

# A Review on “the Study on the Strategy Planning- Changes for Companies Working on Leakage Detection Contracts Affecting Slope Safety” and Utility Profession Development in Hong Kong

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**Abstract:** The lack of safety awareness and low professionalism standard within the utility survey industry in the past decades generated lots of inconveniences and crises such as unnecessary road excavation, casualties and even fatalities. With the rapid development of Hong Kong’s underground utilities, our underground has become so congested and there has been increasingly high demand for utility maintenance and very keen competition among the utility undertakers for room for utilities installation. The author will base on the study on the strategy planning - changes for companies working on leakage detection contracts affecting slope safety by Ir King Wong in late 2002, to further elaborate and discuss what transformations have been undergoing in the industry, what measures have been implemented in tackling the diverse standards and to enhance the professional standard of utility survey practitioners, Utility Specialists (US) in short.

With the global threat under the financial storm, will this challenge once again drive us back to the old days of the utility survey industry? What measures should be prepared by the industry to better prepare us to tackle this threat? What will be the future development of the personnel in utility survey industry now called the utility specialists? As continuous professional development is a widely applied term in emphasizing the importance to have a lifetime practice, rather than maintaining but also updating our knowledge and skills for our workplace, this paper will also portray the challenges and recommendations for the utility specialists nowadays to equip themselves further.

**Keywords:** Standardization, professionalism, continuous professional development, utility specialists

## 1. Introduction and Background

On 23 July 1994, a disaster landslide happened in Kwun Lung Lau in the Western Area in Hong Kong Island and Professor Morgenstern led an investigation to find out the cause of the disaster. The disaster killed 3, injured some and damaged the retaining wall outside the Kwun Lung Lau Estate and a temporary market underneath the retaining wall. Professor Morgenstern’s report concluded and suggested that leakage of nearby buried drains was a key factor contributing to the tragedy and a program of direct monitoring and repair of buried services where leakage might impact on slope stability should be developed.

In 1996, the Works Branch of Hong Kong Government published a Code of Practice (COP) on Inspection & Maintenance of Water Carrying Services Affecting Safety of Slope signed by Ir H.S. Kwong, the former Secretary for Works and requested the slope owners to look after their properties by carrying out regular inspection and testing on the Buried Water-carrying Services (BWCS) affecting their slopes. The concern of leakage detection survey in the early development of Hong Kong was to save water and to cope with the limited water supply. After the Kwun Lung Lau Event, leakage detection has been shifted to include detection on buried water-carrying services affecting slopes and since then, many companies in Hong Kong modified their strategy planning to meet the growing business opportunities. Most of the firms were looking for financial benefits, only very few of them are looking for quality of works. Details about the changes have been discussed in the King Wong report of 2002.

From 2004 to 2006, the said COP was reviewed under the leadership of the then Environment, Transport and Works Bureau (ETWB) and the Civil Engineering and Development Department

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(CEDD), HKSARG with help from other relevant works departments including Architectural Services Department (ArchSD), Buildings Department (BD), Drainage Services Department (DSD), Highways Department (HyD), Housing Authority (HA), Water Supplies Department (WSD) and two professional institutes, namely, the Hong Kong Institution of Engineers (Civil and Geotechnical Divisions) and HKIUS, now the Hong Kong Institute of Utility Specialists. The COP was reviewed and renamed as “Code of Practice on Monitoring and Maintenance of Water-carrying Services Affecting Slopes” and published in November, 2006 after being signed by Ir MAK Chai-kwong, JP, Permanent Secretary for the then ETWB and the current Permanent Secretary (works) for the Development Bureau.

## **2. Situation of Utility Management in Hong Kong**

Hong Kong being small in area and congested with building on the limited usable areas, the constructions and facilities are therefore built closely to each other. According to the Highways Department, on average there are around 37 kilometres of underground utilities per kilometre of road. In terms of density, it is 3.5 times, 24 times and 85 more than that in Singapore, England and the United State respectively. More than 20 utility companies are laying underground pipes and cable lines which include telecommunication cables, gas and water pipes, electricity cables, sewage and ducts, etc. The situation was worsened due to lack of one standard in Hong Kong and communication channel not opened to the surveying practitioners.

## **3. The Study in 2002**

In late 2002, King Wong completed the study “the strategy planning - changes for companies working on leakage detection contracts affecting slope safety” (the King Wong Report) and the followings were the key contents.

