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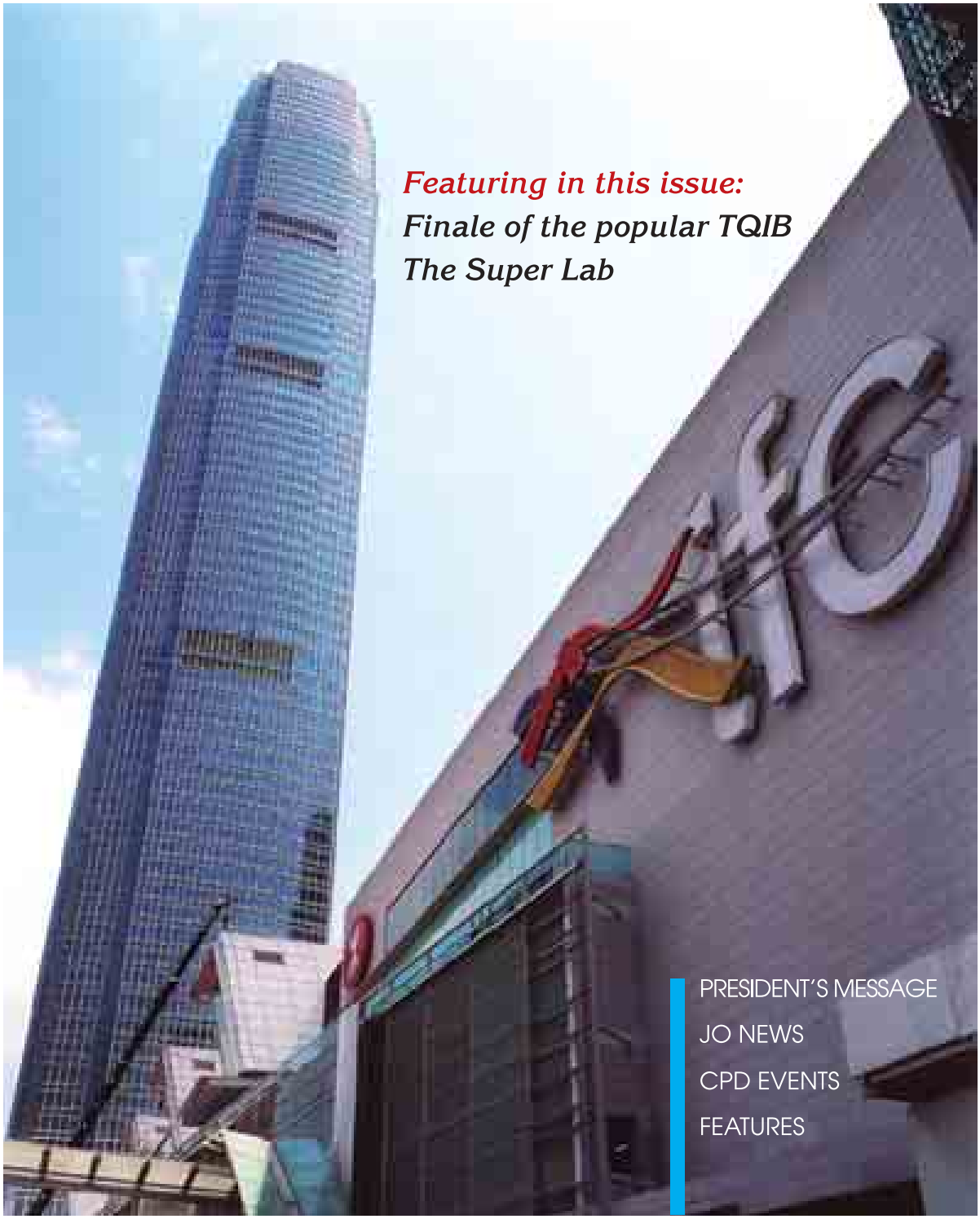
THE ConStructor 營造

Spring 2005 春季



Featuring in this issue:

Finale of the popular TQIB

The Super Lab

Dear Members,

Under the collective efforts of the Joint Contracts Committee composed of representatives of HKIA, HKICM and HKIS, we are pleased to inform that the latest version of the Standard Forms of Building Contract (SFBC) for the construction industry of Hong Kong is now concluded for publishing.

The SFBC booklets are planned to be officially launched in April 2005. Members will be further notified once these comprehensive booklets are available for order.

