



Civil Aviation Department Environmental Report 2015

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1 Foreword

This Environmental Report covered the environmental performance of the Civil Aviation Department (CAD) in 2015.

In the work of environmental management, the Department strives to minimize the disturbance caused by aircraft operations to the local communities and pursue environmentally friendly operations both in various functional areas and office management.

Our Environmental Goals

CAD is committed to ensuring that all services provided by the Department as well as our operations are conducted in an environmentally responsible manner.

Our Environmental Policy

We support the Hong Kong Special Administrative Region Government's initiatives to improve the environment by:-

- Committing to a safe, efficient and sustainable air transport system in Hong Kong;
- Compliance with relevant environmental protection ordinances;
- Striving to minimize the adverse effect that the development of the aviation industry may cause to our quality of life and environment;
- Promoting waste reduction, recovery and recycling, and reduction in consumption of resources including material, fuel and energy; and
- Providing environmental education and training to staff.

2 Aircraft Noise Management

CAD is conscious of the impact of aircraft noise on the community and has implemented a series of noise mitigating measures. We also monitored the implementation of these noise mitigating measures and the aircraft noise situation in various districts with the aid of a computer-based Aircraft Noise and Flight Track Monitoring System.

Quieter Arrivals

Arrivals from Southwest over Water

Subject to weather and safety conditions, arrival aircraft between midnight and 7 am are required to approach from the southwest over water. This measure aims to reduce the number of aircraft overflying populated areas such as Shatin, Tsuen Wan, Kwai Chung, Tsing Yi, Sham Tseng and Tsing Lung Tau.

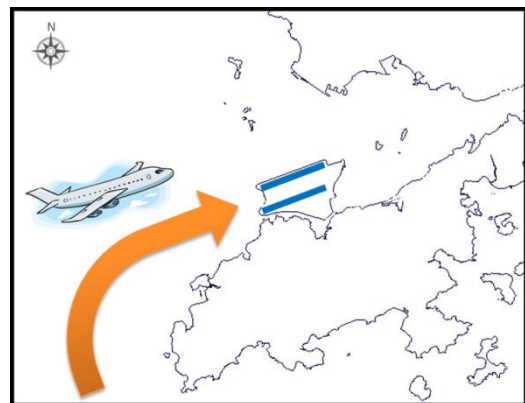


Figure 2-1: Route of arrival aircraft from southwest at night

Continuous Descent Approach Procedure

When weather and flight conditions do not allow night arrivals to approach from the southwest, arrival aircraft from the northeast direction are encouraged to adopt the Continuous Descent Approach (CDA) procedure.

The CDA procedure requires the aircraft to fly higher and adopt a lower power and drag configuration during the commencement of the approach, thereby reducing aircraft noise impacts to areas such as Sai Kung, Tseung Kwan O and Ma On Shan.

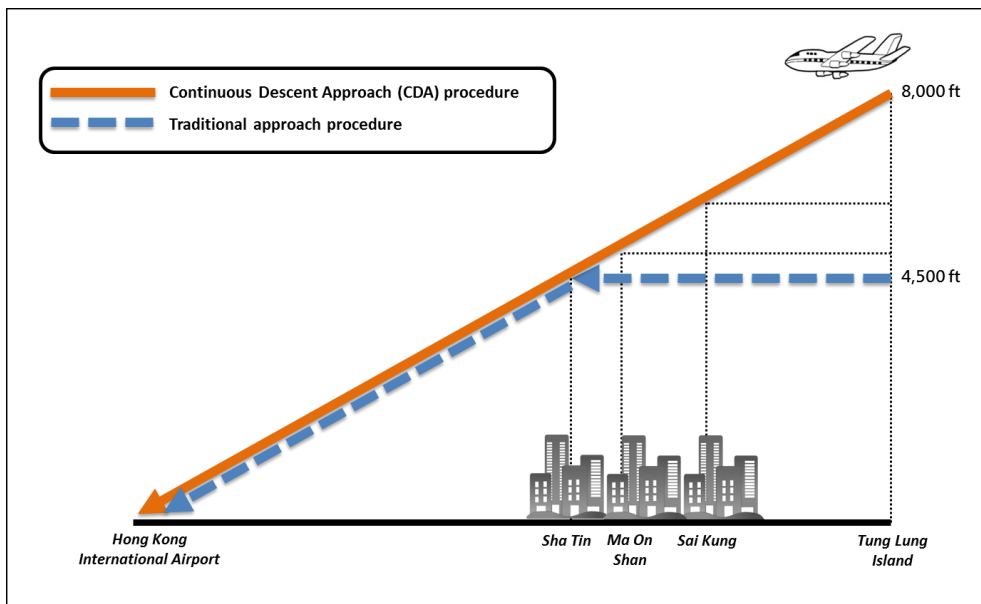


Figure 2-2: Diagram illustrating CDA procedure

Quieter Departures

Noise Abatement Departure Procedures

All aircraft departing to the northeast are required to adopt the Noise Abatement Departure Procedures stipulated by the International Civil Aviation Organization (ICAO) so long as safe flight operations permit.

