

Architectural Services Department Environmental Report 1999

中文版本

建築署一九九九年環境保護報告

Introduction

Architectural Services Department (ArchSD) is responsible for the design, procurement and maintenance of all government buildings, except public housing. Advisory services are provided to the government and quasi-government organisations on all building related matters.

In 1999, 112 projects were completed. Annual expenditure totalled HK\$10.8 billion. Through the inclusion of more environmentally friendly elements within projects such as Health Education and Exhibition Centre in Kowloon Park, Slaughter House in Sheung Shui, Museum of Coastal Defence in Lei Yue Mun, and the Award Winning Designs such as the Belcher Bay Garden, the "Hong Kong Garden" in the Kunming International Horticultural Exposition and the Swimming Pool Complex in Tai Po, we are gradually improving the environment of Hong Kong.



Museum of Coastal Defence



Belcher Bay Garden was presented the Gold Award (Overall Winner) of the 1998 Green Project Award Scheme in January 1999



Hong Kong Garden - Windows of China - received 9 awards in the 1999 Kunming International Horticultural Exposition (1 contribution, 1 gold, 5 silver and 2 bronze)



Tai Po Swimming Pool Complex won a Special Distinction Award from the International Olympic Committee and the International Association for Sports and Leisure Facilities in 1999



Director's Message



I am very pleased to issue our second Environmental Report. In sharing our 1999 activities with you , we have tried to make the content interesting , yet provide sufficient details for those looking to follow our approach. We were the first Government department to obtain an ISO 14001 certified Environmental Management System and this is very important to us . My staff and I are fully committed to continually improve our environmental performance in any way that we can . Further information on our activities is available on our web site <http://www.archsd.gov.hk/> . Feedback , in any way that can assist us to improve the environment of Hong Kong , will be greatly appreciated.



Environmental Management System (EMS)

The Environmental Management System was implemented in 1997 and certified under the internationally recognised ISO 14001 in March 1998 . Under the system , we address and manage the aspects of our work which have the most environmental impact through our "Environmental Policy" and "Objectives and Targets".

ArchSD's Environmental Policy

Architectural Service Department when offering our clients a comprehensive range of multi-disciplinary professional and technical services for buildings and facilities is committed through our quality management system to improve the environment by:

- Undertaking the design , procurement and maintenance of community facilities in an environmentally responsible manner such as reducing energy consumption and the use of materials which are harmful to the environment .
- Continuously developing and maintaining an environmental management system in accordance with ISO 14001 .
- Complying with relevant environmental protection ordinances.
- Providing training for staff to increase awareness for continual improvement in protecting the environment and preventing pollution.
- Communicating and making available the environmental policy to the construction industry and the public at large .



ArchSD's Environmental Policy



Public Records Office assessed with "Excellent" rating under the HK-BEAM (Hong Kong Building Environmental Assessment Method)



Resources

We have a Quality Assurance Unit of three staff who are responsible for the monitoring and continual development of our EMS (ISO14001). At the same time, they are also responsible for the maintenance of our quality management system (ISO 9001) which is integrated with our EMS.

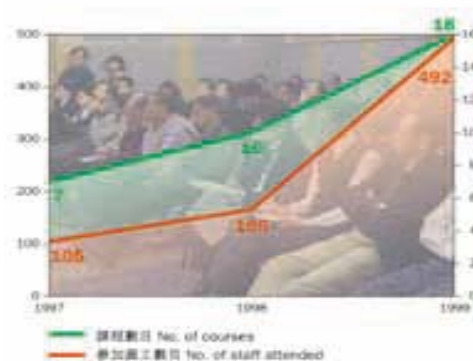
The Hong Kong Quality Assurance Agency audits us twice per annum on the EMS and inspects our projects, sites and documentation to make sure that the system is effective in achieving our environmental goals. Through this system, we can continue to meet the growing expectations of our clients.



