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PROFESSIONAL ETHICS IN THE DAILY WORKING PRACTICE OF CIVIL AND STRUCTURAL ENGINEERS

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Sooner or later in their daily working practice, engineers come in contact with issues of professional ethics. Codes of professional conduct are well developed and popular in a number of countries all over the world. Also in Germany, codes of professional conduct were developed for various professions such like medicine, civil and structural engineering as well as architecture over the past decades. As a planner, consultant or specialized expert, civil and structural engineers are obligated to obey the rules of proven professional conduct and modern professional ethics. Their professional practice requires the observation of secured technical knowledge and the obligation for ongoing professional development. The paper provides an overview about professional ethics and engineers' professional law. Furthermore, it is dealing with the aspects of professional ethics in the civil and structural engineers' daily working practice and it discusses the question, if rules of professional conduct help to establish clients' trust in the competence and the moral attitude of civil and structural engineers. The author explains why it is necessary to implement ethical education in universities' civil and structural engineering programs and to continue the education in the courses for ongoing professional development. Finally, the paper mentions relevant case law. The conclusion is: Codes of ethics may not have the same importance in all countries all over the world. But they can be inspirational and motivating as well as instructive. Codes of conduct help structural engineers to take decisions and are guiding principles in their daily working practice. Therefore, it is necessary to distribute knowledge of professional ethics and to enforce codes of professional conduct.

Keywords: Codes of ethics, Professional conduct, Engineers' professional law, Ethical education, Client's trust.

1 INTRODUCTION

The construction industry develops rapidly in a globalized world. New technology, increasingly complex construction projects as well as more energy efficiency and environmental requirements bear an enormous burden of responsibility on civil and structural engineers. Every day in their working life engineers are at risk to be confronted with ethical difficult situations. The pressure to perform and the need to reduce construction costs do not make it easier to decide in an ethical correct way. Furthermore, not everything that is technically feasible also is ethically acceptable. For example, within the current intensive debate concerning Hydraulic Fracturing - also called Fracking - ethical aspects of technological progress were discussed as well. Codes of professional ethics can support civil and structural engineers to manage their

everyday working life. Furthermore, they are able to increase clients' confidence in the engineering profession. But, it is to state that codes of ethics do not create ethics (Strahlendorf 2004). They are only guidance for ethically correct professional behavior (Quapp 2015).

2 CODES OF ETHICS

Professional ethics is written down in codes of ethics. In Germany, professional ethics are part of the professional law of engineers and enforceable. Codes of ethics express the rights, duties, and obligations of the members of the profession. Obviously, the codes of ethics are not comprehensive enough to cover all possible ethical dilemmas that an engineer might encounter in his or her career. The codes serve as starting points for making ethical decisions (University of Missouri 2015).

The first codes of ethics were developed in United States of America in the year 1912 (Hubig and Reidel 2003). In the beginning, they only consisted of rules concerning the conduct towards clients and competitors. It took years, until after the Second World War, before principles for the orientation of the engineering practice at the safety, health, and welfare of the public were added (Mitcham 2009), as for instance by regulations concerning the environmental protection. Today, in United States codes of professional ethics are well developed and can be easily followed to avoid problematic situations. In Germany, private professional associations set the first codes of ethics. Later, after the Second World War, these regulations were included in the binding codes of professional conduct (Taupitz 1991) set by professional chambers which were established by law and are so-called indirect public administration at federal level as well as an instrument of professional self-administration. Beside these binding and enforceable rules of professional conduct also codes of ethics developed by private professional associations exist in Germany.

Rules for civil and structural engineers' professional ethics can be found nearly all over the world. Thus, e.g. the American Society of Civil Engineers, defined Ethics Guidelines for Professional Conduct for Civil Engineers as well as the *Fédération Ingénieurs et Scientifiques de France*, the Nigerian Institution of Civil Engineers, and the Japan Society of Civil Engineers, just to mention a few. The guiding principles for professional conduct of engineers are comparable all over the world, whereby it is to note that in Germany a distinction must be made between professional law and self-imposed standards of professional associations for instance set by the *Verein deutscher Ingenieure* (2002). Mostly, avoiding conflicts of interest, a negative attitude to bribes and kickbacks, ensuring legal compliance, refusing benefits as attempts to influence the engineer's performance or judgment as well as protecting the environment etc. are content of such ethical guidelines.

Normally, codes of ethics are set by engineers' organizations or professional associations of engineers and contain:

- General orientation (principles and mission statements) characterizing the engineer's profession
- Professional rules for the engineer's everyday work life concerning relationship to clients, supervisors, colleagues (esp. competitors) as well as regarding profession and public

- Procedural rules for behavior in difficult moral situations (Hubig and Reidel 2003).

Not all of them are binding or enforceable. Furthermore, most of the codes of ethics do not contain all of the aforementioned elements. Having internal and external effects, addressees of codes of ethics are the public, employers, clients and fellow professionals.

3 PROFESSIONAL ETHICS IN PRACTICE

Nearly every day in their working life engineers have to take ethical difficult decisions. When faced with a problem at work that raises a moral issue, rules of professional ethics can help civil and structural engineers to decide how to act. They can assist in making choices in difficult professional situations (Strahlendorf 2004). Rules for professional conduct help clarify values and form a framework for discipline as well as support to build up a group identity and collegiality (Strahlendorf 2004).

One further advantage is the impact on public confidence in the profession of civil and structural engineers. By codes of ethics, clients get an idea about the principles civil and structural engineers try to follow during their work. This is a sign of quality which is the source of the good reputation of engineers and the basis of the professional pride.

