

Journal of The Hong Kong Institute of Construction Managers, Limited

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# The Constructor

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Autumn 2004 秋季



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## Unofficial visit to the Ministry of Construction, Beijing

Following the first HKICM General Council Meeting of 2004/2005 held on 23rd August 2004, it was agreed that China development is one of our major tasks this year. In this connection, Mr. Tam King-leung, President of HKICM, Mr. Woo Man-king, Chairman of the China and International Link Liaison Committee, and Mr. Monty Chan, Deputy Secretary General, had paid an unofficial visit to the officials of the Ministry of Construction on 06 September 2004.



*HKICM Representatives and MOC Officials*



*President Tam (centre) and representatives of HKIS and HKIA*

## Shanghai Promotions of the Construction Trade

President K. L. Tam, Mr. Jeff Cheung and Mr. Anthony Chan joined the HK Services Delegation for the 2010 World Expo Shanghai Roundtable Conference under the flag of the Trade Development Council upon the lead of Mr. Henry Tang during 21-22 September. It was a pity that our President was so heavily committed that he could not stay further to witness the maiden performance of the F1 Shanghai Grand Prix.

## Quality Building Award (QBA)

Quality, Teamwork, Design, Innovation, Cost, Environmental Friendliness / Sustainability, Safety, Health & Hygiene, Project Management, Social and Ethical, and Customers Satisfaction are the 10 judging criteria of QBA. It spells the modern criteria for success.

Under the co-efforts of peer professional bodies, in which HKICM is one of the supporting organizations, the Quality Building Award 2004 was concluded by the Presentation Conference held on 27th August 2004.

Winner of the residential category is the Jolly Place of the Hong Kong Housing Society, while the winner of the non-residential category is One Peking of Glorious Sun Holdings Limited.



*The Jolly Place*



*One Peking*

Dear Members,

The new 2004/ 2005 session started as the new General Council was elected at the 7th Annual General Meeting that has taken place on 18th June 2004. The composition of the 2004/ 2005 Council can be found in this issue of newsletter, together with the functional Organization Chart. All members are invited to join the sub-committees to help serving the Institute, jot a note to or email the Secretariat Office if you wish to do so.

Though the past year was disastrous to the construction industry, the Institute did not take any break. We have seen wider recognition of the professional standing of HKICM, in particular the recognition of HKICM membership by the increasing number of Government departments.



*President K. L. Tam*

We have also started reaching for the promotions of the Institute in our motherland. As the newly established profession of Registered Constructors (RC) takes its growth momentum in the PRC, we shall focus on and take hopeful parts in the development of the RC, with the ultimate and clear goal for reciprocal recognition. A number of marketing activities will be conducted in this Council Session for such regards. The first one was an unofficial visit to the officials responsible for the RC in Beijing. The second one was an official visit to Shanghai at end September with the Trade Development Council under the leadership of the Hon. Mr. Henry Y. Y. Tang, Financial Secretary, for vocational promotions. Members who have working relationships in the construction management field of the PRC are invited to assist in the marketing of HKICM.

We shall also carry on with the successful provision of continuing professional development events in this session, catering for the needs of all classes of membership. Whether or not in the form of CPD events, emphasis will be made towards the construction management knowledge concerning operations in China, which is growing to be an integral part of the vocational necessity of the profession.

As always, we need your help to better serve you. Your valuable patronage is most essential in the success of institutional activities, particularly in this age of changes and challenges. Do join us or take more active parts to help us serve better.

Yours sincerely,



K.L. Tam  
President

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## 2004/2005 Session of General Council Members

**President:**

Mr. Tam King-leung

**Immediate Past President:**

Mr. Ho On-sing Thomas

**Vice-Presidents:**

Dr. Chan Kwok-wong John  
 Dr. Cheung Kwok-wai Alex  
 Dr. Wong Oi-wan Evia

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 Mr. Sin Wing-ning Barry

**Honorary Treasurer:**

Mr. Mok Hon-wa Kenneth

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 Mr. Cheung Moon-hoi Jeff  
 Mr. Chung Fook-ping  
 Mr. Ho Chi-ming  
 Mr. Lau Yu-kwan  
 Mr. Lee Fook-pui  
 Mr. Leung Hai-ming Raymond  
 Mr. Mok Kwok-woo Peter  
 Mr. Siu Kam-yuen Stephen  
 Mr. Sung Dicky  
 Mr. Wong Chi-lap  
 Mr. Wong Ching-lok Christopher  
 Mr. Wong Tat-kee David  
 Mr. Woo Man-king  
 Mr. Yip Chi-po Robin

