

Quality Enhancement Grant Scheme

Progress Report

Project No.: 06/QEGS/A-08-09

Reporting Period: From Jan 2010 to Jun 2010

Signature: _____



Organization Chop: _____



Name of Authorized Person: Dr. PUN Kwok Leung

Chu Hai College of Higher
Name of Grantee: Education

Chu Hai College of Higher
Organisation: Education

Project Manager /
Position of Authorized Head, Department of
Person: Civil Engineering

Date: 15 July 2010

Part A

Project Title: Enhancement of Teaching and Learning on Environmental Sustainability

Name of Grantee: Chu Hai College of Higher Education

Project Period: From July 2009 to June 2012

Part B

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1 THE PROJECT

1.1 Introduction

This document reports the progress of the project (Project Title: Enhancement of Teaching and Learning on Environmental Sustainability; Project No.: 06/QEGS/A-08-09) for the period from January 2010 to June 2010.

An Annual Quality Assurance Monitoring Report for the period from July 2009 to June 2010 has also been prepared. A summary of this first Annual Quality Assurance Monitoring Report is included in this submission.

2 PROGRESS ON TASKS

2.1 Project Activities

This section reports the project activities held/completed during the reporting period from January 2010 to June 2010. A summary of the project activities held/completed is presented in Table 2.1.

Table 2.1 Summary of the Project Activities Held/Completed between January 2010 and June 2010

	Type of Activity	Date, Time, Venue and No. of Participants	Resources Used	Description
1	Project Team Meeting No. 4	<u>Date/Time:</u> 16 March 2010, 2:00pm <u>Venue:</u> President Office, Chu Hai College of Higher Education <u>No. of Participants:</u> 10	-	Regular meeting to update and review progress.
2	Project Team Meeting No. 5	<u>Date/Time:</u> 18 May 2010, 2:00p.m. <u>Venue:</u> President Office, Chu Hai College of Higher Education <u>No. of Participants:</u> 10	-	Regular meeting to update and review progress.

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	Type of Activity	Date, Time, Venue and No. of Participants	Resources Used	Description
3	Quality Assurance Meeting No. 1	<u>Date/Time:</u> 16 March 2010, 3:00p.m. <u>Venue:</u> President Office, Chu Hai College of Higher Education <u>No. of Participants:</u> 6	-	Discussion of the monitoring and self-evaluation mechanism including evaluation forms, records, log sheets, etc. and the preparation of the 1 st Annual Quality Assurance Report
4	Traffic Noise Study	<u>Date/Time:</u> Jan to May 2010 <u>Venue:</u> ➤ Campus of the College ➤ Roads in Tsuen Wan District including: 1. Tai Ching Road 2. Castle Peak Road <u>No. of Participants:</u> 2	B&K 4231 Sound Level Calibrator; B&K 2238 Sound Level Meter; RION NL-22 Sound Level Meter	Supporting the final year dissertation.
5	Traffic Noise Study	<u>Date/Time:</u> 24 May 2010, 1:00 p.m. <u>Venue:</u> Rm304, Chu Hai College of Higher Education <u>No. of Participants:</u> 8	B&K 4231 Sound Level Calibrator; B&K 2238 Sound Level Meter; RION NL-22 Sound Level Meter,	Demonstration of the noise equipment
6	Indoor Air Quality Study	<u>Date/Time:</u> Jan to June 2010 <u>Venue:</u> Classrooms, Chu Hai College of Higher Education <u>No. of Participants:</u> 3	Indoor Air Quality Meter- Aerosol Monitor; Formaldehyde Meter; Gas Monitor; Volatile Organic Compound Monitor, Phoenix, computers	Supporting the final year dissertations.
7	Indoor Air Quality Study	<u>Date/Time:</u> 24 May 2010, 1:00 p.m. <u>Venue:</u> Rm304, Chu Hai College of Higher Education <u>No. of Participants:</u> 8	Indoor Air Quality Meter- Aerosol Monitor; Formaldehyde Meter; Gas Monitor; Volatile Organic Compound Monitor	Demonstration of the indoor air quality monitoring equipment

