

DATA SUMMARY

LOCATION

Date and time	Wednesday, 6 July 2011 at 13:40 UTC¹
Site	Marseille FIR/Girona Airport (LEGE)

AIRCRAFT

Registration	EI-DLW
Type and model	BOEING 737-800
Operator	RYANAIR

Engines

Type and model	CFM 56-7B26
Serial Number	2

CREW

	Captain	Copilot
Age	39 years old	33 years old
Licence	Airline Transport Pilot (ATPL)	Commercial Pilot (CPL)
Total flight hours	9,000 h	4,000 h
Flight hours on the type	7,000 h	2,050 h

INJURIES

	Fatal	Serious	Minor/None
Crew			6
Passengers			116
Third persons			

DAMAGE

Aircraft	None
Third parties	None

FLIGHT DATA

Operation	Commercial air transport – Scheduled – International – Passenger
Phase of flight	Cruise

REPORT

Date of approval	28th June 2012
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¹ All times in this report are UTC unless otherwise specified.

1. FACTUAL INFORMATION

1.1. History of the flight

The B737 aircraft was flying from Pisa to Las Palmas de Gran Canaria. About a half hour after takeoff, at around 13:20, the copilot told the captain that he was feeling ill and had a headache, at which point the captain took over the aircraft's controls.

Seconds later the copilot started feeling nauseous and shaking, failed to respond to the captain's answers and eventually fainted. Upon noticing this, the captain requested the purser's presence in the cockpit to help the copilot. The purser reported to the cockpit, secured the copilot and helped him by administering oxygen.

The captain declared a medical emergency on the ATC frequency for the Marseille FIR, which was handling the flight at the time, and requested to divert from the planned route and land at the Girona Airport (LEGE).

The aircraft was cleared to proceed directly to the airport as requested. About four or five minutes after fainting, the copilot regained consciousness, though he remained incapacitated in his seat. Once his condition stabilized, the purser returned to the passenger cabin. The captain prepared for the approach, which transpired without incident. The airplane landed at 14:06 and proceeded to the stand, where airport medical services were waiting for it, along with two ambulances from local emergency services. After an initial assessment of his condition, the copilot was taken to a nearby hospital, where further tests were conducted. These tests did not reveal any serious health problems and he was released shortly thereafter.

1.2. Personnel information

The copilot had a Class 1 medical certificate issued on 11/11/2010 that was valid for twelve months. Neither this certificate nor any of those issued in the three years prior contained any restrictions.

The copilot lived in Pisa and had slept in his house the night before. He ate some two hours prior to the flight and walked to the airport, as it is very close to this house (a 10 minute walk). It was a hot day, and the temperature during his walk was 29 °C. He stated that he had sweat considerably during the walk and that as soon as they went inside the airplane's cockpit, they turned on the air conditioning.

In the two days prior he had flown on round trips from Pisa to Dublin and then from Pisa to Marrakech, respectively. The approximate duration of these flights had been three hours each. He had gone on duty at around noon (13:45 & 11:42 LT) and finished early in the night (19:35 & 18:45 LT). In the four days prior to these flights he had been

on leave, but remained in Pisa. His total flight time in the fifteen days prior to the incident was 37 h, and he had been on duty for 55 h.

The report from the emergency room at the hospital to which the copilot was taken gave the following diagnosis: "Syncope and collapse. Fainting fit, (near) (pre) syncope, faint, vasovagal attack". This diagnosis matched the assessment made initially by the airport's medical personnel.

After the incident, the copilot underwent more thorough tests that confirmed the absence of any latent medical problems.

According to the company's training records, both crewmembers had taken part in the airline's periodic training/proficiency program, including those activities involving the incapacitation of a crewmember.

The captain stated that he was very familiar with the Girona Airport, as it is a Ryanair hub. He had flown into it on several occasions (over 100 landings).

1.3. Communications

The aircraft was in contact with ATC Marseille, ATC Barcelona and finally with the control tower at the Girona Airport. The ATC stations were also in contact with one another.

At 13:34, the pilot contacted ATC Marseille reporting "medical emergency due to pilot incapacitation", and requested to divert to Girona.

The controller asked the pilot to confirm the emergency and asked him to set his transponder code to 7700², to which the pilot replied: "it's only a medical emergency but we can do that if you want". The controller again asked for confirmation by saying, "You are not declaring an emergency, only a medical emergency", to which the pilot replied, "it's only a medical emergency due to pil...", without finishing the sentence. The controller decided to keep the original transponder code and cleared the pilot to proceed directly to BISBA, inside the Barcelona FIR.

