
Aircraft collision with fuel truck, involving a Boeing 737-200, EI-CKR, at Dublin Airport, on 2 April 1999

Micro-summary: While taxiing to park, this Boeing 737-200 scraped a fuel truck.

Event Date: 1999-04-02 at 0854 UTC

Investigative Body: Air Accident Investigation Unit (AAIU), Ireland

Investigative Body's Web Site: <http://www.aaiu.ie/>

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AAIU Report No. 1999/018
AAIU File No. 19990016
Published 30/11/1999

Aircraft Type and Registration: Boeing 737-200 EI-CKR
Date and Time (UTC): 2 April 1999 at 08.54 hrs
Type of Flight: Public Transport
Persons on Board: 130
Injuries: Nil
Nature of Damage: No damage to the aircraft
Information Source: Aer Rianta Duty Officer, Dublin Airport

Synopsis

The incident was notified to the Air Accident Investigation Unit (AAIU) by the Aer Rianta Duty Airport Manager at 09.07 hours approx. on 2nd April 1999.

The aircraft, which was on a scheduled passenger flight from Stansted, landed on runway 10 at Dublin Airport at 08.51 hours and taxied to Stand 18. On approaching Stand 18 the aircraft struck a fuel truck and trailer which was about to be used to refuel an aircraft on the adjacent Stand 17. The aircraft port wing rode over the top of the trailer causing a small chip to the paint on top of the trailer. There was no apparent damage to the aircraft. The wing then settled clear of the trailer as the passengers exited the aircraft. None of the witnesses present observed the actual moment of impact between the aircraft and the trailer.

1. Factual Information

1.1 History of the Incident

The aircraft EI-CKR landed on Runway 10 and the Captain taxied the aircraft to Stand 18 via taxiway Bravo One and the inner apron taxiway. As the aircraft taxied forward to the stand the flight crew became aware of another aircraft EI-CNV on Stand 17. Between it and their aircraft was a fuel truck and its trailer. They also observed the marshaller ahead of them and the engineer beside the ground power unit slightly to their right.

As the aircraft continued along the yellow taxiline under the guidance of the marshaller, the port wing approached the rear of the trailer.

The fuel truck operator who was about to refuel the aircraft on Stand 17 had reeled out the fuel hose. When he saw EI-CKR approaching Stand 18 he reeled the hose back in. He went to the rear of the trailer and observed the engineer from Stand 17, with his arms crossed, shouting to the marshaller in order to have EI-CKR brought to an immediate stop. At this point the aircraft braked and came to a stop with the nose wheel practically on the hammerhead (a designated point on stand on which the nose wheel is placed).

As the tip of the port wing neared the top of the trailer the wing forward slat impinged on the trailer top surface causing a small chip of paint to be removed from the trailer top surface. The aircraft settled with the forward slat about 4 inches from the trailer top surface and this distance increased as the passengers disembarked and the aircraft lightened.

At 08.57 hours the First Officer requested ATC clearance for the positioning flight back to Stansted unaware that this incident had taken place.

The Stand 18 engineer informed the Captain of the incident and together they examined the aircraft. At 09.12 hours the Surface Movement Controller (SMC) approved pushback and start but informed the First Officer that there was a fire vehicle behind his aircraft. By this time the Fire Prevention Officer and members of the Airport Police had arrived to preserve the scene and to interview witnesses including the Captain and First Officer. At 09.40 hours both the aircraft on Stands 17 and 18 and the truck and trailer were released by the Duty Airport Manager.

1.1.2 Eyewitness recollections

Personnel who were on or in the general vicinity of the stand at the time in question were interviewed, over a number of days, after the accident. See FIG 1. for probable location of witnesses.

The Aircraft Operator's ramp co-ordinator (Witness No 2) assistant ramp co-ordinator (Witness No 9), and line foreman (Witness No 4) arrived following the incident.

The ramp co-ordinator was notified of a power failure in the baggage hall area at 07.30 hours. Every available person was drafted into the Aircraft Operator's baggage area. They had to use flash lamps up through the belt shaft to try and clear the luggage down to the baggage hall.

He said power was reconnected at 08.50 hrs and his area was the last area to be connected. When he examined the fuel trailer and aircraft he found the wing and trailer 6 inches apart. At 09.10 hours the fire service, Airport Police and Fire Prevention Office (FPO) arrived. The doors of the aircraft had been closed in preparation for departure. The Captain was seeking push-back clearance.

