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4. Conclusion

The revitalization of doctor's accountability is the core of medical professionalism in modern times. To construct medical professionalism in China, it will depend on enriching the traditional essentials of *Da Yi Jing Cheng* and *Yi Nai Renshu* and adapting to Chinese culture. For instance, it is crucial to emphasize the role of family decision-making in respect for the informed consent of patients. In addition, the principle of valuing virtue above personal gains of Confusion ethics should be further applied in cultivation of doctors' professionalism, which is constructive to promoting doctor's dedication of serving the interest of patients. As medical professionalism is a subject involving medical ethics, health care system, management system and social culture, the survey covered many related issues such as the general evaluation of patients for medical services, doctor-patient relationship, informed consent, medical errors, medical disputes and medical conflicts of interest. However, this paper is simply a general report focused on highlighting some major issues. It still needs further in-depth statistical analysis of data on patient and region classification, in order to reflect more profound and specific problems of medical professionalism.

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Session Two: Engineering Ethics

How Should We Accept the American-Style Engineering Ethics?

Atsushi FUJIKI[①]

Department of Liberal Arts (Humanities and Social Science),
Kurume National College of Technology, Fukuoka 8390000, Japan

Abstract: In this study, I would like to discuss how East Asian nations should receive the American-style engineering ethics generally considered as a part of professional ethics by comparing the rise of engineering ethics in the United States and the history of the acceptance process of American-style engineering ethics in Japan. The following argument for the acceptance of American-style engineering ethics will proceed in four steps. The first section describes the early history of the engineering ethics in the United States briefly to confirm that the engineering ethics was raised in the wake of the engineers' movements aimed at improving their social status. Second, I am going to examine the international agreements among bodies responsible for accrediting engineering degree programs and the international engineers' qualification systems to argue that the American-style engineering ethics has widely spread through these frameworks and now become the de facto standard. Third, I would like to emphasize that engineers and the various academic societies of engineering in Japan have aspired to professionalize themselves in order not only to adapt to the assumption that engineering is a profession, but to raise the social status of engineers to fulfill their responsibilities autonomously as the members of international and domestic communities. Finally, I will summarize the main points of arguments so far and describe future prospects on this issue. Here I will describe that we have to improve the social status of engineers and also have to recognize them as the engineering professionals whether we accept the American-style engineering ethics as it is or modify it to a greater or lesser degree.

Key words: Engineering Ethics, History of Engineering Ethics, International Mutual Rec-

① Atsushi FUJIKI, male, assistant professor, Department of Liberal Arts (Humanities and Social Science), Kurume National College of Technology. E-mail: gri0083@gmail.com

ognition Agreement of Engineering Accreditation, Social Systems on Engineering Education and Qualification, Japan

0. Introduction

Engineering ethics was created as standard part of curriculums of engineering education for both engineering students and non-engineering ones in the United States in the mid-1970s[1]. A few decades later, now engineering ethics have spread over not only in the United States, but also in some European and Asian countries. Like with many other countries, Japanese leaders of engineers decided to import an engineering ethics as a whole new discipline from the United States in order to standardize their engineering education system on the basis of an international mutual recognition agreement of engineering accreditation in the middle of 1990s. However, they soon faced a serious problem when they have tried to accept American-style engineering ethics.

Table 1　Historical Development of Engineering Ethics in the U. S.

Phase	Feature	Period
1	Implicit Ethics	1900-
2	Ethics as Loyalty	1900-1930
3	Ethics of Efficiency	After WW II (1945-1970)
4	Public Safety, Health and Welfare	1970s and beyond

(adapted from Ref. [10])

American-style engineering ethics generally regards engineers and engineering societies to which they belong as a profession, and the professional responsibilities that all engineers should take are often explained as an implicit or tacit social contract between engineering profession and public. But we Japanese haven't had such a perspective. We don't have socio-cultural background recognizing that engineering is the profession. For this reason, we cannot easily adopt so-called "social contract" view so as to explain why all the engineers should take special responsibilities.

