# TITLE

## GENERAL INFORMATION

| | |
|---|---|
| Name of Operator: | Air Services Limited |
| Aircraft Manufacturer: | Thrush Aircraft Inc. Georgia, USA |
| Aircraft Model: | S2R-T34 |
| Nationality and Registration Marks: | 8R-AAG |
| Place of Accident/Region: | MARDS Airstrip (SYMA) Region 5, Guyana – 06 27 53.47 N 057 45 29.68W |
| Date of Accident: | 9th August 2018 |
| Time of Accident: | 14:58hrs |

**Accident No. GAAIU: 3/1/20**

**This investigation was conducted in accordance with ICAO Annex 13 and therefore, it is not intended to apportion blame, or to assess individual or collective liability. Its sole objective is to draw lessons from the occurrence which may help to prevent future accidents. Consequently, the use of this report for any purpose other than for the prevention of future accidents could lead to erroneous conclusions.**

*Note: - All times in this report are Coordinated Universal Time (UTC) unless otherwise stated. UTC is four hours ahead of Guyana Standard Time (GST).*

## CONTENTS:

## GLOSSARY OF ABBREVIATIONS

| | | |
|---|---|---|
| AIP | - | Aeronautical Information Publication |
| AMEL | - | Aircraft Maintenance Engineering Licence |
| AMO | - | Approved Maintenance Organisation |
| AOC | - | Air Operator Certificate |
| ASL | - | Air Services Limited |
| ATPL | - | Airline Transport Pilot Licence |
| EFCIA | - | Eugene F. Correia International Airport |
| GAAIU | - | Guyana Aircraft Accident Investigation Unit |
| GCAA | - | Guyana Civil Aviation Authority |
| GUYSUCO | - | Guyana Sugar Corporation (Aircraft Department) |
| ICAO | - | International Civil Aviation Organisation |
| MEL | - | Minimum Equipment List |
| MPM | - | Maintenance Procedures Manual |
| RWY | - | Runway |
| S/N | - | Serial Number |
| TBO | - | Time before Overhaul |
| TSN | - | Time since New |
| TSO | - | Time since Overhaul |
| VMC | - | Visual Meteorological Conditions |

## Synopsis:

During the landing roll, the aircraft started to drift left of the imaginary centerline of the runway. An attempt was made to correct the aircraft to bring it back to the center of the runway, by using full right rudder and some brake input. This was unsuccessful, and the aircraft made a sharp left turn and ran off the runway. The aircraft stopped when the propeller hit a fence post.

The pilot, the only occupant of the aircraft, was not injured.

The aircraft's propeller and engine were damaged.

There was no fire.

# 1. Factual Information

## 1.1. History of the Flight

The aircraft is based at the MARDS Airstrip. On 9th August 2018 the aircraft was chartered to carry out four aerial fertilization operations, on rice fields in the vicinity of the airstrip. At the time of the occurrence the aircraft was in its landing roll. The pilot stated that after the aircraft landed and with all three wheels on the ground, and the tailwheel locked, he applied brakes and the aircraft started to drift to the left. He stated that although he applied more right brake, forward stick and right rudder, the tailwheel remained locked and the aircraft continued off the left side of the runway. He then applied maximum braking on both wheels and moved the throttle lever to full reverse position and the aircraft decelerated but did not stop. It came to a stop after hitting the airstrip fence, 2075ft from the beginning of the 2400ft runway.

## 1.2. Injuries to Persons

**Table: 1- Showing Injuries to Persons**

| Injury | Crew | Passengers | Others | Total |
|---|---|---|---|---|
| **Fatal** | 0 | 0 | 0 | **0** |
| **Serious** | 0 | 0 | 0 | **0** |
| **Minor/None** | 1 | 0 | 0 | **1** |
| **Total** | **1** | **0** | **0** | **1** |

## 1.3. Damage to Aircraft

The aircraft propeller hit a fence post. The propeller and engine were damaged.

## 1.4. Other Damage

There was no other damage.

