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Australian Transport Safety Bureau

Collision with ferris wheel involving Cheetah Sierra 200, 24-7634

near Old Bar, NSW | 1 October 2011

Investigation

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Addendum

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Safety summary

What happened

On 1 October 2011, the pilot of a Morgan Aero Works Cheetah Sierra 200 aircraft (Sierra), registered 24-7634, was attempting to land at the Old Bar Airstrip after conducting a private flight from Taree Airport, New South Wales.

The pilot commenced a go-around after touching down. During the climb out the aircraft collided with a ferris wheel that was part of a group of amusements located at a beach festival, adjacent and to the south of the airstrip.

There were two persons on board the Sierra and four occupants of the ferris wheel at the time of the collision. There were no reported injuries from the occupants of the ferris wheel, and the passenger in the Sierra reported receiving a minor injury.

What the ATSB found

The ATSB found that the management of risk in relation to flight training operations by Recreational Aviation Australia Incorporated (RA-Aus) was adequate; however, it had been circumvented in a number of areas during the training of the pilot. That resulted in a pilot operating in the aviation environment who did not possess the required competencies to exercise the privileges of a private pilot certificate.

The ATSB also found that the approach to the management of risk by the Old Bar Beach Festival Committee, specifically relating to aviation operations at the beach festival, was ineffective and resulted in a level of risk that had the potential to impact on the objectives of the festival.

What's been done as a result

RA-Aus have taken steps to ensure that the flight training facility that undertook the pilot's training and its staff are aware of the requirements imposed upon them by the RA-Aus Operations Manual, and that RA-Aus staff at the facility have the required skills and knowledge to carry out flight training operations. The pilot underwent a flight review that established the need for additional training.

The festival and airstrip committees reported that in future the airstrip will be closed and aviation operations suspended when the festival is taking place.

Safety message

The management of risk in aviation requires diligence and structure to be effective. In particular, when aviation activities are part of a public event the supporting procedures, processes and guidelines need to be carefully developed and applied to manage risk to those choosing to participate in the aviation environment and to others external to the aviation activity.

Contents

The occurrence

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

The reported purpose of the flight was to position the aircraft at the airstrip for a static display. This was at the request of the aircraft manufacturer. The display was associated with the Old Bar Beach Festival. The Old Bar Beach Festival was located in an area that surrounded and included the Old Bar Airstrip.

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

Another aircraft, a Morgan Aero Works Super Diamond Twister (Diamond), registered 19-7344, was to accompany the Sierra during its flight to Old Bar. At the time of departure from Taree, runway 22 was in operation and there were two aircraft conducting circuit operations using that runway. The Sierra and Diamond aircraft were observed to line up together on runway 04, approximately 100 m apart in line astern formation, and then depart simultaneously. The passenger in the Sierra reported that while en route to Old Bar, the pilot slowed the aircraft down so that they could observe the Diamond engage in 'stunt flying' in the local area.

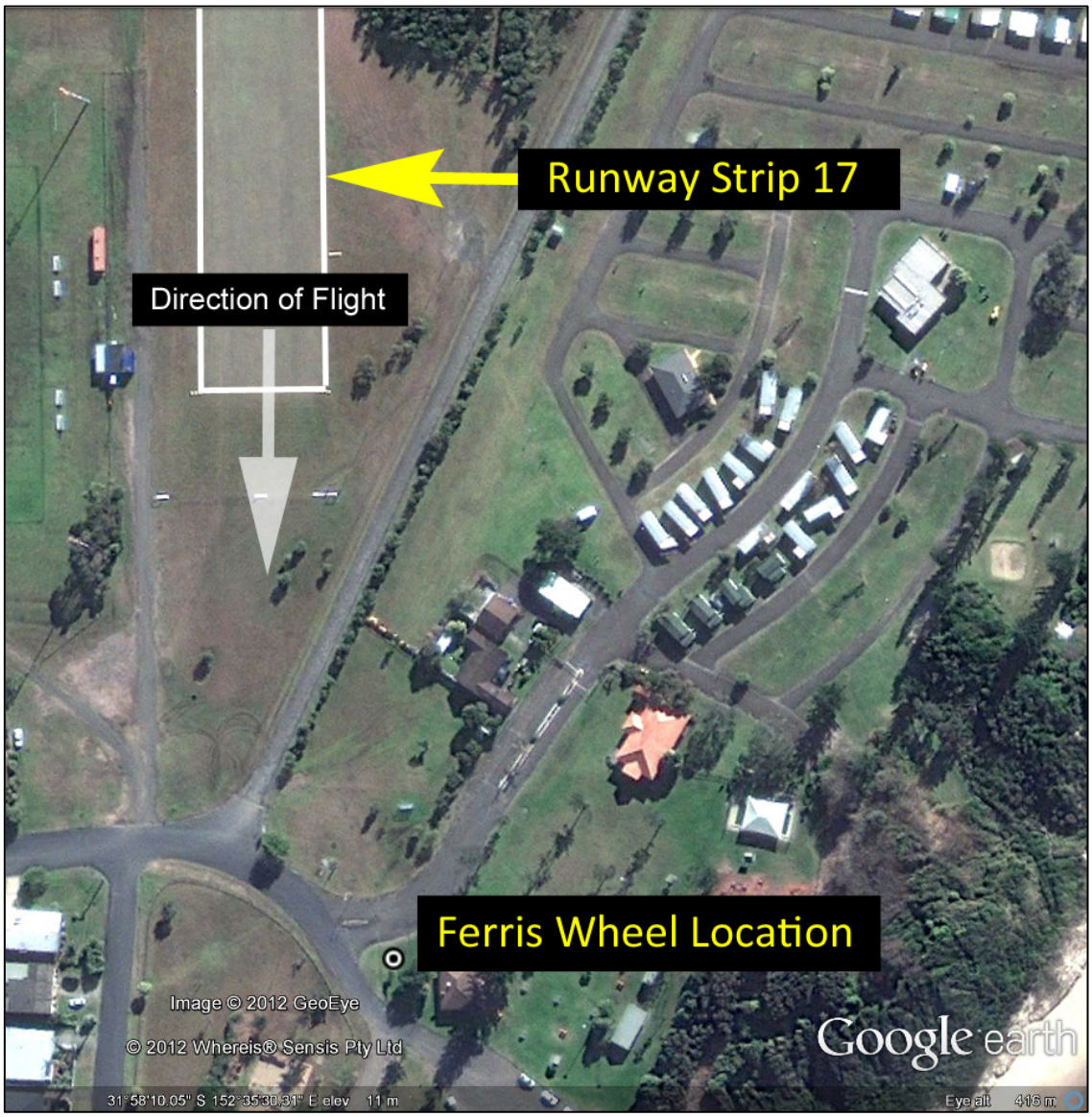
Upon arrival at Old Bar, the Diamond entered the circuit and landed on runway 35. There were a number of other aircraft at the airstrip that had arrived that morning and the pilots of those aircraft had also elected to use runway 35 for landing.

When the Sierra arrived at Old Bar, the pilot overflew the airstrip and elected to join the circuit for runway 17. The pilot flew a standard left circuit and reported touching down approximately 6 m (20 ft) beyond the runway threshold markings. He then performed a touch-and-go landing prior to conducting another circuit for runway 17. The Sierra pilot indicated that he conducted the touch-and-go because he wanted to assess the airstrip's surface conditions following the rain showers and to ascertain the location of any obstructions. The pilot decided that following the second circuit for runway 17, he would make a full stop landing.

The pilot of the Sierra reported that the second circuit was normal, similar in dimensions to the first, and with a similar touchdown point. After touching down, the pilot became aware that he may not be able to stop the aircraft before the end of the airstrip and elected to go around. After raising the flaps and applying power the aircraft became airborne toward the end of the runway. Witnesses described the aircraft's airspeed as being relatively slow and that it was climbing slowly. The aircraft diverged to the left from the runway centre-line and continued to climb; however, it impacted a ferris wheel amusement ride. The centre of the ferris wheel was located 161 m south of the end of runway 17 and 34 m to the left of the extended runway centre-line (Figure 1). The ground at that location was about 2.5 m lower than the elevation of the airstrip.

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

Figure 1: Location of the ferris wheel in relation to the runway strip



Source: Google Earth and ATSB

The passenger in the Sierra reported receiving a minor injury as a result of the impact. There were no reported injuries from either the pilot or the occupants of the ferris wheel. The NSW Police received one report of a minor injury from a member of the public as a result of debris that was liberated during the Sierra's impact with the ferris wheel. The aircraft was substantially damaged.

Context

Pilot information

The pilot of the Sierra held a Civil Aviation Authority[2] student pilot licence that was issued in 1987, and had logged a total of 27.9 hours—22.1 dual and 5.8 solo—while undergoing training for the issue of a private pilot licence (PPL). Due to personal reasons the pilot discontinued training in 1988, and did not attain a PPL.

In March 2011, the pilot commenced training for the issue of a Recreational Aviation Australia Incorporated (RA-Aus) pilot certificate.[3] Examination of the pilot's logbook indicated that before commencing RA-Aus training, the pilot had not undergone an assessment to determine the level of aviation knowledge and skill retained since operating an aircraft 23 years prior.

The pilot underwent a flight test for the issue of his recreational pilot certificate on 16 May 2011. His logbook indicated that he had logged 38.6 hours dual and 10.2 hours solo at that time. The application for the issue of his pilot certificate recorded that he had 34.8 hours dual and 14.1 hours solo.

The pilot underwent training in cross-country flight procedures and was issued with those privileges on 25 July 2011. At that time his logbook indicated that he had logged 50.7 hours dual and 20.4 hours solo. No documentation relating to the issue of his cross-country or his passenger-carrying privileges could be identified by the Australian Transport Safety Bureau (ATSB).

At the time of the accident the pilot's logbook included an additional 8.3 solo hours and a total flight time of 79.4 hours.

The pilot had completed a medical declaration for both his student and pilot certificates.

Pre-flight preparation

The pilot indicated that prior to leaving home for Taree Airport he checked the NOTAMs[4] and consulted the *Country Airstrip Guide*[5] entry for Old Bar and determined that there were no operating limitations that would preclude the flight. The pilot indicated that he ascertained there were no obstructions listed on the Old Bar entry in the guide,[6] and that there was nothing that would affect the conduct of the flight.

The airstrip guide listing for Old Bar stated that 'Old Bar Heritage Airstrip Management Committee manage this airstrip - approval is required'. It further stated that:

> Pilots using the airstrip do so entirely at their own risk and must personally ensure the airstrip is suitable for their operation. To request approval to use and to check airstrip status contact [contact details removed].

The pilot advised that he did not contact anyone at Old Bar to obtain a report of the strip and local conditions, or to obtain permission to operate there.

Despite reviewing the *Country Airstrip Guide*, the pilot reported that he forgot the runway directions by the time he arrived at the airport. The pilot sought the advice of others at Taree Airport on what he should do upon arrival at Old Bar in relation to including the runway direction in

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2 Aviation regulatory body that preceded the Civil Aviation Safety Authority.

3 RA-Aus does not issue licences; rather they issue pilot certificates.

4 A Notice To Airmen advises personnel concerned with flight operations of information concerning the establishment, condition or change in any aeronautical facility, service, procedure, or hazard, the timely knowledge of which is essential to safe flight.

5 The *Country Airstrip Guide* was a commercial publication that listed the details of many airstrips in Australia.

6 The airstrip guide entry for Old Bar listed a number of obstructions to operations at the airstrip, including fences and lighting posts.

any radio call. The advice to the pilot was that because traffic levels were likely to be low, he should indicate his intended landing direction in his initial radio call at Old Bar.

The pilot reported that after arriving at Taree Airport, he conducted a pre-flight inspection of the aircraft. That inspection did not include visually checking the fuel quantity or quality, as the aircraft had already been refuelled by the owner, who advised the pilot that those checks were completed. The pilot reported determining the quantity of fuel on board by the indications on the aircraft's fuel gauge. It then commenced to rain and the decision was made to cancel the flight. The aircraft was returned to the hangar.

Approximately 20 minutes later the rain cleared and the decision was made that the flight would go ahead. The pilot reported conducting minor checks only after the aircraft was removed from the hangar.

Pilot's recollection of the flight

After seating his passenger, the pilot started the aircraft and taxied to the run-up bay where he carried out his checks with no abnormalities being reported. After making radio contact with the pilot of another aircraft that was conducting circuits on runway 22, he lined up on runway 04 and departed in that runway direction. The pilot conducted a left circuit from that runway and set course from the downwind leg for Old Bar. He reported that he initially climbed to 1,000 ft above mean sea level (AMSL) and climbed to 1,500 ft as he approached Old Bar.

Upon arrival at Old Bar, the pilot overflew the strip and manoeuvred the aircraft so that the windsock was visible from the left side of the aircraft. He reported that there was no indication of the wind direction, so he elected to join a left circuit for runway 17, as that was the runway that he had used on all the other occasions when he had flown into the strip. The pilot recalled that the position of the Diamond aircraft that departed Taree at the same time was not known until he was established on final approach to runway 17.[7]

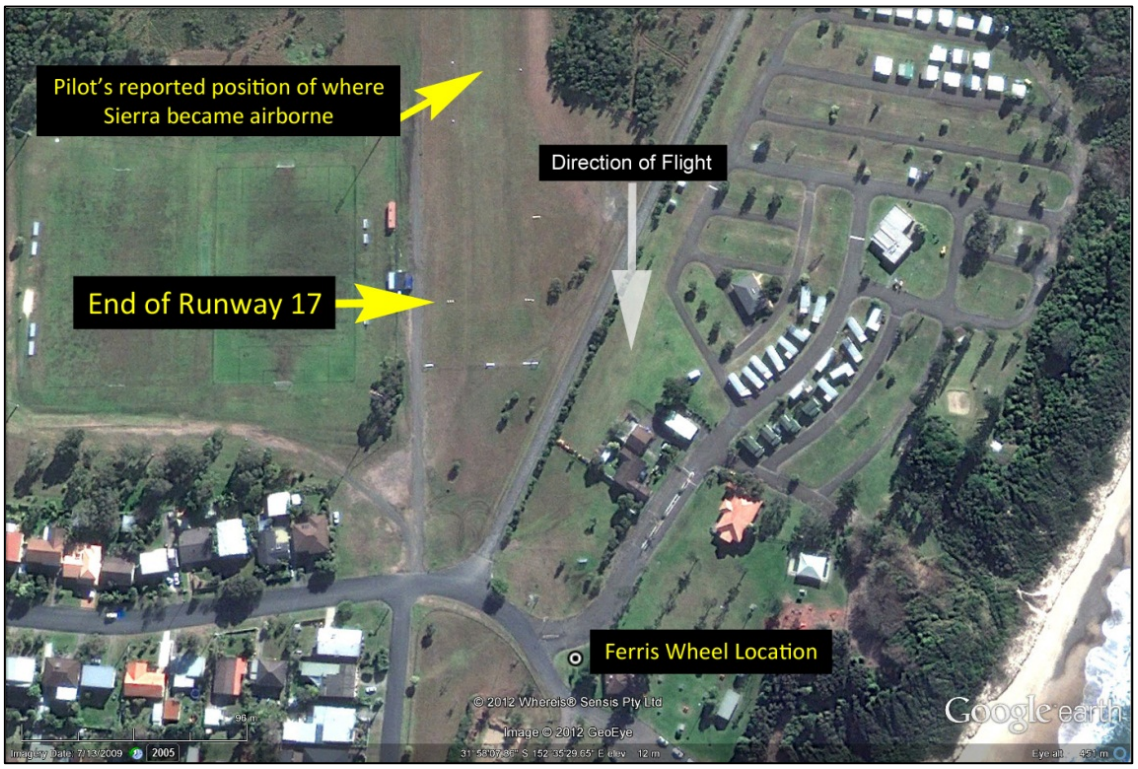
Recordings of radio transmissions indicated that the pilots of the Sierra and Diamond aircraft had discussed which runway each pilot was going to use prior to their arrival at Old Bar.

