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Professionalism in Engineering Bibliography

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Description

This annotated bibliography contains references to professionalism within engineering. It includes subsections on the Role of Codes of Ethics in Engineering Practice, the History of Engineering, and Social Responsibility.

Body

The Role of Codes of Ethics in Engineering Practice

Broome, Taft Jr. 1989. Can engineers hold public interests paramount? *Research in Philosophy and Technology.*9:3-11.

The purpose of this paper is to consider whether public paramountcy rules are consistent with defensible conceptions about the nature of engineering. The main arguments are: (1) while these rules are consistent with conventional applied science conceptions of engineering, these conceptions are not defensible, and; (2) ordinary meanings of public paramountcy are not consistent with a new defensible conception of engineering. Instead of suggesting that these rules be repealed from engineering codes of ethics, qualifications for the meaning given to public paramountcy are presented.

Davis, Michael. 1991. "Thinking Like an Engineer: The Place of a Code of Ethics in the Practice of a Profession." *Philosophy and Public Affairs* 20(2):150-167.

The author addresses three myths about engineering codes of ethics. First, that the first codes of engineering ethics put loyalty to the client or employer ahead of the public interest. Second, that engineering codes of ethics should be mere moral guides rather than legalistic rules, and finally, that codes of engineering ethics are too vague to provide much guidance.

Davis, Michael. 2009. Is engineering a profession everywhere? *Philosophia. 37(2) 211-225.*

This author discusses how western ideas of what constitutes a "profession" might be applied in any country, especially how the profession of engineering differs from the function, discipline, and occupation of engineering. To do this, he explains the connection between the term "profession" to the hard-to-translate term "code of ethics". The author argues that to understand engineering or any other occupation, as a profession is to adopt a certain concept of it, a concept that is neither old nor (yet) universal.

Davis, Michael, "Three Myths about Codes of Engineering Ethics." *IEEE Technology and Society Magazine*, Vol. 20, Issue 3. pp. 8-16.

The author addresses three myths about engineering codes of ethics. First, that the first codes of engineering ethics put loyalty to the client or employer ahead of the public interest. Second, that engineering codes of ethics should be mere moral guides rather than legalistic rules, and finally, that codes of engineering ethics are too vague to provide much guidance.

Gotterbarn, D., K.W. Miller. 2009. The Public is priority: making decisions using the software engineering code of ethics. *Computer.* 42(6): 66-73.

The software engineering code of ethics and professional practice encourages software engineers to undertake positive actions and to resist pressures to act unethically. Article discusses how this code can be used to make decisions that come up in the daily work of software engineers.

Harris, Charles E. 2004. Internationalizing professional codes in engineering. *Science and Engineering Ethics.* 10(3): 503-521.
Using the American Society of Mechanical Engineers (ASME International) Code of Ethics as an example, this article discusses how professional societies are working to try and make their codes applicable to engineers working throughout the world. The author examines how provisions in the ASME code can cause problems of application for societies outside the United States, and how these issues can potentially be overcome.

Loevinger, L. 1996. Enforcing ethical standards of professional associations. *Professional Ethics: A Multidisciplinary Journal.* 5(1-2): 157-166.
The author discusses how codes of ethics have become inherent in the concept of a profession and how U.S. Federal Courts have historically interpreted and enforced these codes of ethics.

Perlman, Bruce and Roli Varma. Improving ethical engineering practice. *IEEE Technology and Society.* 21(1): 40-48.
Discusses the relevance of engineering codes of ethics of professional engineers, and how studying the role of ethics in paradigm cases of engineering failures, such as the Challenger explosion, the Ford Pinto gas tank, and other cases helps illuminate the difficulties in actualizing codes of ethics in practice.

Pfatteicher, S.K.A. 2003. Depending on character: ASCE shapes its first code of ethics. *Journal of Professional Issues in Engineering Education & Practice.* 129(1): 21-31.
The article discusses how, for the first 60 years of their society's existence, American Society of Civil Engineers (ASCE) members repeatedly rejected proposals that the society adopt a formal code of ethics, and even after the adoption of the code in 1914 members were extremely concerned that it would unduly restrict an engineer's behavior and practice. The first ASCE code was intended, in effect, not so much as a collection of rules, but as a declaration of engineers' independence from such rules. This paper explores this history, and discusses what to be an ethical

engineer and what role professional societies should play in establishing, encouraging, and enforcing ethical standards.

Vesilind, P. Aarne. 1995. Evolution of the American Society of Civil Engineers Code of Ethics. *Journal of Professional Issues in Engineering Education and Practice.* 121(1): 4-10.
Reviews the history of the code of ethics adopted by ASCE, and analyzes the development and maturation of the civil engineering profession. The author examines the establishment of an environmental component to the more recent versions of the code of ethics.

History of Engineering

Armytage, Walter H.G. 1976. *A Social History of Engineering.* London: Faber and Faber.
A classic history that shows how social and economic conditions in each have precipitated advances in engineering, starting from the time of the Greeks but focusing on the nineteenth and twentieth centuries. The author also looks at the history of the profession and the study of higher and technical education.