These procedures require aircraft to reduce power upon reaching an altitude of 800 feet or above, thus can alleviate aircraft noise impact during take-offs on communities in the vicinity of the airport.

Departures via West Lamma Channel

Subject to weather and safety conditions, aircraft taking off to the northeast between 11 pm and 7 am the following day are required to fly south to the West Lamma Channel, thereby avoiding flying over populated areas such as Kowloon, North Point, Shau Kei Wan and Chai Wan. Our statistics showed that most aircraft complied with this requirement.

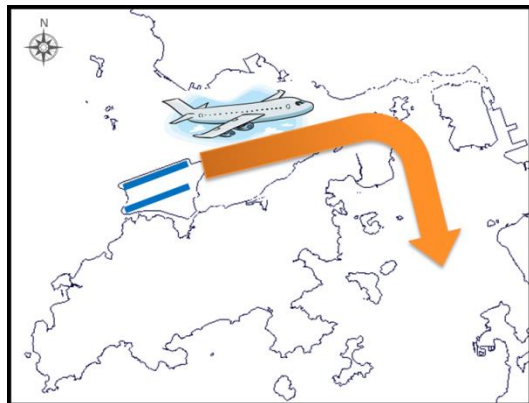


Figure 2-3: Route of departure aircraft to northeast at night

Improving Track Adherence

In 2012, we introduced a set of new noise mitigating departure procedures which make use of satellite-based navigation technology for noise mitigation. Aircraft which are equipped to use the technology, when departing to the northeast of the Hong Kong International Airport (HKIA), can make use of the on-board navigation capabilities to achieve higher track-keeping accuracy during their turn to the West Lamma Channel. With better adherence to the designated flight path, the aircraft can be kept at a distance from the populated residential areas. In doing so, the aircraft noise footprint can be confined and the overall aircraft noise effect on these residential areas can be reduced.

Restrictions on Noisy Aircraft

Since 1 July 2002, all noisy aircraft which do not comply with the noise standards stipulated in Chapter 3 of Annex 16, Volume I, Part II to the Convention on International Civil Aviation (Chapter 3 Noise Standards) are not allowed to operate in Hong Kong.

To further alleviate the aircraft noise impact on local communities, commencing from end of March 2014, CAD ceased to allow airlines to schedule aircraft whose noise levels only marginally meet the Chapter 3 Noise Standards (so-called “Marginally Compliant Chapter 3 aircraft”) to operate between 11 pm and 7 am the following day. This measure has been extended to cover the whole day since end of October 2014.



Figure 2-4: New aircraft engine with improved efficiency in emissions and noise reduction

Noise Monitoring

CAD has installed an Aircraft Noise and Flight Track Monitoring System to monitor the implementation and effectiveness of various noise mitigating measures, and the noise environment in various districts. The system comprises 16 outdoor noise monitoring terminals located in the vicinity of the flight paths and a central computer server which correlates the flight data provided by radars and the noise data recorded by the noise monitoring terminals.



Figure 2-5: Outdoor noise monitoring terminal

3 Aircraft Emissions

Most aircraft operating at HKIA comply with the engine emission standards as stipulated in Annex 16, Volume II to the Convention on International Civil Aviation. With the growing attention to the climate change caused by the greenhouse gas (i.e. carbon dioxide, CO₂), CAD has been closely monitoring the development of guidelines from ICAO on the reduction of CO₂ emission from aircraft operations and conveyed the guidelines to the industry.

Measures Taken by Airlines

Airlines have taken measures to retire and replace old aircraft with new models which are more fuel efficient hence less emissions. Apart from the modernization of aircraft fleet, airlines also endeavour to reduce emissions through reduction of aircraft weights, better maintenance and improved flight planning and management.