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	Type of Activity	Date, Time, Venue and No. of Participants	Resources Used	Description
8	Air Ventilation Study (Civil Engineering Design)	<u>Date/Time:</u> 26 Feb 2010, 15:00 <u>Venue:</u> Rm 208, Chu Hai College of Higher Education <u>No. of Participants:</u> 18	Phoenics, computers	Workshop on Air Ventilation Assessment by Computational Fluid Dynamics
9	Air Ventilation Study (Architectural Design)	<u>Date/Time:</u> 28 Feb 2010, 15:00 <u>Venue:</u> Rm 208, Chu Hai College of Higher Education <u>No. of Participants:</u> 14	Phoenics, computers	Workshop on Air Ventilation Assessment by Computational Fluid Dynamics
10	Air Ventilation Study (Civil Engineering Design)	<u>Date/Time:</u> Jan – Jun 2009 (weekly) <u>Venue:</u> Rm304, Chu Hai College of Higher Education <u>No. of Participants:</u> 2	Phoenics, computers	Supporting the final year dissertation.
11	Air Ventilation Study (Architectural Design)	<u>Date/Time:</u> 1 Feb 2010, 2.00pm <u>Venue:</u> Waterside Studio, Chu Hai College of Higher Education <u>No. of Participants:</u> 18	Sketch-up, AutoCAD	Briefing of the project and the coming tasks
12	Air Ventilation Study (Architectural Design)	<u>Date/Time:</u> 24 Feb 2010, 2.30pm <u>Venue:</u> Rm207, Chu Hai College of Higher Education <u>No. of Participants:</u> 18	Phoenics, computers	Introduction of general theory of wind in Hong Kong; data obtainment from HK Observatory; application of Phoenics for the final year project
13	Air Ventilation Study (Architectural Design)	<u>Date/Time:</u> March 2010 (weekly) <u>Venue:</u>	Sketch-up, AutoCAD, computers	Building up of computer model for the site for the later testification of

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	Type of Activity	Date, Time, Venue and No. of Participants	Resources Used	Description
		Waterside Studio, Chu Hai College of Higher Education No. of Participants: 18		Phoenics
14	Air Ventilation Study (Architectural Design)	<u>Date/Time:</u> Apr - May 2010 (weekly) <u>Venue:</u> Waterside Studio, Chu Hai College of Higher Education No. of Participants: 2	Phoenics, computers	Trial-run of simulation
15	Air Ventilation Study (Architectural Design)	<u>Date/Time:</u> May – Jun 2010 (weekly) <u>Venue:</u> Waterside Studio, Chu Hai College of Higher Education No. of Participants: 2	Phoenics, computers	Readjustment of parameters in Phoenics; running of simulation against building masses testification
16	Water Quality Study	<u>Date/Time:</u> Jan – Jun 2010 (bi-weekly) <u>Venue:</u> Meeting room of the Faculty of Science and Engineering No. of Participants: 3 per each meeting	Delft3D suite of models; computers	Students learned the computer software for hydrodynamic and water quality modelling, and worked on their dissertation studies using the Delft3D suite of models.
17	Water Quality Study	<u>Date/Time:</u> 17 Jun 2010, 2:30p.m. <u>Venue:</u> Rm204, Chu Hai College of Higher Education No. of Participants: 11	Delft3D suite of models; computers	A workshop on “Application of Delft3D-FLOW for Hydrodynamic Modelling” to introduce the model setup, simulation and to provide hands-on training.
18	Lighting Design	<u>Date/Time:</u> 30 Jan 2010, 9.45am <u>Venue:</u>	--	Briefing of the project and the coming tasks