**Co-opted Members:**

Mr. Chiang Mo-shek Bosco  
 Dr. Ng Shiu-tong Thomas

**2004/2005 Junior Organisation Members:**

**Chairman:**

Mr. Ho Chi-ming

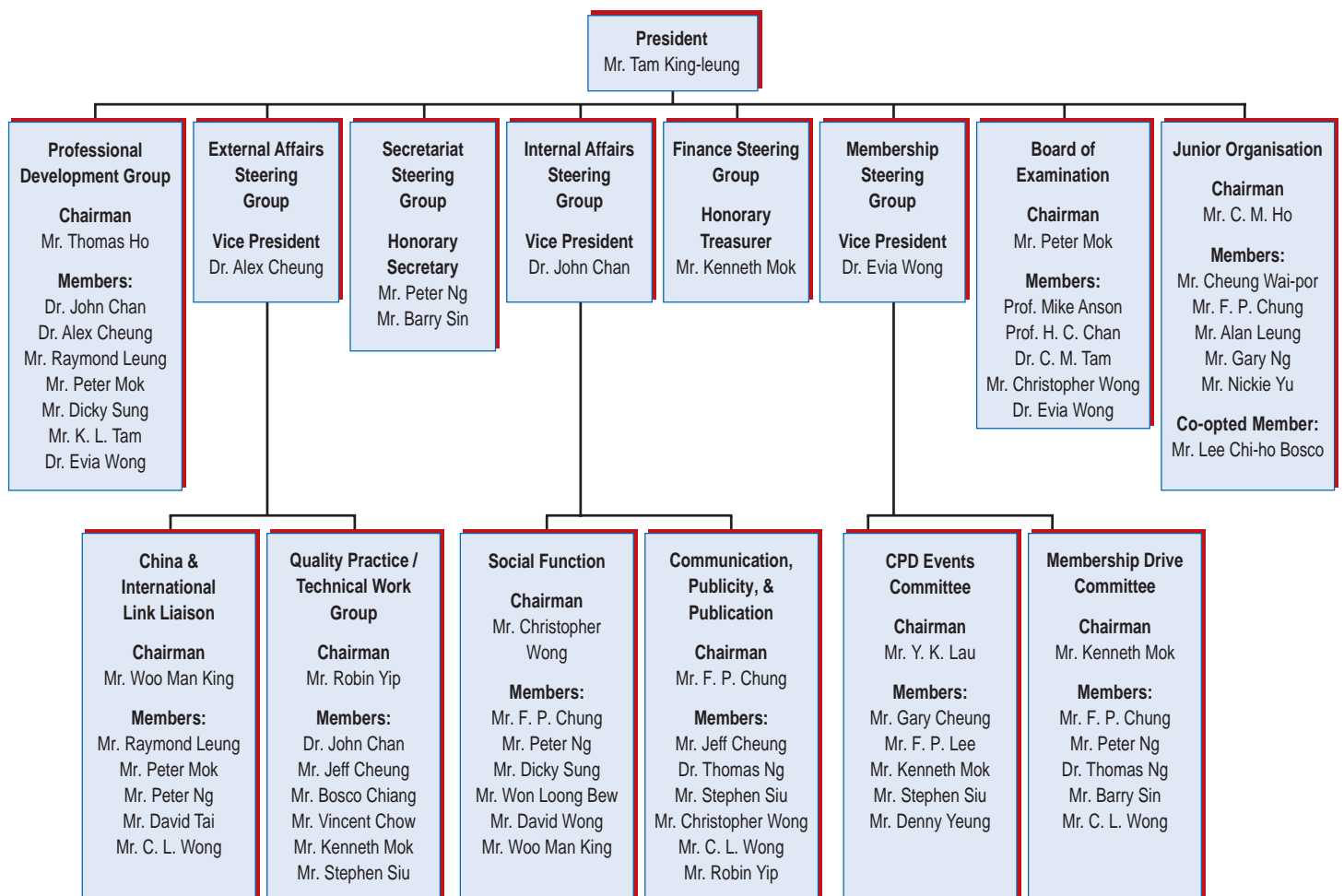
**Members:**

Mr. Cheung Wai-por  
 Mr. Chung Fook-ping  
 Mr. Leung Tik-lun Alan  
 Mr. Ng Siu-nin Gary  
 Mr. Yu Chi-leung Nickie

**Co-opted Member:**

Mr. Lee Chi-ho

## 2004/2005 Organization of Committees and Work Groups



## Membership Discipline Classification (MDC)

As part of the commitments to the Buildings Department for the recognition in the Site Safety Supervision Plan, the Membership Discipline Classification Committee authorized by the General Council had started with the classification exercise. The Committee had completed the classification exercise for most of our members and the moderation exercise will soon be carried out. It is anticipated that the official classification and the moderated result would be available before the end of the year. Fellow, Member, and Associate classes of members will be informed via post. Should there

be disagreements with the classification results; a one-time Request For Review is allowed at no cost. The Review will be performed by either the Board of Examination or by an authorized panel, from which the Review result will stem, last and final.

According to the results of the MDC, newly designed Membership Certificates, Membership Cards, and Membership Green Cards will be re-issued in the next membership year.

## Presentation of Certificates of Appointment to Beijing Representatives

Taking the chance of the second unofficial visit to Beijing, President K. L. Tam had presented certificates of appointment to the two Beijing representatives: Mr. Li Chun-lin and Mr. Liu Zhen, who are graduates of the well known Tsinghua and Tienjian Universities respectively. Both gentlemen are young elites of the construction industry taking up executive posts in Beijing.