Measures Taken by CAD

CAD, being the air navigation services provider, has from time to time reviewed air routes and air traffic management arrangements by making reference to the latest ICAO guidelines and taking advantage of technology advancement aiming at enhancing airspace capacity and operational efficiency, as well as making civil aviation more environmentally friendly. Since 2009, CAD has adjusted the flight routes for flights arriving from the west and north of Hong Kong, thereby shortening the arrival routes. After the adjustment, each flight can shorten its flight route by up to about 210 kilometres, or save up to about 14 minutes in flight time. In addition, by collaborating with adjacent air traffic control centres, we have adjusted the spacing requirement between flights on air routes transiting from Hong Kong and Taipei Flight Information Regions for Korea since 2011, which enabled more aircraft to fly at optimum and fuel efficient altitude. Apart from saving time for travellers, these initiatives also reduce fuel consumption and the quantity of greenhouse gas emitted. CAD will continue to explore new green initiatives to reduce aircraft emission.

4

Green Measures in Other Aviation Related Operations

Standardized Forms for Various Tariff and Flight Applications

Exchange of correspondence and submission of documents in relation to various tariff and flight applications to the Air Services Office involve considerable consumption of paper and processing time. By the use of standardized forms for applicable types of applications, the required information and details can be provided in pre-set formats. This arrangement streamlines the processing procedures and avoids excessive emails and letter exchanges and thus reduces paper consumption.

Use of Electronic Version of Air Navigation

Services Regulatory Documents

Electronic version of various air navigation services regulatory documents is available for CAD staff's internal reference at the Air Traffic Management Standards Office website, which is readily accessible through office desktop or notebook computers connected to CAD intranet. Latest versions of the documents will be posted onto the website with electronic notification via email for document update so that the need for staff to keep individual paper copies could be reduced to a minimum.

Electronics Submission / Approval

Use of Electronic Flight Bags

Starting from late 2013, upon the fulfillment of safety related requirements, most document records, manuals and licenses that used to be carried on board aircraft or submitted to CAD in paper form, can be provided through electronic means.

Up to end of 2015, two major airlines in Hong Kong have been approved by CAD to use electronic flight bags in their flights of particular aircraft types to and from Hong Kong. This practice greatly replaces and reduces paper-based references found in the carry-on flight bag in the past, including various operations manuals, maps and navigational charts. With the use of electronic flight bags which bring the technological advances of computer information delivery to the airplanes, flight crews can perform different management tasks more efficiently with less paper.

Application for Guided Tours of the Aviation Education Path

Any individual or group interested in a guided tour of the Aviation Education Path in the CAD Headquarters may down-load the application form from CAD website and submit the duly completed form by electronic means. This practice supports the paper saving policy of the Department.

Electronic Flight Strip System

For a long time, paper flight progress strips had been used to facilitate air traffic control operations in the control tower at the HKIA. As a step to enhance operation efficiency and environmental friendliness, the paper strips have been replaced since December 2012 by the Electronic Flight Strip System (EFSS), which displays flight data on a screen and allows data management by electronic means. EFSS helps reduce paper usage. It is estimated that during 2015, more than 1,019,000 paper strips (equivalent to about 84,900 sheets of A4 size paper) have been saved.

The EFSS will also be featured in the new Air Traffic Management System which is expected to be implemented in the new Air Traffic Control (ATC) Centre in 2016. Paper strips will be totally replaced thereafter. As a result, paper consumption is likely to be further reduced.