Nevertheless, it is nearly impossible for Japanese engineering ethics to discard the concept of the profession. American-style engineering ethics has already become a de facto standard between the signatory nations to the international mutual recognition agreement of engineering accreditation. Renunciation of the concept of profession means the abandonment of international conformity with engineering education systems performed at other countries.

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① Wei V. The Rise of Engineering Ethics[J]. *Technology in Society*, 1984,6: 341-345.

So we need to determine our policy on the following question: how should *Japanese* accept the concept of the profession to our engineering ethics?

In this short paper, I would like to give a possible answer to this question by surveying recent situation of the acceptance process of engineering ethics in Japan.

1. The Rise of Engineering Ethics in the U. S.

According to Mitcham, the emergence of professional engineering ethics as a clearly defined component of engineering practice and education may be framed as a four-phase process[1]. The revolt of engineering, as exemplified in establishing of engineering professional societies and settling upon a code of ethics, was rapidly advanced during the first and second phases. Those results of the reform were succeeded to the third and fourth phase of engineering ethics. The point at issue during these four phases is quite simple: *professionalism*.

1.1 Establishment of Engineering Professional Societies

In the late 19th century, engineering leaders in the U. S. started to turn their occupation into what they thought a profession should be: an occupation that possessed specialized knowledge, autonomy, and social responsibility[2]. College programs and professional societies, founded from the 1880s onward, provided and maintained the specialized knowledge and autonomous aspects of the conception of a profession[2]. Establishment of these engineering professional societies instilled the idea that engineering is the profession into the public.

Table 2　Historical Development of Code of Ethics for Engineering Societies in the U. S.

Phase	Feature	Name of Society and Period
1	Loyalty to the clients and employers, Interest in the fellow engineers and profession, Enlighten the public on technology	AIEE(1912), ASCE(1914), ASME(1914), AICE(1914)
2	Interest in the safety, health and welfare of the public	ECPD(1947), NSPE(1946,47)
3	Holding paramount the safety, health and welfare of the public	ECPD(1974), IEEE(1979), NSPE(1981)
4	Interest in the environment	ASME(1998), NSPE(2006)

(adapted from Ref. [10])

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① Mitcham C. A Historico-ethical Perspective on Engineering Education: from Use and Convenience to Policy Engagement [J]. *Engineering Studies*, 2009,1: 35-53.

② Kline R R. Using History and Sociology to Teach Engineering Ethics[J]. *IEEE Tech- nology and Society*, 2011,20, Winter, 2001/2002.

Furuya referred the relationship between American engineering professional societies and code of ethics as following:

> Engineering professional societies have to gain the acceptance of public for their professional excellency in order to insist their independence. This insistence consists of the content of the first code of ethics. Then, code of ethics has created to profess this content on the internal engineering societies and public.

We have to pay attention to these two points: 1. engineering professional societies were organized for the purpose of raising engineers' social status. 2. various code of ethics were created as one of the measurement to achieve that purpose.

The Boston Society of Civil Engineers is the first professional engineers' society established in the United States[①]. ASCE was established at New York four years later than Boston. One of the challenge for some engineering professional societies established in the early days is to balance between business and professionalism. In other words, the problem is how to guarantee their specialization and autonomy as profession.

ASME standardize "ASME Boiler and Pressure Vessel Code" in 1914 to prevent the boiler explosion accidents occurring frequently in those days. Its work was highly evaluated, but ASME worked as advocate of industrial circles rather than of independent profession. In this way, engineers' social activities for gaining social recognition precede engineering ethics in the United States[②].

1.2 The Early Days of Code of Ethics

As stated above, several engineering societies were established for the purpose of the empowerment of engineers and created code of ethics as a way of achieving its purpose. Engineers oriented toward professionalizing themselves, but early code of ethics created by AIEE, ASME, ASCE, and so on attached great importance not to the ' safety, health and welfare of the public' which now regarded as the most important principle in engineering ethics, but ' loyalty to the clients and employers' (see Table 2). Schyler S. Wheeler, president of the AIEE in 1906, thought that engineer's duty to public was "largely educational" and noted that:

① ASCE History and Heritage of Civil Engineering, http://apps. asce. org/history/tl_profession. html
② Hiyago H. GijutsuShakai no An-nai-nin: Gijutsu-shikai no JiritsuniMukete (Guide for the Technological Society: Toward the Autonomy of Institution of Professional Engineers, Japan)[J]. *IPEJ Journal*, 2007,19: 4-7.