The classification of membership disciplines is completed. The first lot of the classification results will be mailed to you shortly after the conclusion of the group moderation. Meanwhile, the Work Group will continue with their efforts in moderating the unfinished lists in due course.

In the year of 2005 we shall continue to strengthen our PRC liaison efforts to work for the benefit of our members. With your support I am sure the membership base and hence the Institute will continue to grow.

The Chinese New Year is within arm's reach, may I wish you all a healthy and sound Year of the Chicken.

Yours sincerely,

K. L. Tam
President

The Communication, Publicity & Publications Committee of HKICM 2004/ 2005
Chairman: Mr. F. P. Chung
Members: Mr. Jeff Cheung, Dr. Thomas Ng, Mr. Stephen Siu, Mr. Christopher Wong, Mr. C. L. Wong, Mr. Robin Yip

Executive Editor: Mr. Monty Chan
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Room 801, 8/F, 25 Des Voeux Road Central, Hong Kong.
Tel:(852) 2523 2081 • Fax: (852) 2845 4749
E-mail: info@hkicm.org.hk • Web Site: www.hkicm.org.hk

進營社簡訊

The new round of the Junior Organization Committee in Session 2004/05 has absorbed young and aggressive members to continue on the long-term initiatives carried forward from last year. Mr. C.M. Ho was appointed new Chairman of the JO Committee to replace Mr. F.P. Chung who, while remaining in the JO as one of the Committee members, would put more of his time on looking after the Institute's publications. We must thank Mr. Chung and the outgoing Committee for their hard work in founding the Junior Organization, and appreciate very much their contribution in setting up the organization framework as well as the objectives to be pursued.

The New JO Committee

The new JO Committee had its first meeting on 2 November 2004, and the following composition was passed:

Chairman: HO Chi Ming (M) 何賜明

Vice Chairman: LEUNG Tik Lun Alan (G) 梁迪倫

Function Convener (Editorial):
CHUNG Fook Ping (M) 鍾復平

Function Convener (Social/Promotion):
LEE Chi Ho (M) 李志豪

Function Convener (Professional Development):
YU Chi Leung (M) 余志良

Members: Cheung Wai Por (A) 張偉波
NG Siu Nin Gary (C) 伍紹年

We admit the fact that in the first two years of its formation, the Junior Organization failed to establish a close network amongst non-corporate members, and this can be seen from the composition of the JO committee. We need more Construction Supervisors and Student Members to join our team, so that we can think what the young members think and do what the young members want us to do. Any young members who are willing to share our aspiration please do offer yourself by calling the Secretariat. We need your help to move ahead.

The JO Committee is planning for a number of activities to be launched this year as follows:

- A boat cruise around summer time;
- School visits;
- Seminar on progression path;
- Putonghua for Construction Professionals;
- Site visits;
- A feature in the JO column of HKICM newsletter - interview with leading professionals; and
- Inviting short articles to the JO column with award to the best piece.

進營社委員會吸納了年青和積極的會友，在新的一年裏繼續為副會員提供服務。由於前任主席鍾復平先生須全力主理本會刊物事務，理事會委任何賜明先生接掌進營社主席一職。新一屆進營社委員會亦已組成，將會展開一連串為副會員而設的活動。

鑑於過去在團結副會員方面的工作做得不夠深入，我們計劃在新的一年裏略為調整方針，推出多一些工地考察和康樂聯誼活動，冀能吸引更多年輕社友參與。此外，我們亦關注副會員的進修和持續專業發展，並會透過會刊【營造】內的進營社專頁來解答各會友的疑問。

順帶呼籲各年輕社友，如果你們願意抽出一些時間為本社服務的話，請加入我們的工作隊伍，群策群力，讓我們更了解各會友的想法，使服務更切合大家需要。有興趣報名的熱心會友可與秘書處聯絡，謝謝你們的支持。

Message from the new JO Committee

As led by Mr. Chung Fook-ping, the immediate past chairman, the JO has been set up healthily and progressively in the last two years. It is my great pleasure to work with Mr. Chung (my former teacher in 1980) and all the members in the JO Committee this session year. To be the linking bridge between the Institute and all the non-corporate members including Graduates, Associates, Construction Supervisors and Students, membership coordination will be our critical task in 04/05.

We also note that progression route is one of the major concerns of the non-corporate members. The committee will study further the possibility of introducing training programmes or schemes in this issue.

With your continuous supports and contributions, I am sure that the JO can be organised successfully as you aimed.

