Ethical Autonomy and Engineering in a Cross-Cultural Context[1]

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The present discussion poses the question: Is professional autonomy a necessary component of an engineering ethics? The question has some urgency associated with it in the current climate of globalization of engineering practice, since an affirmative answer seems to be a fundamental presupposition of most American scholars of the subject, despite the fact that individual autonomy is not valued as a virtue in some other cultural contexts. In American examinations of autonomy the discussion often revolves around the issue of how the professional autonomy of practicing engineers can be enhanced, for example through the strengthening of avenues for professional disobedience or whistleblowing. Thus, to exercise responsible engineering it is assumed that professional responsibility of engineers sometimes requires challenging the status quo and that all engineers should be aware that they might be put in a position where this is necessary.

In examining autonomy in the context of engineering, however, it is also necessary to recognize a parallel trend, namely the increasing globalization of engineering practice. Not all societies value moral autonomy to the degree that the U.S. does, and in fact some societies positively discourage it for both their citizens in general and in the workplace. It therefore cannot be assumed that in a global climate the question of autonomy can serve as an uncontested universal foundational assumption for building an engineering ethics. In particular, I contrast conceptions of autonomy in Japan and the U.S., and investigate the implications the differences have for specific elements of an engineering ethics. In the following, I will argue that what has occurred is a confusion of the value of autonomy with the goal that autonomy is to achieve. Once this melding is recognized, it can then be asked whether the goals of engineering ethics can be achieved in alternative ways. If this is possible, then professional autonomy is no longer a necessary requirement of an engineering ethics, although in particular societal contexts stressing it may be the best way to achieve its aims.

Looking at the question of autonomy can thus also serve a secondary purpose. It can establish what justifications are appropriately used in developing an engineering ethics. It focuses us on the goals to be achieved through the imposition of special ethical standards for engineers. There exists some intercultural confusion about what the basic framework of an engineering ethics

should be and, while clarifying this issue is not the central aim of this paper, it should be noted that the conclusions reached here have normative implications for the structure of a universal engineering ethics.

Global Engineering Ethics

Given the current world situation, it would be difficult to argue that there is not a need for a global foundation for an engineering ethics. Inherited models of localized practice have limited application in a situation where technology almost inevitably has cross border ramifications, even if individual engineers do not directly interact with other cultures. Beyond that, for most engineers in the future their interaction with other cultures will surpass the indirect effects of technological dispersion. Most will have direct contact with other cultures through relationships with foreign engineers in their own culture or through assignments in other countries on a short or long term basis. Multinational corporations have engineers from different cultural backgrounds employed in the same corporate environment, have to deal with subcontractors in different countries, and have to try to adapt their technology for sale and use in numerous different environments. The trends in engineering practice all point to a continued process of global interaction.

Once this is recognized, it must also be understood what barriers stand in the way of globalizing engineering ethics. Foremost among these are the current national interpretations in the setting of standards of practice. A variety of models are in use, ranging from universal requirements for registration, such as in Canada, to no requirement for professional certification, as is the case in Japan. A number of countries and regional associations are now in the process of establishing agreements for cross-border recognition of engineering qualifications,[2] but their attempts are hampered not only by the variety of local standards, but also by a divergence in educational models for engineers and conceptual differences in the terminology used in different societies as it applies to the ethical practice of engineering. Furthermore, it must be considered that in this century societies' increasing reliance on technology is creating unstable conditions and thus is causing uncertainties regarding the appropriateness of new or evolving standards. This makes it appropriate to delve beyond the mere formulation of standards into an examination of their underlying cultural foundations. One of the main contrasts among cultures in this regard is their differing emphasis on the role of the individual in society.

Autonomy and Culture

The ideal of individual autonomy is deeply embedded in the Western philosophical and political tradition. The Socratic dictum, "Know Thyself," forms the cornerstone of this tradition through its emphasis on the self and knowledge. Without further analysis, I will accept the standard assumption that the critical components of autonomy are a requirement for freedom from coercion of thought and action for the individual, adequate knowledge based upon which to arrive at one's own decisions, and the assumption of responsibility by the individual for the decisions he or she has made. The result of this process is independence of the individual's judgment, the value of which has been deemed to be an intrinsic one in the Western tradition.

The value of autonomy, although not necessarily its intrinsic nature, has in more recent times been integrated into the context of professional ethics. Within the framework of the professions, the ideal of the professional was seen as one who acts individually and independently in relation to a client, because it is only the professional who is able to act based on adequately developed knowledge. Due to this knowledge, the professional also assumed the responsibility for the appropriate outcome of professional action. In establishing the model of the professional-client relationship as one where the professional acts autonomously, a paternalistic frame for the professional assuming control over the client's decisions was, however, also established. The more autonomy is ceded to the professional, the less is available for the client. In order that the relationship did not become too dominated by the variable judgment of the individual professional, the professions, in turn, were expected to exercise a control and sanctioning function in relation to the professional. In recent years this model has begun to break down to some extent, with increased demands for client autonomy, especially in the realm of medicine. In fact, in the U.S. at least, the demands for patient autonomy have won out. However, it is noteworthy that while the conflict is described in the literature as one between paternalism and autonomy, it is really one between two different forms of autonomy, professional autonomy and personal autonomy. Not in question at all in the discussion is whether some individual should be making the decision. Even when it is advocated that other physicians or family of the patient ought to be consulted as part of the decision-making process, there is little question that the final decision should be made by one of the two central individuals involved.

