McDonnell Douglas MD-11, N805DE

AAIB Bulletin No: 1/98 Ref: EW/C97/9/2Category: 1.1

Aircraft Type and Registration:	McDonnell Douglas MD-11, N805DE
No & Type of Engines:	3 Pratt & Whitney 4000 turbofan engines
Year of Manufacture:	1992
Date & Time (UTC):	23 September 1997 at 0700 hrs
Location:	Manchester Airport
Type of Flight:	Public Transport
Persons on Board:	Crew - 14 - Passengers - 228
Injuries:	Crew - None - Passengers - None
Nature of Damage:	None
Commander's Licence:	Airline Transport Pilot's Licence (USA)
Commander's Age:	57 years
Commander's Flying Experience:	16,960 hours (of which 232 were on type)
	Last 90 days - 152 hours
	Last 28 days - 80 hours
Information Source:	AAIB Field Investigation

History of flight

Flight DAL 12, was a schedule from AtlantaAirport, USA to London Gatwick Airport; at 0559 hrs the aircraftentered the hold at WILLO at FL110. When asked, the commanderinformed ATC that he would be able to remain in the hold for 30minutes. The RVR at Gatwick was less than 200 metres and thecrew required 300 metres before they could make an approach.

At 0631 hrs, ATC informed DAL 12 that theRVR was still 200 metres and asked if it was the intention todivert. The commander replied that he would like "VECTORTO MANCHESTER". The aircraft was given a radar heading of280° followed about 2 minutes later by clearance to climbto FL120. At 0638 hrs, DAL12 requested a higher altitude as soonas possible and was cleared to FL130 then FL140. At 0645 hrs,as the aircraft was approaching FL140 ATC asked what level thecommander would like and was told FL250. This level was not availableand clearance was given to climb to FL190 which the controllersaid was probably going to be the highest available; this wasacknowledged as "ONE NINE ZERO'S FINE".

At 0647 hrs, the aircraft was at FL190, on a radar heading of030° and expecting a routing to TRENT and DAYNE for Runway06 at Manchester. At 0649 hrs, DAL 12 told ATC that "WENEED TO PROCEED DIRECTLY TO MANCHESTER - WE'RE GETTING TIGHT ONFUEL". The aircraft was routed direct to TRENT at 0650 hrsand, at 0654 hrs the commander asked if they could land straightin on Runway 24; the controller relayed the request by telephoneto Manchester Control Centre.

At 0655 hrs, DAL 12 called Manchester Area Control and was asked"DO YOU WISH TO DECLARE AN EMERGENCY" to which the replywas "NOT AT THIS TIME". The aircraft was then clearedto continue for Runway 06 at Manchester. At 0658 hrs, with 65track miles to run, the aircraft was cleared to descend to FL110. Further descent clearances were given and, following clearanceto FL70 at 0706 hrs, the aircraft was transferred to ManchesterDirector who told DAL 12 that "YOU'RE NUMBER FIVE IN TRAFFICABOUT TWENTY EIGHT FROM TOUCHDOWN". DAL 12 replied "WE'REFUEL SHORTAGE WE'RE GOING TO HAVE TO DECLARE AN EMERGENCY WE CAN'TACCEPT NUMBER FIVE OR SIX". The controller responded byturning the aircraft onto a heading of 330° which shortenedthe distance to touchdown to 18 track miles; to facilitate thisone aircraft was given a delaying orbit and another was askedto keep its speed up on the ILS.

At 0708 hrs DAL 12 was cleared to 3,500 feet and turned onto aheading of 040° to intercept the localiser at about 17 nmfrom touchdown. The controller told the aircraft that LiverpoolAirport was nearer at this point but DAL 12 replied that theywere "NOT THAT DESPERATE". The Airport was broughtto Full Emergency status and DAL 12 landed safely at 0716 hrs.

Analysis of the Manchester Airport runway movements associatedwith the incident indicated that, had DAL 12 taken its turn inthe sequence of landing aircraft, it would have landed at 0721hrs at the earliest and 0727 hrs at the latest.

Meteorology

The London Gatwick Airport ATIS information broadcast from 0551hrs as Information Whiskey included the following:

RUNWAY IN USE ZERO EIGHT RIGHT BE ADVISED ATC LOW VISIBILITY PROCEDURESARE IN FORCE ----------WIND CALM VISIBILITY ONE HUNDRED AND FIFTYMETRES WITH FOG SKY CLEAR TEMPERATURE PLUS SIX DEW POINT PLUSSIX QNH ONE ZERO TWO SIX MILLIBARS -------.

