁰, Relative Humidity 48% and QNH 1000 mbs / 29.54 inches with no significant weather. The reported weather by local Met Office at 1000 UTC was; visibility 5 km, haze, wind 130⁰ / 08 kts. The temperature / Dew Point was 39⁰ / 25⁰ and QNH 1000 mbs / 29.54 inches. Pakistan Meteorological Department Multan Aerodrome weather reports for 0900 and 1000 UTC are attached as Appendix "C". There was no other significant weather phenomenon prevailing at the time of incident, however Captain of the aircraft did experience turbulence while flying the circuit patterns.

1.10 **Navigation Aids Availability:** Cessna 150 is equipped with ADF, VOR / DME and ILS equipment for the conduct of its training flight at Multan Flying Club.

1.11 **Communication Aids Availability:** Cessna 150 aircraft is equipped with VHF radio for its two way radio contact with all concerned and relevant agencies during the conduct of flight.

1.12 **Flight Register:** The solo circuit and landing training flight of Captain of aircraft was duly recorded and authorized by Multan Flying Club.

1.13 **Impact Information:** Aircraft touched down on its nose landing gear, damaging severely the nose landing gear. As a result of nose landing gear hitting the ground / runway surface first, the aircraft bounced and entered into porpoise. The aircraft experienced extreme uneven loading on landing gears which resulted in nose landing gear collapse along with extensive damage to main landing gears and buckling of fuselage behind main landing gears area . During porpoise, the left and right wing tips of the aircraft also came in contact with the ground / runway surface which resulted in damage to both the wing tips.

1.14 **Other Damages:** No other apparent damage was observed to the runway surface / services.

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- 1.15 **Aircrew Medical Examination:** Following the incident on 01 September, 2012 at Multan, Blood and Urine samples of Muhammad Waqas Tarar were collected which did not reveal any abnormality.
- 1.16 **Fire:** No pre / post occurrence air / ground fire indications by Captain of aircraft and evidences by Investigation Team were observed.
- 1.17 **ATC Tape Extract:** ATC Tape Extracts were retrieved for detailed analysis.
- 1.18 **CVR / FDR:** Cessna-150 is not equipped with onboard CVR / FDR.
- 1.19 **Crew Resource Management (CRM):** At the time of occurrence Student Pilot Muhammad Waqas Tarar was flying solo while undertaking a circuit and landing training flight.
- 1.20 **Cockpit Switchology:** Following cockpit switchology was noted by Investigation Team after the occurrence:
- (a) The Master switch was observed in "OFF" position.
 - (b) The Fuel Selector switch was found on "Both" and not "OFF" position.
 - (c) The Ignition switch was found in "OFF" position.
 - (d) Throttle was observed at fully pulled out "Idle" position.
 - (e) Mixture was observed at "Idle Cut off" (fully pulled out position).
 - (f) Flaps were found 300 down.
 - (g) Apparently the front wind screen and rear / baggage compartment top screen were found cracked with no other damage to the cockpit area.
 - (h) Indications of various indicators inside the cockpit could not be recorded as battery connections were disconnected for safety reasons and aircraft was without any electrical power.
- 1.21 **Retrieval of Aircraft:** After recording all the post incident photographic evidences, the aircraft was removed from the runway. As a result of the occurrence, runway remained blocked from 0954 hrs to 1122 hrs UTC, however no scheduled flight was affected.
- 1.22 **Damage Assessment / Repair scheme:** Detailed Damage Assessment / Repair scheme have been developed and worked out by Multan Flying Club

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Engineering set up in coordination with Directorate of Airworthiness (PCAA) and is attached as Exhibit "D".

- 1.23 **Useful Investigation Techniques:** Various investigation techniques and procedures were employed to ascertain the flight profile and events leading to the accident and their analysis.

