

Boeing 767-336, G-BNWM

AAIB Bulletin No: 6/97 Ref: EW/G96/12/1 Category: 1.1

Aircraft Type and Registration:	Boeing 767-336, G-BNWM
No & Type of Engines:	2 Rolls-Royce RB211-524H turbofan engines
Year of Manufacture:	1991
Date & Time (UTC):	6 December 1996 at about 0322 hrs
Location:	Over North Atlantic Ocean, approx. position 56°N 40°W
Type of Flight:	Public Transport
Persons on Board:	Crew - 11 - Passengers - 155
Injuries:	Crew - None - Passengers - None
Nature of Damage:	None
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	52 years
Commander's Flying Experience:	13,184 hours (of which 4,424 were on type) Last 90 days - 198 hours Last 28 days - 64 hours
Information Source:	Air Safety Report submitted by the operator and further enquiries by AAIB

The crew had operated the outbound sector from London Gatwick to Pittsburgh (USA) during the day of 4 December, arriving at about 2040 hrs (1540 hrs local time). The rest period in Pittsburgh was in excess of 24 hours, during which the First Officer (F/O) consumed only a light diet. He felt rested and fit to operate the return sector.

The aircraft departed from Pittsburgh at 2332 hrs (1832 hrs local time, 5 December) on the return sector to Gatwick. The aircraft was equipped for Extended Range Twin Engine Operations (ETOPS) over water with a 180 minute en route diversion validation and all of the relevant aircraft systems were serviceable. The planned flight time was 6 hours 54 minutes and an additional four tonnes of fuel was being carried in view of the forecast fog expected at Gatwick at the planned arrival time. The nominated en route alternates (ERAs) on the Flight Plan were Halifax (Nova Scotia, Canada), Keflavik (Iceland) and Paris CDG (France). The Flight Plan primary landing alternate airfield was Prestwick and the secondary alternate Paris CDG. The handling pilot for the cruise phase was the F/O and the right autopilot and the autothrottle systems were engaged.

During the flight, the F/O began to feel some discomfort and took two tablets of what he believed were normal strength Paracetamol type painkillers at about 0200hrs. He then consumed a light meal. About 20 minutes later, he began to feel light headed and nauseous. He excused himself from the flight deck and went to the toilet. He collapsed in the toilet, but came round a few minutes later. On returning to the flight deck, he informed the commander of his situation. The nausea and sickness continued so he lay down in a comfortable position on the floor of the flight deck, where he remained for some considerable time. Aid was administered by the cabin staff. The F/O and the commander had consumed different menu items in accordance with the operator's normal practice and the commander considered that the F/O's sickness was due to the consumption of the meal.

The aircraft passed the waypoints 'STEAM' at 0205 hrs, 55°N/50°W at 0240 hrs and 56°N/40°W at 0322 hrs. The ETOPS Progress Chart for the flight showed that the ETOPS ERA changed from Halifax to Keflavik at 0257 hrs. The weather conditions at both of these alternates were good throughout the relevant periods of the flight. The commander stated that he elected to continue the flight towards the UK as he considered it safer than a diversion as it was night time and the alternate landing sites would have been unfamiliar. The aircraft was performing normally and the flight continued uneventfully towards the UK. Communications with Oceanic ATC were conducted as normal using the HF radio. The commander elected not to inform ATC of the incapacitation at this stage as he considered that there was little assistance they could offer.

The commander monitored the weather as the flight continued. A record of the weather at several major UK airports at 0450 hrs was recorded on the flight log. Fog was being reported at Gatwick and an RVR for Runway 26L of 450 metres was annotated on the flight log along with the METAR information. Manchester and Glasgow were also reporting fog. London Heathrow was reporting a visibility of 3,000 metres in mist with overcast cloud base 400 feet. Prestwick, Belfast, Shannon and Dublin all had good weather conditions with visibilities in excess of 10km.