- I. History of water leakage detection in Hong Kong;
- II. History of drainage inspection in the United Kingdom;
- III. Industry advancement, standards being set, the present situation and future development in the UK;
- IV. History of drainage inspection and the existing situation in Hong Kong;
- V. The changes in the contracts that contract sum became bigger and bigger;
- VI. Standardization, institution, training and how to become preferred services providers;
- VII. Difficulties, future of leakage detection and recommendations on how to improve.

At the end of the study, the following recommendations have been made in view to achieve for high quality of works and being professional:

- i. To form a formal list of specialist for Underground Utility Surveys.
- ii. To qualify persons who meet the requirements as competent persons.
- iii. To set up a standardized method/system for different types of Underground Utility Surveys.
- iv. To pre-qualify or with a marking scheme for specialists to allow them submitting tender directly to reduce cost and chance of lost of control for the progress.
- v. To evaluate specialists after each major contract for the performance of the specialists.

During the study, only a few of the utility survey firms (BUDA, EGS and Freyssinet) can meet the basic requirements for utility survey although many other of them were working in the market.

After some years from the report, the situation has been changed, improved yet some issues are to be resolved. Apart from the 3 firms being mentioned stayed as profession as they were, many other firms at the same time left the market or dimmed due to various matters including unreasonable low price led to company bankruptcy; low quality of works led to no tender invitation from clients; low remuneration package to staff led to no professionals serving the company and so cannot provide

quality service to clients. In stead, some new firms entered the market as derivatives of those dimming firms.

#### 4. The Utility Specialists-In the past

In the past, the importance of the utility survey has been overlooked. Many would not carry out survey believing that the record plans would be sufficient. Others found the survey results inaccurate that they have no confidence on the operators at all.

Soon after the Kwun Lung Event, there were lots of contracts requesting the contractors to employ qualified persons for the survey works, there wasn't any clear definition on the personnel and survey accuracy requirements, nor there was any performance evaluation system involving the practitioners that most of the survey results have had various issues to be resolved.

Before the formation of HKIUS, Ir King Wong chaired the Steering Committee for the improvement to be taken and setting up of relevant requirements for personnel and company in terms of training, qualifications, safety and quality assurance system, etc. In addition, how to educate clients and how to ensure all the practitioners are competent were also the key matters to be tackled.

**To start with**, a training course was introduced to Hong Kong by a training institute in 2001, for standard coding of Conduit Condition Evaluation (CCE-CCTV & ME) by using man entry and non-man entry methods and other advanced training for water leakage detection, utility surveys, GPR survey, pipe rehabilitation, etc . The theory and practice were adopted from Australia and was widely used in Australia in the industry which is compatible to that using in the United Kingdom and has been adopted by Singapore.

#### 5. The Utility Specialists-Recent Development (2003-2008)

##### 5.1. The Institution

Hong Kong Institute of Utility Specialists (HKIUS) was registered in 2002 as a non-profit making organization with an aim to promote and advance the knowledge and practice of underground utility services, and the creation and maintenance of a high standard of professional qualification in utility survey by organizing trainings and events. Its first Executive Committee was established on 1<sup>st</sup> April 2003.

HKIUS is aimed to:

- Promote and advance the knowledge and practice for underground utility survey profession, and to create and maintain a high standard professional qualifications;
- Provide an advisory service on underground utility surveys for members of HKIUS and members of the public in general;
- Facilitate exchange of opinions with others professional bodies on underground utility survey;
- Help maintaining reasonable post-services standard in underground profession in the community
- Co-operate and confer with, or otherwise assist and advise, government departments, quasi-governmental organizations, public utilities organizations, universities, colleges and other public or private bodies or corporations in the utility survey industry.

Currently, there are around 200 members in HKIUS coming from various professions for surveying, maintaining, design, works and data management, etc. Details of HKIUS may be found at [www.hkius.org.hk](http://www.hkius.org.hk).

##### 5.2. Standardization and Public Recognition

In few years' time, HKIUS together with UTI and HKURC has drafted standardizations including those for work procedures, report format, work requirements, personnel requirement, technology advancement, etc to be further enhanced in the near future. In addition, students from the Departments Building and Real Estate (BRE) and LSGI of The Hong Kong Polytechnic University and Departments of Mechanical Engineering and Civil Engineering of the University of Hong Kong has completed some studies related to methods, materials, procedures, underground utility allocations and utility management, etc.