The assistant ramp co-ordinator was at Boarding Gate A12 at the time of the incident. After handing a load sheet to the Captain of the aircraft on Stand 16 he went to talk to the fuel truck operator. He observed that at that time there was about 1" to 2" between the wing and the trailer. The fuel truck operator said at that time that no contact was made between the aircraft and trailer. He observed that the nose wheel of the aircraft had come to a stop just off the hammerhead. He indicated that electrical power in the Aircraft Operators baggage area was restored at 08.30 hours.

The line foreman-engineer arrived shortly after the incident and noticed paint removed from the top of the fuel trailer. He inspected the aircraft and signed it off as a suitable for flight. When he arrived the fuel trailer and aircraft were not then in contact.

Witness No. 1

This witness was on Stand 17 and he was about to help in the off loading of the aircraft on Stand 17. He had been assigned as marshaller on Stand 18 and when he saw the aircraft approaching he ran down to act as marshaller. As he was marshalling in the aircraft he realised that there was insufficient clearance between the aircraft and the fuel truck and trailer stationed between Stands 17 and 18. He then signalled the aircraft to stop. The aircraft stopped short of the hammerhead and did not move thereafter. On examination, Witness No.1 concluded with the fuel truck operator that the aircraft and trailer were very close but not in contact.

He said that earlier the belt in the baggage hall had failed due to a power cut and staff from the ramps had to go to the baggage hall to help out. On his return, "everything happened so fast" and he did not pay special attention to the position of the fuel truck and trailer. It was normal for fuel trucks to be in such positions during refuelling operations.

After the aircraft had come to a stop he called for the engineer on EI-CKR to have a look at the aircraft. He did not see the engineer from Stand 17 (Witness No. 3) coming towards him with his arms crossed (indicating to stop the aircraft) when he was marshalling the aircraft.

Witness No. 3

This witness was assigned as the engineer to EI-CNK on Stand no. 17. When he heard the aircraft come to the adjacent Stand 18 he thought that the fuel truck and trailer which had arrived to refuel his aircraft might be very close to Stand 18. He tried to get the attention of the marshaller on Stand 18 to get him to stop the aircraft immediately. He was facing towards the marshaller giving him the emergency stop signal. The aircraft came to a stop with the nose wheel about 30 cm from the normal stop position. He was convinced there had been no contact between the fuel trailer and the aircraft.

The Captain of the aircraft did not give any indication that he was responding to the signals being given by the witness. Witness No.3 indicated that the fuel truck operator had called his superiors who had alerted the airport fire service. He then returned to Stand 17 and his aircraft. The FPO arrived and preserved the scene on Stand 17 and 18.

This witness recommended the installation of emergency telephones at strategic points on the ramp.

Witness no. 5

This witness was assigned as Ramp Agent team leader for EI-CKR when that aircraft came in. The electricity power supply had failed in the baggage hall area prior to the arrival of the aircraft and most of his crew were in this area. He said that 80% of the ramp crew were in the baggage hall during the power failure.

They received a call that the Operator's aircraft were coming in earlier than expected. He had marshalled in the aircraft on Stand 17. He heard shouts and the aircraft on Stand 18 had just come to a stop. In his estimation, the aircraft and trailer did not make contact.

He said that they were about to push back EI-CKR when the FPO prevented the movement of the aircraft. The aircraft, due to position to Stansted, did not require fuel and had no passengers on board.

Witness no. 6

This witness was First Officer on EI-CKR. He was PNF (pilot not-flying) when the aircraft landed on Runway 10. The aircraft taxied on Bravo Two via the apron, made a right hand turn on to Stand 18. He observed the aircraft on Stand 17 and the fuel truck and trailer on that stand.

He was monitoring the right hand side of the aircraft. Everything was normal. They were marshalled on to the stand and the aircraft stopped in response to the marshaller.

The aircraft engineer then came on board and as the Captain and the engineer were both speaking in broken English, he did not know what they were talking about. He realised that there was some concern when the engineer and Captain both left the cockpit to inspect the aircraft. He went to the bottom of the steps for a short period before returning to the aircraft. He was not aware there was a fire engine behind the aircraft when he initially requested pushback. The aircraft crew were alerted to this by ATC.

Witness No. 7

This witness was the fuel truck operator attending EI-CNV on Stand 17. He received his training as a truck operator and driver in the RAF and was 1 year with his present employer.