The assumption of autonomy so dominant in Western cultural discussions of professional ethics is, however, not a significant feature of actions by "professionals" in all cultures. In part this results from different societal conceptions of the role of the individual, differing societal values, and divergent religious traditions. It is beyond the scope of this paper and outside of its purpose to compare all actual examples of possible variations on the theme of autonomy. Here I will only use Japan as an illustration of some of the important differences from the Western model.

Beyond the theoretical dimensions of these issues, there are good real-world reasons for using Japan as an example in the context of an analysis of engineering practice. During the 1980's, Japan was set out as a model for the future of technological innovation and manufacturing by many Western commentators. While much of the literature has backtracked in the face of a decade long Japanese recession, one result of the admiration is that we know more about the Japanese way of doing things in the field of technology than about any other non-European based country. Furthermore, Japan, through its export oriented economy, will continue to be a dominant player in the process of globalization. Finally, the use of Japan as an example is appropriate because it is currently taking significant steps to imitate the Western model of professionalism, which is not part of its tradition and is, I argue, inconsistent with its societal values.

On a cultural level, Japan is also an excellent example because it strongly exhibits some of the dominant strains found to an extent in many other non-Western models. Japan is a culturally homogenous society, and it takes great pains to remain that way, both through the exclusion of foreigners and the education and socialization of its young. During the Edo (Tokyo) period of the Tokugawa Shogunate (1603-1868), foreigners were totally excluded from Japan with the exception of the trading port of Nagasaki. When Japan "opened up" during the following Meiji Restoration, its slogan was "Western technology with Japanese spirit," emphasizing the continuity of Japanese values. Even today, children who return from extended stays outside of Japan with their parents are viewed as different from other Japanese. When Japan needed foreign workers during its economic boom, the primary source for those workers was descendants of Japanese who had emigrated to South America.

Educational practices mirror this emphasis on uniformity. Students all over Japan study the same curriculum and do so at the same pace. Emphasis is placed

on gaining an identical knowledge base and there is great resistance to having a student fail. The high rate of Japanese literacy, the highest in the world, is in large part attributable to this group focus. An important aspect of educational practice is also inculcation into the dominant social values. Children in a class eat lunch together at their desks and are expected to clean up their classroom as a group activity. Students, even of kindergarten age, dress identically when they attend the same school (White 1987).

These types of practices highlight the significance in Japan of group values. A great tendency exists to highlight the group above the self. In many ways, the basic unit of analysis is the group rather than the individual. Social practices are structured to reinforce group standards and behavior. Different schools of flower arranging or tea ceremony are difficult for the outsider to distinguish, because their differences can be so subtle. Within a school, participation means imitating the ways of the master. It has often been argued by Japan scholars that this emphasis on the group comes from the village tradition of Japan, which to a large extent still holds, even in the large cities (Bestor 1989).

This paper is being written during the O-Bon summer festival season, which serves as an excellent example of Japanese cultural tradition. During this period, many firms shut down for a uniform vacation period. The holiday is intended for a "return home" to one's birthplace and family and to honor one's ancestors, and is indeed the busiest travel period of the year. A feature of the season is neighborhood unity and neighborhoods in large cities organize festivals alongside larger ones that cities organize. During these festivals the main public event is an evening o-bon dance where people in traditional, and sometimes nontraditional, costumes dance around a central stage. What is striking to the outsider is that everywhere in Japan people are doing the same dance and that everyone knows how to do it. Participants vary from toddlers to senior citizens and one can visibly see the progress toward standardization with the age of the participants. Most of the dancers are part of organized groups wearing the same clothing, so that subgroups in this larger dance are easily discernible.