Calhoun, Daniel Hovey. 1960. *The American Civil Engineer: Origins and Conflict.* Cambridge: Technology Press-MIT.
Though somewhat dated, this book discusses the origins of the profession of civil engineering in America, their struggle achieve recognition of their usefulness to society, and the challenge of developing a clearer definition of civil engineers' professional responsibility.

Calvert, Monte. A. 1967. *The Mechanical Engineer in America, 1830-1910.* Baltimore: Johns Hopkins Press.
Discusses the professionalization of mechanical engineering during nineteenth century and the conflicts that existed between mechanical engineers who had been trained through apprenticeships in the shop, and a new generation of college-educated engineers. He discusses the founding of the American Society of Mechanical Engineering from 1880 onwards, and the struggles between these two groups as the organization began debating the need for licensing, formal code of ethics and an active political role for the profession.

Ceruzzi, Paul E. 2003. *A History of Modern Computing Cambridge: MIT Press.*
Provides a straightforward and comprehensive account of the electronic digital computer's first five decades, and the engineers and computer scientists involved in its construction, as well as discussing the social phenomena that shaped this technology's development.

Davis, Michael. 1995. "An Historical Preface to Engineering Ethics." *Science and Engineering Ethics*. 1(1):33-48.
This article looks at the history of the profession of engineering in order to distinguish it from the history of science and technology. The author discusses the relative youth of engineering and its distinct technical and moral commitments, in order to highlight the special contribution of engineers to technology and to their own professional standards.

Davis, Michael: 1998. *Thinking Like an Engineer: Studies in the Ethics of a Profession.* New York: Oxford University Press.
In this book, the author concentrates on a set of issues crucial to engineering ethics and seeks to outline a philosophy of engineering as a profession. The volume looks at the history of engineering, the role codes of ethics play in engineering practice, ands well as how social organization and technical requirements combine to define how engineers should (and presumably do) think.

Dennis, Bernard G. Et al. 2003. *American Civil Engineering History: The Pioneering Years.* Reston, VA: American Society of Civil Engineers.
Collection of papers from a conference sponsored by ASCE that discusses the development of the profession of civil engineering and highlights the careers of famous engineers in this field.

Hill, Donald. 1996. *A History of Engineering in Classical and Medieval Times* . London: Routledge.
A good reference book on engineering on classical and medieval engineering. The book is divided by subject and discusses civil engineering mechanical engineering and early technology included irrigation systems, dams, bridges, waterwheels, clocks and automata.

Meredith J. W. and P.M. McCarter. 2009. History of the IEEE-USA: 1973-2009. *Proceedings of the 2009 IEEE Conference on the History of Technical*

Societies. **Philadelphia, PA: 5-7 August 2009. 21 p.**
Describes the history of the U.S. branch of the Institute for Electrical and Electronics Engineers from 1973-2009, and its role in advancing the profession while meeting the global challenges of the 21st century.

Leyton, Edwin. 1971. *The Revolt of the Engineers: Social Responsibility and the American Engineering Profession .* Cleveland: Case Western University Press.
By examining the history of engineering, this book discusses issues of professionalism, social responsibility and ethics. He discusses the conflicts that exist for engineers between their relationship to business, their rightful degree of social responsibility, and the appropriate ways in which their profession should be organized as a whole.

Reynolds, Terry. 1991*. The Engineer in America: A Historical Anthology from Technology and Culture*. Chicago, University of Chicago Press.
Discusses the development of the engineering profession in America in the past 200 years, and the sometimes paradoxical role engineers have played in building the infrastructure on which America is based.

See also:

ASCE History and Heritage Program
Includes readings and bibliographies on the history of the civil engineering profession, information on historic landmarks and civil engineering projects, structures and sites, and information on state and local history and heritage in the United States. Also includes links to other engineering history sites.

IEEE Global History Network
The IEEE Global History Network is a wiki with content generated by IEEE members and invited experts looking at the history of the electrical engineering profession, IEEE, and how electrical, electronic and computer technologies have dramatically changed the world in the 19th and 20th centuries.

NSPE Heritage Site
Founded in 1974, this web site gives a brief history of the National Society of Professional Engineers and provides a timeline, video and other materials about the history of this professional organization and the profession of engineering in general. They also provide a history of the NSPE Code of Ethics.

The Society for the History of Technology

A society devoted to studying the development of technology and its relations to society and culture. Includes publications on the history of technology and history of engineering, and extensive links to further resources covering all areas of engineering practice.

Social Responsibility

Durbin, Paul T. 2008. Engineering professional ethics in the broader dimension. *Interdisciplinary Science Reviews.* 33(3): 226-233.

Discusses the need for engineering societies to broaden their ethical outlook to focus on the broader social responsibilities of professionals and their focus on making service to humanity a paramount responsibility, rather than focusing their efforts on disciplining the misconduct of individual society members.