## 1.5 Personnel Information - Pilot

| | |
|---|---|
| Gender: | Male |
| Date of Birth/Age: | 24th April 1966/52 years |
| Nationality: | Jamaican |
| License: | Guyana ATPL #AA000134 |
| Date of issue: | 16th October 2017. |
| Date of last medical: | 10th April 2018 |
| Valid until: | 31st October 2018 |
| Aircraft rating: | Single and Multi-Engine Land |
| Last Proficiency Check on Type: | 12th July 2018. |
| Total hours: | 9577.1hrs |
| Total Hours on Type: | 993hrs |
| Hours in last 30days: | 101.8hrs |
| Hours in last 7 days: | 15.6hrs |
| Hours in last 24 hours: | 2.30Hrs |

The pilot's Class 1 Medical Certificate requires him to possess spectacles that correct for near vision.

The pilot previously flew a piston Thrush aircraft in Jamaica. All experience on this type of aircraft, the S2R T34 turbine aircraft, was acquired since coming to Guyana in 2016. He did five hours of conversion training in Louisiana and additional training in Guyana. The pilot's training records were reviewed. Certificates were presented for Turbine Aircraft Aerial Application, dated 4th November 2016, Recurrent Ground Training for Agricultural Aircraft dated 26th January 2018, Dangerous Goods Regulations Recurrent Training, valid until 30th September 2019. The pilot also completed his last APC on type on 12th July 2018.

## 1.6 Aircraft Information

### 1.6.1 General

| | |
|---|---|
| Manufacturer: | Thrush Aircraft Inc. |
| Year of Manufacture: | 2010 |
| Aircraft Model: | S2R-T34 |

| | |
|---|---|
| Aircraft S/N: | T34-337 |
| Certificate of Registration: | Issued – 26th November 2014. |
| Certificate of Airworthiness: | Valid until 27th March 2019 |
| Total Airframe Hours: | 2142:43hrs |
| Maximum Take-off Weight: | 6000lbs |
| Last Scheduled Inspection: | 400hrs |
| Time since last Inspection: | 12:15hrs |
| Next Inspection Due: | 50hrs |
| Engine Model: | PT6A-34AG |
| Engine S/N: | PCE-PH0585 |
| Engine TSN: | 2367:51hrs |
| Engine TSO: | N/A |
| Cycles Data: | Not available |
| Propeller Type: | Hartzell HC-B3TN-3D/T10282N+4 |
| Propeller S/N: | BUA31370 |
| Propeller TSN: | 647:47hrs |
| Fuel Type: | AVGAS 100LL |

The Turbo Thrush S2R-T34 is a single-seater, agricultural aircraft, equipped with a PT6A-34AG engine. It has a tail dragger tricycle landing gear, with a free-castering tailwheel when it is unlocked. On the ground, the aircraft is steered by rudder control and brakes.

### 1.6.2. Maintenance

Examination of the aircraft maintenance records indicates that there were no outstanding maintenance issues. The last scheduled maintenance was a 400hrs check, which was done on 14th July 2018. This check was done at the approved away-from-base maintenance facility. Records show that all required and scheduled maintenance had been performed and all Airworthiness Directives had been complied with. There were no outstanding MEL items on the aircraft.

### 1.6.3. Mass and Balance

There was no load on the aircraft.

## 1.7 Meteorological Information

The weather reported at the time of the occurrence, by the pilot, was: Wind – calm; less than 5kts from ENE, visibility – unlimited, with clear skies. The accident occurred in the morning, during daylight hours

## 1.8 Aids to Navigation

Not applicable.

## 1.9 Communications

The aircraft was not in communication with the Air Traffic Services.

## 1.10 Aerodrome Information

The following information, pertinent to the MARDS Airstrip, was taken from the Guyana Aeronautical Information Publication.

| | |
|---|---|
| Aerodrome Identification: | SYMA |
| Coordinates: | 06 27 53:47N 057 45 29.68W |
| Elevation: | 0 ft. |
| Runway orientation: | 12/30 |
| Runway length: | 2400ft |
| Runway width: | 50ft |

The airstrip is located in Region No.5 in the eastern coastal area of Guyana.

The runway is finished with concrete and is within a grass strip, which is properly prepared for aircraft operations. The entire airstrip is fenced with low expanding chain-link fencing supported with short wooden fence posts. The approach to the runway is free of obstacles. The runway is equipped with two windsocks located on the left of Runway 12 and on the right of Runway 30 respectively.

The airstrip is mostly used to facilitate agricultural/crop dusting activities such as seeding, fertilizing and spraying of adjacent rice fields.

## 1.11 Flight Recorders

This aircraft is not required by regulation to be equipped with a flight recorder.

