

NIGHT CURFEW AND AERONAUTICAL NOISE— AN ANALYSIS OF THE DEVELOPMENTS IN INDIAN AVIATION INDUSTRY

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Abstract

Aeronautical noise is considered to be the main environmental problem derived from airport operations. It directly affects the quality of life of the people living close to airports. As a means to mitigate the problems caused by aeronautical noise, night curfew is one of the proposed measures.

Section I analyses environmental issues in context with the ICAO's Aircraft Noise Management through the Balanced Approach concept and the impact of the continued imposition of night curfew by European countries on developing countries and it is submitted that the increasing congestion in Asia-pacific mostly due to the imposition of night curfew by the European countries will force the countries in Asia and Africa to impose constrictions on the aviation industries which will increase the congestion. Hence, the measure of night curfew must be treated cautiously and alternatives should be explored.

Section II analyses recent acknowledgement of the option of night curfew in Indian scenario and various constraints in the imposition of the night curfew and submits alternatives like improvement of airport infrastructures and air route planning which will lead to easier rescheduling of the flights and less pollution and in turn will minimize the economic impact on the aviation industry and also measures like use of strategically placed runways from where the night flights can be operated.

Introduction

The growth of worldwide passenger traffic and freight by air is showing continuous upward trend. This would require increased operation of aircraft thereby putting pressure on existing infrastructure mainly in the developing countries. Aeronautical noise is considered to be the main environmental problem derived from airport operations. It directly affects the quality of life of the people living close to airports. Generally, these are people who do not directly benefit from the airport business. As a means to mitigate the problems caused by aeronautical noise, a night curfew is often imposed on the airport activities to minimize the existing conflicts. The existing practice of night curfews in some parts of the world impacts adversely on the availability of slots at such airports. Night curfew adds on to the airspace capacity requirements during the

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day hours thereby leading to congestion in the airspace during the day time. This in turn increases gaseous emissions due to increase in holding time by aircraft and thus further polluting the environment. This would also add to global warming problems. ICAO is already seized with the gaseous emission problem. It is, therefore, considered that the prevailing practice of night curfew in some parts of the world not only adversely impacts the air traffic handling capacity and airport infrastructure at other airports but also adds up to polluting the environment with gaseous emissions.

The airlines carried an estimated 2 billion passengers globally in the year 2006 and now the average additional passenger growth is estimated at 3 billion. The added traffic volume due to growth would put pressure on operator's service providers and may add on to the circumstances leading to unsafe situations. There is therefore need to avoid negative impact on environment as well as on safety of operations, for which efforts need to be taken at an international level.

ICAO also has a policy for noise pollution avoidance, in which a balanced approach is adopted by operational improvements in the management of air traffic by ATC, which aims to reduce the effect of noise pollution in populated areas near airports. Night curfew, however, adds on to environmental issue with regard to noise pollution since the operational improvement in ATC management gets handicapped. Growth in air transportation industry needs additional improved airspace and infrastructure capacity. In this direction it is necessary to review the need to continue with the night curfew at aerodromes, thereby making airports available round the clock for operations.

The ICAO's Aircraft Noise Management—Environment Issues

Aircraft noise is one of the most significant causes of adverse community reaction related to the operation of aircraft both in developed and developing countries. This is expected to remain valid in most of the regions of the world in the days to come. With the development and growth in aviation sector, the issue of excessive noise from aircraft operations and resistance by the communities residing in the airport vicinity has become a regular feature. The aircraft coming off the production line today are about 75% quieter than they were 40 years ago and the same is evident from ICAO's Certification Standards.