*President Tam presenting the Certificate to Mr. Li Chun-lin*



*President Tam presenting the Certificate to Mr. Liu Zhen*

## CPD Events Coming up

Date	Topic	Organizer(s):
6 Nov 2004	Site Visit to Fu tei	CPD Events Committee, HKICM
18 Nov 2004	Delay Claims - A Practical Guide	The Hong Kong Institute of Construction Managers, The Australian Institute of Quantity Surveyors
24 Nov 2004	Where can FM add more?	The Hong Kong Institute of Facility Management
3 Dec 2004	Employability of the Hong Kong Construction Professionals in the Mainland of China	CPD Events and Social Function Committees, HKICM
9 Dec 2004	CII-HK Conference 2004 on Construction Partnering	Construction Industry Institute, Hong Kong
Dec 2004	Project Administration Focusing on Planning and Monitoring	CPD Events Committee, HKICM





1



2

1. Mr. Y. K. Lau and Mr. Raymond Leung  
 2. Mr. Paco Tsang and Mr. Y. K. Lau  
 3. Dr. Alex Cheung and Mr. Y. K. Lau  
 4. Mr. Matthew Chan and Mr. Y. K. Lau



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### Update on PRC contractor licensing regime

On 6 September 2004, the Ministry of Construction and the Ministry of Commerce jointly issued a Notice on Issues Relating to the Administration of the Qualification Regime of Foreign-Invested Construction Enterprises (Jianshi [2004] No. 159) ("Notice").

The intent of the Notice appears to be to assist foreign contractors doing business in the PRC in their transition from the old construction licensing regime (where licences are granted on a project-by-project basis, without having to establish a PRC contractor entity - commonly known as the "Order 32" regime) to the new licensing regime (where a Foreign-Invested Construction Enterprise ("FICE") has to be established and the requisite qualifications obtained - commonly known as the "Order 113" regime).

It should be noted that concessions/time extensions have already been granted previously in relation to the implementation of Order 113, so it appears that the relevant authorities are aware of the difficulties faced by foreign players in complying with the regime and are willing to listen and assist with the transition.

The Notice seeks to assist in the transition by giving the following concessions to foreign contractors:

- (1) In relation to those FICEs which have obtained their establishment approval but not their Order 113 qualifications: up until 1 July 2005, those FICEs may continue to perform Chinese construction work by submitting the relevant signed-up construction contracts and their "old" Order 32 licence to the relevant authorities for approval to execute those projects. However, after 1 July 2005, no FICEs are allowed to contract for

- Chinese construction work without their Order 113 qualifications.
- (2) In relation to those FICEs which have obtained their Order 113 qualifications: up until 1 July 2005, those FICEs may use either their "old" Order 32 licence or their Order 113 qualifications to contract for Chinese work (there may be advantages in using one or the other, e.g. the scope of the Order 32 licence may be wider). Such work done can be used/taken into account in future applications for qualification upgrading or for annual audits.
- (3) In order to encourage international contractors to establish FICEs in the PRC, where newly-established FICEs are unable to satisfy the requirements relating to track record and manpower staffing when applying for their qualification approvals under the Order 113 regime:
  - (i) the track record of a foreign contractor for projects outside the PRC may be counted towards its PRC track record; and
  - (ii) an FICE may hire service providers outside the PRC to fill the "technical, engineering, economics and administrative" positions within the company and to undertake the role of project manager (the number of project managers being unlimited).

However, the "foreign" track record and service providers mentioned in (i) and (ii) above would still have to satisfy the other requirements specified under the Order 113 regime, as part of the approval process for the FICE's qualification application.

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## Total Quality Inspection for Buildings TQIB

**By Dr. Alex Cheung & Ivan Mak - Building Diagnostic Consultants Limited**

*Dr. Alex Cheung is the current Vice President of HKICM, a very senior engineer of the construction industry. Ivan Mak is the General Manager of BDCL, an expert in Building Diagnosis.*

### Synopsis:

Thousands and thousands of new buildings in Hong Kong are put in the market every year, some of those might have hidden defects due to possible design faults, substandard workmanship and other possible causes. Unfortunately, these defects might be difficult to be effectively detected by our “naked eyes” and these hidden defects may become the “detonator” of the localized failure of the buildings. The situation would be even worst during the service life of the buildings. With time lapsed, the hidden defects couple with the improper uses of building owners, natural weathering and corrosion of reinforcement; may result in accelerated deterioration of the structural elements, dis-functioning of part or the whole of the buildings, very expensive and unexpected maintenance costs and the possibility of person injury or even loss of life. Quite a few of the property developers and the building users are aware of the potential threat to the general public and the consequential liability. Numerous complaints on the newly constructed buildings in recent years, were solid evidences of the improperly inspected buildings and this would inevitably lead to costly damage in developers’ reputations, and generate psychological and emotional impacts for property owners. These frustrated situations could be avoided by a reliable building inspection program and a long-term structural monitoring system adjunction with the latest building inspection technologies.