## 1.12 Wreckage and Impact Information

During the landing roll, the aircraft veered left, off the runway and stopped 90ft from the edge of the runway, when it made contact with the fence. The tips of the propeller blades hit a fence post and were twisted.

## 1.13 Medical and Pathological Information

The pilot was not subjected to any medical or pathological tests.

## 1.14 Fire

There was no fire.

## 1.15 Survival Aspects

The cabin and the cockpit of the aircraft remained intact after the accident. The pilot's seat, seat harness and seat belt were intact.

## 1.16 Tests and Research

The right brake was dismantled and inspected. There was no evidence of any defects to this braking system.

Checks were carried out on the tailwheel locking mechanism, there was a little difficulty both to lock and unlock the locking mechanism. Corrosion was observed at the pivot point of the lever bracket assembly. The locking pin was also inspected but no damage was discernable.

## 1.17 Organisational and Management Information

Air Services Ltd (ASL) is one of the oldest aircraft operators in Guyana. It is also the largest operator, with a fleet of twenty-five aircraft comprising Cessna single engine variants, BN2A Islanders, Thrush Commanders (crop dusters), Pipers and various helicopters.

The company acquired its Guyana Air Operator Certificate No. 001 from the Guyana Civil Aviation Authority in 2002. This AOC allows the company to do domestic; scheduled and charter, passenger and cargo operations. The company also has an Aerial Application Certificate which permits it to conduct aerial work. The management structure includes the Accountable Manager, the Director of Operations, the Chief Pilot and the Safety Manager.

The company acquired an Approved Maintenance Organisation (AMO) certificate No.003 issued by the GCAA in 2003 and carries out its own maintenance. The management structure of the AMO includes the Accountable Manager, Maintenance Manager and Quality Assurance Manager. The Maintenance Procedures Manual (MPM) also lists six Base/Line Certifying staff. This includes management staff. The company utilizes the AMEL system as the basis for maintenance certification.

Its main maintenance facility is co-located with its aircraft operations at EFCIA and includes hangar space, offices, and several specialized workshops. Base and line maintenance are done on airframes, engines, avionics, instruments and propellers for aircraft below 5700kg. The company also has an away-from-base line maintenance station that was approved by the GCAA to carry out the Operators Approved Maintenance Programme for the S2R T34 aircraft.

It was noted that both the AOC and the AMO have the same Accountable Manager. Significant changes were recently made to the technical management teams of both the AOC and the AMO.

The company's Flight Operations Manual was reviewed. Chapter 12 of the Manual, which is the Training Programmes Manual, lists the general training for pilots and specific training for agricultural aircraft pilots. The general training details the required ground training; which includes aircraft performance, physical characteristics of the aircraft and its components and aircraft systems integration items; Dangerous Goods; Crew Resource Management; Emergency Duties and Company Procedures Indoctrination. It also details initial flight training and recurrent ground and flight training. The length of currency for these training programmes is not specifically stated.

## 1.18 Additional Information

### 1.18.1. The Pilot

The pilot was off duty the day before this occurrence. On the day of the occurrence he started flying another aircraft from about 12:00hrs for about two and one-half hours. He had completed eight crop-spraying trips in this time. He then switched to the accident aircraft, 8R-AAG at 14:46hrs. The preflight check was satisfactorily completed and there were no concerns.

He recalled that two days prior to this occurrence he had advised the engineers that the right brake was spongy. There was no record of this defect in the aircraft's technical log book. The pilot expressed the view that because he was able to report the defective brake directly to a mechanic, there was no need to record this as a snag. Review of the Technical Logbook records showed that no defects were recorded for the period from February 2018 up to and including this latest report. Consequently, there were no defect rectifications recorded.

Before he started the flight, he was advised that the brake liner was changed. He looked at the liner and noted that it was new. He started the aircraft and checked the right brake by taxying the aircraft in circles and doing several brakes checks. The brakes functioned satisfactorily. He then taxied out to the runway, during which time he was riding the brakes. Before taking off, he did a full power runup, holding the aircraft on the brakes, there was no creep on either side.