Regular in-house training course

In 1999, the approximate resources put into environmental projects and management activities totalled HK\$ 167 million. This figure includes :

- Projects on Environmental Control such as air and water pollution control works, noise mitigation measures, waste water treatment and disposal measures, and asbestos abatement works (HK\$137 million)
- Resources for environmental studies associated with project activities, eg. environmental review and impact assessment for projects, environmental considerations / research works / design options and cost analysis etc. conducted on building projects (HK\$23 million)
- Maintaining an EMS in accordance with ISO 14001 Including staff training and housekeeping activities (HK \$7 million)



No. of Staff Attending Environmental Courses



Training visit for staff
- Mai Po Marshes in September 1999
(to get acquainted with the ecosystem)



Targets and Performance

Under the ISO 14001, our objectives and targets are set and reviewed each year with an aim to continuously improve our environmental performance .

For 1999, a total of 34 targets were set and 30 targets have been achieved with better results. 2 involving research and data collection are on-going. The remaining 2 targets on saving papers cannot be fully met due to the establishment of new teams and new branch offices in Kai Tak and Shui On Centre.



The targets of 1999 are grouped under the following broad categories :

| Objectives and Targets | Achieved with better results | On-going | Not fully met |
|--|------------------------------|----------|---------------|
| • To reduce energy consumption | 2 | 1 | - |
| • To reduce the use of materials and techniques which could have a harmful effect on the environment | 12 | - | - |
| • To fully comply with environmental legislation | 5 | - | - |
| • To increase environmental awareness | 4 | 1 | - |
| • To improve housekeeping through green management | 4 | - | 2 |
| • To reduce the use of paper | 3 | - | - |

For 2000, 42 targets were set. Of these, 8 were 1999 on-going targets, 17 were 1999 enhanced targets and 17 were new targets.



In order to give a more comprehensive account of the main areas of work during the year, we have elaborated in detail some of our more interesting objectives and targets as well as additional initiatives undertaken by our Department. These are described in the following pages.



Reduce Energy Consumption

Reducing Electricity Demand through Better OTTV

To improve energy efficiency by reducing electricity demand from air - conditioning through better OTTV(overall thermal transfer value) which is a measure of the energy consumption of a building envelope .

In 1999 , 93% of our projects achieved an OTTV of less than $23\text{W}/\text{m}^2$, exceeding the target of 90% by 3% . In 2000 , we aim to achieve OTTV of less than $18\text{W}/\text{m}^2$ sq. for 10% of our projects .The current statutory OTTV requirement is $35\text{W}/\text{m}^2$.



2000 design primary school - OTTV $11\text{W}/\text{m}^2$



Use of sun shading device



Cheung Sha Wan Government Offices - OTTV $20\text{W}/\text{m}^2$



Use of study model to explore the environmental design option

Environmental Consideration in Early Stages of Planning

To consider the energy efficiency of buildings by considering the environmental consequences during the early planning stages, eg. the orientation , building form , use of external shading devices , choice of materials, building automation system etc. Guidelines are being developed to assist overall consideration of the aspects of more energy efficient buildings.

Use Electronic Ballasts to Save Energy

By using electronic ballasts and motion detectors in some floors of ArchSD's Headquarters at the Queenway Government Offices and in the Property Services Branch Headquarters Building at Hunghom, we have reduced energy consumption by about 22%. Currently 52% of our new projects use electronic ballasts and our target for 2000 is not less than 80%.

Energy Saving Building Services Installations



Use of heat wheel to reclaim thermal energy from exhaust air to treat incoming fresh air



Use of heat pump to heat up hot water in hospital's hydrotherapy pool



Use of heat recovery system to heat domestic water and reheat conditioned air



Use of photovoltaics for projects located in remote sites and for park lights in some open areas.

Achievements in 1999

2 ArchSD projects were among the first group of 14 buildings which were successfully registered under the "Hong Kong Energy Efficiency Registration Scheme for Buildings" developed by the Electrical and Mechanical Services Department for recognition of their adoption of measures to save energy .





North Point Government Offices received 3 certificates for compliance with the "Codes of Practice for Energy Efficiency " of Electrical Installations , Lighting Installations and Air Conditioning Installations



Headquarters Building of Property Services Branch , ArchSD received certificate for compliance with the "Code of Practice for Energy Efficiency" of Lighting Installation.



Minimise Construction Waste

Use Factory-made Components

To use more factory-made components in the provision of building services installations.