能與恩師鍾復平及各委員共事，深感榮幸!

作為學會與進營社的橋樑，社友的聯繫工作及專業進程探索，繼續是我們委員會的重要任務。 進營社得以茁壯成長，有賴各位的支持。

春節將至，謹此向各位拜個早年，祝身體健康，事業進步!

HO Chi-ming 何賜明
Chairman of JO Committee 04/05

CPD Events Coming Up

Date	Topic	Organizer(s):
8 Jan 2005	Visit to Plastic Piping Manufacturers in Shunde and Heshan	The Australian Institute of Building, Hong Kong Chapter The Hong Kong Institute of Construction Managers
26 Jan 2005	System Management in Construction Industry - An Asian Exchange	Hong Kong Quality Assurance Agency (HKQAA)
22 Feb 2005	Public Private Partnerships - Opportunities and Challenges	Centre for Infrastructure and Construction Industry Development, HKU; Civil Division of the Hong Kong Institute of Engineers
12 March 2005	Site Visit to Yuen Long Highway Widening Project	Junior Organisation, Hong Kong Institute of Construction Managers
18 March 2005	Refreshment Seminar for Construction Managers on Site Safety	HKICM
March 2005	Seminar on Pre-cast Concrete Design	HKICM
To be informed	Environmental Demolition Methods	HKICM
To be informed	Building Repair and Maintenance	HKICM

Site visit at Fu Tei

1) Hon Secretary Peter Ng & Mr. Nicholas Longley
2) Mr. Y. K. Lau & Mr. Ron Brinkman
3) Mr. John Battersby & Mr. Y. K. Lau
4) Prof. Francis Wong & President Tam

The First 'State Key Laboratory' (國家重點實驗室) outside the Mainland at the University of Hong Kong - The Research Centre of Emerging Infectious Diseases, Department of Microbiology, Faculty of Medicine

香港大學醫學院微生物學系轄下的「新發傳染性疾病國家重點實驗室」

THE first-ever State Key Laboratory outside the Mainland, named "Research Centre of Emerging Infectious Diseases" (突發傳染病研究中心), approved by the China Ministry of Science and Technology for the research on emerging infectious diseases was recently completed in the University of Hong Kong (HKU). The Lab was designed and constructed to Physical Containment Level 3 (PC-3) with animal holding facilities for research to be done with live animals. The Lab is the first facility of this kind outside Mainland China and the only one focusing on emerging infectious diseases.

The Estate Office of HKU awarded the assignment to Tysan Building Construction Company Limited (Tysan) as the main contractor to take up this very spectacular project. Upon reviewing the initial designs of the Lab with the designers and users, crucial operational issues of the Lab were identified for solutions before the stages of detailed design and construction commenced. To resolve the said issues in good time with accuracy, Tysan invited Dr. Tony Della-Porta, a renowned and proven biosafety expert, joining the Project Team as an independent consultant focusing on the design review on operational safety and to develop the relevant procedures for the safe use of the Lab. Dr. Della-Porta had given professional advise to fine-tune the design to the optimum under the existing site constraints.

In May 2004 when final installations of the Lab were completed, a validation in Australian Standard 2243.3: 2002 was performed by Mr. David Martin, a well-experienced biocontainment engineer, who found the results satisfactory and had submitted a full validation report.

What is a Physical Containment Level 3 (PC-3) laboratory

In Physical Containment Level 3 (PC-3) laboratories, researchers study some of the world's potentially most dangerous microbes. These labs are designed to prevent microbes and/ or dangerous substrates from escaping into the environment and to provide maximum safety for the researchers. When a laboratory is designated PC-3, that means the second highest possible containment measures are in place.

Autoclaves

This PC-3 laboratory was designed with a specific air cascade regime. A special air lock system was designed to suit the differential air pressure requirement and all extract air is HEPA filtered.

The laboratories and category 3 animal rooms were constructed as sealed boxes with fully coved junctions to allow efficient disinfections. Most of the doors within the Category 3 suite are controlled by an electric interlocking system. The interface points of all E&M penetrations puncturing the containment box are sealed, maintaining integrity against the negative pressure within the different parts of the Lab.

HEPA filter element

From the Outside

The lab was designed and constructed to allow only those that go into the laboratory of intend remain inside and that nothing, even as tiny as a bacterium or virus, could escape from the lab.