The Marseille area supervisor contacted his counterpart at the Barcelona area control center to inform him of the diverted airplane.

At 13:40 UTC, ATC Marseille directed the pilot to set the transponder code to 7700 and cleared him to descend to FL150.

² 7700 is the transponder code used internationally to indicate an emergency.

At approximately 13:51, the pilot contacted Barcelona FIR ATC, reporting a “medical emergency”. He was cleared to proceed directly to BANOL, which is the initial approach fix (IAF) for the ILS approach to runway 20 at Girona. He was assigned a new transponder code (different from 7700) and the pilot was asked about the nature of the emergency and what he required once on the ground. The pilot replied that the copilot was incapacitated and requested an ambulance, noting explicitly that the aircraft was under “single pilot operation” and that they could make it to the stand without any problems.

The control center relayed this information to the Girona tower, which in turn passed it on to the Airport Coordination Center (CECOA in Spanish). The center asked whether the pilot had declared an emergency, to which the controller replied that it was a *medical emergency*. The CECOA asked about the possibility of activating the firefighting service, but the controller replied that he did not think it was necessary as it was a *medical emergency*, though he mentioned that he would check the relevant “card”.

At 13:54 the pilot was cleared for the runway 20 approach. The pilot, now in contact with the tower, reported the medical emergency with the phrase “we’re in a medical emergency due to the incapacitation of the copilot”.

The pilot was cleared to land at 14:00:10.

1.4. Aerodrome information

Runway 20 at the Girona Airport is 2,400 m long and has the necessary equipment to allow for Cat. II/III instrument approaches.

The airport has an aviation emergency plan (PEA in Spanish)³ that is based on the reference documentation published by the ICAO⁴.

The plan considers aviation, police and health emergencies.

Emergencies of a medical nature are classified based on whether or not the crew of the aircraft experiencing problems declares an emergency. If it does, the “General Alarm” category of the PEA is activated; if not, the “Local Alert” is activated. The intention of the “Local Alert” level is to confirm the severity of the situation, while the “General Alarm” level requires airport emergency service to take immediate action.

If the pilot declares an emergency, the tower supervisor or on-duty controller presses a button that automatically notifies the firefighting service (FFS), the medical service and

³ Aviation Emergency Plan PEA-2010 Ed. N.º 1, 20/07/2010.

⁴ *Airport Services Manual*, part 7 «Airport Emergency Planning».

the airport coordination center (CECOA). If not, the tower informs the CECOA by telephone or radio.

The CECOA is charged with gathering all of the necessary information and coordinating the response of the services involved: FFS (firefighting services), medical services, operations area technicians (marshallers), the airline operator/handling company and CECAT (the emergency medical service of the regional government of Catalonia).

A health problem with a passenger on an aircraft is classified as a Local Medical Alert, and the PEA is activated at the Local Alert level. The Girona Airport has an emergency medical technician (EMT) on duty to render first air services.

The airport also has a specific medical assistance procedure⁵, as required by the PEA, for those cases in which non-urgent or urgent medical assistance is needed. In this procedure, the responsibility for coordinating the assistance lies with the CECOA, which will be informed by the tower and gather all of the information necessary and relay it to the medical service. It will instruct the marshallers to transport the medical technician to the aircraft or to the PRM (persons with reduced mobility) service, in case their assistance is needed to move the patient. The medical service, for its part, gathers information to determine the resources that are necessary to assist the patient, conducts an initial assessment of the patient's condition and requests assistance from the PRM service or calls an ambulance if an evacuation is needed.

According to the report issued by the airport, the control tower contacted the CECOA to report that there had been a medical emergency onboard an aircraft, that the pilot was unconscious and would require an ambulance, and that the aircraft would land at Girona in about twenty minutes. The CECOA notified the following groups, as required by the activation of a Local Alert:

- Airport medical service, which in turn immediately requested an emergency ambulance, as well as assistance from the PRM service. The EMT was taken by a marshaller to the aircraft parking stand.
- Chief of Operations, who in turn notified the Airport Director.
- The Ryanair handling agent, which was also asked for additional information on the flight for coordination purposes.
- Airport security. The CECOA explained the situation, requesting that they facilitate access to the ambulance.
- Movement area marshallers were also informed of the situation and instructed to accompany the ambulance and to transport the EMT to the aircraft to assist the patient and supervise the operation.

As an additional safety measure, the airport's firefighting service (FFS) was also informed.