> The public finds no such declaration of high standards in the engineering profession as in the older professions. It is therefore inclined to treat the engineer lightly in ethics, and to withhold from him that deference which, If rendered, would in itself encourage a higher professional standard.

Moreover, the AIEE's code of ethics was largely ceremonial, and no serious efforts were made to enforce it. Its aim was to enhance the status of engineers, not to improve their morals[①].

The member of ASCE who promoted creating the code of ethics in 1914 describes that he think a great deal of raising their social status and avoidance of legal restraints (professional autonomy) rather than self-imposed tutelage. We can see from the above that engineering professional societies in the United States attempt to guarantee their autonomy and to establish the reputation of professional societies by creating code of ethics[②].

1.3 Engineering Ethics as a Part of Engineering Curricula

Engineering ethics as the new field came into being in the mid-1970s when scholars from engineering and philosophy joined to identify and address ethical problems confronting engineers[③]. It was created as standard part of curriculums of engineering education and regarded as a part of professional ethics.

AAAS published a report concern with professional ethics project. They pointed out the role of the code of ethics in the context of professional ethics as follows:

> Public and professional concerns about science and technology initially focused on the highly visible products of technology such as airport sittings, the use of pesticides or drugs, or the development of new energy facilities. these concerns rapidly expanded, however, to include a broader re-examination of the more indirect ways in which professional knowledge and research methodology affected the public. As a result, broader attention was focused on the safety of research procedures, the cost and availability of professional services, and the qualifications of technical personnel. These concerns have stimulated a review of the basic assumptions governing the accountability measures developed within the pro-

① Layton E T. *The Revolt of the Engineers*[M]. Ohio: Case Western Reserve U. P., 1971.
② Ishihara K. Gijutsu-shaRinriKyohiku ha NazeHitsuyouka (Why Should We Teach Engineering Ethics?)[J]. *the Institute of Electrical Engineers of Japan*, 2004,124: 626-629.
③ Weil V. The Rise of Engineering Ethics[J]. *Technology in Society*, 1984,6: 341-345.

fessions. Such assumptions are often embodied in the ethical principles or rules of conduct adopted by the professional societies, and as a result increasing attention has been directed toward the development and application of the societies' codes of ethics[①].

Table 3 APEC Engineer and EMF International Engineer Member Economies

Member Economies	APEC Engineer	EMF International Engineer(Designation, Member Organization)
Japan	○	○ IntPE(Jp) Institution of Professional Engineers Japan
Korea	○	○ IntPE(ROK) Korean Professional Engineers Association
Chinese Taipei	○	○ (Joined in 2009) Chinese Institute of Engineers
Hong Kong China	○	○ IntPE(Hong Kong) The Hong Kong Institution of Engineers
Philippines	○	−
Thailand	○	−
Malaysia	○	○ IntPE(My) Institution of Engineers Malaysia
Singapore	○	○ Institution of Engineers Singapore
Indonesia	○	−
Australia	○	○ IntPE(Aus) Engineers Australia
New Zealand	○	○ IntPE(NZ) Institution of Professional Engineers NZ
Canada	○	○ IntPE(Canada) Engineers Canada
United States	○	○ United States Council for International Engineering Practice
Ireland	−	○ IntPE(Irl) Engineers Ireland
South Africa	−	○ IntPE(SA) Engineering Council of South Africa
United Kingdom	−	○ IntPE(UK) Engineering Council UK
Sri Lanka	−	○ Institution of Engineers Sri Lanka
India	−	○ (Joined in 2009) Institution of Engineers India
Bangladesh	−	△ (Provisional Member) Bangladesh Professional Engineers Registration Board

The Institution of Professional Engineers, http://www.engineer.or.jp/emf/emfsignatories.html

The codes of ethics, although it had been created as a way of achieving empowerment of engineers at the beginning, was inherited to the engineering ethics in a slightly different context. That is, American-style engineering ethics and their professionalizing process is inseparably related to each other. Considering these social and historical background, it is clear that core concepts of American-style engineering ethics are professionalism.

