HongKong Building Surveyors

NEWSLETTER

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News

- The HKIS/RICS joint office is now open in Room 1936, Swire House.
  Tel.: 5-263679

  Opening Hours:—

Weekdays	—	9:00 am	—	1:00 pm
		2:00 pm	—	6:00 pm
Saturdays	—	9:00 am	—	1:00 pm

- The HKIS/RICS joint dinner was held on 24th October 1985 in the Furama Hotel with over 400 members and guests participating.

- The University of Hong Kong has agreed, in principle, to set up general partice and building surveying degrees. The matter will be considered by the Univeristy and Polytechnic Grants Committee early next year.

- Mr. Ho Wing Yin gave a CPD talk on building maintenance and computer application in Australia on 25th October 1985.

The Supply and Demand of Chartered Building Surveyors in Hong Kong

(a summary of the report of Building Surveyors Division in December, 1984)

A) BACKGROUND

In early 1984, there was concern over the number of building surveying jobs being held by professions other than Chartered Building Surveyors. The Building Surveyors Divisional Committee then decided that a study was required on the supply and demand of chartered building surveyors in Hong Kong.

B) EMPLOYMENT STRUCTURE

Employment of chartered building surveyors (CBS) in Hong Kong as at 31st May 1984 were:—

	Fellows	Professional Associates	Total
Government Departments	14	94	108
Private Practice	11	28	39
	25	122	147

CBS's are employed as building or maintenance surveyors in Government. However, Government also accepts qualifications of HKIA, RIBA, ARCUK, NZIA for these posts.

The breakdown by qualifications of the 186 building or maintenance surveyors in Government is as follows:—

Chartered BS	other qualifications	Total
109 (58.6%)	77 (41.4%)	186

C) DEMAND

Projected demand is:—

	1984/5	1985/6	1986/7	1987/8	1988/9
projected growth	—	11	10	8	9
projected vacancies	—	11	12	12	13
– 5%					
Total	—	22	22	20	22

The projected growth has been based on the 5-year forecasts of the major employers in Hong Kong. The projected vacancies due to retirement or non-renewal of contract is estimated at 5% of the total number of building/maintenance surveyors.

D) SUPPLY

Supply can be considered under the following headings:—

a) Applicants for academic training.
b) Academic training.
c) Professional training.

a) **Applicatnts for academic training:—**

Professional Diploma H.K. Polytechnic

		Applications	Places	Ratio
b	1982/3	100	25	1 : 4
	1983/4	67	30	1 : 2.3
	1984/5	161	31	1 : 5

b) **Academic training**

The Hong Mong Polytechnic runs a 3-year full time Professional Diploma Course in Building Surveying leading to exemption from the Part II RICS examination. With the Professional Diploma students may sit the Final Examination.

The number of Hong Kong students gaining final examination or an exempting degree is as follows:—

Year	Pass RICS Final or Exempting CNAA Degree
1976	1
1977	10
1978	5
1979	11
1980	12
1981	11
1982	4
1983	—
1984	1

The H.K. Polytechnic predicts the following output of building surveying graduates:—

	1984/5	1985/6	1986/7	1987/8	1988/9
Professional Diploma	35	17	25	25	—
Degree in Building Surveying	—	—	—	—	25

c) **Professional training**

Academically qualified students require 2 years of approved training followed by a Test of Professional Competence. The number of training places available is:—

Buildings Ordinance Office	22
Architectural Office	11
Housing Department	7
Private Sector	say 4
	44

Assuming that a student is employed for 3 years prior to qualification, the average number of places available each year for professional training is 14.

E) CONCLUSIONS

The anticipated supply and demand situation is:—

a) Demand — 22 persons

b) Supply

- applicants for courses — 110 persons
- H.K. Polytechnic graduates — 25 persons
- Professional training — 14 persons

As can be seen, the major problem with meeting demand for CBS is the lack of places available for professional training. This is a critical area for improvement.

The demand for building/maintenance surveyors in Government for the period 1984 – 1987 will be met in the main by the recruitment of professionals other than CBS.

