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Good Engineers Need Good Laws, Structured summary: Good engineers need good laws

Background, aim and relevance of the paper

Many engineers aspire to contribute positively to human well being through their professional work, and/or to perform their professional activities in an ethically or socially responsible way. Professional organisations of engineers have formulated codes of ethics expressing these aspirations. However, the socially or ethically responsible conduct of engineers is severely impaired by aspects of the contemporary legal systems. In this paper, three legal aspects have been analysed, relating to (1) secrecy, (2) the liability for potentially harmful effects, and (3) the apportioning of responsibility and liability within a hierarchical organisation. Also, the directions have been sketched in which the current legislation should be changed in order to be more aligned with basic ethical principles, and in order to make it easier for engineers to perform their tasks in a socially and ethically responsible way. The affected areas of law include laws governing secrecy, the right to be informed and the duty to inform; labour contract law, liability law, business law, and legislation regarding legal persons in general. The analyses presented in the paper help determine the right directions for change and can thus be used to evaluate specific proposals for legal change. The paper's findings have important implications for the engineering curricula and for the engineering community. In this structured summary, the findings for the first two topics mentioned above are briefly stated. Next, the implications for the engineering curricula are summarised.

Duty to inform, right to be informed and secrecy

There exists a conflict between the legally defined rights and duties of engineers on the one hand, and the perceived ethical duty of engineers, stated in many codes of engineering ethics, to inform the public on the risks and (possible) negative effects of the activities that they are involved in on the other hand. The duty to inform is embedded in more fundamental ethical principles, notably the right of everyone to be informed on risks created by others that may

affect him/her, and the right of everyone to be safeguarded from the consequences of another person's actions. The right to be informed on risks created by others has been curtailed in various ways in the actual legislation of both the private and the public domain. This is reflected by problems for engineers aspiring to live up to their codes of ethics. An employee of a business or government organisation and who wants to inform the public about aspects of his work that he thinks the public should know is risking a conflict, both with his employer and with the law. If whistleblowers bring their case to court, judges weigh the conflicting values and interests that are involved. In practice, private business interests and (perceived) social interests get more weight than the values that the codes of conduct aim to protect. Hence such conflicts are almost always lost by the whistleblower, leaving him/her with high personal costs and losses.

The phenomenon of whistle blowing thus reveals an inconsistency between ethical codes/principles and the legislation regarding secrecy and rights/duties of employees of hierarchical organisations (private and public). This inconsistency should be resolved, not merely because it is harmful for individual employees, but also because it may be very harmful for society at large, as the influence of hierarchical organisations on society is pervasive.

Responsible conduct and liability for potentially harmful effects

A common element of codes of ethics for engineers is that engineers should accept responsibility for the safety, health and well being of the public as well as for the environment and sustainability. Engineers who wish to live up to such responsibilities are severely hampered by the fact that the companies for which they work are subjected to conditional and limited liability, rather than to unconditional and unlimited liability, also called strict liability. It follows from basic ethical principles that the liability for activities that have not been consented to by all those who are subjected to the (possible) consequences should be strict. In addition, strict legal liability is an indispensable instrument for effective management and control of risks and other side effects of technology.

The ethical principles that imply strict legal liability are the right to be safeguarded mentioned above together with its counterpart, the principle of reciprocity. The latter principle says that he who violates a right of another one may be reacted to in a reciprocal way. That means that somebody who infringes a certain right of another will himself lose that same right insofar as that is necessary (and no more than that) in order to correct the original violation or to compensate for it and in order to, if necessary, prevent further infringement. It follows that anyone who does not respect another person's right to be safeguarded and who thereby causes another person damage loses his own right to be safeguarded, in the sense that he may be forced, without conditions, to repair or fully compensate the damage.

The paper provides a sketch of the history of legal liability showing that until into the 19th century, private law was much more than at present based on strict liability. Conditional forms of liability, such as the doctrine of “no liability without fault”, and corporations with limited liability were introduced on a large scale during the 19th century, driven by the desire to promote technological development. The resulting conditional and limited nature of current legal liability is an important cause of the present situation of non-sustainability and poorly controlled risks.

It is concluded that any change towards less conditional and less limited forms of liability would improve the prospects for engineers to perform their work in a responsible way, as it would contribute to aligning the interests of companies with the ethical codes of the engineers that they employ. However, strict liability cannot solve all ethical problems of engineers, as many possible consequences cannot be repaired or (fully) compensated for. For such activities and the laws that state the conditions under which they are performed, the informed consent of all those who are subjected to the possible consequences is unconditionally desirable in view of the right to be safeguarded mentioned above. That consent cannot be assumed to exist if, as is actually the case, political decision making is based on majority rule, rather than on consensus rule.

Implications for the engineering curricula

(1) Future engineers should during their study be provided with the knowledge and information that is required to assess the actual and possible role of law as regards the ethical and social aspects of technology and engineering. They should be enabled to formulate sound opinions on these issues, both as civilians with (passive and active) political rights and duties and as future engineers who are expected by the public to exercise their professional functions in (ethically, socially) responsible ways. Here, “sound” is meant in the sense of: consistent with the existing relevant knowledge and information. This requires that the engineering curricula should devote systematic attention to the critical study of the functions and presuppositions of the legal system, including ethical foundations and including a critical assessment of how well the actual legal systems perform their functions. Basic knowledge of concepts and results of certain “mathematical” areas in the social sciences is helpful and may be necessary, such as the theory of decision making under uncertainty, and game theory. Illustrations are provided in the paper, but could not be included in this summary.

(2) Laws are the product of collective (political) decision making. The engineering curricula should include a critical analysis of the procedures of this decision making, including an

assessment of possibilities for improvement. The science of public choice has rendered insights on this issue that are extremely relevant and can be easily incorporated in the curricula. These insights include the positive and normative properties of unanimity rule versus majority rule, and the (im)possibilities of collective decision making based on quantitative and qualitative inputs of individual preferences.

Zandvoort. (2005) EJEE 30 (1), pp. 21-37. In this paper a critical analysis is presented of aspects of contemporary legal systems, from the perspective of engineers who desire to perform their profession in an ethical or socially responsible way.", "PESIEE, Theory paper, ethics, society, legal aspects", 30,1,2004,21 - 37,,Henk,Zandvoort,h.zandvoort@tbm.tudelft.nl

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