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Collision with terrain, 24-7634

Old Bar Airstrip, New South Wales

1 October 2011

Abstract

On 1 October 2011, a Cheetah Sierra 200 aircraft, registered 24-7634, departed Taree Airport for the Old Bar Airstrip, New South Wales. On board were the pilot and a passenger. After arriving overhead the Old Bar Airstrip, the pilot conducted a left circuit followed by a touch-and-go landing on runway 17. The pilot then flew an additional circuit, from which a full-stop landing was planned.

On the second landing, the pilot estimated that he would not be able to stop before the end of the airstrip. As a result, the landing was aborted and a go-around was commenced. During the initial climb phase of the go-around, the aircraft collided with a ferris wheel that was located to the south of the airstrip. The ferris wheel was part of a beach festival and, at the time of the collision, there were four people on the ferris wheel.

The aircraft and ferris wheel were damaged in the collision and the passenger and a person on the ground sustained minor injuries.

The investigation is continuing.

FACTUAL INFORMATION

The information contained in this preliminary factual report is derived from the initial investigation of the occurrence. Readers are cautioned that new evidence will become available that may alter the circumstances as depicted in this preliminary report. As such, no analysis or findings are included in this report.

History of the flight

Departure from Taree

On 1 October 2011, at about 1000 Eastern Standard Time¹, a Cheetah Sierra 200 aircraft (Sierra), registered 24-7634, was attempting to land at the Old Bar Airstrip after a private flight from Taree Airport, New South Wales. The flight was being conducted under the visual flight rules (VFR). On board were a pilot and a passenger.

The purpose of the flight was to position the aircraft at the airstrip for a static display. The display was held in conjunction with a beach festival in the area surrounding the airstrip.

The pilot had driven to Taree Airport to prepare for the flight; however, the weather conditions at the time would have made flight under the VFR difficult. The flight was subsequently cancelled although sometime later, the weather conditions improved and the pilot's preparation for the flight resumed.

Another aircraft, a Super Diamond Twister (Diamond), registered 19-7344, was to accompany the Sierra during its flight to Old Bar. At the time of the departure from Taree, runway 22² was in operation with two aircraft conducting circuit operations using that runway.

1 Eastern Standard Time (EST) was Coordinated Universal Time (UTC) + 10 hours.

2 Runways are named by a number representing the magnetic heading of the runway.

The Sierra and Diamond were observed to line up together on runway 04, about 100 m apart in line astern formation, and then depart simultaneously. The passenger in the Sierra reported that while enroute to Old Bar, the pilot of the Sierra slowed the aircraft down so that they could observe the Diamond engage in 'stunt flying' in the local area.

Upon arrival at Old Bar, the Diamond entered the circuit for, and was observed to land on runway 35. Two other aircraft that had arrived at Old Bar about 20 minutes earlier and also used runway 35 for landing.

When the Sierra arrived at Old Bar, the pilot overflew the airstrip and elected to join the circuit for runway 17. The pilot reported flying a normal left circuit and touching down about 20 ft (6 m) into the runway from the threshold markings. He then performed a touch-and-go³ followed by another circuit for runway 17.

The Sierra pilot decided that, following the second circuit for runway 17, he would conduct a full stop landing. The pilot reported that the second circuit was normal, of similar dimensions to the first, and with a touchdown point also in a similar position. The pilot stated that, after touching down, he became aware that he may not be able to stop the aircraft before the end of the airstrip, and elected to conduct a go-around. After applying power and raising the flaps, the aircraft became airborne toward the end of the runway.

Witnesses described the aircraft's airspeed as being relatively slow and indicated that it was climbing slowly. The aircraft was reported to have continued to climb; however, it impacted a ferris wheel that was located to the south of the airstrip.

Sierra pilot recollection

In a statement to the NSW Police, the pilot reported arriving at the Old Bar Airstrip and conducting a touch-and-go landing to assess the condition of the airstrip and the local conditions. He then flew another circuit before conducting an approach to land. He indicated to the police that he approached at about 60 kts, which he felt was

too fast, and touched down too far into the airstrip as compared to the previous approach.

The pilot elected to conduct a go-around as he felt unable to stop before the end of the airstrip. The pilot recalled that when applying power, the nose of the aircraft pitched up and to the left. He reported realising that he was low but that it was 'within an acceptable range according to aviation standards'.

The pilot advised that at no time during the flight had he seen the ferris wheel.