In 1999, 100% new projects used prefabricated joint for main water pipe, over 95% new projects used prefabricated air duct and pre-assembled electrical distribution board, and 82% new projects used prefabricated metal mounting brackets.



Pre-assembled electrical distribution board
Target : 50% new projects



Prefabricated metal mounting brackets
Target : 50% new projects



Prefabricated main water pipe joint
Target : 90% new projects



Prefabricated air duct
Target : 50% new projects

Promote Waste Management on Site

Contractors are reminded to segregate inert materials from other construction wastes before separate disposal to public fill and landfill. For construction contracts commencing after July 1999, a trip-ticket system has been implemented to avoid illegal dumping and ensure proper disposal of construction and demolition materials.

Segregation of inert wastes from other construction wastes



Soil, rubbles, bricks,
concrete / cement lumps



Metal, timber, packaging materials,
bamboo scaffoldings



Reduce the Use of Depletable Materials

Reduce the Use of Hardwood

In 1999, 5 schools in Tseung Kwan O successfully used "system design formwork" and substituted the traditional timber formwork with precast construction and metal formwork. The improved quality of concrete finish resulted in a reduction of thick rendering on walls and there was approximately a 30% reduction in construction waste.



Use of system design for construction of standard school



Consider Various Options in Structural Design

Consider various options in structural design such as standardising the sizes of structural members for repetitive use of formwork. In the construction of residential quarters at Lee On Road which has a repetitive floor plan, system aluminium formwork instead of the conventional timber formwork has been adopted.



Use of aluminium formwork to replace conventional timber formwork

Establish Database Related to Environmental Matters

We are developing a database of more environmentally acceptable materials to promote green specification. A list of native plant species is also being prepared to promote the use of native species for soft landscaping works. Information will be on our web site when finally developed .



Comply with Environmental Legislation

To Enforce the Prohibition of Diesel Hammers for Percussive Piling Works

In 1999, no diesel hammers were used in projects. A list of piling contractors for mini-piles using percussion free technique has successfully been formed under the Works Bureau List of Specialist Contractors .



Phasing out of diesel hammer percussive piling with more environmentally friendly mini-piles to reduce air and noise pollution



To Ensure Contractors' Compliance with Environmental Legislations

To ensure that our contractors are in compliance with the environmental legislations, a "Site Aspects Schedule" (SAS) identifying the significant environmental aspects during construction has to be prepared at the commencement of construction . The SAS would be recorded in the site record book, reported during site meetings and eventually reflected in the Contractor's Performance Report. To help contractors we have prepared information for them to follow.



Proper containment of hazardous materials to avoid contamination



Spraying water along temporary access road to cut down construction dust



Wheel washing facilities at site entrance to eliminate dust being carried to public road



Improve Indoor Air Quality

Setting IAQ Standards for ArchSD's Projects

ArchSD contributes in the Indoor Air Quality Management Group to promote voluntary 3-levels indoor air quality management programme for Hong Kong. The Department will design new buildings to comply with level 1 of the Recommended IAQ Objectives.

Asbestos Control Works in Existing Buildings

ArchSD served on the Asbestos Administration Committee (AAC) as Chairman of the Subcommittee for Registration of Asbestos Removal Contractors and Supervisors. The AAC has played an important part in the successful implementation of the asbestos control programme in Hong Kong under the Air Pollution Control Ordinance.

ArchSD is also responsible for the removal of asbestos containing materials (ACM) in existing government buildings. The numbers of buildings involved have substantially decreased after previous years of intensive removal works. The ACM not yet removed in the government buildings are classified as "low risk" and are under close monitoring.



Vacuum cleaning asbestos materials

Ventilation Improvement Works to Existing Refuse Collection Points

To minimise the offensive odour generated from the refuse collection points (RCP), ArchSD has undertaken extensive improvement works in the RCP's ventilation system by replacing the existing carbon filtration system with the more sophisticated water scrubber system. By forcing air currents through a water chamber, the system is effective and reliable in removing the unpleasant gases, thus reducing the odour nuisance to an acceptable level stipulated in the environmental guidelines.