There being no clear or one standard in the past that, the standards adopted by HKIUS for various surveys and as requirements for members of HKIUS have received well recognition from the public. It is not difficult to realize that Particular Specifications adopted by HKIUS are now being used with or without any amendment by the consultants, contractors, surveyors, government authorities for non-public works contracts and by the public users when they are looking for help for their slope maintenances on BWCS, drains and pipes in their new developments, etc.

### 5.3. Continuous Professional Development, CPD

During the time and after the King Wong report, to make the public aware about the importance of utility surveys and to provide platform for CPD for both HKIUS members and other related professions, a total of over 100 events were organized and/or supported by HKIUS with some of the major ones listed as follow:

Date	Title/Topic	Speakers and Remarks
Nov., 03	Open Forum "The Public Interest in Reducing Road Opening, Safer Excavation and Better Slope Maintenance by using GIS based Utility Information Centre	Various and Over 500 including directors of works departments, figure heads of associations, heads of academic departments, leaders of consultants, contractors, surveying and related business firms attended
10 Sep, 05	Contemporary Legal Issues in the Utility Industry of Hong Kong	Various and over 250 attended
9 June, 05	Technical Seminar on Utility Management in Hong Kong	Ir Thomas Wong (Assistant Director of HyD) and over 200 attended
21-22 July, 07	Professional training and sharing forum at DongGong, China	Nearly 100 attended. Speakers from Beijing, SZ and HK.
Sep 05 to 07	"Utilities Protection, Slope Maintenance and Work Safety in Excavation- Drawing, Slogan, Creative Writing and Practical Competitions"	Over 2000 entries and 1000 attended various seminars, talks, visits and conference. The field competition was finalized with 10 teams from local and 4 cities (SZ, GZ, Dalian, Shanghai) from the mainland China.
7-9 June, 08	Professional training and sharing camp at ShenZhen, China	Nearly 100 attended. Speakers from GZ, SZ and HK.
14-15 Sep, 07	Conference on the Utility Safety and Management-A two-Coast, four-area conference.	Over 300 attended with around 30% from the Mainland
14 Apr, 08	Technical Talk on The Utility Profession in the New Era	Ir Dr. Prof. William Ko and Over 200 attended
14 Apr, 08	HKIUS 5 <sup>th</sup> Anniversary and the HKURC Inauguration Dinner	Over 200 including directors of works departments, figure heads of associations, heads of academic departments, leaders of consultants, contractors, surveying and related business firms attended

With continuous efforts from the members and the staff of HKIUS, by June, 2009, valid corporate members (O/M/F) of HKIUS will be exempted by the Labor Department, HKSARG for attending refreshment course for the Mandatory Safety Training (Green Card) to show the fact that corporate members of HKIUS have met the requirements by the internal requirements on CPD and with concerns on safety matters.

To maintain membership or being a new member of HKIUS, it is one of the requirements of HKIUS for members to have at least 35 CPD hours annually or 70 CPD hours in two consecutive years. Members cannot meet the requirements will be suspended for membership and given a period to acquire for enough CPD hours and membership will be de-listed when situation maintains unchanged.

#### **5.4. Research and Development**

To further develop the utility profession, with support from HKIUS and the Faculty of Construction and Land Use, the Hong Kong Polytechnic University, the Hong Kong Utility Research Centre (香港管綫管理研究中心) was established in 2007 with Ir Dr. Prof. William C.G. Ko SBS (高贊覺博士、教授、工程師), Ex-Director of Water Supplies as the Founding President and the Founding Vice President is Ir Damien CC Ku (古志眾工程師). The HKURC is operated under the supervision of the Secretary General, Ir Dr. King Wong (黃敬博士、工程師)

##### **5.4.1. Aims & Objectives of HKURC**

- I. To promote and advance the knowledge and practice of the underground utility management.
- II. To facilitate exchange of knowledge and practice with other professional/research bodies on underground utility management.
- III. To develop and enhance the role of the underground utility survey profession in the community.
- IV. To cooperate and confer with, or otherwise assist and advise, Government departments, universities, colleges and other public or private bodies or corporations in the Utility Surveying Industry & Works.