Figure 4-1: Traditional paper flight progress strips

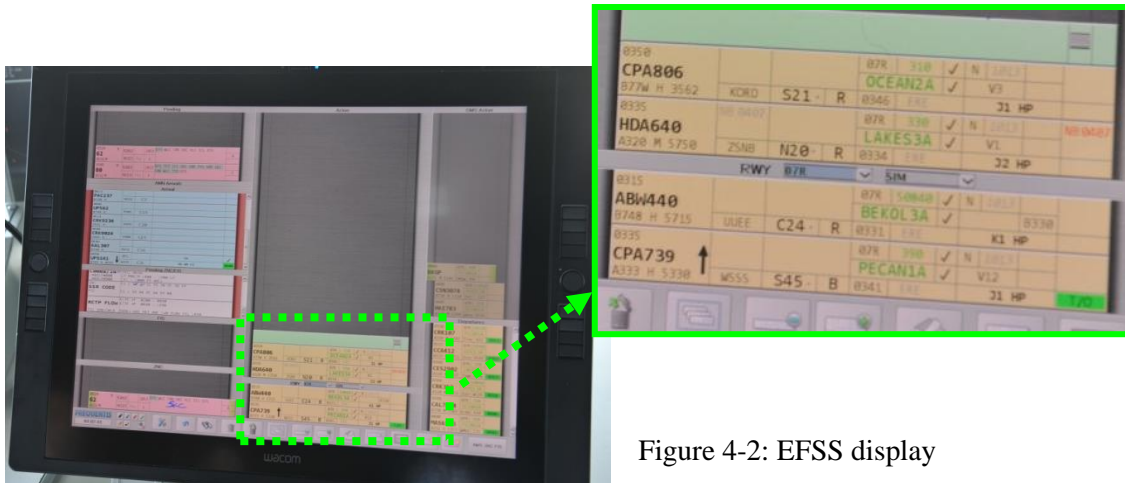


Figure 4-2: EFSS display

Online Promulgation of Divisional Documents

The Air Traffic Management Division (ATMD) of CAD has launched a website with secured access limited to divisional staff, named as the “ATMD Information Dissemination Website”, since 1 September 2014. The website was at first used to disseminate roster information to colleagues through the internet. In December 2014, the function of the website has been extended to house and disseminate training materials, Airport Circulars, Divisional Information Circulars and materials of professional interest aiming to replace the traditional means of distributing hard copies.

In order to reap further environmental benefits, since 2015, ATMD has further extended the use of the website to provide online access to divisional reference documents and their updates which had used to be disseminated by CD-ROMs. As a result of this initiative, about 2,000 CD-ROMs would be saved each year.

Aeronautical Information Management System

Concurrent with the relocation of the Aeronautical Information Management Centre to the CAD Headquarters, a new Aeronautical Information Management System (AIMS) commissioned operation in December 2015. The biggest change brought about by the new system is the digitization of information management. Aeronautical data is stored in the new system in digitized and structured formats, which enables further processing and distribution by electronic means. The new system does not only enhance the accuracy, efficiency and quality of information dissemination, but also help reduce paper consumption.

Graphical Presentation of Aeronautical Information

Before the implementation of AIMS, when graphical presentation of information on special areas affecting flight operations was required, our staff would make hard copies of the charts, then manually plot the areas on the charts after detailed measurement. At times, several drafts were made during the plotting process and several sheets of charts were required when the area covered more than the extent of one chart. Subsequently, the plotted paper chart would be sent out by fax or delivery. Not only did the process require more time and effort, it was not environmentally friendly.

Provisions under the New System

The new AIMS has a graphical report tool which enables operators to input the geographical coordinates of areas concerned and instantaneously display the areas on the screen. Operators can select to display essential elements in the background to make a clear presentation in a paperless environment. An electronic copy of chart can be easily generated and sent out via email efficiently. It is much more user-friendly and can save paper.

Taking advantage of the functionality of the new system, CAD will continue to explore new initiatives to disseminate and exchange information in a more environmentally friendly manner.

5 Green Housekeeping

CAD has implemented a number of green housekeeping measures in daily office operations to encourage energy conservation, paper conservation, waste collection and recycling, proper disposal of environmentally hazardous waste, green procurement and environmental awareness among all staff.

Energy Conservation

Daily Energy Saving Measures in Housekeeping

CAD has adopted a series of green measures in order to minimize the consumption of energy in our daily office operations:-

- Continuing to follow the Government recommended summer air conditioning setting of 25.5°C and use electric fans to improve air circulation and provide better staff comfort if necessary
- Continuing the practice of switching off any air conditioning, interior lights, exterior lights, decorative lights, lifts, escalators, digital signage system, video wall, etc. when not in use
- Fine-tuning the external lighting on-off hours periodically to optimise against seasonal changes in light / dark hours
- Reviewing and further reducing the amount of lighting, especially in areas which are not frequently visited. Some unnecessary fluorescent tubes in the corridors of the Air Traffic Control Complex (ATCX) have been removed



Figure 5-1: De-lamping in common area

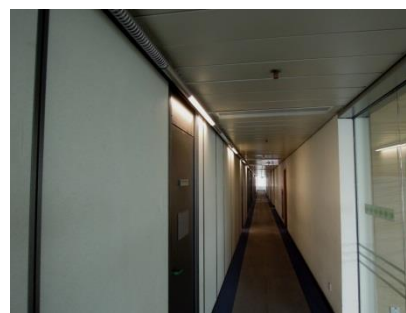
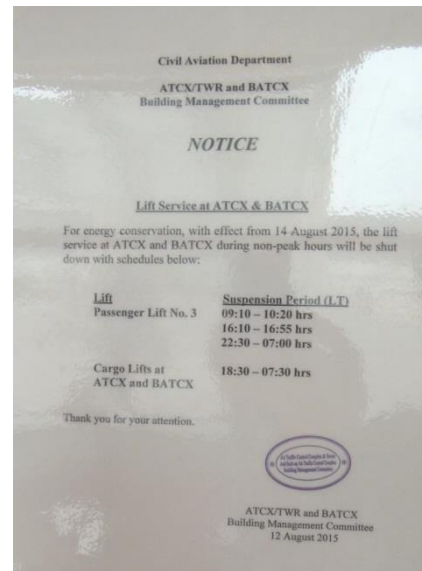