① Chalk R, Frankel M, Chafer S. AAAS Professional Ethics Project: Professional Ethics Activities in the Scientific and Engineering Societies[J]. *American Association for the Advancement of Science, Committee on Scientific Freedom and Responsibility*, 1980.

2. Globalization of Engineering Degree Programs and Qualification Systems

In this section, I am going to describe the reason why engineering ethics developed in the United States have rapidly spread all over the world from the viewpoint of globalization of both engineering degree programs and engineers' qualification systems.

The recent movement of promoting globalization of engineering degree programs and engineers' qualification systems have a lot to do with the establishment of WTO. It is because international mutual recognition agreement of engineering accreditation have been promoted in accordance with the terms in the provision of General Agreement on Trade in Service (GATT) enacted as a part of Marrakesh Agreement Establishing the World Trade Organization.

Each country saw the establishment of WTO as an opportunity to start developing the structure of international mutual recognition agreements of engineering accreditation and qualification systems. However, not all these countries, including Japan, had the corresponding organizations such as FEANI(Europe) and ABET(U.S.) at that time. Therefore, many of them established a whole new organization or modified existing one by reference to ABET.

The Washington Accord, signed in 1989, is an international agreement among bodies responsible for accrediting engineering degree programs. It recognizes the substantial equivalency of programs accredited by those bodies and recommends that graduates of programs accredited by any of the signatory bodies be recognized by the other bodies as having met the academic requirements for entry to the practice of engineering[①]. Graduate Attributes and Professional Competencies published by International Engineering Alliance presents the graduate attributes and professional competency profiles for professional tracks, and ethics is specified in the required competency. Most of the countries which already became a member of, or now attempting to participate in the Washington Accord have developed their own institutions for accreditation on the model of ABET in the United States. ABET has specified ethics as one of accreditation criteria before Washington Accord was established. When ABET made a new engineering criteria, generally called "Engineering Criteria 2000", they emphasized the importance of ethics rather than before. Judging from these facts, we can at least say that ABET has interpreted ethics as very important compe-

① International Engineering Agreements, http://www.washingtonaccord.org/washington-accord/

tency for the engineers and that tendency has spread over the world through Washington Accord[①].

In addition to the engineering degree program, engineers' qualification systems have been also globalized in recent 15 years. Two of the representative systems for Japanese engineers are the "APEC engineer" and "EMF engineer" (see Table 3). APEC engineer is an agreement in place between a number of APEC countries for the purposes of recognizing "substantial equivalence" of professional competence in engineering[②]. Another one is a multi-national agreement between engineering organizations in the member jurisdictions which creates the framework for the establishment of an international standard of competence for professional engineering, and then empowers each member organization to establish a section of the International Professional Engineers Register. The standard of competence applied is the same as for the APEC Engineer agreement[③]. The APEC Engineer Manual said that all recognized programs cover the principal and supplementary fields of study[④]. Ethics is included in supplementary fields.

It is necessary to keep in mind that American-style engineering ethics rapidly spread through these agreements and became de facto standard. That's why we are unable to disregard American-style engineering ethics.

3. The Process of Professionalization in Japan

In the former sections, we took an overview of recent situation of engineering ethics from the viewpoint of social systems. It is often said that one of the key factors disseminating engineering ethics to the many countries is the process of globalization of economy. Someone also said that the set of subsequent like establishment of JABEE and revision of Professional Engineer Act was the result of pressure from outside. I would like to show that these popular perceptions are insufficient by examining the acceptance process of engineering ethics in Japan.

3.1 Changing Circumstances surrounding Engineers in Japan

Engineering education reform in Japan started around 1996. The first step toward that re-

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① Prados J, Peterson G, Lattuca L. Quality Assurance of Engineering Educa- tion through Accreditation: The Impact of Engineering Criteria 2000 and its Global Influence, (2005).

