

ACCIDENT

Aircraft Type and Registration:	Cessna 208B, Caravan (Cargomaster), G-OJMP
No & Type of Engines:	1 Honeywell TPE331-12JR-704TT turboprop engine
Year of Manufacture:	2002 (Serial no: 208B0917)
Date & Time (UTC):	17 July 2021 at 1338 hrs
Location:	Old Sarum Airfield, Wiltshire
Type of Flight:	Commercial
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - 1 (Minor) Passengers - N/A
Nature of Damage:	Damaged beyond economical repair
Commander's Licence:	Commercial Pilot's Licence
Commander's Age:	47 years
Commander's Flying Experience:	5,390 hours (of which 3,746 were on type) Last 90 days - 171 hours Last 28 days - 76 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and further enquiries by the AAIB

Synopsis

During the final approach to land, the pilot became distracted when he attempted to retrieve his kneeboard, which had fallen off the right seat into the footwell while on the downwind leg. Upon looking up after recovering it, the pilot found the aircraft was at a very low height. He therefore initiated an abrupt pitch up to arrest the rate of descent. The aircraft touched down hard in the undershoot.

The pilot suffered minor injuries and the aircraft was significantly damaged.

History of the flight

The pilot was scheduled to operate about 20 parachuting sorties from Old Sarum Airfield, Wiltshire, where the parachutists landed on the airfield. The weather was good with a wind from 030° at 9 kt and Runway 06 was in use.

During these flights, the pilot wore a full-face oxygen mask and did not secure the shoulder straps on the five-point harness. He took an A5 sized metal kneeboard that he used to record details of each flight. This was kept under his backpack-style flight bag on the right seat, the flight bag being secured by routing the seat's harness through the bag's straps.

The first 13 flights were uneventful, with the pilot taking a rest after the eleventh flight.

During some of these earlier flights the pilot was informed, over the radio by the Drop Zone (DZ) controller, that gliders had been seen circling to the south of the airfield, but the pilot was unable to visually acquire them.

The next flight proceeded without event until the post-drop descent. Prior to the descent the DZ controller advised the pilot that gliders had now been seen to the south-west of the airfield. Mindful that he had not seen any of them, and conscious that they seemed to be moving clockwise around the airfield, he decided to fly a shorter final approach path to keep the aircraft closer to the airfield and further from the gliders, rather than potentially come into conflict with the gliders during the approach and landing. The pilot thus extended his initial descent further than on the previous flights, delaying the turn downwind, with the aim of being lower abeam the threshold of Runway 06 than previously. Given the shorter final approach path, he planned to land at the beginning of Runway 06, rather than slightly deeper on the flatter section¹, as he had done on the earlier landings.

While descending on the downwind leg, the kneeboard slipped out from under the backpack into the right footwell. The pilot initially dismissed this as a minor event and continued with the circuit, which included configuring the aircraft for landing once abeam the threshold. However, on the final approach he became concerned that the kneeboard posed a possible hazard in the form of a potential restriction of the rudder pedals as he landed on the 18 m wide runway. At about 200 ft aal, having checked that the aircraft was on an appropriate flight path, he reached down to pick up the kneeboard from the footwell.

Upon looking up, after retrieving the kneeboard, the aircraft was a lot lower than expected. As a result, the pilot abruptly pitched the aircraft up in a bid to arrest the rate of descent (ROD). He described this as a “lifesaving manoeuvre”. The aircraft touched down very hard in a field about 2 m short of the airfield boundary. It then crossed a berm that borders the airfield, at which point the nosewheel began to oscillate before collapsing. The aircraft came to rest soon thereafter within the lateral confines of the runway (Figure 1).

After the aircraft came to rest, the pilot secured the engine and aircraft systems and completed the normal shutdown items. The pilot exited the aircraft unassisted using the pilot’s side door. Once outside he noticed that the flaps were up and wondered whether he had not lowered them for the landing.