At 0539 hrs, the aircraft was transferred to the control of London ATCC Area Control, VHF frequency 133.6 MHz, while at FL350 on course to 'GIBSO' reporting point. The flight was cleared from 'GIBSO' on a 'WILLO 1D' Standard Arrival Route towards Gatwick. The commander did not inform ATC of the medical incapacitation at this stage, but at 0544 hrs he requested permission to leave the frequency for a few minutes in order to call company operations. This permission was granted by the controller. Medical assistance on arrival at Gatwick was then requested on the company frequency. The aircraft passed Strumble VOR at 0547 hrs and the commander returned to the Area Control frequency at 0550 hrs. A touchdown RVR of 800 metres at Gatwick was broadcast by the controller at this time, but no reference was made as to the runway in use. Descent clearance was issued at 0556 hrs and the initial descent was commenced at 0559 hrs.

The F/O still felt light headed, but returned to his seat during the latter stages of the descent. The Cabin Service Director occupied the supernumerary seat in order to offer assistance to the commander and to tend to the F/O. The F/O played no active part in the approach, although certain aspects of the weather and type of approach had been discussed with the commander.

The flight was transferred to two other control sectors as it descended. At 0608 hrs, it was requested to reduce to holding speed and to route direct towards 'HOLLY' for sequencing. 'HOLLY' is the entry point of the holding fix for Gatwick for aircraft arriving from the west. The controller informed the commander that the aircraft was number five in the landing sequence. On transfer to Terminal Control, Gatwick Intermediate Director, frequency 126.825 MHz at 0612 hrs, the commander checked in with the passing and cleared flight levels and informed the controller that

the aircraft was a "Boeing 767, with the information". This was a reference to having copied the ATIS information for Gatwick broadcast on VHF frequency 121.025 MHz. It is normal practice for crews to report the particular code letter associated with the ATIS broadcast, in order that the controller may confirm that the latest update has been obtained. In this case, the code letter was not transmitted by the commander. The controller therefore replied that the current ATIS information was 'C' and that the QNH was 1019 mb. At this stage, the commander advised ATC that there was a medical emergency on board "*which happens to be the First Officer, so it would be appreciated if we didn't have to go round the hold and if you could give us some assistance coming in*". The controller did not respond to this request directly, but continued to vector a preceding aircraft onto the ILS for Runway 08R. The fact that Runway 08R was being used was mentioned three times during transmissions between ATC and the preceding aircraft. The Boeing 767 was then transferred to the Gatwick Final Director at 0614 hrs, frequency 118.95 MHz.

On transfer, the Boeing 767 was heading north and descending to 4,000 feet. The controller stated that the aircraft had 23 nm to touchdown and enquired as to whether the aircraft would be "*OK to handle a Cat 3*". The commander responded by asking if the visibility was still 600 metres. He was informed that the RVRs had increased to 1,300 metres touchdown and greater than 1,500 metres for mid point and stop end, with a cloud report of overcast below 100 feet. The commander replied that he was intending to make an approach under those conditions. The commander reported that his speed was 230 kt and the controller turned the aircraft right onto a heading of 050°. Further descent was instructed down to 3,000 feet on the QNH 1019 mb.

At 0615 hrs, the controller advised that the aircraft had 3 nm to run to the localiser. At this stage, the commander enquired if the Runway in use was 08R. He was informed that this was correct and confirmed that it had 3 nm to run to the localiser and 15 nm to touchdown. The commander apologised as he had understood it to be Runway 26L in use and requested a "*delaying tactic*". A left orbit was given, to roll out on a heading of 050°. The aircraft was about to fly outside regulated airspace during the orbit so the controller requested that the descent be stopped at 4,000 feet. He also asked if the commander was flying the aircraft by himself, to which the reply was in the affirmative. The aircraft was levelled off at 4,000 feet and the speed was reduced in order to configure for the approach. This gave the commander the necessary time to reprogram the Flight Management System (FMS) and to set up the appropriate navigation aids for the approach.

The ILS at Gatwick radiates on the same frequency (110.9 MHz) for both Runways 26L and 08R, although only one system is active at any given time. However, when Runway 26L is in use (inbound course 262°M) the morse identifier transmitted from the facility is 'I-WW' and when Runway 08R is in use (inbound course 082°M) the identifier transmitted is 'I-GG'.

