



ORGANIZACIÓN DE AVIACIÓN CIVIL INTERNACIONAL



Agenda Item 8:

Local environmental impacts of
international civil aviation

OVERVIEW



Objective:

Characterize the environmental impacts of aviation in the vicinity of airfields and ICAO's instruments for managing them.



Scope:

Local impacts: aircraft noise, local air quality (LAQ) and water and soil impact. Global climate and CORSIA are not addressed.



Frame of reference:

Annex 16 (Vol. I and II), Doc 9829, Doc 9889, Doc 9640, Doc 9184 and the resolutions of the Assembly on environmental matters.

GENERAL DESCRIPTION

Regulatory Framework

Chicago Convention · Annex 16



Environmental protection. Volume I: aircraft noise. Volume II: emissions from aircraft engines.

Committee on Aviation Environmental Protection (CAEP)



Committee on Aviation Environmental Protection, established by the Council in 1983; it replaced the Committee on Aircraft Noise (CAN, 1970) and the Committee on Aircraft Engine Emissions (CAEE, 1977).

Consolidated policy



Assembly resolution A41-20: general provisions, noise and local air quality, revised at each session.

Eco-Airport Toolkit e-collection



ICAO's electronic collection dedicated to airport environmental planning and improvement, with practical and ready-to-use information for States, airport operators and other stakeholders.

Three axes of impact in the aerodrome environment

- 01 Aircraft noise**
Annoyance and operational limitations in nearby communities.
- 02 Local air quality**
Emissions from engines and airport sources in the vicinity.
- 03 Water and soil**
Storm runoff, melting fluids, spills, and drainage.



Nature of the noise problem

Effect on communities

Aircraft noise is the most perceived environmental impact in the immediate vicinity of the aerodrome.

Operational consequence

Noise problems have led to operating restrictions and opposition to the expansion or construction of airports.

Risk of fragmentation

Uncoordinated policies to address noise can hinder aviation's role in economic development.

ICAO's response

An airport-by-airport approach, with objective and measurable criteria and consultation with all stakeholders.

Noise certification: Annex 16, Volume I

Noise standards at the source have been set as SARPs since the 1970s, starting with the Special Meeting on Aircraft Noise in the Vicinity of Aerodromes (1969).

Purpose of Certification

Ensure that the aircraft design incorporates the latest noise reduction technology available.

Demonstration

It is demonstrated by procedures representative of the day-to-day operation of the aircraft.

Expected Result

That the reductions offered by technology translate into less noise around airports.

Large jet and propeller aircraft: Noise standards are set out in Chapters 2, 3, 4, 14 and 16 of Annex 16, Volume I, available in all six ICAO languages.

The Balanced Approach (Doc 9829)

Published in 2004 and revised in 2007 and 2008. It seeks to address noise at each airport in an environmentally responsive and economically responsible manner, with maximum environmental benefit at the lowest cost.

01

Noise reduction at source

Certification standards and new engine and airframe technology.

02

Land-use planning

Compatibility between the aerodrome and the surrounding land uses.

03

Noise abatement procedures

Flight paths, configurations and operational profiles that reduce exposure.

04

Operating restrictions

Last resort, only after evaluating the three options above.

The selection of measures is preceded by the assessment of the noise situation: contour lines, indices, baseline and management plans.

Certified emissions and the LTO cycle

ICAO's primary environmental objective: to limit or reduce the impact of aviation emissions on local air quality. The corresponding SARPs are listed in Annex 16, Volume II.

REGULATED POLLUTANTS

NO_x

Nitrogen oxides

HC

Unburned hydrocarbons

CO

Carbon monoxide

nvPM

Non-volatile particulate matter

Smoke

and fuel venting

LANDING AND TAKE-OFF (LTO) CYCLE

The emissions certification is based on four operating modes, each with a characteristic thrust and mode time, measured on a test bench with the engine installed.

- Take-off
- Climb
- Approach
- Taxiing and idling

Emission sources on the airport grounds

Main engines

Aircraft emissions in the LTO cycle, directly within ICAO's remit.

Ground support equipment

GSE and auxiliary power units (APUs) operating on the apron.

Fixed installations

Boilers, power plants and airport infrastructure activities.

Ground access

Passenger, staff, and cargo vehicles accessing the airport.

Assessment: Emissions Inventories

Doc 9889 — Handbook on Air Quality at Airports

Third edition, 2023. It provides guidance on State requirements, emission sources, inventories and allocation of emissions, and on applicable analytical frameworks.

Engine emissions data bank

Collects certification data for jet engines with thrust greater than 26.7 kN; it is publicly accessible and hosted by EASA on behalf of ICAO.

