

# A STUDY ON THE COMPARATIVE ANALYSIS OF THE PROFESSIONAL ENGINEERS ACT OF DIFFERENT COUNTRIES

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**ABSTRACT:** The Professional Engineers Act (PE Act) of Korea reduces the competitiveness of PE, because of the lack of articles regarding guarantee of business scope and regarding continuous education. In foreign countries, after one passes the PE exam, he/she should register at the concerned government agency; in this way, a practical and systematic continuous professional development (CPD), along with management of work experience of PE, is carried out.

In this thesis, the Professional Engineers Acts of different countries have been compared and analyzed in order to consolidate international competitiveness of Korean professional engineers. Also, the author of this thesis presented measures to solve the problems of the Korean PE Act.

*Key words :* Professional engineer, Professional Engineers Act, System of Professional Engineers

## 1. INTRODUCTION

### 1.1 Backgrounds and Purpose

The systematic cultivation and management of Professional Engineers(PE) who hold expertise and practical experiences in the field of science and technology is essential for maximization in efficiency of national technical manpower and securing of national competitiveness.

The revision of the Professional Engineers Act is the most preferential task to prepare for institutional foundation required to authorization, registration and professional work of PEs and to reasonably operate the utilization and management of the system. The United States, Australia and Canada, which are the advanced countries in terms of APEC engineers, along with the official members to the Washington Accord, such as Hong Kong, Britain and South Africa, have constantly revised and supplemented their own laws and systems related to PE Act since 1999. Japan coordinates and operates the regulations concerning qualification, authentication and registration of PEs, which are the basic elements to integrate screening and registration of APEC engineers into the PE Act.<sup>1</sup>

In this paper, a proposal to improve the configuration system of the PE Act through international comparison of the PE Acts is presented so as to cultivate PEs equipped with international competitiveness in line with the technological innovation age. We need to contribute to the arrangement of a systematic and efficient management system over the PEs system through the improvement of the PE Act. We should also secure efficiency of the PE Act by stipulating PE qualification exam, registration, management and utilization in the PE Act.

### 1.2 Methods and Scope

The author of this paper conducted this study to let PEs and national high quality technical manpower, make contributions to the development of technologies by analyzing the problems of the PEs Act and presenting measures to rearrange the PE Act through a comparative analysis of the related laws of foreign countries.

#### (1) Research of the PEs Acts at Home and Abroad

After comparing and analyzing the domestic and foreign PEs Acts and related literature, the author of this paper identified various problems of the Act and drew an alternative.

#### (2) Opinion Conversion through Interviews with Specialists

A more thorough and practical alternative was drawn up through interviews with incumbent PEs in the technical communities like the Korean Professional Engineer Association and Professional Engineer Society of Korea.

## 2. ANALYSES OF EXISTING STUDIES

As mutual certification of PEs emerges recently, the studies of the Professional Engineers Act and system are actively being carried out.

Soonbo Shim (1999) conducted a study of internationalization of the national technology qualification system and PEs system. The Korean Professional Engineer Association constantly carries out a study on super-qualified engineers system improvement and unification of PEs management.

Jungyoon Cho (1998) devised supplementary measures of the PEs system through review of the system and conducted research to consolidate a connection with industrial markets.

In the case of the section related to the PE Act, there are some limits in that Jungyun Cho analyzed only domestic Professional Engineers Act, drew problems and suggested measures to develop the Act.

sukChun Yoon(2002) presented fact-finding survey of major national qualification systems for arrangement of national technology qualification system along with suggestions. Especially, the study was performed focused on the research of the PEs system.

Reehyung Lee (2003) presented a forecast of demand and system for the establishment of PEs management and operation system and various problems on the PEs system. In his study, detailed research, such as detailed implementation means as a study for formulation of a basic plan for utilization of PEs and development, was not undertaken.

Chansik Lee (2004) presented measures to arrange and improve related systems, laws and regulations and short-, medium- and long-term plans to consolidate international competitiveness of PEs. By analyzing the Professional Engineers Act, National Technology Qualification Act and Construction Technology Qualification Act to draw the measures for arrangement of related laws and regulations, a revision direction was presented.