F) RECOMMENDATIONS

a) Professional training

If the H.K. Polytechnic is able to obtain full exemption from the Final examination for its Professional Diploma course, the number of available professional training places will be increased from 14 to 22. It is recommended that the Hong Kong Branch ensure that the H.K. Polytechnic actively pursue such exemption. In addition, every assistance should be given to the Polytechnic for the establishment of a degree course in building surveying.

b) Academic training

The Building Surveyors Division in Hong Kong should continue to organise tutorials with tutors from the United Kingdom.

c) Public Relation

To attract students of high calibre for the building surveying courses, the Building Surveyors Division should promote the image of the CBS by career pamphlets or exhibitions.

d) Periodic Review

A survey of the supply and demand of CBS in Hong Kong is to be carried out every two years.

The HKIS Shanghai Visit

Raymond Cheng

The HKIS International and PRC Affairs Committee organised a 5-day visit to Shanghai from 27th to 31st, October 1985. On the morning of 27th October, 11 members (4 building surveyors) managed to turn up in the Kai Tak Airport despite last minute changes to the flight departure time. The Cathay Pacific flight safely landed in the Shanghai Hongqiao Airport at about 11:30 a.m.The weather was a fine 21°C but slightly misty.

It was another hour before the delegation reached their booked Lan Tian Hotel. After a late lunch at about 2:30 p.m., the group visited the Yu Garden with its famous Dragon Wall. The Garden itself is a marriage of both the Northern and the Southern style of Chinese architecture and landscaping and was built over 400 years ago in the Ming dynasty.

The group had a sumptuous dinner at the Jin Kiang Hotel. After dinner, members were still energetic enough to tour the Huang Pu Park where hundreds of amorous young lovers of Shanghai spent their courting nights. In order to explore the night life of Shanghai even further, the group showed up at the Huaqiao Hotel disco to witness the dancers of Shanghai with their graceful rumba.

The second day, 28th October, was all business. There were long meetings with the Shanghai Pariotic Construction Corporation, the Foreign Economic Relations and Trade Commission, the Planning Commission of Shanghai, and the Shanghai Municipal Housing Management Bureau. The HKIS delegation tried to convey the meaning of the various types of surveyors in the Hong Kong context, while their Shanghai host was trying to discuss opportunities for foreign investments. The most interesting topic was the problem of planning in Shanghai which suffered from overcrowdiness, building shortage, inadequate transport facilities, sewage disposal difficulty and inadequate green areas. After the meetings, the group went to a dinner hosted by the Shanghai Patriotic Construction Corporation.

The third day morning, 29th October, found members with sleepy eyes, attending the meeting with the Shanghai United Engineering Consulting Corporation. This Corporation was set up by the state and was responsible for providing consultancy service to foreign investors who intended to build in Shanghai. Some questions raised by the HKIS members were left unanswered such as the procedure for approving a project from inception to completion. THe after noon was spent in visiting the Minhang and the Hongqiao Development Zones which are similar to the satellite towns in Hong Kong. The prefabricated 4-storey factory buildings in Minhang were particularly interesting.

On 30th October, the group paid a visit to the Shanghai Asscciation for Advancement of Science and Technology which was trying very hard to introduce the latest technology and techniques into China. The afternoon tour of the Huangpu River was exceptionally relaxing after a series of meeting in the previous few days. Members were able to get a full view of the central district of Shanghai as well as the industrial areas which lie along the River. In the evening, the delegation hosted a dinner to the Shanghai officials in return for their hospitality.

Members were split into four group on the morning of 31st October to talk in detail on quantity surveying, building maintenance, valuation and structural surveys for MTR projects. Slowly and hesitatingly, members conveyed their message in their Hong Kong style putohwa (mandarin).

In was a great relief to all members after the morning session. The whole afternoon was spent in sightseeing and shopping for their wives or girlfriends. The group subsequently returned to Hong Kong on a Cathay Pacific flight in the evening.