The takeoff was normal. The aircraft had 66gls of fuel on each side and the load was 2750kg of urea. All the fertilizer had been discharged in the field before landing, and about 10gls of fuel was used before returning to the airstrip. The accident occurred on landing, after the first flight, at about 14:58hrs. The Pilot stated that the approach was normal. The aircraft's speed on final was 80mph, it touched down at 65mph and the tail wheel came down at about 50mph. He stated that on the approach the aircraft was configured with full flaps, power was 12psi on torque, the propeller control was full forward, and speed was 80mph on final. When the aircraft crossed the fence, he moved the throttle back to idle and started to retract the flaps to get the aircraft to settle, because it loves to float, the aircraft settled and landed on the mains.

On landing, just after the tailwheel was down, he pulled the control stick back to lock the tail wheel in place, started braking and started bringing the throttle to the beta position. Almost immediately, the aircraft started swinging to the left. He explained that when he activated reverse thrust, it had not yet taken effect, so he pushed the throttle forward to get it out of reverse to avoid any adverse yaw. He then released the left brake and stayed on the right brake, but the aircraft did not react as he expected. He then pushed the control stick forward with the intention of unlocking the tailwheel, and continued with the right brake, but the aircraft continued going left off the runway. He then pulled the stick back in the locked position, applied maximum braking on both wheels and full reverse but was not able to stop the aircraft before it reached the fence. The aircraft stopped at the fence when the propeller hit one of the fence posts. He then shut down the engine.

The pilot initially stated that he touched down approximately 517ft from the beginning of the runway. He estimated that the tail wheel touched down 290ft later, 807ft from the beginning of the runway. Using a combination of these figures estimated by the pilot and actual marks picked up from the runway, the aircraft would have traveled 998ft from the time the tail wheel touched to the time it started to veer to the left. The left main wheel exited the runway 126ft later and the aircraft travelled an additional 90ft on the grass shoulder, before contacting the fence. The pilot later submitted revised figures to show that the aircraft covered a distance of 600.95ft between the initial touchdown and the tail wheel touchdown; and the aircraft traveled a distance of 811.4ft before braking action commenced. He has also stated that the aircraft started to veer to the left immediately upon input of braking action.

At the accident site, it was noted that the flaps were fully retracted, as stated by the pilot.

### 1.18.2. Expert Advice from Thrush Aircraft Inc.

Advice was sought from the Thrush Aircraft Inc. about the effect of applying reverse thrust before the aircraft's tail wheel is firmly on the ground. This company's Director of Training/Air Safety Investigator advised that if reverse thrust is applied before the aircraft's tail wheel is firmly on the ground, the aircraft will veer to the right if uncorrected. However, there is a common tendency among pilots, to over-correct which will cause the aircraft to veer left. He further advised that when reverse thrust is applied, airflow over the

tail surfaces is restricted, making it necessary to use differential braking for directional control if the tailwheel is off the ground.

The photograph below was sent to the Air Safety Investigator. He advised that the locking mechanism should be checked for functionality and the right brake should be checked to determine its effectiveness. He advised that evidence from the photo indicates that the aircraft was heavily side loaded when it departed the runway, meaning it was traveling at a relatively high rate of speed in a specific direction and the longitudinal axis of the aircraft was not parallel with the direction of travel. He also noted that evidence indicates that the tail-wheel was on the ground prior to departing the runway, but because it was castering, it did not leave a streak mark on the hard surface. Further, the angle in which the aircraft departed the runway is too great for the tail-wheel to caster if it were in fact locked. If the pilot inadvertently unlocked the tail-wheel during the landing (this is done by pushing the control stick full forward), the aircraft would be very difficult to control until such time when the tail-wheel was straightened and the lock mechanism was able to engage. Typically, if the tail-wheel was unlocked inadvertently and subsequently locked once it was aligned again, there is a high probability of damage to the locking pin which will be slightly bent.

*Picture showing track marks of aircraft undercarriage – left turn off runway*

### 1.18.3. Interview with Company Engineering Staff

The AMO Certifying Engineer for the aircraft reported that two days before this occurrence the pilot had verbally reported that the right brake was malfunctioning, and the brake liner was changed after this report was received. He had certified the change. He said that the minimum life for the liner is known. The engineer advised that the brake lining that had been changed was still within usable limits, but it was changed to give comfort to the pilot. As required after work on the brake, testing for effective braking, including static testing and pressure checks were done, along with the check for surface contact. The brakes fluid level was also checked. He stated that the aircraft was not taxied for the check because it is recommended that the hopper should be filled, and the fuel tanks should also be filled. So, this check is left for the pilot to carry out. The pilot was advised of this. He said that the pilot did the required checks and found the brakes satisfactory. There was no creeping when this check was done, neither were any leaks found. He also noted that the brakes would not normally be intermittent because it is a mechanical system, the brakes could only have been affected if there was a leak or loss of pressure.