2. **Chronological Sequence of Events:** At 09:29:05 (UTC) Captain of AP-BAS contacted ATC Tower Multan for taxi instruction and the aircraft taxied out as per taxi clearance for holding point 36 via Charlie link. From 09:30:02 Captain of AP-BAS started to use the call sign of AAS and confirmed it to the Tower for his aircraft. At 09:35:44, Captain asked for departure and took off as per plan for the training solo circuit flight. At 09:42:01, aircraft reported final 36 for a touch and go landing and the touch and go landing remained uneventful. At 09:50:06 called final 36 for second touch and go landing after flying a circuit pattern and tower cleared him accordingly with surface wind 0500 / 5 kts. At 09:52:09 aircraft informed that it had crashed on runway. The duty controller despatched the crash tender to the runway and promptly informed all the concerned agencies. After the recording of photographic evidence the aircraft was removed from the runway. The runway remained blocked between 0953 to 1122 UTC due to the said occurrence.

2.1 Findings

- 2.1.1 The Captain of aircraft's ground and flying training performance has been satisfactory at Multan Flying Club.
- 2.1.2 The Captain of aircraft had a total flying experience of 78:20 hrs (54:00 hrs dual and 24:20 hrs solo) till occurrence.
- 2.1.3 The Captain of aircraft had flown a total of three consecutive training flights on Cessna-172 for conversion (02 x Navigation and 01 x Circuit & Landing) prior to undertaking the solo circuit and landing training flight on Cessna-150.
- 2.1.4 After having flown Cessna-172 in first flight with instructor pilot on 01 September, 2012, the mishap training flight was the second flight of Captain of aircraft for the day.
- 2.1.5 The solo training flight of Captain of aircraft was not planned / scheduled a day in advance rather it was planned after the first flight of Captain of the aircraft.
- 2.1.6 Before takeoff the Captain of aircraft started to use the call sign of AAS which was cross verified by tower and confirmed by the Captain of aircraft.
- 2.1.7 The Captain of aircraft executed a successful and uneventful touch and go landing practice during his first circuit pattern.
- 2.1.8 The Captain of aircraft flew his second circuit pattern till finals runway 36 without any reported anomaly.

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- 2.1.9 The Captain of aircraft experienced mild turbulence during both the circuit patterns while flying at circuit altitude and on finals.
- 2.1.10 As per the Met information, at 0900 UTC the reported visibility was 5 km, QNH 1000 hPa / 29.54 in/mm, RH 48%, and surface wind 0900 / 06 kts with no significant weather around Multan whereas at 1000 UTC the reported visibility was 5 km, QNH 0999 hPa / 29.52 in/mm, RH 48%, and surface wind 1300 / 08 kts with no significant weather around Multan.
- 2.1.11 After second touch and go landing clearance, once Captain of aircraft applied the back pressure on control column to round out the aircraft in order to achieve correct flare out height, he actually ballooned and ended up high on flare out.
- 2.1.12 While maintaining throttle at idle, the Captain of aircraft applied slight forward pressure to lower the nose and achieve the correct flare out height.
- 2.1.13 After lowering of nose of aircraft, the Captain of aircraft failed to achieve the correct landing attitude at flare out height and made a three pointer contact with runway surface on both main and nose landing gears simultaneously.
- 2.1.14 As a result of uncontrolled hard touch down the aircraft got airborne again.
- 2.1.15 To correct the anomaly, Captain of aircraft again lowered the nose of aircraft and as a result aircraft nose landing gear impacted with the runway surface.
- 2.1.16 Due to the contact / impact of nose landing gear first with runway surface, the aircraft bounced on its nose wheel and entered into porpoise.
- 2.1.17 The Captain of aircraft just advanced the throttle for a very short duration in order to adjust and then brought throttle back to idle to continue the landing.
- 2.1.18 The aircraft remained in uncontrolled flight (porpoise condition) and during these bounces the Captain of aircraft continuously gave inputs to the control column to counter the bounces.
- 2.1.19 The Captain of aircraft inputs to counter the bounces aggravated the situation and resulted in nose landing gear collapse, touching of engine propeller along with both left and right wing tips on runway surface in addition to serious structural damages to aircraft.
- 2.1.20 After number of porpoise bounces, the aircraft finally came to a halt on its nose, left wing tip and left main landing gear.
- 2.1.21 The Captain of aircraft followed the emergency egress procedure, after carrying out the required checklist actions.
- 2.1.22 All defects found on the inspected parts confirm that they have been damaged during landing phase.
- 2.1.23 No evidence of failure or malfunction of any aircraft system / sub-system prior to encountering the landing irregularity (porpoise) has been found.