The pilot sustained two small cuts to his chin, which had been inflicted by his oxygen mask.

The aircraft was damaged beyond economical repair.

Footnote

¹ See *Airfield information* section for more information about the profile of the runway.

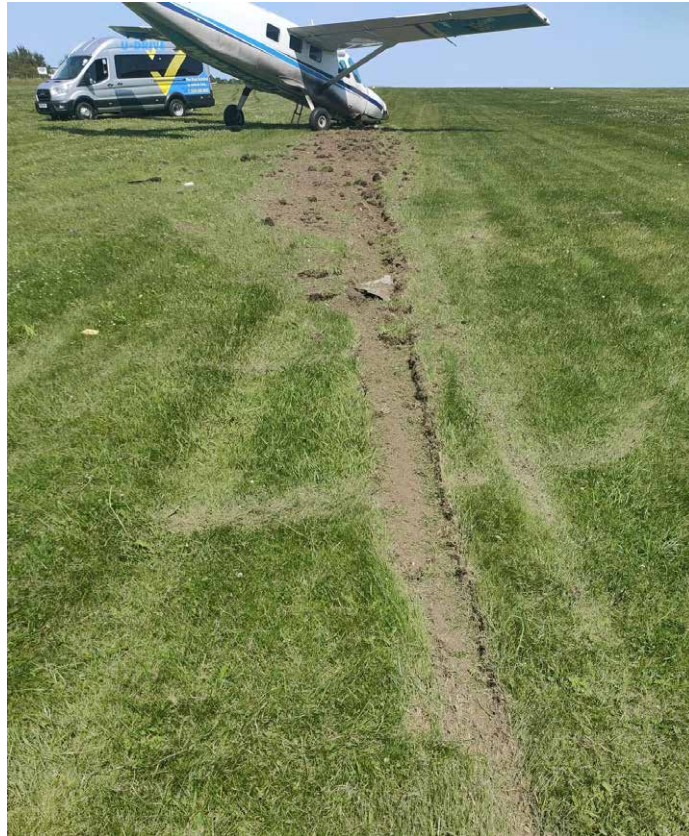


Figure 1

G-OJMP after the accident

Pilot's comments

The pilot commented that the aircraft's technical log was A4 sized. As he deemed this too large to record each flight's details as they progressed, he made his own A5 sized kneeboard. He did not secure his kneeboard on his leg, as it could potentially cause a control restriction. He added that there were no other forms of stowage in the aircraft in which to secure his A5 kneeboard or the A4 technical log.

The pilot said he had developed a habit of not wearing the shoulder straps on the five-point harness. The reason for this was that in parachute aviation he was frequently required to look over his right shoulder into the cabin or his left shoulder to see the parachutist's door or watch the dispatching ground crew. Using the shoulder straps hindered these movements, particularly rightward. While there was a small mirror on the cockpit coaming, he believed it was of limited practical use. During the moments after the landing, he vividly recalled not being able to straighten his upper body, or raise his head, as he had been effectively bent double over the control column during the landing. He added that in future he will always secure the shoulder straps.

He said that he would normally extend the flaps just before the aircraft rolled out on the final approach. He added that he would also normally complete some additional checks on the final approach to ensure the aircraft was correctly configured for landing. These included

checking the flaps were down and the approach was stable. However, he did not have the time to complete these due to the shortened circuit pattern and the distraction. While he was not certain he landed with the flaps retracted, he believes he probably did.

The pilot did not consider a go-around, principally because he was focused on recovering the kneeboard, although he added that executing a go-around would have introduced additional risk given the majority of the parachutists were still landing on the airfield at the time he made the approach. He also felt that had the kneeboard caused a restriction on the rudder pedals during the go-around there may have been controllability issues given that left rudder would have been required when power is applied in a go-around.

As a result of this accident the pilot recommended to the operator that they re-design the technical log so that it can be secured to a pilot's leg without potentially causing a control restriction. He also recommended that all pilots be established on a stable approach no closer than $\frac{1}{2}$ nm from the threshold. At the time of publication, the operator had not responded to these recommendations.