Section 7 (pg7/9) of the ASL S2R T34 Thrush Maintenance Schedule requires inspection of all brake components during the 100-hours inspection. Condition checks of the brakes discs and linings are required to be done daily.

Inspection of the locking mechanism is part of the Check-A inspection rather than part of the pre-flight inspection, so it is done before the first flight of the day but not before every flight. The locking mechanism was checked as part of this inspection.

During the investigators' second inspection it was noted that there was some amount of rust on the tailwheel which was attributed to the corrosive environment and the fact that the aircraft was not washed as was normal after every operation. Since the aircraft was moved from the accident site to the hangar in the presence of the investigator, nothing was done to it. It was noted that after the mechanism was lubricated, it operated easier.

The Certifying Engineer noted that while the pilot was taxying the aircraft prior to takeoff, he would have had to command several turns, including 360° turns, to get the aircraft into position for takeoff. Thus, the tailwheel locking mechanism had to be functioning satisfactorily at that time.

### 1.18.4. The Guyana Civil Aviation Authority

The Guyana Civil Aviation Authority has wide-ranging responsibility to ensure that aircraft operators carry out their functions in keeping with their approved Operations Manual. This includes, among other things;

i. ensuring compliance with the qualification and currency requirements for persons to be appointed as pilot-in-command and
ii. sufficiency of qualified engineering staff to effectively carry out the required maintenance functions of the company's fleet of aircraft; or alternatively ensuring that an adequate arrangement is in place to meet maintenance requirements of the fleet.

## 2. Analysis

### 2.1. The Pilot

No evidence was provided to show that the pilot had completed all required training as listed in the company's Flight Operations Manual. Thus, the pilot was not properly qualified and current to conduct this flight. No record was provided for the following:

i. Company Procedures Indoctrination Training – violation of GARs 8.10.1.9
ii. Security Training – violation of GARs 8.10.1.11
iii. Initial Crew Resource Management – violation of GARs 8.10.1.12

The pilot's failure to record the brakes defect in the aircraft technical log is unacceptable. This is in violation of the Guyana Civil Aviation Regulations No. 6 of 2001; paragraph 12(2)(b).

The pilot was familiar with the airstrip, having operated there recently.

There was no evidence of any pre-existing medical or behavioural conditions which may have adversely affected the pilot's performance during this flight.

### 2.2. The Aircraft

#### 2.2.1. Maintenance

The aircraft has a Certificate of Airworthiness which is valid until 20th March 2019. Records indicate that the aircraft was being maintained in accordance with the approved maintenance schedule. There were no noted defects or deferred maintenance items from the previous flight.

During inspections, after the accident, by the accident investigation team and company maintenance engineers, it was agreed that the tail wheel locking mechanism was not functioning as it should, possibly due to the corrosion found on the pivot point of the lever bracket assembly.

#### 2.2.2. Mass and Balance

There was no load in the hopper. The aircraft was within center of gravity limitations.

### 2.3. The Airstrip

The airstrip was in satisfactory condition for this flight.

## 2.4. The Weather

This accident occurred during the morning. At the time of the accident, it was reported that there was bright sunshine, clear skies, calm wind and good visibility at the airstrip.

## 2.5. The Landing

The aircraft made a straight-in approach to land on Runway 30. The pilot stated that he made a normal landing, with approach and touchdown speeds within normal parameters. Under these conditions, the pilot should have been able to stop the aircraft within a ground roll of about 900ft. This was verified by a senior company thrush commander pilot. However, evidence points to a different scenario in this particular landing. The picture of track marks on the runway and leading on to the runway shoulder indicates that the aircraft was traveling at a relatively high rate of speed.

The pilot also mentioned that on landing, he pulled the control stick back to lock the tail wheel in place, started braking and started bringing the throttle to the beta position. However, because of the high speed, it was possible that the tail wheel was not firmly on the ground when this was done. As noted by the Thrush Aircraft Safety Investigator, this situation can lead to directional control difficulties.