PC-3 Lab design features include the followings:

- All seams, joints and doors are sealed to make the lab envelop airtight. No openable window in a PC-3 lab. Air does not flow in or out under the air seal doors
- Air is pumped out of the building through a HEPA filtration system that catches even the tiniest microscopic particles, bacteria and viruses
- All discharge air ducts are welded stainless steel and tested airtight
- Inside the PC-3 facilities, the laboratories are surrounded by buffer corridors that help protect the labs in a controlled pressurized zoning design
- Features such as airlocks, decontamination chamber, autoclaves, disinfectant "dunk tanks" and waste water treatment systems ensure that absolutely everything that leaves a PC-3 lab is decontaminated

Interior Security

PC-3 lab workers must pass an interior security control system before getting into the facility.

Some recommended security measures include combinations of the followings:

- Extensive background checks prior to employment for everyone who works in the building
- Guards who check everyone's identification and credentials at building entrance
- Special identification cards that are scanned to provide an electronic record of who goes in and out, and when
- Electronic security system that allows access of authorized and properly trained personnel only

Air Treatment and Filtration

All exhaust air would be filtered by a high-efficiency particulate air (HEPA) filter system. HEPA filters use ultra-fine fibers to remove microscopic particles 0.3 microns in size and smaller from the air with 99.97 percent efficiency. Larger particles are of course removed more easily. HEPA filters can trap any bacteria or viruses that may be in the air. The air pressure across these filters is monitored, and if a filter becomes clogged and the pressure drops, an alarm signal would be generated to the control centre for immediate follow up. The filters are inspected regularly, and they are sterilized before being replaced.

Changing and Shower Room

Changing Room and Shower Room

Researchers must leave their clothes behind in a changing room, take a decontaminating shower, and put on laboratory clothes (even socks and underwear are provided) or a biocontainment suit before entering the lab.

Inside the Lab

Once passed security check and inside the lab, the following safety systems and procedures will take place.

Emergency eye wash

-80°C Refrigerator and Incubator

Safety features include the followings:

- Entries and exits have double-door airlocks
- Work surfaces are regularly decontaminated
- If a vaccine exists, researchers are vaccinated against the microbe they are studying
- All solid and liquid wastes are decontaminated by heat sterilization, gaseous sterilization, or liquid disinfectant. Before it leaves the facility, this waste meets or exceeds the environmental standards of the community where the facility is built

Biocontainment Suits, Pass Thro Boxes, Autoclaves and Biosafety Cabinets

The facility comprises two number of general purpose PC-3 Labs (Labs 1 and 2), a Write Up Room, a Decontamination Chamber, two number of Animal Rooms (Animal Rooms 1 and 2) for research using isolated animal cages and cabinets, one number of Animal Room (Animal Room 3) for research on animal being put inside fencing BUT not isolated from the atmosphere of the room. Researchers who worked in the Animal Room 3 are required to put on biocontainment suits.

Unique Features inside the Animal Rooms

Once the daily research work is completed, researchers in biocontainment suits must shower out with air shower and then water shower with disinfectant before leaving the Animal Room 3.

With the establishment of this first 'Super Laboratory', it is hoped that both the research scientists and the community could be protected from fatal diseases. We are all looking forward to witness the full service of the Lab to fight against new emerging diseases.

Client: Estates Office, The University of Hong Kong

Project Architect: Percy Thomas Architects Planners and Designers Ltd.

E/M Consultant: Parson Brinckerhoff (Asia) Ltd.

Quantity Surveyor: Levett & Bailey Chartered Quantity Surveyor Ltd.

Main Contractor: Tysan Building Construction Co. Ltd.

Laboratory Safety and Operation Consultant: Dr. Tony Della-Porta, Managing Director, Biosecurity and Biocontainment International Consultants Pty Ltd (Bio2ic)

Independent Laboratory Validator: Mr. David Martin, Biocontainment Engineer, Martin Containment Consulting

Logistics Advisor: Biocline Healthcare Products Ltd.