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	Type of Activity	Date, Time, Venue and No. of Participants	Resources Used	Description
		Room 201, Chu Hai College of Higher Education <u>No. of Participants: 25</u>		
19	Lighting Design	<u>Date/Time</u> Feb - Mar 2010, 9.45am (weekly) <u>Venue:</u> Room 201, Chu Hai College of Higher Education <u>No. of Participants: 25</u>	--	Identification of study site, site documentation
20	Lighting Design	<u>Date/Time</u> Mar - Apr 2010, 9.45am (weekly) <u>Venue:</u> Room 201, Chu Hai College of Higher Education <u>No. of Participants: 25</u>	AutoCAD	Construction of site plan, reflected ceiling plans; setting up of questionnaire formats
21	Lighting Design	<u>Date/Time</u> Apr - Jun 2010, 9.45am (weekly) <u>Venue:</u> Room 201, Chu Hai College of Higher Education <u>No. of Participants: 25</u>	AutoCAD, EXCEL	Interview conduction and questionnaire collection
22	Project Website Design	<u>Date/Time</u> Jan – Jun 2010 (bi-weekly) <u>Venue</u> Meeting room of the Faculty of Science and Engineering <u>No. of Participants</u> 4 per each meeting	Computers	Students learned and participated in the design work of the project website.
23	Project Website	<u>Date/Time</u>	Computers	Year 2 students

	Type of Activity	Date, Time, Venue and No. of Participants	Resources Used	Description
	Poster	Jan – Jun 2010 (bi-weekly) No. of Participants: 2		involved in the design of the website poster.

2.2 The Five Major Studies

Traffic Noise Study

A student has completed the “Study on the Characteristics of Road Traffic Noise in Tsuen Wan District” – Study TN1. Noise measurements were carried out at the three designated locations – two locations in Tai Chung Road and one in Castle Peak Road in Tsuen Wan District. The traffic noise characteristics in these three designated locations were studied based on the measured sound pressure level, 1/1 octave band spectrum, driving behaviour and surrounding factors. The field measurement and measured results at the three designated locations are presented in **Appendix A**.

The other study is on the “Development of a Data Acquisition System for Traffic Noise Measurement” – Study TN2. A student has fabricated a wire data acquisition system. Noise signal can be collected from the sound level meter, via data collection box to the computer for data analysis. A computer program is being constructed and this will be continuous in the coming academic year.

A wire and wireless data acquisition system was set up for data logging, transmission and storage. A Sonicwall TZ 210 wireless-N gateway and a Sonicwall’s SonicPoint-N Dual-band access point were also installed on the third floor of the College. On-site testing was performed to determine the installation location of the gateway and the access point so as to provide wireless network access covering most of the classrooms on the same floor.

The wireless network access facilitates the traffic noise data acquisition. Any notebook computer using the shared WPA password with the TZ 210 gateway controller can get wireless network access via the wireless gateway within the wireless coverage. Two computer science students are involved in the configuration of the wireless gateway. To increase the flexibility and ease the control of the access to wireless network, the students are going to

learn how to set up a RADIUS server to work with the wireless gateway to support WPA Enterprise authentication. **Appendix B** shows the wireless data acquisition system.

A demonstration of the use of noise equipment was conducted on 24 May 2010 at the Environmental Laboratory of the Chu Hai College of Higher Education. **Appendix C** shows the poster of this demonstration. The functions of the noise equipment, measuring procedures/setup and the normal practice of handling skills were introduced to students. The students also had a chance to use the noise equipment. This was beneficial for them to familiarise the measuring equipment and to develop their interest in the area of noise.

Relevant information about the traffic noise study and the demonstration will be uploaded to the project website.

Indoor Air Quality Study

Students used indoor air quality equipment to measure the concentrations of indoor air pollutants in accordance with the measuring procedures stated in "A Guide on Indoor Air Quality Certification Scheme for Offices and Public Places". The study covered the following topics:

- Correlation between Indoor Air Quality and Air-conditioner's Operation – Study IAQ1
- Indoor Air Quality Impacts on Student in Classroom – Study IAQ2
- Numerical Analysis of Indoor Air Quality of Enclosed Classroom – Study IAQ3

For Study IAQ1, a student completed her study on the relationship between Indoor Air Quality and Air-conditioner's Operation. Three case studies were done in three different classrooms at the Chu Hai College of Higher Education. The measuring parameters included PM10, nitrogen dioxide, carbon monoxide, carbon dioxide, TVOCs, formaldehyde, humidity and temperature. From the measurement data, it was found that an efficient ventilation system was important to maintain a good level of indoor air quality. **Appendix D** shows the measuring setup of indoor air quality equipment and the profile of humidity at Room 304 of the Chu Hai College of Higher Education.