India has requested the International Civil Aviation Organisation (ICAO) to review night curfew restrictions imposed by some countries on the operation of airlines. In a paper presented to the ICAO, India has called for a review, arguing that the imposition of night curfew creates a mismatch in utilising infrastructure round-the-clock and hampers the growth of airlines. According to Government of India "The concept of night curfew adversely affects the concept of free flow of air traffic and causes inconvenience to the travelling public. In addition, curfew at some airports during the night causes congestion at other times of the day, leading to an adverse impact on the environment," It has been pointed out that night

curfew adds to the airspace capacity requirements during the day, thereby leading to congestion in the airspace. This, in turn, increases gaseous emissions due to increased holding time by aircraft, thereby further polluting the environment. India has argued that with modern aircraft becoming quieter there was a need to review the existing curfew, since night curfew was resorted to by some airports because of the high levels of noise caused by aircraft with earlier designs.

The ICAO has already upgraded the noise requirements and today aircraft for interstate operations are certified to Chapter 3 standards. These aircraft are typically quieter by 20 dB than the earlier aircraft designs, which translate into a 75 per cent reduction in noise. Chapter 3 standards were adopted in 2001 and became applicable on January 1, 2006.

Now the Chapter 4 noise standards are more stringent than those in Chapter 3. The new standards would apply to newly certified aircraft that would be 10 dB quieter than Chapter 3 designed aircraft. Further, India has pointed out that growth in the air transport industry needed additional improved airspace and infrastructure capacity.

Upon request from India and other countries to review night curfew, CAEP undertook the study of the environmental impact of curfews in one region on origin, destination in other regions, with a case study for a major airport during CAEP meeting. The concerns assigned to the Task group by the CAEP Report are as follows:

- (a) Night curfew at some European airports are perceived to cause the transferring of their night-time noise burden to some developing countries where night-time noise is generated by aircraft scheduled to avoid departing or arriving during the curfew period at European airports;
- (b) the need for continuing noise curfews has been questioned, given that aircraft noise Standards have improved over the years and the current aircraft in service are much quieter than when the curfews were instituted;
- (c) Airports with night curfews that are capacity constrained during day time, restrict the ability to open up new slots for additional traffic which may result in opportunity costs to airlines and airports;
- (d) Night curfew restrict the capability of airlines to offer flights at the most convenient times (arrival or departure) to its customers, thereby reducing customer choice and adversely affecting airlines' level of service;
- (e) In the case of airports in developing countries that have excess capacity during day time, there may be additional economic costs of keeping the airport open during night-time which include air and ground crew, airport operations personnel, and general support staff; and

- (f) Night curfews can cause inconvenience to passengers if they must arrive (or depart) at night-time from one airport due to restrictions on departure (or arrival) airport.

A1 Findings Of The Study

The study states that there is no inherent link between European countries and night-time movement in Mumbai, India. There is no reason why night time curfew would require flights to leave Mumbai at midnight unless it is to arrive in the early morning to make connecting flights. The report also states that European carriers operate flights to reach India before the activation of curfew hours and return to Europe after curfew hours in order to utilize the aircraft optimally. Optimal utilization of aircraft in international air transport may not want to ground aircraft during 24 hours. However, airlines can better develop their flight schedules so as to make optimal use of their aircraft if the constraint of night curfew is removed. Now airlines have to make off-optimal. This also includes the issue of congestion at airports resulting in additional emissions.

The study seemed to have digressed from the main issue that unilateral night curfew by certain European countries is not conducive to healthy international air transportation on the following grounds:

- (1) Night curfews are imposed as a local protest by citizens living around the airport. These persons all over the world were aware of the noise before they bought the property but they did so with their own will and with possibly an eye to capital appreciation due to proximity to airport.
- (2) Unilateral night curfews are increasing phenomena all over the world and as noise awareness grows, night curfews, if imposed by countries like India or South Africa, would limit the flight timing options between the countries. The present night curfew in Europe has effectively transferred the problem of time noise burden from the communities around their airports to communities around airports of Mumbai, Delhi, Johannesburg, etc.
- (3) The need for continuing noise curfews has also been questioned given the aircraft noise standard improvements over the years and that the current aircraft engines are quieter than earlier ones mainly due to ICAO specifications. The need for night curfews has therefore, diminished. In fact, ICAO should link the reduction of engine noise rules to reduction/removal of night curfews.
- (4) Airports with night curfews are generally capacity constrained during the day and restrict ability to open up new slots for additional traffic which may result in opportunity cost to airlines and airports. Night curfew restrict the capacity of airlines to offer flights at most convenient times (arrival or departure) to their customers at destination airports thereby reducing customer choice and adversely affecting airlines' level of service.