Existing carbon filtration system in RCP



Water scrubber system to reduce odour nuisance



Improve Building Sustainability through Restoration & Refurbishment

Restoration of Historical Monuments

We have recently worked with the Antiquities Advisory Board and the Antiquities and Monuments Office and restored the historical buildings along Lung Yeuk Tau Heritage Trail in Fanling, including the Lo Wai Village Wall and Entrance Gate, Tang's Chung Ling Ancestral Hall and Wing Ning Wai Village Wall.

The Restoration of Cheung's Ancestral Hall in Shan Ha Tsuen in Yuen Long is also recently completed.



Restoration work for Tang's Chung Ling Ancestral Hall
- Lung Yeuk Tau Heritage Trail in Fanling



Cheung's Ancestral Hall (after restoration)
in Shan Ha Tsuen, Yuen Long

Refurbishment of Existing Buildings

The ArchSD Annual Award Winner "Health Education and Exhibition Centre" is designed from an existing old barrack block located at the entrance of the Kowloon Park and has incorporated new features.



Refurbishment of the old barrack block in Kowloon Park

The District Community Centre and Singleton Hostel at Sai Ying Pun has carefully preserved the massive granite verandah of the old Mental Hospital as a recognition of its historical value. The remaining areas of the old structure were demolished to make room for the new 9 - storey building with an elevation design articulated to echo the classical look of the arch - shaped verandah.



District Community Centre and Singleton Hostel at Sai Ying Pun
- preservation of the granite verandah of the old Mental Hospital



Use Less Paper

Conversion of Manuals to Electronic Format

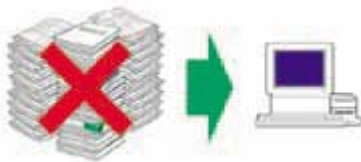
In 1999, we have successfully converted the full set of Manuals (total 15 nos.) detailing our Quality Management System into the electronic format and made available on the Department's intranet for staff's reference. This will in future save paper and reduce administrative costs.

Electronic Tendering

We are actively supporting the Works Bureau's initiative to develop an electronic tendering system, which, when implemented will dramatically reduce the amount of paper used by this Department in the tendering process.

Implementation of Government Office Automation

With the introduction of intranet in ArchSD, more and more office information are disseminated electronically, eg. office circulars, minutes of meeting etc.



As an initiative to save paper, the Department has asked the staff to review whether they require a hard copy of "The Civil Service Newsletter" which is a periodical for all civil servants, or they would prefer reading it from the internet. Results showed that our staff were very supportive to this initiative as the total number of copies required had reduced from 2000 to 280, a saving of perhaps 172,000 A4 sheets per year.



Green Management



Monitoring of Paper Consumption with Set Targets for Reduction

We have monitored the consumption of A4 paper , computer paper and envelopes with targets set to reduce 1% consumption for each . We have achieved 30% saving for computer paper. The targets to reduce A4 paper and envelopes cannot be achieved but the situation is improving in 2000.

Green Housekeeping Initiatives

Our Green Manager Committee meets regularly to review and monitor the performance targets . The green measures have already been described in our previous 1998 environmental report but the targets set for 1999 are higher than those in 1998.



Increase Environmental Awareness



Kadoorie Biological Science Building, University of Hong Kong - double skin design to facilitate maintenance of service plant and reduce solar heat gain

Training Visits

6 formal site visits have been arranged for staff in 1999 to promote their awareness and update their knowledge on environmental matters.

- Agriculture, Fisheries and Conservation Department's Lions Nature Education Centre and Tai Tong Nursery in February 1999 (to get acquainted with the local plant species and the ecosystem)
- Agriculture, Fisheries and Conservation Department's Shing Mun Arboretum (to get acquainted with the local plant species) and Mai Po Marshes in September 1999 (to get acquainted with the ecosystem)
- Cathay Pacific City in March 1999 (to appreciate the environmental features of the Cathay Pacific City in Chek Lap Kok and share experience with their Green Manager)
- Kadoorie Biological Science Building, University of Hong Kong in November 1999 (to appreciate the building's environmental designs)
- Yau Lee Wah and Construction's Precast Plant at Shenzhen in November 1999 (to see the technology and work sequence of prefabrication)
- Paul Y site for hotel at Causeway Bay in December 1999 (to see the use of precast construction and prefabricated exterior wall cladding)