### **3. PROFESSIONAL ENGINEERS ACTS OF DIFFERENT COUNTRIES**

#### **3.1 Korea**

The PE was enacted in 1963 in reference of the related laws of the United States and Japan. In the initial stage of its introduction, a PEs exam, registration and management were operated in a unified law system like other foreign countries. The Act has been revised four occasions up to 2005. The current laws and regulations regulating PEs are divided into the National Technology Qualification Act (Authentication), Professional Engineers Act (Utilization) and Construction Technology Management Act.

The PE Act (Mar. 31, 2005) consists of 22 articles, Implementing Ordinance and Implementing Rules. The Act stipulates the duties and obligations of PEs, establishment and registration of PE's office, PE association, penal clauses and so on.

##### **(1) Duties and Obligations of Professional Engineers**

Duties (obligations to be in good faith and confidentiality) are provided for. As duties of PEs, the engineering work is classified and presented, depending on technology fields. Regarding obligations, minimum requirements as a PE are presented in a declaratory manner.

##### **(2) Establishment and Registration of Professional Engineer's Office**

Registration requirements, criteria and procedures necessary for opening a PE's office are stipulated. There is great difference in meaning or content from registration of foreign countries that requires registration of PEs as a basic condition to act as a PE.

##### **(3) Professional Engineers Association**

In the US, each State Registration Board is responsible for PE exam, registration, license issuance and work experience management, except for making questions for the PE exam. The Professional Engineers Association in Japan is responsible for PE exam and registration. The Korean Professional Engineers Association cannot efficiently conduct registration and work experience management, due to non-existence of regulations regarding the registration of PEs. The content concerning PE management nearly does not exist, given that other laws and regulations are preferentially treated in terms of members' work experience and performance evidence.

#### **3.2 Professional Engineers Acts of Foreign Countries**

The systems and regulations of the PE Acts of the US and Japan were researched and analyzed in this thesis.

##### **1) United States**

The US operates a unified law system in which exam, continuing education and follow up management for PEs are stipulated in the PE Act by state.<sup>2</sup> Each state's professional engineers association supervises the PE exam. The NCEES(National Council of Examination for Engineering and Land Surveying) is responsible for making questions for the exam and marking.

Professionals land surveyors, such as PEs, should meet the requirements of each state government and pass the examination to conduct related professional work or operate a company. When they intend to act or operate business in a state where their licenses were not issued, they need to meet the license conditions required by the concerned state.

The PE Acts of three states, California, Florida and Utah, were reviewed and analyzed in this paper: Although detailed contents are different, such as members of the Board, there was almost no difference in general regulations and registration. The main contents are as follows:

##### **(1) Prohibition of using similar names, such as PE**

Nobody can use the title of PE or similar one, if he/she was not approved or registered by State Registration Board. This principle also applies to civil engineering professionals and land surveyors in addition to PE. By concretely regulating work scope clauses, non-qualifiers' participation in engineering business is prohibited.

##### **(2) Checking Status of Engineering Education**

Curriculum that is acknowledged by ABET (Accreditation Board for Engineering and Technology) is required. Any person who received accredited engineering education can be exempted from practical education conducted by EIT (Engineering-in-Training) for some period. In California, total training cannot exceed five years.

##### **(3) Registration After Passing the Examination**

If anyone who passed the FE (Fundamental of Engineering) examination and 1<sup>st</sup> and 2<sup>nd</sup> main examinations did not register at each state's Registration Board, he/she cannot participate in the concerned domain of engineering work. Through registration, the Registration Board can identify individual PE's work experience, status of CPD and demand and supply status of PEs.

#### (4) Good Samaritan Immunity

According to the PE Act of California, a PE, who surveyed and diagnosed a structure by the request of a public agency without expecting any pay or consideration, is not responsible for the results, except for his/her negligence and deliberate unjust management. With this provision, a PE can independently work, based on his/her conscience and free will.

