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WORKING PAPER

ASSEMBLY — 38TH SESSION

EXECUTIVE COMMITTEE

Agenda Item 17: Environmental Protection

NOISE MANAGEMENT IN INDIA AND ROAD MAP FOR INTERNATIONAL AVIATION

(Presented by India)

EXECUTIVE SUMMARY

With a significant passenger growth rate, India will be the third largest aviation market in the world by 2020. This growth will eventually lead to environmental challenges, the most significant being noise. Similar challenges are expected globally. This paper introduces the noise management initiatives by the Directorate General of Civil Aviation and makes requests for action on a global basis.

This paper also requests the development of noise studies and noise monitoring systems by airports with more than 100,000 annual aircraft movements by 2014/2015, as well as the introduction of noise limits/guidelines and land use plans specific to these airports by 2018 in line with ICAO's Balanced Approach and the specific State conditions.

Action: The Assembly is invited to:

a) recognize the need for developing noise mapping studies for major airports;
b) urge Contracting States to install permanent noise monitoring systems;
c) urge Contracting States to formulate action plans for their major airports with respect to noise limits and land use plans around their respective airports in accordance with ICAO's Balanced Approach; and
d) request the Council to develop specific guidelines for the Contracting States in this critical area.

Strategic Objectives:	This working paper relates to Strategic Objective C – *Environmental Protection and Sustainable Development of Air Transport.*
Financial implications:	No additional resources required.
References:	ICAO Annex 16, Volume 1 – *Aircraft Noise* Assembly Resolution A37-18, *Consolidated statement of continuing ICAO policies and practices related to environmental protection.*

1. INTRODUCTION

1.1 Global aviation's economic impact is estimated at 2.2 trillion US dollars, representing 3.5% of the worldwide Gross Domestic Product (GDP). The industry transports around 3 billion passengers every year and supports almost 57 million jobs. Within the Asia-Pacific region, aviation represents a 470 billion dollar industry, transports 780 million passengers and supports 24 million jobs.

1.2 India represents a growing aviation market with 10 scheduled airlines operating nearly 400 aircraft with scheduled air services operational to/from more than 75 airports. In 2011, the country ranked ninth in the global civil aviation market, while five international airports have been built on public-private partnerships. In 2009, aviation represented 1.5% of India's GDP (17.8 billion US dollars) and supported in total 8.8 million Indian jobs. During fiscal year 2011-2012, it transported approximately 100 million passengers. It is expected that domestic and international passenger traffic will continue to grow at rates of 12% and 8% respectively and that India will become the third largest aviation market in the world by 2020.

1.3 The growing aviation market significantly contributes to economic development, but inevitably also leads to environmental challenges, especially regarding noise. Noise represents one of the most significant environmental challenges associated with aircraft and airport operations across the world. The aviation industry has endorsed the balanced approach, which was introduced by ICAO in 2001 as the most appropriate method to address the aircraft noise challenge. The balanced approach is based on the consideration of four pillars: 1) reduction of noise at source; 2) land use planning and management; 3) noise abatement operational procedures; and 4) operating restrictions. Although there have been significant improvements based on the Balanced Approach, given the industry's growth and the presence of population agglomerations near airports, large parts of population are still affected by aircraft noise across the world.

1.4 In India, the DGCA has already taken a number of important steps to address the noise challenge in line with the balanced approach, including setting up a regulatory framework, issuing noise-related circulars, establishing noise guidelines, and developing the first-ever noise study for Indira Gandhi International Airport in 2012.

2. DISCUSSION

2.1 Indian Legal Framework

2.1.1 In 2000, the Ministry of Environment and Forestry (MOEF) of India established the Noise Pollution (Regulation and Control) Rules for noise levels with respect to each land use category. Further, the Requirement and Procedure for Monitoring Ambient Noise Level due to Aircrafts, issued by the MOEF in 2008, sets the framework for noise monitoring at airports, including the minimum size of airports that are required to monitor noise, indicators, site selection, types of monitoring stations, reporting, etc.