First methodological step

Obtain a reliable estimate of emission types and quantities; Assessment in the local context is complex and multifactorial.



WATER AND SOIL • 1 OF 2

Water and soil pressures

Supply

The airport depends on the local availability of water and the water stress of the region.

Drainage management

Floods, drainage problems and erosion associated with rainfall events.

Discharge

The water leaving the premises must be safe for the surrounding environment.

De-icing and anti-icing

Fluids applied to aircraft and pavements are the most specific source in the sector.

Management: Safety and Environment Protection

Doc 9640

Manual on Aircraft Ground De-icing/Anti-icing Operations: formal procedures for safe winter operations.

Best practices

Selection of approved fluids and application techniques that reduce the generation of pollutants without compromising safety.

Containment and treatment

Systems for the collection, containment and treatment of runoff associated with snowmelt, subject to discharge permits.

Current CAEP agenda

Working Group 2 addresses contamination at airports and expands the Eco-Airport Toolkit collection.

Planning and assessment tools

EMS**Environmental Management System**

Methodology and framework to identify and cost-efficiently manage the significant environmental aspects of the operation.

Doc 9184**Airport Planning Handbook**

Part 1, Master Planning: Guides the development of the master plan and the compatibility of the airfield with its environment.

ACERT**Carbon and Emissions Reporting Tool**

Free ACI spreadsheet that allows the operator to calculate their GHG inventory by scopes 1, 2 and 3, with no prior experience.

ICAO Environmental Tools (ENV Tools)**Integrated modelling**

It quantifies noise, fuel consumption and emissions from operations, from the airport level to the global level.

Eco-Airport Toolkit e-collection: what is it?

ICAO's electronic collection dedicated to airport environmental planning and improvement, with practical and ready-to-use information for States, airport operators and other stakeholders.

Focus on airports

It brings together good practices and lessons learned from airports around the world in a concise, globally applicable format.

Stand-alone publications

Each publication addresses a specific environmental issue, to identify specific solutions and decide based on real experience.

Complement, not substitute

It complements ICAO policies, SARPs and guidance texts, without replacing them.

The WG2 of the CAEP deals with the environmental aspects of airports and the operations in their vicinity; its 2025-2028 program includes expanding the Eco-Airport Toolkit e-collection.

Collection Modules

The publications cover the environmental issues that define an airport's local performance: air, water, energy, waste, biodiversity and climate resilience.

Air and noise

Air Quality Management at Airports: emission sources, ambient air regulation, reduction measures and air quality management plans.

Water and soil

Water Management at Airports: supply, management capacity (flooding, drainage, erosion) and discharge of clean and safe water into the environment.

Energy and environment

Cleaner Energies at Airports, Biodiversity in Airport Management and Climate Resilient Airports.

Other modules: GHG Management and Mitigation at Airports, Sustainable Considerations for Airport Surface Access, Innovation and Technology in Airport Sustainability and An Environmental Management System for Airports.

Relationship to local environmental impacts

The local impacts of international civil aviation (noise, air quality, water and soil) are managed at the airport and its surroundings: the Toolkit translates that framework into actionable practices.

From SARP to practice

Annex 16 and the manuals (Doc 9889, Doc 9829) establish the what; the Toolkit shows the how-to with real airport cases.

Compatibility

ICAO notes that it is achieved with airport planning, management of pollutant sources and management of the surrounding land use.

Use by States

It supports environmental management plans, infrastructure projects and operational practices.

Documented examples of action include airports in Hong Kong (SAR), Kuala Lumpur (Malaysia) and Rajiv Gandhi (India).

CLOSING

Conclusions and Reference Documents

Local impacts are managed on an airport-by-airport basis, with objective criteria and stakeholder consultation.

Noise and air quality have certification standards in Annex 16; Water and soil are governed by national guidance and regulation.

Operating restrictions are the last resort of the Balanced Approach, not the starting point.

REFERENCE DOCUMENTS

Annex 16, Volume I (noise) and Volume II (engine emissions) · Doc 9829, Balanced Approach · Doc 9889, Handbook on Air Quality at Airports · Doc 9640, Ground De-icing/Anti-icing · Doc 9184, Airport Planning · Doc 9501, Environmental Technical Manual · Assembly Resolution A41-20 · Eco-Airport Toolkit

Diagnostic Assessment

1 Regulations

Has Annex16, Vols. I and II, been incorporated into national regulations?

2 Data

¿ Do international airports have noise and emissions baselines?

3 Airports

Is there an environmental management system with responsibilities, indicators, and monitoring?

4 Authority

Is there an environmental management system with responsibilities, indicators, and monitoring?

Please complete



Thank you