This paper aims to highlight:

- i. The availability of the highly sophisticated building inspection equipments and technologies in the international market,
- ii. The advantages and limitations of different technologies,
- iii. The effectiveness of the Total Quality Inspection, which utilizes the combination of the unique testing features, tailors for the accuracy and cost-effectiveness approach for any particular field conditions,
- iv. The proper use of the equipments and the accuracy of assessing the data by well-trained technicians,
- v. The importance of choosing the right technologies in different unique cases,
- vi. The nightmare of mis-used of the equipments and the malpractice by the technicians.

In addition, this paper allows readers to get access on full range of inspection technologies such as:

Applications:	Technologies:
External Wall Inspection	<ul style="list-style-type: none"> <li>• Rapid Infrared Thermographic Survey (RITS)</li> </ul>
Water Seepage Investigation	<ul style="list-style-type: none"> <li>• Rapid Infrared Thermographic Survey (RITS)</li> <li>• Fluorescent Dye (FDT)</li> <li>• Acoustic Leak Detection</li> <li>• Ultrasonic Leak Detection</li> <li>• Closed Circuit Television (CCTV)</li> <li>• Moisture Mapping</li> <li>• Endoscopic Inspection</li> </ul>
Utility Mapping	<ul style="list-style-type: none"> <li>• Ground Penetrating Radar Survey (GPRS)</li> <li>• Cable Detection</li> </ul>
Structural Tests	<ul style="list-style-type: none"> <li>• Bond Test</li> <li>• Covermeter</li> <li>• Rebound Hammer</li> <li>• Impact Echo Test</li> <li>• Half-Cell</li> </ul>



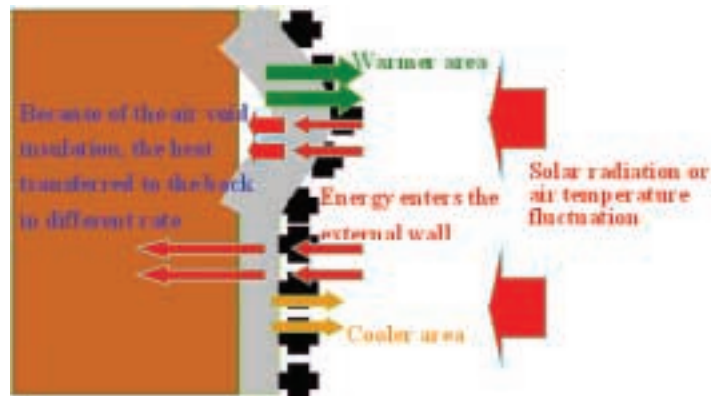
A combination of different inspection technologies should be encouraged for a complete quality control of building inspection. We call it - Total Quality Inspection for Building.

The idea of TQIB is to utilize the combination of unique features of different inspection technologies, which provides a best-fit customer-made inspection approach for various scenarios in different applications. As such, the accuracy, reliability and cost-effectiveness of the inspection will be further enhanced.

## A. External Wall Inspection

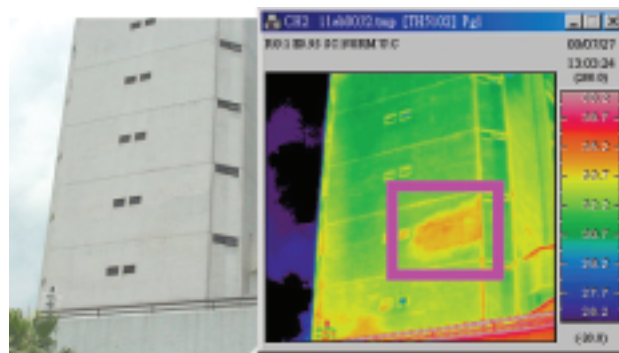
### 1. Rapid Infrared Thermographic Survey (RITS):

#### 1.1 Principle:



When the finishing mortar or tile of an external wall has delaminated, a small void is created on the underside of it. Since the sealed air space has a greater adiabaticity, heat transfer between the surface of the external wall and the inner face of the structure becomes smaller at that particular area. The temperature of the defected area is higher than the rest of area on the same surface. By using a specialized Infrared Thermal Imager, a visual image of the defected area can be captured, located and recorded.

#### 1.2. Sample Pictures:



#### 1.3. Advantages of RITS:

- Low subjective
- High accuracy
- Data recorded and visualized
- Strong data for evidence
- Calibration available
- High efficiency
- Low cost



**1.4. Important Factors to be considered when choosing equipment:**

- Mechanical scanning technique that uses vertical and horizontal mirrors
- FPS (focal plane array) technique in which infrared detection elements are allocated on a flat plane to obtain an image