The Sierra pilot reported flying a normal circuit and touching down about 6 m from the threshold markers on runway 17. He raised the flaps and applied full power for a touch-and-go in order to check the condition of the strip and to make sure that there were no obstructions on or around the strip. The pilot reported that the second circuit was similar to the first, with the turn onto base and aircraft configuration being consistent: namely, flaps lowered to three quarter down and airspeed between 50 and 60 kt. He indicated that he touched down in nearly the same spot as previously, and described both circuits as being virtually the same. The pilot reported that at no time during the overfly or the first or second circuits did he see the ferris wheel to the south of the airstrip.

After touching down, the pilot was under the impression that he was travelling too fast to stop before the end of the runway, despite applying the brakes, and he decided to conduct a go-around. He reported that while applying the brakes, the response felt 'normal' and they did not appear to be sluggish or spongy in any way. He added that there was no indication of any slipping or skidding of the aircraft while on the runway. He raised the flaps and applied full power and reported becoming airborne before he reached the beginning of the aircraft parking area located to the east of the strip (Figure 2). The pilot then commenced a climb and maintained a reported airspeed of 60 kt. The next thing he was aware of was a loud 'bang' and then everything stopped. He indicated that it took some time for him to comprehend that he had collided with the ferris wheel.

[7] The pilot of the Diamond aircraft had elected to land on runway 35 as the windsock was hanging on the southern side of the pole.

Figure 2: Pilot's reported lift-off position



Source: Google Earth and ATSB

Pilot's recall of events to other parties

The pilot was interviewed by the NSW Police after the accident. In that interview the pilot stated that, on the second approach, he had been too fast at 60 kt and landed too far along the runway.

The pilot indicated to the aircraft owner that he was a little high on the second approach and had been flying at 60 kt on final. He confirmed that he used three quarter flap for the approach and indicated that he touched down on the runway about halfway down its length.

The passenger reported that the pilot became aware that the airspeed was too high for the approach and landing just prior to touching down from the second approach.

Pilot's 72-hour history

The pilot reported that he had slept normally on the three nights before the accident and there were no pre-existing personal issues that would have distracted him. He reported that he did not eat breakfast on the morning of the flight and only had a cup of coffee prior to leaving for the airport. His last reported food intake was approximately 13 hours prior to the accident.

Pilot's flight training

Recreational Aviation Australia requirements

RA-Aus administered recreational aviation activities under a number of specific exemptions to civil aviation legislation. As part of this arrangement for self-administration of recreational aviation, RA-Aus had to assure the Civil Aviation Safety Authority (CASA) that the activities they administered could be undertaken safely. RA-Aus were required to perform to a specific set of standards, which provided CASA with the confidence that there was appropriate oversight and management of risk. Those standards were established to:[8]

[8] Civil Aviation Safety Authority (2010), Sport Aviation Self-Administration Handbook, p.16.

> Provide the sport aviation industry with an oversight regime that instils confidence in its ability to provide a safe environment for participants, as well as other airspace users, and the general public.

As part of that framework, RA-Aus produced a CASA-accepted Operations Manual to outline their requirements in a number of operational areas. One of which was the training of pilots for a RA-Aus pilot certificate.

Flight training facility

The operations manual required that persons undergoing training for the issue of a pilot certificate could only do so at 'properly approved Flight Training Facilities'.[9] The flight training facility (FTF) at Taree at which the pilot underwent his training was reported to have been established as a temporary facility of another training facility located in Sydney. The Sydney facility already had another satellite facility at Wollongong.

If the chief flying instructor (CFI) wished to operate another facility, they were able to do so, either as a satellite flight training facility (SFTF) or a temporary satellite flight training facility (TSFTF). While the operations manual was specific on what was required to establish a FTF or a SFTF, there were no specific instructions on the process to follow for the approval of a TSFTF.

The purpose of a TSFTF was outlined in the operations manual as 'training a recreational aircraft owner to fly their own aeroplane, from their own property/airfields'.

The operations manual also indicated that operations at a TSFTF could not exceed one period of 10 continuous days in a calendar month. RA-Aus reported that this requirement was introduced so that instructors associated with the TSFTF, who were probably engaged in training at other facilities, would not be subject to excessive work days without a day off. The CFI and instructors at the Taree TSFTF reported interpreting this requirement to mean that they could operate a TSFTF permanently, as long as they did not work more than 9 days in a row.

RA-Aus included a list of flight training facilities on its website to assist persons, wishing to undertake flying training in recreational aircraft, to contact a training facility. The list that was current at the time of the pilot's certificate issue only listed one training facility at Taree. That facility was not the one that was being operated as a TSFTF by the CFI.

The permanent FTF in Sydney had undergone a routine audit by RA-Aus in March 2010 and as part of that audit the locations where other training had taken place was raised. The CFI indicated to the auditor that training had been undertaken at Taree. When asked if this facility had been inspected, the CFI indicated to the auditor that it had not. He regarded it as only a temporary facility due to the small amount of training that had been done there. The auditor reported that he discussed the different levels of training facilities with the CFI and at the end of the audit, the CFI indicated that training at Taree was not likely to continue. The CFI indicated later that no such discussion took place.

RA-Aus reported that it had not completed an audit of the Taree facility. In addition, it was reported that there was no documentation relating to the establishment or approval of the TSFTF at Taree prior to the accident.

The ATSB reviewed all of the audits conducted by RA-Aus on the permanent FTF in Sydney. A repeated finding from the audits related to problems with student records; specifically, a lack of detailed student progress entries.

The instructor who was based at Taree reported that the TSFTF had been operating for about 2 years. The CFI indicated that it had been operating for at least 2 years, as he had been there for at least two Christmas periods.

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[9] RA-Aus Operations Manual – Section 3.01 p. 1. RA-Aus use the term '*flight training facility'* to describe a place where a person undergoes training for a pilot certificate. They indicate that they use this term to differentiate it from *'flying school'*, which is the term used in General Aviation.

Immediately following the accident, the CFI wrote to RA-Aus indicating that he would like to '...start procedures to formalize the satellite school at Taree'. The email also indicated that he sought approval to operate a facility at Taree.

RA-Aus issued an operations bulletin[10] to all flight training facilities in September 2009 following a series of audits that determined that the standards of operational administration and conduct at SFTFs[11] were well below standard. The bulletin indicated that the applicable standards were contained in the operations manual and were not arduous to follow and must be complied with.

Staff and facilities

The facility at Taree was reported to be staffed by the CFI and two senior instructors. One of the senior instructors lived in Taree and the other some distance from Taree. The senior instructor involved in the training of the Sierra pilot had only had his senior rating for 10 months at the time of the accident. The CFI was primarily involved in operating his own flying school in Sydney and reported that he visited the school at Taree every second weekend.

One of the senior instructors indicated that there were only three or four students who had either completed their training at the school or were still under training. Information from another source indicated that there were up to 12 students at the school.

The RA-Aus operations manual required an SFTF to have the same facilities in terms of supporting documentation, classrooms and teaching equipment as a permanent facility. A TSFTF did not have to meet those requirements; however, it did have to provide adequate facilities to conduct briefings. Prior to the accident the facility at Taree did not have an established classroom and the CFI indicated that the only available briefing areas were the office and lunchroom areas associated with the manufacturing facility in the same hangar.

Pilot training records

RA-Aus provided a document titled *Recreational Aviation Australia Inc - Generic Student Progress Booklet* to FTFs to assist them with record keeping. Those records were consistent with the requirements of the operations manual training syllabus. The records were not mandatory; however, they indicated the minimum level of record keeping that RA-Aus expected from an FTF. If an FTF had created more comprehensive records, then those records were able to be used.

The generic RA-Aus records consisted of a section to summarise the training and a number of further expanded sections on each flight lesson where instructors were able to provide qualitative comments on a student's performance. Those sections also recorded student and instructor signatures to certify competency in various tasks, and were meant to be reviewed prior to solo flight operations and attempting the pilot certificate flight test.

The Sierra pilot's training file consisted of the first section[12] of the progress booklet only. The CFI reported that he completed those pages on the day of the pilot's certificate test based on notes from the instructors who had flown with the pilot. The CFI reported that the facility at Taree had been 'cleaned up' and the notes were no longer available.

A summary page was meant to record the competency level of the student after each particular flight according to a code at the bottom of the page (for further information on these codes refer to the section titled *Recreational aviation training syllabus* later in this report). These codes were further expanded in the introduction to the records and the RA-Aus operations manual. A review of the Sierra pilot's summary page revealed that the CFI had not used the codes and had instead placed a 'tick' against each manoeuvre and task that had been conducted during the flight lesson.

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[10] An Operations Bulletin was a document issued by the RA-Aus Operations Manager that contained information relevant to flight operations and was distributed to all RA-Aus flight training facilities. Such bulletins formed part of the RA-Aus operations manual until their contents were included in the manual.

[11] The Operations Bulletin included TSFTFs in its discussion about the standards and conduct found during the audits.

[12] There were a total of 25 pages in the flight training records. The first six pages contained administrative records, and a summary of flights undertaken. The records obtained by the ATSB consisted of the first six pages only.

There were no recorded objective comments in the training records that provided a qualitative assessment of the student's performance, decision making abilities or competency achieved during training.

The CFI reported that he only used part of the training progress sheets to record the pilot's training as the pilot had previous experience in general aviation (GA), and under the requirements of the RA-Aus operations manual, the pilot only had to do a minimum of 5 hours training. The other instructor that was primarily involved in the pilot's training appeared unfamiliar with the generic training records and their use.

RA-Aus operations staff indicated that when a student sat for a theory examination in accordance with the operations manual, they were to complete an answer sheet for assessment and marking. The pass mark for each written exam was 80 per cent and it was expected that students would be verbally quizzed on any incorrect answers, to achieve a final mark of 100 per cent. The answer sheet was then expected by RA-Aus to form part of the student's training records.

The CFI reported that the pilot had completed written exams in basic aeronautical knowledge, human factors, radio procedures and air legislation. He indicated that he did not ask the student to complete a pre-solo *'*rules of the air*'* examination, as he had completed one 23 years previously when he started his GA pilot training. When asked for the pilot's answer sheets for each examination, the CFI reported that they were destroyed following the exams. RA-Aus operations staff reported that they expected FTFs to process the exams following the procedure described in the preceding paragraph.

Instructor's and CFI's recollection of the pilot's performance

The senior instructor who conducted the majority of the pilot's training reported that when they flew into the Old Bar Airstrip as part of the pilot's training, the importance of speed control was emphasised to the pilot. The instructor indicated that, due to the length of the strip, the only type of approach that he would expect a pilot to conduct there was a short field approach. The instructor reported that the pilot had not been confident when flying into Old Bar due to the trees located at the northern end of the strip.[13] The instructor did not identify any other issues during the pilot's training.

The senior instructor also reported that following the accident, the pilot discussed the accident with him and indicated that he was not comfortable flying the aircraft at low airspeeds. Another person also indicated that following the accident, the pilot had expressed being uncomfortable flying at low airspeeds.

The instructor reported that the pilot prepared well for flights, particularly cross-country flights. He indicated that, during the early stages of the pilot's cross-country training, he had to conduct a number of briefings on procedures following the flights, and that 'nothing else really stood out' as a problem for the pilot.

The CFI stated that the only problem he could recall on the pilot's certificate test was the circuit entry procedure. He indicated that during the pilot's training flights the only thing that he could recall the pilot having difficulty with was that he entered the circuit too high on the crosswind leg.

Pilot's training deficiencies identified during the investigation[14]

The pilot was unable to tell investigators what fuel type was used in the Sierra and how to determine the aircraft's loading. In this respect, he stated that he had flown the aircraft numerous times with two persons on board and full fuel and had no problems.

The need by the pilot to ask people for advice on what to do in relation to runway direction and the radio call on arrival at Old Bar suggested a limited knowledge of the procedures for application at

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[13] The trees at the northern end of the strip were low coastal shrub trees, estimated to be about 7 m high and located about 150 m from the threshold of the runway.

[14] These deficiencies relate to items within the RA-Aus-approved syllabus of training contained in the Operations Manual.

uncontrolled aerodromes. When asked to describe how to perform a short field take-off in the Sierra, the pilot reported that it would be appropriate to use full flaps to conduct that procedure in the Sierra. This contrasted with known short field take-off configurations in other aeroplane types, which included less than full flap. The pilot was unable to indicate specific power settings for various stages of flight.

Finally, as the pilot reported that he conducted the first touch-and-go landing at Old Bar in order to assess the conditions of the strip and to inspect for any obstructions, the pilot was asked if he had been trained to use a procedure known as a 'precautionary search and landing' during his RA-Aus training. This procedure has application when a pilot inspects an unprepared landing area, disused airfield or other airstrip from the air for suitability of use and the presence of obstructions, prior to an approach and landing. The flight training syllabus contained in the RA-Aus operations manual required that pilots be taught this procedure. The pilot indicated that he was not familiar with the precautionary search and landing and had not undergone any training in its application.

The pilot's RA-Aus pilot certificate was suspended following the accident and he was required to undergo a flight review with a RA-Aus examiner. The results of that review revealed that while his manipulative ability was of an appropriate standard, there were areas of his situational awareness, decision making abilities and weather interpretation that were not up to the required competency standard. The flight review also confirmed his lack of training in the required syllabus item of precautionary search and landing. The pilot was required to undergo additional training following the review before he could again exercise the privileges of the pilot certificate.

