

Accident

Aircraft Type and Registration:	Boeing 737-8AS, EI-EGD
No & Type of Engines:	2 CFM56-7B26/3 turbofan engines
Year of Manufacture:	2010 (s/n 34981)
Date & Time (UTC):	4 October 2023 at 1320 hrs
Location:	London Stansted Airport
Type of Flight:	Commercial Air Transport (Passenger)
Persons on Board:	Crew - 6 Passengers - 103
Injuries:	Crew - None Passengers - None
Nature of Damage:	Right wing leading edge damaged
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	42 years
Commander's Flying Experience:	10,803 hours (of which 7,915 were on type) Last 90 days - 102 hours Last 28 days - 41 hours
Information Source:	Air Accident Report Form submitted by the commander and subsequent enquiries by the AAIB

Synopsis

A ground vehicle collided with EI-EGD when it was turning onto stand across the back-of-stand road the vehicle was travelling on. The vehicle driver may have experienced 'inattentive blindness' and may have been affected by task fatigue. The vehicle operator and airport authority both issued safety notices to airport drivers regarding safe driving practices.

History of the accident

EI-EGD landed on Runway 22 at Stansted and was cleared to taxi to stand D62R at Apron D via Taxiway Juliet. The aircraft entered Apron D at 12 kt with engine 1 N1 at 20% and engine 2 shut down.

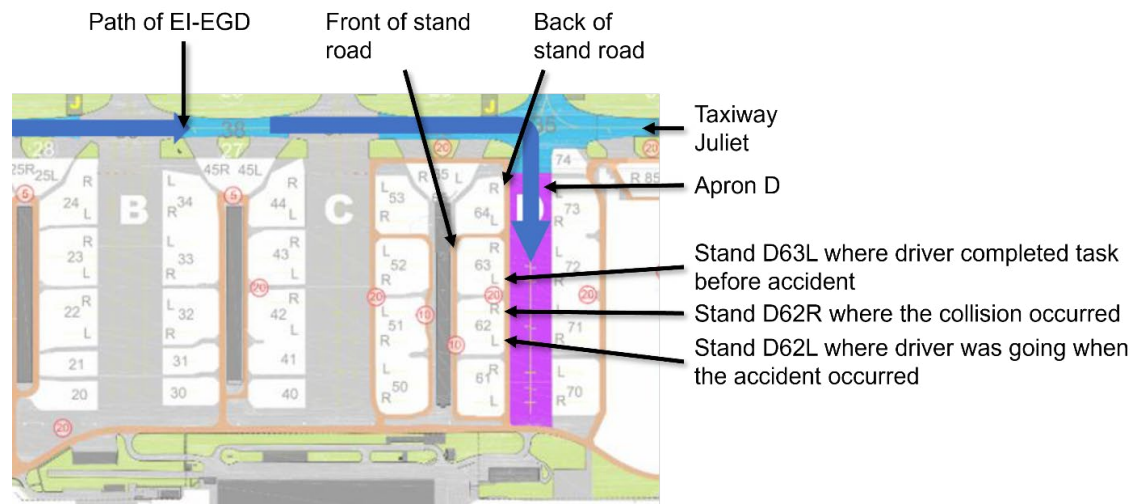


Figure 1
Location map

The vehicle driver reported it had been a busy morning. Data from the vehicle operator showed that he had completed 13 tasks on the day and there had been periods of downtime in between the tasks. The operator reported this was consistent with the time of year.

The driver was initially tasked with assisting a passenger at Stand D62L and went to that location to prepare, but before completing this he was sent to D63L (Figure 1).

The driver attended Stand D63L and loaded his only passenger on to an aircraft. He was then instructed to go back to D62L. The driver reported he felt annoyed by this request and that someone else should be assigned. The driver reversed off the aircraft at D63L and joined the back-of-stand road heading towards Stand D62L. The vehicle was driven along the back-of-stand road at 13 mph. The speed limit was 20 mph.

Meanwhile, the aircraft continued along Apron D towards the allocated stand. The pilots completed a check that the stand entrance and stand area were clear before beginning the right turn on to stand D62R. The co-pilot was pilot monitoring and announced "CLEAR RIGHT". He recalled seeing the vehicle but thought it had stopped. When this check was made the vehicle was travelling towards the back-of-stand road from the rear right of the aircraft parked at Stand D63R and was facing towards EI-EGD. It had not yet joined the back-of-stand road and was not in conflict with the aircraft. Once the co-pilot's check was complete, the pilots' attention turned to the stand guidance system and the personnel and equipment at the head of the stand.