The religious foundation of Japan is a complex mixture of Shinto, Buddhism, Confucianism, and Taoism (Earhart 1998). Although most Japanese describe themselves as not being religious, religious practices and symbols like the O-Bon festival form an important underpinning of the nation, in part due to the Imperial family's ancestral connection to the gods themselves. While to an outsider it seems confusing to have a wedding which seems to have both Shinto and

Christian rituals associated with it, based on the clothing and ceremonies involving the bride and groom, to the Japanese it forms part of one identity. On the theoretical level, the most dominant religious practice is Buddhism, given the lack of a doctrinal foundation of the native Shinto. As the Buddha saw it, the aim of life is to reduce suffering by eliminating the notion of the self (Sanskrit *anatman*). Destruction of belief in a self or ego meant release from the pain induced by the world. This lack of emphasis on the self forms an enduring part of the Japanese tradition. While 'I' is one of the most common words used in English, overuse of the equivalent in Japanese (*watashi*) indicates a lack of character. As Hyakudai Sakamoto puts it: "One theory holds that the word *watakushi* originates in *wa-tsukushi*, which means "I annihilated," or "myself eliminated." *Wa-tsukushi* is a way of identifying the self in most minimal fashion" (Sakamoto 1993, p. 11). The classic Japanese saying, "The nail that sticks out will be hammered down," accurately reflects the social picture.[3]

Professional Autonomy Justified

The contrast between the emphasis on individualism in the American tradition and the Japanese emphasis on group values in the social order has been well recognized in the literature and the above discussion breaks no new ground.[4] I now want to investigate the implications of the differing societal structures for the domain of engineering ethics. The discussion makes evident that it is difficult to divorce the technological enterprise, given that it is a human activity, from its surrounding societal context.

It is by now the generally accepted perspective in the U.S. that professional autonomy is a cornerstone of responsible engineering practice. As Martin and Schinzinger put it in their groundbreaking text on engineering ethics, "the study of engineering ethics aims at empowering individuals to reason more clearly and carefully concerning moral questions, rather than to inculcate any particular beliefs. To invoke a term widely used in ethics, the unifying goal is to increase moral autonomy" (Schinzinger & Martin 2000, p. 14).[5] Although the concept of engineers acting as individual agents with corresponding responsibility and accountability did not originate with engineering, but rather with the individual medical practitioner, it has a special relevance for the practice of engineering, due to the special pressures which face the typical engineer. Even though the medical profession's paradigm of individual practice may be changing as medicine adopts a corporate culture, that paradigm has firm historical roots. For engineering, on the other hand, the model has been an ideal imposition on a very

different historical picture. About ninety per cent of American engineers are employed by corporations. The ideal of individual practice was never much more than that, an ideal, but it was seen as a necessary one if engineering was to be elevated to true professional status. For example, early codes of engineering ethics referred exclusively to clients rather than the current phraseology of "employer or client." This is due to the generally accepted assumption that there is an inherent conflict between the fundamental values of a profession and of business. As most engineering codes of ethics highlight, "Engineers shall hold paramount the safety, health, and welfare of the public in the performance of their duties."[6]

The primary professional responsibility of engineers is thus seen as being the guarantors of public safety in the development, use, and spread of technology. Business, on the other hand, based on the neo-classical capitalist model, operates based on the assumption that the forces of the market and appropriate governmental regulation will protect the public, and that within that framework corporations should make decisions based on their own perceived interests. The establishment of engineering as a profession can thus be viewed as an additional safeguard for the public, with the responsibility of protecting the public in the face of opaque technology. The professional model applies in that it is assumed that the public is unable to understand the complexity of technology and is unable to make sound independent decisions in relation to it. The implication is that in relation to technological development some form of paternalism is necessary. I believe this to be a fundamental difference between engineering and other professions, which are moving away from paternalistic perspectives to a focus on client autonomy. In a way, in moving toward increased professionalization, engineering has implicitly taken the opposite tack of developments in other professions. Given what is at stake in engineering processes, this may be a necessary feature in a technologically complex world. This is the case because in engineering it is society as a whole which is the true client, rather than simply one or a few individuals who are the clients of the practitioner in the more typical professions (Luegenbiehl 1981).[7] Technology has the potential for wide ranging, long lasting, and irreversible impacts and consequently engineers must assume a special responsibility for ensuring that the public is kept safe as a result of their design decisions.

In order to give some coherence to this claim in light of the Western emphasis on the individual's autonomy, it is important that the distinction between the value

of autonomy and the value of professional autonomy be kept in mind. There is a clear difference between some role that an individual might have as a participant in society as a citizen and the role of the individual as it requires professional autonomy. In the role of the citizen, the justification for autonomy might occur on two levels. One is the Kantian notion that individuals are by their very nature as rational beings deserving of autonomy. The other is a more politically inspired perspective which holds that individual autonomy is necessary for the proper functioning of society based on an ideal of liberal democracy. In terms of professional ethics, neither one of these justifications directly applies. In fact, it is generally argued that a key potential conflict is between the duties of the professional as a professional and her or his basic moral beliefs, such as in the case of refusal to follow a hierarchical superior's instructions. While this is not the place to explore this conflict, it should be noted that the resolution of it forms one of the more contentious elements of debate in professional ethics. What is clear from the debate, however, is that it is recognized by most parties to the debate that this potential conflict between professional ethics and personal ethics exists (Harris, et al. 2000). I hold that this is based on the fact that the justification for the two is not the same. Professional ethics, as a role ethics, is ultimately based on the justification of protection of the client. In the case of engineering, the ethics codes make the assertion that this is the public as a whole. Now it might be argued that, analogous to the Kantian perspective, there is something inherent in the notion of professionalism that requires autonomy of the professional, but to my knowledge no such argument has been put forth, only the position that autonomy is required for the appropriate performance of an engineer's duties in light of the potential conflict with managerial orders.[8]