Aircraft information

Certificate of type acceptance

The Cheetah Sierra 200 aircraft (Sierra) was being operated under the auspices of RA-Aus and was exempted from certain provisions contained in the Civil Aviation Regulations 1988 (CAR). In order to meet those exemptions, the aircraft had to satisfy a number of requirements laid down in the Civil Aviation Orders (CAO). This included that a 'Type Certificate'[15] or a 'Certificate of Type Acceptance' issued by a National Airworthiness Authority (NAA)[16] was in force for the particular aircraft type.

As the Sierra was manufactured in Australia, CASA was the designated NAA. CASA advised that no 'Type Certificate' or 'Certificate of Type Acceptance' for the Sierra series of aircraft had been issued at the time of the accident.

In September 2010, the incumbent RA-Aus technical manager issued the Sierra series of aircraft with a Certificate of Type Acceptance, which was issued on the basis of the aircraft complying with CAO 95.55 paragraph 1.6.[17] The RA-Aus certificate indicated that its acceptance was based on data and continuing support guarantees supplied by a particular company. That company was not the Australian manufacturer of the aircraft, being a recreational aircraft manufacturer who produced high wing aircraft only, was based in the northern hemisphere and had no affiliation with the Australian manufacturer. The ATSB was unable to determine why the overseas manufacturer was referenced on the Sierra Certificate of Type Acceptance.

The ATSB obtained a number of other RA-Aus-issued certificates of type acceptance for recreational aircraft that had been appropriately issued to correctly type certificated aircraft.

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15 A Type Certificate is a document issued by a National Airworthiness Authority stating that a particular manufactured aircraft meets an applicable standard and authorises the manufacturer to offer the aircraft for sale.

16 NAAs are government statutory authorities in each country that are responsible for the certification of aircraft as part of their duties. For example, in Australia the Civil Aviation Safety Authority is the NAA, in the United States the Federal Aviation Administration is the NAA, and so on.

17 CAO 95.55 paragraph 1.6 was the applicable reference when the Certificate of Type Acceptance was issued. CAO 95.55 was redrafted in April 2011.

Following the accident, RA-Aus advised the ATSB that the 'Certificate of Type Acceptance' that was issued to the Sierra manufacturer was invalid and had been rescinded due to a number of issues.

Aircraft registration

When the aircraft was first registered in September 2010 the manufacturer had applied for registration under the auspices of RA-Aus in accordance with the requirements of Civil Aviation Order 95.55 paragraph 1.6. The RA-Aus Technical Manual[18] outlined the procedures to be followed for aircraft registration. The manual required a number of documents to be submitted with the application otherwise the aircraft could not be registered. These included photographs of the aircraft, a weight and balance data sheet and, for factory-built aircraft, a copy of the flight test report for the applicable aircraft.

The aircraft manufacturer reported that no flight test report had been completed when the aircraft was first test-flown following manufacture. In addition, only a partially completed registration application form for the Sierra was on the RA-Aus aircraft file. Although required by the technical manual, none of the required supporting documentation was affixed to the file. The incumbent RA-Aus Technical Manager had approved the aircraft for full registration under the RA-Aus 24-prefix, which was appropriate to factory built aircraft and allowed it to be used for flight training. However, as the Sierra aircraft did not have a type certificate or certificate of type acceptance issued by CASA, it was not eligible to be registered by RA-Aus under the 24-prefix.

Examination of the aircraft registration label revealed that the details for the occurrence aircraft serial number did not match those on the aircraft data plate. The application form completed by the manufacturer when applying for registration did not correctly indicate the serial number as stamped on the data plate and affixed to the airframe. The RA-Aus administration section had also incorrectly transcribed one figure when completing the label. That label was affixed to the aircraft in September 2010 and the incorrect serial number and a transcription error had gone undetected by the aircraft owner since that time.

Following the accident, RA-Aus advised that all 24-prefix Sierra aircraft were deregistered and re-registered under the 19-prefix, which was appropriate to amateur built aircraft. Such aircraft cannot be used for flight training.

Aircraft owner's handbook

The aircraft manufacturer advised that the aircraft was constructed to the standards required in *British Civil Airworthiness Requirements – Section S – Small Light Aeroplanes*. Sections 1581 to 1585 of those standards outlined the information that must be provided in the pilot's operating handbook (POH) for the aircraft. That included information relating to the weight and balance of the aircraft, as well as the operating procedures required to achieve the take-off and landing distances and speeds.

Examination of the 'Owner's handbook' found in the aircraft revealed no information that would allow a pilot to calculate the aircraft's weight and balance. In addition there was no information provided on how to perform a short field take-off or short field approach and landing or any information on landing distances.

The manufacturer reported that for a short field approach he expected the aircraft to be flown at 50 kt with full flap. The normal approach was to be flown at 55-60 kt with whatever flap setting the pilot deemed necessary. A search of internet forums revealed that the aircraft manufacturer had replied to a question on the subject of landing distance and indicated that the aircraft required

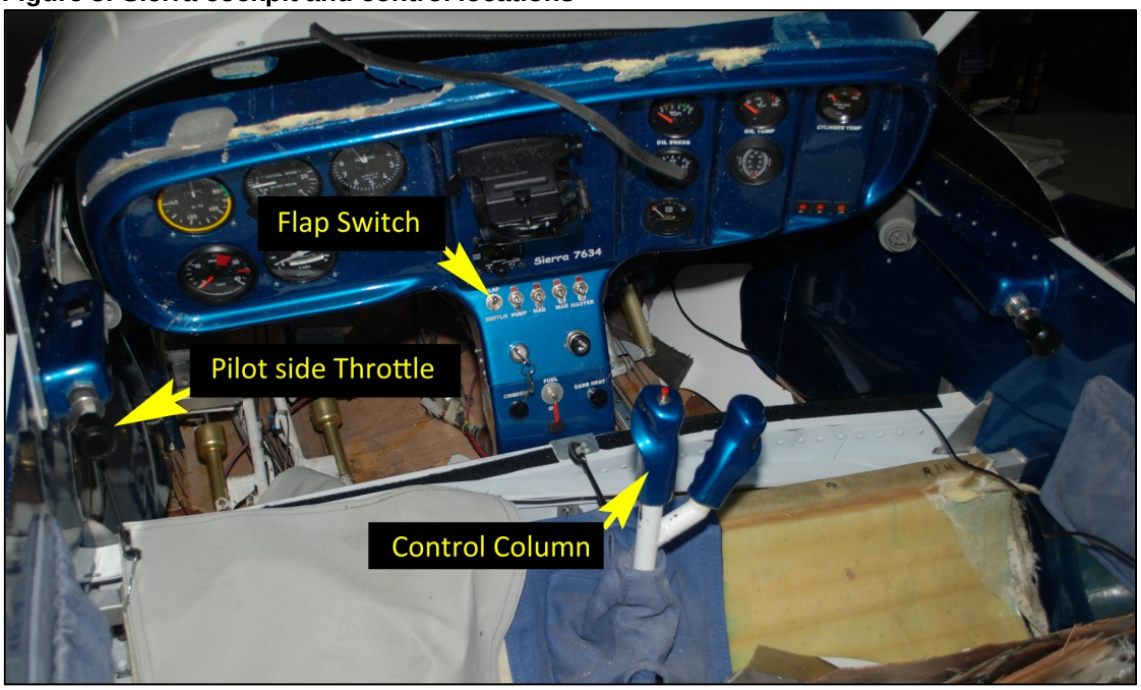
[18] The RA-Aus Technical Manual is produced to provide guidance on the registration, maintenance and associated activities in relation to recreational aviation aircraft. It is the companion manual to the RA-Aus Operations Manual and is provided to all members of RA-Aus.

350 m to land when approaching over a 50 ft obstruction. During the investigation the manufacturer confirmed that these figures were correct.

Cockpit and control layout

The cockpit of the Sierra was configured for two persons, a pilot and passenger. The pilot occupied the left seat. There was one control column that was located between the two seats and duplicated throttles. The flap control switch was located on the centre control panel of the aircraft (Figure 3).

Figure 3: Sierra cockpit and control locations



Source: ATSB

A pilot flying the Sierra from the left seat would place their right hand on the control column, and operate the throttle with their left hand. When conducting a touch-and-go landing, a pilot would keep their right hand on the control column, and operate the flap switch with their left hand. Once the flaps had been raised, they would then open the throttle using their left hand. The pilot confirmed that this was the procedure that he used when conducting the go-around at Old Bar.

Searches of internet forums related to the building of the Sierra aircraft revealed that many owners/builders moved the flap switch to a position on the control column. The manufacturer of the Sierra reported that when the aircraft was rebuilt following the accident, the flap switch was relocated to a position directly above the left throttle.

Weight and balance

The weight of the aircraft prior to its departure from Taree was calculated using the recorded empty weight of the aircraft,[19] the reported weights of the pilot and passenger, the weight of the equipment that was reported on board and a fuel weight from the reported 80 L of fuel on board. Using these figures the calculated weight of the aircraft was 2 kg above the maximum take-off weight of 544 kg.

There were no loading instructions in the owner's handbook. As a result, the position of the aircraft's centre of gravity during the flight could not be calculated.

[19] The actual empty weight was found following an examination of the aircraft maintenance logbook.

Aircraft manufacturing

Post-accident examination of the aircraft found no pre-existing airframe or engine defects that would have precluded normal operations. There were, however, a number of manufacturing-related items that had the potential to impact on future operations.

Many of those items related to the construction methods used in the manufacture of the aircraft. When those items were compared to acceptable practices[20] used in the aviation maintenance and manufacturing industry, many were deficient.

Civil Aviation Safety Authority audit

During a routine scheduled audit of RA-Aus in November 2011, CASA discovered inconsistencies with the issue by RA-Aus of recreational aircraft certification documents, specifically light sport aviation (LSA)[21] aircraft. The audit found that a number of aircraft had been incorrectly registered for use in flight training when they could not be registered in that category due to the manufacturing process used in their construction. A number of those aircraft were subsequently deregistered from the 24-prefix category and re-registered as amateur built or 19-prefix aircraft.

RA-Aus wrote to the manufacturer of the Sierra requesting additional documentation so that the aircraft could be registered as an LSA aircraft. However, as the Sierra was not manufactured or registered as an LSA category aircraft, the CAO 95.55 para 1.6 requirements were applicable.

Those certification and registration issues were being attended to by RA-Aus at the time of this report.

Meteorological information

There was no local weather station at the Old Bar Airstrip. The closest weather station was located at Taree Airport. Data from the automatic weather station (AWS) at Taree for 1000 EST indicated that the wind was recorded as being from the north-north-west at 3 kt with gusts of 4 kt. Cloud was reported in the area and rain had been recorded as falling in the previous hour. The aerodrome forecast[22] for Taree forecast wind from 340 degrees (north-north-west) at 10 kt.

Witnesses at Old Bar reported that the wind at the airstrip during the morning and at the time of the accident was 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.

Wreckage and impact information

The Sierra aircraft

The cabin area and fuselage sustained minimal damage from the impact. The majority of the damage was sustained by the wings of the aircraft (Figure 4).

Examination of the aircraft and its flight path revealed that it had not contacted any other structure or tree before it impacted the ferris wheel.

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[20] FAA Advisory Circular AC 43.13-1B *Acceptable Methods, Techniques, and Practices – Aircraft Inspection and Repair*, issued September 8, 1998. That document is widely referred to within the aviation maintenance community and contains information on maintenance practices to be used when the manufacturer has not provided any maintenance-related information. A copy of that document is provided to all RA-Aus members.

[21] Light Sport Aircraft is a relatively new aircraft category in Australia. LSA must meet certain specifications that are contained within Civil Aviation Safety Regulation (1998) Part 21, Subpart H – *Airworthiness requirements for Light Sport Aircraft*.

[22] 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. Old Bar is 6 NM (10 km) from Taree Airport.

The ferris wheel

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 predominantly red. When erected, the height of the ferris wheel (structure and wheel) was reported by the operator as 20 m.

The ferris wheel remained upright following the collision. The impact moved the base of the ferris wheel by 75 cm in the direction of flight of the Sierra. The aircraft impacted the upper right side of the wheel as viewed from the direction of flight. At the time of impact, the occupants of 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 structure and took considerable effort to remove (Figure 4). The aircraft was reportedly leaking fuel following the impact and firefighting foam was deployed by emergency services to minimise the risk of fire.

The operator of the ferris wheel reported that when he inspected the wheel following the collision most of the structure appeared to have been damaged.

Figure 4: Aircraft entangled in the ferris wheel

Source: NSW Police

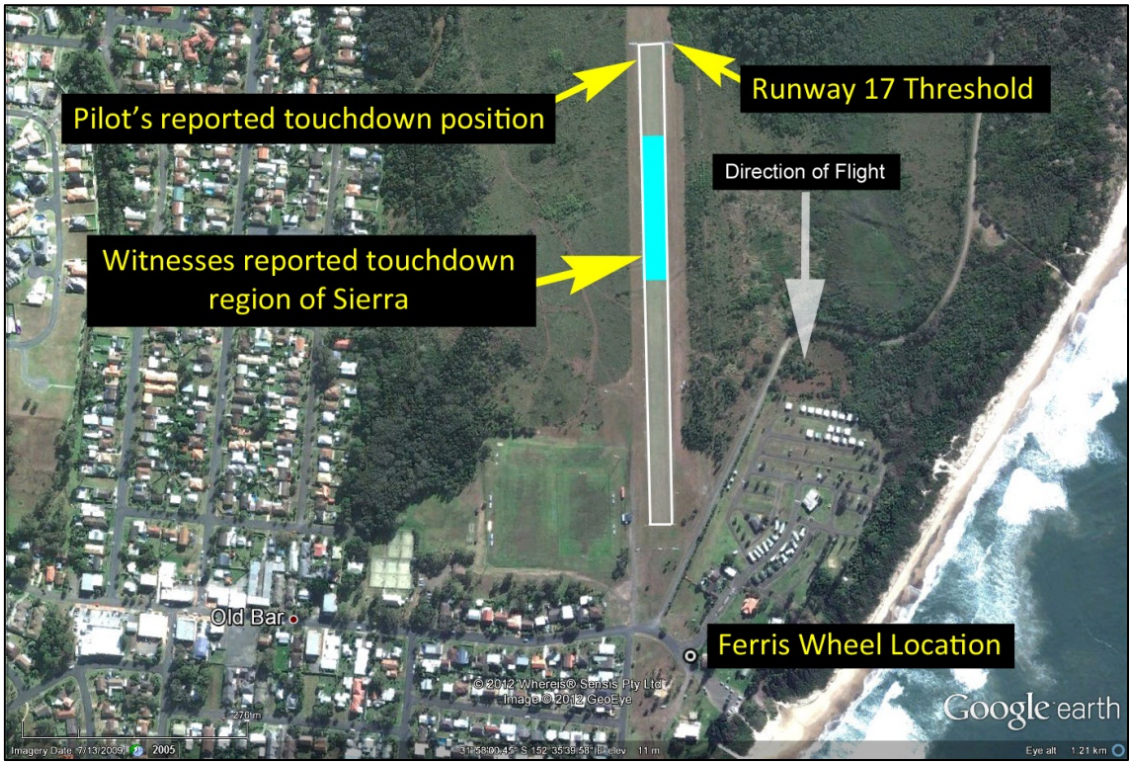
Witness recollections and video recording of the touch-and-go

Witness recollections

Numerous witnesses were located in the area around the airstrip, including a number who were experienced pilots. The witnesses reported that all the other aircraft that arrived at Old Bar that morning used runway 35 to land, including the Diamond aircraft, which was reported as landing approximately 5 minutes before the Sierra.

