Japan’s Cooperation and Technology in the Airport Sector including Eco-Airport

July, 2013

Civil Aviation Bureau (CAB), Ministry of Land Infrastructure, Transport and Tourism (MLIT)
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  ✓ Much experience, Advanced technology

• ECO-Airport
  ✓ Introducing the concept of environmentally friendly airports

• Other Field of International Cooperation (Reference)
  ✓ Air Navigation and Aviation Safety
• Japan’s International Cooperation in the Airport Sector
✓Much experience, Advanced technology
Main projects in Asian countries:

- Chittagong Int’l Airport
- Rangoon Int’l Airport
- Mingaladon Int’l Airport
- Bangkok Int’l Airport
- 2nd Bangkok Int’l Airport
- Colombo Int’l Airport
- Phuket Int’l Airport
- Kuala Lumpur Int’l Airport
- Padang Airport
- New Padang Airport
- Palembang Airport
- Jogjakarta Airport
- Balikpapan Airport
- New Bohol Airport
- Iloilo Airport
- Bali Int’l Airport
- Surabaya Airport
- Tan Son Nhat Int’l Airport
- Ninoy Aquino Int’l Airport
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- Iloilo Airport
- Balikpapan Airport
- Bali Int’m
Japan’s assistance to foreign airports includes a wide variety of items, ranging from planning and construction for new airport, to improving existing airport functions, support for the introduction of environmental measures and developing human resources of the airport sector.
Japan was faced with various issues that include noise pollution and a lack of airport capacity primarily due to a rapid increase in aviation demand. While striving to overcome these problems, we have cultivated advanced technological expertise and a wealth of experience and know-how in the airport sector.

● Cutting-Edge Technology in Airport Construction
As an example, the D Runway at Tokyo International Airport, which opened in 2010, combines a piled pier for the river area and reclamation fill so that it does not obstruct the flow of the river.

● Flexible Response in Airport Planning, Design and Construction
Examples range from the design of an international airport as a grand entranceway to a country to the construction of a terminal equipped with standard specifications at an affordable price.

● Technology and Knowledge in Airport Operation, Maintenance and Management
Expansion and repair work can be conducted without closing the airport in order to minimize the impact on flights and users. The revenue growth initiatives in retail business, etc.

● Terminal Operation Pursuing Convenience and Comfort for Users
Airport users can spend comfortably while also enjoying the cultural and entertainment features provided by efficient terminal operation.
• ECO-Airport

✓ Introducing the concept of environmentally friendly airports
What is “Eco-Airport”? 

“ECO” which can sustainable is asked for ecology and an economy. => Double ECO

“Eco-Airport” means both:  
- Airport which is environmentally-friendly  
- Environmental Policy/measures at or around the airports

Under the concept of the “Eco-Airport”, in Japan, since 2003, various measures have been made for the better environment at airports mainly initiated by JCAB with the collaborative approach of airlines, airport operators and local governments etc.

Main feature of “Eco-Airport”:  
- Eco-Airport improves the image of the country (:airport is the entrance of a country) -> Ecology  
- Eco-Airport reduces the operation costs by saving energy at airports -> Economy

Benefit of “Eco-Airport”:  
- Good for global warming, regional environment  
- Good for airport Operation and Management
Various measures for “Eco-Airport”

Note that Eco-Airport is driven by VOLUNTARY MEASURES, not passive regulations by authorities.

Efforts which need initial funding

- Grass clipped for fertilization use
- Solar Panels
- Rooftop Greening
- LED lighting
- Electric Vehicle
- Recycling and Reusing rain and kitchen water
- Recycling Plant
- Ground power unit

Efforts we can start from now!

- Unnecessary lights off
- Less idling of engines
- Saving water
- Recycling

Note that Eco-Airport is driven by VOLUNTARY MEASURES, not passive regulations by authorities.
Japan’s Cooperation:
- Various approaches spanning from Survey, Workshop/Seminar to setting Guideline
- Ready to share practices/information to support ASEAN’s steps for “Eco-Airport”

[Our steps so far]

2006.4-10: Questionnaire survey on the environmental measures taken at the major airports in AMS
2007.3: Eco-Airport Workshop (Tokyo)
2008.1: 2nd Eco-Airport Workshop (Tokyo)
2008.3-6: Proposal on the revised draft of the ASEAN-JAPAN Eco-Airport Guideline draft
2008.11.7: Endorsement of the ASEAN-Japan Eco-Airport Guideline at the 6th ATM+J held in Manila, the Philippines
2009: Questionnaire survey on the current situation of facilities related to environmental improvement at the major airports in AMS
2009-2011: JICA seminar on Eco-Airport (JICA Training Course ‘Airport Development Planning for Considering Environment’)
2012.2: Seminar for Following up of JICA seminar on Eco-Airport (Hanoi & Ho Chi Minh)
2013.2-: Survey on the progress of the ASEAN-Japan Eco-Airport Guideline (questionnaire survey and field survey)
Japan’s Cooperation with ASEAN [FOR NEXT STEP]

Observation of Survey by questionnaire* (Interim findings)
*JCAB conducted survey on the progress of the ASEAN-Japan Eco-Airport Guideline in February, 2013
  (As of the middle of June, we’ve received responses of 4 officials and 10 operators.)