Professional autonomy is then appropriately justified based on the goal for the accomplishment of which a profession has been established in society. Briefly put, the goal of engineering is to design, develop, and implement technology. The role of engineering ethics within that context is to ensure the protection of the public's safety, health, and welfare in the process. This can be further seen based on two points. First, a number of engineering codes of ethics include the notion that enhancement or advancement of humanity should be established through engineers' work to benefit humanity in a positive sense. For example, a proposed model code of engineering ethics says engineers shall "endeavor to direct their professional skills toward conscientiously chosen ends they deem, on balance, to be of positive value to humanity; declining to use those skills for purposes they consider, on balance, to conflict with their moral values" (Unger 1994, pp. 110-24). Again, the difficulties inherent in establishing this

requirement prevent further discussion here, but the key is that it makes clear that the work of engineers is seen as being governed by designated goals. Second, codes of ethics and the discussion of ethics in engineering more generally, are only peripherally designed for the benefit and protection of the individual engineer. Some halting attempts have been made to establish a set of rights for engineers, but these have not seen much additional development (Whitelaw 1975). When rights are discussed in engineering texts, these are in the main rights applicable to all employees rather than strictly rights of professionals. A significant exception to this is the notion of the right of professional dissent, culminating in the right or obligation to blow the whistle, but here again the justification by the individual has to be based on the ideal of protecting the public.

I take it then that if professional autonomy is justified, it is not justified based on some ideal of autonomy in general, but rather based on the need of autonomy for the engineering profession to properly carry out its agreed on task in society. Based on a contract theory of the professions, an implicit agreement exists between an occupational group and society through which a profession is delegated by society to carry out one of its specialized functions. This function requires a high degree of skill and an extensive theoretical and applied knowledge base. The occupational group accepts certain restrictions on its activities and the role of guaranteeing that the function will be carried out in an exemplary fashion. In return, the occupation becomes a profession and is granted a high level of prestige and a relatively secure living for its members. In part this is typically achieved through the granting of monopoly power to the profession. The profession controls educational requirements for entry, entry itself, and continued participation in the profession. It does so through its licensing power, which is most often structured through society in the form of governmental control, but with the clear control by the profession itself in that members of the profession draft the actual rules. While the professions claim that this is intended to guarantee the work done by its practitioners, others see more sinister motives of self enrichment, but that is clearly not the theoretical justification for the existence of the professions (Luegenbiehl 1983).

What we have then is a theoretical justification for the autonomy of the professions based in the need for deciding on adequate and enforceable standards of practice. It should be noted that there are practical difficulties in applying this model to engineering in the U.S., since engineering there does not have monopoly power. Less than twenty per cent of U.S. engineers are licensed and

the remainder therefore does not fall under the regulatory scheme of engineering as a profession. Most engineers, or people designated as engineers by their employers, are covered by what is known as the industrial exemption, whereby one engineer is able to sign for the work of another. This means that the profession lacks control over entry, over the work that engineers are to perform, and lacks disciplinary power. Most of all, it lacks control over who is able to represent themselves as an engineer. However, in practice engineering has been relatively successful at achieving a degree of prestige and compensation commensurate with professional status. This may, however, be more due to the dependence of contemporary society on technology than due to the influence of the profession. Thus most engineers and most of society think of engineers as professionals, but perhaps in a rather confused sense, since the individual autonomy of engineers tends to be restricted by their employment context.

Nonetheless, it is the model of professionalism which guides the ideal of social responsibility inherent in engineering and in its codes of ethics. In terms of the theoretical model, though, the professions need to provide an additional justification for the transfer of the autonomy granted to them by society to the individual practitioner. This is provided for by the claim that no one outside of the profession is in a position to judge the quality of the practitioner's work. Given the employment context of the engineer, she or he will be surrounded by people lacking engineering education and consequently subject to making decisions based on non-engineering criteria, often economic ones, which they will consider to be more telling than engineering ones. Perhaps the most famous quote in this regard comes from the Challenger space shuttle case, where the engineering manager, Robert Lund, is told by his superior during a crucial pre-flight certification conference: "Take off your engineering hat and put on your management hat" (Boisjoly 1993, p. 63). The role of the profession in relation to the professional is to be the guarantor and judge, but also the protector of the engineer. The profession guarantees the individual's work to the outside world, often in the form of an imposed code of ethics of practice, and simultaneously sets itself up as the enforcer and ultimate arbiter of its rules. Autonomy on the individual professional level is a means of protecting both the professional and the profession against the forces of external ignorance and potential greed.