⁵ SER-001/10 Procedimiento de Asistencia Sanitaria (Medical Assistance Procedure) Ed n.º 2, 01/06/07.

1.5. Flight recorders

The information from both the CVR and FDR was recovered.

The CVR recorded the conversation between the pilot and copilot as they prepared for the flight in the cockpit. Both participated actively in said preparations.

The copilot was the pilot flying during the takeoff and climb. Both phases proceeded normally. The CVR recorded a normal and fluid conversation on operational topics. Once the aircraft reached a given altitude, the conversation turned to personal matters.

The tone and frequency of the copilot's speech was completely normally until he mentioned his headache.

The CVR recorded the captain's call to the purser and her subsequent efforts to reanimate the copilot. They exchanged opinions on the possibility of administering oxygen to him and finally the captain ordered the purser to do so. The sound of the mask can be heard on the CVR.

After a few minutes the purser left the cockpit to inform the passengers. The purser then called the captain to ask if he needed more help in the cockpit, to which the pilot replied no, instructing the purser to prepare the cabin for landing.

The captain did not request anyone's help to read the checklists. He listened to the Girona Airport ATIS and read the items on the landing checklist out loud.

The FDR data on the descent rate, indicated airspeed, pitch and deviations from the glide slope and ILS localizer all indicate that the approach was stabilized.

The FDR also revealed that during the descent and approach, the autopilot was engaged until a radioaltitude of 200 ft, at which time the pilot took manual control of the aircraft. This was corroborated by the alarm tone that sounds when the autopilot is disengaged, and which was heard on the CVR recording moments before the landing.

1.6. Additional information

1.6.1. Syncope

A fainting fit or a vasovagal syncope is the most common cause of fainting. Various factors stimulate the vagus nerve, which causes the parasympathetic system to slow the heart rate and dilate the body's blood vessels. The slow heart rate and the dilated blood vessels result in lower blood flow to the brain, resulting in a loss of consciousness.

The episode is triggered by factors related to an increase in parasympathetic activity. These include, but are not limited to: emotional stress, pain, prolonged heat exposure, anxiety or dehydration. In many cases the syncope is preceded by symptoms (which can last from seconds to minutes), including gastric discomfort, headaches, nausea or dizziness and a feeling that a loss of consciousness is imminent. The loss of consciousness itself is brief and the patient quickly recovers when the body is repositioned.

1.6.2. *Company procedures*

In compliance with applicable regulations⁶, the company's Operations Manual envisions various aspects related to the incapacitation of a flight crew member.

The document has a brief discussion on the dangers involved in this situation and on its impact on safety, and mentions the importance of its identification by the flight crew members, particularly when a partial incapacitation is involved. To this end, the document contains a series of signs of a possible incapacitation to aid in recognizing it, and explains the typical causes of an incapacitation and its indications.

Chapter 8 of the Operations Manual firstly specifies that the incapacitation of a member of the flight crew requires an emergency declaration and landing at the nearest airport. As much information as possible will be provided to ATC, specifying the type of emergency (pilot incapacitation). It does not specify the type of call to make (urgency or MAYDAY).

The airline's safety and emergency procedures (SEP) provide more detail on the steps to be taken. This document does not categorically require that an emergency be declared, indicating only that an emergency will be declared "if necessary".

The incapacitation simulator session instructor guide states: "F/O will return to Dublin as a medical emergency". This scenario combines the concepts of incapacitation and medical emergency in the same simulator session.

In every case, the procedure to be followed after an incapacitation covers three fundamental aspects:

1. Control the aircraft. The other crewmember will take over the flight controls and summon the purser to the cockpit using the standard emergency call ("No. 1 to the flight deck immediately"). The autopilot will be used to the maximum extent possible to reduce the workload. When communicating with ATC, the most direct route possible to the selected airport will be requested.

⁶ Regulation (EC) 859/2008 of 20 August, whose annex (EU-OPS 1) specifies the common technical requirements and administrative procedures applicable to commercial air transport by airplane.

2. Secure and assist the incapacitated crew member using the “pilot incapacitation drill”. Depending on the incapacitated crew member’s condition, the purser will fasten the locks on the restraint system in the pilot’s seat or evacuate the pilot to the passenger cabin to administer first aid. It will be ascertained whether any medical personnel are onboard who can help assess the pilot’s condition, provide assistance and reanimate the pilot if possible. As a general rule, the option of administering oxygen will be considered. Securing the pilot means fastening the pilot’s harness and moving the seat back from the controls so as not to interfere with operations.
3. Prepare for landing. Determine whether another pilot is onboard who can assist the active pilot during the landing by occupying the vacant seat, or require the purser to sit in the jump seat and aid the pilot flying by reading the pre-landing checklists. This requirement is listed as standard or mandatory in some parts of the manual and employs the use of the word “will”, and as being at the pilot’s discretion in others with the use of the word “may”.

