Abstract

The Convention on International Civil Aviation 1944 (Chicago Convention) lays down the pillar elements for airport noise management which are reduction of aircraft noise at its sources, noise compatibility land use, noise abatement flight procedures, restriction of the operation, and noise charges or levies. These legal measures were adopted into Thailand, as one of the contracting States, since B.E. 2518 (1975) under the Civil Aviation Act B.E. 2514 (1971). There were many amendments in the Convention, including the regulations with regard to aircraft noise charges for pollution management, noise certificate, flight operation, and air navigation, adopted after the fourth amendment of Annex 16, Volume I in 2006[1]. The “Balanced Approach” policy[2] should be practically taken into action in the national policy on air transportation system and airport noise management to resolve the conflicts more efficiently and flexibly. The legal instruments in the Enhancement and Promotion of Environmental Quality Act B.E. 2535 (1992), the airport noise permissible limits and its measurement, airport noise calculation and determination the airport noise monitoring system together with flight tracking system, including the noise contour map for civil remedy or compensation related to noise should be implemented appropriately.

Airport Noise Management in Thailand

Airport noise was introduced into Thailand through the aircraft operations both from military and civilian activities many decades ago. The complaints on airport noise from the community in vicinity of international airports have been heard and recorded by government in associated with increasing aircraft movements, and other specific factors of local topography, atmospheric conditions, population density, etc. A number of complaints will illustrate the arrangement of valuation on the balance of the economic returns from aviation industry and the human standards of living without any suffering from all pollution from airport operations. The legal measures introducing by the Chicago Convention as shown in Aircraft Noise of Annex 16 Volume I[1], were adopted into Thailand, as one of the contracting States, since B.E. 2518 (1975) under the Civil Aviation Act B.E. 2514 (1971). Under the Chicago Convention, there are several environmental principles with the realization of appropriate environmental protection and pollution mitigation in each contracting state[3] — i.e. the Polluter Pays Principle, the Precautionary Principle, the Prevention Principle, the Co-operation Principle, and the Participation Principle.

Realizing the importance of noise problem, many revisions to the Chicago Convention and its Annex together with Thai domestic acts regarding noise management have been carried as illustrated in the below timeline of airport noise management in Thailand. The “Balanced Approach”, a concept consisting of identifying the noise problem at an airport and then analyzing the various measures available to reduce noise through the exploration of four principal elements, namely reduction at source, land-use planning and management, noise abatement operational procedures and operating restrictions, under of the Chicago Convention, endorsed by ICAO Assembly in 2001[12], and reaffirmed to call upon States to recognize ICAO’s role in dealing with the problems of aircraft noise by ICAO Assembly in 2007[13], has been inserted into the last amendments of the related rules and regulations under the Civil Aviation Act since 2008[2], while its implementation scheme has not been quite easy in practical way.

1922 : The Civil Aviation Act B.E. 2465 (1st wave)
1947 : The ratification of the Chicago Convention 1944
1954 : The Civil Aviation Act B.E. 2497 (2nd wave)
1971: the adoption of the ICAO Annex 16: Volume I, Aircraft Noise into the Civil Aviation Act B.E. 2514\[1\] (promotion of low noise aircraft, phase-out program, aircraft noise measurement)

1973: Ministerial Declaration on the Aviation Safety Zone dated on 12th December B.E.2516 was declared for NBIA site\[6\]

1979: The Land Use Planning Act B.E. 2522

1992: The Enhancement and Promotion of Environmental Quality Act B.E. 2535 (environmental impact assessment for airport project, pollution control zone, environmental quality standards)

1997: Thai Constitution B.E. 2540 (environmental impact assessment process and public participation process of airport project)

2003: Launch the discrete airport noise monitoring program by the Pollution Control Department (PCD) in the vicinity of Don Muang International Airport (the former Bangkok International Airport)

2004: Ministerial Declaration on the Aviation Safety Zone dated on 22nd December B.E.2547 was declared for NBIA site (Superseded 12th Dec 1973)\[1\]

2005: The “Balanced Approach” was introduced into the Chapter of the ICAO Annex 16: Volume I, Aircraft Noise\[1\]: AOTs conducted the housing surveys in the vicinity of the NBIA project.

2005: Re-assessment of New Bangkok International Airport (NBIA) EIA was approved by National Environmental Board (NEB)

2006: The Environmental Research and Training Center (ERTC), joined the discrete airport noise monitoring program in the vicinity of Don Muang International, Suvarnabhumi Airport (BIA), and other international airport in Thailand.

