

# Emergency immediately after take-off: the dilemma of excess weight

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The take-off weight of an aircraft can be much higher than its maximum landing weight. This is particularly common in long-haul aircraft, which carry a large amount of fuel on board

Safety, Quality and Environmental Division

## What should be done then if an emergency occurs immediately after take-off, when the aircraft's weight exceeds the maximum allowable landing weight?

The aircraft's commander has to decide between two options: try to land heavy or reduce the aircraft's weight before landing. Both options have their pros and cons, and it is the aircraft commander who is in a position to decide which option is best, depending on which aircraft systems are affected and how severely. Traffic control's job is to assist the commander at all times.

If the aircraft can fly smoothly and an emergency landing is not deemed to be necessary, the commander will most likely opt to lower the aircraft's weight to a value that ensures that the landing can be made without overloading the landing gear or the aircraft structure. The weight can be reduced in two ways: by dumping the fuel, if the aircraft provides for this; or by flying in a holding pattern to burn the fuel.

### What the regulation says:

If the commander opts to dump fuel, the applicable Spanish rules are contained in Article 8 of Royal Decree 1180/2018 (transposition into Spanish law of the SERA regulations).



Royal Decree  
1180/2018

## ATC must coordinate with the aircraft commander:

- The route or area where the fuel will be dumped. To the extent possible, it must be away from populated areas and preferably over water and away from storms.
- The flight level, which should be higher than 6,000 feet and above the minimum area altitudes (MSA, MVA, MEA).
- Duration of the manoeuvre.

## Other aircraft have to be separated by the following minimum distances:

- 10 nautical miles ahead and to either side of the dumping aircraft.
- 50 nautical miles behind.
- 1,000 feet above.
- 3,000 feet below.

Uncontrolled traffic has to be **notified** of the fuel dumping operation by means of a message broadcast on the appropriate frequency. Nearby adjacent units must be notified as well.

The crew may need to keep radio silence during the fuel dumping operation. In this case, ATC must coordinate the expected duration of the radio silence with the crew.

## What can the controller do?

As in any emergency, always remember to "ASSIST" in the initial moments:

- Acknowledge
- Separate
- Silence
- Inform
- Support
- Give the crew Time to analyse the situation calmly

## Whenever possible:

- Coordinate as early as possible with the selected **aerodrome** to make sure all its emergency systems are available.
- The commander will want to land on the **longest runway** available nearby: gather all the relevant information so you can provide it to the crew. If the runway is wet or the braking action is diminished for any reason, inform the crew.
- The **duration** of the fuel dumping operation is highly variable and can take a long time (a fully loaded B747 may need to dump fuel for an hour). Keep this in mind when searching for a suitable area.
- After landing, do not expect the aircraft to vacate the runway immediately. Measures must be readied in case the **runway is blocked**.
- The aircraft's structure is capable of supporting an **overweight** landing, although it is definitely not desirable due to the excess stress it will place on the landing gear. It is the commander who decides at any given time which option is safest. If the commander reports that the aircraft will do an overweight landing, immediately report this to the airport's emergency services.



A fully loaded B747 may need to dump fuel for an hour

## And what happens to the fuel?

- The fuel needs about 6,000 feet to dissipate in the atmosphere.
- At lower temperatures, more fuel will reach the ground. Other factors (wind, aircraft's wake, design of the fuel dump nozzle) are also relevant.
- Even if the fuel has dispersed and is not harmful, it is very possible for the odour to be detectable on the ground.
- If the fuel is dumped from a low altitude, this could affect the population by not giving enough time for the fuel to disperse in the atmosphere.