Witnesses located in the vicinity of the airstrip were able to describe the final landing approach, ground roll and go-around of the Sierra. A number of the witnesses indicated that the Sierra appeared to touch down well into the airstrip, some distance from the landing threshold. Two witnesses reported that it touched down approximately halfway down the airstrip (Figure 5).

Figure 5: Touchdown region as reported by witnesses



Source: Google Earth and ATSB

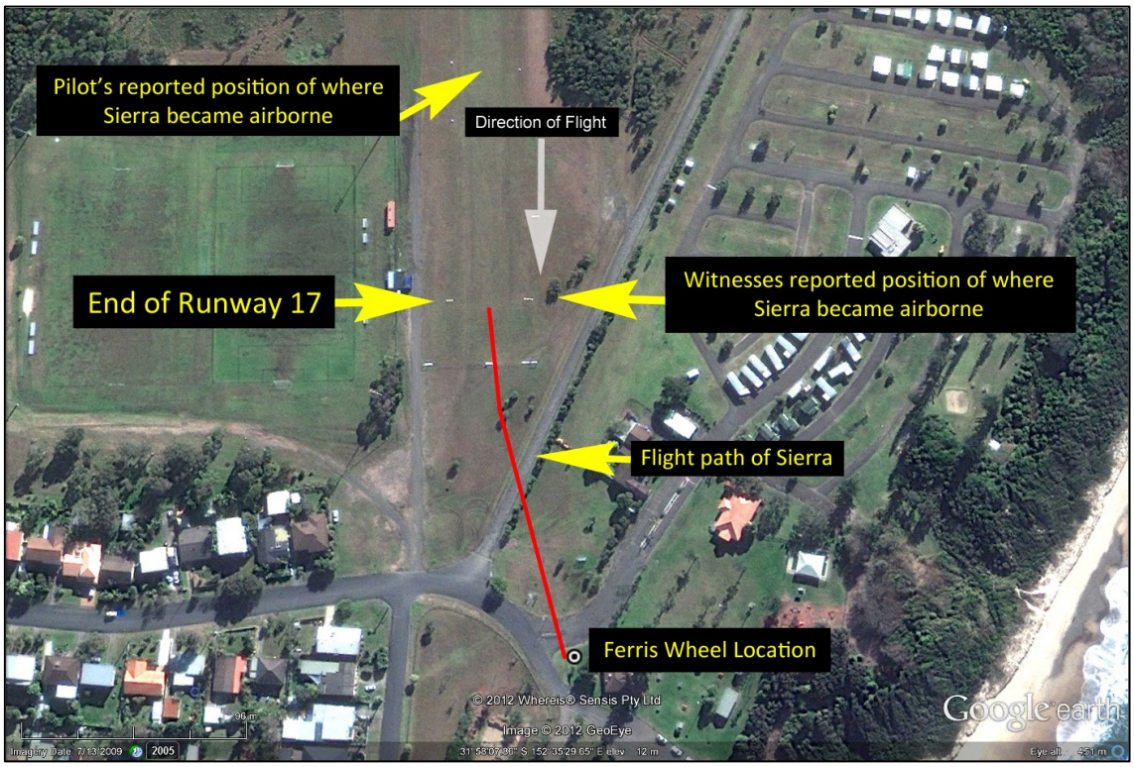
Two witnesses, who had considerable aviation experience, indicated that it appeared the pilot was late in applying the brakes on the aircraft after it touched down. One witness reported becoming 'alarmed' on hearing the pilot increase engine power to go around. Another witness reported having 'grave concerns' about the performance of the Sierra and the actions of the pilot and gave the aircraft his full attention.

All of the witnesses reported that the Sierra became airborne almost coincident with the threshold markers at the upwind end of runway 17 (Figure 6). They also reported that it cleared the wire fence at the end of the strip 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 coming from the aircraft; rather, they all reported that the engine sounded normal. Witnesses indicated that the Sierra continued to climb in a nose high attitude, albeit slowly and that it missed a number of trees before flying towards the ferris wheel.

Video recording

A video recording taken by persons at the festival at the time of the impact confirmed the lift-off point of the Sierra and its subsequent flight path as reported by the witnesses.

Figure 6: Reported lift-off position and subsequent flight path



Source: Google Earth and ATSB

An analysis of the video recording of the lift-off and subsequent flight was used to estimate the groundspeed of the aircraft during the time from when it passed the upwind end of runway 17 until it impacted the ferris wheel. That analysis revealed the aircraft was travelling at an estimated ground speed of 63 kt. Given the indicated airspeed at the time of 60 kt as reported by the pilot, this suggested that the aircraft was being subjected to a tailwind component of approximately 3 kt. If the aircraft was travelling slower than the speed reported by the pilot, then the tailwind component was greater than 3 kt.

Organisational and management information

Old Bar Beach Festival

Organising committee membership and festival history

The beach festival that was being held on the day of the accident was established and managed by a committee consisting of local residents and business owners. A similar festival had been held on the same October long weekend for the previous 5 years. Over that time the festival had grown in size and visitor numbers had increased accordingly, with a reported 17,000 visitors attending in 2010. The organising committee held regular planning meetings throughout the year to discuss and organise the festival, its events and associated activities. The area where ground based festival activities were located is shown in Figure 7.

The Old Bar Beach Festival committee president reported that in 2011, two members of the Old Bar Airstrip committee were invited to be members of the festival organising committee as the festival committee did not have any aviation expertise within its members. Examination of the meeting minutes of the festival committee for the period March to September 2011 revealed that only one of the airstrip committee members who were appointed to the festival committee attended any meetings in that period. The other member of the airstrip committee reported that they were not aware of being invited to be part of the festival committee.

Figure 7: Area of ground based festival activities

Source: Google Earth and ATSB

The president of the festival committee advised that due to a computer equipment failure and loss of data, many documents relating to the organisation of the festival and its activities were not available.

Management of aviation activities

Festival committee members reported that the festival originally became involved with aviation and the airstrip in 2006, when the seventy-fifth anniversary of the gazettal of the airstrip was celebrated. During that festival numerous aircraft visited the strip and conducted displays.

The president of the airstrip committee wrote to CASA in 2009, seeking advice on the requirements for the conduct of an air display, which was proposed to be held in conjunction with the beach festival. The committee president and caretaker of the airstrip reported that following advice from CASA, the decision was made that it was too onerous to comply with CASA's air display and approval requirements. This recollection was confirmed by festival committee members. There was no subsequent submission to CASA for an air display approval.

However, aviation activities were part of the festival in the years leading up to the accident. The main activity had been a fly-in, where aircraft were invited to land at the airstrip and become an exhibit for festival patrons or park at the airstrip. The committee reported that in 2010 an aerobatic display was added to the festival. Consistent with information on the aerobatic pilot's website, documentation from the airstrip committee indicated that the aerobatic display was in fact added to the festival program in 2009. In addition a parachuting display was added as part of the opening ceremony.

The festival committee president reported that they did not include aviation activities as part of the festival, and that they were organised separately by the airstrip committee. The president reported that if aviation activities were associated with the festival, the cost of public liability insurance would be prohibitive. In addition, the festival committee indicated that they were advised by their insurance broker not to use any words that specifically related to aviation or anything similar in any

of their advertising or programmes, as that would not be covered by their insurance policy. The insurance broker advised that no such advice was given to the committee.

The airstrip committee president reported that aviation activities in 2011 were planned in association with the festival, and that airstrip committee members were asked to attend the festival planning meetings. In an email to the airstrip committee president, the festival president stated:

> …as it will be the 80th anniversary of the gazetting of the Airstrip this year, so we should make [it] a huge celebration.

Subsequent correspondence indicated that there were going to be trial instructional flights conducted during the festival by RA-Aus-registered aircraft. At least 10 RA-Aus aircraft and a helicopter were expected to fly in for the festival. There was discussion about holding a flying display by a model jet aircraft and having the parachuting and aerobatics display aircraft land at the strip for static displays.

The festival programs for the years 2008 to 2011 were obtained by the ATSB and were found to include a prompt on each program at a specific time to 'look to the sky for heritage listed airstrip celebrations'. When asked why these specific words were used, the festival president and committee members reported that they were the only words that were compatible with the advice they had been given regarding advertising. The committee members did however indicate that the programmed 'look to the sky…' event related to aviation activities, specifically the aerobatics and parachuting displays. The president and committee members also indicated that the airstrip committee had other aviation activities planned; however, they did not know what those activities were. A member of the airstrip committee reported that aircraft that flew into the strip were not taking part in the 'look to the sky' event in 2011, but they had done so in past years.

Examination of the festival website revealed specific mention of the aerobatics display, as well as festival goers being able to see:

> ...classic machines of the air take to the skies above our historic Old Bar Airfield.

Local media websites indicated that aviation activities had been associated with the festival in previous years.

Festival committee members reported that they were not aware of having aircraft at the festival as exhibitors and that they had never invited any aircraft owner to exhibit their aircraft as part of the festival. One of the themes of the festival for 2011 was 'Made in the Manning'[23] and was meant to showcase local businesses and manufacturers. The airstrip caretaker indicated that he had extended invitations to aircraft builders and operators from Taree Airport, which included the accident aircraft owner and manufacturer, to come out to the airstrip and take part in the 'Made in the Manning' part of the festival. The airstrip caretaker indicated that the invitation was initially verbal and then followed up with a written invitation at a later date. A copy of the written invitation was examined by the ATSB in the form of an undated letter that was not specifically addressed to any organisation. The invitation sought 'aeronautical support' for the festival and indicated that the invitation came from the festival committee.

The manufacturer of the Sierra indicated that he received verbal permission to attend the festival, followed by a written invitation. Examination of that document revealed that it was dated 13 December 2011, it was not the same invitation as issued by the caretaker and that the manufacturer was invited to attend and participate in the festival. The written invitation also gave permission for the manufacturer to operate from the airstrip.

It was also reported that another aircraft flew to the airstrip on the morning before the accident. The airstrip caretaker reported that he knew of that aircraft and its owner and that it was from a local recreational flight training facility. He indicated that he had not invited that person to participate in the festival. It was reported that this pilot parked his aircraft on the eastern side of the

[23] Old Bar and its environs are located in the Manning River valley of NSW.

airstrip and erected a banner advertising trial instructional flights. Emails from the airstrip committee president indicated that they expected that aircraft to be present on both days of the festival.

Festival Committee minutes

Examination of the festival committee minutes for the year leading up to the festival revealed that the airstrip and aviation activities were discussed at every meeting. These indicated that an aerobatic display, a parachute jump and a fly in were planned. Other aviation activities were discussed as possible entertainment. The minutes for the meeting of 9 September 2011 contained the following entry:

> Confirmed times of [aerobatic pilot] display and [parachutist] jump time and advised will finalise the air display times with the participants who have agreed to come. No requirement for inclusion in programme but agreed to provide promotional material for a media release ASAP [as soon as possible] after the meeting.

The media release referred to in the minutes was prepared by an airstrip committee member at the request of the festival committee. The media release indicated that in addition to the planned activities, there would be:

> ...light aircraft activity delighting onlookers with breathtaking displays of skill and daring.

Parachuting

The person who was to conduct the parachuting displays sought and was granted approval for a display jump at the airstrip in 2011, in accordance with the requirements of the Australian Parachute Federation. That approval indicated that there would be a flag jump and that tandem and fun jumps would take place between the hours of 0900 and 1700 each day of the festival. The parachuting event was also advertised on internet forums, inviting other parachutists to attend and take part in the jumps.

The festival president reported that the only parachuting expected during the festival was the jump associated with the opening ceremony. The president of the airstrip committee advised of being aware of the parachute jump for the opening ceremony but he was not sure if any additional parachuting activities were planned. The drop zone for any parachuting was the sporting field to the west of the airstrip, within the nominated area of the festival activities.

The festival president indicated that there was no commercial arrangement with the person who was to conduct the parachute display, indicating that it was done on a voluntary basis by the jump operator.

Aerobatics

The pilot who was to conduct the aerobatic displays sought and was granted permission for those displays at the airstrip in 2011, in accordance with the existing regulatory requirements. In this respect, as the aerobatics display was being held in conjunction with a public gathering, permission was required under CAR 156 (1). In addition, because aerobatics were intended at a height of less than 3,000 ft, permission was also required under CAR 155(3).

The aerobatic pilot indicated that the display predominantly took place over the ocean adjacent to the airstrip. In previous years the pilot landed his aircraft at the strip after his display to allow its inspection by festival visitors and him to answer any questions. The airstrip caretaker reported that this approach was likely again in 2011, depending on the weather.

As part of seeking permission for the aerobatics display, the pilot requested that a NOTAM be issued for the Old Bar Airstrip to alert other pilots of the display. A search of the Airservices Australia NOTAM office revealed that a NOTAM was not issued on either day of the festival. The airstrip committee president confirmed that the committee had not arranged a NOTAM in support of the aviation activities.

The aerobatic display was organised and paid for by the festival committee.

Fly in activities and management

The airstrip committee president reported that there were no specific requirements for pilots who wished to fly in to the airstrip during the festival. The president indicated that permission was granted for local operators to attend; however, individual pilots were still required to obtain permission prior to operating into the airstrip. In this respect, the only planning undertaken by the airstrip committee was to arrange specific parking areas on the airstrip for exhibiting aircraft, the parachute aircraft and any itinerant aircraft.

There was no specific advertising of the fly in for the 2011 event. In previous years the event was advertised on a number of aviation-related websites.

Risk management of the planned activities

Risk management

Organisations of any kind can face factors, either internal or external, that impact on their operating objectives. This results in a measure of uncertainty. Australian New Zealand standard *AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines*[24] defines risk as the 'effect of uncertainty on objectives'.

Organisations manage uncertainty to ensure that they can meet their objectives. This entails anticipating, understanding and deciding whether to accept the identified risk, or to modify its impact by introducing appropriate risk mitigation strategies. That process was known as risk management, which the AS/NZS standard on risk management defined as 'Coordinated activities to direct and control an organization with regard to risk'.