The Operations Manual also contains a chapter listing the precautions and criteria to be considered by the crew prior to the flight to ensure that the crew’s psychophysical state during the flight conforms to the requirements of JAR-FCL 3⁷ and UE-OPS 1. The manual quotes the text of these regulations regarding the need for a medical certificate and the crew member’s own responsibility, who must report any suspected incapacity or symptom. The manual also provides guidelines on ways to avoid fatigue in flight, the effects of stress and on specific situations such as the use of medications, vaccines or blood donations. It also contains food safety precautions, especially before and during the flight.

The company’s continuing training/proficiency program includes aspects related to incapacitation. Both flight and cabin crew members receive recurrent training in which they review the incapacitation procedures. As part of this program, captains and copilots have a simulator session in which the captain’s incapacitation is simulated. The exercise is not repeated simulating the copilot’s incapacitation.

The Operations Manual considers medical emergencies in flight in connection with the appearance of a medical problem involving a passenger. The manual gives a series of guidelines to use in this situation, such as the way to communicate with ATC (using the international phraseology for an urgency message: PAN PAN PAN), and the criteria for selecting the landing airport, such as the pilot’s familiarity with the airport and the medical assistance available. The manual emphasizes that in this case, no deviations will be made from standard operating procedures (SOP).

⁷ JAR FCL 3 (Joint Aviation Regulations - Flight Crew License) on the medical-aviation organization, Class 1 and Class 2 medical certificates and the medical requirements applicable to flight personnel on civil airplanes and helicopters.

1.6.3. *Procedures of ATC services*

The incapacitation of a flight crew member is classified as an emergency/special situation in the applicable document utilized by ATC services⁸.

The manual's goal is to anticipate scenarios and the likely needs or requirements that an aircraft might have in that situation, such as requesting an immediate descent, more time for the crew to take control of the situation, landing at the nearest suitable aerodrome or medical assistance and an ambulance. According to the document, the calls that should be expected from an aircraft in that situation are either distress (MAYDAY MAYDAY MAYDAY) or urgency (PAN PAN PAN) calls.

It then gives controllers guidelines to follow, such as:

- Giving priority to the aircraft.
- Providing information (radar vector guidance).
- Informing the control room supervisor.
- Informing the destination aerodrome/CECOA.
- Limiting communications to a minimum to avoid overloading the pilot.

Lastly, it gives the kind of information that the controller can provide to the pilot flying that will likely be useful, such as information on the weather, the approach or the availability of medical services. The manual does not specifically mention activating the firefighting services.

This document also considers an emergency arising from a medical problem affecting a passenger. The main difference between this situation and an incapacitation involves the type of call expected from the aircraft, namely that no specific type of call is mentioned. The recommendations for this case also make no mention of facilitating navigation or additional precautions regarding pilot overload, since in this scenario both crewmembers should be available.

2. ANALYSIS

2.1. Medical aspects

The copilot had a valid and in force medical certificate as required by applicable regulations. He had no history of any health problems that could affect his ability to

⁸ *Procedures for emergency and special situations in aircraft S41-02-GUI-001-3.1 DIRECCION DE NAVEGACION AEREA.* This is an operational reference manual intended to be used by ATS personnel in various ATC stations in Spain (control tower, approach and control center) to handle emergencies and abnormal situations onboard aircraft. It consists of a series of cards applicable to each type of emergency.

perform his duties onboard safely. The medical tests performed after the incident also failed to reveal a pathology that could explain the syncope.

Both the applicable regulation and the Operations Manual discuss hygienic and health measures that can be taken prior to the flight and that are based on the crew members' self-discipline and that are intended to prevent sudden incapacitations that cannot be foreseen by an aviation medical exam. The investigation could find no indication that any of these measures was not complied with. The data collected indicate that the copilot's overall condition and mood were normal. He had rested normally with his family at his house and his total activity in the days prior was considerably below the legal limits. He had even taken some time off a few days earlier.