Construction Period: September 2003 to March 2004

Training, Testing and Commissioning Period: March to October, 2004

Contract Sum: 23 millions

Design standard based on Australian Standard 2243.3: 2002

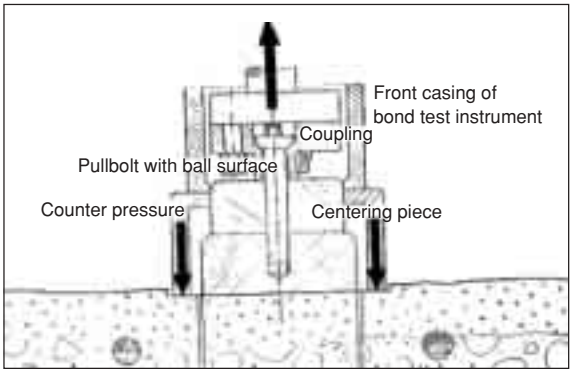
Total Quality Inspection for Buildings TQIB

(... Continue from last issue)

D. Structural Tests for Building:

1. Bond Test

The Bond-Test pull-off system was used to evaluate the near-to surface tensile strength of concrete structure and the adhesion strength of an applied coating or overlay. Bond Test is one of the favorable non-destructive testing to determine the tensile strength of the structure. The test involves applying a direct tensile load to a partial core advanced through the overlay material and into the underlying concrete until failure occurs. The load is applied at a constant rate, and the ultimate load is recorded.. In this manner cracking parallel to the surface of the base material can be evaluated. It is generally expressed in magapascals (MPa) at an age of 28 days. The tensile strength of concrete is about 8 % to 12 % of the compressive strength and is often estimated as 0.4 – 0.7 times the square root of the compressive strength.

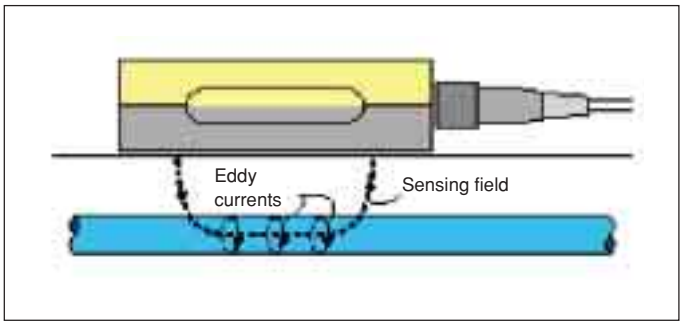


Applications: 1. Testing for adhesion of runway overlay
2. Adhesion testing of repaired bridge girder

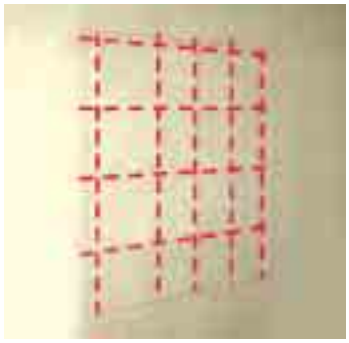
2. Covermeter

Adequate cover, to the steel reinforcement in a structure, is important to ensure that the steel is maintained at a sufficient depth from the concrete surface so as to be well protected away from the effects of carbonation or from aggressive chemicals. The main objectives are to determine the location of steel reinforcement and also the determination of concrete cover when the bar size is known. In the case of an existing structure where design drawings are not available, the size of the bars may also able to be determined. This method has been proposed for the simultaneous determination of concrete cover, location and size of the steel reinforcement bar effectively.

The principle of the use of the devices is based on measuring the change in the electromagnetic field generated by the instrument due to the presence of a magnetic mass such as a steel reinforcement bar. The system will receive the strongest when the sensor lines up with the rebar.

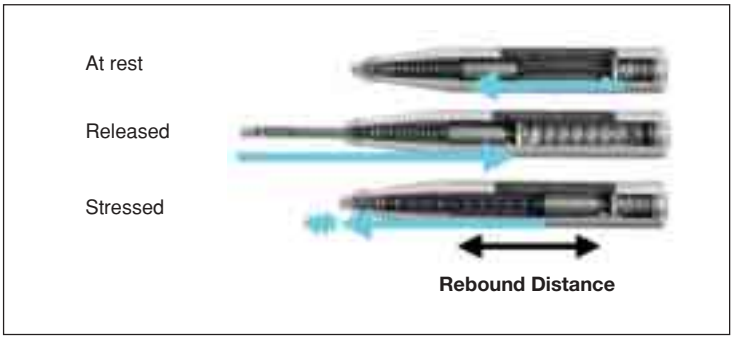


Applications:
Provide ***Position***, ***Cover*** *and* ***Diameter*** of reinforcing bars in concrete simultaneously.