The AS/NZS standard established a framework to assist in ensuring that all aspects of risk were identified and managed. That included: establishing the context and then identifying, analysing, evaluating, treating, monitoring and reviewing the risk(s). An essential overarching part of the framework was communication and consultation, which needed to take place continuously as the other parts of the framework were attended to.

It is beyond this report to enter into a complete discussion of risk management principles and practices. Interested readers are invited to obtain a copy of the relevant risk management standard - AS/NZS ISO 31000:2009.

Festival risk management

As part of preparations for the 2008 festival, the festival committee approached an independent consultant to perform a risk assessment of the planned activities. Examination of a copy of this risk assessment identified a section in the document where the recommended treatment options for each identified hazard were to be signed by the committee as accepted. The original signed copy of the risk assessment could not be provided to the ATSB by the festival committee.

The risk assessment was drawn up and conducted based on information provided to the consultant by the festival committee. This included in the areas of personal injury, financial matters, event delays, event reputation, civil order, assets and infrastructure, criminal acts, environmental issues, public liability and human resources. There was no mention of the placement of amusements or of aviation activities in the risk assessment.

The consultant reported having no recollection of being asked to look at either the location of any amusements or aviation as part of the pre-assessment information briefing that was given by the festival committee. The consultant indicated that hard and electronic copies of the assessment were provided to the festival committee.

Similar risk assessments were reported to have been conducted by the festival committee as part of the preparations for the festivals in 2009, 2010 and 2011.

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[24] AS/NZS ISO 31000:2009 supersedes AS/NZS 4360:2004 - Risk Management.

Two risk assessment documents related to the 2011 festival were provided to the ATSB by the festival committee immediately following the accident. The first was a copy of the 2008 consultant's assessment with the date changed to reflect the 2011 festival. This form was then used to assess the 2011 festival. The introduction to the 2011 assessment indicated that it was carried out by the same consultancy that carried out the 2008 assessment. The consultant reported ceasing operations in early 2009. The recommended treatment options from the 2011 assessment were not signed as accepted by any committee members.

The second document was an additional risk assessment carried out by the festival committee for the 2011 event. Examination of that assessment revealed no mention of any hazard or risk specifically related to aviation or airstrip activities.

In January 2012, the festival committee provided additional documentation to the ATSB. This included another copy of the second 2011 risk assessment, which had been modified to include 'Air Strip' as an identified hazard, and referred readers to the airstrip committee.

One of the airstrip committee members, who was also on the festival committee and had attended all of the festival committee meetings in 2011, reported that they had not been approached to do anything specifically relating to risk assessment as part of their involvement with the festival. Other airstrip committee members reported that they had not been asked to do anything specifically related to a risk assessment. In addition, examination of the festival committee minutes found no indication of any airstrip committee members being tasked to carry out a risk assessment.

The festival committee obtained public liability insurance for the festival that contained a number of exclusions and conditions. These included that the policy did not cover aviation activities (either by helicopters or aeroplanes). Advice was received that the insurance policy also did not cover parachuting operations as that was considered to be an aviation activity. A similar policy had been obtained in 2010 with the same conditions attached.

The festival committee also provided the ATSB with a copy of the public liability insurance for the amusements at the festival. Although that policy specifically listed a number of amusement rides, there was no indication on the policy certificate of the policy covering the ferris wheel.

Festival committee tasks and responsibilities

The festival committee formalised the organisation of the festival by drawing up a document outlining each committee member's tasks and responsibilities. That included the president and all members of the committee.

The two members of the airstrip committee who were on the festival organising committee were assigned the task 'team leader – joint: Heritage Celebration'. The responsibilities of that task included 'managing the Old Bar Airstrip and ensuring that all health and safety regulations are issued to participants'.

One of the airstrip committee members reported that they understood that tasking to mean ensuring that anyone who turned up to exhibit their aircraft did so on the western side of the airstrip, and that there would be a means of preventing damage to the aircraft by putting up ropes and barricades. They indicated that if a person just flew in the airstrip to attend the festival, they would be marshalled to the normal aircraft parking area on the eastern side of the strip. The other member reported that he was not aware of being asked to be a member of the festival committee and was therefore not aware of any of the specific tasks or responsibilities.

Additional information

Recreational aviation pilot training

Training syllabus

When a pilot underwent training for the issue of a pilot certificate, that training was carried out in accordance with the approved syllabus of training in the RA-Aus operations manual. Unlike in

general aviation, where each operator is required to produce their own manual, RA-Aus produced a single manual to assist their pilot members and training organisations meet their obligations in relation to relevant aviation legislation.[25]

The introduction to the operations manual stated that:

> To achieve standardisation of pilot training methods and procedures, thus ensuring a high and continued level of pilot competency, the procedures contained in this manual must be strictly adhered to.

Information from RA-Aus operations personnel indicated that the training syllabus was competency-based.[26] The syllabus contained three levels of competency or codes against which a pilot was to be assessed, including:

> **Standard 3** is the required competency for solo conduct of the intended operation. This code represents the competency of the member to perform the activity correctly without instructional assistance under carefully supervised conditions in a safe environment.
>
> **Standard 2** is the competency required for the operation to be safely completed at a pilot certificate level. This represents the member's ability to be able to competently and without instructional assistance, perform the activity correctly and adjust actions to cope with emergencies under uncontrolled environments.
>
> **Standard 1** is the requirement for instructors wishing to teach the endorsement. This standard represents the instructor's ability to competently perform the required activity with a high degree of accuracy and in a professional and competent manner in uncontrolled environments and adjust actions to cope with emergencies in a highly consistent manner, facilitating the instruction of the activity to a student. [Emphasis in original]

These competency standards were expanded further in the introduction to the generic training records section of the operations manual with the addition of the following two codes:

> Standard 5 – further **instruction** required specific to the lesson. The student did not reach the required standard to move onto the next lesson or, requires further instruction of a specific activity within the lesson or, sections of the lesson could not be completed.
>
> Standard 4 – further **practice** required. The student demonstrated an understanding of the content of the lesson but has not met the requirements of competency code 3. The student will benefit from further practice gained during normal progression through the syllabus. They can progress onto the next lesson, or may benefit from a refresh of multiple activities across multiple lessons. [Emphasis in original]

The additional competency standards were intended to ensure that rigorous, objective assessments were made against valid, documented and industry-accepted standards. That was, similar to the competency standards required by the CASA Day VFR syllabus.

Civil Aviation Advisory Publication (CAAP) – 5.59A-1(0) - *Competency Based Training and Assessment in the Aviation Environment*[27] provided guidance to the aviation industry, including to the recreational aviation sector, on the provision of competency-based training. CASA intended the CAAP to reduce the likelihood of ineffective training, thereby reducing safety risk.[28]

When questioned, none of the instructors or the CFI that were involved in the pilot's training was aware of the CAAP.

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[25] A copy of the operations manual is provided to all members of RA-Aus. For a pilot to obtain a pilot certificate, they must be a member of RA-Aus.

[26] In relation to aviation, competency based training is defined as training and assessment that ensures that the trainee meets specified standards. These standards define the skills, knowledge and behaviours required to safely and effectively operate an aircraft.

[27] Available at - http://www.casa.gov.au/wcmswr/_assets/main/download/caaps/ops/5_59a_1.pdf

[28] Background to Project FS 09/05 – *Competency Based Training and Assessment in the Aviation Environment*.

Competency-based assessment

CAAP 5.59A-1(0) highlighted that a cornerstone of a competency based training system is the 'rigorous and objective assessment of the trainee against valid standards'.

Errors in the competency assessment process or the incorrect attribution of competency can lead to persons who lack the required competency, or have not yet displayed competence in all expected conditions, taking part in the aviation environment. In consequence, those persons can pose a safety risk to other members of the industry, the public, and to themselves.[29]

The assessment of a person's competency must ensure that the person is not only competent during the assessment, but also into the future. In guidance material provided to the vocational education industry, Foyster (1990) commented:[30]

> When we certify we are in fact predicting the future – at least to the extent that we invite anyone looking at a certificate to infer something about the future performance of the person to whom the certificate applies. The prediction can only be valid if the assessment is, in the technical sense, valid.

Foyster was addressing the assessment of competence at the completion of an industry training course. In the aviation context, the assessment of a person for a pilot certificate represents the completion of a syllabus of training, the outcome of which is a competent pilot who can safely operate an aircraft within the aviation environment.

The pilot's instructors and CFI reported that they had not undergone any formal training in the conduct of competency-based training or assessment. The conduct of a competency-based assessment is one of the areas recognised by practitioners as needing improvement in a competency-based system.[31]

There was no record that the pilot had demonstrated and/or achieved competency in all required areas during his training.

Training issues previously raised

In 1987, the House of Representatives - Standing Committee on Transport Safety published a report on Sports Aviation Safety in Australia.[32] During this committee's hearings, many witnesses suggested that one way to improve sports aviation safety was to mandate pilot training. As part of their findings, the committee recommended that all sports aviation pilots be certified to standards contained in the then Australian Ultralight Federation Operations Manual.[33]

On 20 October 2005, a pilot was fatally injured in a microlight aircraft accident near Mareeba, Queensland. During the subsequent coronial inquest, the available training records for the deceased pilot were reviewed and the coroner expressed concerns as to whether the pilot's training was 'comprehensive and adequate'. The coroner made a number of recommendations on the conduct and recording of training in recreational aircraft to RA-Aus and a recommendation that sought to eradicate the recreational aviation community's culture of minimal compliance and replace it with one that promotes safety.[34]

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29 Mitchell, L. (1995). The definition of standards and their assessment, in *Competency Based Education and Training,* Burke, J. ed., Routledge Falmer: London.

30 Foyster, J., (1990). *Getting to grips with competency-based training and assessment*. Commonwealth Department of Employment, Education and Training: Canberra.

31 Harris, J., Guthrie, H., Hobart, B. & Lundberg, D. (1995). *Competency-based Education and Training: Between a Rock and a Whirlpool*, Macmillan: South Yarra.

32 *Sports Aviation Safety*, Report of the House of Representatives – Standing Committee on Transport Safety, January 1987, AGPS, Canberra.

33 The Australian Ultralight Federation became Recreational Aviation Australia Inc. in 2004.

34 http://www.courts.qld.gov.au/__data/assets/pdf_file/0008/86786/cif-scholl-ph-20090127.pdf - retrieved 9 December 2011.

Old Bar Airstrip

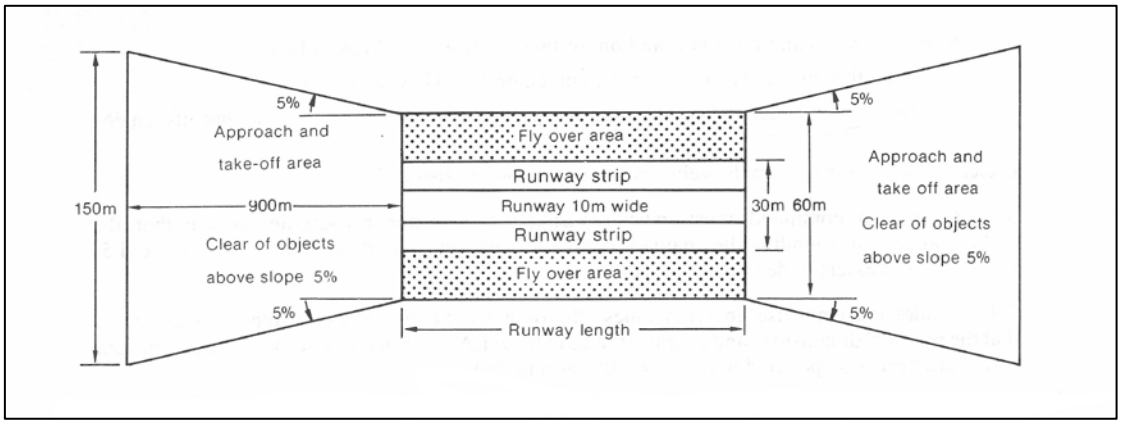
Aeroplane landing area guidelines

CAAP 92-1(1) *Guidelines for Aeroplane Landing Areas* provided guidance to assist pilots meet their responsibilities under CAR 92(1), CAR 233 *Responsibility of pilot in command before flight* and CAR 239 *Planning of flight by pilot in command*.[35] Guidance was also provided to owners/operators of landing areas in terms of the physical dimensions, marking and lighting of landing areas.

As the information was for guidance only, there was no legal requirement to follow the information in the publication. However; as indicated in the introduction to the CAAP, it 'sets out methods that may be used and which experience has shown should, in the majority of cases, ensure compliance with the Regulations'.

Figure 8 was taken from CAAP 92-1(1) and outlines the areas that have to be considered in relation to obstacle clearance areas. These guidelines are intended for use without the need to employ a surveyor. In the guidelines, the lateral splay moves outward from the edge of the strip at a gradient of 5 per cent and can be expressed as a ratio of 1:20. This means that for every 20 units of measurement[36] moved over the ground in a direction parallel to the runway centre-line and away from the end of the airstrip, the splay moves one corresponding unit outwards over the ground at right angles to the runway centre-line. The same ratio applies to the vertical surface; for every 20 units moved across the ground away from the end of the airstrip, the splay moves one unit vertically up from the ground. That process continued until 900 m from the end of the airstrip.

Figure 8: Recommended physical characteristics of an aircraft landing area



Source: CASA

Airstrip information

The Old Bar Airstrip is a heritage listed airstrip orientated in a north-south direction with two reciprocal runway strip designations of 17/35.[37] The runway[38] is 540 m long, 15 m wide and has a grass surface. In addition, the runway has a 30 m runway strip[39] and a 60 m flyover[40] area (Figure 8). There is a windsock located on the western side of the airstrip. The landing thresholds were both marked with gable and cone markers.

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35 CAAP are intended to be read in conjunction with the applicable regulations to which they refer.

36 It does not matter what unit of measurement that a person uses to measure this distance. They can be metres, feet, inches, or even a person's steps. The important thing is that the same unit is used in both dimensions.

37 Runways and airstrips are named by a number representing the magnetic heading of the runway.

38 Defined in CAAP 92-1(1) as that portion of the landing area intended to be used for the landing or take-off of aeroplanes. Available at - http://www.casa.gov.au/wcmswr/_assets/main/download/caaps/ops/92_1.pdf

39 A portion of ground between the runway and fly-over area which is in a condition that ensures minimal damage to an aeroplane which may run off a runway during take-off or landing. (CAAP 92-1(1) definition)

40 Defined in CAAP 92-1(1) as a portion of ground adjacent to the runway strip that is free of tree stumps, large rocks or stones, fencing, wire and any other obstacles above ground but may include ditches or drains below ground level.

The landing threshold for runway 35 was displaced to the north by 30 m as a result of a fence at the south of the airstrip. This fence was collocated with the airfield strip markers and resulted in an obstruction to landing aircraft.