What this discussion makes evident is that the autonomy of individual engineers or professionals in general is not directly derived from moral theory and claims about human autonomy found there. Few would argue, for example, that moral

autonomy justifies the actions of the roofer or the house painter in relation to her job. Competence in the case of the engineer, unlike that of some other workers, has a moral dimension. This is based on the special implications the work of professionals has for human life. That is not to say other occupations have no impact on lives, they all do, but the professionals' work has a special, sophisticated, set of competencies associated with it that other occupations do not. And that is part of what justifies viewing engineering as a profession, even though some of the essential traits appear to be missing in the societal grouping in the U.S.

Once it is accepted that professional autonomy is not equivalent to the moral autonomy of the Western tradition, although it has moral dimensions, it can then be asked whether professional autonomy is an essential ingredient of professional practice. Here I would like to reformulate the inquiry in terms of the purpose for which the professions exist. That purpose, as previously indicated, is to carry out some special function in society.   In engineering, as the ethics codes assert, it is required that the function be carried out while holding "paramount the safety, health, and welfare of the public." However, in conducting the inquiry it is extremely important that the context of engineering be kept in mind. The analysis above was carried out in light of two conditions: a history of professionalization of occupations in the West and an employment environment of neo-classical capitalism. But these two conditions do not hold everywhere in the world. And thus it must be asked whether autonomy at either the level of the profession or the individual professional is a universally needed requirement, for if it is, then major cultural changes in some parts of the world will be necessary for engineers to function ethically in those societies.

The Japanese Model

In Japan, as our proposed alternative example, neither one of the above two conditions holds. Japan does not have a tradition of professions and it does not in general advocate a classical capitalist model. Further, as has already been proposed, it has no high regard for individual autonomy. It thus serves as an excellent point of contrast in terms of the main elements of the U.S. model. Other societies will exhibit varying degrees of divergence in terms of these elements and should be examined individually as well. In looking at the Japanese example, since the main subject is the requirements of an engineering ethics, I will restrict myself to examining the context in which most engineers are employed, that of business.

It has already been shown that the educational and socialization practices in Japan emphasize the group above the individual. In the context of business, the educational practices seem specifically designed to further this emphasis. Traditionally, although this has begun to change in the last few years, Japanese corporations hire incoming college graduates once each year, and all begin training at the same time. Employees are selected more based on the college from which they have graduated and based on their professor's connection with a corporation, than based on their major or class standing. "The general view is that university is a well-earned four-year vacation between adolescence spent in "examination hell" and a future lifetime of regimented employment" (Bieniawski & Bieniawski 1996, p. 194). While some critics have argued that a weakness of the Japanese educational system is that students, after years of preparing for the difficult entrance examination for university, relax during their college years and are almost assured of graduating, corporations are complicit in the system because it allows them to undertake the necessary training themselves. As one report on engineering education in Japan put it:

> Evidently, from the perspective of industry, the definition of a quality graduate is markedly different in Japan and the U.S. In the U.S., a "good" graduate, among other characteristics, is defined as one who will be immediately useful to the company, has graduated with high marks, and has relevant work experience. In Japan, a "good" graduate is one who is flexible, fits in well with the company (trainable), and has proven their potential in the harsh entrance examination by attending a prestigious university (Yamada & Todd 1997, p. 344).

Employees thus come to corporations relatively unformed, with the exception of belief in group coherence, which has been reinforced during the college years by the tremendous amount of time devoted to a "club" which most students belong to, be it a sports team or a hobby group.

Once graduates are hired, the corporation reinforces group dynamics. Employees are encouraged to bond with fellow workers hired during the same year. All university graduates, including engineers, receive approximately the same salary for a number of years and subsequent raises are seniority based. At the same time employees are encouraged to identify with the corporation as a whole by way of rotation through various departments. This also discourages feelings of being a specialist in a particular practice (Kinmoth 1989). All of these factors

work together in a system of lifetime employment in the large corporations, where employees in a corporation feel closely dependent on each other and on the corporation.[9] Lifetime employment makes possible what to many American corporations would seem to be practices wasteful of their financial resources. Because employees will work together for their entire career, the ideal of group harmony (*wa*) becomes a guiding virtue in the Japanese corporation as it is in Japanese society as a whole.