2006: ERTC, PCD, Airport Authority of Thailand (AOTs), and Aerothai joined the discrete airport noise monitoring program in the vicinity of Don Muang International, Suvarnabhumi Airport (BIA), and other international airport in Thailand

2006: The NBIA Grand Opening (Suvarnabhumi Airport) in 28th September 2006

The Working Committee on the reviewing of the Post-Auditing on the Mitigation Measures and Monitoring Report was established in compliance with the NBIA EIA monitoring plan.

- All international flights from Don Muang Airport were moved to Suvarnabhumi Airport (BIA)

- The Civil Aviation Act B.E. 2497 (Amendments B.E. 2549)

- The study on the Noise Abatement Departure Procedure I and II were introduced for aircraft noise data monitoring and comparison at BIA.

2007: Thai Constitution B.E. 2550 (environmental and health impact assessment process, and public participation process of airport project)

- The Civil Aviation Act B.E. 2497 (Amendments B.E. 2550) (noise certificate, airworthiness certificate, noise abatement flight instruments, flight operations )\[5\]

- The Cabinet Resolution dated on 21st November 2006 was delayed implementation. The Three Parties Working Group was established to advocate its implementation.

2008: The Civil Aviation Act B.E. 2497 (Amendments B.E. 2551: Adoption of the “Balanced Approach” from the ICAO Annex 16: Volume I, Edition IV of 2005\[1\], including the airport charges for pollution control abatement program\[6\]

- ERTC, PCD, AOTs, Aerothai, academics launched the research on the future airport noise management: case study of problems and solutions from BIA

2009: The airport noise monitoring report of the vicinity of BIA was published by ERTC, and PCD.

2010: The first draft of 2008 research was published for reviewing and discussing by the interested parties.

Current Issues and Difficulties

People living in the vicinity of airports have been suffered from airport noise in associated with the air traffic volume, type of airplanes, flight procedures, maximum take-off mass (MTOM), flight path allocation and management, etc. The higher air traffic volume were mostly found within the air traffic data records of international airports—i.e. Don Muang International Airport (the former BIA), Chiang Mai International Airport, Phuket International Airport, etc.

The Framework on the Mitigation Measures of Airport Noise Management proposed by PCD in 2003 under endorsement of the Pollution Control Board (PCB) and the National Environmental Board (NEB), were accepted by the Cabinet Resolution in 2006\[6\], influencing the related government authorities on their exercising of rules and regulations on aircraft noise related issues. The related agencies shall take into account all interested mitigation measures as appropriated.

In Thailand, airport noise monitoring program was taken into account of the proposed mitigation measures and monitoring plan in the EIA post-auditing process of all airport projects, particularly in airports with high air traffic volume such as international airports. The airport noise
monitoring programs will be conducted by the discrete environmental noise with the contribution of the aircraft flyover noise twice or three times a year in order to submit the post-auditing report to the Office of Natural Resources and Environment Planning (ONEP). Its practical noise monitoring method, declared in the post-auditing report, applies only the Equivalent Continuous Sound Pressure Levels ($L_{eq}$) of overall environmental noise levels perceiving by receptors’ surrounding, including the aircraft noise components. The calculated $L_{eq,t}$ taken into account of the fly-over aircraft noise events were unclearly identifying on the process of the practical noise monitoring method, declared in the post-auditing report. The results may be coincident to the recommended descriptors and determination, describing in the ISO ISO 1996-1:2003 and ISO 1996-2:2007 in terms of the 24-hour equivalent continuous sound pressure levels ($L_{eq,24hr}$) of environmental noise with fly-over aircraft noise components that unclearly identifying the contribution of aircraft noise levels heard on the ground.

The aircraft flyover noise monitoring, generally implemented by the airport noise monitoring system, shall be in compliance with the aircraft noise monitoring heard on the ground as shown in either the ISO 3891-1978 or Annex 16: Volume I. However, the noise measurement program in the vicinity of international airports, conducted by ERTC, PCD, AOTs, and Aerothai during 2005 to 2010, adopted the sound exposure levels of each aircraft flyover events in associated with the both mentioned international methodologies on the calculation of $L_{eq,24hr}$, $L_{dn}$, or $L_{den}$ of vicinity aircraft noise levels.

