Civil Aviation Authority

SAFETY NOTICE

Number: SN–2019/002

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Protecting Final Reserve Fuel and The Minimum Fuel Declaration

This Safety Notice contains recommendations regarding operational safety.

Recipients must ensure that this Notice is copied to all members of their staff who need to take appropriate action or who may have an interest in the information (including any 'in-house' or contracted maintenance organisations and relevant outside contractors).

Applicability:	
Aerodromes:	Certificated/Licensed Aerodromes
Air Traffic:	Air Traffic Service Providers
Airspace:	Not primarily affected
Airworthiness:	Not primarily affected
Flight Operations:	Operators, AOC Holders and Approved Training Organisations
Licensed/Unlicensed Personnel:	Flight Crew, Air Traffic Controllers, Instructors and Examiners

1 Introduction

1.1 The term MINIMUM FUEL was introduced by ICAO in 2012 [1] and is used 'to describe a situation in which an aircraft's fuel supply has reached a state where the flight is committed to land at a specific aerodrome and no additional delay can be accepted.' [2, 3]

1.2 Information obtained from mandatory occurrence reports (MORs) has indicated this term is frequently misunderstood and misused. [4] This Safety Notice seeks to address these issues by clarifying the procedures for protecting final reserve fuel, including usage of the MINIMUM FUEL declaration.

2 Background [5]

2.1 An operator's fuel policy should ensure safe completion of each flight and allow for deviations from the planned operation. This is accomplished using a balanced approach dependent upon accurate pre-flight planning, proactive fuel management and actions to protect final reserve fuel.

2.2 After flight commencement, in-flight fuel management procedures should act as controls to check that pre-flight (or in-flight) planning assumptions are continually validated. Such validation is necessary to support a culture of continuous fuel state awareness and ensure that adequate safety margins are maintained.

2.3 The fuel policy should culminate in a mandate to protect final reserve fuel. This mandate should identify the pre-emptive actions required by the flight crew to achieve this aim; and is

intended to ensure sufficient fuel remains available to accomplish a safe landing when unforeseen circumstances preclude completion of the flight as originally planned.

2.4 The coordinated escalation process (with air traffic control) related to the protection of final reserve fuel typically occurs in three procedural steps [see Appendix 1] and may be resolved at any stage of the process, as appropriate to the situation. The MINIMUM FUEL declaration usually represents the second step in the series.

3 Actions to be taken (See section 8 for references)

3.1 'The pilot-in-command shall continually ensure that the amount of usable fuel remaining on board is not less than the fuel required to proceed to an aerodrome where a safe landing can be made with the planned final reserve fuel remaining upon landing.' [6, 7, (8)]

3.2 'The pilot-in-command shall request delay information from ATC when unanticipated circumstances may result in landing at the destination aerodrome with less than the final reserve fuel plus any fuel required to proceed to an alternate aerodrome or the fuel required to operate to an isolated aerodrome.' [6, 7]

Note: 'The request for delay information… is not a request for assistance or an indication of urgency, but a procedural means for the flight crew to determine an appropriate course of action when confronted with unanticipated delays. There is no specific phraseology recommended for use with ATC… as each situation may be different.' [5]

3.3 'The pilot-in-command shall advise ATC of a minimum fuel state by declaring MINIMUM FUEL when, having committed to land at a specific aerodrome, the pilot calculates that any change to the existing clearance to that aerodrome may result in landing with less than the planned final reserve fuel.' [6, 7, 8]

Note: 'This is not an emergency situation… Declaration of MINIMUM FUEL informs ATC that:

a) all planned aerodrome options have been reduced to a specific aerodrome of intended landing' [5, 6, 7] *and*

b) 'as long as the current clearance is not modified, the flight should be able to proceed as cleared without compromising the PIC's responsibility to protect final reserve fuel.' [5]

3.4 'The urgency signal 'PAN PAN…' should not be used instead of the MINIMUM FUEL declaration' [4] unless for any reason, a MINIMUM FUEL declaration is not possible.

