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What Part should the Public have in Writing Engineering Standards?

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Civil engineers have long recognized a professional obligation to put the public health, safety, and welfare ahead of other considerations in their work. Structural engineers recognize a similar obligation.[1] Yet, the phrase "public health, safety, and welfare" presents at least two problems of interpretation.

First, there is the problem of defining "the public" well enough to determine in what the public health, safety, and welfare consists. Is the public everyone, or only everyone within the engineer's own country, or only everyone outside the organization for which an engineer works, or people identified in some other way? I have elsewhere argued that "the public" should be understood as including all those anywhere whose lack of information, technical knowledge, ability, or conditions for adequate deliberation renders them more or less vulnerable to the power that engineers wield on behalf of client or employer. [2] Understood in this way, the public is a collection or aggregate rather than an organized body, an abstraction (much like a set in mathematics). Its membership varies with the engineering work in question. The public has interests but, unlike an electorate or corporation, no decision procedure—no "will" of its own.

Second, there is the problem of defining the relation between "health", "safety", and "welfare". The phrase in which these three words occur makes the three sound like one single uncomplicated consideration. They are not. Long-term health can compete with short-term safety, welfare with health, and so on. Tradeoffs must sometimes be made between these three considerations or even within a single one. A number of suggestions have been made over the years for how to determine allowable tradeoffs, everything from cost-benefit analysis to shadow markets, public-opinion polls, and ordinary politics. These suggestions generally share two features. First, they treat the public as entirely passive or, at best, as accessible only through

some surrogate (public opinion or legislature). Second, they tend to bring in the public, if at all, only near the end of the engineering work, well after most of the important decisions have been made. The public, however brought in, generally gets to approve or disapprove, not participate in the engineering work as it proceeds, not even in the sporadic way management, marketing, the legal department, or even customers often participate. The best such thin participation can achieve is public acquiescence, not informed consent, since the public, being only a collection or aggregate, can have no will of its own, only so many individual wills. Without a public will, there can be no public consent, informed or otherwise. Among the less happy outcomes of involving the public only late in the process (or not at all) is mass outrage at the result, an expensive redesign, or total abandonment of the project.

What I propose to do here is to assume the definition of public just described and argue for a partial solution to the second problem (defining relations between public health, safety, and welfare). My thesis is that: **Principles that engineers already accept require that, *insofar practical*, the public have a *continuing* part in defining allowable tradeoffs between public health, public safety, and public welfare in any work of engineering because the public is likely to have significant knowledge of what tradeoffs should, or should not, be made, information that engineers typically lack.**

We may, I think, assume that engineers should always use the best information reasonably available and, insofar as reasonable, seek to improve the stock of useful information. "Best information reasonably available" is, of course, an elastic term but, at a minimum, it includes (when relevant): information available in standard engineering reference works, whether paper or electronic; information available from employers, clients, or colleagues, whether written, graphic, or oral; and information available from other readily accessible sources. The publications of engineering's standard-writing bodies, whether professional (such as ASCE's), governmental (GSA), or independent (ISO), may also count—when relevant—as information reasonably available. Would not an engineer who, having such relevant information available and enough time to consult it, knowingly failed to consult it have failed to "uphold …the honor, integrity, and dignity of the engineering profession"?[3] If she merely failed to consult the relevant information because she was unaware of it, would we not say that she should have been aware of it and, if anything went seriously wrong because of her failure to consult it,

that she was negligent, at least partially responsible for what went wrong, and therefore an embarrassment to other engineers?

The other half of what I shall assume is that engineers are always required, insofar as reasonable, to seek to improve the useful information available. This assumption may appear too demanding. But a close look will, I think, dispel that appearance. The search for new information is limited to what is "reasonable". Anything that makes the search unreasonable—constraints of time, budget, law, skill, or the like—is enough to suspend the requirement. The requirement is limited in another way as well. The information need not be sought just because it can be discovered or even because it might prove intellectually interesting. The information sought must be *useful*—or at least seem likely to be. An engineer who failed to seek to improve the useful information available to engineers when reasonable to seek it would have failed to "work for the advancement of the safety, health and well-being of their communities".[4] He would also have failed to satisfy two Fundamental Principles of engineering. He would, that is, have failed, first, "[to use his] knowledge and skill for the enhancement of human welfare [when he could]" and, second, "[to strive] to increase the competence of practitioners and the prestige of the engineering profession [when he could]".[5]

Yet, it must be admitted that the public's participation in much everyday engineering seems impractical. Members of the public cannot be present at every design meeting, much less sit beside every engineer as he works. There are unlikely to be several million members of the public willing to volunteer for an activity likely to require much time over many months (or even years) to be effective. And, even if there were enough volunteers, the cost of providing space for them, the difficulties of preserving business secrets, and so on would undoubtedly be enough to make their participation impractical.

Nonetheless, the public can make a substantial contribution even without such pervasive participation. For example, the public can participate in the writing of technical standards on which engineers regularly rely. Of course, there are obvious objections even to such less extensive but still substantial public participation. Those objections may be organized under five headings: scale; knowledge; interest-group hijacking; public psychology; and better alternatives. While each objection offers a substantial reason against some public participation, they do not, individually or combined, offer reason enough to give up public participation altogether. Indeed,

they leave much room for experimentation with public participation at all stages of standard writing—and, all else equal, in other parts of engineering as well. And, if I had another half hour, I would explain why.

Notes

[1] While the ASCE's Code of Ethics (2009) expressly makes this obligation to the public "paramount", the 2011 Model Code of Ethics of the National Council of Structural Engineers Associations (NCSEA) simply puts the obligation first among the seven "Tenets", leaving its status to interpretation. This difference between codes of ethics, though significant, does not affect the question dealt with here.

[2] "Thinking like an Engineer: The Place of a Code of Ethics in the Practice of a Profession", *Philosophy and Public Affairs* 20 (Spring 1991): 164-165; and "Does 'public' mean an engineer's nation?" *Proceedings of IEEE International Symposium on Ethics in Engineering, Science, and Technology* (*Ethics 2014*), forthcoming.

[3] ASCE, Canon 6. NCSEA, Tenet 6 is identical except for insertion of "structural" before "engineer". While all the rules under that Canon (and all the sub-tenets of Tenet 6) are concerned with financial corruption, the language of the Canon (and Tenet) is more general (with the reference to "corruption" slapped on the end). I therefore think it fair to interpret both Canon and Tenet as concerned with any conduct that might damage the profession's "honor, integrity, and dignity".

[4] ASCE, Canon 1.e; NCSEA, Tenet 1.e.

[5] See either ASCE Code of Ethics or NCSEA's.