Descent to 3,000 feet followed once the aircraft had become established on the Localiser for Runway 08R and a normal glidepath capture occurred. The Digital Flight Data Recorder (DFDR) indicated that all three autopilot systems were engaged for the coupled approach and an uneventful auto-land ensued at 0625 hrs. The surface wind was from 030° less than 5 kt and all RVRs were in excess of 1,500 metres. The commander indicated that the runway had become visible at 200 feet above ground level. The aircraft remained on Gatwick Director frequency until after landing, when it was transferred to the Gatwick Ground Control frequency.

After landing, the aircraft taxied to a North Terminal parking stand where the passengers deplaned normally. After the passengers had disembarked, the First Officer was able to walk to the waiting ambulance which took him to the Port Health Authority centre. He was examined by doctors and transport was arranged to take him home some six hours later, once he had recovered.

Provision of weather information

In order to ascertain why the commander was under the impression that Runway 26L was in use, the records were obtained from the Met Office (for the METAR information) and from Gatwick ATC (for the ATIS broadcasts).

The runway in use at Gatwick changed from Runway 26L to Runway 08R at 0514 hrs. ATIS information 'A' at 0500 hrs gave Runway 26L in use. Subsequent ATIS broadcasts from 0520 hrs onwards all gave Runway 08R. The ATIS broadcasts relevant to the time of the approach were:

From 0520 hrs, Information 'B', Runway 08R, ATC Low Visibility Procedures (LVPs) in force, 0515 hrs weather, surface wind 020°/4 kt, visibility 400 metres, Fog, Overcast below 100 feet, temperature +2°C, dew point +1°C, QNH 1018 mb.

From 0550 hrs, Information 'C', Runway 08R, ATC LVPs in force, 0545 hrs weather, surface wind 020°/3 kt, visibility 600 metres, Fog, Overcast below 100 feet, temperature +2°C, dew point +2°C, QNH 1019 mb.

From 0620 hrs, Information 'D', Runway 08R, ATC LVPs in force, 0615 hrs weather, surface wind 020°/2 kt, visibility 800 metres, Fog, Overcast below 100 feet, temperature +2°C, dew point +1°C, QNH 1019 mb.

All of these broadcasts were terminated with the instruction for all aircraft to acknowledge the relevant information letter to ATC on first contact with Gatwick.

Records of the METAR observations for Gatwick indicated that an RVR was being quoted for Runway 26L on observations up to and including the 0520 hrs METAR. The relevant METARs were as follows:

0520 Z, 020°/4 kt, visibility 400 metres, RVR Runway 26L in excess of 1,500 metres, Fog, Overcast below 100 feet, temperature +2°C, dew point +1°C, QNH 1018 mb, becoming visibility 800 metres.

0550 Z, 020°/3 kt, visibility 600 metres, RVR Runway 08R 900 metres, Fog, Overcast below 100 feet, temperature +2°C, dew point +2°C, QNH 1019 mb, becoming visibility 1,000 metres.

The data used for the VOLMET broadcasts is taken from the METAR information. Therefore, the Gatwick Runway 26L RVR was being broadcast on the VOLMET facility until about 0555 hrs, even though the runway in use had changed to Runway 08R at 0514 hrs.

Data from the three runway transmissometers at Gatwick indicated that at the time of the runway change the RVR at the eastern end of the airfield was significantly worse than that at the western end. The touchdown RVR for Runway 08R then fell below 1,500 metres from 0538 hrs until 0632 hrs. The worst recorded values were 800 metres around 0550 hrs.

The METAR for London Heathrow at 0620 hrs gave the surface wind as 320°/2 kt, visibility 3,500 metres in mist, cloud - few at 700 feet, scattered at 900 feet, with a TEMPO of broken cloud at 800 feet.

Medical Aspects

The First Officer had taken two tablets of what he believed was a proprietary brand of painkiller. Further investigation indicated that the tablets were of the co-codamol type, which contained a mixture of codeine phosphate and paracetamol. Proprietary brands contain 8 mg of codeine phosphate with 500 mg of paracetamol. A stronger tablet, normally available by prescription only, contains 30 mg codeine phosphate with 500 mg paracetamol. Packets of such tablets normally carry the following wording "*Warning. May cause drowsiness. If affected do not drive or operate machinery. Avoid alcoholic drink.*"

In this case, the First Officer did not have the packaging available. It was the first occasion that he had tried this type of analgesic and was unaware of its side effects.