Gunn, Alistair S. 2010. Integrity and the Ethical Responsibilities of Engineers. *Philosophy of Engineering and Technology.* 2(2): 125-134,

Discusses the uniqueness of the engineering profession in that it is one of the old professional activities whose practitioners can be held to account for their failures, according to publically promulgated standards. However, the public generally has a limited understanding of what engineers do because they do not understand the nature of risk or the limited extent to which individual engineers are responsible for the construction, use or maintenance of their designs. The author discusses how, because of the complex nature of engineering as a profession, engineering integrity is also complex and engineering education should emphasize this.

Harris, Charle E, Michael Pritchard and Michael Rabins. 2009. *Engineering Ethics: Concepts and Cases.* Belmont, CA: Wadsworth Cengage Learning.

This is a collection of readings and case studies that has been successfully used in many undergraduate engineering ethics courses. The readings introduce moral theories, discusses the role of engineers in organizations, and cover major topics such as the concept of risk, and standards of care. The chapters also cover methods for determining the type of problem you are dealing with, and offers a number of tools for decision-making. Each section includes a number of historical and fictional case studies with commentary.

Herkert, Joseph H. 2005. Ways of thinking about and teaching ethical problem solving: Microethics and Macroethics in Engineering. *Science and Engineering Ethics.* 11(3): 373-385.
The author introduces a method of integrating macroethical issues and concerns (such as collective social responsibility of the profession and about societal decisions about technology) in engineering ethics by broadening the context of ethical problem solving. The author discusses how to create online cases studies that emphasize ethical decision making in individual, professional, and societal contexts; how to leverage existing online computer ethics resources with relevance to engineering education and practice; and how to create transparent linkages between public policy positions advocated by professional societies and codes of ethics.

Johnson, Deborah. 1989. The social/professional responsibility of engineers. *Annals of the New York Academy of Sciences.* 577:106-114.
A foundational article discussing why engineers are not like hired guns, but have a professional responsibility to their clients and society.

Johnson, Deborah. 1991. *Ethical Issues in Engineering.* Englewood Cliffs, NJ: Prentice Hall.
An anthology of articles by leading scholars in the field discussing the professional and social responsibilities of engineers to clients, to employers, the environment, and to society and the public as a whole.

Ladd, John. 1982. Collective and Individual Moral Responsibility in Engineering: Some Questions. *IEEE Technology and Society Magazine* 1:3-10.
The author looks at some of the unique ethical responsibilities of engineers, discuses the nature of engineering as a profession, and the responsibilities of engineers to organizations they work for and collaborate with. Ladd also discusses some of the distinctions that can be drawn between individual and collective responsibilities.

Martin, Mike W. and Roland Schinzinger. 2004. *Ethics in Engineering*. New York: McGraw Hill.
This volume is an introduction to key ethical issues in engineering and takes into account both specific organizational context and broader technological trends. It discusses the responsibility of engineers to their employers, clients, public safety and society as a whole, and offers a framework for understanding and solving the

ethical dilemmas that arise daily in engineering practice.

Riley, Debra. 2008. Engineering and Social Justice. San Rafael, CA: *Morgan and Claypool Publishers.*
The author of this volume calls upon engineers to be more responsive to public concerns, and cultivate a passion for social justice and peace, and to develop the skill and knowledge set needed to take practical action for change within the profession. By introducing readers to techniques from radical pedagogies of liberation and other movements for social justice, the book presents a road map for engineers interested in developing critical thinking and reflective decision-making skills to help them take the action necessary to achieve social change.

Stieb, James. 2009. Understanding engineering professionalism: a reflection on the rights of engineers. *Science and Engineering Ethics* Available through Springerlink.
The author argues that the trend of engineering societies such as the National Society of Professional Engineers (NSPE) of defining engineering and professionalism in such a way as to require the benefit of humanity, violates an engineer's rights. It applies political pressure that dissuades from inquiry, approaches to new knowledge and technologies, and the presentation, publication, and use of designs and research findings. He argues that a more politically neutral definition of engineering and/or professionalism devoid of required service or benefit to mankind does not violate adherence to strong ethical standards.

Swiestra, Tsjalling and Jaap Jelsma. 2006. Responsibility without moralism in technoscientific design practice. *Science Technology & Human Values.* 31(3): 309-332.
This article looks at the extent to which engineers can be held responsible in normal practice. The authors look at the conditions under which individuals in science and technology research can be imputable as they prevail in ethics and common sense, and conclude that these conditions are seldom met in modern technoscientific research practice. The authors conclude that changes in structural characteristics of practice , such as funding rules, stimulates engineers to attune to the inner politics of science to wider social concerns, and that this change can also help them to overcome the shifting of social responsibilities to others as a consequence of the lack of agency they usually perceive.

Vesilind, Aarne P. 2005. *Peace Engineering: When Personal Values and Engineering Careers Converge.* Woodsville, NH: Lakeshore Press.

This collection of essays looks at opportunities that exist for engineers to use their education and skills to proactively encourage peace in our world, and discusses the kinds of education required and the career opportunities that exist for engineers interested in including social justice in their concept of how they wish to practice their profession. This book is a compilation of papers originating at a conference held at Bucknell University.

Notes

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