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2.1.24 It is conclusively ascertained during the process of investigation that the AP-BAS aircraft was fully serviceable during the mishap training flight prior to encountering the landing irregularity (porpoise).

3. Analysis

3.1 Operational Analysis

- 3.1.1 The Captain of aircraft performance on ground and flying training was found to be satisfactory at Multan Flying Club.
- 3.1.2 On the day of occurrence, no significant weather was prevailing at and around Multan aerodrome area.
- 3.1.3 The weather conditions were well within the parameters to undertake solo circuit and landing training flight.
- 3.1.4 The Captain of aircraft had flown a total of three consecutive training flights on Cessna-172 for conversion prior to undertaking the solo circuit and landing training flight on Cessna-150.
- 3.1.5 On 01 September, 2012, Captain of aircraft flew his conversion training flight (circuit and landing) on Cessna-172 before flying his solo circuit and landing training flight on Cessna-150.
- 3.1.6 The Captain of aircraft experienced mild turbulence during the solo circuit and landing training flight during the circuit pattern.
- 3.1.7 The training flight remained uneventful till second circuit pattern final approach.
- 3.1.8 After the clearance of tower for second touch and go landing, Captain of aircraft applied more than the required back pressure on control column to round out the aircraft which resulted in ballooning and aircraft ended up high on flare out.
- 3.1.9 The Captain of aircraft followed the incorrect procedure and maintained throttle at idle while applying slight forward pressure to lower the nose and achieve the correct flare out height.
- 3.1.10 After lowering of nose of aircraft, the Captain of aircraft failed to judge the correct landing attitude at flare out height and made a hard three pointer touchdown / landing with runway surface (on both main and nose landing gears simultaneously).
- 3.1.11 As a result of uncontrolled hard touch down the aircraft bounced and got airborne again.

- 3.1.12 The Captain of aircraft followed the incorrect technique to correct the variation in landing pattern and again lowered the nose of aircraft while maintaining throttle at idle.
- 3.1.13 As a result of lowering nose attitude, aircraft nose landing gear impacted with the runway surface.
- 3.1.14 The aircraft bounced on its nose wheel and entered into landing irregularity (porpoise).
- 3.1.15 The Captain of aircraft just advanced the throttle for a very short duration in order to adjust the anomaly and then brought throttle back to idle to continue the landing which is contrary to the standard recommended procedure of go around to handle the porpoise landing irregularity.
- 3.1.16 The aircraft remained in uncontrolled flight (porpoise condition) and during these bounces the Captain of aircraft continuously gave inputs to the control column to counter the bounces of nose and main landing gears which is contrary to the standard recommended procedure of maintaining the control column at one particular position.
- 3.1.17 The Captain of aircraft incorrect inputs to control column aggravated the situation and resulted in touching of engine propeller along with both left and right wing tips with runway surface in addition to serious damages to landing gears and airframe / structure of aircraft.
- 3.1.18 As the throttle was maintained at idle position by Captain of aircraft, therefore, after number of porpoise bounces the aircraft came to a halt on its nose, left wing tip and left main landing gear.
- 3.1.19 The Captain of aircraft followed the correct emergency egress procedure.

3.2 Technical Analysis

- 3.2.1 All defects found on the inspected parts of Cessna-150 (AP-BAS) confirmed that they had been damaged during landing phase.
- 3.2.2 No evidence of failure or malfunction of any aircraft system / sub-system prior to encountering the landing irregularity (porpoise) has been found.
- 3.2.3 It is conclusively ascertained during the process of investigation that the Cessna-150 (AP-BAS) aircraft was fully serviceable during the mishap training flight till encountering the porpoise landing irregularity.

4. Observations

- 4.1 The Captain of aircraft changed the callsign of solo circuit and landing training flight after taxi out from AP-BAS to AAS.