Figure 5-2: Fluorescent light tubes are removed alternately at the corridors

- Generally, lifts, escalators, air conditioning and lighting at common areas of CAD Headquarters are in operation from 7:30 a.m. to 6:30 p.m. during working days. Only half of the lifts are in operation during non-peak office hours and one lift in each lift lobby is in operation after normal office hour. Moreover, some lifts in ATCX and Back-up Air Traffic Control Complex (BATCX) are switched off during non-peak office hours for energy-saving



- Encouraging staff to use staircases instead of lifts
- Installing energy-saving timer devices in most share-used printers and photocopiers to prevent the consumption of electricity in standby mode during non-office hours

Figure 5-3: Some lifts in ATCX and BATCX are switched off during non-peak office hours



Figure 5-4: energy-saving timer devices connected to photocopiers

- Checking lights and electrical appliances during security patrol outside office hours to ensure that they are switched off if not in use
- Displaying notices in all meeting / training rooms to remind users to switch off lights and all electrical appliances before leaving
- Installing solar films in strategic locations to reduce sunlight and heat
- Introducing green installation during the building construction, e.g. installing photovoltaic panels on the rooftop of CAD Headquarters. In 2015, the electricity generated by the panels was 21,000 kWh



Figure 5-5: An example of solar films shielding the office area from sunlight effectively (glass panel on the left with solar film installed)



Figure 5-6: Photovoltaic panels on the rooftop of CAD Headquarters

Electricity Consumption of CAD Buildings

Electricity consumption of our government buildings in financial year (FY) 2015-16 as compared with FY 2013-14 as baseline is tabulated below:-

	Electricity consumption (kWh)	Electricity consumption under comparable operating conditions (kWh)
FY 2013-14 (baseline)	26,590,970	Not applicable
FY 2014-15	27,090,851 (+1.9%)	27,103,123 (+1.9%)
FY 2015-16	26,080,028 (-1.9%)	26,094,576 (-1.9%)

Remark: Figures in brackets indicate percentage change compared with baseline.

As set out above, the change in electricity consumption of our government buildings in FY 2015-16 has decreased by 1.9%, when compared with FY 2013-14 (baseline), under comparable operating conditions. The reduction was contributed by our effective implementation of energy-saving initiatives.

Energy Audit

In response to the 5% energy saving target in government offices announced by the Chief Executive in the 2015 Policy Address, a consultant was appointed to conduct an Energy Audit exercise in 2015 for the major CAD premises including the CAD Headquarters, ATCX and BATCX. When recommendations by the consultant are available, CAD will study the feasibility and take appropriate follow up actions.