Visit to Precast Plant in Shenzhen



Visit to hotel site at Causeway Bay employing prefabrication technology

Training Courses

16 different training courses covering environmental aspects have been organised for our professional and technical staff. These can be summarized into the following categories :

- Environmental management and ISO 14001 auditor training
- Environmental legislation and its enforcement in Hong Kong, eg. noise prevention, waste water disposal etc.
- New products / techniques / theories for enhancing building's environmental performance, eg. fuel cell technology, environmentally friendly products
- Controlling measures for environmental impacts, eg. waste management

Participation in Environmental Functions

ArchSD participated in 30 publicity functions in 1999 including seminars, conferences, workshops, ceremonies and exhibitions etc. We have promoted our Environmental Policy among the industry and general public through the ArchSD homepage, interviews, feature articles, publication and participation in the Hong Kong Institute of Architects Committee of Sustainable Development.



ArchSD representative briefed the construction industry of the Department's environmental policy

Staff Motivation Scheme

To promote staff awareness, our Property Services Branch introduced the award to the teams who are "The Best Performer in Environmental Targets"



Representatives of winning teams awarded for "The Best Performer in Environmental Targets"

Giving Environmental Advice

By giving advice and comments on particular projects and town planning proposals, ArchSD encourages practice of environmental protection measures and communicates our environmental policy to other government or quasi-government bodies.

In 1998, 349 nos. of environmental advice was given to other departments. In 1999, 711 nos. of environmental advice, which represents an increase of 104%, was given.

Participation in Environmental Functions

Presentations were made as follows:

- "Sustainable Development in Hong Kong for the 21st Century" presented in the Forum on Environmental Policies for the 21st Century
- "Overview of the Green Building Challenge 1998" presented at the Hong Kong Institute of Architects in January 1999
- "Setting a Value on the Environment" at the Quality Building Conference of the Citizens Party in March 1999
- "An Overview in the Safety, Health and Environmental Requirements in Specifications of Building Services Branch for Tall Government Buildings" and "The Control and Maintenance of the Indoor Air Quality in Building" presented in the Symposium on Tall Building Design and Construction Technology in June 1999 at Beijing
- "Environment, Buildings and ISO 14001" at the American Society of Civil Engineers Workshop on Environmental Challenges in Urban Development in September 1999
- "Quality or Value" at the Quality Building Workshop of the Citizens Party in November 1999
- "Environmental Odour Control for Sustainable Development of Public Odorous Premises in Urban Areas" presented in the 3rd International Symposium on HVAC in November 1999 at Shenzhen.

Study Reports

The following study reports have been issued in 1999 for internal use:

- Electronic ballast against low lost ballast/electromagnetic ballast for fluorescent lamp tube
- Application of XPLE cables
- Chiller noise problem of a government building in Lantau
- Market ventilation and waste scrubbing system
- "EPOCH21" energy saving device
- Application of "SINEWAVE" active harmonic filter in alleviating distortion in electrical installation
- Indoor air quality and energy conservation measures in air-conditioning design
- Noise assessment criteria for new projects
- Humidity control and dehumidification by desiccant energy wheel



Works for the Improvement of the Environment

Refurbishment of Public Toilets

Works have been carried out extensively to refurbish the existing toilets commencing 1997. Apart from the general aesthetical improvement works such as the upgrading of wall and floor finishes etc., environmental considerations have been incorporated:

- Enhancing natural lighting and ventilation by raising the ceiling height and providing more windows at high levels, inclusion of skylight wherever possible
- Provision of louvres and canopies to reduce direct solar heat gain
- Exhaust system installed at low level to extract foul air and improve the indoor air quality
- Conversion of the aqua privies in remote areas into flushed toilets to improve the general hygiene



Public toilet in Sheung Shui -
before refurbishment (left) and after refurbishment (right)

Use of skylight and louvres to enhance
natural lighting and ventilation



Extensive Soft Landscaping to New Buildings

Landscape design is an important element in our present design of community facilities. In the past, hard landscaping such as basketball courts and school bus drop off points are provided to the standard schools. In our recent designs, more extensive soft landscaping has been incorporated to the boundaries to enhance the general environment, providing a pleasant space for student activities after school hours.