When he arrived Stand 18 was empty. He parked the truck and trailer with the cab of the truck about 6 ft from the wing tip. He connected the bonding cable and was about to connect the refuelling hose to the aircraft when the engineer (Witness No. 3) who was giving him the fuel requirement figures saw EI-CKR coming on to Stand 18. The witness saw the engineer go to the rear of the trailer to ensure that the aircraft had sufficient clearance to come onto the stand. Witness then saw the engineer with his arms crossed indicating that the aircraft should stop immediately. Witness did not feel comfortable and without refuelling the aircraft on Stand 17 he reeled in the hose. He said that the outer 3 feet of the wing ended up suspended over the fuel trailer. He could not move the fuel trailer because the contact between it and the wing as he viewed it at that stage was "wafer thin". He informed his superiors of the incident and said that he could not refuel the aircraft on Stand 17. When he went back, the passengers from EI-CKR were disembarking and the wing had settled away from the fuel trailer to a distance of 1 inch.

After further inspection he observed that there was a chip of paint missing from the top of the refueller at a point directly in line with the nearest point of the wing. He was satisfied that the aircraft and trailer had touched. He did not move the trailer until after EI-CKR pushback.

He indicated that the ramp agent would normally instruct him when he could refuel an aircraft, as the ramp agent would be in control of vehicles servicing the aircraft on the stand. He commented that it was sometimes difficult to find a parking position near the aircraft.

Witness No. 8

This witness was the engineer assigned to Stand 18 and specifically to EI-CKR. He was not directly employed by the Operator but was leased through a manpower leasing agency on a temporary basis. He had worked at a foreign airport previously and indicated that all vehicles attending an aircraft at that airport have a specific parking location while on a stand.

It was, in his opinion, difficult to drive and park such a long fuel vehicle in the stand area. He observed the engineer from Stand 17 (Witness No. 3) shouting in order to have EI-CKR brought to an immediate stop.

Witness No. 10

This witness was the Captain of EI-CKR.

The aircraft landed on Runway 10 and left the runway on taxiway Bravo One via inner taxiway on apron and turned right on to Stand 18. He observed the truck on his left and the marshaller straight ahead. He continued to look to his left side.

He saw a member of the ground staff in a yellow jacket indicating that the clearance was sufficient. He continued to observe this member on his left and the marshaller. He taxied slowly and stopped when the marshaller told him to do so.

The aircraft was being prepared to fly back to Stansted without passengers and did not require a fuel uptake. After 15 or 20 minutes the engineers came to the cockpit and said there had been light contact between the aircraft and the fuel trailer. He said that a small amount of paint had been removed from the top of the trailer (thumbnail size) but that the aircraft was fit for flight. The doors were then closed and stairs retracted in preparation for pushback.

Then the Captain saw the fire service and police and was informed by the engineer that an investigation was in progress. He went out and observed that the distance between the wing and the trailer was about 6". He said he could see a mark on the fuel trailer from the ground but did not get on to the trailer. He did not observe any mark on the wing of the aircraft.

Witness No. 11

The witness was a ground crewmember and stated that he was not designated to assist with EI-CNV on Stand 17 but initially thought that his assigned aircraft was coming on Stand 17. He was driving the mobile steps vehicle (float) which he put up to the rear passenger door of EI-CNV on Stand 17. He then saw his aircraft, EI-CKR, coming on to Stand 18 from the direction of Link 3. He drove his float around to the rear of EI-CNV and drove past the front of the fuel truck. He then became alarmed at the closeness of EI-CKR and the fuel truck and trailer and jumped out of the float. Avoiding the incoming aircraft's engines, he went around to the rear of the trailer. He saw the engineer on Stand 17 (Witness No. 3) with his arms crossed in the air, hands clasped indicating to the marshaller to bring the aircraft to a stop and apply the brakes. He did the same action but the aircraft had just stopped.

He had a conversation with the fuel truck operator who understood at the time that no impact had taken place. However, the fuel truck operator later confirmed that an impact had, in fact, taken place.

1.2 Injuries to persons

There were no injuries sustained by crew, passengers, ground crew or others.

1.3 Damage to aircraft

There was no apparent damage to the aircraft.