#### 2) Japan

Since the Japan's PE Act was enacted and proclaimed in 1957, it changed greatly. The PE Act was revised for second time in 1967. In 1983, the Act was revised for third time. The current PE Act comprised of 63 articles and 15 additional rules is now applied.

Main contents of the Japanese PE Act are as follows:

#### (1) The PE Act Regulates the Examinations for PE and Assistant PE

The PE system in Japan is operated as a unified law system in which examination, registration, obligations of PEs and operation of the PE system have been stipulated in the PE Act, since 1957. Japanese PE Association affiliated with Ministry of Education and Science is responsible for the examination for PEs and assistant PEs. Minister of Education and Science appointed the Japanese Professional Engineer Association as a designated examination agency and registration agency.

#### (2) Registration of PEs

Anyone who acquired PE qualification after passing the PE exam needs to register at the Professional Engineer Registration Department. When there is some change for the registered content, the change should be immediately reported to the Minister of Education and Science Ministry and the registration certificate should be corrected. As in the case the US, PE's work experience and the status of CPD can be checked and PE status can be identified to find out the demand and supply status of PEs.

#### (3) Obligations of PEs

By regulating the content, equivalent to ethics code of Korea and the US, strict work performance is induced. Also, the concerned PE writes registered technology field, so that non-qualifiers' participation in engineering business can be prohibited.

### 4. COMPARATIVE ANALYSIS OF DOMESTIC AND FOREIGN PE ACTS

In Table 1, the contents of the Professional Engineers Acts of the US and Japan and Korea are compared.

The biggest difference of the PE Acts of Korea and foreign countries is whether the PE system is operated in a unified law system under the PE Act.

The Ministry or Department in charge of science and technology carries out all the PE related work from qualification examination and registration to management

under the PE Act in terms of the PE systems in the US and Japan. In Korea, the department for authorization and the one for management and utilization are separately operated in terms of the PE system. Therefore, many problems exist in deciding or managing major policies.

Regarding the registration of PEs, it is essential to register at a concerned agency to act as a PE in the US and Japan. Meanwhile, registration is not an obligation, as long as a person who passed the PE examination does not establish his/her own office in Korea. While the PE system in the US and Japan is the one that is possible for systematic and planned management and adjustment of demand and supply of PEs through registration, the registration of PEs is not an obligatory in Korea, unless the concerned PE establishes his/her own PE office. Thus, it is difficult to precisely identify status of PEs, as well as work experiences of PEs and making their database.

In the work scope aspect, the US executes a license system that some exclusive work is possible, given that a certain level of construction or major construction of a structure needs deployment of a PE compulsorily. In Korea, there is no unique work scope and even people with proper education and experiences can participate in the PEs' work.<sup>3</sup>

As a result of comparison in utilization people with proper education and experiences in the industrial sites, they conducted work in limited fields or worked as an assistant PE in the US and Japan, while those who had been acknowledged in education and experience can conduct the same work as PEs in Korea. This was a difference between Korea and other foreign countries.

The major problems drawn through comparative analysis of the PE Acts at home and abroad are as follows:

(1) Because, the PE related laws and regulations are divided into the PE Act, National Technology Qualification Act and Basic Construction Management Act, a systematic and efficient operation and management of the PE system is difficult and has some difficulties in establishing a policy to utilize the system.

(2) Although a PE should essentially participate in the construction process of the public facilities and hazardous facilities, the exclusion of non-qualifiers or penal clauses are not clearly presented. Thus, an accident in such facilities will be connected to a huge disaster.

(3) The PE Act, as well as the National Technology Qualification Act that stipulates PE authorization, has no legal provision about registration for those who passed the PE examination. Thus, it is difficult to manage CPD and work experience of PEs.

