

# The Dutch Safety Board

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**Occurrence #:** 2004117                      **Classification:** Serious incident

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## FACTUAL INFORMATION

Date of the occurrence:	17-07-2004	Cockpit crew:	2
Place of the occurrence:	Bremen	Cabin crew:	4
Aircraft registration:	PH-MPF	Passengers:	114
Airline company:	Martinair		
Aircraft model:	Airbus A320-232		
Aircraft type:	Passenger aircraft		
Type of flight:	Air transport flight	Injuries:	None
Phase of operation:	Approach		
Damage to aircraft:	Nil	Lighting conditions:	Daylight

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## The flight and the incident

The occurrence concerned a scheduled passenger flight from Shannon (EINN) to Amsterdam (EHAM). Rotterdam (EHRD) was the planned alternate airport and the total amount of fuel at departure from Shannon was 5.600 kg, of which 1.048 kg final reserve fuel.

Before departure from Shannon the weather forecasts for Amsterdam and Rotterdam were checked. Both gave a similar weather image: generally flight conditions well above the required landing minima with temporarily the possibility of rain and thunder showers with under these circumstances a visibility of 4,000 m, a wind speed of 17 knots and wind gusts up to 36 knots.

When the aircraft approached Amsterdam severe thunderstorms were active overhead Amsterdam with the implication that Amsterdam airport as well as the Amsterdam Terminal Control Area (TMA) were closed. Since overhead Rotterdam the same type of weather existed, it was decided to divert to Groningen (EHGG).

Approaching Groningen the weather conditions turned out to be bad there as well whereupon the captain decided to divert to Bremen airport (EDDW). During the last part of the flight the captain apparently expected to land with less than the required 30 minutes final reserve fuel and consequently declared a low fuel emergency to air traffic control (ATC). The landing at EDDW was uneventful. After landing it was found that 1,100 kg of fuel still remained in the tanks.

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## Investigation & Analysis

On request of the Bundesstelle für Flugunfalluntersuchung (BFU) in Germany the investigation was done by the Dutch Safety Board.

During the preparation of an air transport flight the amount of fuel to be taken is calculated carefully. Sufficient fuel has to be taken for taxiing (taxi fuel) and for the flight from the airport of departure to the destination (trip fuel) plus an additional amount of fuel to compensate for small deviations from the planned flight (contingency fuel). To this at least the fuel will be added required to divert from the destination airport to the chosen alternate airport (alternate fuel) plus an amount of fuel sufficient to fly for 30 minutes (final reserve fuel). On request of the captain extra fuel may be taken (extra fuel). An air

transport flight is legally required to land with at least this 30 minutes of final reserve fuel remaining on board.

Every air transport flight recognizes three phases as far as fuel:

1. The "normal" phase, during which the aircraft is expected to land with at least the amount of alternate fuel plus final reserve fuel;
2. The "abnormal" phase, during which the aircraft is expected to land with less than the alternate fuel plus final reserve fuel, but with more than the final reserve fuel;
3. The "emergency" phase in which it is expected to land with less than the final reserve fuel.

If the captain expects to land with less than 30 minutes final reserve fuel he shall declare a low fuel emergency.

The calculated amount of fuel in the flight plan did not contain an item extra fuel. The planned alternate airport was Rotterdam.

The selection of alternate airport(s) – decisive for the amount of alternate fuel to be taken - is based on prescribed weather limits. The weather forecasts for Amsterdam en Rotterdam met to this on the understanding that wind gusts may be ignored in the flight preparation phase. At this it must be noticed that heavy showers in the weather forecast make it difficult to predict the circumstances being present during the approach.

The decision of the crew to depart with the planned amount of fuel under these circumstances met the regulations. However in the preparation phase also other considerations can play a part. Such as possible delays during approach at the destination with reference to the weather, the availability of runways and volume of other air traffic. Also the fact that Rotterdam is a close-by alternate and weather conditions possibly deteriorate there simultaneously need to be involved in the flight planning.

On the day of the occurrence there was talk of a changing weather situation that was foreseen by neither the meteorologists, neither ATC nor the crew. Given the remaining fuel diverting to Bremen was still possible and so was decided by the crew.

The implication that possibly would be landed with a minimal amount of fuel (less than 30 minutes final reserve fuel) was recognized in time by the crew whereupon the captain declared a low fuel emergency. Because of this the flight got priority at the landing and was the remaining flight time reduced.

The taken amount of final reserve fuel was 1,048 kg. After landing the amount of fuel in the tanks was 1,100 kg. By correctly executing the procedures the crew had - with assistance of ATC – prevented that the fuel during landing was less than prescribed.

With hindsight the circumstances at the moment of the occurrence were such that taking along extra fuel would have been a wise decision. The Safetyboard indicates that the amount of fuel to be taken in specific circumstances does not have to be limited to the amount that is legally prescribed.

Note 1: At the Aviation Safety Reporting System (ASRS) Directline website is an interesting publication. It was written by Jeanne McElhatton and is called Great Expectations, Minimum Fuel Situations. The publication can be found at: [http://asrs.arc.nasa.gov/directline\\_issues/dl3\\_great.htm](http://asrs.arc.nasa.gov/directline_issues/dl3_great.htm).

Note 2: This report has been published in English and Dutch language. If there are differences in interpretation the Dutch text prevails.