Paper Conservation

Daily Paper Saving Measures in Housekeeping

We promote the “4-R principle” in paper conservation as summarized below:-

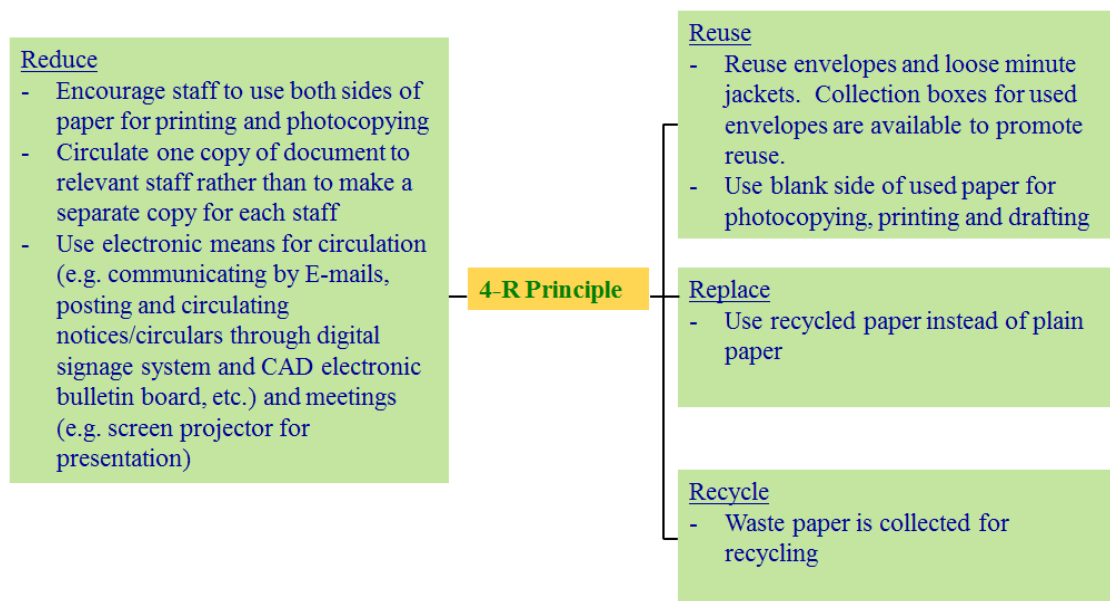


Figure 5-7: Diagram showing the 4-R principle

Paper Consumption for the Recent Three Years

The paper consumption of CAD continued to decrease in 2015. A summary of the paper consumption for the recent three years is as follows:-

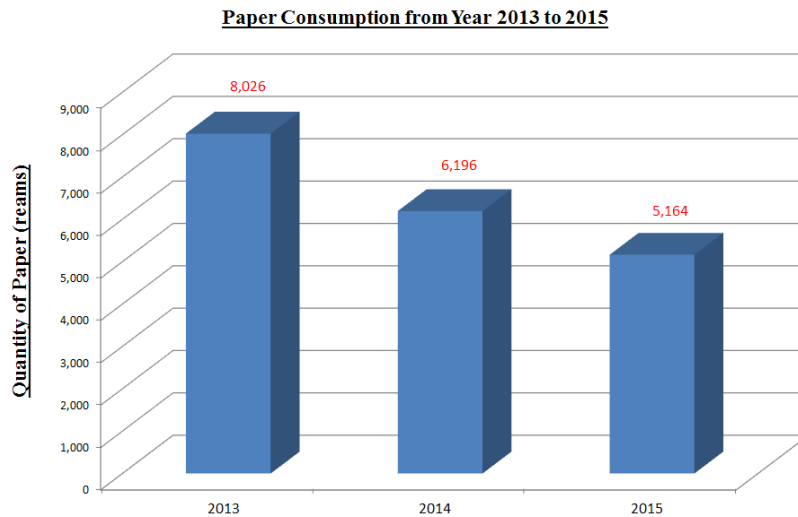


Figure 5-8: Paper consumption from year 2013 to 2015

Waste Collection and Recycling

Recycling Bins to Collect Waste Paper, Plastic Bottles, Aluminium Cans and Rechargeable Batteries

We collect waste paper, used plastic bottles, metal cans and rechargeable batteries, etc. for recycling. Recycling bins are placed in common areas to facilitate disposal by staff or visitors. The materials collected are delivered on a regular basis to recycling operators. The table below shows the amount of recyclables collected in 2015.

Recyclables	Amount Collected
Waste Paper	3,959 kg
Plastic	22 kg
Metal	16 kg
Rechargeable Batteries	7 pieces



Figure 5-9: Collection box for rechargeable batteries in CAD Headquarters



Figure 5-10: Recycling bins in CAD Headquarters

Food Waste Collection and Decomposition System

Food waste is one of the major solid wastes in Hong Kong. Reduction of food waste is therefore crucial for minimizing the load of landfills. To work towards this goal, a food waste decomposition system had been installed in CAD Headquarters and in operation since the commissioning of CAD Headquarters in late 2012.

A food waste collection box is placed in the CAD Staff Canteen at CAD Headquarters for collecting customers' food wastes, which are then disposed of into the food waste decomposition system. During the decomposition process, the food waste is converted by enzyme into liquid, part of which is used as a natural fertilizer for the vegetation at CAD Headquarters and the remaining is discharged as an effluent. In 2015, we collected about 2.2 tonnes of food waste, mainly from our Staff Canteen.



Figure 5-11: Food waste is collected in CAD Staff Canteen



Figure 5-12: The food waste decomposition system in CAD Headquarters

Reduction of Waste in Staff Canteen

Apart from handling the food waste collected through the food waste decomposition system, the Staff Canteen has also taken actions to reduce other solid wastes through the following means:-

- Encourage customers to request a smaller portion of rice, thus reducing the chance of creating food waste
- Publicity materials are posted in the Canteen to remind customers to reduce the amount of left-over food

- Paper packages for re-usable chopsticks are no longer in use
- Backing sheets for the food trays are not provided



Figure 5-13: The CAD Staff Canteen encourages customers to request a smaller portion of rice if necessary to minimize wastage



Figure 5-14: A publicity poster produced by the Environmental Protection Department is posted in the CAD Staff Canteen reminding customers not to be a waster