According to the diagnosis of the hospital that treated the copilot, he experienced a fainting fit or a vaso-vagal syncope, the most common cause of fainting. This syncope can occur in perfectly healthy people for various reasons, including, most notably, prolonged heat exposure or emotional stress. Worth noting is the fact that the copilot walked a certain distance in the sun before reporting to the airplane on a hot July day. This could have triggered the syncope.

2.2. Operational aspects onboard the aircraft

The safety standards for air transport onboard multi-pilot aircraft rely on having all members of the flight crew involved in the operation of the aircraft.

Independently of the risk to the health of the affected crew member, the incapacitation of a member of the flight crew on an aircraft certified for two pilots must be regarded as an emergency situation that threatens safety margins and requires landing at the nearest airport.

This emergency can also be coupled with a medical emergency that is not so much a threat to flight safety, but to the life of the person affected by the incapacitation.

In compliance with the regulations governing commercial air transport operations (EU-OPS 1), the airline has procedures that can be used by the members of the flight and cabin crews to aid them in both identifying and handling these situations.

The application of these procedures is practiced as part of the airline's established training program. The captain and purser had both taken part in this program. It is worth noting, however, that in the flight crew simulator sessions, crews only train for the incapacitation of the captain, never of the copilot. There seems to be no operational reason for this disparity. Either member of a flight crew can succumb to incapacitation, and thus the simulator sessions that train for this situation should involve both crew members. Certain deficiencies noted in the captain's actions, and discussed later, could

be attributable to this shortcoming, and thus a safety recommendation is issued to the operator in this regard.

The incapacitation was immediately apparent. In fact, as soon as he began to feel the initial symptoms, the copilot informed the captain, who took over the controls and the communications right away.

An analysis of the FDR data did not show any discontinuities or disruptions in the flight parameters indicative of a momentary loss of control of the aircraft or of an uncontrolled input to the flight controls by the unconscious copilot, as often happens during an incapacitation.

The captain summoned the purser to the cockpit, and she followed established procedures by securing the copilot and administering oxygen as instructed by the captain. She remained in the cockpit until the copilot's condition stabilized.

The crew did not, however, inquire as to the presence of medical personnel onboard, an action included in the procedure and that could have aided in assessing the stricken copilot's health and even contributed to his recovery.

The captain did not delay in opting to land at Girona, an airport he was very familiar with, that was along their route and that is a Ryanair hub.

He reported his intentions to ATC, specifically informing of an emergency due to the copilot's incapacitation, though he used the term "medical emergency". When the controller asked for confirmation, the pilot insisted that it was "only" a medical emergency. The pilot and controller both agreed to maintain the transponder code instead of changing it to 7700, which would identify the aircraft as being in an emergency. The code was changed later at ATC's request before the aircraft entered Spanish airspace.

Even though the French supervisor apprised his Spanish counterpart of the situation, Spanish controllers asked the pilot again about the nature of the emergency. The pilot's response was along the same lines, stating that the copilot was incapacitated but that the emergency was of a medical nature and explicitly adding that he would be able to reach the parking stand without any problems.

An analysis of the airline's operational documentation reveals that it does not specifically state that an identified incapacitation on the flight deck must necessarily be followed by the pilot's declaration of an emergency. The manual does not indicate, for example, the type of message to be used (MAYDAY or PAN), and there are apparent contradictions between the Operations Manual and the Safety and Emergency Procedures (SEP). The fact that the simulator instructor's guide states that the incapacitation flight will end as a medical emergency does not contribute to make a clear distinction

between both concepts. This lack of clarity in written procedures could explain the way in which the captain handled the situation, emphasizing the medical nature of the emergency and apparently not regarding it as a situation that could affect flight safety.

Ryanair's incapacitation procedure states to prepare for landing once the aircraft is under control and the incapacitated crew member is secured.

Help is to be sought out from any pilots who may be flying among the passengers, and if there are none, then the purser is to aid the pilot flying by reading the checklists from the jump seat. This is mentioned in two separate parts of the manual but it is unclear whether this requirement is a standard response to an incapacitation situation or is left to the discretion of the crew member in control of the airplane.

Neither of the two alternatives presented was used by the captain, despite the fact that the purser, who had been trained on this situation, offered to help the captain shortly before landing. He did not believe her presence to be required and undertook to conduct the landing by himself. This meant an increased workload and calls into question the proper application of the relevant procedure, which is itself regarded as confusing.

Given that the text of the Operations Manual, both as it refers to the emergency declaration by the pilot and to the involvement of the purser in reading the checklists, can be improved, a safety recommendation is issued to revise and improve the text.

