Airport Environmental Measures Taken by JAPAN (Eco-Airport)

Civil Aviation Bureau (CAB)
Ministry of Land, Infrastructure, Transport and Tourism (MLIT)
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1. Why environmental measures?
2. Environmental measures at the PLANNING stage
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Why Environmental Technology?

(Background)
In general, airport environmental measures are environmental assessment, aircraft noise mitigation and so on. Recently, eco-airport aimed at reducing environment impacts at airport through airport management is encouraged.

(Current Status)
Various environmental technologies are actively developed and applied at airports to reduce environmental impacts.

(Measures in Japan)
The consistent airport environmental measures are taken from the planning to operation stages.
Especially, eco-airport has been adopted not only in Japan but also in ASEAN States.
Some ODA projects require to adopt environmental reduction technologies.
Why Environmental Technology?

(ODA Case)
New Bohol Airport Project (ODA Project) requires;
(1) Environmental measures to minimize environmental impacts on the surrounding area.
(2) Airport operation taking environmental measures.

(Specific measures)
> Silt curtain is installed during offshore construction to contain turbid water.
> Introduce low-energy technology based on Eco-airport concept.
> Drainage measures, monitoring of marine ecosystem after the launch
Outline of this Presentation

- The consistent airport environmental measures are taken from the planning to operation stages. This enables coexistence with environment.
- Measures are implemented at each stage.

Example:
Naha Airport Runway Expansion Project

Example:
Naha Airport Runway Expansion Project

Example:
Activities of Eco-Airport in Japan and ASEAN Countries
Flow of PI procedure

- PI was applied from the beginning of the project

Planning Naha Airport Runway Expansion Project - 1

- 2003 to 2007: General research level
  - step1
  - step2
  - step3
- 2008: Draw up level
- 2009: Facilities design level
- 2010 to 2013: Environmental impact assessment level
- 2014: Construction

PI: Public Involvement
Planning Naha Airport Runway Expansion Project - 2

How can we take a proper care of environmental aspect at this phase?

- PI was applied to determine the location of new runway.
- 3 proposals of locations were discussed.

- Overall evaluation on expansion effect, costs, environmental load, etc.
- 1,310m was the cheapest and less environmental load.
- Integrated plan of user-friendliness and environmental consciousness at early stage.
- No setback on construction.
Construction

Naha Airport Runway Expansion Project - 3

Revetment work

- Creation of marine habitat on gentle slope
- Special wave-dissipating block for easy epiphyte

Cross section of gentle slope

Covering stone by wave-dissipating blocks

Wave-dissipating blocks with uneven surface

Corals attached to wave-dissipating blocks

Sand prevention sheet

Foundation riprap

10 years
Naha Airport Runway Expansion Project - 4

Key environmental measures

- Established monitoring committee
- Consisted of academics and local government

- Preservation and transplantation of important species
- Creation of new bio-base

- Transplant using special sampling container
- Rooted in 1 or 2 months

1~2 months after transplantation
Activities of Eco-Airport in ASEAN & JAPAN

Concepts of Eco-Airport

• Environmentally-friendly airport
• Voluntary environmental policy/measures at or around the airports
• The government formulates “Eco-Airport Guideline”
• The Eco-Airport Council of each airport formulates an annual Environmental Plan and takes initiatives
• Improving the country’s image (an airport is the gateway to the country) -> Ecology
• Reduction of operation costs by saving energy at airports -> Economy

Double ECO
Activities of Eco-Airport in ASEAN & JAPAN

Events in the Philippines

- Endorsement of the ASEAN-Japan Eco-Airport Guideline at the 6th ATM+J held in Manila, the Philippines in 2008
- JICA seminar on Eco-Airport (The JICA Training Course ‘Airport Development Planning Considering Environmental Impacts’)
- Philippine-Japan environment seminar (2013, Manila)
- Questionnaire & field surveys on the progress of Eco-Airport in ASEAN (2013~2014)
Activities of Eco-Airport in ASEAN & JAPAN

Subject: 18 airports in the entire ASEAN countries (10)

1. Questionnaire survey

<table>
<thead>
<tr>
<th>Rates for measures introduced</th>
<th>Done</th>
<th>Done + Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>organizational structure (3 measures)</em></td>
<td>30%</td>
<td>71%</td>
</tr>
<tr>
<td><em>operation &amp; management (14 measures)</em></td>
<td>45%</td>
<td>68%</td>
</tr>
<tr>
<td><em>building/facility/equipment (39 measures)</em></td>
<td>37%</td>
<td>40%</td>
</tr>
</tbody>
</table>

Progress differs from airport to airport

2. Field survey

- Wastewater facility
- Greening wall
- Sensor-based water faucet
- Solar panels

Good Practices

Future measures

-To promote the Eco-Airport measures and managements, ASEAN countries and Japan will share new technologies as well as the problems and solutions at each airport.
Activities of Eco-Airport in ASEAN & JAPAN

- Monitoring is important for sustainable management.
- The review is conducted every year, 5 years, or 10 years.