1.4 Other damage

There was a chip of paint, approximately 1 inch long removed from the top of the trailer.(See Fig.2)

1.5 Aerodrome Information

1.5.1 Apron area

Stand 18 is located at the extreme end of Pier A such that the yellow taxilines to the stop line on Stand 17 and Stand 18 are on a converging angle. In addition, the yellow taxiline for Stand 19 also converges with that of 18.

When Stand 19 is used for wide-bodied aircraft, Stand 18 and Stand 20 cannot be used.

The ICAO recommendation (Annex 14 Vol 1 Chap. 3.12.6) is as follows:-

An aircraft stand should provide the following minimum clearances between an aircraft using the stand and any adjacent building, aircraft on another stand and other objects.

Code Letter	Clearance	Wing Span
A	3m	up to but not including 15M
B	3m	15M up to but not including 24M
C	4.5m	24M up to but not including 36M
D	7.5m	36M up to but not including 52M
E	7.5m	52M up to but not including 65M

When special circumstances so warrant, these clearances may be reduced at a nose-in aircraft stand, where the code letter is D or E:

- (a) *between the terminal, including any fixed passenger bridge, and the nose of an aircraft; and*
- (b) *over any portion of the stand provided with azimuth guidance by a visual docking guidance system*

Note:- On aprons, consideration also has to be given to the provision of service roads and to manoeuvring and storage area for ground equipment.

Stand 18 is used for aircraft with a wing span not exceeding 28.9m. The clearance required is 4.5m.

1.5.2 Loss of baggage area power supply

The Airport Operator informed the investigators that the power supply failure was limited to the baggage hall area and extended from 07.15 to 08.00 hours on 2/04/99. Because it was a submain failure the stand-by plant did not operate during this time.

1.6 Apron Safety, regulation, monitoring and enforcement

Responsibility for the control of apron surface traffic rests with the Airport Operator. As stated in the Airport Directive No 2 *"in pursuance of this responsibility the Airport Authority will regulate the parking of aircraft, and the movement of vehicles, equipment and pedestrians on the apron"*

Section 5.2.1 of the Directive under marshalling states that *"it is the responsibility of the Airport Authority to provide marshalling of aircraft at Dublin Airport. Marshalling services may be delegated to a designated Handling Agent or contracted Handling Agent or contracted Handling Agents"*.

In this case, marshalling services have been delegated to the aircraft operators. Monitoring and policing of ground handling companies at Dublin Airport is carried out by the Airport Operator on an on-going basis. If any breaches of ramp safety are observed, they are brought to the attention of the offending company.

1.7 Additional Information

The U.K. Civil Aviation Authority (CAA) have published a guidance document entitled "Airside Safety Management" (CAP 642) in response to the need for guidance about safe operating practices for all those engaged in activities taking place on the airside areas of airports and aerodromes.

With the support of industry and the UK Health and Safety Executive, the UK CAA established a joint Working Group to look at specific issues concerning aircraft and personal safety in the ground handling phase of airport operations. The move was in general accordance with the views of the UK Air Accident Investigation Branch. The advice and guidance in CAP 642 is best described as 'Acceptable Good Practice' and represents an acceptable way of achieving a safe standard. It illustrates how risks might be identified and provides advice about how airside safety can be placed within the context of a systematic and structured management approach - a Safety Management System.

1.7.1 Training and Training Records

Training records were provided for the following personnel:

1. Marshaller, Witness no. 1
2. Ramp Agent - Team Leader, Witness no. 5
3. Assistant Ramp Co-ordinator and Dispatcher, Witness no. 9
4. Crewman, Witness no. 11

The marshaller had undergone an operators "Ramp Safety Course" which included instruction in aircraft marshalling. The certificate was undated and was not signed by the Ramp Manager as required. Most of those interviewed did not adversely comment on the training received but expressed concern at the degree of training being received by those employed under agency contract. They further stated that the classroom training was minimal.

2. Analysis

A number of factors combined to cause this incident:

Under normal circumstances, the aircraft operators turn round time schedule requires that ramp staff and servicing vehicles are highly synchronised in order that aircraft arrive and depart at the published times. This imposes a considerable amount of pressure on all ramp staff.

On the day in question the electricity supply failed in the baggage area and this necessitated the majority of the Operator's ramp staff to be called to the baggage area to clear bags from the belts which could not be operated. To do this, some staff operated in darkness with their hand wands converted into torches.

The exact duration and timings of the power out given by the witnesses and airport operator do not agree. However, it is apparent that some areas of the baggage hall had power restored before others. This is a normal occurrence in fault finding and subsequent power restoration.

