Airport Noise Measurement in the International Airport of Thailand

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Keywords: Airport Noise Measurement, International Airport, Thailand

Abstract

Annually, the international airports in Thailand have recorded the large number of aircraft movements. There are many international airports which have more than 5,000 flight movements a year for examples: Mae Pah Luang Chiang Rai International Airport (CEI), Phuket International Airport (HKT), Chiang Mai International Airport (CNX), Donmueang International Airport (DMK), and Bangkok International Airport or Suvarnabhumi Airport (BKK). The proposed environmental monitoring plan in the environmental impact assessment report (EIA report) of each airport project set the airport noise monitoring plan and enforced each of them to submit their the post-auditing airport noise monitoring report at least once a year to the authorities. The current airport noise monitoring information of five international airports will be summarized in this paper.

Aircraft Movements Statistics

Airport noise was introduced into Thailand through the aircraft operations both from military and civilian aviation activities many decades ago. One of the most important pollution in the vicinity of the operated airports is aircraft noise. The international civil aviation shares majority of the flight movements in the major international airport around the world. The policy on international air transportation hub in the ASEAN Economic Community (AEC) is one of the most important economic development projects in many countries, including Thailand. The development of aviation industry in Thailand will increase economic returns to Thai society while the people living in the vicinity of the airport are suffering from airport noise every day since the airport was operated to serve the air transport services, increasing in the number of flight movements.

Most of the international airports have annually large number of aircraft movements both in passenger and cargoes, reported by the Airports of Thailand Public Company Limited (AOT) annual air transport services statistics. The airport noise management will be the key environmental issues around the international airports in the future. The airport noise is traded off by the economic returns from economic development on aviation industry sector. The airport capacity expansion will be closely related to effectiveness of airport noise management.

Since 2001, the aircraft movement statistics of four international airports in Thailand which are CEI, HKT, CNX, and BKK (DMK before September 2006 and Suvarnabhumi after September 2006) illustrated that there were over 10,000 flights, annually. Many new low-cost airlines pronounced to expansion their investment in air transport services in domestic and international market in ASEAN countries. Airport noise is even more important issues in airport management schemes by increasing aircraft fly-over movements, definitely around international airport in Thailand. The aircraft movement statistics were shown in Figure 1-2, 1-5, 1-8, 1-11, and 1-14, respectively.

Airport Noise Measurement in Thailand

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 larger air traffic volume were mostly found within the air traffic data records of international airports—i.e. CEI, DMK (the former BKK), CNX, HKT, etc. (Figure 1-2, 1-5, 1-8, 1-11, and 1-14).

In Thailand, airport noise monitoring program were taken into account of the proposed mitigation measures and monitoring plans from
the Environmental Impact Assessment Report (EIA report) in the EIA post-auditing process of all airport projects, particularly in airports with large air traffic volume, passengers, and cargos. The proposed environmental monitoring plan in the EIA report of each airport projects set out the airport noise monitoring plan and enforced each airport to submit their airport noise monitoring report at least once a year to the authorities, the Office of Natural Resources and Environment Policy and Planning (ONEP) and the Department of Civil Aviation (DCA). The airport noise monitoring programs will be conducted by the discrete environmental noise with the contribution of the aircraft flyover noise twice a year in order to submit the post-auditing report to the ONEP (ONEP).

Its practical noise monitoring method, declared in the EIA post-auditing report, applies only the Equivalent Continuous Sound Pressure Levels (L_{eq,t}) of overall environmental noise levels perceiving by receptors’ surrounding, including the aircraft noise components and others various noise sources near the microphone. Those calculated L_{eq,t} in the report were unclearly identified on the process of the practical noise monitoring method. While the results may be coincidently similar to the noise levels from the recommended descriptors and determination, illustrating in the ISO 1996-1:2003\(^{[2]}\) and ISO 1996-2:2007\(^{[3]}\) in terms of the 24-hour equivalent continuous sound pressure levels (L_{eq,24hr}) of environmental noise with fly-over aircraft noise components. More frequent found the aircraft fly-over noise position, more equal of the measured noise levels in L_{eq,24hr} of those two methods of measurement read by the sound level meter without any proof of noise source signature from fly-over aircraft that heard on the ground or even identifying other noise source contribution from the ground in those reports.