To building surveyors, Shanghai could offter good opportunities for renovation and rehabilitation works as many of the Georgian style buildings built in the 1930's are still in good condition and with refurnishing, could be turned into five-star hotels or prestige offices. Quantity surveyors from Hong Kong are already working on some joint venture projects in Shanghai and their future involvement will definitely increase. Estate surveying or valuation is still a field to be explored as China has still not changed significently on her concept of private ownership of land.

Prefabricated Factory under Construction in Minhang Development Zone

The Durability of Concrete

Raymond Bates

A) INTRODUCTION

This paper tries to approach the subject of durability of concrete in Hong Kong from the point of view of a building surveyor. In Hong Kong, a third of the public housing stock requires repair and the money spent on concrete repairs amounts to several hundred million dollars each year.

B) DEFECTS

The main defects are corrosion and cracking which are mainly attributed to:—

a) Poor concrete mix or workmanship
b) Corroded reinforcement
c) Design error
d) Movement such as overloading, gas explosion
e) Alkali – aggregate reaction
f) Fire damage
g) Freezing or thawing.

C) CORROSSION OF REFINFORCEMENT

The following factors affect the corrosion of steel:—

i) Carbonation
ii) Moisture
iii) Cracking
iv) Calcium chloride
v) Electrolysis
vi) Prestressed steel.

C) i) Carbonation

This is a process in which carbon dioxide in the air seeps into the concrete and reacts with water in the concrete pores to produce carbonic acid which neutralizes the alkaline environment protecting the steel.

The alkalinity of fresh concrete is pH 12.5 – 13.0. Providing the alkalinity stays above pH 10.5 – 11.0, it is adequate to protect the steel. Fully carbonated concrete has a pH value of around 8.3.

Good quality dense concrete carbonates to a depth of 3-4mm at an early stage but with only carbonate to a depth of 7mm after 50 years. Poor quality concrete will carbonate to a depth of 7mm initially and may reach 50mm within 8 years.

The rate at whch carbonation reaches the reinforcement depend upon:—

a) time
b) concrete cover
c) concrete density
d) water cement ratio
e) Cracks penetrating to reinforcement
f) alkalinity of the concrete.

ii) Moisutre

Reinforcement corrodes most violently at relative humidities of 80 – 90%. On buildings, areas prone to alternate wetting and drying deteriorate fastest.

iii) Cracking
Cracks permit moisture and air to reach the reinforcement, causing corrosion and carbonation. Cracks below 0.2mm are not a problem as they tend to be self-sealing.

iv) Calcium chloride
Chloride content in concrete over 0.4% by weight will corrode the reinforcement.

v) Electrolysis
There are differences in electrical potential between different parts of the reinforcing steel. If these anodic and cathodic areas are connected by an electrolyte such as salt solutions in the hydrate cement, an electro-chemical corrosion process is set up attacking the steel.

vi) Prestressed Steel
Prestressed steel corrodes at a faster rate than unstressed steel.

D) INVESTIGATIONS

These may take the form of

a) Visual Inspection

Cracks, spalling, deflection, staining and efflorescence are all indicators of potential problems. Inspection aids used range from binoculars, cameras, DEMEC gauge, tell tales and crack inspection microscopes.

b) Non-destructive tests for concrete

i) Surface hardness — using William's testing pistol, Frank spring hammer and Einbeck pendulum hammer.

ii) Rebound test — using the Schmidt hammer to measure the rebound from a concrete surface, and to arrive at the concrete strength.

iii) Penetration test — using explosive driven probes or impact hammers.

iv) Dynamic or vibration tests
These measure the resonant frequency or the pulse propagation. The former is for determining natural frequencies of vibration of concrete for calculating Young's moduli of elasticity. The latter aims at measuring the time taken for either an ultrasonic pulse or mechanical waves to travel through concrete. The results are then correlated with concrete strength.

c) Laboratory tests for concrete

These include acoustic detection of cracks, moisture content, density, permeability, aggregate shape and size, carbonation, pH value, chloride content, cement content and aggregate cement ratio.

d) Reinforcement

i) Cover Meter — used for determining location of steel, depth and bar diameter.

ii) Radiography — X-ray and gamma rays can be used for locating reinforcement and for determining concrete density.

iii) Electrochemical Noise – indicates whether corrosion is occurring.

iv) Resistivity – indicates the ease with which corrosion currents can flow.

v) Electropotential Mapping – indicates whether corrosion is taking place.