It is clear that the effects of this power outage were felt for some time after power was restored.

It being Good Friday morning, the passenger movement through the airport was heavier than normal. To compound the problem, some of the Operator's aircraft arrived early and needed to be marshalled on to their stands. The marshaller for EI-CKR was one of those working in the baggage hall when, at short notice, he was called to the ramp area.

The fuel truck operator driving a truck and trailer of total length of 20 metres was detailed to refuel EI-CNV on Stand 17. He positioned the vehicle so that the fuel dispensing control cabinet was nearest to the aircraft's starboard wing. The position that he took up, however, meant that the trailer section protruded into the Stand 18 area. This caused an obstacle and a hazard to any aircraft approaching along the taxiway of Stand 18. There were no markings to indicate the division between Stands 17 and 18.

At least two members of the ground crew attending EI-CNV on Stand 17 ran forward with their arms waving and hands crossed to try to capture the attention of the marshaller and the cockpit crew of EI-CKR on Stand 18. The marshaller appears not to have seen them.

The Captain and First Officer first became aware of the fuel truck and trailer when turning onto Stand 18. The Captain observed the trailer to his left hand side and continued to taxi forward observing the clearance between the wingtip and the trailer. When he could no longer be certain of the clearance due to his angle of approach as the trailer passed to his left behind him, he noticed a "ground staff member" indicating to him that the clearance was sufficient.

The marshaller was also indicating to continue moving. He stopped the aircraft when instructed by the marshaller. The Captain was unaware of the incident until informed by the ground engineer some 15 to 20 minutes later.

The investigation failed to find the identity of the "ground staff member" mentioned by the Captain of the aircraft. There may indeed have been another witness giving signals to the cockpit crew but the basis of normal marshalling is that the flying crew respond only to the marshallers signals.

The marshaller indicated that he signalled the pilot to stop the aircraft when he became aware that the trailer was impeding the path of the aircraft. He believed that the pilot did stop the aircraft but that the aircraft rolled forward a few feet to just short of the hammerhead. However, the aircraft should not have been guided to a position where rolling a few feet might cause a collision. At the same time, it would have been in the interests of airside safety had the Captain of the aircraft elected not to approach the stand when the fuel trailer was obviously protruding between stands. However it may not have been clear to the Captain due to the distances and angles of sight involved, that the clearance was diminishing rapidly.

A witness stated, that Stands 16, 17 and 18 have no red lines on the apron surface to indicate the boundaries of each. This was confirmed by the investigation. In addition, because Stand 19 is used for wide-bodied aircraft, markings on Stand 19 would necessarily overlap Stand 18. Another witness indicated that in other airports with which he is familiar, it is customary to have designated vehicle parking spaces on aircraft stands.

The investigation is satisfied that many of those present were not in a position to have actually witnessed the contact between the aircraft and the trailer. The chip in the paint work at the top of the fuel trailer, as pointed out to the investigators by the fuel tanker operator, could not have been seen from the ground. It should be noted that the fuel tanker operator was the only person to climb to the top of the trailer immediately after the event in order to inspect the trailer.

The importance of whether or not the aircraft actually made contact with the trailer, however lightly, is to a large degree unimportant. The fact that it was some 12 minutes after the event that the Fire Prevention Officer was informed is sufficient indication of the general lack of awareness and understanding of the potential for a disaster that existed at the time.

One indication that operational pressures might have affected airside safety standards is indicated by the fact that eighteen minutes after arriving on Stand 18 the First Officer requested push back and was unaware that a fire engine was positioned directly behind his aircraft.

3. Conclusions

- 3.1 The investigation found that the aircraft wing did make contact, however lightly, with the fuel trailer.
- 3.2 The fuel truck and coupled trailer obstructed the safe entry of EI-CKR on the Stand 18.
- 3.3 The marshaller continued to marshal his aircraft along the taxiline and did not signal the flying crew in sufficient time for them to bring the aircraft to a stop at a safe distance from the fuel trailer.
- 3.4 The electrical power failure at the airport baggage area prior to the incident had an adverse effect on the safe handling of aircraft on the ramp as the majority of ramp staff were under pressure to clear the baggage and marshal/turn round the aircraft.
- 3.5 The aircraft operator failed to notify the incident to the airport operator within a reasonable time contrary to laid down airport procedures.
- 3.6 Stand markings, or lack thereof, on Stands 17, 18 and 19 are misleading and confusing, leading to potential misjudgements.