Extensive soft landscaping to standard schools

Sheung Shui Slaughter House



The HK\$1.8 billion Sheung Shui Slaughter House is one of the largest of this type of facility in Asia. It is designed to meet the highest international standards for hygiene and environmental protection.

Choice of Site

The new slaughter house is designed to re-provision the 3 existing abattoirs in Kennedy Town, Cheung Sha Wan and Yuen Long. These buildings were located in the built-up areas and had caused much environmental nuisance to their neighbourhoods.

The site for the new slaughter house is chosen because of its isolation from urban areas and convenience to rail. The trains no longer have to go into town and people living along the railway line need not suffer the noise and odour nuisance caused by the pigs and cattles. With a purpose-built railway siding, trains carrying livestock will off-load directly to the lairage.



Direct off-loading of livestock from train to lairage

Modern Slaughter Lines

The slaughter house has sophisticated, energy efficient equipments to enhance cleanliness and hygiene conditions of fresh meat. Fully automatic mechanised devices are employed throughout the process.



Fully automatic mechanised slaughter line

Waste Water Treatment

The slaughter house has an independent and innovative treatment system which treats water using bacteria and other micro-organisms. The 5,000m² of effluent generated daily will be treated by the biochemical waste water treatment plant to normal domestic waste water standards.



Underground water treatment tank

Odour Control

There are 6 sets of huge water scrubbers to reduce odours. After treatment through the chemical process, the odour discharged will not exceed 2 odour units (Ous) and is in line with environmental protection standards.

A spraying system for non-toxic agents will be used to neutralise odours when necessary and help reduce the odour nuisance level.



Water scrubber to reduce odours

Noise Mitigation Measures

The noise generated from lairages can reach 100 db. Acoustic facilities have been installed to contain the noise level. To reduce the noise generated from delivery vehicles, a noise barrier wall 700m long and 3m high has been erected along the section of Po Wan Road near the residential area. In addition, noise barrier walls of 2-4m high are erected along the slaughter house's perimeter.



Acoustic louvres for noise mitigation

Use of Solar Energy and Heat Pump to Heat Water

Hot water is one of the main consumable resources in the building's operations. The consumption rate is 650m³ per day, which is equivalent to the usage by 8,000 normal households. We have adopted the use of solar panels, which is an environmentally friendly method, for the pre-heating of water. Further heating is by the heat pump system which utilises the rejected heat from the air-cooling operation to further heat up the water.



Provision of 450 solar panels to pre-heat water



Looking Forward

We are now in the 3rd year of implementing the ISO 14001 environmental management system. We have received awards and recognitions for our environmental performance in projects this year, however we are not content with our achievements. Looking towards 2000, we have set the following goals:

- To Achieve Maximum Sustainability in our New Projects

We are adopting a more holistic approach in achieving sustainability in our new projects which include the Science Park at Pak Shek Kok, the International Wetland Park & Visitor Centre in Tin Shui Wai, the Tourist Improvement Works in Central & Western District and the Electrical and Mechanical Services Department's Headquarters at Kai Tak.

- To Participate in the Hong Kong Team in the Green Building Challenge (GBC)

GBC is an international forum on Sustainable Development. One of our school projects will be used as a detail study using the GBC IT software methodology in assessing its environmental performance. This will increase our awareness, further our knowledge in the environmental assessment of buildings and set a benchmark for the future.

- To Promote Environmental Awareness in Construction Sites

Over the last year we have devoted much time in the promotion of awareness of the environmental requirements in construction sites among our professional and site supervisory staff. We would like to continue our efforts in the coming year and promote the necessary cultural change to our partners at work, including our contractors and consultants.

We are fully committed in the continuous improvement of our environmental performance. We would be glad to receive any comments you may have to help us improve the future editions of our environmental report.



Participation in the Green Building Challenge



Science Park at Pak Shek Kok