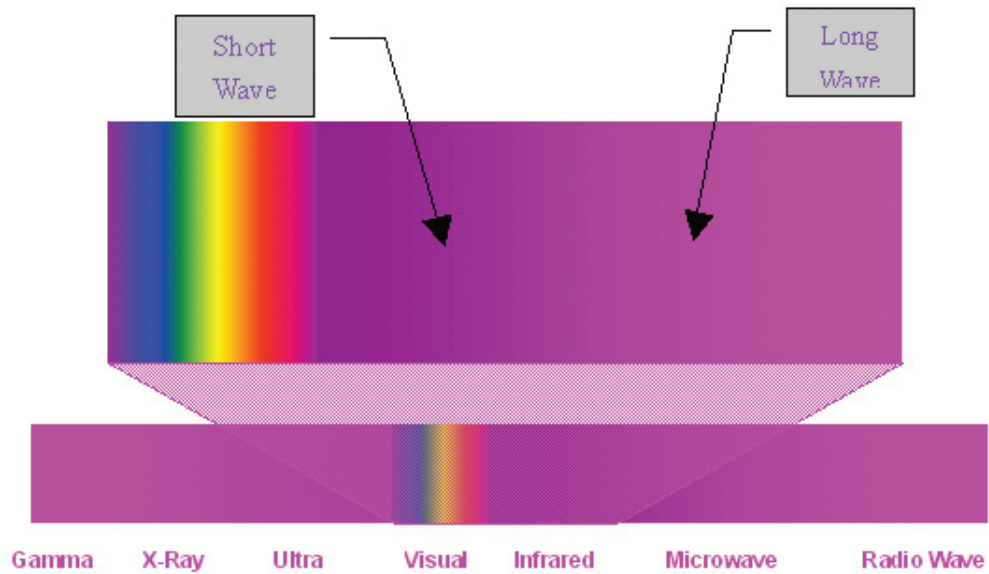
**Comparison of Mechanical Scanning and Focal Plane Array**

FPA	Mechanical Scanning
1 measurement for one pixel	8 measurement for one pixel
No calibration of ALL sensors for each test	Calibration of ALL sensors for each test
Real time	0.65s or 1/22s
Damage of pixel	No damage of pixel
Low stability of images	High stability of images
Very suitable for E&M	Suitable for E&M
Unsuitable for building diagnostic	Suitable for building diagnostic

**1.5. Comparison between long wave and short wave devices:**

- For objects with normal temperature such as the external wall of a building, in comparing both types, LW devices generally provide better images while the quality of images provided with SW devices is low, especially in cold weather
- For SW devices, the temperature on the images is not stable and changes due to solar radiation
- For LW devices, the resolution degrades little even in low temperatures, the image quality is better than that with SW devices, and the variation in solar radiation is little

**Long wave and Short wave**



### 1.6. Well-trained operators are also important to obtain a good result:

- Proper operation of instrument
- Know how of energy transfer principle
- Proper interpretation
- Normal camera photos
- Visual inspection
- Record of environmental data
- Experience
- Judgment by photographers
- Partial hammer tapping

## B. Water Seepage Investigation

### 1. Introduction

1.1 According to the Buildings Department Homepage, the following figure shows a general picture of defective drains happened in existing buildings in Hong Kong.

	Reports received about defective drains	Statutory orders issued on defective drains	Advisory letters issued on defective drains	Compliance with statutory orders issued on defective drains	Compliance with Advisory letters issued on defective drains
2000	334	168	115	107	67
2001	552	99	29	67	20
2002	574	219	49	76	27
2003	2293	2125	411	253	60

1.2 Base on the about table, reports received about defective drains by Buildings Department was gradually increase from 2000 to 2002 and a boom increase at 2003. This dramatic growing gives an alert to the building industry.

1.3 Since water leakage problem were complicated (it may included several water leakage sources), different type of survey for water leakage detection were developed.

### 2. Type of Survey

#### 2.1 Rapid Thermographic Infrared Survey (RITS)

##### 2.1.1 Principle

Due to the heat capacity of water is higher than concrete, time for heating water seepage area in concrete was longer. Therefore, temperature of water seepage area in concrete was low. Since every object emitted infrared ray and quantity of the ray depends on its surface temperature, infrared camera can captured the ray (the temperature) to form infrared image. Base on the image, water seepage area in concrete was detected.

2.1.2 Procedure - Water Seepage from Sanitary Ware (Shower Area)

Firstly, infrared image (photo2.1.2a) was captured at the affected area (e.g. peeled painting). Then, water spraying at the suspected source (e.g. shower area)(photo 2.1.2c) was carried out. If the suspected source was the real source, the infrared image would become as photo2.1.2d shown.

2.2 Fluorescent Dye Test (FDT)

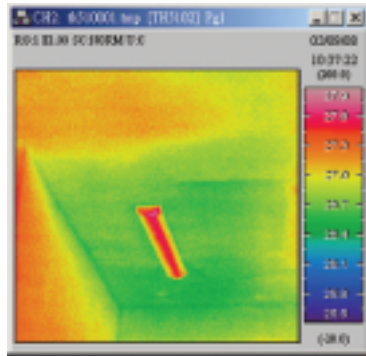


photo 2.1.2a



photo 2.1.2b



photo 2.1.2c

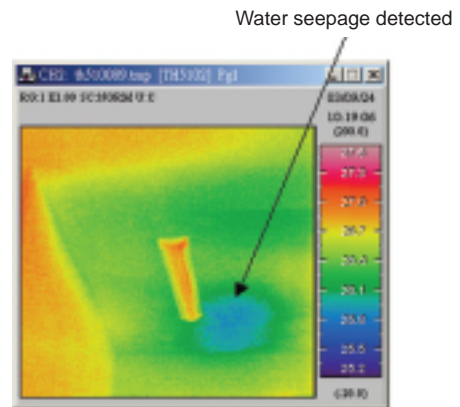


photo 2.1.2d

2.2.1 Principle

Base on the characteristic of fluorescent dye glowed under high-intensity UV lamp, water leakage source was be easily traced.