3. Rebound Hammer

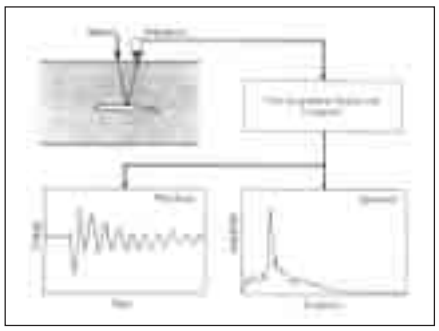
Rebound hammer is also known as concrete surface hardness test. The main purpose of the test was to determine the surface hardness of concrete. The most commonly used is the Schmidt hammer with an arbitrary scale of 0-100 mm. It consists of a spring –controlled hammer mass that slides on a plunger within a tubular housing. The hammer is forced against the surface of the concrete by the spring and the distance of rebound is measured on a scale. The test surface can be either horizontal or vertical. The test is more suitable as a quick and economic means of assessing uniformity than for strength estimation.



Application:
Determine the compressive strength of the concrete structure

4. Impact Echo Test

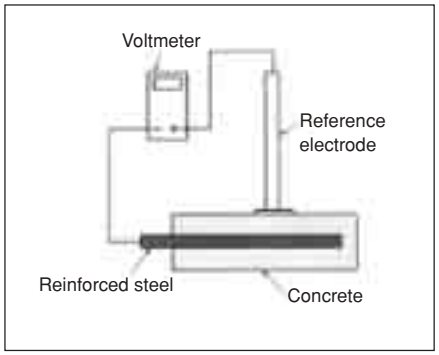
The impact-echo test method is one of the most recent of the nondestructive testing method used on concrete for the detection damage. The use of the impact echo test method enables you to detect hidden damage and determine the extent of damage inside a concrete cross section (delamination, honey-combs, cracks, etc.). Impact echo test is not a “black-box” system that can perform blind tests on concrete and masonry structure and always tell what is inside. The method is used most successfully to identify suspected problems within a structure, in quality control applications, such as measuring the thickness of new highway pavements, and in preventive maintenance program. Impact-echo is based on the use of transient stress waves generated by elastic impact. A short during mechanical impact, produced by tapping a small steel sphere against a concrete surface, is used to generate low frequency stress waves that propagate into the structure and are reflected by flaws or external surfaces. The resulting displacement versus time signals is transformed into the frequency domain. Using the time base of the display, the travel time of the pulse is determineb If the wave velocity in the medium is known, the travel time can be used to determine the location of the defect or interface where the reflection occurs.



Applications:
1. Quality control of the finishing work (testing the bonding of repairs)
2. Quality control of the overlay (for bitumen structure)

5. Half-cell

Corrosion of steel reinforcement in concrete is normally prevented by the alkaline nature of the concrete in which imparts chemical passivity to the steel. However, if the concrete is carbonated or chloride ions are present at the steel surface, the corrosion reaction will provide a sufficient supply of oxygen and moisture are both present. After locating a test area of reinforcement near the surface, a short length is exposed and an electrical connection made using a self-tapping screw. An insulating washer ensures that the connection is between the screw and bright steel. The lead from this connection is attached to the positive terminal of the computer. The negative terminal is then connected to the half cell. The corrosion areas of steel reinforcement bar in concrete are forming a short-circuited galvanic cell, with the corroding area as the anode and the passive surface as the cathode. The voltage of such a cell can reach as high as 0.5V or more, especially where chloride ions are present. In order to ensure that sufficient electrolyte is present at the surface all locations are pre-wetted using a fine spray of weak detergent mixture.



Application:
Detect the corrosion activity of the reinforcing steel of a concrete structure

Conclusion:

By combining the different inspection technologies and testing methods, the Total Quality of a building can be securely assured. A regular base inspection schedule, during the serious life of the buildings, should be encouraged. The outcomes of such maintain program is not just effective and reliable and it is going to create very substantial cost savings for the owners and community (i.e. both tangible and intangible savings).

About the Author:

Dr Alex Cheung FHKICM, FHKIE, FICE, FCIOB, FIOSH, serving the HKICM as Vice President, is the Technical Director of the Building Diagnostic Consultants Limited and he specializes in Concrete Technology & Corrosion Engineering. As an active professional, Dr Cheung was previously appointed as a Member of the Working Group of the “Building Safety Inspection Scheme (BSIS)” by the Building Department, HKSAR and he was also a former Chairman of the Hong Kong Concrete Repair Association.

In 1998, Dr Cheung was active serving HKIE as the Vice President and he was also the former Chairman of Building & Civil Division as well as the founder Chairman of the Safety Specialist Group.