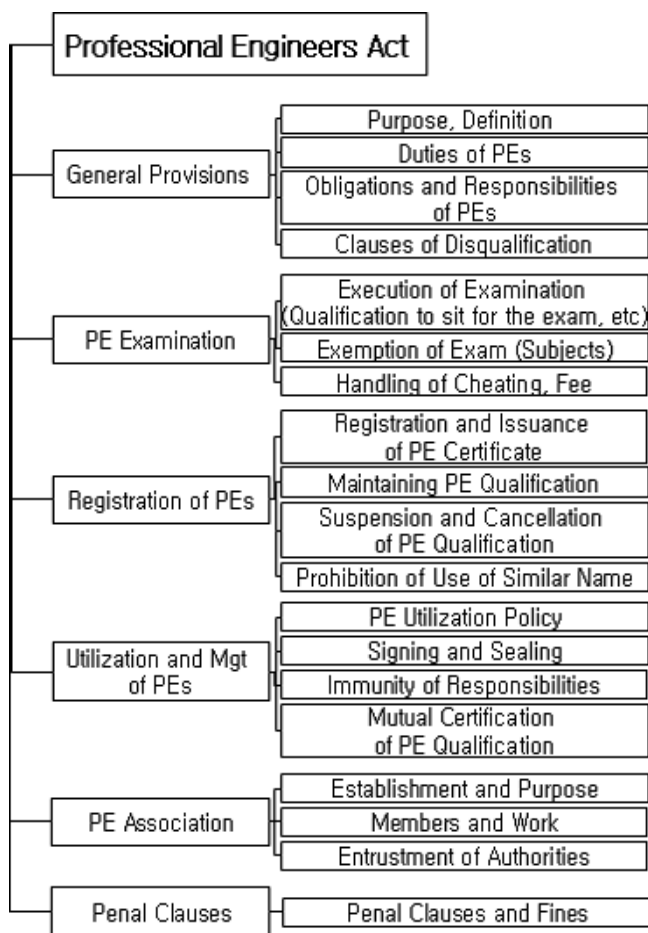
(4) Mutual PE certification between countries can be a problem, because there is no education limits when a person meets experience requirement, not to mention engineering education certification in terms of qualification to sit for the PE exam in Korea

**Table 1.** Comparison of The Professional Engineers Acts of Different Countries

Classification	Korea	United States	Japan
Laws	Authorization (National Technology Qualification Act), Utilization (Many including PE Act, Construction Technology Mgt Act, Engineering Tech Promotion Act)	'Professional Engineers Act (California)' or 'Professional Engineers Act and Professional Land Surveyors Licensing Act (Utah): Unified Act	PE Act (Unified act)
Responsible Dept.	Authorization (Human Resource Development Service of Korea affiliated with the Ministry of Labor), mgt/Utilization (15 concerned ministries including the Ministry of Science and Technology)	NCEES , each State Board	Japanese PE Association affiliated with the Ministry of Education and Science
Registration and Maintaining the PE Qualification	<ul style="list-style-type: none"> <li>▾ No regulations about registration after acquiring PE license</li> <li>▾ Registration is not obligatory, except for opening a PE office</li> </ul>	<ul style="list-style-type: none"> <li>▾ Registration after initially passed the PE examination</li> <li>▾ After activities for qualification maintaining (Education, lecture, business participation, etc), re-registration</li> </ul>	<ul style="list-style-type: none"> <li>▾ Registration after passing the PE examination first time</li> <li>▾ No provision regarding qualification maintaining</li> <li>▾ Regulate duties to improve the qualities of PEs (Supplementation of CPD is promoted, according to mutual certification trend of PEs )</li> </ul>
Work Scope	<ul style="list-style-type: none"> <li>▾ No detailed regulations (Qualification system)</li> <li>▾ No regulation of exclusion</li> <li>▾ Merely at the level of presenting the types of qualification</li> </ul>	<ul style="list-style-type: none"> <li>▾ Exclusive work by technology field (License system)</li> <li>▾ Essential in the case of conducting a certain level of construction or major part construction of a structure</li> <li>▾ Required when permitting engineering business (essential of PE license holder participation)</li> <li>▾ Approval of non-qualifiers ineffective</li> </ul>	<ul style="list-style-type: none"> <li>▾ No detailed provisions (Qualification registration system)</li> <li>▾ Technology qualifier preferentially treated in the design service area</li> </ul>
Utilization of People with Proper Education and Experience	<ul style="list-style-type: none"> <li>▾ No provision in the PE Act</li> <li>▾ Performing equal work as PEs under the Construction Technology Mgt Act</li> <li>▾ Only primary grade technicians are to be acknowledged in the future</li> </ul>	▾ Partial utilization	▾ Partial utilization (Construction execution field)
Engineering Education Certification	<ul style="list-style-type: none"> <li>▾ Authorization is stipulated by the National Technology Qualification Act (No limits in education)</li> <li>▾ 89 programs are certified in 15 universities including Dongguk University and Yeungnam University) (2004) ▾</li> </ul>	▾ Required to complete ABET (Accreditation Board for Engineering and Technology)-certified engineering education in the qualification to sit for PE examination	▾ No related provision (No limits in education)
Checking Status of Continuous Professional Practical Work	▾ No related provisions	▾ Required to hold work performance details for re-registration	<ul style="list-style-type: none"> <li>▾ Declaratory provision of the duty to improve qualities of PEs</li> <li>▾ No detailed content and criteria</li> </ul>
Regulations of Responsibilities and Obligations	▾ Restricted to abstract and comprehensive provisions	<ul style="list-style-type: none"> <li>▾ Regulation by technology field and by work</li> <li>▾ Immunity provision</li> </ul>	<ul style="list-style-type: none"> <li>▾ Provision of obligations of PEs and others</li> <li>▾ Similar to ethics code of Korea and the US</li> </ul>

