



IBAC Bulletin B01-4

Subject: Noise abatement take-off and climb procedures.

Introduction

This Bulletin is to foreshadow the release of an amendment (#11) of ICAO PANS-OPS Volume 1 (Doc 8168-OPS/611). This amendment will become applicable **1 November 2001**.

The amendment relates to PANS-OPS Volume 1 Part V, **Noise Abatement Procedures, Chapter 3, Aeroplane Operating Procedures** and will replace the existing Chapter 3.

This amendment, as and when incorporated by States (i.e national regulations), will be of direct interest to and impact all operators of turbojet aircraft.

In order to achieve compliance operators will be significantly reliant on the support of aircraft manufacturers. It is therefore advisable that the latter be cognizant of this amendment.

These new procedures will also have implications for flight crew training and thus should be of interest to training establishments.

Background and References

This amendment ensues from the work of the ICAO Committee on Aviation Environmental Protection, 5th Meeting.

States and International Organizations, including IBAC, were consulted on the amendment proposal by State Letter Ref AN 1/61-01/37 dated 19 March 2001.

Additional references:

ICAO Air Navigation Commission, AN-WP/7673, Addenda 1 and 2 thereto, Discussion Paper No.1 and Flimsy No. 1.

PANS-OPS Amendment 11 (Advance copy)

For complete details please refer to the attachment hereto.

Specific attention of operators is drawn to the following paragraphs:

3.1.2

3.2.1b)

3.2.3 a), b), c) and h)

3.3.1

IBAC Staff Comments

It is of note that the noise abatement take-off climb procedures viz NADP 1 and NAPD 2 are now **examples**. As such, these will supercede the prescriptive, **recommended** procedures (Procedure A and Procedure B) heretofore in the PANS-OPS.

Ref para 3.2.3 (h) this prescribes a requirement that minimum thrust level information be included in the aircraft operating manual.

Insofar as ICAO definitions and provisions are concerned, the aircraft operating manual is part of the operations manual and Annex 6 Part I (Operation of Aircraft- International Commercial Air Transport) requires an operations manual. There is no equivalent requirement for an operations manual in Annex 6 Part II (Operation of Aircraft – International General Aviation).

Nevertheless, and in the context of Annex 6 Part II, the operator is required to provide information necessary for the safe operation of the aircraft. In the event such information is not covered by the Aircraft Flight Manual, other means must be found to accomplish this. It is understood that such information is generally provided by aircraft manufacturers in documents commonly referred to as Pilot Operating Instructions or Aircraft Operating Manual.

Ref para 3.3.1 this requires that the noise abatement procedure developed by the operator be agreed to by the State of the Operator.

Compliance with this requirement appears to be relatively straight forward in circumstances requiring an operations manual, since a copy of that manual is normally provided to the regulatory authority of the State of the Operator for review, acceptance and, where required, approval.

In other circumstances, i.e. where there is no requirement for an operations manual e.g. in the context of Annex 6 Part II the view has been taken by the ICAO Secretariat that agreement to the noise abatement procedure can be conferred by the State in guidance material.

At this juncture, it is unclear as to how individual States will proceed. In this regard IBAC had endeavoured in it's comments to ICAO on the amendment proposal to reduce, to the extent consistent with ensuring safety, the administrative burden to be imposed on bizav operators (and for that matter also States' Regulatory authorities).

AMENDMENT NO. 11 TO PROCEDURES FOR AIR NAVIGATION SERVICES — AIRCRAFT OPERATIONS

PART V

NOISE ABATEMENT PROCEDURES

*Replace the existing Chapter 3, paragraph 3.1 by
the following:*

Chapter 3

AEROPLANE OPERATING PROCEDURES

3.1 INTRODUCTION

3.1.1 This chapter provides the aeroplane operating procedures to be taken into account when developing noise abatement take-off and climb procedures. In the appendix two examples of noise abatement climb procedures are given, one which alleviates noise close to the aerodrome, Noise Abatement Departure Procedure 1 (NADP 1) and one which alleviates noise more distant from the aerodrome, NADP 2.