Pre-flight preparation

The pilot advised the investigation that before leaving Taree Airport, he had consulted the 'Country Airstrip Guide' entry for the Old Bar Airstrip and determined that there were no obstacles in the area around the airstrip and that the runway length was sufficient for the flight. He also indicated that he had checked the NOTAMS and determined that there were no problems in conducting the flight. The pilot did not report accessing any weather information prior to leaving home, and did not contact the caretaker of the airstrip to obtain an assessment of the local conditions or for permission to use the strip.⁴

The pilot then drove to the airport at Taree, helped to get the aircraft out of the hangar and conducted a pre-flight inspection of the aircraft. It then started to rain, and as a result he cancelled the flight and returned the aircraft to the hangar.

The pilot stated that about 20 minutes later, the weather improved and the aircraft was again removed from the hangar. He reported that the aircraft owner indicated that about 80 L of fuel was on board the aircraft.

After loading his passenger, the pilot started the aircraft and taxied to the run-up bay where he carried out his checks⁵ with no abnormalities

3 Practice landing in which the aeroplane touches the runway briefly, before the pilot applies power and lifts off.

4 The *Country Airstrip Guide* entry for Old Bar Heritage airstrip indicated that there were significant obstacles in the area, the runway direction was runway strips 17/35, and that permission was required before using the airstrip.

5 Generally, a high power run-up check is carried out in a piston-engine aircraft to check the aircraft's ignition and other systems before commencing an initial takeoff.

noted. He communicated with the pilots of two other aircraft that were already in the circuit and then entered runway 04 for the takeoff and departure for the Old Bar Airstrip.

Arrival at Old Bar

The pilot reported overflying the Old Bar Airstrip and, after checking the windsock and assessing that there was no wind, electing to enter the downwind leg of the circuit for what he described as 'the southern runway'. When questioned further, the pilot could not identify the strip directions at Old Bar, explaining that it was appropriate to use the terms 'from the north or south' when making circuit entry radio calls.

The pilot indicated that he had planned to conduct a touch-and-go on arrival to assess the condition of the airstrip, and to visually inspect it for any obstructions. He stated that he was using the southern airstrip as this was the one that he had used when operating from Old Bar about 2 weeks previously.

The pilot recalled that the first landing was normal and that touchdown was about 20 ft (6 m) into the runway from the landing threshold markers. He indicated that his airspeed on final was between 50 and 60 kts and that he extended the flaps to the three-quarter down position. He also reported that the only other aircraft in the area was the Diamond aircraft that had travelled across from Taree with the Sierra.

The pilot only realised that the Diamond landed using runway 35 when his own aircraft was on final approach to runway 17 (the reciprocal runway).

The pilot recalled that the aircraft had operated normally, that there were no problems with the strip and that he raised the flaps and applied full power for the takeoff. He reported becoming airborne at about the halfway point on the strip.

The pilot climbed the aircraft to 500 ft and commenced another circuit. He reported that the aircraft was performing 'flawlessly' during this circuit.

The second approach was reported to mimic the first, with no discernable difference between the two approaches. That included the use of the same airspeeds and flap settings. The pilot reported touching down 'in about the same spot

as before', and then applying the brakes for about half of the strip length to slow the aircraft. The brakes operated normally, with no sign of abnormal braking or locking of the brakes as the aircraft slowed down.

The pilot described increasing concern while braking about the high ground speed and that he would not be able to stop the aircraft before the end of the strip. He elected to conduct a go-around and applied full power and raised the flaps before becoming airborne 'a little bit past three-quarters down the runway'.

As the aircraft climbed away, the pilot realised that he was low but was unconcerned as the aircraft was climbing. The pilot reported maintaining the climb attitude and 60 kts until, as he was about to increase the airspeed to 70 kts, 'everything stopped'.

It took some time for the pilot to realise that he had collided with the ferris wheel. The pilot reported that he did not sight the ferris wheel during the overfly and circuit entry, the first circuit and touch-and-go landing, or the second circuit and go-around.

Witnesses recollection

As a result of the beach festival, there were numerous witnesses located in the area around the airstrip. A number of those witnesses were experienced aviators.

The witnesses reported that all of the other aircraft that had arrived at Old Bar that morning had used runway 35 for landing. That included the Diamond aircraft, which was reported to have landed about 5 minutes before the Sierra.

Witnesses who were located on the western side of the airstrip described the Sierra's final landing approach, ground roll and go-around. A number of those witnesses indicated that the aircraft appeared to touch down well into the airstrip, some distance from the landing threshold. Two witnesses reported that the aircraft touched down about halfway down the airstrip.