Collection of Rain Water Recycling for Irrigation

Rain water and air-conditioning condensate water is recycled for the irrigation system installed at CAD Headquarters. The following table shows the saving of irrigation water in 2015:-

Buildings of CAD Headquarters	Facilities Building	Office Building	Air Traffic Control Building
Annual Irrigation Consumption (L)	8,130,000	3,700,000	2,230,000
Annual Recycled Water Collection Catered for Irrigation (L)	2,220,000*	210,000	420,000
Percentage of Saving	27%	6%	19%

* Including the water recycled from the cooling tower

Water Saving Measures

Fresh water is a precious natural resource. We encourage our staff to actively reduce their water consumption by the following –

- Bottled water is not provided during internal meetings. For seminar and conferences involving guests, water dispensers are placed in the meeting venues for their refilling.
- Notices are posted in pantries to remind colleagues to save water



Figure 5-15: A notice reminding colleagues to preserve water resources

Bring Your Own Cup

We encourage colleagues to bring their own cups when attending meetings, in order to minimize the waste generated from disposable paper cups.

Reduction of Procurement of Newspapers

Since May 2014, newspaper cuttings were circulated by electronic means instead of hardcopies. It is estimated that about 46,000 sheets of paper can be saved per year.

Green Procurement

CAD follows the guidelines as set out in the Government's green procurement policy and avoids procuring single-use disposable items. We purchase items that are durable, energy-efficient and recyclable. Below are some examples of green procurement measures implemented in our Department:-

- Procuring equipment such as operation equipment, electrical appliances, fluorescent tubes, photocopiers and printers that have obtained an energy label
- Choosing green products such as refillable ball pens, mechanical pencils and recyclable laser printer cartridges



Figure 5-16: Example of an electrical appliance with an energy label

- Reviewing the operational need against monthly supply items regularly, particularly for those items with expiry dates
- Avoid using items that are environmentally unfriendly, for example, correction fluid and batteries containing mercury

During procurement of goods, we recommend the following environmentally friendly measures to the suppliers for their preparation of quotation / tendering documents and performing the contract in the future:-

- All documents are recommended to be printed on both sides and on recycled paper. Paper that exceeds 80 gsm should be avoided
- Use of plastic laminates, glossy covers or double covers should be avoided as far as possible
- Single line spacing is recommended and excessive space in the margins and in between paragraphs should be avoided
- The use of packaging material should be minimized
- If the goods are to be packed in a carton box, the carton box made from 100% recovered fibre is preferred, provided that it is strong enough for storage, stacking and transit

Electric Vehicles

To ameliorate the air pollution problems in Hong Kong, Electric Vehicles (EVs) are becoming more widely used in the territory. CAD commenced to replace our petroleum saloon vehicles with EVs since 2013. In 2015, we have also replaced two aging petroleum saloon vehicles by EVs. Among our existing fleet of 6 saloon vehicles, two-third of them are EVs.



Figure 5-17: Two new saloon EVs of CAD

Training and Communication

Environmental Management Committee and Green Managers

The Environmental Management Committee (EMC) was chaired by the Departmental Green Manager and comprised of representatives from all divisions of the Department. It was established to recommend environmental goals, policy objectives and targets and to promote environmentally responsible management within the Department. To achieve this, the Committee would meet regularly to consider green initiatives, promote staff awareness, monitor and report on the implementation of green measures. A green manager was nominated from each division to coordinate and oversee green management issues of the respective division.

Appointment of Energy Wardens

Energy Wardens of divisions and on-site service contractors were appointed to promote and remind staff to comply with green housekeeping and energy-saving measures in the workplace. In 16 July 2015, more than 20 Green Managers and Energy Wardens attended a briefing which provided them with a better understanding about their roles and responsibilities. The certificates of appointment were also presented to the Energy Wardens.



Figure 5-18: Group photo of the Departmental Green Manager, EMC Members, Green Managers and Energy Wardens at the briefing

Energy Conservation Talk with CLP Power Hong Kong Limited

We invited CLP Power Hong Kong Limited (CLP) to conduct an energy conservation talk for CAD staff and on-site service contractors on 6 March 2015. During the talk, useful energy saving tips in the workplace were introduced. Colleagues also learnt many valuable advice and information in the talk.



Figure 5-19: Snapshot of the energy conservation talk organized with CLP

Green Tips to all CAD Staff

A Green Corner is available in the CAD electronic bulletin board, where staff members can easily access relevant guidelines and green tips, such as circulars and pamphlets on energy saving measures, waste avoidance practices in office, etc. The related information will also be recirculated to staff regularly.