3.1.2 The State in which the aerodrome is located is responsible for ensuring that noise abatement objectives are specified by aerodrome operators. The noise abatement objectives should enable operators to develop safe procedures in accordance with this chapter. The State of the Operator is responsible for the approval of safe of the flight procedures, developed by the aircraft operators.

3.2 OPERATIONAL LIMITATIONS

3.2.1 General

- a) Noise abatement procedures based on this document should not be selected if noise benefits cannot be expected.
- b) Noise abatement climb procedures which do not comply with the minimum requirements of the procedures in this document shall not be approved by the State of the Operator.
- c) The pilot-in-command has the authority to decide not to execute a noise abatement departure procedure if conditions preclude the safe execution of the procedure.

3.2.2 Take-off

3.2.2.1 Noise abatement procedures in the form of reduced power take-off should not be required in adverse operating conditions such as:

- a) if the runway surface conditions are adversely affected (e.g. snow, slush, ice or water, or by mud, rubber, oil or other substances);
- b) when the horizontal visibility is less than 1.9 km (1 NM);
- c) when the cross-wind component, including gusts, exceeds 28 km/h (15 kt);
- d) when the tail-wind component, including gusts, exceeds 9 km/h (5kt);
and

- e) when wind shear has been reported or forecast or when thunderstorms are expected to affect the approach or departure.

Note.— Some operating manuals (or Flight Manual) may impose restrictions to the use of reduced take-off power while engine anti-ice systems are operating.

3.2.3 Departure climb

Aeroplane operating procedures for the departure climb shall ensure that the safety of flight operations is maintained while minimizing exposure to noise on the ground. The following requirements need to be satisfied:

- a) Noise abatement procedures shall not be executed below a height of 240 m (800 ft) above aerodrome elevation;
- b) The noise abatement procedure specified by an Operator for any one aeroplane type should be the same for all aerodromes;
- c) To minimize the impact on training while maintaining some flexibility to address variations in the location of noise sensitive areas, sufficient commonality shall exist between the departure procedures specified by the Operator. There will be no more than two departure procedures to be used by one Operator for an aeroplane type, one of which should be identified as the normal departure procedure, and the other as the noise abatement departure procedure;
- d) Normal departure procedures typically include general noise reduction measures which encompass one of the two examples shown in Appendix A — Noise Abatement Departure Climb Guidance;
- e) Conduct of noise abatement climb procedures is secondary to the satisfaction of obstacle requirements;
- f) All necessary obstacle data shall be made available to the operator and the Procedure Design Gradient shall be observed;
- g) The power settings to be used subsequent to the failure or shut-down of an engine, or any other apparent loss of performance, at any stage in the take-off or noise abatement climb are at the discretion of the pilot-in-command and noise abatement considerations no longer apply.
- h) The minimum level of thrust for the flap/slat configuration, after power reduction, is defined as the lesser of the maximum climb power and that level necessary to maintain the specified engine inoperative minimum net climb gradient (1.2, 1.5 or 1.7 percent for 2, 3 or 4 engines) for the flaps/slats configuration of the aeroplane, in the event of loss of an engine, without a throttle position increase by the pilot in command. The minimum thrust level varies as a function of flap

setting, altitude, and aeroplane weight, therefore, this information must be provided in the aircraft operating manual;

- i) The power settings specified in the aircraft operating manual are to take account of the need for engine anti-icing when applicable;
- j) Noise abatement climb procedures are not to be used in conditions where windshear warnings are extant or the presence of windshear or downburst activity is suspected; and
- k) The maximum acceptable body angle specified for an aeroplane type shall not be exceeded.

3.3 Development of Procedures

3.3.1 A noise abatement procedure shall be developed for each aeroplane type by the operator (with advice from the aeroplane manufacturer, as needed), and agreed to by the State of the Operator. The departure procedure to be used on a specific departure should satisfy the noise objectives of the State of the aerodrome.

Appendix A — Noise abatement departure climb guidance

A.1 General

A.1.1 Aeroplane operating procedures for the take-off climb shall ensure that the necessary safety of flight operations is maintained whilst minimizing exposure to noise on the ground. The following two examples of operating procedures for the climb have been developed as guidance and are considered safe when the criteria in 3.2 are satisfied. The first procedure (NADP 1) is intended to provide noise reduction for noise sensitive areas in close proximity to the departure end of the runway. The second procedure (NADP 2) provides noise reduction to areas more distant from the runway end.