One of the witnesses indicated 'alarm' at the actions of the pilot when the engine power increased during the go-around. Another reported 'grave concerns' about the aircraft's performance and the actions of the pilot, and giving the aircraft

his full attention. Both of these witnesses had considerable aviation experience.

All of the witnesses reported that the Sierra became airborne almost coincident with the threshold markers at the departure end of runway 17. They also reported that it cleared the wire fence at the end of the airstrip by no more than about 1.5 m and that the aircraft appeared to be travelling very slowly.

None of the witnesses reported hearing any abnormal engine sounds from the aircraft; rather, they all reported that the engine sounded normal. Witnesses commented on the aircraft's continued slow climb in a nose-high attitude and that it missed a number of trees before flying in a straight line into the ferris wheel.

A review of a video that was taken by persons who were on the ferris wheel at the time of the impact, confirmed the lift off point of the Sierra. In addition, the aircraft's recorded flightpath was consistent with that reported by the witnesses.

Injuries to persons

The passenger in the Sierra reported a minor injury as a result of the impact. There were no reported injuries from the pilot of the Sierra or any of the four occupants of the ferris wheel.

The NSW Police received one report of a minor injury from a member of the public. That injury was recorded as being a result of debris that was liberated during the impact of the Sierra with the ferris wheel.

Pilot information

The pilot had 79.5 hours total flight time, of which 51.5 hours were logged in recreational aircraft. Of that time in recreational aircraft, 28.6 hours was dual and 22.9 hours solo. The remaining flight hours were obtained in civil-registered aircraft some 24 years previously.

The pilot was issued with his recreational aviation pilot certificate on 16 May 2011.

The Recreational Aviation Australia (RA-Aus) operations manual indicated that student pilots could only undergo flight training at properly approved training facilities. The pilot had conducted his flight training at Taree, with a number of hours flown with the owner of the Sierra.

A flight crew certificate application form was completed as part of the pilot's flight test and indicated that his flight training was conducted with a specifically-named training facility. A search of the RA-Aus listing of approved flight training facilities that was current at the time of the pilot's certificate application, revealed that no such training facility existed under that name.

Aircraft information

General information

RA-Aus approve certain aircraft for use in ab-initio flight training.⁶ Factory-built recreational aircraft are approved for this purpose. The Cheetah Sierra 200 aircraft was a factory-built, two-seat, single-engine aircraft. The manufacturer of the aircraft was located at Taree Airport.

The aircraft's registration certificate expired on 24 September 2011. Information from RA-Aus indicated that the aircraft's registration was renewed on 30 September 2011. The serial number on the registration certificate did not match the serial number on the aircraft's data plate.

Aircraft examination

An examination of the aircraft following the accident revealed no pre-existing airframe or engine defect that would have precluded normal operations. However, the following manufacturing-related items were noted that had the potential to impact on future operations:

- The use of electrical cable ties to secure fuel lines and connectors within the aircraft (Figure 1). A post-impact fuel leak was identified that resulted from the disconnection of a fuel line at the main tank drain. Electrical cable was routed alongside and connected to a number of fuel lines.

⁶ 'Ab-initio' flight training is defined as training for people with no previous aeronautical experience.