4. Safety Recommendations

- 4.1 The airport operator, Aer Rianta, should review the practice of permitting fuel trucks with trailers coupled to operate on stands where the adjacent stands converge such as Stands 17 and 18, unless there are clearly designated areas for parking of servicing equipment on the stand. **(SR 51 of 1999)**
- 4.2 The IAA should set up a working group consisting of the IAA, Airport Owner, and representatives of the different ground handling agencies/companies to formulate a set of requirements/criteria for the management and operation of airport apron areas, thereby providing a standard against which these operations will be audited and monitored. **(SR 52 of 1999)**

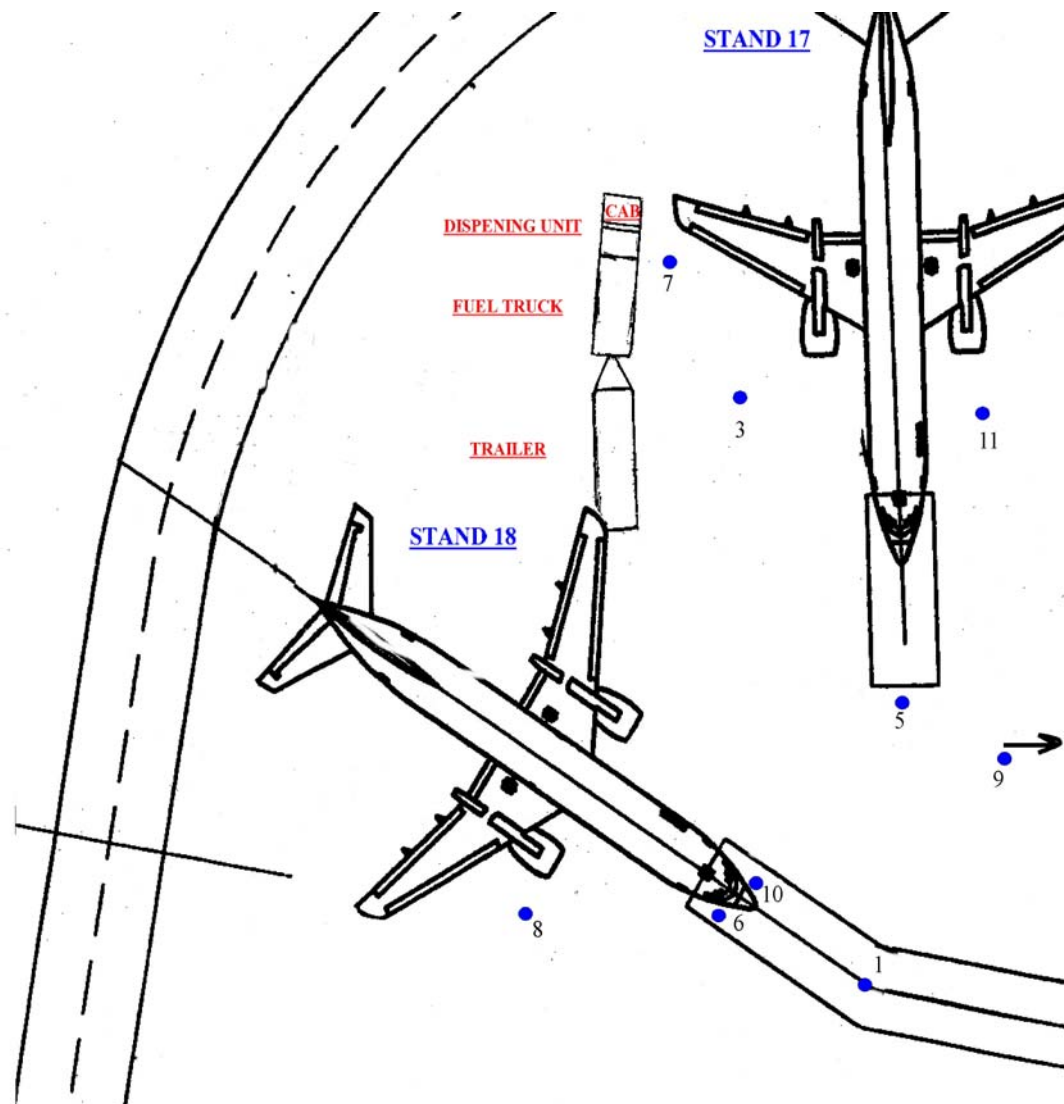
Note: A similar safety recommendation to the above was previously recommended in Report Series 1/98. It was SR 4.2 in that report. It is now coded as SR 31 of 1998