The 0720 hrs meteorological report for Manchester Airport was:

'EGCC 10002KT 9999 FEW045 10/09 Q1028 NOSIG'

Regulation

US FAR 121 - 645 requires, in part, that:

'For any certificate holder conducting flagor supplemental operations outside the 48 contiguous United Statesand the District of Columbia, unless authorized by the Administratorin the operations specifications, no person may release for flightor take off a turbine-engine-powered airplane, unless, consideringwind and other weather conditions expected, it has enough fuel-

(1) To fly to and land at the airport to whichit is released;

(2) After that, to fly for a period of 10percent of the total time required to fly from the airport ofdeparture to, and land at the airport at which it was released;

(3) After that, to fly to and land at themost distant alternate specified in the flight release, if analternate is required;

and

(4) After that, to fly for 30 minutes at holdingspeed at 1,500 feet above the alternate airport under standardtemperature conditions.'

Company fuel policy

The Abnormal Operations chapter of the companyFlight Operations Manual contains the following definitions:

Minimum Fuel

'A Minimum Fuel condition exists if:

The estimated fuel remaining on arrival at the airport of intendedlanding is less than 30 minutes flying time calculated at 1500feet altitude at holding airspeed, and includes an allowance forestablished fuel quantity indicating error, and

All available options to resolve a low fuel condition have beenexhausted, and

No further delay can be accepted.'

The section also contains the advice that:

'In international airspace, ATC may not be familiar with the terminology"Minimum Fuel." Clearly communicate the need for minimumdelay.'

The final part is headed ATC Priority andstates the following:

'A Minimum Fuel condition requires that theaircraft proceed to the airport of intended landing with no furtherdeviations from the planned route of flight. The planned routeincludes normal arrival procedures plus any delays in routingknown at the time minimum fuel is declared.

Minimum Fuel is advisory only and does notestablish a need for priority handling.'

Minimum Fuel for the MD-11 is 11,000 lb.

Emergency Fuel

'Emergency Fuel equals approximately 15-20minutes of fuel remaining. An Emergency Fuel condition existswhen the estimated fuel remaining on arrival at the airport ofintended landing is less then the fuel required to:

Execute a missed approach at 200 feet AFE

Climb to 1,500 feet AFE and proceed downwind

Fly another approach to a landing from a point ten miles fromthe end of the runway, and

Includes an allowance for fuel quantity indicating system error.'

The section also contains the advice that:

'When declaring "Emergency Fuel"in international airspace, use the "MAYDAY" terminology,as foreign controllers may not be familiar with the "emergencyfuel" terminology.'

The final part is headed ATC Priority andstates the following:

'An Emergency Fuel condition requires thatthe aircraft land immediately. ATC should provide priority handlingdirectly to the airport of intended landing.'

Emergency Fuel for the MD-11 is 8,000 lb.

A Flight Operations Bulletin dated 31 July 1997 was addressedto all pilots and dispatchers; it discussed minimum fuel and diversionconsiderations. It states that:

'A declaration of Minimum Fuel should be madewith ATC when you expect to arrive at your airport of intendedlanding with less than the Flight Operations Manual Minimum Fuelquantity. This requires a commitment to either the destinationor a specific diversion airport and tells ATC you have exhaustedall other options.'

It also states that, when a landing at thedestination is questionable because of persistent weather:

'Fuel remaining before diversion should normallynot be less than the fuel required to proceed to the missed approachpoint ..... plus the amount required ..... tothe planned alternate to assure landing with Minimum Fuel.'

Company and commander's reports

Both the company and the commander reportedfrankly and gave every assistance in the investigation. The commanderhad given considerable thought to the length of time he couldhold at WILLO and amount of fuel he would need to get to Manchester. He left the hold when the fuel remaining was 20,500 lb; the flightplanned fuel to alternate was 10,440 lb. About halfway to Manchesterthe crew calculated an arrival fuel of 13,440 lb. At the timehe was told that he was number five to land on Runway 06, thecommander estimated that the landing fuel would be 11,000 lb. It was his first month on the aircraft and he was concerned thatany delay associated with having 4 aircraft ahead of him or thepossibility of one of them blocking the single runway, would puthim below the Minimum Fuel or even the company Emergency Fuel. He therefore declared an emergency to ensure he did not landwith significantly less than the Minimum Fuel; the aircraft landedwith 10,400 lb.

The commander, who had only recently qualifiedon the MD-11 aircraft, was uncertain of the amount of extra fuelhe would use during vectoring for final approach and thought thatthe delay

might put him into an Emergency Fuel situation. Hedecided to declare an emergency because he knew that the FAA approvedterminology 'Minimum Fuel' is not recognised in the United Kingdom.

The company considered that the commanderconducted the flight in a prudent manner and that he took thesafe course of action by declaring an emergency.

The planned level for diversion to Manchesterwas FL310 however, the aircraft spent the first 6 minutesafter leaving WILLO at FL110 followed by 7 minutes at FL130 beforebeing cleared to FL190 which was the final level. The companyhas required their Flight Control Department to amend the plannedfuel to alternate to reflect flight at the more usual lower levels.