Training for New Recruits

To ensure a good understanding and compliance to departmental green policies and practices among new recruits, starting from 2014, we have included a briefing on green management in the orientation programme for them.

Promotion in the CAD Link

To raise the awareness of our colleagues towards green management and energy saving, news and messages in relation to environmental management are disseminated and promoted in our departmental newsletter – CAD Link.

Recognition in Environmental Management

Indoor Air Quality

We support the commitments under the Clean Air Charter. As mentioned in the previous chapters, we have been implementing measures to reduce emissions from our daily operation.

The Indoor Air Quality (IAQ) of CAD premises is assessed annually to monitor the situation. In 2015, the CAD Headquarters and ATC Centre and Control Tower Cabin of ATCX/Tower obtained the “Excellent Class” of the IAQ Certificate, while the remaining of ATCX/Tower, and BATCX were awarded the “Good Class” IAQ Certificate.

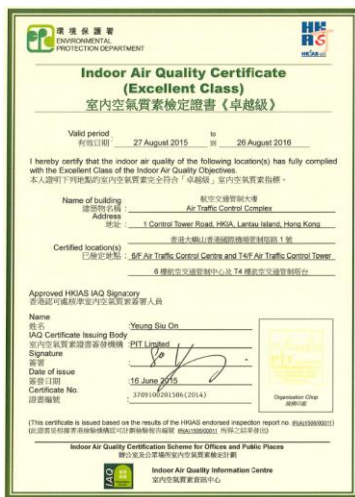
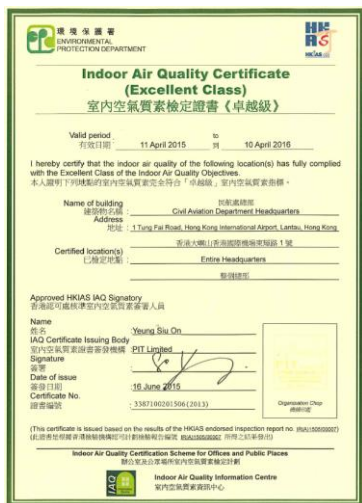


Figure 5-20: The CAD Headquarters and ATC Centre and Control Tower Cabin of ATCX/Tower obtained the “Excellent Class” IAQ Certificate in 2015

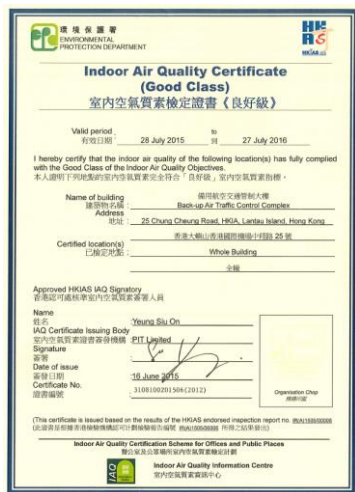
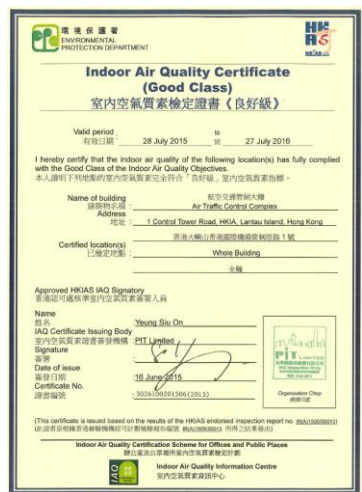


Figure 5-21: The remaining ATCX/Tower, and BATCX were awarded the “Good Class” IAQ Certificate in 2015

Green Plus Recognition Award 2015

We have participated in CLP’s annual Green Plus Recognition Award since 2014 which aims to promote energy saving and environmental awareness at workplace. CAD was given the “Gold Award” in 2014. In 2015, the CAD Headquarters were given the “Prestige Honour Award”. We will further explore more green initiatives and strive for continuous improvement.



Figure 5-22: CAD was given the “Prestige Honour Award” in the Green Plus Recognition Award 2015

Views and Suggestions

CAD Environmental Report in the previous years can be found in the CAD website (http://www.cad.gov.hk/english/er_report.html). We welcome comments and feedback from readers so that we could identify ways for improvements. You can provide your views and suggestions to us by the following means:

General Enquiry

Address : Civil Aviation Department
Civil Aviation Department Headquarters,
1 Tung Fai Road,
Hong Kong International Airport,
Lantau, Hong Kong

Contact no. : 2910 6355

Fax : 2910 6351

Email : enquiry@cad.gov.hk

Website : www.cad.gov.hk