The pilot stated in his MOR, that 'he started braking as soon as the tailwheel was on the ground and locked in position and immediately the aircraft started to veer to the left'. However, in keeping with the findings of the Thrush Aircraft Safety Investigator, even though the tailwheel was on the ground, the absence of any skid marks on the runway, indicates that it was not locked. Further, an analysis of the pilot's touchdown estimates, and marks picked up from the runway, indicate that the tailwheel touched 290ft after the mains touched and the aircraft started to veer left 998ft after the tailwheel touched down. This means that the aircraft would have been traveling in a straight line for 998ft. This is within the stopping distance for the aircraft under normal circumstances.

The pilot's second submission, in which he shows that the tailwheel of the aircraft touched 600.95ft after the main wheels touched and braking started 210.45ft later, and further that the aircraft started to veer left as soon as braking started, is seen as an attempt to re-enforce his belief that the aircraft had a brakes defect.

The final position of the aircraft indicates that the runway excursion occurred at high speed and the aircraft was stopped by impact with a fence post, 2,075ft from the beginning of the runway. There was 325ft of runway remaining. Following a normal approach, with a final approach speed of 80mph and touchdown at the predetermined point, it would be impracticable for the aircraft to continue to travel at such high speed so far down the runway.

Further in discussions with two senior thrush commander pilots, they both agreed on the following:

i. That in a normal landing (i.e. final approach speed at 80mph, touchdown at 65mph and tail wheel on the ground at 50mph), the aircraft should be able to come to a full stop in about 900ft and this is without use of excessive brakes or reverse thrust.
ii. That if the pilot checked the brakes before takeoff and found them to be satisfactory, then the brakes are considered to be effective for landing and stopping under normal circumstances. They agreed that signs of unsatisfactory braking include creeping, veering to left or right and a spongy feeling. The pilot did not experience any of these signs while testing the brakes before taking off.
iii. That with the tailwheel locked, the aircraft will move along its longitudinal axis. If the tailwheel is locked on the ground its direction cannot be changed using rudder input. Thus, if the pilot cannot unlock the tailwheel, he will not be able to change the aircraft's direction.
iv. That in response to the pilot saying that he closed the throttle and raised the flaps before landing because he did not want the aircraft to float down the runway, they noted that this is an unacceptable procedure during the landing process. Additionally, why would the pilot be concerned about floating down the runway if according to him, his speed was 80mph, and position on short final was text book perfect.

## 2.6. Survival Aspects

The aircraft is equipped with both harness and lap seatbelts. These functioned satisfactorily.

## 2.7. The Company

The company has a responsibility to ensure that pilots have completed all required training before they are allowed to operate as pilot in command. There was no record of this pilot completing the Company Indoctrination Training, Security Training and Crew Resource Management Training. Similarly, to the pilot, the company is in violation of GARs 8.10.1.9, GARs 8.10.1.11 and GARs 8.10.1.12 respectively.

It was noted that the pilots who fly this aircraft did not record any defects in the aircraft technical logbook. This apparently is now a common practice in this organisation and is not acceptable. Defects affecting safety may be carried from one flight to another, resulting in cumulative hazards for subsequent flights, which may result in fatal consequences. It is also apparent that the company did not take any action to ensure that defects were recorded in the aircraft technical log book. In addition to this lapse, record keeping in the Aircraft Technical Logbook is generally unsatisfactory. The aircraft and engine cycles were not recorded and there were several instances in which there is no record that the person who was required to carry out the A check had done so. By not ensuring that the Technical Logs Records were accurately completed the company is in violation of GARs 9.1.4.9

The company should consider whether the qualified engineering staff listed in the company's MPM are able to provide enough maintenance coverage for the number and variety of aircraft operated by this operator.

## 2.8. The GCAA

It is apparent that there are shortcomings in the surveillance, done by the GCAA, over this company. Several failings were noted especially those related to quantity, qualification and currency of engineering and operations staff, and some aspects of record keeping. The GCAA should increase/improve surveillance, checks and audits of this company to ensure that the company operations are in compliance with all approved manuals, especially as they relate to training and staffing issues.

# 3. Conclusion

## 3.1 Cause

The probable cause of this accident was the failure to go around from an approach that was too fast and most likely too high. Efforts to maintain control after touchdown resulted in the aircraft running off the runway.