The airport noise levels around international airports were separately conducted and reported by each the EIA post-auditing report annually. People living in the vicinity, particularly around the Don Muang International Airport, mostly did not place their complaints against the airport or any authorities since they believe that they will not get any remedy or relief. This belief was from the fact that they moved into this area after the airport had been operated. In addition, most inhabitants were air force officer families, airport employers, subcontractors, other employee in related services, etc. Sadly, it seems their ears were familiar with the noisy environment.

The situations were totally changed by rapidly increasing of the complaint volume of the Suvarnabhumi Airport since 2006. Troops of people living in the vicinity of BIA marched to the airport to place their complaints against the noisy environment and asking for their remedies and compensations on the noise insulation of their houses and properties. The Cabinet Resolution dated on 21 November 2006 ordered AOTs to pay for the remedies and compensations. The difficulties were found out by what criteria will be equally taken into account in the allocation of remedies and compensations in noise abatement programs—i.e. which noise exposure map shall be applied for remedy and compensation allocation, which descriptors and calculation methods shall be applied for qualified determination on noise exposure mapping, how many inhabitants shall be eligible to receive the remedy and compensation, etc.

The flexible various of policy and legal instruments, outlined by the Chicago Convention in compliance with the “Balanced Approach” of Annex 16 Volume I, shall be beneficially implemented into the future airport noise management plan at BIA relevant to its related factors on noise abatement measures. The noise monitoring system is one of the most important instruments to support the existing airport noise data on noise prediction model verification, making the noise contour map for achieving existing and future noise impacts, analyzing the best solution for noise abatement departure procedures, choosing the preferential runway, collecting taxes or charges from noisy aircraft in equal practical manners.

Unfortunately, there is currently no aircraft noise monitoring system, installing in the vicinity of the BIA in order to be a back bone of the fact-finding instruments, and fulfill a database system of aircraft noise management for public disclosure, particularly the maximum utilization of the “ICAO Balanced Approach” in an appropriated way. No precise predicted airport noise data for airport planning, no evidence for noise surcharges on violation of the flight procedures, no accurate noise map for zoning and compensation allocation were generally occurred without the noise monitoring system.

The present resolutions, applied to the vicinity of BIA may not be in consistent with the people needs to a certain extent. Either they have been submitted their complaints to the authorities, the Cabinets, the Office of National Human Rights Commission or finally filed the lawsuit against the interested authorities in the administrative court for their compensations and remedies. AOTs and affiliated authorities are now trying their best to
conduct the compensation program but it may not be properly sufficient to deal with the existing affected inhabitants.

**What should the New Waves of the Airport Noise Management in Thailand be?**

The international air transportation hub was one of the most competitive factors of each state, particularly in the economic returns in a small region like South-East Asian. Airport project and its expansion shall be carried out without any obstacles. The complaints from the community nearby may cause important obstacles of airport expansion like in other big and dense cities, reducing the potential of getting more economic returns.

All five key elements in the “ICAO Balanced Approach” will be very beneficial to be flexibly and collectively implemented into the airport noise management in each contracting state as appropriate to their social characteristics and consideration. The airport noise monitoring system in compatible with the ISO 20906-2009[1] shall be installed immediately in the vicinity of airports to provide existing aircraft noise and airport noise data, making databank of noise data for future expansion on noise impact analysis and noise abatement program initiatives. The system will support all existing evidences for others mentioned measures—i.e. making a recognized airport noise map, validating noise prediction data for future expansion, choosing preferential runway, taking airport noise charges, penalty landing fee, and etc.

The implementation of the “Balanced Approach” will not be easy in practice. Evidently, the noisy aircraft phase-out programs is technically the most difficult approach in Thailand because it takes more than a decade in following of the Chicago Convention. Another difficult factor to achieve is the land use compatibility. Though the land use planning is the most delicate issue, it is the most powerful fundamental influence not only noise reduction but also other pollution mitigation. Therefore, the land use compatibility programs shall be immediately taken into action in gradually manners along with the airport expansion and future airport noise management.

Nevertheless, the economic instrument will be one of the flexibly strongest instruments in both short-term and long-term mitigation measures. The airport charges and taxes will be allocated to appropriated activities in associated with the mitigation measures under the “Balanced Approach”. However, the economic instrument shall be carefully and precisely taken into account by the cost-benefit analysis, harmonization with the social factors, specific local influences prior to introduce it into practice.

The ultimate goals of the “Balanced Approach” implementation shall bring about the balance of the valuation on the benefits from aviation industry on one side and the human rights protection of the living environment on the other side through the multi-approached resolutions, flexibly and economically.

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