The vehicle joined the back-of-stand road and was travelling parallel to the aircraft in the same direction at a slightly faster speed. The driver did not notice when EI-EGD started to turn across the back-of-stand road on to Stand D62R. When turning on to stand the aircraft was travelling at 10 kt with engine 1 at 24% N_1 .

A ground handling agent was positioned at the head of stand and realised that the vehicle was not going to stop. He attempted to signal to the pilots using hand signals but did not use the STOP button on the stand guidance system and the pilots did not notice him.

Just before the collision, the driver noticed the aircraft, performed an emergency stop and attempted to reverse out of the way but the right wing of the aircraft collided with the roof of the vehicle and then travelled over it. EI-EGD was travelling at 8 kt with engine 1 at 24% N_1 when the collision occurred. At this point the vehicle was behind the cockpit.

During the collision the aircraft's wing passed over the vehicle and the vehicle ended up behind the right wing. The vehicle was then driven behind EI-EGD and stopped on Stand D62L next to the back-of-stand road where the driver reported the accident to the relevant parties. The damage to the aircraft is shown in Figure 2.



Figure 2
Damage to the aircraft

Accident location

Apron D at Stansted is a busy location with a high number of aircraft and vehicle movements. On the side where the accident occurred there are roads at both the front and rear of the aircraft stands. There are no airbridge facilities and passengers cross the front-of-stand road on foot to reach the terminal on arrival. To reduce risk of harm to passengers, the front-of-stand road is one-way and has a lower speed limit of 10 mph. On the back-of-stand

road there is the potential for conflict with other vehicles and aircraft that are pushing back or entering the stand. Aircraft pushing back are protected by a ground handler who stands on the back-of-stand road and signals to approaching vehicles to stop. There are no similar provisions for aircraft turning onto stand.

Recorded information

CCTV footage showed the aircraft and vehicle movements. Aircraft were boarding at stands D63L and D62L. There were no other vehicle movements along the back-of-stand road or the road between Stand D63L and D62R during the time when the accident vehicle was driving from D63L to D62L.

The vehicle was fitted with an external 360° camera system and an internal behaviour monitoring system. The internal system faced to the rear of the vehicle and captured the driver's actions and head movements before the collision.

The aircraft FDR and CVR were available.

CCTV footage, internal vehicle system recordings and the CVR were synchronised and used to examine the timeline and driver's glance behaviour. The vehicle was reversed away from the aircraft at D63R then driven forwards towards the back-of-stand road. Travelling forwards took about seven seconds and during this time the driver made three distinct glances through the left window along the back-of-stand road and one glance to the right along the road.

At this point EI-EGD was directly ahead of the vehicle. The co-pilot announced "CLEAR RIGHT" just before the vehicle joined the back-of-stand road about 15 seconds before the collision.

While driving on the road, the driver's attention appeared to be focused through the front window. There were no obvious glances through the left window towards the aircraft or to the right towards the stand guidance or activity at Stand D62R. EI-EGD started to turn on to stand about 11 seconds before the collision and the driver appeared to notice the aircraft about 5 seconds later.

Vehicle information

The Bulmor SideBull OMNI 135 (Figure 3) was used to transport passengers requiring assistance between the terminal building and aircraft. This vehicle type can engage with aircraft under the operation of one driver. The vehicle at the time was serviceable with pre-use inspections having been completed on the day and several days prior.



Figure 3

Example Bulmor SideBull OMNI 135 vehicle

The vehicle provided a wide direct field of view through the windows as shown in Figure 4 with some obscuration caused by the vehicle structure. Vision to the rear was enhanced with multiple mirrors and the camera system.



Figure 4

Views from the front and left side windows



Figure 5
Damage to the vehicle

Personnel

The vehicle driver began work in the airport environment in March 2023 and gained his airside driving permit in April 2023. Training for the Bulmor SideBull vehicle was completed in June 2023.

At the time of the accident, the driver was working his first shift after four rest days. The driver's first task was at 0526 hrs. The driver's pre-licence medical and post-accident drugs and alcohol testing showed nothing of concern.

The driver had been involved in a collision with another vehicle six weeks before this one.

The vehicle driver commented that he felt that more time was needed for each job and that there was an unfair distribution of work. He stated that he found driving on the airport "unnerving" due to the other vehicles and had previously reported a near miss with another vehicle. He stated that, in general, when driving on the back-of-stand road he was most conscious of looking out for other vehicles and aircraft that might be about to push back.