##### **5.4.2. Research Interests**

The research interests of HKURC include:

- I. Utility Survey Methods
- II. Utility Survey Techniques and Result Accuracy
- III. Materials for Utilities
- IV. Control Programmes for Utilities, Utility Management Design and Systems
- V. Condition Evaluation of Buried Utilities etc.

In addition, HKURC also provides funds for relevant academic researches and training. Recently, funds have been granted to Civil Engineering Department and Mechanical Engineering Department, HKU, IVE (Chai Wan) and a Secondary School for relevant researches, design projects and training.

HKURC is currently supported by some 30 Honorary Advisors and they come from local and the Mainland academics institutes and figure heads of the industry

More details about HKURC may be found at [www.hkurb.org.hk](http://www.hkurb.org.hk).

## 6. Professionalism

### 6.1. Disciplines of HKIUS

HKIUS members come from a wide range of disciplines involved in utility survey and other specialities including:

#### HKIUS Disciplines

- A) CCE(CCTV&ME): Conduit Condition Evaluation (CCTV and ME Survey) 管道狀況評價〔排水〕
- B) MHICS: Manhole Internal Condition Survey (沙井狀況評價)
- C) US(PCL): Utility Survey (Pipe Cable Locator Survey, PCL) (管綫測量)
- D) WLD: Water Leakage Detection and Control (漏水監控)
- \*E) BWCS: Advanced Leakage Detection of Buried Water Carrying Services Affecting Slopes (斜坡管道測漏)
- F) PR: Pipe Rehabilitation by Trenchless Technology(管綫維修)〔非開挖工程技術喉管修補〕
- G) GPR: GPR(Ground Penetrating Rader) Survey (管綫雷達探測)
- H) FLOW: Flow Study in Drainage Conduit (流量監控)
- I) PCS: Pipe Condition Surveys by other non-destructive methods (管道狀況評價)
- J) DM: Data Management for Utility Records (管綫資料管理)
- K) UM: Utility Management(管綫管理)
- L) PM: Project Management for Utility Industries(管綫項目管理)
- M) Others: Membership without Discipline for those professionals interested in the industry but without relevant experiences(非管綫專業會員)

**\* Application for Discipline E will require applicants to meet the requirements for at least 3 out of 4 from Disciplines A, B, C and D.**

#### **HKIUS memberships**

HKIUS members are divided into two major categories, namely, corporate and non-corporate. For corporate members, they are further divided into professional and non-professional grades.

The following classes of HKIUS members are classified as professional.

- For Individual: Manger and Fellow members and RPUS.
- For company: Group A, B & C.

All the corporate members are eligible to vote at all HKIUS AGM and EGM. However, only the individual professional (M/F) members may become RPUS (Recognized Professional Utility Specialists), Professional Auditors, Trainers and only Fellows who have served the institute are eligible to be elected as President or VPs of HKIUS.

The entry requirements of HKIUS have been clearly defined in its Constitution (2007) while applicants are yet to be assessed by professional interview for all the corporate (O/M/F) membership.

A summary of the entry requirements and current number of members is listed as follow:

Membership Type	Abbreviation	Requirements	Total no.
Student	N/A	Full time students and age below 25.	2
Affiliate	N/A	Age over 18 and Support to HKIUS constitution	2

Associate	AMHKIUS	F.5+1 year +Training +Safety +CPD	15
Operative	OMHKIUS	F.5+3 year +Training +Safety +CPD + Interview	52
Manager	MHKIUS	Degree+5 years +Training +Safety +CPD + Interview	82
Fellow	FHKIUS	Degree+8 years (or MHKIUS+ 5 years)+Training +Safety +CPD + contribution to the industry	19
Recognized Professional Utility Specialist	RPUS	M/FHKIUS+2 years local exp.+ CPD+ interview	2 (accept application from 1 <sup>st</sup> Jan, 2009)
Honorary Fellow	Hon.FHKIUS	Professionals with substantial contribution to the industry and by invitation only.	4

Table 6.1: HKIUS individual membership distribution.  
(Note: membership under annual review or application excluded)