Recorded information

Image recorder

The aircraft was fitted with an image recorder in the ceiling of the cockpit, between the two pilots' seats, that recorded the main instrument panel. The operator had installed it as a means of engine health monitoring.

The recording showed the pilot looking across the cockpit, in the direction of the right footwell, while the aircraft descended downwind. The aircraft entered the finals turn 18 seconds later. The recording ended just as the aircraft rolled out on the final approach at about 250 ft aal. It did not show the pilot reaching into the copilot's footwell to recover the kneeboard.

The final visible rate of descent was about 2,000 ft/min at 350 ft aal (Figure 2). This was just before the aircraft rolled out onto the final approach.

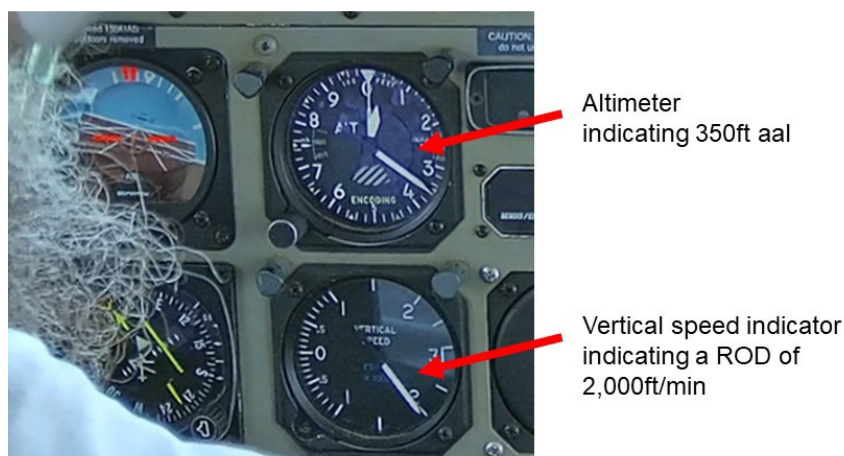


Figure 2

A still from the image recorder showing the ROD at 350 ft aal

Airfield CCTV

The accident was recorded on the airfield's CCTV camera that was pointing towards the threshold of Runway 06. It initially captured the aircraft on the final approach with a steep nose down attitude and a high ROD. The aircraft continued in this attitude until it was very close to the ground, at which point its nose was seen to pitch up abruptly (Figure 3). The aircraft then struck the ground, close to the airfield boundary.

It could not be positively determined from the CCTV if the aircraft had its flaps down during the landing.



Figure 3

A series of stills from the CCTV showing the last moments of the approach

Airfield information

Old Sarum Airfield is a disused airfield within a Parachute Drop Zone. The grass runway is orientated 06/24 and is approximately 792 m long and 18 m wide.

There is an uncropped field in the undershoot of Runway 06. The boundary between the field and the airfield has a berm that is about 7 cm high. The first part of Runway 06 has a pronounced upslope. It is then level for about the next $\frac{1}{4}$ of its length. This flat section then continues until about halfway, at which point the runway starts to gently slope down towards the Runway 24 threshold.

Electronic conspicuity

G-OJMP was not fitted with any kind of electronic conspicuity (EC) device and there were no portable EC devices at the airfield. However, the two aircraft that were used to replace the accident aircraft both had an EC device fitted in the aircraft's panel unit. Furthermore, colleagues of the pilot, who conduct parachuting flights at other locations, have been issued with portable EC devices. These devices may increase the chances of detecting other transient traffic around the drop zone, including gliders.

There is a Department for Transport funding scheme where a rebate of up to 50% of the cost of an EC device can be claimed until 31 March 2022².

Operations Manual

The operator's Operations Manual did not have any guidance on flying a stable approach.