## 3.2 Contributory Factor

The application of reverse thrust when the tailwheel was not firmly on the ground and locked.

## 3.3 Findings

### 3.3.1. The Pilot

1. The pilot's licence was valid.
2. His last APC on type was satisfactorily completed on 12th July 2018.
3. The pilot was not qualified to carry out the intended operation, as records were not presented to show that he had completed all required training.
4. The pilot violated some aspects of both the GCARs and the GARs, as listed in 2.1 above.
4. The pilot was familiar with the airstrip conditions, having operated into the airstrip frequently prior to this occurrence.
5. The approach and landing speeds were too high, and the pilot should have made a decision to go around and attempt another landing.
6. The decision to raise the flaps to get the aircraft to settle during landing is not an acceptable procedure.

### 3.3.2. The Company

1. The company holds an Aerial Application Certificate and an Approved Maintenance Organisation Certificate.
2. The company is considered to be short-staffed for its maintenance requirements.
3. The company did not ensure that this pilot was fully qualified and current prior to scheduling him for flight duties as pilot-in-command.

4. The period of currency for various training programmes is not stated in the company's Flight Operations Manual.
5. The frequent changes among senior technical staff could affect morale and ultimately the performance of their duties.
6. The company's record keeping is not satisfactory generally.
7. The company breached several regulations as listed in 2.7 above.

### 3.3.3. The Aircraft

1.The aircraft had a valid Certificate of Airworthiness and its records showed that it was maintained in compliance with regulations.
2.There were no outstanding maintenance or MEL issues with the aircraft.
3. The corrosion found on the pivot point of the lever bracket assembly for the locking pin may have contributed to the difficulty in locking and unlocking the tailwheel.

### 3.3.4. The Weather

The weather at the airstrip at the time of the accident was VMC. The wind was calm.

### 3.3.5. The Airstrip

The runway was in satisfactory condition for the operation. Collision with a fencepost off the runway shoulder contributed to damages sustained by the aircraft when it ran off the runway.

### 3.3.6. The GCAA

1.The GCAA has responsibility for surveillance oversight of this company's operations and maintenance activities, to ensure that lapses are corrected.

2.The GCAA did not provide adequate oversight for this company to ensure that its operations and maintenance activities were in keeping with the approved manuals.

3. The pilot was initially issued with a Guyana ATPL on 15th May 2016. His current ATPL has an issue date of 16th October 2017. It was explained that the latter date was given when the GCAA changed its licensing system.

# 4. Safety Recommendations

## 4.1. The Pilot

The pilot should be required to complete the following: -

1.Revise the Aircraft Flight Manual especially the landing techniques and operation of the tailwheel.

2. Review the GCARs and the GARs to ensure satisfactory knowledge of relevant areas.

3. Crew Resource Management refresher training, with emphasis on single crew operations. This must include airmanship, attitude, the need to guard against complacency and the importance of self-discipline, situational awareness, problem solving and decision making.

4. Other training as required by the company's operations manual should also be completed.

## 4.2. The Company

1. The company should consider sending the pilot for refresher simulator training periodically, which will allow him to hone his skill and benefit from professional advice.

2. The company should ensure that all pilots are provided with all required initial and recurrent training before allowing them to operate as pilot-in-command.

3. The company should expose its management staff to training in the GCARs and the GARs to ensure that its operations are in compliance with legal requirements.

4. The company should review its Training Programmes Manual to ensure that the currency for individual training programmes is clearly stated.

5. The company needs to be more vigilant with regard to the record keeping in the aircraft technical log. It is unacceptable that defects are not recorded in the technical log. The company should also ensure that engine cycles are recorded in the technical log book.

6. The company should carry out a staff needs assessment to determine if the present complement of staff can provide a safe level of maintenance service for its fleet.

## 4.3 The GCAA

1.The GCAA should increase/improve its surveillance, checks and audits of this company to ensure that the company's operations are in compliance with all approved manuals, especially as they relate to training and staffing issues.

2. The GCAA should consider if the company's present engineering staff can provide adequate coverage for this company's fleet. This is especially necessary if the company requests approval to increase its fleet.

3. Implementation of a new licensing system should not affect the date of initial issue of individual licences. GCAA should ensure that the new system allows for both date of Initial Issue and Re-issue Date.

**END**