Corporate Company Membership	Years of Experience (Years with HKIUS) and requirements	Min. No. of member Total/ (Professional)	Total no.
(Group A)	3 years + Quality and Safety System	3/ (1)	0
(Group B)	5 (3) years + Quality and Safety System	6 / (3)	15 (all current company members to be divided as Group A or B depends on company size, turnover and equipment range)
(Group C)	10 (3) years + Quality and Safety System	10/ (5)	0 (accept application from 1 <sup>st</sup> April, 2009)
Sponsor Company Member	Not Required but supportive to the industry	Not Required	0

Table 6.2: HKIUS Company Membership Distribution  
(Note: membership under review or application excluded)

## 6.2. Latest Technology and Personnel Training

In light of the densely-populated nature of underground utility system, an anticipated development of such an underground network, and the continuous development of Hong Kong as a metropolitan city, we need to pay special attention to how such an underground network is maintained and further developed. Some latest technologies and systems, such as Integrated Data Management System (IDMS), Geographic Information System (GIS), One Call Centre and pipe condition assessment techniques, etc. can be utilized so as to better locate various underground utilities and monitor their conditions. On the other hand, personnel training is also becoming more and more important, as personnel in this profession need to equip themselves for the latest development in terms of technology, equipment, as well as some ethical issues.

### 6.2.1. GIS Database Concept

Geographic Information System (GIS) is a system of computer software, hardware and data, and personnel to help manipulate, analyze and present information that is tied to a spatial location. At the core of this database, it enables users to obtain the relevant data through the Internet. Users can select a location by coordinates, slope registration number, name of survey specialist and the categories of

data that they want on the browser, the web-based GIS will retrieve the required information and display on users' browser. It also allows the users to pay and download the softcopy of the data.

GIS is used because it helps us in a number of ways. It helps to handle a lot of data with different types and time. The current practice of operations on site is mainly manual type which creates a lot of discrepancies and inconsistencies. Based on GIS, we can find paperless way to fill in correct information of underground public utilities via a pocket PC or PDA, so that time and cost will be saved when we need to dig up the road to search for relevant underground utilities at the right positions.

### **6.2.2. Hong Kong Conduit Condition Evaluation Codes**

With an aim to provide a platform to have more effective communication and hence to reduce errors and cost, the Hong Kong Conduit Evaluation Codes (HKCCEC-2004) was established by help of local authorities and education organizations in 2004. The codes can be applied in the conduit condition evaluation. The system has now been revised twice and the fourth edition is expected to launch in April, 2009. The key difference between HKCCEC and similar system in the U.K. and Australia is that we pay more attention on the slope safety.

The utility situation will be graded according to the codes. The best will be "1" while the worst will be "5". The utility whose grade is "5" represents that it needs to be repaired immediately.

### **6.2.3. Integrated Data Management System**

Built in accordance to HKCCEC-2004 and will be amended to HKCCEC 2009 (Code of Practice of Conduit Condition Evaluation by CCTV Survey) for Conduit Condition Evaluation and HKIUS adopted specifications for Utility Survey (US), Manhole Internal Condition Survey (MHICS), Water Leakage Detection, etc. and the relevant international color codes for utilities, Integrated Data Management System (IDMS) can digitally record all kinds of breakage or destruction in one platform. It is a database containing various sorts of information built on GIS.

With IDMS, we can be assured that the problematic breakage or destruction can be dealt with quickly, so that more serious events can be prevented in future. In light of this, people's lives and properties can be protected in a wider extend, and unnecessary social costs will be saved in the future.

### **6.2.4. One Call Centre**

"Call Before You Dig" is a very common practice in the developed countries such as the State, Canada and Australia. However, one call centre is now available in Hong Kong yet.

Efficient service on utility survey and mapping services, excavation permits, competent persons on site, etc. will be highly demanded by the needed clients. It will be even better if the service will be provided in short time, say within 2 hours and at reasonable cost. For utility surveying companies, the practice of using One Call Centre can reinforce quality and efficiency in providing services, which can somehow enhance the company's image. The company can also have optimal use of human resources with more coordinated distribution of competent persons. With more effective communication with the competent persons, these competent persons can have increased jobs and so more income. With this incentive, few people will employ substandard service providers.

For client and the public as a whole, One Call Centre for utility detection before dig will safe guard our lives and to improve our living standard but maintain at the reasonable cost and time for surveying and compiling with the law requirements.