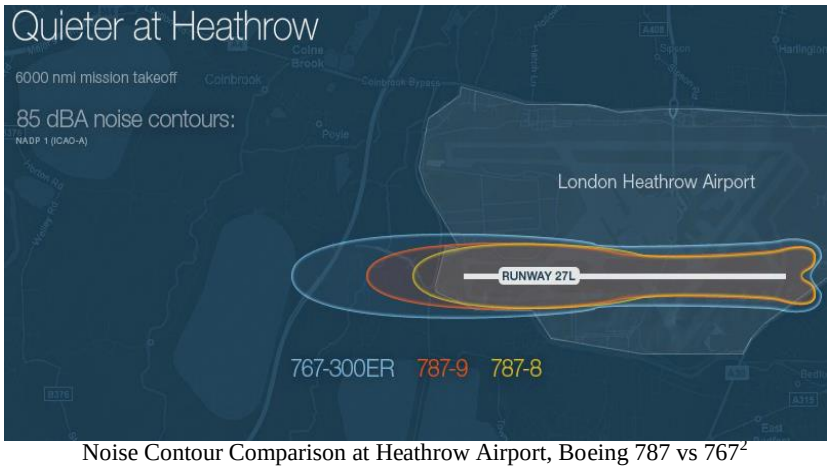
2.1.2 In 2009 the DGCA established an Aviation Environmental Unit to assess and address the environmental implications of aviation's growth, develop guidelines for environmental improvements and collect information from aviation industry stakeholders, in line with the recommendations of international organisations (e.g. ICAO) and requirements of domestic institutions, such as relevant Ministries. Between 2010 and 2011, the DGCA has issued four noise-related Circulars, in relation to the restricted use of ground run-ups and Auxiliary Power Units (APUs) at all Indian airports as well as the introduction of interim noise guidelines and restricted use of reverse thrust at Delhi International Airport.

2.2 Airport and airline initiatives

2.2.1 Some airports undertake short-term measurements, with the exception of Delhi International Airport, which is the only airport in India with a permanent noise monitoring system

comprising five noise monitoring terminals. These terminals were installed in 2010 and are linked to the airport flight database that includes information about flight movements to/from the airport. As a result, this airport maintains a comprehensive noise monitoring database. In addition, a number of noise abatement procedures were developed for Delhi International Airport, including Continuous Descent Approach (CDA), mixed mode operation and runway use plan for night hours, restricted use of reverse thrust, phasing out of Chapter 2 aircraft for civil use during night time, restrictions on use of Ground Power Units (GPUs) and APUs, restrictions on ground run-up of engines, and a noise complaint redressal cell.

2.2.2 The operations of airlines play an important role regarding noise reduction. Airlines operate modern fleets mainly of Boeing and Airbus aircraft, while future orders suggest that this trend will continue. Air India recently received Boeing 787 Dreamliners, while Jet Airways and IndiGo will be launching the B737 Max and A320 NEO (New Engine Options) in near future, resulting in appreciable noise reduction. According to Airbus, the noise levels of the NEO will be up to 15 dB below Chapter 4 specifications.[1] The significantly lower noise footprint of the Dreamliner for Heathrow airport is shown in the Figure below. Airlines have also been updating their mode of operations to reduce noise, for instance by implementing CDA procedures where appropriate.



Noise Contour Comparison at Heathrow Airport, Boeing 787 vs 767[2]

2.3 DGCA's noise study for Delhi International Airport

2.3.1 The most comprehensive approach to estimate the noise impact from aircraft operations was undertaken by the DGCA in 2012 with the first-ever detailed noise study in India for Delhi International Airport. DGCA awarded a contract to a specialised consulting agency to perform this study, which will also serve as a pilot case for other major Indian airports to follow. The study has been carried out in three phases: a) noise mapping; b) validation; and c) action plan, used 2011 actual data, applied international best practices for noise mapping to determine areas with a high noise load, validated the noise maps with actual noise measurements and examined measures to reduce the impact of aircraft noise in line with ICAO's Balanced Approach.