Figure 1: Use of cable ties to connect fuel lines

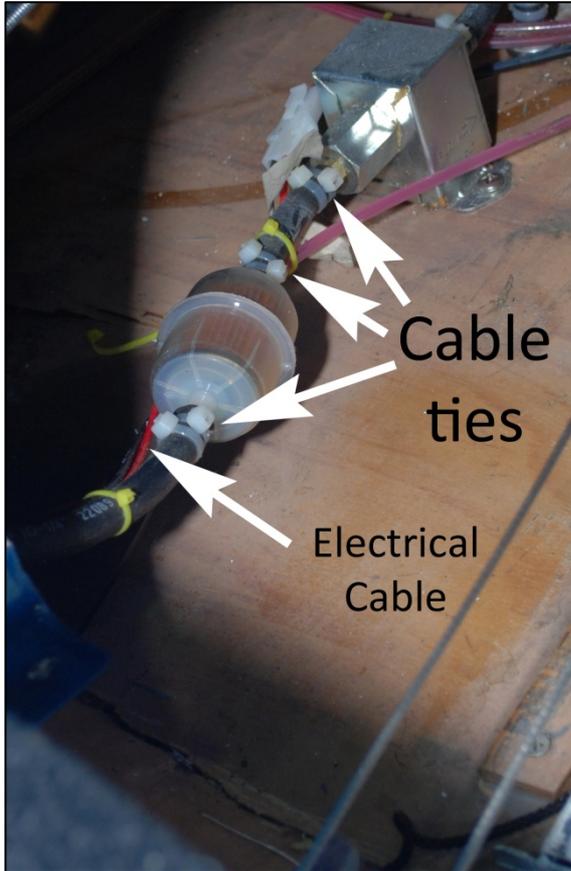
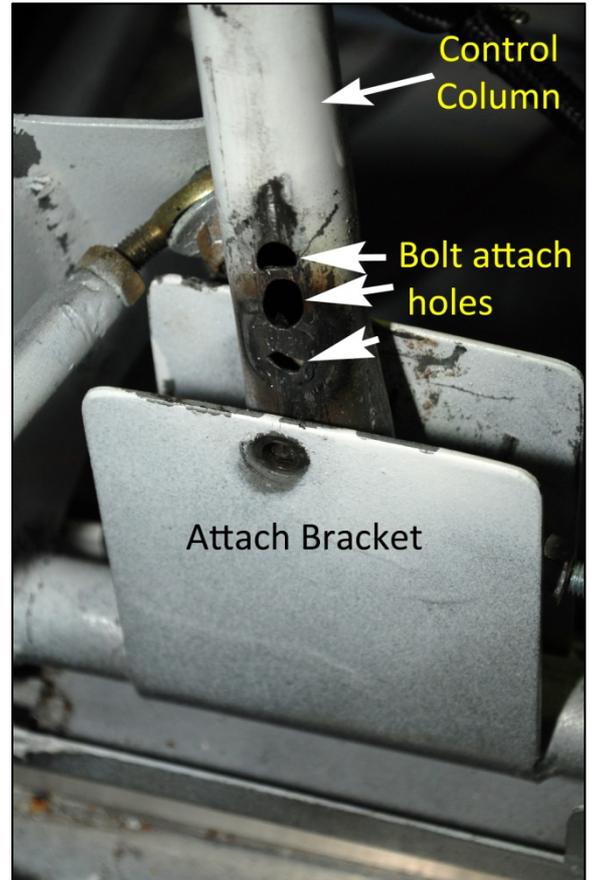


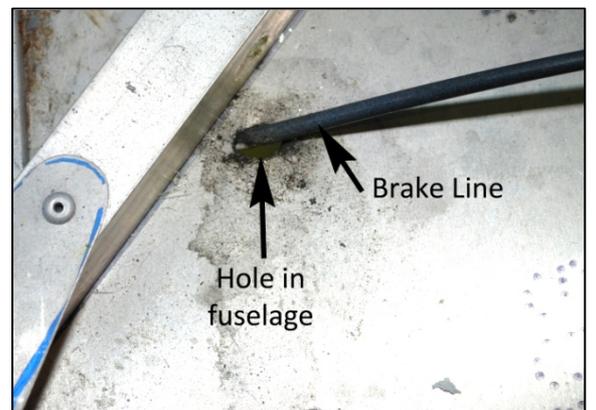
Figure 2: Control column attachment



- The single flight control column showed numerous holes and repairs at the single attachment point to the flight control attachment bracket (Figure 2). There was no evidence of a bushing around the attaching bolt.

- A number of hydraulic brake lines were routed through holes that were drilled in the bottom of the fuselage, with no evidence of grommets being employed to prevent chafing (Figure 3).

Figure 3: Hydraulic brake line routing through fuselage



- A number of tailplane ribs were not aligned with rivet lines (Figure 4).

Figure 4: Tailplane rib construction



Additional manufacturing items of concern included:

- an elastic bungee cord trim system that was routed over a metal structure and exhibited signs of chafing
- numerous apparently unsuccessful attempts to secure wing ribs with rivets
- multiple non-continuous weld repairs to the engine mount.

Meteorological information

There was no local weather station at the Old Bar Airstrip. The closest automatic weather station (AWS) was located at Taree Airport.

Data from the Taree AWS for 1000 that day recorded the wind as being from the north-north-west at 3 kts with gusts of 4 kts. Cloud was reported in the area and rain had been recorded as falling in the previous hour. The

aerodrome forecast (TAF)⁷ for Taree forecast a wind from 340° at 10 kts.

Witnesses at Old Bar reported that the wind at the airstrip during the morning and at the time of the accident was blowing from the north-west and that there were occasional gusts. They also reported that a rain shower had passed through the area about an hour before the accident.