Codeine phosphate is an opiate which may cause sedation and dizziness and is considered by the CAA Medical Division to be incompatible with flying duties.

The CAA published an updated Aeronautical Information Circular (AIC) on the subject of Medication, Alcohol and Flying (AIC 114/1996 - Pink 128) on 3 December 1996. The circular details some possible effects of various medications and their adverse effects on pilot performance. The First Officer was not aware of this circular (or its earlier edition AIC 16/1993 - Pink 73) or its contents until this investigation.

The circular notes that if there is any change in the medication or dosage, however slight, the effect should be observed by the pilot on the ground prior to flying. The pilot is also advised not to take any medicines before or during flight unless their effects on the individual's body are completely familiar. If there is any doubt at all, then a Doctor experienced in Aviation Medicine should be consulted.

The operator receives copies of the AICs in its Technical Administration area. These are then forwarded to all the relevant departments for information. The content of the AICs is then disseminated to crews in the form of various information notices.

The following extracts are taken from current Flight Crew Orders regarding the use of medication:

"Many drugs lower operational efficiency and impair judgement and reaction time...."

Commonly prescribed drugs in the classes listed below may have a prolonged effect on performance:

- a) anti-histamines...., anti-motion sickness tablets or medicines prescribed for allergic conditions;*
- b) sleeping tablets or sedatives;*
- c) tranquillisers;*
- d) stimulants used to prevent drowsiness and to curb appetite when reducing weight;*
- e) analgesics;*
- f) antibiotics, cortisone, steroids and similar preparations;*
- g) drugs for the control of high blood pressure.*

Many preparations are marketed containing a combination of medicines. Sedatives and alcohol aggravate the effects of each other, and may be dangerous if taken at the same time....."

Flight Crew Actions following an Incapacitation

The operator publishes a series of Flight Crew Orders, which form part of the company Operations Manual. The Order dealing with Injury or Illness, to Crew, On Board the Aircraft contains the following extracts:

"Any Crew member feeling unwell in the air should immediately say so. Any apparent incapacity in a fellow crew member should be investigated without delay.

In the event of injury or illness of a Crew member in flight, it is the Captain's responsibility to decide if an immediate landing is to be made. In the event of a Crew member, or a number of Crew members indicating symptoms of food poisoning the Captain should, when considering diversion, take into account the possibility of a common cause producing further Crew incapacitation.

Under these circumstances an intermediate landing can be considered an emergency and route and aerodrome experience requirements will not apply.

If due to incapacitation of a Flight Crew member the crew complement is reduced below the minimum complement for the aircraft a PAN call must be made."

The Boeing 757/767 Flying Manual contains a Non Normal Procedure in the event of a crew incapacitation. The following are relevant extracts:

" The remaining pilot must assume or maintain control.

Establish a safe flight profile and engage the autopilot.

Obtain crew assistance.....

Inform ATC.

Arrange medical assistance on arrival.

Brief a cabin crew member to assist as required.....

Complete the approach and landing using the autopilot as much as possible.

A partially incapacitated pilot should not be allowed to participate in the subsequent operation of the aircraft as judgement may be impaired.

After landing, obtain immediate medical assistance.....

On an ETOPS sector, the pilot in command must decide whether to continue the flight, return to an airfield behind or divert to an alternate en-route. In making this decision, consider all relevant operational factors, including:-

weather conditions at the chosen airfield,

the reduction in flight time which would be achieved by diverting,

the workload involved in conducting a diversion single-handed,

familiarity with the alternate,

the condition of the incapacitated pilot,

availability of medical facilities.

In reaching these decisions the overall safety of the remainder of the flight is paramount. "

Aircraft Equipment and Operational Limitations

The aircraft is certificated for operation by a minimum of two pilots.

The aircraft is equipped with Electronic Flight Instrument System (EFIS) displays. A pictorial map of the route being flown is normally displayed on the Electronic Horizontal Situation Indicator (EHSI) and this is a valuable aid to geographic orientation and situational awareness.