The more detailed the professional code is the more guidance it offers for the engineer. Codes of ethics do not only give orientation for professional conduct, they relieve the engineers of some responsibility as well. Thus, every engineer can invoke the codes of ethics considering the other societies' expectations which means a protecting effect for civil and structural engineers. Furthermore, codes of ethics relieve the state and the legislation which can build upon the professional regulations (Hubig and Reidel 2003).

Consequences for violation of professional codes of ethics are heterogeneous. There is a big difference between countries where engineering only can be practiced with a professional license such as in Germany and other countries where a professional license is not necessary. In Germany, violating the codes of contact can result in serious consequences such as a fine or the removal from the chamber of engineers and in fact to a dismissal from the profession. In other countries (e.g. USA) violating the code of ethics may result in expulsion from a professional society but not in a prohibition to practice engineering (University of Missouri 2015).

Professional societies' ethical guidance falls into three basic categories depending on consequences (Gardenier 1995). First, a "weaker" type of code of ethics which is more a declaration of intent without any consequences is the type of "Aspirational guidelines". They encourage competent and moral practice in general, but do not provide specific rules of conduct (Gardenier 1995). Mostly, they consist of a few advices for desirable ethical conduct. But today, the second type "Educational Guidelines" is usual which articulates more clearly what represents ethical practice, often with interpretive commentary or case illustrations (American Society of Civil Engineers 2008). Their intention is an educational effect on the institution members. However, this category of codes does not imply or impose sanctions for deviations from the guiding principles (Gardenier 1995). "Regulatory guidelines", as the Code of

Ethics of the Institution of Engineers Australia (2010), spell out adjudicable guidelines and informs about consequences, such as fines or expulsion from the society, for failures to comply. Furthermore, ethics are covered by statutory codes of conduct in state or federal law (e.g. the US Foreign Corrupt Practices Act or the German Act Against International Corruption)

The relationship between law and professional ethics is quite interesting. Not everything that is unethical is at the same time illegal too. In the majority of the countries, codes of ethics are not legally binding. But, most of the regulations are in compliance with the national legislation. However, in some aspects professional ethics cover far more issues than the law does. Nevertheless, ethical issues often play a role in cases of professional liability, such as the Kansas City Hyatt Regency walkway collapse or the Bad Reichenhall Ice Rink Collapse (Quapp 2015).

4 PROFESSIONAL ETHICS IN EDUCATION

Significant for a positive effect of professional ethics on society is a wide distribution of codes of ethics among not only engineers but also the public. Knowledge about the code contents is a must for civil and structural engineers. Therefore, a lifelong ethical education, starting at universities and continuing in further training should be offered.

4.1 Professional Ethics in Study Programs

On the basis of the arguments above the question arises if, in civil and structural engineering programs, there is a need for special courses in professional ethics. In the discussion a distinction must be made between extra courses or the inclusion of ethics in subject specific courses. Certainly, higher education institutions must take on the task to educate their students in professional ethics. But it seems to be much more successful to integrate this subject in a teaching concept where practical aspects play a major role (Kledtke 2000). Thus, questions of ethically impeccable professional conduct can be included e.g. in courses in building project management or law as well as in all other subject specific lectures and should be discussed at practical examples. Lecturers should teach their subjects practice-oriented and discuss application in construction industry always in the light of environment and society. Although accreditation organizations such as the Accreditation Board of Engineering and Technology (ABET 2014) have mandated that engineering programs include ethics in their curriculum, additional ethic courses are not to prefer because they would further reduce time for specific technical subjects in civil and structural engineering programs.

4.2 Professional Ethics and Continuing Professional Education

Continuing professional education is an essential element of professionalism, and it is often referred to directly in codes of ethics. In Germany, further training is obligatory for members of state chambers of engineers and publicly certified experts to continuously improve professional knowledge and skills. The legislature in Germany is authorized to impose this obligation for ongoing professional development to civil and structural engineers (Higher Administrative Court of North Rhine-Westphalia 2012). If civil or structural engineer members of the German engineers' chambers are not able to prove continuing education courses in sufficient quantity it will have consequences

such as imposing a fine or withdrawal of recognition as government-recognized expert (Vock 2013).

Furthermore, professional ethics should be an educational subject in continuing professional education. Only if engineers know about the codes' contents they can apply. Of course, nearly all civil and structural engineers are informed about the codes of professional conduct but may be not in detail. Furthermore, legislation can change and new court decisions can be published with effects on ethical issues.

5 CONCLUSION

Because of the more complex demands on civil and structural engineers in globalized everyday work life, importance of codes of ethics increased in the last years. Codes of professional conduct are the conscience of the engineering profession. They may not have the same importance in all countries all over the world but codes of ethics can be inspirational and motivating as well as instructive. Day by day, codes of professional ethics help structural engineers to take difficult decisions and are guiding principles in their working practice. Because of high requirements on engineers such as standing responsibility for society as well as liability for construction deficiencies and damages, civil and structural engineers need regulations of ethically impeccable professional conduct which are independent of stakeholders' interests.

The codes are able to convey an image of engineers' competence and reliability in public. Rules of professional conduct for engineers are both a promise and an obligation. They help to establish clients' trust in the competences and the moral attitude of civil and structural engineers. But, it must be noted that codes of ethics do not create ethics. They only define ethically wrong or right professional conduct.

Therefore, it is necessary to distribute knowledge of professional ethics and to enforce codes of professional conduct. Collateral education is required to bring a code of ethics alive, starting in the education at the universities and continuing in the courses for continuing professional development. Furthermore, infringement of regulation about professional conduct must be sentenced without any exception in order to preserve public confidence in the work of civil and structural engineers.

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