Research

The phenomenon of 'look but don't see' errors or inattention blindness is well researched. It was demonstrated in the classic gorilla experiments by Simons and Chabris (1999)¹ where participants watched a video of two teams, one wearing white and one wearing black, passing a ball around. Participants were asked to count the number of passes made by the white team. During the video, another figure in a black gorilla suit walks through the scene. About half of the participants didn't see the gorilla even though it was visible and attention grabbing. The '*Selective attention test*' video can be viewed at <http://www.dansimons.com/videos.html>.

Analysis

All the taxiing speeds were in accordance with the operator's procedures. The pilots completed a visual check before the turn on to stand but when the check was completed the vehicle was not in conflict with them. By the time the vehicle started to come into conflict with the aircraft, the pilots' attention had moved to the stand guidance system, and they were concentrating on accurately parking according to that system. Taxiing on to stand, particularly with one engine shut down, is a challenging manoeuvre that requires accuracy and focused attention.

The pilots did not see the signals from the ground handler as their attention was focused on the stand guidance. Use of the STOP function of the stand guidance system would have been a more effective way to signal to them.

The vehicle provided a good overall field of view and the obscuration caused by the vehicle structure was not sufficient to hide EI-EGD. The aircraft was visible through the windows and the vehicle design did not contribute to the accident.

The vehicle was driven below the speed limit and the vehicle driver appeared to be attentive but either did not see the aeroplane or saw it but did not anticipate that it would turn on to the stand. The internal vehicle CCTV showed that when the driver was about to join the back-of-stand road, most of his attention was to the left and right along the road rather than straight ahead where the aircraft was passing. When travelling on the road, most of the driver's attention was ahead along the road, and not to the left where the aircraft was beginning to turn or towards the stand area where the driver may have noticed clues that an aircraft was about to arrive, such as the stand guidance system and the ground handler.

The driver described his primary concern in that environment as being other vehicles and aircraft pushing back. Although, at this time, there were no other vehicles or aircraft pushing back, the driver's visual behaviour was consistent with searching for them and little attention was directed towards the taxiway on his left. As demonstrated in the invisible gorilla experiment, when searching an environment, humans 'tune' their search pattern and attention to the specific stimuli they are searching for. This makes those specific stimuli

Footnote

¹ Simons, D.J and Chabris, C.F. (1999). Gorillas in our midst: Sustained inattention blindness for dynamic events. *Perception*, vol 28, pages 1059 – 1074. See www.dansimons.com for further information.

more likely to be noticed but other stimuli are less likely to be noticed even when they are highly conspicuous. The inattentional blindness phenomenon may account for the driver not seeing EI-EGD even when it was clearly visible.

The vehicle operator will conduct a review of the training process for Bulmor drivers and increase active and visible supervision. The external and in-vehicle footage captured by the Bulmor SideBull vehicles provides a resource that could potentially be used as a coaching tool during training and on-going competency assessment to improve drivers' visual search.

The driver was relatively inexperienced in the airport environment and his account and history suggested that he found it challenging. The driver reported that it had been a busy morning and he felt annoyed about the way that jobs were allocated. Although the number of tasks was consistent with the time of year and not unusually high, this individual driver was potentially feeling fatigued by the workload that day and distracted by his emotional response to the last-minute tasking. These factors may have reduced his performance.

The environment and operational context in Apron D is challenging for all drivers. There are lots of opportunities for conflict between vehicles and aircraft. On the back-of-stand road in particular, conflicts can arise from any direction. When workload is high, drivers and pilots are fatigued and everyone is trying to achieve fast turnaround times, it is not surprising that visual searches will not always be completely thorough, especially considering phenomena such as inattentional blindness. Safety could be improved if the layout or operating rules of the stands and roads could be changed to increase the predictability of the behaviour of other vehicles and reduce the number of different directions from which conflicts could arise. The airport authority plans to evaluate the current road layout and design and to consider whether any modifications can be made without introducing new risks.

Conclusion

A Bulmor SideBull OMNI 135 vehicle collided with EI-EGD because the vehicle driver did not see the aircraft or did not anticipate it would turn onto stand. The driver may have experienced inattentional blindness and his performance may have been reduced by the fast operating tempo, high workload and task related fatigue. The stand and road layout in the area created the potential for conflict between vehicles and aircraft to arise from any direction.

Safety action

Following this event, the vehicle operator and airport authority both issued safety notices to airport drivers regarding safe driving practices. The airport's safety notice drew attention to clues that drivers can use to recognise that an aircraft would soon be turning on to stand, such as the presence of personnel and equipment at the head of stand and the activation of the stand guidance system.