Even this brief introduction is enough to show that professional independence would be very difficult to establish in such a corporate system. The new employee is inculcated with the values of the corporation. His or her first loyalty is to the corporation, not to some abstract notion of profession. When Japanese employees are asked "What do you do?," the typical answer is something like "I am a Mitsubishi man," not "I am an engineer." "The degree to which the Japanese identify with their employers is generally so strong it prevents them from having or developing any interest or links with others in their profession. In many professions, members of different organizations do, in fact, avoid communicating with each other" (DeMente 1981, pp. 62-3). "Professional society meetings, conferences, and continuing education programs are normally considered an important part of career development in western countries. The average Japanese engineer does *not* participate to any great extent in professional activities. Instead, most efforts are devoted to the company's goals" (Heidengren 1992, p. 122). Given this emphasis on identification with the employer, Japanese engineers have a difficult time even thinking about the idea of whistle blowing. In conversations with them, while they understand my use of the concept, they do not grasp why it would ever be necessary to engage in such an action, since they identify so closely with their employer. As one Japanese engineering professor with extensive industrial experience puts it, "Informing outsiders of confidential information has been taken as betrayal to the organization and colleagues. Whistle blowers are perceived as untrustworthy and would not be accepted by Japanese society. No appreciation by the public is expected to a specific whistle-blower as seen in the U.S" (Iino 2001, p.8D2-39).

Japan lacks a tradition of profession and professional identification and therefore the associated emphasis on professional autonomy. While in medieval times the system of family centered occupational tradition had some similarity to the European guilds in a hierarchical feudalistic system, with the industrialization of Japan in the second half of the nineteenth century the idea of group loyalty was transferred to the context of work rather than to an external body accrediting the

quality of work. A basic aspect of the emphasis on the group in Japan is the distinction between being inside and outside (*uchi/soto*) of the group. It is the internal ties of the group which to a large extent determine actions, not adherence to some abstract principle. Loyalty and selfless devotion are the determinants of action.

The major historical groups for the Japanese have been family (*ie*), local community (*mura*), the corporation (*kaisha*), and the nation. Since the beginning of industrialization in Japan, as Taka and Foglia assert, "*kaisha* has taken over many of the functions of *ie* and *mura*" (Taka & Foglia 1994, p. 137). The identification with being Japanese (*nihonjin*), however, remains strong. The world of the *gaijin* (foreigner) always remains outside. "The Japanese/outsiders distinction is central to a Japanese identity, and blurring the divisions poses a threat to a Japanese definition of the world" (Yamada 1997, p. 140). In looking for guidance for action, the Japanese engineer will thus typically act in terms of the sense of the group, not a group of professional engineers, but the fellow members of the corporation. The guidance, in turn, is typically consensus based after an extensive process of informal consultation (*nemawashi*). This has led Scott Clark, after an extensive anthropological investigation of the ethics of engineers in Japanese corporations, to arrive at the conclusion that "engineering ethics in Japan is founded upon building and maintaining positive relationships." (Clark 2000, p. 20) Mutual trust and the need for harmony thus override individual concerns and lead to a lack of individual autonomy, with important ramifications for engineering ethics. "Put in another way, because the loyal employees generally try to do what seems to be good for the corporations, issues such as manufacturing defective products or stealing the firm's assets have not been earnestly discussed in Japan" (Taka and Foglia 1994, p. 139).

Consideration of the inside/outside distinction raises the second feature relevant to this discussion, that of the corporation's identity. On the neo-classical capitalist model, the corporation sees its primary obligation to the owners, the stockholders. In the Japanese model of developmental capitalism, on the other hand, the aims of the corporation are closely identified with the aims of the nation. A primary function of the corporation is to help society advance, rather than serving the immediate desires of the stockholders (Gilpin 2001). Japanese are the inside group, while everyone else is outside. The other major function of the corporation, in accordance with the above analysis, is to remain in existence, to provide a continuing source of earning a living for its employees, just as a family would assume continuing responsibility for its members (Lauenstein

1993). This ideal has been made workable in part by a system of interlocking corporate ownership (*keiretsu*) which allows corporations to take a longer term outlook. It also explains what from a Western perspective seems to be very little regard for the ordinary citizen's needs. The bond between the industrial complex and government holds that the furthering of national interests takes precedence over the private needs of the public. Until very recently, there has been no consumer movement in Japan. "Influenced by the press and by its sense that the achievements of Japanese industry are the achievements of the nation, the Japanese consuming public is uncritical and supportive" (Prestowitz 1988. p. 176).

The relationship between government and industry has been continually strengthened since the 1950's through an industrial policy implemented by way of a system of administrative guidance. Government directs and "guides" the corporations according to its vision of the national interest, and corporations, despite some significant exceptional cases, have generally followed the directives, even to the extent of cooperating with rivals in the same industry.[10] The primary instrument of guidance for industry has been the well-known Ministry of International Trade and Industry (MITI), which was recently renamed METI (Ministry of Economy, Trade, and Industry). METI has "near-monopoly power" in its area of responsibility. "Among large industrial states, few, if any, bureaucracies exercise comparable power over the sector-specific management of the industrial economy" (Okimoto 1989, p. 112). Lest it be thought that this makes for a unidirectional system of command, it is important to keep in mind that consultation and consensus building occurs in the relationship between METI and industry just as it does internally to the corporations. Japan thus has not only a sense of common purpose for its technological future, but also a means of attempting to manage that future.[11]

Compatibility of Models

The relevant contrast that we find between the U.S. and Japanese situations for engineers is then as follows. The ideal professional model requires that the engineer and the engineering profession be autonomous so as to protect the public in the face of corporate self-interest. The ideal Japanese model, on the other hand, requires the engineer to function harmoniously as an integral part of the group in a system where the corporation serves the needs of society. The potential for professional autonomy is very limited in the Japanese model. In the Western model the profession guarantees the quality of the engineer's work

through its contract with the larger society. In the Japanese model the corporation serves the same function.