2.2.2 Procedure - Water Leakage at Drainage Pipe

Firstly, circulate the drainage system with water and fluorescent dye (photo 2.2.2a). Then, inspect the affected area by high-intensity UV lamp (photo 2.2.2b).

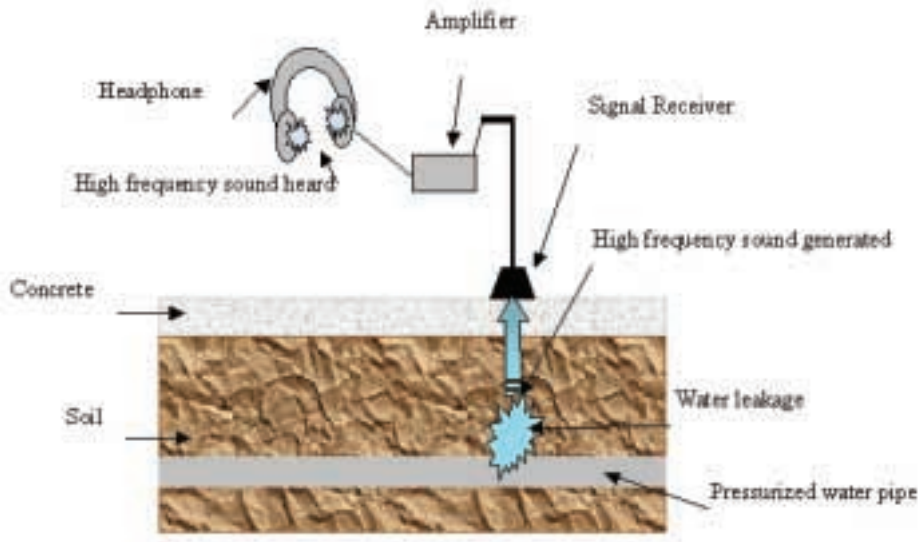


2.3 Acoustic Leak Detection

2.3.1 Principle

If water was leaked from underground-pressurized water supply pipe, high frequency sound was generated from the leak point. That sound can be received by equipment and heard by human ears.

Application: Water Leakage from Underground Water Supply Pipe

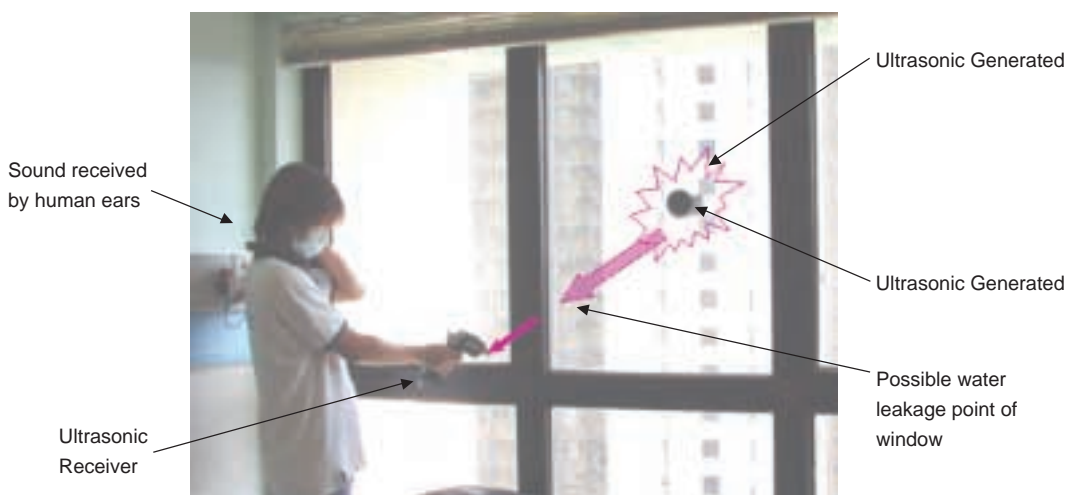


2.4 Ultrasonic Leak Detection

2.4.1 Principle

By the ultrasonic generator emitted ultrasonic from exterior of windows, a strong ultrasonic can be detected by ultrasonic receiver at interior through the possible water leakage point of windows.

Application: Water Leakage from Windows



### 2.5 Closed Circuit Television (CCTV)

#### 2.5.1 Principle

By using the mobility and activity of the camera with tracer connected with long wire to record the condition of the interior of pipes by console unit.

#### 2.5.2 Procedure - Condition of Underground Sewer Pipe

At first, find the location of the pipe. Then, clean the interior of the pipe by high-pressure water jetting or similar method. Third, connect the console unit (photo 2.5.2a) with the camera with tracer (photo 2.5.2b) and then put the camera into the pipe through manhole and record (photo 2.5.2c).

A video camera will be led by a tractor and move inside a pipe. The video will be transmitted and recorded to the display on the ground.



