



# FUEL MANAGEMENT DURING ABNORMAL OPERATIONS

## 1. Introduction

Abnormal operations encourage caution and a big workload from the flight crew, fuel management becomes difficult and delicate task as the tools normally used for fuel monitoring, such as FMS predictions and flight plan comparison, may be invalid or misleading.

Pilots should be familiarized with their aircraft and extra care and attention shall be taken in order to guarantee the safety of the operation.

## 2. Abnormal Situations

Fuel consumption under abnormal situations could vary according the situation and the related factors; it could be from the subtle to the extreme.

Failures will cause different types of fuel penalties, it is important to be familiarized with the manufacturer manuals in order to attack these factors in time.

Take into account that abnormal situations will affect the normal fuel operation and some calculations will not reflect the reality of the situation.

Here are some examples:

### 2.1. In-flight engine failure

Once an engine failure has been identified the crew should start the process to solve the situation. Most of the time, a drift down is required to a lower altitude, at the same time more thrust and power is demanded from the remaining engine in order to maintain altitude.

### 2.2. Air conditioning packs failure:

The usage of one pack demands higher fuel consumption due to the lower cruising altitude.

### 2.3. Landing gear problem

When the landing gear remains extended, maximum speed and altitude will be affected (low speed vs low altitude). Fuel flow will be much higher due to the higher drag.

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## 2.4. Flight surfaces

Failures related with the flight surfaces like slats, flaps and others will affect the maximum altitude and speed of the aircraft. The fuel used to return or divert will be higher due to the increased drag.

Pilots must be aware that some of these situations will clearly affect the FMS performance; some of the fuel predictions might be erratic or different.

## 3. Abnormal Situations – Decision making

In case of an abnormal situation pilots should act according to the manufacturer manuals and guidance manuals.

At the same time, take into account the effects of the affected items and compare them with the MEL (Minimum Equipment List).

Pilots must be aware of the fuel on board; under an abnormal situation, special caution should be taken, compare the FMS information with manual calculations based on fuel flow and ground speed will be important to determine range and endurance.

## 4. Minimum Fuel situation

Minimum fuel is defined as an indication that an aircraft's fuel supply has reached a state where, upon reaching the destination, it can accept only very short delay or no delay at all.

This is not an emergency situation; but merely indicates that an emergency situation is possible, should any undue delay occur:

A pilot will advise ATC about the minimum fuel status when fuel supply has reached a state where, upon reaching destination, the pilot cannot accept any delay.

Minimum fuel situation is not an emergency situation; it is an advisory indicating that an emergency situation could be possible at any moment.

Minimum fuel advisory does not give any traffic priority.

If the remaining fuel suggests the need for priority in order to achieve a safe landing, the pilot should declare an emergency and report the remaining fuel in minutes.

If the pilot encounters himself at a minimum fuel situation, he must be able to monitor the fuel consumption and have a plan of action.

At the same time communication with the ATC must be necessary in order to achieve the safety of the operation.

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