One way of seeing this is in the process of taking responsibility for actions. Western observers are sometimes puzzled by the way corporate heads in Japan take responsibility for actions of subordinates. If there is wrongdoing by employees in a U.S corporation, the job of the executive is to get rid of the wrongdoers. If the executive has to take responsibility, it is because he or she should have exercised a neglected supervisory function. In other words, the executive was not doing his or her job properly. In the Japanese system, on the other hand, the executive will often resign or submit to other sanctions, including abject and 'sincere' apologizing, as a symbolic representation of the corporation as a whole taking responsibility for the action. In a sense, when an employee does wrong, the whole corporation does wrong or is responsible. While this has sometimes been interpreted as the avoidance of responsibility (Clark 2000), it is more useful to interpret is as a form of collective responsibility. Akito Morita, the founder of Sony Corporation, has been quoted as saying that "the company is a fate-sharing vessel" (Schoppa 1985, p. 12). Hiroshi Honda uses the case of a subsidiary of Toshiba Corporation selling technology to the former Soviet Union, in violation of international agreements, which had the potential to make submarines too quiet for detection. The case became famous in the U.S. when members of the House of Representatives used sledge hammers to destroy Toshiba radios on the steps of Capitol Hill (*Newsweek* 1987, p. 40). As Honda puts it: "The chairman and the president of Toshiba resigned, even though the home office had not been involved in the affair" (Honda 1992, p. 31).

Seen in terms of engineering, it is therefore the corporation which takes responsibility for, and guarantees, the engineer's work. The engineers, for their part, are an integral part of the larger group and, knowing that their fate is tied to that of the corporation, would be aware that they would not profit from individual actions. The corporation, in turn, sees its interests tied to those of the nation. The core demand for "the safety, health, and welfare of the public," the primary goal of an engineering ethics, can then be achieved through the corporation, since it is not expected to act based solely on the interests of its owners. Put another way, the stockholders see themselves in the same "fate-sharing vessel" as the other members of Japanese society and are therefore able to take a self-sacrificial perspective. "Buy American" campaigns in the U.S. have been notably unsuccessful because U.S. consumers will gravitate toward the best product at the lowest price. Japanese, on the other hand, have accepted high food and

transportation expenses, as well as "rabbit hutch" housing, because they have been persuaded that the national, and therefore their own, interest lies in an export driven economy.

It is interesting that in his research on Japanese engineers Clark found that "nearly every engineer that spoke of safety considered it as part of the quality of the product" (Clark 2000, p. 25). While an American company might well say that product safety is a feature delegated to its engineering staff, it would make no such assertion about quality. Quality and safety are separate aspects of the product. In taking a holistic approach to the product, the Japanese engineers are reflecting the integrated nature of all the divisions of the corporation. One of the findings of comparative studies of American and Japanese engineers has been that American engineers want to be design engineers and do not assign as much prestige to jobs in manufacturing, quality control, and sales. No such distinction is evident among Japanese engineers. There is, instead, an emphasis on the priority of production, with an integrated perspective on the different phases of the engineering process (Imai 1986). The identity of the engineer is found in the corporation as a whole, not in one of its specific divisions, nor in any specific job description.

Autonomy is an essential ingredient of Western conceptions of professional ethics. The need for autonomy is generated by the work environment of the engineer, where the public safety is liable to be threatened by the economic imperatives generated by management, which is itself responding to pressures from its stockholders. If the conception of the societal responsibilities of the corporation is different, as it is in Japan, then the control function exercised by engineering autonomy is not as evident. If, further, the engineers and others in the corporation perceive themselves to be in a mutually interdependent relationship, then an emphasis on autonomy will not be the most appropriate way to achieve the goal of engineering ethics. As a consequence, in one engineering environment autonomy may be appropriately emphasized, and may need to be promoted in order that the societal purpose of an engineering ethics is achieved, while in another it need not be and its emphasis could actually be counterproductive.[12]