Special local procedures for operations at the Old Bar Airstrip were available online and in airfield guides. This information indicated that the airstrip met the requirements of CAAP 92-1(1) with the exception of the transitional surfaces.[41] Sporting field light poles to the west of the airstrip infringed the lateral transitional areas outlined in the CAAP.

The airstrip was neither a registered nor a licensed aerodrome. Therefore there was no legislative requirement governing the obstacle clearance areas surrounding the airstrip. Determining the suitability or otherwise of the airstrip for an aircraft operation rested with the pilot in command of that aircraft.

CAR (1988) 92 - *Use of Aerodromes*[42] stated:

> (1) A person must not land an aircraft on, or engage in conduct that causes an aircraft to take off from, a place that does not satisfy one or more of the following requirements: ...
>
> (d) the place (not being a place referred to in paragraph (a), (b) or (c)) is suitable for use as an aerodrome for the purposes of the landing and taking-off of aircraft; and, having regard to all the circumstances of the proposed landing or take-off (including the prevailing weather conditions), the aircraft can land at, or take-off from, the place in safety.

There was no location-specific NOTAM reporting service in operation for Old Bar Airstrip. The only way for pilots to ascertain the condition of the strip or any other operational limitation imposed by local conditions was to contact the airstrip committee prior to using the strip. As previously stated, the pilot indicated that he did not contact the committee prior to the flight.

The festival committee reported being unaware of any document relating to obstacle clearance around airstrips prior to the accident. Airstrip committee members reported that they were aware of CAAP 92-1(1).

The local council reported that the airstrip had never been formally surveyed for obstructions. However, a number of trees to the south of the airstrip under the approach path and to the south-eastern side exhibited evidence of pollarding[43] to ensure that they did not pose a hazard to aircraft operations. The airstrip caretaker reported that when the trees started to encroach on the approach path, they were pollarded by a local tree surgeon.

The airstrip is not a public airstrip and permission from the Old Bar Heritage Airstrip Committee is required before pilots can use the strip. The caretaker of the strip reported being contacted by a pilot for permission to use the strip and request an indication of the local weather conditions on the morning of the accident. He indicated that the pilot who contacted him was not the pilot of the Sierra.

Pilots who frequently flew to the strip reported that it was considered to be a marginal strip due to its length. In response, these pilots adopted short field approach and departure procedures when operating to Old Bar.

Photographs of the airstrip 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.

Positioning of the ferris wheel

The airstrip committee president provided a feedback report to the festival committee after the festival in 2008. The report highlighted that amusements had been located in parkland to the

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41 The transitional areas are those areas to the sides of the runway environment. They are required to be clear of tall objects and structures, which have the potential to create windshear over the runway environment.

42 Applicable to all pilots. There is no exemption issued to RA-Aus operations against this Regulation.

43 Pollarding is the process of removing the top of a tree.

south of the airstrip, infringing the departure and approach areas for the airstrip. The report recommended that if possible these amusements should be relocated to another area for the next festival. The airstrip committee president reported that the festival committee complied with that recommendation.

The festival committee produced a document titled *Risk assessment areas* in relation to the 2008 festival. In respect of the location of the festival amusements, the document stated:

> After the risk assessment completed by [the consultant], it was decided to permanently relocate the areas for the amusements and rides to Rushby Park and Surf Club park areas right out of the flight path of the Air strip.

Rushby Park is to the south-east of the airstrip. The festival committee reported that, due to a council requirement not to have vehicular traffic on the sporting fields, Rushby Park was the only area where they could place the amusements. They also reported that the ferris wheel had not been under the flight path when the decision was made to move all of the amusements away from that area. However, another ride that was 'quite high' was in place that year.

The location of the ferris wheel at the time of the accident was reported to have been the same as for the period 2009-2011. Festival committee and airstrip committee members reported that they had not received any complaints about the location of the ferris wheel.

A total of 13 amusements were anticipated by the festival committee to attend the 2011 festival. Placement of amusements was coordinated by one of the festival committee members. It was reported that this committee member met with the agent who organised the amusements on 30 September 2011, the day before the accident to indicate the site allocated to each amusement. In addition, the festival committee indicated that a council employee inspected and approved the site for the amusements. Examination of the committee minutes for the period leading up to the festival revealed that there was no specific discussion in relation to the placement of the amusements.

Greater Taree City Council requirements

The festival committee had approached the Greater Taree City Council for funding in support of the festival and to obtain permission to use the sporting fields and parklands around the airstrip for the festival (Figure 7). The application forms outlined many of the activities that would take place at the festival, but did not include specific mention of any aviation activities, or that the airstrip would be used during the festival.

The council required amusement operators that proposed business within the local council area to complete a form titled *Application form to Operate an Amusement Device*. A copy of the amusement operator's insurance policy and a site plan indicating the location of the amusements were required to be submitted with the application. Copies of these forms for four of the 13 amusements that took part in the 2011 festival were obtained from the council, including an application form that was by the operator of the ferris wheel. The council indicated that these were the only forms held for the 2011 festival.

No copies of any operator's insurance policy, or completed site plans were able to be provided by council. The council reported that the only staff member who attended the site before the festival did so in respect of their environmental health responsibilities.

Safety analysis

Introduction

The training provided to the pilot was not complete when compared to the Recreational Aviation Australia Incorporated syllabus of training. Furthermore, there was no evidence that the pilot had obtained the required competencies that would permit him to exercise the privileges of a Recreational Aviation Australia (RA-Aus) pilot certificate. This increased the risk to other users of the aviation environment and members of the public at the Old Bar Beach Festival.

The approach by the festival committee to the management of aviation-related festival risk was ineffective. This was evidenced by the location of the ferris wheel within the obstacle clearance splay for runway 17 that, in combination with the pilot's conduct of the touch-and-go, increased the risk that the aircraft would strike the ferris wheel.

No mechanical problem was identified with the aircraft that would have contributed to the accident. However, there were a number of problems with the manufacture, certification and registration of the Sierra aircraft that increased the risk of such aircraft being incorrectly used for flight training and other commercial operations, and the risk to the general public.

The pilot's decision to land on runway 17 resulted in a probable tailwind. This would have resulted in an increased groundspeed on touchdown and an increased landing distance required. The increased landing distance was also a result of the pilot's conduct of the approach and landing, in terms of airspeed selection and aircraft configuration.

This analysis will examine the pilot's training and competence in terms of its contribution to the accident, in the context of the ferris wheel being located within the obstacle clearance splay area as described in Civil Aviation Advisory Publication 92-1 *Guidelines for Aeroplane Landing Areas*. In addition, a number of missed opportunities for the organising festival committee to more effectively risk manage the conduct of the aviation-related festival activities will be discussed.

Training, records and pilot competency

The lack of qualitative contemporaneous evidence in the pilot's training records of his competence and levels of knowledge attained precluded an assessment by the Australian Transport Safety Bureau (ATSB) of those aspects of his training. To ensure the validity of a competency-based training system, record keeping is crucial.[44]

The assessment of an individual's competency is based on demonstrated competence under a range of conditions and situations. The training records provided by RA-Aus to its flight training facilities were intended to facilitate the assessment and recording of trainee pilot competence against RA-Aus-defined competency standards. These, together with other sources of evidence, were intended to be used to assess a trainee pilot's competence to exercise the privileges of the RA-Aus private pilot certificate.

To be valid, that evidence needs to be measured in an objective manner against industry-accepted standards, and be sufficient to allow the accurate assessment of a person's competency under all expected conditions. RA-Aus had provided defined standards of competence against which pilots were to be assessed. The chief flying instructor (CFI) that oversaw the pilot's training indicated that, when he completed the Sierra pilot's training records on the day of the pilot's flight test, they were not used in the manner in which RA-Aus intended – to assess and record specific competencies during the pilot's training. When combined with the lack of completed answer sheets to the supporting written examinations, this meant that there was no

[44] Docking, R (1993), *Hidden dangers in competency-based record-keeping*, in Testing times: a national conference on assessment for competency-based training: conference papers, NCVER, Adelaide.

reliable contemporaneous information to determine the competence or knowledge level of the pilot. As a result the ATSB had to use information and evidence collected during the course of its investigation to make an assessment of the validity of the pilot's training and achieved competencies.

The demonstrated actions of the pilot, both in his preparation for, and conduct of the flight were not what would have been expected of a recently trained and approved pilot and did not align with the instructor's and CFI's recollections of the pilot's performance during his recent training. The pilot was granted cross-country privileges 2 months prior to the accident and had subsequently logged an additional 8.3 hours flight time, all of it solo. It is unlikely that this amount of flight experience following training would be sufficient for the pilot to develop the traits demonstrated on the accident flight. A person does not possess innate piloting competencies and behaviours. Such competencies and behaviours can only be developed by undergoing specific training. The ATSB concluded that the actions of the pilot were not inherent, but were an indication of the content and quality of the training received by the pilot.

In particular, it could be expected that, had the pilot been exposed during training to the 'precautionary search and landing' procedure, he would have better understood the implications of his planned approach and landing on runway 17 at Old Bar. This included its suitability for use and any performance implications as a result of the slight tailwind. Most importantly in the context of this accident, it may have alerted the pilot to the risks associated with the location of any obstructions, such as the ferris wheel. An awareness of the location of the ferris wheel, and the associated risk, would have markedly reduced the likelihood of it being struck by the pilot.

The results of the flight review undertaken by the pilot with an RA-Aus examiner following the accident were consistent with the evidence obtained by the ATSB in respect of the pilot's competence. In combination, both showed that the pilot did not possess the required competencies to exercise the privileges of an RA-Aus pilot certificate. It was highly likely that the training provided to the pilot did not afford him the opportunity to develop those competencies.

Competency in aviation certifies more than a pilot's aircraft handling skills. It is the combination of knowledge, skills and behaviours, which includes decision making, while using those aircraft handling skills. The pilot's flight to the Old Bar Beach Festival, conducted while not possessing the required competencies to exercise the privileges of a RA-Aus pilot certificate, represented an increased risk to himself, his passenger, the aviation community and to the public.

Minimalist approach to training

The CFI's interpretation of training requirements under the RA-Aus Operations Manual relation to the pilot's earlier general aviation training suggested a minimalist approach to the pilot's training. The CFI considered that he only had to give the pilot 5 hours of training. However, since the pilot did not attain his general aviation pilot's licence before ceasing training in 1987, he had no opportunity to maintain currency as a licensed pilot in the intervening period. This reduced the likelihood that he would retain significant knowledge or skills from that earlier training. The result was that the CFI and his instructor commenced the pilot's training using a mental model of his competence that was inconsistent with the likely competence level of the pilot.

In the event, the pilot took considerably more time to obtain his RA-Aus pilot certificate than the 5 hours intended by the CFI. Had an assessment of the pilot been undertaken before commencing training, it would likely have found that his retained level of skill and knowledge was very low. It would have been more appropriate to commence the training from the beginning of the RA-Aus syllabus, as if the pilot had no previous general aviation licence. Whereas the Sierra pilot held a student licence in support of his previous flying training, it only allowed a pilot to exercise the privileges of that licence when appropriately supervised and authorised by a rated flight instructor.

This was effectively also the case in respect of the pilot's aviation knowledge associated with his previous training. In this respect, the validity of the 'rules of the air' theory examination credit that the CFI gave the pilot was questionable, as in the intervening 23 years there were a number of changes to those rules.

The risks associated with a minimalist approach to the training of recreational pilots, and inadequate record keeping, was examined as part of a Coroner's Inquest into a microlight accident that occurred near Mareeba, Queensland on 20 October 2005. The approach to the Sierra pilot's training in this occurrence gives weight to the Coroner's efforts to replace the recreational aviation community's concept of minimal compliance with one that promotes safety.

Conduct of the flight

Information was available to the pilot prior to his departure from Taree Airport for him to have better prepared for the operation to Old Bar. This included the Country Airstrip Guide, which indicated that permission was required to use the Old Bar strip, yet the pilot chose not to contact the airstrip caretaker on the morning of the accident.

Given there was no weather forecast or location-specific NOTAM service for Old Bar, the caretaker represented a valuable information source in terms of the local conditions at Old Bar. Had the pilot contacted the caretaker, he would have better understood the weather conditions and airstrip condition, and their implications for the intended operation. In combination with the application of the precautionary search and landing procedure, such pre-flight preparation would have negated the pilot's reliance on the riskier and untaught procedure of conducting a touch-and-go landing to assess the condition of the landing strip.

In addition, prior knowledge of the wind direction at Old Bar may have influenced the pilot's decision to operate to runway 17 despite the associated tailwind. All other pilots that landed at the airstrip that morning determined that the most appropriate direction for landing was runway 35.

The available runway in excess of that required by the Sierra aircraft type was small—about 190 m. Any downwind during an approach increases landing distance and, in the case of the pilot's landing on runway 17, would have quickly used up the extra available runway length. When combined with the incorrect aircraft configuration for the approach (discussed below), this resulted in a long touchdown, effectively reducing the margin to below zero. The outcome from that point was either a runway overrun, resulting in damage to the aircraft and possible injuries to the occupants or to third parties outside the boundary fence, or the need for the pilot to discontinue the landing. In the event, the pilot discontinued the landing and went around.

Given the standard to which the manufacturer reportedly built the aircraft, the owner's handbook for the aircraft did not contain all of the information required for a pilot to plan a flight. This included a lack of information on loading procedures, which might explain why it was overweight when it taxied for departure from Taree. The pilot's report of previously operating the Sierra with two people and full fuel probably confirmed in his mind that there was no problem with configuring the aircraft that way. It was possible that the pilot's earlier flights were also conducted in an overweight condition.

The pilot's conduct of both approaches was not appropriate for the airstrip length, as they were flown at airspeeds higher than recommended by the manufacturer for a short field landing and used an incorrect aircraft configuration. The first approach was conducted with a touch-and-go landing and likely resulted in confirming to the pilot that the configuration and airspeed were appropriate. The report of the pilot being under confident at slow airspeeds, and the reported lack of confidence when approaching over the trees at the northern end of the airstrip also likely contributed to the approach being high and fast. Consequently, the touchdown point was longer into the strip than intended by the pilot.

The small landing distance margin available to the pilot was then eroded to the point that it no longer existed and the pilot's apprehension of not being able to stop within the remaining distance

was justified. The pilot commenced a late go around and only just cleared the airstrip fence at the upwind end of the airstrip. The combination of the lower-than-normal climb path, pilot's divergence from the runway centre-line and probable preoccupation with aircraft handling and the positioning of the unseen ferris wheel increased the risk of the aircraft impacting the ferris wheel.

The circumstances resulting in the pilot providing an inconsistent recall of events to the ATSB could not be reconciled.