### **6.3. Secondary and Tertiary Education**

With approval from the Education Bureau, the Utility Training Institute (UTI) works with the Department of Civil Engineering of the University of Hong Kong to run an Applied Learning (ApL) Course titled “Utility Profession and Applications” from September 2007. The course aims to let the young people (F.4 students) to understand how to improve utility safety and management by accurate surveys, and raise their safety awareness and teamwork. This course also helps them to acquire professional knowledge and attain good ethics for future works. It is anticipated that students can be equipped with basic skills in utility surveying, communication skills and leadership abilities. These students may also become the first batch of students taking the Degree (BSc. In Utility Survey) as their major subject in the LSGI of the Hong Kong Polytechnic University.

In September, 2009, with a view to further improve the professionalism of the industry and approved by the University Grant Committee (UGC), the Degree course “BSc. In Surveying (Utility Survey)” will be commenced and students are now being recruited. The course is being hosted by the Land Survey and Geo-Informatics Department (LSGI) of the Hong Kong Polytechnic University. Graduates will be expected from 2012 and they will not require further training but CPD, experiences, safety management and interview to become a professional member of HKIUS.

The course will cover all the disciplines (locating, surveying, condition assessment, safety, management, etc) of HKIUS as an introduction and students will need to pick some disciplines as their future professional development.

## **7. How to Maintain High Quality Standard**

In order to maintain a high level of professionalism of utility surveying practitioners, the government, practitioners of utility management, consultants, clients and Hong Kong Institute of Utility Specialists should work together and the following suggestions may be imposed.

### **7.1. Quality of Staff**

In the technical presentation before the 5<sup>th</sup> Anniversary Dinner of HKIUS on 14<sup>th</sup> April, 2008, the Founding President of Hong Kong Utility Research Centre (HKURC), Ir Dr. Prof. William C.G. Ko stated that “As a professional in utility surveying, he must have proper education and training to equip himself with adequate knowledge related to utility surveying and communication skills. Also, as the demand of skill is high for utility specialists, one who just possesses theories is not adequate enough. Practitioners must have practical utility surveying work experience, have experience of using different surveying tools and management programmes. They should also have a logical mind to do their works step by step, so as to reduce the occurrence of mistakes and help producing a more accurate surveying result. Being ethical is also very important for utility surveyors. Those without ethics, though possess experiences and skills, may cheat to supply false information to attain the best interest of himself. This may not only affect their own future, but also the fame of the industry. The industry must set up monitoring measures to ensure the quality of its practitioners.”

Apart from this criterion, all practitioners must also obey industry regulations and labour guidelines. If such standards are not followed strictly, clients’ trust as well as workers’ safety can be affected.

### **7.2. Quality of Company**

Apart from the quality of staff, the quality of specialist companies should also be stressed. As a company’s management quality will affect the working style of its staff, The Hong Kong Institute of Utility Specialists will assess various aspects of its members from time to time to monitor the quality of its member companies. The Institute has also introduced various regulations and to require its members and companies to comply. Specialist companies should not compete for contracts at a throat cutting low price. Service quality should be of paramount importance to strive for long-term benefits.

To ensure the work quality of the company members, HKIUS will pick up at least 1% of work done on an annual base for quality check. In case of query or even complaint received, Professional Auditor will be appointed to investigate the case and if members are found providing substandard service, they will be asked to improve or they will be de-listed if sufficient improvement is not made within a period of time.

### **7.3. Quality of Surveying Results**

To ensure the quality of information collection from utility surveying, methods of testing and accuracy requirements must be unified and conforms to both international and local standards. Also, test result and reports should also be written (by MHKIUS) and endorsed by qualified persons (RPUS). Such persons shall possess at least 5-10 years of related experience to maintain quality of service preferably.

### **7.4. Clients' Understanding**

Clients' knowledge of utility surveying can affect our profession to a great extent. If clients understand the professional standards, then they can make more informed decisions when they choose service providers. By organizing seminars, workshops, sharing sessions, competitions and site visits for clients, clients' knowledge will be broadened, so that they can understand better the importance of utility surveying.

The Hong Kong Institute of Utility Specialists also has a members' list for clients' choice. The list aims to include only companies with a high professionalism and ethical background. Other companies in the profession are also encouraged to raise their level of service, and to become part of this list.