2.3.2 The computations were carried out using the Integrated Noise Model (INM) of the United States Federal Aviation Authority. Several noise metrics were calculated (e.g., L_{Aeq}, L_{den}, L_{DE}, L_{night}) and used to draw noise contours. The results were analysed to ascertain contour areas and the number of people exposed to certain noise levels as well as to assess the noise load at schools and hospitals. The results suggest that the noise load is higher near the airport runways and mainly along the extended centrelines of the runways. As the flight routes do not go over the city centre, no high noise load is found in this area.

[1] Airbus, *A320 Neo Family, Maximum Benefit Minimum Change*, (2012).
[2] The Boeing Company, 2012.

2.3.3 The modelling exercise also indicated that the existing guidelines for aircraft noise levels at specific noise monitoring stations were not exceeded during night time. During daytime, values higher than the guidelines were expected. However, the actual data suggest that such events are rare. Comparing the equivalent noise load during daytime and night time with the MOEF guidelines for residential areas indicates that people live inside the 55 dBA L_{DE} and 45 dBA L_{night} contours. However, at specific locations, background noise from other sources might be higher than aircraft noise. Finally, the equivalent noise load guidelines in India for residential areas (L_{DE}: 55 dBA, L_{night}: 45 dBA) are stricter than in other countries where L_{den} 60-70 dBA and L_{night} 50-60 dBA are more prevalent.

2.3.4 A number of measures have been evaluated to reduce the noise impact including preferential runway use, noise preferred routes, noise abatement departure procedures, additional restrictions to Chapter 2 aircraft operations, and further implementation of CDA. A combination of measures (e.g. operating restrictions, noise preferred routes) has the largest positive impact. In addition, proposals regarding land use planning and the development of community relations can complement the above initiatives.

2.3.5 In conclusion, India has been formulating and implementing a number of initiatives in order to measure and reduce the noise impact of aircraft operations. However, given the significant expected growth of the aviation sector and noise impact on the population, it is imperative that the DGCA develops additional noise management policies and initiatives. Therefore, in line with ICAO's Balanced Approach, the DGCA has launched noise management initiatives to encourage major airports (i.e. airports having more than 50,000 aircraft movements) to model the noise impact from aircraft operations, monitor aircraft noise in a systematic manner with modern equipment and develop specific noise management action plans wherever necessary. Each major airport shall also install a noise monitoring system as per international technical specifications.

3. PRESENT SCENARIO

3.1 Although some airports already have in place, noise monitoring systems, noise abatement procedures, land use plans, etc., several others lack these noise management features. Therefore, relevant action is required in order to measure the magnitude of the current and future noise impact from aircraft operations, formulate initiatives that will address this challenge, and ensure the aviation industry's growth. At the same time there are some generic characteristics of certain airports around the world that make noise management a challenging task. Specifically:

— high annual air traffic growth.

— high dependency on air travel due to geographical characteristics (e.g., large distances, isolated areas).

— limited alternative transportation infrastructure.

— large population agglomerations near airports.

— night time restrictions in other regions (e.g., Europe) transfer the night noise problem to some other countries. In addition, if these countries place similar restrictions, airline operations will be significantly affected.

— lack of land use planning or planning enforcement around airports.

— pursuit of higher economic growth.

4. ACTION REQUESTED BY THE ASSEMBLY

4.1 The Assembly is invited to note the information contained in this paper and:

a) recognize the need for developing noise mapping studies for major airports;

b) urge Contracting States to install permanent noise monitoring systems;

c) urge Contracting States to formulate action plans for their major airports with respect to noise limits and land use plans around their respective airports in accordance with ICAO's Balanced Approach; and

d) request the Council to develop specific guidelines for the Contracting States in this critical area.

— END —