- Recognize that Eco-Airport Council has been already set up at some airports
- Recognize that some voluntary measures (ex. unnecessary light off) have applied at many airports

Observation of Field research* (Interim findings)
*JCAB conducted field survey of the following airports since February 2013.
  (Noi Bai, Yangon, Wattay, Suvarnabhumi, Kuala Lumpur)

-The progress of environmental measures depends on the economic growth of each country and the international rank of each airport.
-It is important to distribute Eco-Airport guideline to local staff, share the best practices and nurture special staff.

Further support for midterm evaluation in 2013
- Arrangement of the progress by doing a survey
- Making proposals for promotion based on the result of the survey

The needs of technique of airport environment
Providing technical information
Use of Photocatalyst Products

Example of the use of photocatalytic technology

By using the decomposition and hydrophilicity properties of photocatalysis, environmental load can be reduced.

- Reduction of environmental load & maintenance cost
- Enhancement of the airport impression & cleanliness
• Other Field of International Cooperation (Reference)
  ✓ Air Navigation and Aviation Safety
The technical cooperation program for strengthening safe and efficient aircraft operation in Indonesia  
-2009- ongoing  
1. Dispatch a long-term expert concerning safety supervision to Indonesia  
2. Invitation to Indonesian personnel for technical training  
3. Dispatch short-term experts in the field of operation, maintenance and safety management  

- Purposes are  
  1. Provide fundamental knowledge of aviation security  
  2. Exchange views in the field among other participants and Japanese experts  
- 1986- ongoing  
(13 participants from 11 counties in Asia Pacific, Africa, Middle east etc. in 2012)
Future response

After approval of 38th ICAO General Assembly (Sep. 2013), every region and country will work on the concrete measures. We have to introduce new CNS/ATM systems to meet Global Air Navigation Plan and ASBUs.

**Supporting the transition to New CNS/ATM**

- **Communication**
  - HF: Indirect communication
  - VHF: Coverage limit
  - Direct communication between ATC and pilot by satellite data link

- **Navigation**
  - NDB, VOR: Coverage limit
  - Performance Based Navigation by Global Navigation Satellite System

- **Surveillance**
  - RADAR: Coverage limit
  - Oceanic Area: Position report by indirect communication
  - Improvement accuracy of the aircraft target position by ADS

**Air Traffic Management (ATM)**
- Air Traffic Flow Management (ATFM)
- Air Space Management (ASM)
- Air Traffic Service (ATS)

**Support for ATM**
- Improve safety
- Improve punctuality of flight schedule
- Improve capacity of air space
- Increase opportunity of approval for flight route and flight schedule which airline company desire
- Minimize requirement of equipped avionics which differ from region to region

**Realization**

Japan will support Asia/Pacific countries to draw up a **master plan** for the whole land which enables smooth transition from old CNS/ATM to new ones as technical cooperation and to do **education** and **training** for human resource development, dispatching experts.

After then, based on the master plan, we’d like to support you to do the whole land new CNS/ATM transition financed by yen loans.
Thank you for your attention.

Mt. Fuji's listing as world heritage site!
Usage of Photocatalyst Titanium Dioxide

Decomposing Ability

1. Titanium dioxide, which is the photocatalyst, is exposed to light.
2. $e^-$ (electron) and $h^+$ (positive hole) are generated.
3. Reactions between O$_2$ contained in air and $e^-$, H$_2$O and $h^+$ occur respectively.
4. Two types of active oxygen, O$_2^-$ (superoxide ion) and -OH (hydroxyl radical), are generated on the surface of the titanium dioxide.

Hydrophilic Properties

1. Titanium dioxide, which is the photocatalyst, is exposed to light.
2. There is a reaction between one O (oxygen atom) in the composition of the titanium oxide and the H$_2$O in the air.
3. As a result of the O and H$_2$O reaction, -OH (hydrophilic group), which is very hydrophilic, is generated on the surface of the titanium dioxide.
How to approach “Eco-Airport”? [Snapshot]

Set up “Eco-Airport Council” at each airport

- Airport administrator
- Relevant organizations
  - Terminal operator, Airline, Ground Handling etc

Survey of environmental status

“Airport Environment Plan” (Setting Environment Targets)

Implementation of the Plan

Mid-term Evaluation (5 years after planning)

Review of Plan

Overall Evaluation (10 years after planning)

Announcement

Plan

Do

Check

For instance
- 10% reduction of CO2 than current

For instance
- LED adoption
  - Less idling of the vehicle

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How to approach “Eco-Airport”? [Snapshot]
How to approach “Eco-Airport”? [PLAN]

Plan
Formulate “Airport Environment Plan”
(Setting Environment Targets)

Critical point when planning:
- Each airport should have each Airport Environmental Plan for the best fit Plan
  (it is better than planning out single nation-wide Airport Environmental Plan to apply all airports, which may ignore the airport characteristics, regional diversities etc.)

Consider that each airport has its own conditions and constraints etc.
(size of airports, local climate, location of airports…)

Large-scale
Off-shore
Mountainside
Snow