- 4.2 The go around procedure / technique in case of encountering bouncing / porpoise during landing pattern was not being taught to the Student Pilots at Multan Flying Club. Instead major emphasis is being laid on correcting the abnormal situation and continuing with landing on the remaining length of runway.
- 4.3 Certain flying exercises / techniques were being taught and preached to Student Pilots at Multan Flying Club for handling various landing irregularities in violation to Basic Flying Training Manual (CAAD-625).
- 4.4 The Captain of aircraft applied the incorrect recovery technique to get out of bouncing / porpoise landing irregularity.
- 4.5 The option of go around to get out of unsafe situation never came into the mind of Captain of aircraft as he was being taught to recover out of abnormal situation and continue the landing.
- 4.6 The standardization of flight instructors is done by the Chief Flight Instructor of the respective flying Club and the process is not being monitored by PCAA.
- 4.7 The flight check for the initial issue of instructor rating is mostly conducted by GM's (GA) but at times it is delegated to CFI's of the respective flying clubs and no clear PCAA regulation / policy exists on this aspect.
- 4.8 The minimum flying experience required to undergo the Flying Instructor Course is CPL / IR with 200 hrs is considered, a very low accumulative flying experience for becoming a mature instructor pilot of a flying club.
- 4.9 There is no system of examining / checking of instructor pilots of flying clubs, while allowing them to use higher privileges such as clearing / sending a student pilot on first Solo after completion of initial basic flying training.
- 4.10 The FITS course conducted at the Flying Club's level is not being monitored closely by the PCAA and PCAA's participation is only during the conduct of Final Check.
- 4.11 The involvement of PCAA's inspector at the important stages of flying is quite negligible at the initial issue of CPL / IR / ATPL licenses.
- 4.12 PCAA has not notified flying clubs any specific limit of flying hours for the conversion from Cessna 150 / 152 to Cessna 172.
- 4.13 The student pilots of flying clubs are observed flying two different types of aircraft on a particular day which is considered hazardous owing to the very low flying experience of student pilots at that stage.
- 4.14 CPL / IR / ATPL and Instructor ratings are awarded at times without oral examination by PCAA.
- 4.15 Due to insufficient involvement of PCAA with Flying Clubs, SOPs are being overlooked and some local innovations / procedures have crept in and are being taught to the student pilots as standard procedure.

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5. **Conclusion:** The aircraft ended up in porpoise landing irregularity because the Cockpit crew of aircraft failed to correctly handle a landing irregularity (porpoise) encountered during second touch and go landing due lack of knowledge and less flying experience and implementation of non-standard / PCAA non-approved landing irregularities handling procedures / techniques being taught at Multan Flying Club.

Finalization

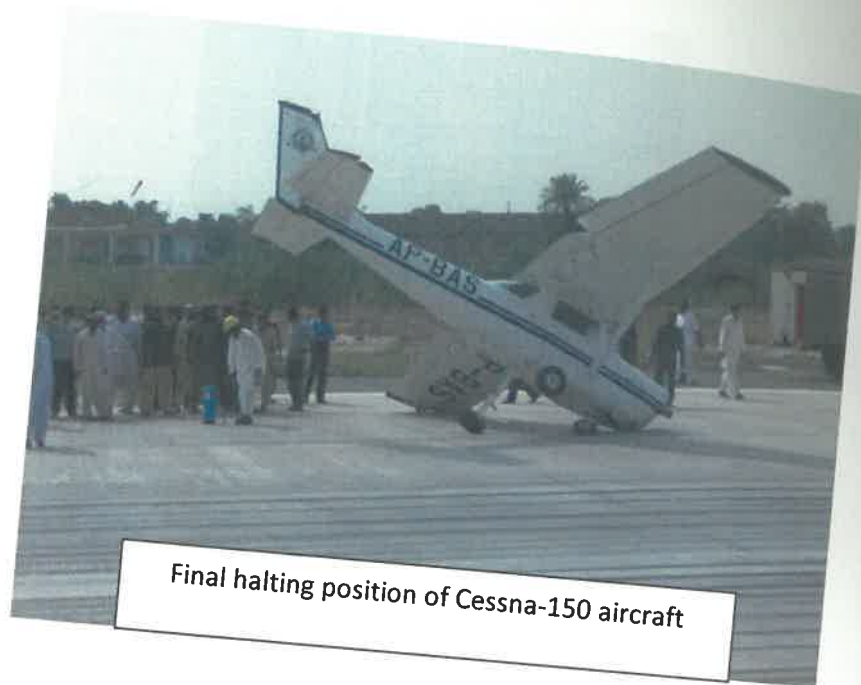
6. **Cause of Occurrence:** Captain's lack of landing irregularities knowledge along with his low flying experience resulted in mishandling of landing irregularity (porpoise) thereby aggravating the situation and causing the occurrence.
7. **Contributory Factor:** Multan Flying Club's implementation of non-standard and PCAA non-approved landing irregularities handling procedures / techniques resulted in mishandling of a landing irregularity (porpoise) by student pilot thereby aggravating the situation and causing the occurrence.