The principle of night curfews imposed unilaterally is in question. ICAO must address the issue of night curfew to help the airline business to grow. With the growth in air traffic and introduction of night curfews, there will be congestion in air between city pairs at certain times. With the improvements in noise standards mandated by ICAO, there should be a parallel imposition of SARPS for containment of night curfews. Night curfews are a result of political development which is taking place against noise at airports and for the communities living around airports and has no basis for mutual reciprocity which is the basis of air service. This issue is common to the cities where there is an airport near the city. There would be an additional cost to airports in case they have excess capacity during day time

A2 India has following comments on the CAEP Study on night curfews

- (1) The CAEP study is limited in scope and at variance with its own conclusion. The issue of night curfew is to be addressed in its full scope and global approach should be attempted.
- (2) Night curfew will affect the airline operations if the Asian and African countries also impose similar kind of restrictions on public demand.
- (3) Night curfew issues need to be addressed keeping in view the growth of aviation sector and state-of-art of aircraft design.
- (4) Specific runways/airports could possibly be utilized for night operations to minimise the community noise problem. Duration of night curfew could possibly be reduced by airports having such night curfews.
- (5) International airlines operate across the globe. Time restriction is a severe constraint in developing flight schedules and off-optimum utilization of aircraft. Therefore, in the interest of airline business this constraint of night curfew should be avoided.
- (6) Removal of night curfew would also help to achieve the aspirational goals of carbon neutral growth and reduction in CO2 emissions apart from providing sustainable growth to aviation sector.

A3 Environmental issues associated with airport operations include

- Noise and vibrations
- Storm water and wastewater
- Hazardous materials management
- Solid waste
- Air emissions
- Energy and water consumption.

A4 ICAO's Initiatives And Noise Requirements

ICAO has been addressing the issue of aircraft noise since the 1960s. Since the first Standards and Recommended Practices (SARPs) for aircraft noise certification were published in 1971, ICAO has made several changes in the noise standards and the latest Chapter 4 requirements were developed and subsequently became applicable in March 2002.

Aircraft manufacturers have been continuously developing technologies to reduce aircraft noise and striving for a better understanding of the source of aircraft noise. Accordingly, the inclusion of noise absorbing material in engines and engine nacelle design and mechanical refinements on engines, together with airframe adjustments, have all contributed incrementally to further reducing noise of jet powered aircraft. Although none of these improvements individually has matched the step forward that came from the increase in bypass ratio, together they have been significant.

The state-of-the-art development and stringent requirements of ICAO has forced manufacturers to achieve next generation aircraft with significant increases in carrying-capacity while achieving reductions in noise levels such as A-380. Boeing's new Dream liner aircraft B787 is also expected to have about 15 to 20 decibel (dB) below the Chapter 4 limits and therefore leading to achievement of at least 10 dB better than the older aircraft.

A5 ICAO'S Aircraft Noise Management Program

ICAO has also developed Aircraft Noise Management through the Balanced Approach concept which identifies the noise problem at an airport and then analyses the various measures available to reduce the noise using four principal elements, namely:

- (a) Reduction of noise at source;
- (b) Land-use planning and management;
- (c) Noise abatement operational procedures; and
- (d) Operating restrictions.

It may be pointed out that according to ICAO traffic growth of Asia Pacific region will become the highest air traffic region by 2012. However it will not be long before a movement for night curfew also starts in Asia and Africa and therefore the issue of night curfew has to be resolved by the Council.