A.1.2 The two procedures differ by whether the acceleration segment for flap/slat retraction is initiated prior to reaching the maximum prescribed height or initiated at the maximum prescribed height. To ensure optimum acceleration performance, thrust reduction may be initiated at an intermediate flap setting.

Note. 1— For both procedures, intermediate flap transitions required for specific performance related issues may be initiated prior to the prescribed minimum height, however, no power reduction can be initiated prior to attaining the prescribed minimum altitude.

Note. 2 — The indicated airspeed for the initial climb portion of the departure prior to the acceleration segment is to be flown at a climb speed of V_2 plus 20 to 40 km/h (10 to 20 kt).

A.2 Noise abatement climb — Example of a procedure alleviating noise close to the aerodrome (NADP 1)

A.2.1 This procedure involves a power reduction at or above the prescribed minimum altitude and delaying flap/slat retraction until the prescribed maximum altitude is attained. At the prescribed maximum altitude, accelerate and retract flaps/slats on schedule while maintaining a positive rate of climb and complete the transition to normal en-route climb speed.

A.2.2 The noise abatement procedure is not to be initiated at less than 240 m (800 ft) above aerodrome level.

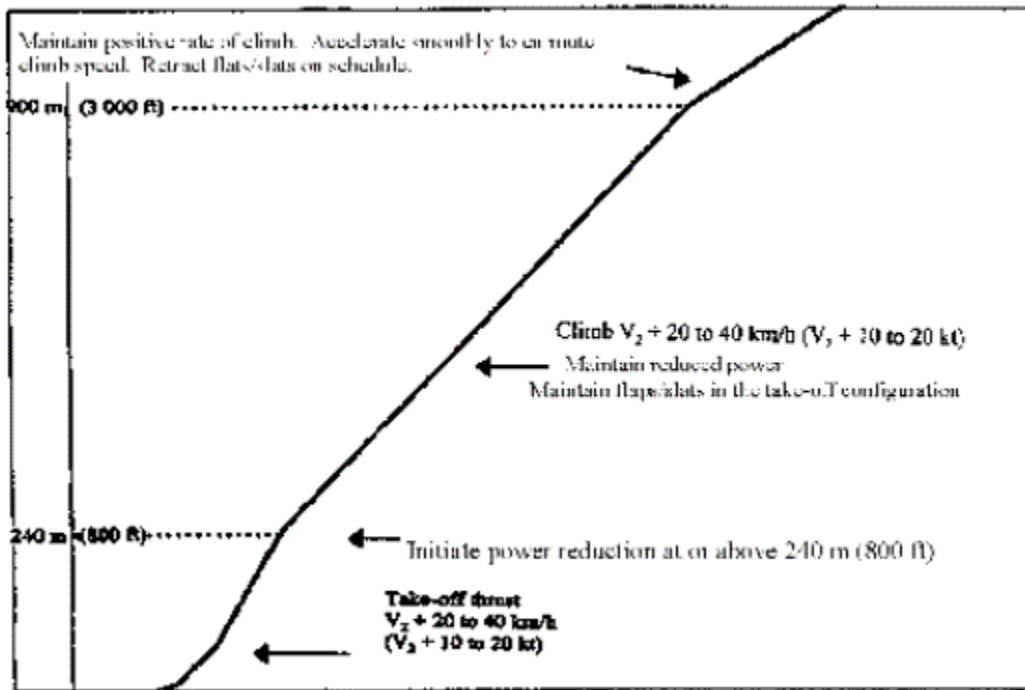


Figure 1. Noise abatement take-off climb — Example of a procedure alleviating noise close to the aerodrome (NADP 1)

A.2.3 The initial climbing speed to the noise abatement initiation point shall not be less than V_2 plus 20 km/h (10 kt).

- on reaching an altitude at or above 240 m (800 ft) above aerodrome level, adjust and maintain engine power/thrust in accordance with the noise abatement power/thrust schedule provided in the aircraft operating manual. Maintain a climb speed of V_2 plus 20 to 40 km/h (10 to 20 kt) with flaps and slats in the take-off configuration;
- at no more than an altitude equivalent to 900 m (3 000 ft) above aerodrome level, while maintaining a positive rate of climb, accelerate and retract flaps/slats on schedule; and
- at 900 m (3 000 ft) above aerodrome level, accelerate to en-route climb speed.