Risk management

Management of risk by RA-Aus

RA-Aus were required under their exemption to civil aviation legislation to manage their members' operational risk, including to the general public. The House of Representatives – Standing Committee on Transport Safety shared a similar concern in regard to recreational aircraft operations and public safety when in 1987 they stated:[45]

> Public safety expectations must also be considered. The Committee feels that members of the public have a right to expect a certain standard if ultralights are likely to fly in their vicinity.

The requirement to manage risk was therefore not a new concept and had been addressed by both RA-Aus and its predecessor, the Australian Ultralight Federation. In this occurrence the management of risk by RA-Aus fell into two separate but ultimately interconnected categories, the management of training activities and the certification and registration of aircraft used in flight training operations.

Risk associated with the management of training activities

RA-Aus had introduced training-related risk mitigation strategies in the form of the Civil Aviation Safety Authority-accepted operations manual, which contained a standardised training syllabus and contemporary competency-based training requirements. RA-Aus also provided a set of standardised training records to flight training facilities, with these facilities to be approved by RA-Aus. A clear statement of intent in the manual explained these requirements and the benefits of their being followed and an operations bulletin reminded training facilities of their obligations under the operations manual. Overall, these requirements represented an adequate level of training risk management by RA-Aus—provided they were observed and followed.

The conduct of operations at the Taree facility circumvented the RA-Aus training risk management measures as it was being operated in a manner inconsistent with that intended by RA-Aus for a temporary satellite flight training facility (TSFTF). RA-Aus required all flight training to be undertaken at 'approved' facilities, and although there were no specific requirements listed in the operations manual for approving a TSFTF, when the TSFTF at Taree continued to operate, despite indicating to an RA-Aus auditor that it would not, it posed an increased risk to operations.

The ATSB found that more than one person was being trained at the Taree TSFTF, that the facility provided its aircraft to students on a commercial basis and that the facility had been operating in this manner for over 2 years. This more permanent set-up was more correctly a satellite facility of the operator's Sydney base, as was confirmed by the CFI's action after the accident to apply to RA-Aus for satellite facility status at Taree. Once that application was received by RA-Aus, they took the necessary steps to manage training risk at the facility in accordance with the operations manual and conducted an on-site inspection and approval of the facility. Prior to that, the Taree facility was operating without appropriate RA-Aus training oversight and approval, and therefore presented an unmanaged risk to flight training operations. This increased the risk of the facility issuing a pilot certificate that did not reliably confirm pilot competence.

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[45] *Sports Aviation Safety*, Report of the House of Representatives – Standing Committee on Transport Safety, January 1987, AGPS, Canberra, p31.

Risk associated with the acceptance and registration of aircraft used in flight training operations

The second RA-Aus risk management responsibility related to the acceptance and registration of aircraft used in flight training operations. RA-Aus had introduced a requirement that only properly approved and certified factory built aircraft could be used in flight training operations.

The requirements for registering these aircraft were published in the RA-Aus Technical Manual but were not followed by the incumbent Technical Manager. This manager had also inappropriately issued a certificate of type acceptance to the Sierra aircraft that did not meet the requirements outlined in the Civil Aviation Orders. In this respect, although the process for issuing certificates of type acceptance was not included in the technical manual, it had previously been appropriately applied by RA-Aus for a number of other recreational aircraft types.

When the processes for the registration and certification of the Sierra were examined by the ATSB, it was found that the risk mitigation requirements of following appropriate procedures and meeting specific requirements had been circumvented. The result was an aircraft being used in flight training operations that was not appropriate. Although not a contributing factor in this accident, the result of that process was an increased risk to persons entering the recreational aviation training environment, and potentially to the general public.

Management of risk by the Old Bar Beach Festival committee

The Old Bar Beach Festival committee discussed the airstrip and the associated aviation activities at every planning and organising meeting in the 7 months leading up to the festival. Although the majority of the discussions were associated with the planned aerobatics and parachuting, there was evidence that persons who flew into the airstrip on the day were likely to 'take to the skies above our historic Old Bar Airstrip' and 'delight onlookers with breathtaking displays of skill and daring'. That was consistent with the aviation related activities during previous festivals.

The number of aircraft expected by the airstrip committee, when combined with the number of static display aircraft, suggested that a significant number of aircraft would be attending. Of these, the majority were expected to be RA-Aus-registered aircraft. The festival committee were therefore aware that aviation activities, in addition to the aerobatics and parachuting, were going to take place at the airstrip during the festival. This was consistent with the festival president's desire to make it a 'huge celebration', and explained the inclusion of a specific item on the festival's timetable of events for that to occur.

While it was appropriate for the festival committee to use other organisations to arrange and manage aspects of the festival and associated tasks, responsibility for all festival activities ultimately rested with the festival committee.

Formal risk assessments

The festival committee proactively engaged an external consultant to conduct a risk assessment of the 2008 festival. That proactive step was not effective however, as the assessment was not valid in relation to aviation activities. At that time there were aviation activities being planned for the festival, but there was no mention of it in the assessment. By not addressing aviation-related risk at that time, any repeat use of the format of the 2008 assessment resulted in continued reliance on invalid risk assessments in subsequent years.

The consultant provided an electronic copy of the 2008 risk assessment to the festival committee and it appeared that the only thing that changed on the document as it was re-used over the following years was the actual date of the festival. This gave the impression that external consultants were engaged to identify and assess risk in preparation for the festival each year, whereas the consultancy ceased to exist some years prior to the accident.

In addition, even though there was a place for all committee members to sign the document, acknowledging the appropriateness of the risk mitigation strategies that were being put in place,

no signed assessment could be provided to the ATSB. In the absence of this evidence, it was not possible to confirm whether the 2011 assessment was actually signed or even seen by the festival committee members.

The re-use of the 2008 risk assessment in the years between 2008-2011 meant that it was a static document and it did not take into account any changes in the level of risk, or additional risk areas over that period. The growth in visitor numbers over the years, to a reported 17,000 in 2010, would tend to indicate that the level of risk, specifically to the general public, increased from that considered in the consultant's 2008 assessment. It also did not account for the introduction of additional aviation activities in 2009, including low-level aerobatics and parachuting, or any risk associated with the placement of amusements in proximity to the Old Bar Airstrip (see the section titled *Airstrip committee management of activities* below for further information).

The static nature of the 2008-2011 risk assessments contrasted with the requirements of AS/NZS ISO 31000:2009 *Risk Management – Principles and guidelines*. This standard emphasised the dynamic nature of risk management, stating that:

> j) **Risk management is dynamic, iterative and responsive to change**.
>
> Risk management continually senses and responds to change. As external and internal events occur, context and knowledge change, monitoring and review of risks take place, new risks emerge, some change and others disappear.

By not actively reviewing and updating the consultancy-based risk assessment afresh each year, the committee lost the opportunity to examine the changing festival environment and consider appropriate mitigation strategies in response to any newly identified risks. Moreover, the committee's own 2011 risk assessment was silent in the areas of aviation and airstrip activities, representing a missed opportunity manage contemporary aviation-related risk.

Ineffective communication and consultation

Many of the people interviewed by the ATSB who were either associated with the festival committee, the airstrip committee or were on both had differing understandings about what the outcomes were for the festival in relation to aviation. For example, the airstrip caretaker reported that he had not invited a person to attend and conduct trial instructional flights during the festival. The airstrip committee's understanding was that this person had been invited to attend and conduct flights. However it is unclear if the festival committee were aware that this was going to occur, despite having airstrip committee members on the festival committee to provide 'aeronautical advice'.

Other examples of incomplete communication and consultation involved the parachuting operations. The festival committee understood that there was only going to be one jump each day, yet the approval issued to the operator meant that jumps could and were likely to take place all day on both days.

In respect of communicating the scope of festival's aviation-related activities to the aviation industry, a NOTAM was requested to be issued to cover the aerobatic display, yet this was not confirmed as happening, nor was an additional NOTAM issued to advise pilots of itinerant aircraft about the activities or temporary obstructions in and around the airstrip. This meant that aircraft transiting the coastal route northbound or southbound would not have been forewarned of these activities, particularly the aerobatics display, which was planned to take place over water to the east of the airstrip. Similarly, an aircraft arriving at the airstrip would not have been aware of the aerobatics display and having an aircraft arrive un-announced in the middle of an aerobatic display raises a significant concern in relation to aviation safety.

This lack of effective external communication of the aviation activities at the Old Bar Airstrip that day contrasted with one of the overarching requirements for effective risk assessment and subsequent management. That is, clear communication and effective consultation with stakeholders throughout every step of the risk management process. The result was that not all parties shared the same understanding of the aviation elements of the festival. This would have

made it difficult for the festival committee to put in place appropriate risk mitigation measures and strategies, resulting in elevated residual risk.

Old Bar Airstrip committee management of activities

The Old Bar Airstrip committee organised for trees in the vicinity of the airstrip to be pollarded, as they had the potential to create an obstruction to aircraft operations. A comparison of the location of the ferris wheel in relation to these trees revealed that one of the trees was further to the east, or further away from the runway 17 extended centre-line than the position of the ferris wheel (Figure 9). This apparent understanding of the risk to aviation operations of such obstacles was inconsistent with locating a higher obstacle, such as the ferris wheel, closer to the runway centre-line.

The location of the ferris wheel in the same place every year since the 2009 festival without incident might explain the acceptance of the associated risk.

An airstrip committee member was included on the festival committee to provide aeronautical advice. However, information on the need to pollard the trees was not passed to the committee, nor was that member's knowledge of the information in Civil Aviation Advisory Publication (CAAP) 92-1 *Guidelines for Aeroplane Landing Areas* on obstacle clearance splays around airstrips. Had that information been passed on, concerns may have been raised and discussed in committee meetings about the obstruction risk posed by not only the ferris wheel, but any other amusement ride of significant height in proximity to the airstrip's approach and departure paths. The only time that the issue was raised was following the 2008 festival and the amusements were moved across the road for the 2009 festival. In the event, the hazard posed by the ferris wheel relative to the airstrip was not recognised and therefore not risk managed by either the airstrip or festival committees.

The airstrip committee required pilots to individually obtain permission to operate to the airstrip. The committee president reported taking this action in order to assess the experience levels of all pilots likely to use the strip. It also informed the committee in terms of the need for aircraft parking. However, the action in 2011 to issue a blanket approval for local area operators to attend and use the strip increased the risk that this might result in less experienced pilots using the airstrip. This was consistent with the manufacturer of the Sierra using a private pilot with relatively low hours that were accumulated over a number of years to ferry an aircraft to the festival.

Figure 9: Pollarded trees in the vicinity of the ferris wheel

Source: ATSB

Location of the ferris wheel

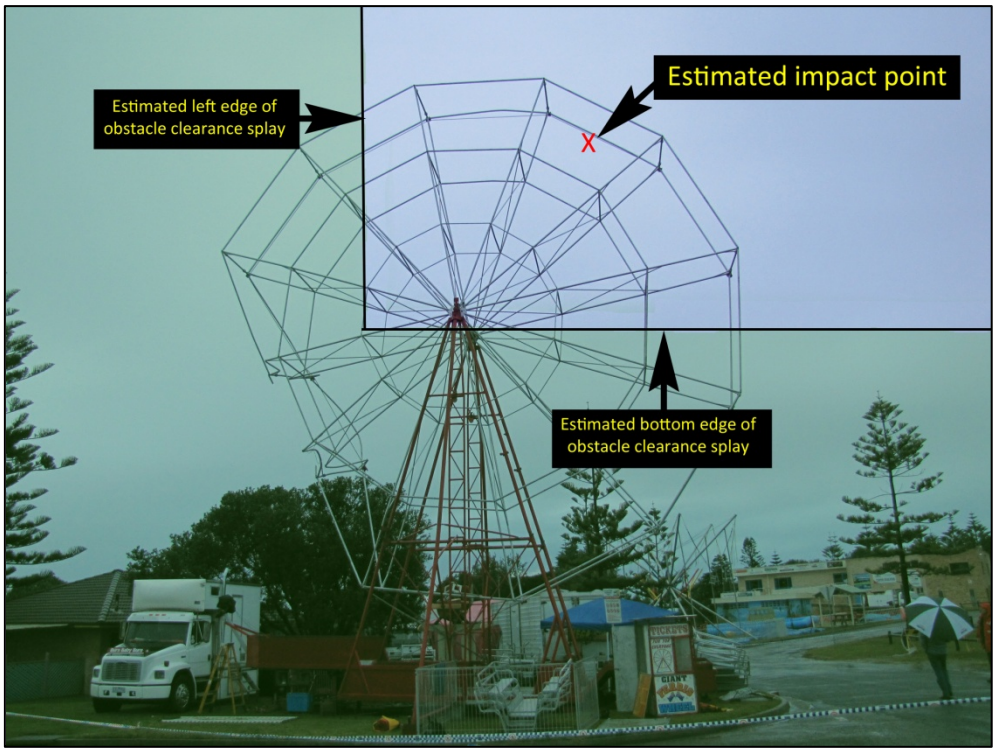
As a result of the displaced threshold on runway 35, the obstacle clearance area did not commence from the runway strip markers that were adjacent to the boundary fence. Instead, it commenced from the end of the runway itself, adjacent to the displaced threshold markings. This

meant that, in the absence of the ferris wheel or any other obstruction, aircraft taking off on runway 17 or approaching to land on runway 35 had an obstacle clear area in accordance with the guidelines in CAAP 92-1.

Using the above ratios, an obstacle could only be 8.05 m high at a distance of 161 m from the runway threshold and could not be located any closer than 38.05 m from the runway centre-line.[46] The slope of the ground down to the ferris wheel's location from the end of the runway meant that, in practical terms, an obstruction could be 2.5 m higher, or a total of about 10.5 m above ground level in that location. If this obstacle was higher than or closer to the runway centre-line than those figures, it would encroach on the obstacle clearance splay.

By superimposing the estimated obstacle clearance splay boundaries on a picture of the ferris wheel, the ATSB found that part of the wheel was within the required runway 17 departure/35 approach obstacle clear area (Figure 10).

Figure 10: Looking south along the direction of flight towards the ferris wheel with lateral and vertical obstacle clearance splays superimposed[47]



Source: ATSB

Other issues

Ergonomics of the cockpit control layout

The layout of the flight controls and location of the flap switch in the Sierra were not optimal and could have contributed to a delay in the application of power during the go around by the pilot. In this respect, the location of the flap switch in the middle of the cockpit meant that the pilot would have had to remove his left hand from the normal position on the throttle and move it to the flap switch to raise the flaps following the second touchdown. He would have then had to return his hand to the throttle to apply power for the go around. The pilot confirmed that he performed these actions in that order during the accident flight.

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46 Measurements in this case are taken from the centre-line of the runway.

47 The damaged section of the ferris wheel has been moved to the lower left (above the white truck) and the carriages have been removed.