8. Safety Recommendations

- 8.1 PCAA Regulatory is to issue instructions and ensure onetime conduct of a thorough ground training brief / lecture covering all the landing irregularities and their standard recovery procedures / techniques for all Student Pilots at all Flying Clubs.
- 8.2 PCAA Regulatory along with Chief Flying Instructor Multan Flying Club is to analyze the performance of Captain of aircraft involved in the accident and ensure necessary recurrent training is conducted before clearing him for solo flight.
- 8.3 PCAA Regulatory is to review / standardize the existing landing irregularities recovery procedures / techniques being taught and preached at Multan Flying Club.
- 8.4 PCAA Regulatory is to study the option that all instructor pilots of Flying Clubs be standardized under-supervision of Directorate of Flight Standard, PCAA Inspector at regular appropriate interval.
- 8.5 PCAA Regulatory is to study the option that the initial check for the award of instructor rating be conducted / monitored by Directorate of Flight Standard, PCAA Inspector only and should not be delegated to Flying Club supervisors.
- 8.6 PCAA Regulatory is to study the option that the flight check for the initial issue of ATPL / CPL and IR be conducted / monitored by Directorate of Flight Standard, PCAA Inspector.
- 8.7 PCAA Regulatory is to study the option that the minimum flying experience requirement to undergo FITS course be enhanced to 300 hrs with CPL / IR instead of 200 hrs CPL / IR.
- 8.8 PCAA Regulatory is to study the option that the system of instructor pilots up gradation checks along with written examination be introduced at all the Flying Clubs and supervised by Directorate of Flight Standard, PCAA and Para-14 of ANO 90.003 be amended accordingly.
- 8.9 PCAA Regulatory is to study the option that Student Pilots of Flying Clubs may be converted to another rating only after minimum of 100 hrs of total flying experience during the CPL course.

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- 8.10 PCAA Regulatory is to study the option of imposing a restriction on Student Pilots of Flying Clubs to fly two different types of aircraft on same day.
- 8.11 PCAA Regulatory is to study and implement the option of introducing an oral examination for the initial issue of ATPL / CPL / IR / Instructor rating before the issuance of Flying License / Rating.
- 8.12 PCAA Regulatory inspectors' involvement in monitoring of all the FITS training phases at Flying Clubs level need to be enhanced.
- 8.13 PCAA Regulatory is to ensure that all the flying training at Flying Clubs is conducted as per the approved standard procedures / Training Manual / SOPs / recommendations of manufacturer and PCAA.

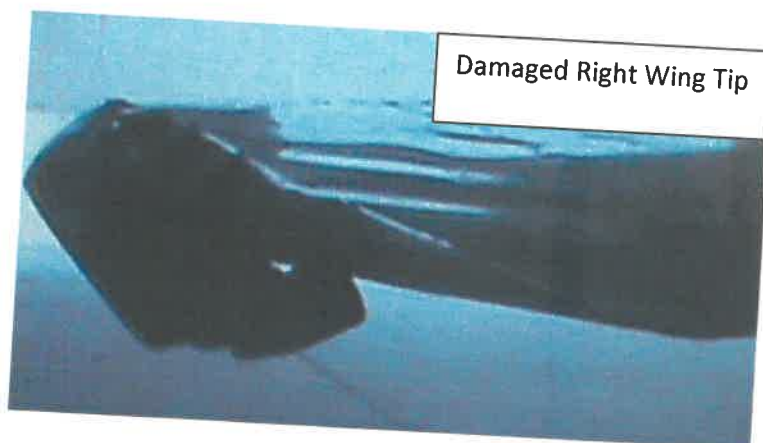




Damaged Propeller and Nose area



Damaged Left Wing Tip



Damaged Right Wing Tip