The result of this analysis should not gloss over the fact that there can be, and indeed is, ethical wrongdoing by Japanese corporations, just as there are American engineers who misuse their professional autonomy. In fact, of late Japanese corporations have been subject to especially heavy public scrutiny,

particularly because of safety issues that have arisen in the nuclear power industry. Hiroshi Iino cites these and a number of other cases, including a case of contaminated milk products and a Mitsubishi cover up of customer complaints about defective products over a period of twenty-five years. (Iino 2001). However, the relevant question is not whether ethical wrongdoing would occur in a particular environment where professional autonomy is not emphasized, but rather whether autonomy itself is a proper foundation for a global engineering ethics. Wrongdoing by some individuals is an inherent feature within any ethical system and therefore pointing to instances of it is not a valid indicator of the superiority of an alternative model, in this instance of the model of professional autonomy. Given the divergence of cultural preconceptions regarding the value of autonomy, it is instead imperative that a global model for engineering ethics be sought which does not require reliance on autonomy as the foundation of engineers' ethical responsibilities.

Conclusion

The position advocated in this paper is that it is a mistake to rely solely on the Western philosophical tradition to justify "professional ethics." The work of "professionals" has a special role in society. Differing ethical requirements may be compatible with that role in different societal contexts. Therefore, professional ethics cannot simply be the subject of abstract philosophical analysis. It needs to be looked at in the context of particular cultural domains. This makes the development of a universal engineering ethics, which I believe is a necessary element in the future of engineering (Luegenbiehl 2003), a much more difficult proposition than if one could simply base such an ethics on a particular tradition of moral theory. It will instead require each culture examining the individual propositions of such an ethics in light of a universal goal of the protection of the public safety.[13]

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Notes

[2] The primary example of this is the Washington Accord, signed in 1989, which recognizes the substantial equivalence of engineering qualifications of graduates of accredited programs in member countries. Since some of the countries have ethics education requirements in their accreditation standards, the Accord has implications for the development of ethics standards internationally. However, the signatories are limited to the United Kingdom, the United States, and a number of English language dominated countries with close ties to Britain.   Japan became the first non-English speaking country to become a provisional member of the Accord in 2001. A similar agreement is being developed by the APEC (Asia-Pacific Economic Cooperation Forum) engineering project.

[3] I want to emphasize that all of the discussion regarding Japanese society should be taken in light of the fact that it is also a society in flux, a dynamic society, where tensions exist between progressive and conservative forces. The visitor to Japan, for example, will notice that many Japanese are dyeing their hair in various colors to distinguish themselves from the uniformly black hair provided by nature. Commentators have variously accounted for phenomena such as this as indicating a permanent change in Japanese culture toward increased individuality, a youthful phase which will be absorbed as the young need to function in mainstream society, or a superficial feature which does not impact the enduring values of Japanese society.

[4] For a more complete review of the contrasts between the two cultures' values see, for example, the classic work by Nakane (1970) or Smith (1983).

[5] The first version of this text, titled *Ethics in Engineering*, by Martin and Schinzinger was published in 1983 and was the first text on engineering professionalism co-authored by a philosopher.

[6] For example, the Code of the National Society of Professional Engineers on the 1947 version of which most other engineering ethics codes of technical societies in the U.S. are modeled, although as time passes amendments to the societies' codes is resulting in some divergence among them.

[7] It should also be noted that paternalism may have various strong and weak forms, so that it may include consultation with the public regarding potential technological developments.

[8] The literature on whistleblowing in engineering is extensive. For a representative example on the need to protect the public see Martin (1992). More recently, some opposition to whistle blowing has emerged in the literature, with Michael Davis the primary analyst (Davis 1996).

[9] Again, it should be noted that due the extended recession in Japan, which began in 1991, starting in the mid-90's some corporations have begun to move away from the lifetime employment system, but only with great reluctance. See *The Japan Times* (1996) The strength of the ideal is demonstrated by the indirect methods, such as placing workers into positions with no duties, used to attempt to eliminate workers and workers' resistance to such methods, which are an extension of the more traditional Japanese tactic of having nonproductive staff "sit by the window." See, for example, *The Wall Street Journal* (1999).

[10] This cooperation should be seen in light of the fact that the Japanese are known to be fierce competitors within industries, in constant competition for market share. The inside/outside distinction applies to the relationship among corporations as well.

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[11] It has been widely debated how successful the work of MITI has actually been in providing for Japan's industrial success and the degree to which other factors are actually responsible. Entering that debate would be outside the scope of this paper.

[12] In light of this conclusion, it is somewhat worrisome that there seems to be a push for the adoption of American codes of ethics worldwide. The National Society for Professional Engineers (NSPE), for example, reports that its code is being translated into a variety of languages and that the opinions of its Board of Ethical Review have been licensed to the Japan Consulting Engineers Council. See NSPE *Engineering Times*, December 2000. With the establishment of the Japan Accreditation Board for Engineering Education (JABEE) in 1999 it is expected a code very similar to American ones will soon be adopted.

[13] As a caveat, it should be noted that the ethical autonomy of the engineer may have functions other than the protection of public safety. That issue is left for another paper.