② International Engineering Agreements, http://www. washingtonaccord. org/APEC/

③ International Engineering Agreements, http://www. washingtonaccord. org/EMF/

④ APEC Engineer Coordinating Committee [EB]. The APEC Engineer Manual, 2009.

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form is, as mentioned in the previous section, the increasing pressure from outside for globalization of economy. Japanese leaders of engineers made decisions to professionalize themselves and to import accreditation systems for engineering education, including engineering ethics as one of accreditation criteria, from the United States.

The first appearance of the words "engineering ethics" in Annual Report on the Promotion of Science and Technology 2000[①] published by MEXT was in 2000. There are some references to construction of an accreditation system for engineers, expecting that ethics education for engineers will be enhanced, and revision of the Law for Consulting Engineers in the section entitled that "Systematic Initiatives to Thoroughly Implement Ethics and to Heighten Awareness of Social Responsibility Among People Involved in Science and Technology".

3.2 The Institution of Professional Engineers, Japan

Established in 1951, IPEJ is the charitable corporation under the Professional Engineer Law of Japan. The first PE law was established in May 1957, and the "Gijutsushikai" was authorized under the Law. They created code of ethics in 1961. The English name of the "Gijutsushi-kai" was changed from "Japan Consulting Engineer Association (JCEA)" to "The Institution of Professional Engineers, Japan (IPEJ)" after amendment of that law[②] in April 2000. Ohashi, Vice president of JABEE, described that the main purpose of the PE law amendment is to ensure consistency with international definition of professional engineer and Japanese professional engineer "Gijutsushi"[③].

When they try to ensure consistency, they need to introduce engineering ethics into Japan so as to fulfill the accreditation criteria. After that, they published two short documents entitled "Gijutsushi Vision 21 (Professional Engineers' Vision for 21st Century)" in 2004 and "Gijutsushi Profession Sengen (Declaration of Professional Engineer)" in 2007. The aim of publishing these documents is to profess that "Gijutsushi" are the profession authorized by PE law both inside and outside the IPEJ. Their thought that they need to improve their social status to fulfill their responsibilities lay behind the publication of these docu-

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① http://www. mext. go. jp/b_menu/hakusho/html/hpag200001/hpag200001_2_027. html

② This amendment allowed IPEJ to represent of Japanese professional engineers on the above-referenced APEC and EMF engineer assessment and registration.

③ Ohashi H. Kigyou no Kata-gata he no JABEE Nintei Program Shuuryou-sei Kat- suyou no Onegai (A Request to Businessmen for the Practical Use of the Students who Complete the Programs Accredited by JABEE) [N/OL]. *JABEE NEWS*, 2008.

ments. One of the factors to achieve this purpose is to promote the engineering ethics. This is the same structure with the rise of engineering ethics in the U. S.

Table 4   The Current State of Creation and Revision of Code of Ethics in Japan

Year	Name of the Society	Editon
1938	Japan Society of Civil Engineers	
1961	The Institution of Professional Engineers, Japan	
1988	The Japan Institute of Architects	
1996	Information Processing Society of Japan	
1998	The Institute of Electrical Engineers Japan	
	The Institute of Electronics Information and Communication Engineers	
1999	The Institution of Professional Engineers, Japan	2nd
	Japan Society of Civil Engineers	2nd
	Architectural Institute of Japan	
	The Japan Society of Mechanical Engineers	
2000	The Chemical Society of Japan	
	The Illuminating Engineering Institute of Japan	
2001	Atomic Energy Society of Japan	
	The Institute of Image Information and Television Engineers	
2002	The Society of Chemical Engineers, Japan	
	The Japan Society of Applied Physics	
	The Japanese Geotechnical Society	
2003	Atomic Energy Society of Japan	2nd
	The Japan Society for Precision Engineering	
2004	The Japan Institute of Architects	2nd
2005	The Chemical Society of Japan	2nd
	Atomic Energy Society of Japan	3rd
2007	The Society of Naval Architects of Japan	
	The Institute of Electrical Engineers Japan	2nd
	Atomic Energy Society of Japan	4th
	The Japan Society of Mechanical Engineers	2nd
2008	The Chemical Society of Japan	3rd
2009	Atomic Energy Society of Japan	5th
2010	The Japan Society of Applied Physics	2nd
	Japanese Society for Engineering Education	
2011	The Institute of Electronics Information and Communication Engineers	2nd