## **8. Career Prospect of Utility Surveying Practitioners**

As a developed city, Hong Kong has become saturated in terms of buildings and underground utilities. In future, the need for underground utility repair and maintenance will increase and utility surveying will have especially great room for its development. Since the government started to care more about the importance of utility maintenance and protection, there has been a substantial increase in underground surveying contracts in terms of sizes and numbers, such as those on high-risk slopes, pre-constructions survey for roads, bridges and buildings etc. Some other government departments such as the Water Supplies Department, Transport Department and Housing Department, and some private corporations also invite specialists to conduct utility surveying for maintenance and related works, the utility surveying market will become bigger and the need for utility specialists will also rise. However, qualified specialist companies can only cater for about half of the projects, some other projects may fall into sub-standard companies.

With a growing demand, joining the utility surveying profession would be a life long career.

### **8.1. The Career Path of Utility Specialists**

With the training scheme introduced in 2000 and the Apprentice Scheme jointly introduced by the specialist company and the Labor Department in 2007, a Secondary Five graduate can start as an Engineering Assistant with an average monthly salary of HK\$7,000 to HK\$9,000. With more experience, continuous professional development and attainment of related diplomas, he may become a Technical Officer, earning a stable income of up to \$20,000 per month.

For fresh graduates, they may first work as an Assistant Utility Survey Specialist with a monthly income of more than \$11,000. Well-performing staff can become a Member of the Hong Kong Institute of Utility Specialists (MHKIUS) in 5 years' time and will probably be promoted to a professional specialist with a monthly income of around \$30,000. Some of them can become partners of utility surveying companies with unlimited potential in career development and remuneration.

## 8.2. Market Need

With traceable records from one of the utility specialist firm (who will be invited for tenders from at least 1/3 of the clients), the need of utility specialists for various types of surveys has been maintained at a high levels in terms of money size.

Table 8.1 shows the relevant tender sums of one of the utility specialist firm and the projected sum on the market as a whole from 2003-2008.

Year	Rounded up Tender sum by one firm (HK\$)	Project Sum of the market (HK\$)	Price Rating (%)	Remarks
2001/02	-	-	100	
2003/04	240,000,000	720,000,00	50	Many of the contracts were from 2002 and the tender prices went down and the start of the iced age of the market.
2004/05	135,000,000	405,000,000	40	First year after the iced age.
2005/06	120,000,000	360,000,000	30	
2006/07	120,000,000	360,000,000	50	
2007/08	170,000,000	510,000,000	60	End of iced age and price picked up.
2008/09	80,000,000 (6 Month)	480,000,000	65	

Table 8.1: Summary of tender from 2003 to 2008.

The market of utility professions was damaged by the unreasonable low tender prices by those entering the market at 2001/02.

As mentioned in the King Wong Report, many new comers (major contractors in Hong Kong) to the market expected for high profit margin as can be forecasted by rates receiving by other specialists in the market and their cost calculation. However, they have a mis-leaded calculation by information provided by non-professional persons/firms entered the field not long ago and wished to the service providers (sub-contractors) instead of employees. The tender prices were become unreasonably low and only upto 30-50% of the previous market rates. They have obviously overlooked the costs for training (non-professional will provide low quality work and hence re-visit required), equipment (frequent damage), data management (database and qualified operators), etc. For those entered the market during the time of 2003 and 2006, most of them left the market at the end of 2006 and so the iced age ended.

## 9. Current Development of Utility Specialists

To raise the professional standard of utility surveying, The Hong Kong Utility Research Centre is currently compiling with technical manuals and instruction manual/guide notes. In 2 to 3 years, the Centre will work with various organizations to establish a Utility Safety Index, for the utility professionals and the public to make use of. Also, the public, government organizations, the construction world and various universities will receive promotion about utility-related standards so that the public's recognition of these standards is raised.

Started late 2008, HKURC commenced to conduct a feasibility research on Utility Surveying costs and procedures. Some Bachelor and Masters students will also work on researches and write up reports on surveying methods, materials, work progress and accuracy of surveying result. Such information will be a positive step to standardization of utility surveying.

## **10. Suggestions on Improvement of Utility Safety and Management**

To improve underground utility management and safety, there are a few workable suggestions:

### **10.1. Increase Perceived Recognition of Professional Utility Specialist Organizations**

HKIUS is a relatively new organization. It needs to strengthen promotion to the government, tertiary institutions and the field of construction through seminars and publication of books related to the utility profession. These steps can help increase the recognition of the organization and encourage more utility surveying practitioners to become its members, thus to create more effectively managed and controlled organizations and qualified staff of the utility profession, so as to ensure that its service quality conforms to the standard.