E) DURABILITY OF REINFORCED CONCRETE

The two major factors influencing durability of reinforced concrete are

a) concrete cover and
b) permeability of the concrete.

These are dependent upon the design and the construction process. The rate of deterioration is then influenced by the environment and the use of the building.

a) Concrete cover – This depends on the degree of exposure to the environment and the grade of concrete and may range from 15-60mm.

b) Permeability – This is influenced by:–
   i) Water cement ratio
   ii) compaction
   iii) curring
   iv) paste/aggregate bond
   v) permeability of aggregates
   vi) cracking.

   These factors are linked to concrete strength and so it is possible to improve permeability by specifying higher concrete strength. In Hong Kong, low carbonation or permeability is found to be associated with concrete strengths of at least 30 N/mm^2.

c) The environment – These include marine environment, air pollution, rainfall, relative humidity, temperature and wind direction. The Hong Kong environment can be considered as aggressive. The weathering effect on buildings must be considered when designing preventive measures.

d) The use of a building
   The way occupants of buildings use them can often be the source of water in the corrosion process. Preventive measures should consider how the building is used.

e) Preventive measures
   In addition to repairs, preventive measures are possible to remove a source of moisture or chlorides or to slow down the rate at whch moisture, carbon dioxide, and airborne chlorides penetrate the concrete. To slow down carbonation, and moisture penetration, coatings can be applied to the concrete. Such coatings should have a low permeability to carbon dioxide while permitting water vapour within the concrete to escape.

   Some silicate solutions can penetrate the concrete and inhibit ingress of water.

   Cathodic protection, used for many years to protect marine structures is now being researched for building protection.

Transfjice Jam and the Shanghai Mass Transit System

Raymond Cheng

With a population of 6.6 million people being crowded in an urban area of only 340 sq. km., Shanghai is one of the most densely populated cities in the world. There are over 1,100 km. of roads but the road area is a mere 9% of the urban area.

Visitors to Shanghai are amazed by the sea of people riding bicycles, totalling 3.2 million. There are 113,000 motor vehicles and 4,100 buses running in 144 routes, carrying some 12 million passengers per day. In addition 10,000 motor vehicles enter the city from other parts of China.

From the above facts, one will not be surprised to find acute traffic jam in the central business district which covers an area of 20 sq. km. The situation is as follows:—

a) **Traffic flow**

45 out of 144 bus routes passes through the central district carrying 7.2 million passengers per day, with a peak hour ridership of 800,000. 54% of the loading and unloading points for lorries are with in the urban area.

Every day, more than 20,000 motor vehicles are obstructed by 26 railway crossings.

Because of the high volume of traffic flow and the narrowness of the streets, 42 road crossings have daily traffic jam, among them 25 are in the central district.

The jams are so bad that the average speed of motor vehicles, has slowed from 25 kph in the 1950's to 15 kph in today.

b) **Shortage of buses**

Since 4,100 buses have to carry 12 million passengers a day, each bus must carry 3,000 passengers per day. Therefore during rush hours, the crush load of a bus may reach 12 persons per sq. m.

c) **Shortage of ferries**

There are 21 ferries along the Huang Pu River transporting 880,000 passengers daily. But those in the central district can hardly meet the demand with only 5 shuttle boats which have a capacity of 20,000 passengers per hour.

To overcome the ever-increasing traffic problem, the Shanghai government is therefore actively considering a mass transit system similar to the Hong Kong MTR. In fact, a feasibility study has already been completed by the Hong Kong MTRC engineers in 1985. Phase 1 of the Shanghai mass transit system will be 14.4 km. long with 13 stations passing through the central business district. The construction problems will be the low soil bearing capacity and, the high water table due to the adjacent Huang Pu River. The estimated cost is in the region of RMB 15 billion, which again may be a problem due to the recent squeeze of China on reserves.