The company operating minima for a Category 1 ILS approach to Gatwick Runway 08R (threshold elevation 195 feet amsl) are 400 feet Decision Altitude and a minimum RVR of 550 metres. The minima for a Category 2 autoland are Decision Height 100 feet (Radio Altimeter, RA) and a minimum RVR of 300 metres. The minima for a Category 3 approach are either No Decision Height, 14 feet RA or 50 feet RA with minimum RVR of 75 metres, 75 metres or 200 metres respectively, depending on the aircraft technical serviceability status and the airport ILS/runway facilities being appropriate.

There is no derogation in the event of a pilot incapacitation. The Flight Crew Orders also allow First Officers to complete the autoland sequence in the event of a Captain's incapacitation once the approach has been commenced.

The weather conditions at Gatwick did not fall below Category 1 limits during the period relevant to the approach of this aircraft.

Other cases of crew incapacitation

The CAA Safety Department database was found to contain 49 cases of in-flight crew incapacitation reported during the past five years during public transport flights. Of these, 31 cases occurred on aircraft operated by two pilots only. Of the overall total cases, 27 were reported as involving some form of incapacitation resulting from nausea or a gastric upset.

Multi-crew operations

The purpose of multi-crew flight decks is to distribute the routine tasks in an orderly and efficient manner, to operate with as great a safety awareness as possible and to ensure that, in the event of one pilot being incapacitated, the remaining crew member(s) may safely complete a successful approach and landing. This may involve a diversion to an alternate landing airfield if the

circumstances warrant such action. Pilot incapacitation exercises are included periodically during simulator initial and recurrent training sessions.

The ethos of monitoring and cooperation is built in to all current flight deck procedures and Crew Resource Management training is intended to ensure that all flight deck crew are fully involved in all aspects of the safe handling and operation of the aircraft. The effect of the incapacitation of a flight deck crew member obviously depends on the particular crew complement being carried and whether any substitution of crew duties is possible, as in the case of two pilots plus a flight engineer or on a route requiring the use of a 'heavy' crew.

Potentially, the most serious situation arises when an incapacitation occurs on a two pilot flight deck. The remaining pilot is left in a non normal and unusual situation. In such cases, the workload is increased and at the same time there is little or no backup monitoring of safety critical items. Errors may be induced as a result of the increased task loading at a time when there is no backstop to trap them and prevent a serious situation developing. Cabin staff are given some training in providing assistance when required, such as reading checklist items, but not in the specialist tasks of monitoring flight profiles, setting of flight instruments or operation of aircraft systems.

There is currently no requirement for any instrument approach weather minima increment to be applied in the event of a pilot incapacitation. The use of the autopilot for an approach in these situations is preferable, but the task of monitoring the aircraft systems and the assessment of the visual cues of the runway and approach lighting still exists. Such human monitoring is an implied requirement where Category 2 and Category 3 operations are conducted, by virtue of the list of serviceable equipment required prior to the commencement of such an approach. There is currently no prohibition of this type of operation in the event of enforced single pilot operation.

The conduct of instrument approaches down to normal operating minima in situations where the aircraft is being operated by less than the optimum number of flight deck crew is an anomaly.

Safety Recommendations

97-14 The CAA should conduct a safety assessment of the current procedures used by UK AOC holders in respect of aircrew actions in the event of a pilot incapacitation for various types of multi-crew aircraft. This assessment should consider a requirement for the formulation of a specific diversion criteria dependant upon the route being flown. Consideration should also be given to a requirement for the prohibition of instrument approaches in weather conditions worse than current Category 1 approach minima and also to a requirement for a suitable increment to current Category 1 ILS or non-precision approach minima, in terms of cloud ceiling and visibility, where this is deemed to be necessary.

97-15 British Airways PLC, Flight Operations Department should ensure that all relevant flight safety information contained in CAA Aeronautical Information Circulars is widely disseminated to crews as soon as it becomes available and with maximum effect. The company should consider the use of appropriate articles in company aircrew newsletters in order to aid awareness in this area.