HISTORY AND RECENT DEVELOPMENT OF CONSULTING ENGINEERING PRACTICE IN TAIWAN

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HISTORY AND RECENT DEVELOPMENT OF CONSULTING ENGINEERING PRACTICE IN TAIWAN

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ABSTRACT

Compared with most of the developed regions in the world, theprofession of engineering consultants in Taiwan is very young. Theprofession started to evolve only in the early Fifties. With therapid economic development and expansion of major infrastructureson the island, the profession started to reach a "mature" stage. This paper traces the development of the engineering consultants' profession in the past forty years, and describes the current statusand future prospect of the profession in the world market. Thepaper also touches on laws and regulations affecting theprofession.

1. History of the Consulting Engineering Practice in Taiwan

Compared with most of the developed countries, the consultingengineering profession in Taiwan is very young. Before the1950s, practically all the public works were carried out directlyby government agencies. Planning, design and constructionsupervision were either done in — house or given to foreignconsulting companies. In the private sector, besides small scaleindustrial plants, developments were concentrated on low risebuildings, and the works were almost entirely handled by architects. With the rapid economic development, increase in population anddemand for higher standards of living, the level of engineeringservices, in terms of technological requirements, efficientutilization of technical manpower and timely implementation, had tochange rapidly. Due to the inherent nature of governmentalagencies, which should be more at the level of policy decision andin a supervisory capacity for project implementations, theconsulting engineering profession started to evolve in Taiwan inthe early Fifties. Development or growth of the consultingengineering profession in Taiwan in the past forty years can bedivided into three stages:

(A) Infant Stage — During the early days of the Big TenConstruction Projects (early seventies), in view of the highertechnological development and demand for more sophisticatedengineering services, the Government took the step of establishingspecialized consulting engineering organizations under the categoryof "non — profit organizations". These organizations or companies arenot governmental agencies but under the nominal supervision of thesponsoring ministries. The major shareholders of these companiesare governmental departments or enterprises and the directors areappointed by the government. They are different from normal stateenterprises because these "companies" are exempted from payingprofit tax. Three "companies" were established during this periodof time. They are: China Technical Consultants, Inc. (CTCI), ChinaEngineering Consultants, Inc. (CECI), and Sinotech EngineeringConsultants, Inc. (SINOTECH).

(B) Adolescent Stage — This is the period of time when the Big TenConstruction Projects were implemented. The three state — sponsoredconsulting engineering organizations have made significantcontributions to the country in terms of not only providingengineering services, but also in terms of raising engineeringstandards, training of engineering manpower and to a certain extentaccomplishing technology transfer through cooperation withestablished consulting firms from the developed countries. Duringthis period of time the economic development in Taiwan hasprogressed rapidly, it was moving from an underdeveloped areatowards a developing area. Besides government — sponsored projectsand state —

owned industries, the private sector played a major rolein the nation's economic development which has made Taiwan beingone of the four little dragons in Asia. Because of the demand aswell as advancement in technology in the engineering profession (including many people returning home after receiving advancedacademic and practical training abroad), many independent consultingengineering firms started to emerge. In addition, several jointventure companies were formed by the three big companies and wellestablished firms from the USA to carry out special tasks.

(C) Matured Stage — The development and growth of engineeringservices in the Seventies has brought the consulting engineeringprofession moving from the adolescent stage towards a third stageof development — a matured stage. During the later part of thesecond, the growing stage, and the very early part of the maturedstage, the consulting engineering firms, both the State—sponsored andthe private companies, were exporting their services to theneighbouring developing countries such as Indonesia, Malaysia, thePhilippines, Singapore, Thailand and Vietnam. The three State—sponsored companies have grown to international size with more than1,000 employees each. The scope of services of these companies hasgreatly expanded and overlapped with each other.

2. Recent Developments

With the recent implementation of the six year developmentplan, which involves a projected spending of over 200 billion USdollars on new infrastructures, several new government — sponsored" non — profit" consulting engineering organizations have emerged. Additionally, many private engineering firms as well as foreigninvested companies have been established. In 1992, there were morethan 700 companies in Taiwan offering engineering, consulting ortechnical services. However, the real growth of the privateindependent consulting engineering firms is somewhat impeded by the"protectionism" of the State—sponsored companies and unlimitedincrease of small companies. Although there are hundreds of firmsregistered for business today, only a fraction of them hassufficient manpower and can offer quality services. Because of theso—called "non — profit", in fact "non — tax paying" status of theState — sponsored companies, many public projects, particularly thoseof significantly large scale, were given automatically to thosecompanies, even at a higher fee scale. Only very recently, theprivate sector of the profession was given chances to demonstratetheir ability and competence. This protectionism has certainlyaffected the growth of the competence of the engineeringprofession. Another factor which also contributed to the slowgrowth of the private independent consulting engineers is the factthat some government agencies, particularly those in controlling themoney, and to certain extent some private developers as well, havea blind belief in foreign consultants, whether they are reallycompetent or not.

The engineering service industry is one of the important industrieswhich a country can export. Only through fair competition andquality assurance can the industry grow. The consulting engineeringprofession will never really reach a matured and progressive stageif these two elements are not present. To enable the consultingengineering profession to really enter into a matured state, thefollowing steps become necessary:

(1) The consulting engineering profession must take up theresponsibility of being professionals with interest of the peopleand public safety as their major concerns.

(2) The profession must be given the opportunity to grow and todevelop without undue protectionism. It is the government'sresponsibility to encourage, not to prevent, the profession toimprove, to develop, to take up professional responsibility and toplay an active role in national development.

(3) The government must take a lead in establishing properprofessional fee structure so that the consulting engineers canafford "to think", therefore to produce safe and economical designs.