For Study IAQ2, the health condition of students in relation to the indoor air quality during lesson was studied using a questionnaire and through the measurement of air temperature, humidity and carbon dioxide (CO₂). The questionnaire was used to collect subjective feeling of

students and the measured parameters were to show the indoor air quality during the lecturing period. More questionnaires will be collected in the coming academic year in order to accurately analyse the relationship between indoor air quality and health condition.

For Study IAQ3, the study topic has been modified to “Assessment of Thermal Comfort Index of Indoor Area by Phoenics”. The student used a commercial computation fluid dynamics (CFD) software named “PHOENICS” to model the distribution and pattern of temperature and humidity inside the classrooms including ventilation system in Room 304 of Chu Hai College of Higher Education. The configuration of Room 304 had been computerised for this study.

A demonstration of the use of indoor air quality equipment was conducted on 24 May 2010 at the Environmental Laboratory of the Chu Hai College of Higher Education. **Appendix C** shows the poster of this demonstration. The functions of indoor air quality equipment, measuring procedures/setup and the normal practice of handling skills were introduced to students. The demonstration was beneficial for students to understand more about the measuring equipment and to increase interests in the area of indoor air quality.

Relevant information including abbreviations, details of study and measurement data of indoor air quality will be updated in the project website.

Water Quality Study

Two final year dissertation studies in academic year 2009-10 that are supported by the water quality study have been completed. The topics are “Numerical Modelling of Tidal Flows in Rambler Channel” and “Investigation of Wind Effects on Water Circulation in Shek Pik Reservoir”. Through the one year’s study, the students learned hydrodynamic model setup, data collection, processing and analysis, model execution and interpretation of model results.

A workshop on “Application of Delft3D-FLOW for Hydrodynamic Modelling” was held on 17 June 2010 to introduce the Delft3D-FLOW module and setup of simple hydrodynamic models for simulation of coastal water and enclosed water body. Students from the Department of Civil Engineering participated in the workshop. **Appendix E** shows the poster of the workshop and the photos taken during the workshop. Demonstration of a reservoir model and a coastal water model was provided. Students were guided to build a simple hydrodynamic model for simulation of water circulation in a bay. The two Year 4 students,

who worked on the above-mentioned dissertation topics, were the helpers to pass on their knowledge and modelling skills to the junior year students during the demonstration session.

Information related to the water quality study has been uploaded to the project website to attract the interest of students and website visitors in water environment. Such information includes a general introduction of the background and purposes of the study, existing water quality in the Western Buffer Water Control Zone and the typhoon shelter in Rambler Channel, the parameters that would be covered in the coming field measurement and laboratory analysis, introduction of the near-field and far-field models for simulation of hydrodynamics and water quality, and the useful links to the relevant websites.

Air Ventilation Assessment

(i) Civil Engineering Design

The following equipment, software and data have been purchased or obtained to support the air ventilation study:

- Phoenics for air flow modelling
- Dell Vostro Computer for model simulation
- Wind data from the Hong Kong Observatory and MM5 from the Plan Department of the government of Hong Kong SAR
- Topographic maps

The air ventilation study supports the final year dissertation studies in academic year 2009-10. Students commenced their studies in September 2009 and completed their dissertation reports in June 2010. The results formed part of the air ventilation study in Tsuen Wan district.

One of the topics of the studies is “Air Ventilation Assessment of the Vision City in Tsuen Wan District”. This study is primarily to reproduce the air flow pattern near the pedestrian level near Vision City. The student was involved in collection, review and analysis of data, and learning of the modelling techniques and the Phoenics software.

The impact on the wind environment in Tsuen Wan district by the recent re-development projects will be further investigated in the academic year 2010-2011.

Two workshops were held in February 2010 to provide training to both the civil engineering and architecture students the use of the Phoenics software for air ventilation assessment.

Appendix F shows the poster of the workshops and photos.