Realizing the importance of noise problem, the Framework on the Mitigation Measures of Airport Noise Management, proposed by Pollution Control Department (PCD) in 2003 under endorsement of the Pollution Control Board (PCB) and the National Environmental Board (NEB) were accepted to be implemented by the Cabinet Resolution in 2006\(^{[4]}\), including the long-term noise monitoring of fly-over aircrafts noise in the major airports, particularly the large volume of air traffic movements. However, there is none of any rules and regulations or guidelines, establishing the noise measurement methods of the fly-over aircraft noise or airport noise heard on the ground in Thai law. Otherwise, the airport noise monitoring scheme, required by the EIA report’s condition of airport operation licensing that was set out the airport owner to practically submit the post-auditing report of each airport project, including airport noise levels from monitoring to the authorities. However, the real-time airport noise monitoring system with 13 permanent and 2 mobile units of noise monitoring facilities, required by the EIA report were installed only at the BKK or Suvarnabhumi Airport since the end of 2011 that it is about seven years after its grand opening in late 2006 with the same unclear measurement methods. The installation and testing of those equipments have been handled by AOT and contracted out consultants. The noise monitoring facilities are now under the testing run by the consultants. Though, the noise monitoring report of the BKK noise situation and noise map will be published online in the future for the complaint handling services by AOT website.

**Airport Noise Situation around Airports**

The noise monitoring data from the post-auditing reports of CEI, HKT, CNX, DMR and BKK, mandating by their EIA reports and the specific noise measurement data from PCD and ERTC report were applied in this paper. The statistics of flight movements at BKK using in this paper were now officially reported by the Department of Civil Aviation (DCA) online and in the yearly report.

During 2005 to 2010, ERTC and PCD in cooperation with AOT and Aerothai conducted the aircraft flyover noise monitoring in compliance with the ISO 3891-1978\(^{[1]}\), the aircraft noise monitoring heard on the ground, in order to adopt the sound exposure levels of each aircraft flyover events in associated with international methodology on calculation of L_{eq,24hr}, L_{eq}, or L_{den} of vicinity aircraft noise levels. All noise monitoring data are shown in Figure 1-1 to 1-15 as bellowed.

The situations were totally changed by rapidly increasing of the complaints’ volume of the Suvarnabhumi Airport since 2006. Troops of people living in the vicinity of BKK marched to the airport to place their complaints against the noisy environment and asked for their remedies and compensations on the noise insulation of their houses and properties. The Cabinet Resolution dated on 21\(^{st}\) November 2006\(^{[4]}\) ordered AOTs to pay for the remedies and compensations. The progress of compensations handling have been reported by AOTs in their annual reports since 2007.
Discussions and Recommendations

The airport noise levels around international airports were separately conducted and reported by each of the EIA post-auditing report annually. People, suffering from airport noise living in the vicinity, particularly around the DMK, mostly did not place their complaints against the airports or any authorities since they believe that they will not get any remedies or reliefs. Their beliefs were from the facts that they moved to live into the vicinity areas after the airport operation, so they cannot apply their rights to be paid for the noise compensations. Most inhabitants, particularly DMR, were air force officer’s families, airport employers, subcontractors, other employee in related services, etc. They definitely will not put their complaints to the airport. Sadly, it seems their ears and healthy were familiar with the noisy living environment.

The noise management and mitigation measures, mandated by the Cabinet Resolution in 2006 aims flexibly to apply for all airports in Thailand, started by the BKK and DMR. The practical resolutions, applied to the vicinity of BKK by the cabinet noise mitigation framework 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 the delaying 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.

The flexible various of policy and legal instruments, outlined by the Chicago Convention in compliance with the “Balanced Approach” of Annex 16 Volume I [6] and [7], shall be beneficially implemented into the future airport noise management plan at BKK 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.

In addition, 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 maps shall be applied for remedy and compensation allocations, 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.

Unfortunately, the fact finding instruments, the aircraft noise monitoring system, installing in the vicinity of the BKK 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. The reported data have not been published in any reports from AOTs. 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. However, the airport noise monitoring reports will be published in the near future.

Acknowledgement

We would like to give our sincere gratitude to Dr. Yamada Ichiro for his encouragement and support including an opportunity to have the contribution on this paper. This paper will not be accomplished without support and constructive comment from Prof. Dr. Michiko So Finegolds, Mr. Tanaphan Suksaard, Ms. Lalin Kovudhikulrungsri, Dr. Suntariya Muanpawong.

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