## 5. PROPOSALS TO IMPROVE THE KOREAN PE ACT

Fig. 1 is a proposal to improve the configuration system of the Korean PE Act so as to solve the problems drawn in this study.



**Fig. 1 Proposal to Improve the Configuration System of the Korean PE Act**

Major improvements include insertion of the duties and obligations clauses of PEs, transfer of PE examination from the National Technology Qualification Act to the PE Act, execution of PE registration system and provision of status of engineering education completion. Details are as follows:

(1) In the general provisions, the responsibilities of PEs as the prime technicians in the nation by supplementing and revising the provisions regarding the obligations and responsibilities of the PEs.

(2) By regulating the PE examination in the PE Act, the PE system can be independently and systematically operated under the exclusively responsible science and technology agency.

(3) Non-qualifiers should be prohibited to participate in related work by making the PE registration compulsory and

the foundation of DB establishment for PE management should be prepared for.

(4) With a provision of the status of certified engineering education completion in the qualification for the PE exam, quality improvement of PEs and mutual certification between countries should be coped with.

## 6. CONCLUSION

The purpose of arrangement of the Professional Engineers Act is to restore the damaged PE system to its original state and secure general principles and universal validity of the law that is regulated in other qualification systems, not to preferentially treat PEs. In this thesis, foreign PE Acts were researched and analyzed to consolidate Korean PEs' international competitiveness.

The author of this paper compared the PE Acts of foreign countries and Korea, drew related problems and presented solutions to the problems. In addition to the US and Japan, Britain, France, Germany and Australia are currently operating the PE Acts and systems. In this paper, the related laws of the US and Japan were analyzed in consideration of the size of engineering markets, Korean PE system and influences of PE system on overall industries.

More diverse studies of PE law system are required in the future in order to cope with the mutual certification of PEs between countries including APEC(Asia-Pacific Economic Cooperation and EMF(Engineer's Mobility Forum)

## APPENDIX

1. Study on the Measures of AEPD Engineer System Development, Soonbo Shim, Ministry of Labor, Oct. 2003
2. Although the laws of a state government are basically not colliding with the federal laws, those cannot be disputed in terms of hierarchical relation, unless those conflict with the federal laws, because the laws of a statement government are based on its unique history, culture and environment.
3. Recently, a measure to improve things regarding people with proper education and experience has been drawn up. Thus, a policy to preferentially utilize those who hold the PE license is under way, restricting the participation of those who have just proper education and experiences.

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