(ii) Architectural Design

The study of effect of building shapes on the wind direction formed part of the site analysis session of the major design project of the final year of the B.Sci in Architecture programme. The project called for a mixed-use building at Argyle Street in Mongkok. The brief was handed out to the students in early Feb 2010, followed by a lecture and demonstration of the application of 'Phoenics' (See Appendix F – F2. Photos).

In March 2010, 18 Students then worked in group to research the buildings and the site information. They also obtained the wind data from the HK Observatory and Planning Department (Task 1 Research & Literal Review) for Task 2 Experiment & Testification application. See **Appendix G** for the wind data obtained. They then constructed, by the use of the computer and softwares AutoCAD, sketch-up, a digital model of the building blocks in the site (see **Appendix H**). The trial run of Task 2 was conducted starting from April 2010, and from May to June 2010, parameters in Phoenics was readjusted and refined for the running of simulation.

Lighting Design

The project formed part of the assignment of the brief of the required course 'Introduction to Environmental Science' of the B.Sci in Architecture programme. The project brief was handed to students in Jan 2010. From February to March 2010, a study site inside Chu Hai College of Higher Education was identified and the study area documentation, which includes recording of the lighting fitments layout, types and details, producing photo-records, etc. was completed (see **Appendix I**). The measured dimensions of the site were translated into digital version by AutoCAD (see **Appendix J**) and a questionnaire was drafted, refined and finalized (see **Appendix K**) in March and April 2010. Interviews were conducted in May and June 2010 and the results were input into EXCEL programme for record and analysis.

2.3 Project Web Site

Three final year students, taking the course BIS390A/B Final Year Project, continued participating in the development of the project website from January to June 2010, with the supervision by the course supervisor. Several activities have been completed and are shown as follows:

- Procedure of updating the website contents was defined
- Web system information updating log form was created
- Website was opened to the public
- The second version of the website was implemented, with the following subsystems:
 - ❑ Website administration subsystem
 - ❑ Topics maintenance subsystem
 - ❑ Contents maintenance subsystem
 - ❑ Upcoming news subsystem
 - ❑ Events maintenance subsystem
 - ❑ Event registration subsystem
 - ❑ Simple search function

In the coming six months, new students will be involved. The interface of the website will be enhanced, and more functions in the subsystems will be designed in order to match with the progress of the other area leaders and the whole project.

2.4 Website Poster

A poster has been designed by two Year 2 students of the Department of Civil Engineering to promote this project. Appendix L shows the project website poster. The poster has been displayed in the College and has been mailed to 84 secondary schools to attract students' attention to this project. Most of these secondary schools are located in Tuen Wan district.

3 QUALITY ASSURANCE

The 1st Annual Quality Assurance Monitoring Report covering the period from July 2009 to June 2010 is included in Appendix M. The attached document gives a brief summary of the procedures and actions taken for quality assurance of the project. A full report was submitted to the College's Quality Assurance Committee for endorsement on 23 June 2010.

4 FINANCIAL CONDITION

Appendix N gives a summary of the financial condition of the Project.

5 PROJECT MILESTONES AND DELIVERABLES

It was reported in the first progress report that the project milestones and deliverables for the first reporting period (Jul 2009 – Dec 2009) were 100% completed. In this second reporting period (Jan 2010 – Jun 2010), the project milestones and deliverables attained are shown in Table 5.1.

Table 5.1 Project Milestones and Deliverables Attained

Milestone Completed – Stage 1 Part II	
Planning and Project Design Stage (Period: Jan 2010 – Jun 2010)	
Milestone and Deliverable	% Completed
➤ Initial stage of traffic noise study and setup of a traffic noise database	100%
➤ Initial stage of indoor air quality study	100%
➤ Initial stage of water quality study	100%
➤ Initial stage of air ventilation assessment	100%
➤ Initial stage of lighting design study	100%
➤ 1st Annual Quality Assurance Monitoring Report	100%

The above-listed key tasks that have been completed contribute to approximately 16% of the overall Project (100%). Together with the key tasks completed in the first reporting period (Jul 2009 – Dec 2009), about 32% of the overall Project has been completed.

There is no project variation during this reporting period.