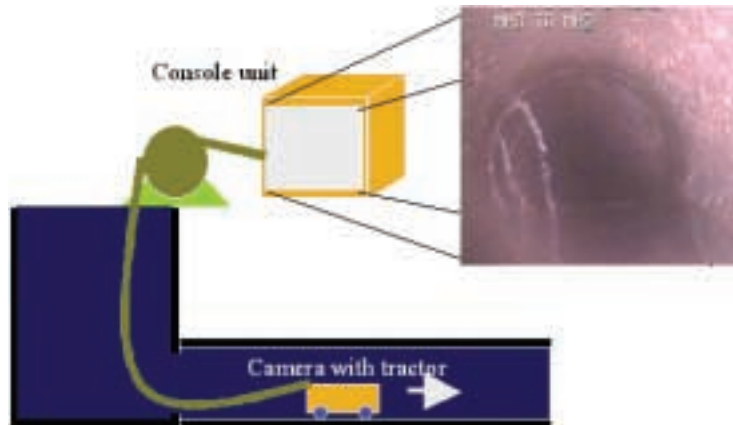
photo 2.5.2a



photo 2.5.2b



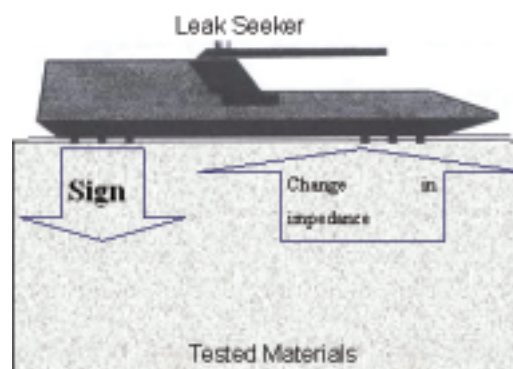
photo 2.5.2c



### 2.6 Moisture Mapping

#### 2.6.1 Principle

Signals are transmitted into inspected material (e.g. concrete and floor screed, etc.) to measure the change in impedance caused by the presence of moisture.





2.6.2 Procedure - Water Seepage from Sanitary Ware (Shower Area)

At first, spray water at the suspected source (e.g. shower area)(photo 2.6.2a). Then, mark gridline on the floor plan (photo 2.6.2b). Third, take reading on the affected area by Leak Seeker (photo 2.6.2c). After analysis, the result would be as figure 2.6.2d shown.



photo 2.6.2a



photo 2.6.2b

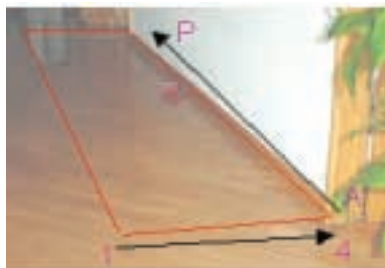
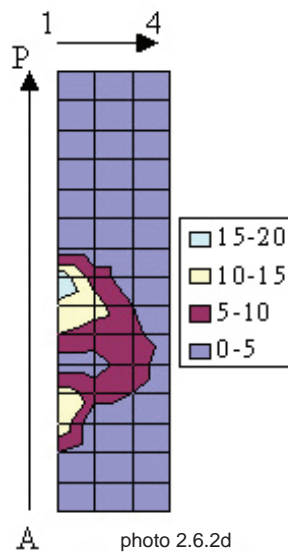


photo 2.6.2c



2.7 Endoscopic Inspection

2.7.1 Principle

By using a small piece of lens with light guide, condition of the interior of pipes can be inspected from the eyepiece.

2.7.2 Procedure - Condition of Drainage Pipe of Basin

Firstly, clean the interior of the pipe by high-pressure water jetting or similar method (photo 2.7.2a). Then, put the lens with light guide in the drainage pipe to inspect the condition of the interior (photo 2.7.2b). The eyepiece can connect to the camera for taking photos (photo 2.7.2c).