Analysis

Conduct of the flight

The pilot was on his fourteenth flight of the day, with the previous 13 being uneventful. Conscious that some gliders may be flying close to the airfield he elected to fly a tighter than normal circuit pattern to try to mitigate any potential conflict.

The pilot was not able to visually acquire the gliders and there was no EC device in the aircraft that may have assisted him with his situational awareness. Had he had a better awareness of where the gliders were, perhaps aided by an EC device, his perceived need to fly an abbreviated circuit and approach might not have been necessary. The shorter circuit pattern gave him less time to deal with any possible distractions during the approach.

The image recording showed the pilot looking across the cockpit, in the direction of the right footwell, while the aircraft descended downwind about 18 seconds before the aircraft entered the finals turn. The pilot recalled that it was while on the downwind leg that the kneeboard fell into the footwell. The recording ended just as the aircraft rolled out on the final approach at about 250 ft aal. It did not show the pilot reaching into the footwell to recover the kneeboard.

Footnote

² See this link for more details: <https://www.caa.co.uk/General-aviation/Aircraft-ownership-and-maintenance/Electronic-Conspicuity-devices/> [Accessed February 2022]

Any attempt to recover a loose article from the floor of an aircraft, while maintaining control, would need to be carried out very cautiously. However, doing so during the final 200 ft of an approach required the pilot to stop concentrating on the key priority of flying the final approach and introduced risk at a critical stage of flight. Having retrieved the kneeboard and looked up again, the aircraft was at such a low altitude that a late and abrupt pitch up was required to arrest the high ROD. Had the pilot needed an extra second or two to retrieve the kneeboard there would not have been time to make any input and the aircraft would have struck the ground in the undershoot. This would probably have led to a much worse outcome for the pilot, especially as he was not wearing the shoulder harness.

The pilot did not wear the shoulder straps as he believed they restricted his movement in the cockpit. While this seems to have given him the ability to reach into the footwell to retrieve the kneeboard, had he been wearing them he would not have been able to reach the kneeboard. This may have caused him to disregard the kneeboard and concentrate on the final approach, although he may still have been concerned that the kneeboard may have caused a control restriction on the rudder pedals during the landing. Also, had he been wearing the shoulder straps and still had a landing accident, he would have been secured in an upright posture, thus preventing him from striking parts of the aircraft structure.

The pilot did not consider a go-around because he was focused on the kneeboard. Had he made a decision to retrieve it, soon after it had fallen into the footwell on the downwind leg, he could have flown around at circuit height, or higher, while he retrieved it. Had he flown a go-around after he had decided it posed a risk, and cleared the DZ and climbed to height, he would have been better placed to look inside and recover the kneeboard. Had he had his shoulder straps secured these may have needed to be loosened or unlocked momentarily. The go-around manoeuvre may also have resulted in the kneeboard sliding backwards away from the rudder pedals, thus reducing the risk of them interfering with them before it was recovered. However, the go-around would have introduced additional risk, given the majority of the parachutists were still landing on the airfield at the time.

The pilot discovered that the flaps were up after landing. While he is not certain he landed with them up he feels he probably did. It thus seems that the distraction of the kneeboard, at such a critical stage of flight, caused the pilot to forget to lower the flaps. It also removed the opportunity for him to do his checks on the final approach to confirm the aircraft was appropriately configured for the landing.

Kneeboard

The pilot had made his own kneeboard to record flight details, but he did not strap it to his leg as he felt it could cause a control restriction. Rather, he stowed it under his flight bag on the co-pilot's seat. Had he had a kneeboard that was unlikely to restrict the controls it would not have needed to be placed in an insecure place and the accident may not have happened.

Conclusion

The aircraft landed hard due to the pilot becoming distracted at a critical stage of flight by recovering his kneeboard, which had fallen into the right footwell while on the downwind leg. The primary concern for any pilot, especially during the final approach to land, is to fly the aircraft. Had he disregarded the distraction and continued to land, or performed a go-around before retrieving it, the accident is unlikely to have occurred.