A.3 Noise abatement climb — Example of a procedure alleviating noise distant from the aerodrome (NADP 2)

A.3.1 This procedure involves initiation of flap/slat retraction on reaching the minimum prescribed altitude. The flaps/slats are to be retracted on schedule while

maintaining a positive rate of climb. The power reduction is to be performed with the initiation of the first flap/slat retraction **or** when the zero flap/slat configuration is attained. At the prescribed altitude, complete the transition to normal en-route climb procedures.

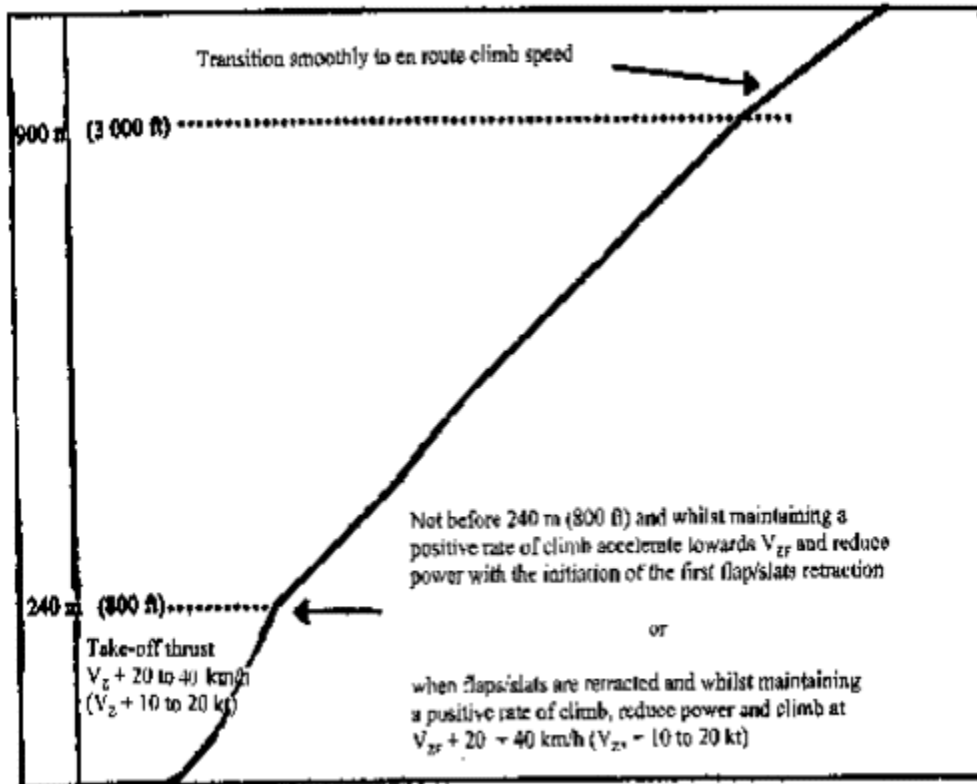


Figure 2. Noise abatement take-off climb — Example Distant procedure (NADP 2)

A.3.2 The noise abatement procedure is not to be initiated at less than 240 m (800 ft) above aerodrome level.

A.3.3 The initial climbing speed to the noise abatement initiation point is V_2 plus 20 to 40 km/h (10 to 20 kt).

On reaching an altitude equivalent to at least 240 m (800 ft) above aerodrome level, decrease aircraft body angle/angle of pitch whilst maintaining a positive rate of climb, accelerate towards V_{ZF} and either:

- a) reduce power with the initiation of the first flaps/slats retraction; or
- b) reduce power after flaps/slats retraction.

Maintain a positive rate of climb and accelerate to and maintain a climb speed of $V_{ZF} + 20$ to 40 km/h (10 to 20 kt) to 900 m (3 000 ft) above aerodrome level.

On reaching 900 m (3 000 ft) above aerodrome level, transition to normal en-route climb speed.

— END —