- 4.3 That within this IAA sponsored working group the CAA CAP642 document be considered as a basis for the working group deliberations. **(SR 53 of 1999)**

Note: A similar safety recommendation to the above was previously recommended in Report Series 1/98. It was SR 4.2 in that report. It is now coded as SR 32 of 1998

- 4.4 Although there are no ICAO requirements to have detailed stand markings there is clearly a need for division lines between stands at this airport. The airport operator, Aer Rianta, should review its position on this. **(SR 54 of 1999)**
- 4.5 Employers of ramp staff at Dublin Airport should ensure that improved training is provided for all ramp staff. A syllabus of training, including classroom training should be established and conducted by the aircraft operator. This training should be audited by the airport operator on a regular basis. **(SR 55 of 1999)**

Note: Subsequent to this incident the Aircraft Operator has reviewed ground operations training documentation in regard to ramp operations and produced numerous amendments and additions.

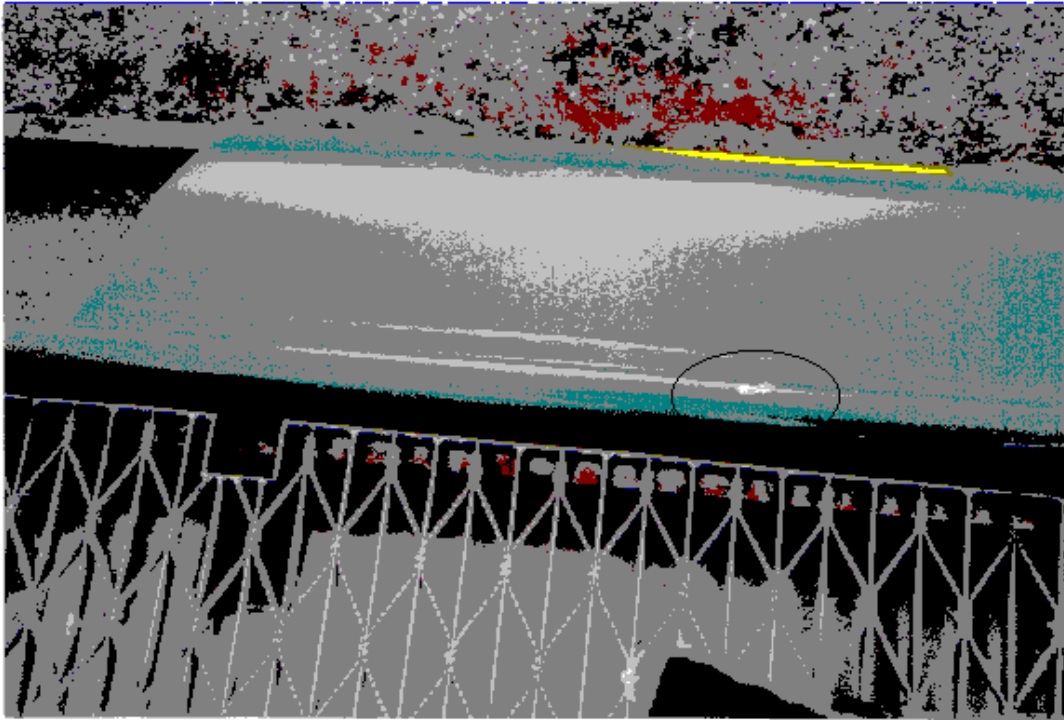


Interviewees

- | | |
|------------------------------|-----------------------------------|
| 1 - Marshaller | 7 - Fuel Truck Operator |
| 2 - Ramp Co-Ordinator * | 8 - Engineer - Stand 18 |
| 3 -Engineer - Stand 17 | 9 - Asst. Ramp Co-Ordinator * |
| 4 Engineer -Line Foreman * | 10 - Captain EI-CKR |
| 5 - Ramp Agent - Team Leader | 11 - Ground Crew - Stands 17 & 18 |
| 6 - F.O. EI-CKR | |

* arrived later

Fig 1



AREA OF DAMAGE TO TOP OF TRAILER

FIG. 2