3.3 Japan Accreditation Board for Engineering Education

Established on November 19, 1999, JABEE is a nongovernmental organization that exam-

ines and accredits programs in engineering education in close cooperation with engineering associations and societies[1]. JABEE was established as the Japanese version of ABET, and made its accreditation criteria by reference to ABET's "Engineering Criteria 2000". Moreover, JABEE has signed memorandums of understanding with ABET[2]. So it is little to be wondered that the basic principle and purpose of JABEE is quite similar to ABET's ones.

Taking advantage of the establishment of JABEE, Japanese engineering education changed their policy and intended to give practical authority to their engineering education programs by obtaining the official guarantee of international mutual recognition agreements of engineering accreditation that the programs accredited by JABEE have a substantial equivalency of the programs accredited by other countries.

Table 5   Feature Articles Published in the Journals of Engineering Societies in Japan

Year	Name of the Society	Title of Special Issue on Engineering Ethics
1983	The Japan Society of Precision Engineering	What Brings about Technology
1992	The Japan Society of Mechanical Engineers	History of Technology and Philosophy of Technology
2001	Architectural Institute of Japan	Ethics
2002	The Japan Society of Mechanical Engineers	Technology / Engineering Ethics
2003	The Chemical Society of Japan	Why Should We Consider with Engineering Ethics Education Now?
	The Philosophical Association of Japan	What Is the Fundamental Problem on Technology and Ethics?
	The Japan Institute of Metals	Thinking about Engineering Ethic
2004	The Japan Scientists' Association	Engineering Ethics, Moral Issues on Business
	Japan Society of Civil Engineers	[Serial Publication] Human Technology
	The Institute of Electrical Engineers of Japan	Engineering Ethics Education
2005	Japan Society for Design Engineering	Ethics of Engineers and Designers
2006	Japanese Society for Engineering Education	Just Start of Engineer Ethics Education
	Japan Industrial Publishing	Engineering Ethics
	The Japan Fluid Power System Society	Duty and Responsibility of Engineers; Engineering Ethics
	Japan Science Support Foundation	Engineering Ethics and Social System
	Japan Society of Information and Knowledge	Information Ethics / Engineering Ethics
	Japan Society of Civil Engineers	[Serial Publication] Thinking about 'Engineering Ethics'
2007	The Japan Society of Mechanical Engineers	[Serial Publication] The Forefront of Engineering Ethics Education
2008	The Japan Society of Mechanical Engineers	Law and Ethics that are helpful for Mechanical Engineers
	Japan Institute of Plant Maintenance	Rethinking Business Ethics and Engineering Ethics!
	The Japan Electric Association	Engineering Ethics
2009	Japan Structural Consultants Association	Engineering Ethics on Structural Design

3.4 The Movement of Japanese Engineering Societies

Simultaneously with the professionalization activities of IPEJ and JABEE, other various Japanese engineering societies began to follow the same path. More specifically, they crea-

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[1]　http://www.jabee.org/english/

[2]　http://www.jabee.org/english/OpenHomePage/e_activities.htm

ted their own code of ethics, published their official textbooks on engineering ethics and special issues on engineering ethics in their journal, established ethics committees (see Table 4 and 5). The Council for Engineering Ethics was established by the association of twelve Japanese engineering societies in 2004. They have been trying to transform themselves from former "Academic-societies" to the American-style "Professional-societies" through such efforts.

However, there is a serious problem for the engineers. The problem is that engineers feel alienated from the public. In other words, public doesn't know about what engineers are doing. JSCE questionnaire entitled "Do you want to make your child civil engineers?" in the August 2007. Its subtitle is "the social status of civil engineers working in Japan". One engineer who edited this featured article said that they are totally not recognized well by other people and grieved over incomprehension of the respondents. The other professional engineer, Ito described that engineers are not recognized by public or society as a member of the community[1]. That is, they think Japanese engineers are socially invisible in the first place. Both of them commonly claimed that they have to raise their social status, as American engineers and engineering societies did in the early 20th century, to fulfill their responsibility. This is one of the real issues that lies in Japan's socio-cultural structure.