Problems Of Aviation Industries

The growth in the aviation sector and capacity expansion by carriers have posed challenges to aviation industry on several fronts. These include shortage of workers and professionals, safety concerns, declining returns and the lack of accompanying capacity and infrastructure. Moreover, stiff competition and rising fuel costs are also negatively impacting the industry.

1. **Employee shortage:** There is clearly a shortage of trained and skilled manpower in the aviation sector as a consequence of which there is cut-throat competition for employees which, in turn, is driving wages to unsustainable levels. Moreover, the industry is unable to retain talented employees.
2. **Regional connectivity:** One of the biggest challenges facing the aviation sector in India is to be able to provide regional connectivity. What is hampering the growth of regional connectivity is the lack of airports.
3. **Rising fuel prices:** As fuel prices have climbed, the inverse relationship between fuel prices and airline stock prices has been demonstrated. Moreover, the rising fuel prices have led to increase in the air fares.
4. **Declining yields:** LCCs and other entrants together now command a market share of around 46%. Legacy carriers are being forced to match LCC fares, during a time of escalating costs. Increasing growth prospects have attracted & are likely to attract more players, which will lead to more competition. All this has resulted in lower returns for all operators.
5. **Gaps in infrastructure:** Airport and air traffic control (ATC) infrastructure is inadequate to support growth. While a start has been made to upgrade the infrastructure, the results will be visible only after 2-3 years.
6. **Trunk routes:** It is also a matter of concern that the trunk routes, at present, are not fully exploited. One of the reasons for inability to realize the full potential of the trunk routes is the lack of genuine competition. The entry of new players would ensure that air fares are brought to realistic levels, as it will lead to better cost and revenue management, increased productivity and better services. This in turn would stimulate demand and lead to growth.
7. **High input costs:** Apart from the above-mentioned factors, the input costs are also high. Some of the reasons of high input costs are: Withholding tax on interest repayments on foreign currency loans for aircraft acquisition. Increasing manpower costs due to shortage of technical personnel.

B1 Development of Airport Hubs

Every country wishes to develop a few airports as hub airports. Hub airports handle a large number of flights and thus provide suitable connections to other places. A successful hub benefits the country as several airlines bring their flights to the airport and indirectly benefit tourism as passengers have better connectivity. Airports also benefit in the shape of higher revenues. In the Asia Pacific region, Bangkok, Singapore, Hong Kong, Tokyo and Seoul handle over 20 to 35 million passengers per annum each and are recognized hubs. In India, Mumbai Airport handles only about 12 million passengers. The volume of traffic at Delhi and other airports is lesser. Moreover, our national carriers are weak and therefore their

contribution in bringing sixth freedom traffic is limited, which is very important for developing a hub. Private airlines are yet to establish in international market. Further, the level of services at Indian airports, including ground handling services is not up to the international standard and certainly below the standards available at other airports in Asia/Pacific region. Thus, presently the conditions are not ripe to develop major hubs in India in competition with other hubs in the region. It is necessary to improve the services at airports and increase the fleet of Indian carriers and at the same time to encourage them to bring in sixth freedom traffic to India to develop Mumbai as a major hub and also Delhi as the second hub. Hubs can also be developed for domestic traffic. Mumbai, Delhi, Kolkata, Chennai, Hyderabad airports are operating as hub airports to a large extent. Nevertheless, people wish to travel directly without changing the flight. As volume of traffic increases, more direct flights will be introduced and the role of hubs will not increase at least proportionately. Nevertheless, people will travel to major airports to catch international flights rather than domestic flights. In this situation, it is extremely doubtful if airport like Nagpur which produces negligent originating or terminating traffic can be a successful hub, either for domestic flights or international flights. The development in this meadow will not only raise the tourism revenue but indirectly it will settle the matter of night curfew. All other issues such as night curfew should be kept in mind while constructing such developed airports.

As mentioned previously, aeronautical noise is considered the main environmental problem generated by airport operations. Primarily, this problem is related to landing, take-off, taxiing and engine test operations. As a secondary factor, the noise generated by the ground support equipment can also be included, even though they affect more directly the airport workers. Thus, the choice of measures to be taken to solve the problems associated with aeronautical noise, existing options must be considered.