Trends in CO2 reduction (t-CO2/one aircraft movement)

Bars: Total CO2 emissions
Lines: Basic unit of CO2 emissions per one aircraft movement

Reference: Centrair Green Report 2012, Central Japan International Airport Co., Ltd.
Various Eco-Airport Measures
Eco-Airport measures

Eco-technologies adopted at passenger terminal

- Natural light
- Ceiling ventilation
- Solar panels
- Rooftop greening
- LED lamps
- Geothermal power
- Co-generation system
- Photocatalytic products
- Rainwater utilization system
Eco-Airport measures

Easy Initiatives

- General waste segregation
- Use motion sensor lighting
- Remove fluorescent lights
- Turn off the lights when not in use
- Turn off the lights frequently
- Lower power consumption
- Lower procurement costs
Eco-Airport measures

Regional Contribution

- Grass clippings for use as fertilizer
- Education of environmental preservation

- Lower maintenance costs
- Better understanding & cooperation
Eco-Airport measures

“5 S”

(The Good Housekeeping Practices)

1. SEIRI
   Sorting Out

2. SEITON
   Systematic Arrangement

3. SEISO
   Shining

4. SEIKETSU
   Standardizing

5. SHITSUKE
   Self-discipline

- Lower maintenance costs
- Better understanding & cooperation

“5S” sign board at Manila International Airport Authority (MIAA)
Eco-Airport measures

Photocatalytic Products

Japanese new technology for decomposition not only by sunlight but visible light

Adopted inside the building

- Lower maintenance costs
### LED Lamps for Airport Taxiways

**Eco-Airport measures**

<table>
<thead>
<tr>
<th>Ordinary type</th>
<th>New type (LED)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taxiway centerline lights (buried type)</td>
<td>![Image of LED centerline lights]</td>
</tr>
<tr>
<td>Taxiway edge lights (above-ground type)</td>
<td>![Image of LED edge lights]</td>
</tr>
</tbody>
</table>

- **Lower power consumption**
- **Lower maintenance costs**
Eco-Airport measures

Eco-car & Eco-station

- Lower power consumption

- Airport shuttle

- Using plugs for GPUs for aircraft

- Electric towing vehicles

- Electric belt loader
Eco-Airport measures

Photovoltaic Power Generation System

- Lower power consumption

Mega solar system

Monitoring panel

Source: New International Kansai Airport
Eco-Airport measures

Ground Power Unit (GPU)

- Energy center
- Electric utility
- Power plant
- Heat-receiving equipment
- Power receiving and distribution equipment
- Heat exchanger
- Power converter
- Cooled/warmed water
- Cold/hot blast
- Electricity for aircraft (400 Hz, 115/200 V)
- Commercial power source (50/60 Hz, 6,600/400 V)

Eco-Airport

Lower power consumption
Eco-Airport measures

Rainwater Utilization System

- Stormwater tank
- Rainwater processing facility
- Recycled wastewater output at 380 million liter per year

* Lower utility consumption

- Recycled wastewater (Supplementing water)
- Flush water
- Air conditioning center
- Others
Eco-Airport measures for Geothermal Air-conditioning System

Winter (cold)
- Water
- Heat exchange
- Terminal
- Heat gained: Maintained at 17°C (62.6°F)
- Heat released

Summer (hot)
- Water
- Heat exchange
- Terminal
- Heat released: Maintained at 17°C (62.6°F)
- Heat gained

Lower power consumption

MLIT / Ministry of Land, Infrastructure, Transport and Tourism

Philippines Infrastructure Seminar, 23 Feb. 2015
Eco-Airport measures

Co-generation System at Terminal

Conventional system

- Generated energy: 100%
- Heat loss: 56%
- Transfer loss: 4%
- Efficiency: 40%

Co-generation system

- Natural gas
- Engine or Turbine
- Electric energy: 20~40%
- Usable heat energy: 30~60%
- Heat loss: 10~30%
- Overall CO₂ reduction: 12.8% (estimate)
- Efficiency: more than 70%

Lower power consumption

Eco-Airport

Philippines Infrastructure Seminar, 23, Feb. 2015
Conclusion

• From the planning stage, “Public Involvement” is adopted to gather public opinions regarding environment.
• At the construction stage, the safe and smooth construction is conducted, preserving the natural environment.
• At the operational stage, various environmental technologies are adopted to promote Eco-Airport.
• Eco-Airport activities was accepted and started to spread in ASEAN States. It is expected to become more active.
• Eco-Airport is based on a stable organization, operation/management measures, and building/facility/equipment aspects. It is important to implement such factors systematically.
• To elicit effects of environmental impact mitigation by Eco-Airport initiatives, it is important to create the PDCA cycle for the continual improvement.
• Japan will continue Eco-Airport initiatives in partnership with ASEAN States through seminars and information-sharing, etc.
Contact Information

• (Photocatalysis technology)

• (LED lamp, Regional contribution, Easy measures, Rainwater utilization)

• (Mega solar panel)

• (GPU, Eco-car, Eco-station)

• (Geothermal system, Co-generation system, others in terminal building)
  – Tokyo International Airport Terminal (TIAT) http://www.tiat.co.jp/en/
Thank you for your attention.