Radio transmission recordings

Recordings of the Sierra pilot's radio transmissions indicated that the Sierra departed Taree runway 04. There were no recorded departure calls from the pilot of the Diamond. The recordings also indicated that both pilots engaged in a conversation regarding the location of each aircraft, which aircraft was going to arrive at Old Bar first, and which runway each pilot intended using at Old Bar for their landing.

Old Bar Airstrip

The Old Bar Airstrip is a heritage-listed airstrip located about 6 NM (11 km) to the south-south-east of Taree. It is orientated in a broadly north-south direction, with runway strip designations of 17/35. Each runway was 540 m long and the surface grass. There was a windsock on the western side of the airstrip and both runway thresholds were marked with gable and cone markers.

Special local procedures for use at Old Bar were published online and in airfield guides. That included advice that the airstrip satisfied the requirements of Civil Aviation Advisory Publication 92-1 (1) - *Guidelines for Aeroplane Landing Areas*, with the exception of the transitional surfaces.

Photographs of the airstrip that were taken on the day of the accident did not reveal any wheel ruts, skid marks or other phenomena that could be associated with the Sierra's landing roll. Following the accident the airstrip was closed by the caretaker.

The local council reported that the airstrip has never been formally surveyed for obstructions. However, a number of trees to the south of the

⁷ Aerodrome Forecasts are a statement of meteorological conditions expected for a specific period of time, in the airspace within a radius of 5 NM (9 km) of the aerodrome.

airstrip that were under the approach path and to the south-eastern side of the airstrip exhibited evidence of pollarding⁸ to ensure that they did not pose a hazard to aircraft operations.

The airstrip is not a public airstrip and prior permission for its use is required from the Old Bar Heritage Airstrip Committee. The caretaker of the strip indicated that the pilot of the Sierra had not sought permission to use the airstrip that day.

Additional information

Beach festival

The Old Bar Beach Festival took place each October long weekend. The sporting fields and parklands surrounding the Old Bar Airstrip were used to accommodate the festival and its activities. As the parks and sporting fields were local council assets, approval for their use was required from the local council. The festival organising committee had sought, and were granted that approval.

The organising committee had arranged for a number of amusement rides to be available for people attending the festival. That included the ferris wheel.

The ferris wheel was of a portable design, which enabled it to be transported from location to location and then assembled on site. Its base was a large flat-bed trailer, with the support structures being incorporated into the base of the trailer.

The main structure of the ferris wheel was about 18 m in diameter and there were 12 individual carriages. Each carriage could accommodate four persons, was fitted with a canopy, and was painted yellow with red trim. The wheel's main structure was painted grey and the base was predominately red. When erected, the height of the ferris wheel (structure and wheel) was reported by the operator as being 20 m.

The same amusement contractor had supplied the rides to the beach festival for the preceding 4 years. It was reported that the ferris wheel was in the same location as it had been for the

previous 3 years. Prior to that, it had been located on the extended runway 35 centreline.

In 2008, after an external risk assessment that was carried out on behalf of the festival organising committee, the ferris wheel was relocated to the east, away from the centreline.

The centre of the ferris wheel was located 34 m to the east of the runway centreline, 161 m from the end of the runway strip (Figure 5).

Figure 5: Location of the ferris wheel relative to the airstrip



Examination of the area between the end of the airstrip and the ferris wheel did not reveal any evidence that the aircraft had contacted any structure or tree prior to impacting the ferris wheel.

Ferris wheel examination

The ferris wheel remained upright following the collision. The aircraft impacted the upper right side of the wheel as viewed from the direction of flight (Figure 6). At the time of impact, the occupants in the ferris wheel were located in two carriages, one below and one to the left of the aircraft impact.

The aircraft became entangled in the wheel structure and took considerable effort to remove. The aircraft was reportedly leaking fuel following the impact and firefighting foam was deployed by emergency services to minimise the risk of fire.

⁸ Pollarding is the process of removing the top of a tree, thereby promoting further branch growth at lower levels on the trunk.

The impact moved the base of the ferris wheel about 75 cm. The operator of the wheel reported that nearly all of the wheel's structure was damaged or bent by the collision.

Figure 6: Aircraft wreckage and ferris wheel following the collision - looking toward aircraft's direction of travel



Further investigation

The investigation is continuing and will include the:

- examination and assessment of the conduct of the pilot's training and issue of the pilot's certificate
- assessment of the ergonomics of the Sierra cockpit, including the control locations and indicators as they might have contributed to the development of the accident
- analysis of witness statements and conduct of further interviews
- assessment of the festival activities and supporting risk assessments
- assessment of the council approval processes for the festival
- examination of the aviation activities associated with the festival.