3.5 'Controllers shall respond to a pilot's declaration of MINIMUM FUEL by confirming the estimated delay (if any)… or by expressing the remaining track mileage from touchdown' [9]

3.6 'Controllers are not required to provide priority to pilots of aircraft that have declared MINIMUM FUEL' [9]

3.7 'Controllers shall keep pilots informed of any increase in delay or increase in track mileage after the pilot's initial declaration of MINIMUM FUEL, following which the controller can expect the pilot to declare an emergency.' [9]

3.8 'The pilot-in-command shall declare a situation of fuel emergency… when the calculated usable fuel predicted to be available upon landing at the nearest aerodrome where a safe landing can be made is less than the planned final reserve fuel.' [6, 7, 8]

4 Recommendations

4.1 Operators and ATS providers should highlight during training that MINIMUM FUEL is not an emergency declaration but a statement of fact. Once ATC has responded with delay information (or distance to touchdown), the pilot will determine whether or not to declare a fuel emergency.

4.2 Operators should emphasise that the procedures to protect final reserve fuel [see Appendix 1] should not be used as a substitute for in-flight re-planning or as justification to continue an improperly planned operation.

5 Safety Reports

5.1 To aid analysis, key details should be recorded in safety reports, including:

a) the planned final reserve fuel figure; and

b) the actual fuel quantity on landing (if practical).

6 Queries

6.1 Queries or requests for further guidance should be addressed to Technical Support, Future Safety, Civil Aviation Authority. E-mail: safetypublicationsteam@caa.co.uk.

7 Cancellation

7.1 This Safety Notice cancels Safety Notice SN-2019-002 Version 2 and will remain in force until further notice.

8 References

[1] ICAO State Letter AN 11/1.3.25-12/10: Adoption of Amendment 36 to Annex 6, Part I;

[2] ICAO Doc 4444 ‘Procedures for Air Navigation Services – Air Traffic Management’, Sixteenth Edition, 2016;

[3] UK Regulation (EU) No. 923/2012 ‘UK Rules of the Air (SERA)’, amended 23 March 2023;

[4] EASA SIB No 2018-08, issued 08 May 2018 (https://ad.easa.europa.eu/ad/2018-08);

[5] ICAO Doc 9976 ‘Flight Planning and Fuel Management (FPFM) Manual’, First Edition, 2015;

[6] ICAO Annex 6 ‘Operation of Aircraft’ Part I – International Commercial Air Transport – Aeroplanes, Twelfth Edition, July 2022;

[7] ICAO Annex 6 ‘Operation of Aircraft’ Part II – International General Aviation – Aeroplanes, Eleventh Edition, July 2022;

[8] ICAO Annex 6 ‘Operation of Aircraft’ Part III – International Operations – Helicopters, Eleventh Edition, July 2022;

[9] CAP 493: Manual of Air Traffic Services – Part 1, Tenth Edition;

[10] *UK Regulation (EU) No. 965/2012 ‘Air Operations’ is being updated to contain requirements about the MINIMUM FUEL declaration.*

Appendix 1

Protecting Final Reserve Fuel

1	**REQUEST DELAY INFORMATION FROM ATC** when unanticipated circumstances may result in landing at the destination aerodrome with: a) less than final reserve fuel, plus fuel required to proceed to an alternate aerodrome; or b) the fuel required to operate to an isolated aerodrome. **Example ATC responses:** "NO TRAFFIC DELAY EXPECTED / DELAY LESS THAN [NUMBER] MINUTES, EXPECT [NUMBER] HOLDING PATTERNS / EXPECTED APPROACH TIME [TIME] / DELAY NOT DETERMINED [REASON FOR THE DELAY]" ***Note: Pilots should use this delay information to determine if a diversion is required.***
2	**DECLARE MINIMUM FUEL**: "[CALLSIGN], MINIMUM FUEL" a) when committed to land at a specific aerodrome*; and b) any change to the existing clearance to that aerodrome* may result in landing with less than the planned final reserve fuel. ***Note 1: Do not expect priority. This is not an emergency situation but an indication that an emergency situation is possible should any additional delay occur.*** **Example ATC responses:** "ROGER, NO TRAFFIC DELAY EXPECTED / EXPECT [NUMBER] MINUTES DELAY / [NUMBER] MILES FROM TOUCHDOWN" ***Note 2: Pilots should use this delay information to determine if a fuel emergency should be declared.***
3	**DECLARE A FUEL EMERGENCY**: "MAYDAY MAYDAY MAYDAY FUEL..." when the calculated usable fuel predicted to be available upon landing at the nearest aerodrome* where a safe landing can be made is less than the planned final reserve fuel. **ATC Response:** Subsequent ATC action shall be based on the intentions of the pilot and the overall traffic situation.

** landing site - in the case of helicopters*