With the current public recognition mentioned earlier and the BSc. In utility survey degree to be launched at the Hong Kong Polytechnic University in September, 2009, the professional path of utility specialists will become more robust, trustable and easy for identification.

### **10.2. Strengthen Training of Utility Surveying Professionals**

In terms of training, specialist companies which are current members of the Hong Kong Institute of Utility Specialists can work with recognized training providers to provide courses which are related to utility surveying, maintenance, data management, etc. Its members are also required to take part in suitable training conducted by experienced trainers. When they complete courses they will receive certificates accredited by the Hong Kong Institute of Utility Specialists, so that they can enhance/maintain their professional qualifications and improve their standard of work.

HKIUS is also promoting its continuous professional development courses, with the aim of providing long-term continuous training to its members and they have to present a clear record of training when renewal their membership. These courses will enable members to regularly receive correct and updated knowledge in the field of utility profession.

### **10.3. Establish Performance Assessment System**

Trainees need to pass assessments set by the Institute to become a member of the Institute and be given professional qualifications. Members of the Institute will also need to take continuous assessment, so that their service quality and professional ethics can be maintained. At least 1% of the works done shall be checked by the institute and in case of query or complaint being received, case will be investigated by the Professional Auditor accredited by the institute. Members under the required standard will be de-listed and should they wish to re-enter the institute, they shall apply as fresh member.

### **10.4. Promote Sharing among Different Parties**

HKIUS and various professional organizations, like the government, clients, educational bodies should organize various promotional activities, such as sharing sessions, seminars and open forums to explain procedures of utility surveying and the professionalism of members of the Institute, and let clients and the public know the importance of utility surveying. Also with different types of competitions, meetings and courses, students can gain more interest in utility surveying, so that there can be more professionals in this field in the future.

The Institute has a list of quality companies in which only those with a high professionalism and ethical background will be included. Other companies in the industry are also encouraged to raise their level of service, and to become part of this list.

## **10.5. Unify Utility Surveying Standards**

For utility surveying to become more mature, unified testing methods and accuracy requirements must be established, which are based on authentic research result together with analysis. Only under such criterion can these standards get overall appeal. The Hong Kong Utility Research Centre will work in researches in this area and pass such results to the Hong Kong Institute of Utility Specialists for validation processes. The Institute will also inform the government, the whole profession and other clients to observe the code of practice through advertisements, circulars and sharing sessions. Through these actions, the standards of the whole utility surveying industry can be improved.

## **10.6. Code of Practice and Operation Manual**

It will be beneficial for members and the public to have clear understanding on utility surveys, works and maintenance requirement, HKIUS together with other related organizations and government authorities shall work together for the publishing of relevant Code of Practice and Operation Manual to be referenced by the public.

HKURC shall take up the role to study on what and how to establish the relevant COPs and Operation Manuals.

## **11. Conclusion**

The utility profession is new but it has significant effect on the livings of the citizens and demands a high degree of professionalism. Its development, though sad, started from after the Kwun Lung Lau Event.

In the past, lots of difficulties faced us as utility specialists. Even worst many of the practitioners claim themselves experts yet to complete any training nor with any professional ethic. The situation led us into the iced age during late 2002 to early 2006. We are now recovering.

In the recent years, with efforts from the authorities, actions for institution, standardization, compulsory safety and skill training to members, clients' education and public awareness training conducted by HKIUS and UTI, etc have forested the industry of utility specialists to a better situation.

In a long run, recognition of the professionals by the authorities and the society for utility specialists in Hong Kong shall further improve the standard of utility specialist industry and professionals shall serve the public to an even higher standard.

Under the current situation, professionalism is the only way ahead to protect and maintain our service level.

Only through training to the required standards and accumulation of sufficient experience, practitioners can produce a good result in utility surveying. In light of this, the Hong Kong Institute of Utility Specialists, Hong Kong Utility Research Centre, Utility Training Institute and other organizations, including the government departments, consultants, construction companies, etc. should work hand in hand and promote professionalism of the utility profession.

All in all, when standards of the utility profession rise, citizens' quality of living can also be improved, which in turn the whole society gains.

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