An analysis of the approach data on the FDR shows that it was stabilized at all times. The recorded data also show that the captain used the autopilot until the airplane was at an altitude of 200 ft, after which the landing was completed manually. This indicates that the automated systems available were properly used, in keeping with the contents of the Operations Manual.

2.3. Response on the ground

Control services also classify the emergency involving the incapacitation of a member of the flight crew differently from that involving a passenger. The applicable "card" in these cases mentions that the most likely call to expect from the aircraft is a MAYDAY or PAN, in keeping with the standard phraseology used for emergencies. While in this case the call did not conform to either of these phrases, the pilot did communicate clearly and on several occasions that the copilot was incapacitated. ATC thus had sufficient information to properly classify the emergency with a view to activating the resources available at the airport.

Since there was no formal emergency declaration by the pilot involving the safety of the flight, the emergency plan at the airport was activated at the Local Medical Alert level and

not at the General Alert level, as would have been required by an in-flight emergency of this type.

As mentioned earlier, the term “medical emergency” refers to a situation that does not directly involve flight safety, and apparently that is how ATC and airport personnel regarded it. The use of this term by the pilot probably resulted in this interpretation, even though he mentioned in successive communications the copilot’s incapacitation, a situation that relevant ATC procedures regard as an in-flight emergency.

The doubts expressed by the CECOIA to the controller in the tower regarding the need to activate the firefighting service also highlight the lack of familiarity by both with this situation and justify the issuing of a safety recommendation intended to ensure a full response by ground services to an in-flight incapacitation.

ATC cleared the aircraft to proceed a direct route to Girona without being specifically requested by the pilot, in line with the recommendations in the relevant ATC procedure.

The information regarding the condition of the copilot was provided by the CECOIA to airport medical personnel, who were able to coordinate the response of local emergency services. As a result, two ambulances were standing by on the apron several minutes before the landing.

3. CONCLUSION

3.1. Findings

- About twenty minutes after takeoff, while in cruise flight, the copilot suddenly became incapacitated.
- The copilot had undergone the medical exams required by applicable regulations and had a valid and in force medical certificate.
- An analysis of the medical history and subsequent tests indicated that the incapacitation was not due to a latent, and therefore foreseeable, medical problem.
- The incapacitation was immediately recognized by the captain, who took over the controls of the airplane before the copilot fainted.
- On noticing that the copilot had fainted, the captain summoned the purser to the cockpit to aid the copilot.
- The purser proceeded to secure the copilot and tried to reanimate him by administering supplemental oxygen as per the “Incapacitation Drill” procedure.
- The crew did not inquire about the presence of medical personnel onboard as suggested by the airline’s procedures.
- The crew did not inquire about the presence of qualified pilots onboard as suggested by the airline’s procedures.

- The pilot did not require the purser to remain in the cockpit to aid in reading the checklists, as suggested by procedures.
- The captain declared a medical emergency due to copilot incapacitation without using the internationally recognized MAYDAY or PAN terms. He diverted to a nearby airport that was familiar to him and requested immediate medical attention on the ground.
- Personnel on the ground interpreted the emergency as being solely of a medical nature even though they were aware of the copilot's incapacitation. The airport's emergency plan was activated at the Local Medical Alert level.
- The approach was stabilized at all times and conducted in automatic to an altitude of 200 ft.
- By the time the aircraft landed, medical personnel were standing by on the ground ready to assist and evacuate the copilot.

3.2. Causes

The incident was caused by the sudden incapacitation of the copilot. Medically the event was classified as a syncope, likely caused by prolonged heat exposure. There were no indications in either the copilot's medical history or in follow-up tests to suggest that the syncope could have been anticipated.

4. SAFETY RECOMMENDATIONS

- REC 16/12.** It is recommended that Ryanair include the incapacitation of the copilot, in addition to that of the pilot, as part of its simulator training and proficiency programs.
- REC 17/12.** It is recommended that Ryanair revise its Operations Manual (OM), its Safety and Emergency Procedures (SEP) and its simulator instructor's guide as concerns the incapacitation of a flight crew member. Specifically, the text on the emergency declaration to be used in the event of an incapacitation and on the purser's role in reading the checklists prior to landing should be improved.
- REC 18/12.** It is recommended that AENA ensure that personnel at both ATC stations and at airport coordination centers be made aware that the incapacitation of a flight crew member is a situation that affects the safety of a flight and that must be treated as a declared in-flight emergency, in particular for the purposes of activating the Emergency Plan at the airport where the aircraft will be landing.