3. professional Engineers' Act

For quality engineering services, those people who carry out theplanning, design and construction work must possess adequateacademic training and appropriate practical experience. In alldeveloped and in a large number of developing countries, theengineering profession in practice is carried out by ProfessionalEngineers. A Professional Engineer, or P. Eng., is a person whopossesses the necessary academic and practical qualification andwho has been granted the right to practice as an Engineer, similarto a lawyer and medical doctor. The body, which is authorized by thegovernment, to be responsible for awarding or approving P. Eng. isdifferent in each country. For example, in the USA, each State hasa Board of Professional Engineers appointed in accordance with theP. Eng. Act in that particular State. In Taiwan, the Bureau ofIndustry of the Ministry of Economic Affairs issues the P. Eng. licence on the basis of certificate of qualifications issued by theExamination Yuan. In other words, in Taiwan, the government authoritywho issues the licence for practice and supervises the ProfessionalEngineers is different from the authority who determines thequalifications of a Professional Engineer. The latter often doesnot have a real understanding of the P. Eng.'s profession. This isquite a unique situation in the world. This "double headedcarriage" system has caused serious problem in the smooth enactmentof the P. Eng. Act in Taiwan.

The Professional Engineers Act in Taiwan was first promulgated in1947, and the most recent amendment was gazetted in December 1985. Although the P. Eng. Act has been in existence for more than 35years and the MOEA claimed that the Act was in force, endorsementof design or manufacturing by licensed professional engineers hasnever been fully enforced. According to the laws, the enforcementor requirement for Professional Engineer's endorsement is theresponsibility of different Ministries under the authorization ofdifferent Acts such as the Building Act (Ministry ofInterior), Highway Act, Railway Act (Ministry of Transportation andCommunications), Powers Act, Industry Act (Ministry of EconomicAffairs), etc.. Unfortunately, there is a lack of coordination andunification among the various Ministries. Although a similarsituation also exists in some other countries, but the ProfessionalEngineers Act is respected by all concerned for the sole purposeof ensuring public safety. In the last few years, the professionalengineers' associations in Taiwan were working diligently with theMOEA in the hope that a proper system can be established. This lackof attention or irrespect for the need for endorsement byprofessional engineers is probably also related to theprotectionism of State—sponsored consulting engineeringorganizations.

According to the latest amendment of the P. Eng. Act gazetted inDecember 1985, a professional Engineer can provide his/her servicein one of the following three ways: (a) Act as an independentP. Eng. or join with other P. Engineers, (b) Be employed by aconsulting engineering firm, and (c) Be employed by organizationswhich are required by law to have P. Engineers on the staff.

4. Government Regulations on Consulting Engineers and Engineering Practice

Up to the present (January 1993), there is no regulation regardingthe registration and supervision (or control) of consultingengineering practice besides the Professional Engineers Act whichwas unfortunately not really enforced in Taiwan. Anyone canregister a company as consulting engineers or engineeringconsultants or technical consultants with the Commercial Bureau ofthe Ministry of Economic Affairs, and the company can conductbusiness by just obtaining a commercial company licence from thecity authority. There is no professional qualification requirementand there is no control over the quality or professionalresponsibility besides those governing normal commercialactivities. The large number of so—called consulting engineeringfirms registered for business operation, more than 700 in January1993, can well illustrate this point. In 1988, a number of large (large in terms of total number of engineers employed) consultingengineering firms organized an association of engineeringconsultants. The association was formally admitted as a member ofthe International Federation of Engineering Consultants (FIDIC) in1991. As of the end of 1992, there were only 49 organizationsjoined the association as members. Efforts

are being made by theAssociation to urge the government agency setting up regulationsfor governing the establishment and operation of consultingengineering practice in Taiwan.

5. Technology Transfer

One of the major items of concern to many developing countries istechnology transfer. This is a novelty term which has been usedextensively by both governments which recipe foreign assistance andforeign governments which provide the assistance. This has alsobeen used by consulting engineering firms form developed countriesas a promotional gimmick. Technology transfer has been the subjectof discussion at many international conferences. It should beappreciated that technology transfer is a two — way communication. It takes the sincerity and willingness of the transferrer to givethe technology but it also requires the transferee to receive thenew technology. To receive the new technology, the engineers at thereceiving end must be properly trained, armed with the necessarybasic knowledge and techniques. More importantly, the receiver musthave the motivation and desire to learn.

In Taiwan, technology transfer has been reasonably successful insome cases but has failed miserably in many other cases. In thepast forty years there were many joint venture efforts for carryingout planning and design of major projects in Taiwan. Several ofthose projects have been repeated either with extension or with newfacilities at new sites. Unfortunately, many of these new projectsstill relied heavily on foreign consultants. There were severalcases when engineers in some joint venture companies openlycriticized the failure of technology transfer. In order to achievethe goal of technology transfer for elevating the engineeringcapability in the country and henceforth export technology andtechnical service, one must examine the following questionscritically:

(1) Is the partner, who is supposed to play the transferring role, sincere and open—minded?
(2) Is the receiving side properly prepared to receive?
(3) Is there sufficient motivation for both the transferrer and the transferee?
(4) Is the environment (including government policies and regulations) proper and encouraging?

6. Concluding Remarks

The development of consulting engineering profession in Taiwan hasgradually grown from the infant stage through adolescent stage andis now moving into the matured stage. However, a number of factors, including protection of government—sponsored organizations, blindtrust in foreign firms, inappropriate or improper grant ofProfessional Engineer's licence, lack of proper regulationsgoverning the practice, have greatly impeded the proper growth ofthe profession.

It is not that the profession does not possess the necessaryquality and enthusiasm for upgrading and development, it is thepractice of the governmental agencies which has contributed to theslow growth. The profession needs encouragement from government forfurther development and improvement in quality.