The most significant sources of noise and vibrations from airport operations are aircraft during the landing and takeoff (LTO) cycles, followed by a variety of ground operations equipment including aircraft taxiing; operation of ground support vehicles (e.g. passenger buses, mobile lounges, fuel trucks, aircraft tugs, aircraft and baggage tractors, and dolly carts); aircraft auxiliary power units (APUs); and aircraft engine testing activities in airports with aircraft maintenance activities. Other indirect sources of noise include ground vehicle traffic from access roads leading to the airport.

Measures for the prevention, minimization, or control of noise and vibration impacts depend on land-use planning and management activities, which may be the primary responsibility of local authorities, or the type and age of flight equipment used by the airlines.¹ Recommended noise management practices include:

- (1) Planning of site for airport location (new developments and expansion of existing facilities), and orientation of routes for arriving and departing aircraft relative to actual and projected residential development and other noise sensitive receptors in the surrounding area. This may include

coordination with local authorities with influence over land use planning and overall transportation planning activities.²

- (2) In areas where significant impacts are anticipated, implementation of preferred procedures and routes for landing and takeoff (LTO) to minimize potential noise from approaching and departing aircraft for noise-sensitive areas.³ These procedures may include instructions on the use of descent profiles or “noise preferential” routes (NPRs), such as the “continuous descent approach” to avoid noise-sensitive areas, the use of “Low Power / Low Drag” (LPLD) procedure to fly the aircraft in a ‘clean’ condition (e.g. no flap or wheels deployed) as long as possible to minimize airframe noise, and instructions on minimizing reverse thrust on landing. An alternative approach may include the dispersion of noise through equal use of multiple flight tracks as opposed to a preferential flight track;
- (3) Use of night time or other operating restrictions.⁴
- (4) If necessary, working with local authorities to identify and implement noise prevention and control strategies in noise abatement zones (e.g. sound insulation of buildings that are exposed to aircraft noise above levels stipulated by local authorities or limitations on night time operation of certain landing routes);
- (5) Reducing noise of ground operations at the source or through the use of sound barriers and deflectors.
- (6) Provision of power supply to the aircraft to reduce or eliminate the need for use of APUs.

Conclusion

Aircraft noise is one of the most significant causes of adverse community reaction related to the operation of aircraft both in developed and developing countries. This is expected to remain valid in most of the regions of the world in the days to come. With the development and growth in aviation sector, the issue of excessive noise from aircraft operations and resistance by the communities residing in the airport vicinity has become a regular feature.

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rescheduling of the flights and less pollution and in turn will minimize the economic impact on the aviation industry.

Endnotes

1. Noise management activities should be based on the International Civil Aviation Organization (ICAO), Resolution A33/7, *Balanced Approach to Aircraft Noise Management*. The balanced approach identifies the noise problem at the airport and analyzes measures available to reduce noise based on four principal elements: reduction at source (quieter aircraft); land-use planning and management; noise abatement operations procedures; and operating restrictions (e.g. operating restrictions and noise charge).
2. Additional information is provided in ICAO, *Airport Planning Manual, Part 2 – Land Use and Environmental Control*.
3. Procedures and routes are published in the *Aeronautical Information Publication (AIP)* of the airport and are mandatory for operating airlines. They may be used to avoid noise-sensitive areas within the limits of aircraft operational safety regulations and should be developed in consultation with local authorities and operating airlines.
4. Operating restrictions should be applied as a last resort and only after consultation and approval by the local authorities. As noted in the ICAO Assembly Resolutions, in force as of 8 October 2004, the use of operating restrictions on existing aircraft may not be financially feasible or cost-effective and aircraft noise standards and certification presented in ICAO Annex 16 to the Convention on Civil Aviation, Volume I—Aircraft Noise is not intended to introduce operating restrictions.

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