photo 2.7.2a

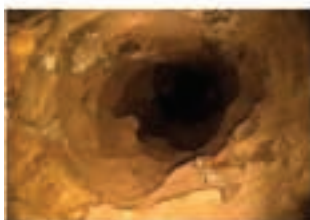


photo 2.7.2c



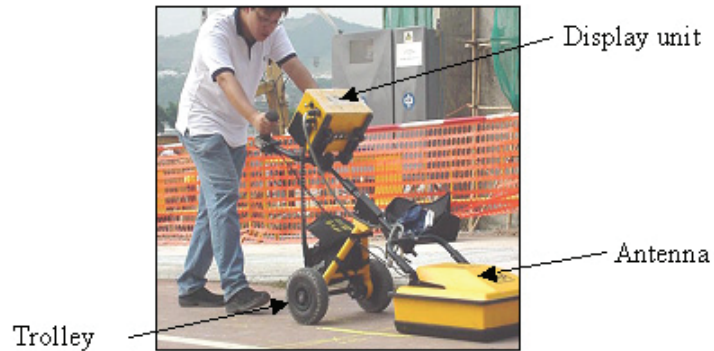
photo 2.7.2b

### C. Utility Mapping

#### 1. Ground Penetration Radar Survey (GPRS)

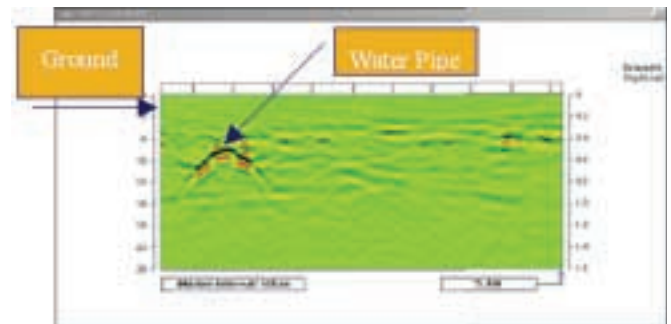
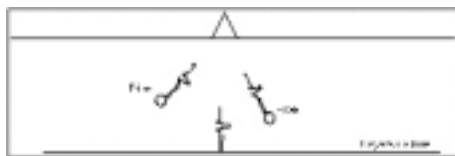
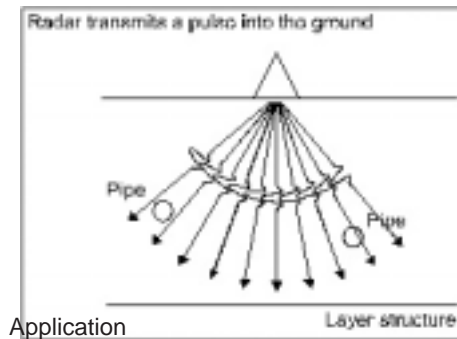
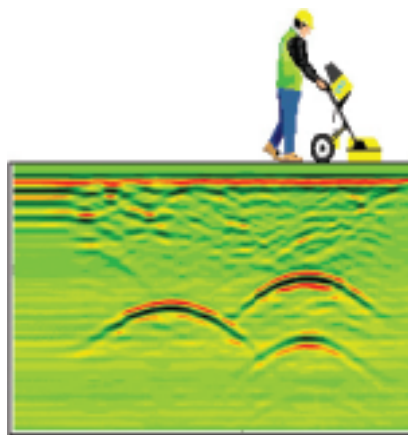
##### 1.1 Principle

GPRS is a non-destructive testing (NDT) method, which uses electromagnetic impulses to locate the ground or built structures (e.g. embedded water supply pipe, sewer pipe, etc.).



##### 1.2. Procedure - Embedded Water Supply Pipe

The Antenna generates primary signal to the inspected area and then receives reflected signal from objects. Figure 1.2a shows what reflected signal look like. Besides, no connection on the services is needed.



Ground Penetrating Radar has the following applications:

- Detect the location of embedded metallic and non-metallic utilities
- Estimate the depth of the embedded utilities and objects
- Saved all data in hard disk for easy future reference

## 2. Pipe and Cable Detection

### 2.1 Principle

The signal generator (photo 2.1a) gives signal to the metallic pipe (e.g. water supply pipe). The signal (electromagnetic field) travels along the pipe and then the signal receiver (photo 2.1b) detects the strongest signal waves at the top of the pipe. Therefore, the location of the pipe located.

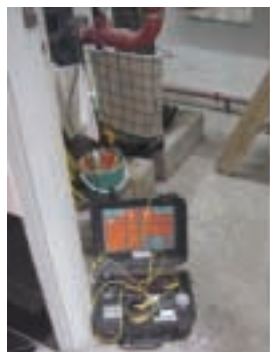


photo 2.1a



photo 2.1b

### 2.2 Procedure

Base on the principle mentioned (item 2.1 above), signal receiver detects several strong signal waves at several locations, the embedded metallic pipe could be line up.



The cable detector can pick up the electromagnetic wave generated by an electric cable. If a connection can be made to the embedded utilities, a signal generator can induce a signal along the metallic pipes. By detecting the peak signal, the accurate location of an embedded utility can be positioned. The equipment was also designed to estimate the depth of the embedded utilities.

### Application:

Pipe and Cable Detection has the following applications:

- Detect the location of metallic pipe and electric cable
- Estimate the depth of metallic pipe and electric cable
- Identify electric cable
- Identify metallic pipes if connection can be made
- A recommended non-destructive test in the Electricity Supply Lines (Protection) Regulation of Electricity Ordinance (Cap. 406)

A utility map with proper dimension will be the report.



...to be continued in the next issue.



## Building Diagnostic Consultants Limited 香港工程質量檢測中心有限公司

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### Scope of Services 服務範圍:

To provide Total Quality Inspection for Building & Structure  
結構及樓宇全面質量檢測

External Wall Diagnosis 外牆飾面脫離勘察

Water Seepage Diagnosis 滲漏勘察

E & M Inspection and Monitoring 機電檢測

Utilities Mapping 地下喉管定位及勘察

Structural Diagnosis 結構測試

Geotechnical & Structural Monitoring 岩土及結構監測

Automated Condition Monitoring System 全自動過程監控

Integrated Services 綜合勘察及監測;或其他定造服務