An understanding of the potential impact of this issue on this accident is possible by considering the case should the pilot have taken 1 second to reach across and activate the flap switch. In this time the aircraft, if it was travelling at a speed of 45 kt, would have travelled 23 m, which was 12 per cent of the landing margin available on runway 17 at Old Bar. If the pilot had taken longer to activate the flaps, the distance travelled would have been longer, quickly eroding the landing margin available.

The location of the flap switch and its difficulty of use had been identified and publically commented on by amateur builders of the Sierra and they had taken steps to relocate it to a more useable position. Subsequent to this accident, the aircraft manufacturer relocated the flap switch to a more useable location.

The influence of the ergonomics of the Sierra cockpit layout on the landing distance in this accident could not be quantified.

Greater Taree City Council requirements

The Greater Taree City Council required two sets of documentation in support of the festival committee's application for approval of the Old Bar Beach Festival. The first included the application to use the sports fields and associated areas. This element of the festival committee's application did not mention that any aviation activities were going to take place at the festival, meaning that the local council was unaware of what was actually going to take place.

The second set of documentation included application forms for the amusement devices. Those were incomplete, in that they did not include the necessary site plan for the amusements. This represented another missed opportunity for the council to understand the implications for the planned aviation activities of the likely position of the ferris wheel relative to the airstrip.

Findings

From the evidence available, the following findings are made with respect to the collision with a ferris wheel near Old Bar, New South Wales involving Morgan Aero Works Cheetah Sierra 200 aircraft, registered 24-7634, on 1 October 2011. These findings should not be read as apportioning blame or liability to any particular organisation or individual.

Safety issues, or system problems, are highlighted in bold to emphasise their importance. A safety issue is an event or condition that increases safety risk and (a) can reasonably be regarded as having the potential to adversely affect the safety of future operations, and (b) is a characteristic of an organisation or a system, rather than a characteristic of a specific individual, or characteristic of an operating environment at a specific point in time..

Contributing factors

- The pilot of the Morgan Aero Works Cheetah Sierra 200 aircraft did not possess the required competencies to exercise the privileges of a Recreational Aviation Australia Incorporated private pilot certificate.
- **The training provided to the pilot did not afford him the opportunity to develop the competencies required to exercise the privileges of the Recreational Aviation Australia Incorporated private pilot certificate. [Safety issue]**
- While conducting a go-around from runway 17 at the Old Bar Airstrip, the pilot inadvertently allowed the Morgan Aero Works Cheetah Sierra 200 aircraft to diverge to the left of the runway centre-line and collide with a ferris wheel amusement ride that was located to the south of the airstrip.
- The location of the ferris wheel was within the runway 17 take-off/runway 35 approach obstacle clearance splay area as described in Civil Aviation Advisory Publication 92-1 *Guidelines for Aeroplane Landing Areas*.
- **The approach to the management of risk at the Old Bar Beach Festival, specifically in relation to aviation activities, was ineffective and resulted in a high level of unmanaged risk that had the potential to impact on the objectives of the festival. [Safety issue]**

Other factors that increased risk

- **The manufacture of, and the processes used to certify and register the Morgan Aero Works Cheetah Sierra 200 aircraft, resulted in an increased risk to persons entering the recreational aviation community and using the aircraft for flight training, and also to the general public. [Safety issue]**

Other findings

- The documentation required by the local council to give approval to the amusement devices was incomplete.

Safety issues and actions

The safety issues identified during this investigation are listed in the Findings and Safety issues and actions sections of this report. The Australian Transport Safety Bureau (ATSB) expects that all safety issues identified by the investigation should be addressed by the relevant organisation(s). In addressing those issues, the ATSB prefers to encourage relevant organisation(s) to proactively initiate safety action, rather than to issue formal safety recommendations or safety advisory notices.

All of the directly involved parties were provided with a draft report and invited to provide submissions. As part of that process, each organisation was asked to communicate what safety actions, if any, they had carried out or were planning to carry out in relation to each safety issue relevant to their organisation.

Pilot training

Number:	AO-2011-126-SI-01
Issue owner:	Recreational Aviation Australia Incorporated
Operation affected:	Aviation: General Aviation
Who it affects:	Operator of the Taree flight training facility.

Safety issue description:

The training provided to the pilot did not afford him the opportunity to develop the competencies required to exercise the privileges of the Recreational Aviation Australia Incorporated private pilot certificate.

Proactive safety action taken by: Recreational Aviation Australia Incorporated

Recreational Aviation Australia Incorporated (RA-Aus) advised of safety action in response to this safety issue in the areas of the pilot's competence to exercise the privileges of the RA-Aus private pilot certificate, the Chief Flying Instructor's administration of the requirements of the RA-Aus Operations Manual, the provision of training by the senior instructor and the validity of the Taree training facility as a temporary satellite flight training facility. These actions are discussed in the following sections.

Pilot certificate action

The pilot's RA-Aus pilot certificate was suspended following the accident and the pilot was required to undergo a flight review with an RA-Aus examiner. As a result of that review, the pilot was required to undergo further training before being allowed to exercise the privileges of his pilot certificate.

Chief flying instructor review

RA-Aus reported that the Chief Flying Instructor (CFI) attached to the Taree flight training facility (FTF) was mentored on the:

- correct use of Generic Student Progress records
- proper method of keeping and retaining records
- importance of keeping records
- correct definition and requirements of a temporary satellite flight training facility (TSFTF)
- administration of RA-Aus pilot certificate application forms
- production of standardised pilot briefing notes.

Senior instructor review

RA-Aus operations staff undertook a review of the performance of the senior instructor who provided the pilot's training. That review found that the instructor had adequate aeronautical knowledge but did not possess any formal and consistent briefing material for pilots. In response, he was tasked to produce a set of standardised pilot briefing notes.

Validity of the Taree flight training facility

RA-Aus reported that the CFI of the FTF was mentored on the correct procedure to follow for the implementation of TSFTFs. The facility was inspected by RA-Aus operations staff and approved as a TSFTF.

In addition, the RA-Aus Operations Manual is being updated to include a clear definition of a TSFTF and the requirements for their establishment.

RA-Aus have advised that they will be conducting random desktop audits of pilots trained by the FTF to ensure continued compliance with requirements.

Action number: AO-2011-126-NSA-072

ATSB comment/action in response:

The ATSB is satisfied that the action taken and proposed by RA-Aus should lead to improvements that adequately address the safety issue.

Risk management of aviation activities

Number:	AO-2011-126-SI-02
Issue owner:	Old Bar Beach Festival Committee Old Bar Airstrip Committee Greater Taree City Council
Operation affected:	Aviation: Other
Who it affects:	All organisers of events for the general public that include aviation related activities, including festivals, fairs, exhibitions and air shows.

Safety issue description:

The approach to the management of risk at the Old Bar Beach Festival, particularly specifically in relation to aviation activities, was ineffective and resulted in a high level of unmanaged risk that had the potential to impact on the objectives of the festival.

Proactive safety action taken by: Old Bar Beach Festival Committee

Following this accident, the Old Bar Beach Festival Committee indicated to the Old Bar Airstrip Committee that they wished to reduce the level of aviation activity associated with the festival. They also indicated that in future they would more actively engage the airstrip committee in the risk management of activities at the festival.

Action number: AO-2011-126-NSA-073

ATSB comment/action in response:

The ATSB is satisfied that the action taken and proposed by the Old Bar Beach Festival Committee, in combination with the action intended by the Old Bar Airstrip Committee (see discussion below), should lead to improvements that adequately address the safety issue.

Proactive safety action taken by: Old Bar Airstrip Committee

Following this accident, the Old Bar Airstrip Committee decided to close the airstrip for the duration of subsequent Old Bar Beach Festival and similar public events. They indicated that the

airstrip may be opened to users prior to upcoming festivals to pre-position static display aircraft only, but that the airstrip will be closed during the festival itself.

The airstrip committee also indicated that they reviewed their policy for approving operators to use the airstrip. The committee decided to continue to require individual pilots or representatives of defined groups to obtain permission to the use the airstrip. In this respect, the committee advised that it considered a defined group to include an aero club or a vintage or aircraft type association whereby the representative has the authority to brief participants about operations at the airstrip.

Action number: AO-2011-126-NSA-074

ATSB comment/action in response:

The ATSB is satisfied that the action taken and proposed by the Old Bar Airstrip Committee, in combination with the action intended by the Old Bar Beach Festival Committee, should lead to improvements that adequately address the safety issue.

Proactive safety action taken by: Greater Taree City Council

Following this accident, the Greater Taree City Council advised that it has reviewed its event management guidelines and issued a new series of application forms for event approval. These forms can be found at www.gtcc.nsw.gov.au. The forms cover a range of topics, and include a requirement to undertake a risk assessment process in support of any application(s).

The council also advised that it has reviewed its processes and improved support for external event management.

Action number: AO-2011-126-NSA-075

ATSB comment/action in response:

The ATSB is satisfied that the action taken by the Greater Taree City Council, in combination with the action intended by the Old Bar Beach Festival Committee and Old Bar Airstrip Committee, should lead to improvements that adequately address the safety issue.

Aircraft construction and certification

Number:	AO-2011-126-SI-03
Issue owner:	Recreational Aviation Australia Incorporated
Operation affected:	Aviation: Other
Who it affects:	All manufacturers of light sport aircraft

Safety issue description:

The manufacture of, and the processes used to certify and register the Morgan Aero Works Cheetah Sierra 200 aircraft, resulted in an increased risk to persons entering the recreational aviation community and using the aircraft for flight training, and also to the general public.

Proactive safety action taken by: Recreational Aviation Australia Incorporated

Recreational Aviation Australia Incorporated (RA-Aus) action in response to this safety issue was twofold, addressing the aircraft construction and certification aspects of the issue separately. These actions are discussed in the following sections.

Aircraft construction

RA-Aus reported that the Morgan Aero Works Cheetah Sierra 200 aircraft involved in the accident was grounded following the accident and its subsequent rebuild. It will not be re-registered unless under the RA-Aus 19- (amateur built) category.

Issuing of certificate of type acceptance

A routine Civil Aviation Safety Authority (CASA) audit of RA-Aus in November 2011 resulted in the identification by RA-Aus that:

- the Morgan Aero Works Cheetah Sierra 200 aircraft involved in the accident at Old Bar was not constructed to a known standard
- the aircraft manufacturer did not hold a production certificate issued by CASA
- the Morgan Aero Works Cheetah Sierra 200 aircraft type was not a light sport aircraft (LSA) category aircraft and did not possess a special certificate of airworthiness.

In response to these findings, RA-Aus:

- grounded the fleet of Morgan Aero Works Cheetah Sierra 200 aircraft
- removed the factory built status from the aircraft manufacturer
- advised the aircraft manufacturer to comply with LSA standards in order to regain factory build status
- deregistered all 24- (factory built) Morgan Aero Works Cheetah Sierra 200 aircraft and re-registered them under the 19- (amateur built) category.

RA-Aus also employed a new Technical Manager.

Action number: AO-2011-126-NSA-076

ATSB comment/action in response:

The ATSB is satisfied that the action taken by RA-Aus should lead to improvements that adequately address the safety issue.

General details

Occurrence details

Date and time:	1 October 2011 – about 1000 EST	
Occurrence category:	Accident	
Primary occurrence type:	Collision with terrain	
Location:	Near Old Bar Airstrip, Old Bar, NSW	
	Latitude: 31° 58.191’ S	Longitude: 152° 35.491’ E

Aircraft details

Manufacturer and model:	Morgan Aero Works Cheetah Sierra 200	
Registration:	24-7634	
Operator:	Morgan Aero Works	
Serial number:	41-S20-1	
Type of operation:	Private	
Persons on board:	Crew – 1	Passengers – 1
Injuries:	Crew – nil	Passengers – 1 minor
Damage:	Substantial	

Sources and submissions

Sources of information

The sources of information during the investigation included:

- the pilot of the aircraft
- the manufacturer of the aircraft
- the Old Bar Beach Festival Committee
- the Old Bar Heritage Airstrip Management Committee
- Recreational Aviation Australia Incorporated (RA-Aus)
- the Chief Flying Instructor (CFI) of the flight training facility that trained the pilot
- the Greater Taree City Council
- a number of witnesses.

Submissions

Under Part 4, Division 2 (Investigation Reports), Section 26 of the *Transport Safety Investigation Act 2003* (the Act), the Australian Transport Safety Bureau (ATSB) may provide a draft report, on a confidential basis, to any person whom the ATSB considers appropriate. Section 26 (1) (a) of the Act allows a person receiving a draft report to make submissions to the ATSB about the draft report.

A draft of this report was provided to the pilot, the Civil Aviation Safety Authority (CASA), the aircraft manufacturer, the Old Bar Beach Festival Committee, the Old Bar Heritage Airstrip Management Committee, RA-Aus, the CFI and the Greater Taree City Council.

Submissions were received from the pilot, CASA, the aircraft manufacturer, the Old Bar Beach Festival Committee, the Old Bar Heritage Airstrip Management Committee, RA-Aus, the CFI and the Greater Taree City Council. The submissions were reviewed and where considered appropriate, the text of the report was amended accordingly.

Australian Transport Safety Bureau

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The ATSB is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: independent investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to fare-paying passenger operations.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

Purpose of safety investigations

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the factors related to the transport safety matter being investigated.

It is not a function of the ATSB to apportion blame or determine liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

Developing safety action

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. The ATSB prefers to encourage the relevant organisation(s) to initiate proactive safety action that addresses safety issues. Nevertheless, the ATSB may use its power to make a formal safety recommendation either during or at the end of an investigation, depending on the level of risk associated with a safety issue and the extent of corrective action undertaken by the relevant organisation.

When safety recommendations are issued, they focus on clearly describing the safety issue of concern, rather than providing instructions or opinions on a preferred method of corrective action. As with equivalent overseas organisations, the ATSB has no power to enforce the implementation of its recommendations. It is a matter for the body to which an ATSB recommendation is directed to assess the costs and benefits of any particular means of addressing a safety issue.

When the ATSB issues a safety recommendation to a person, organisation or agency, they must provide a written response within 90 days. That response must indicate whether they accept the recommendation, any reasons for not accepting part or all of the recommendation, and details of any proposed safety action to give effect to the recommendation.

The ATSB can also issue safety advisory notices suggesting that an organisation or an industry sector consider a safety issue and take action where it believes it appropriate. There is no requirement for a formal response to an advisory notice, although the ATSB will publish any response it receives.

Australian Transport Safety Bureau

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Investigation

ATSB Transport Safety Report
Aviation Occurrence Investigation

Collision with ferris wheel involving Cheetah Sierra 200, 24-7634
near Old Bar, NSW, 1 October 2011

AO-2011-126
Final – 17 April 2014