4. Conclusion

In the first section, my insistence is that it is too difficult for us to get rid of the concept of profession from American-style engineering ethics. We also have to pay attention to the fact that engineers at that time intended to improve their social status along with the professionalization. In the second section, the key point is that we can't ignore or discard the concept of profession because it was already widely spread over the world through international mutual recognition agreement. In the third section, I said that various Japanese engineering societies decided to accept the concept of profession, and now they proceed to professionalize themselves. But on the other hand, there is a difficult issue that engineers are "socially invisible".

Let us now return to the first question: how should *Japanese* accept the concept of the profession to our engineering ethics? I would like to give a possible answer to the question on

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① Ito H. JinkenSengen to shite no Gijutsu-shaRinri (Engineer Ethics as a Declaration of Human Rights) [J]. *IPEJ journal*, 2008,20: 4-7.

the basis of past arguments. My answer is that we may have to accept the concept of profession in its original , or reformed form and construct some base for the non-engineers to let them know what engineers are doing. Because the concept of profession which is usually viewed as an integral part of the American-style engineering ethics has already become the de fact standard between the signatory nations to the international mutual recognition agreement of engineering accreditation. Along with this, I think we also have to develop some new curricula of engineering ethics for non-engineers. Engineers and engineering societies should continue to work for their professionalization so as to carry out their special responsibilities. However, the more important issue here is that, as stated above, most of the people do not know what engineers are doing. They need to improve their social status and turn themselves into "socially visible" profession. Engineers can only be transformed to the profession when the public recognized that they are the real profession.

5. Future Discussion

My research has severely-limited focus of the current affairs engineering ethics, because there is a lack of perspective on the comparison with many other Asian countries. Comparative research of the acceptance process of engineering ethics in Asian countries will be needed.

Abbreviation

· ABET: Accreditation Board for Engineering and Technology
· ASCE: American Society of Civil Engineers
· ASME: American Society of Mechanical Engineers
· FEANI: European Federation of National Engineering Associations
· JSCE: Japan Society of Civil Engineers
· IPEJ: The Institution of Professional Engineers, Japan
· JABEE: Japan Accreditation Board for Engineering Education
· MEXT: Ministry of Education, Culture, Sports, Science and Technology
· NSPE: National Society of Professional Engineers
· WTO: World Trade Organization

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Three Intrinsic Ethical Dimensions in Technology

Chengwei WEN[①]　Zhiye GUO[②]

Faculty of Humanities and Social Sciences, Dalian University of Technology,
Dalian 116024

Abstract: With the development of technology, the intrinsic ethical dimension of technology is constantly present. Technology appeals to ethics, which is its intrinsic requirements, mainly in three aspects: Firstly, whether technology is good or bad is tested ultimately by the nature, so technology should be in harmony with the nature. Secondly, the free characteristics of technology determine that technology must be self-discipline. Thirdly, the ethical intentionality of technology is preexistent compared with practical activity of technology. Therefore, the ethical dimension is the intrinsic dimension of technology and the demands of ethics is a necessary requirement for the development of technology itself.

Key words: Technology, Technology Ethics, Harmony, Self-discipline, Intentionality of Ethics

0. Introduction

With the rapid development of technology that has brought more and more negative effects, scholars and the public have repeatedly drawn attention to technology ethics. There are many types of ethical models and ethical theories that mainly focus on the serious consequences of technology, so the final solution is likely to be towards the law. However, technology ethics as moral dimension, compared with technology, should be preexistent, and as a result of this, should be reflected on before negative consequences of technology arises. This paper expounds the idea that the demand of technology on ethics is an inherent requirement of technology itself by analyzing the three intrinsic ethical dimensions in technology.

① Chengwei WEN, female, professor, Department of Philosophy, Dalian University of Technology. E-mail: sywenchw @yahoo. com. cn

② Zhiye GUO, female, PhD student, Department of Philosophy, Dalian University of Technology. E-mail: guo_zhiye @163. com