Professor Sethy of the Indian Institute of Technology has put together an important book that will give engineering educators a useful global perspective on the state of ethics education in their discipline. The principle strength of the book is the geographical diversity of the 17 contributors to this volume. Not only is India represented, but so is the U.S., U.K., Holland, Spain, Denmark, Finland, Malaysia, and Sudan. Obviously, Europe and Asia have a strong presence and there are multiple entries from the U.S., but there is alas nothing from South America or Australia. The book consists of a series of short essays by, for the most part, professors whose job it is to teach professional ethics to engineering students. Strange to say there is no one here from industry describing what ethical practices he/she might require in a newly hired engineer.

Reading the entire book through over a two-day period, as I did, can be a mind-numbing experience — one that I would not recommend. One problem is the format of each essay. Most of them conclude with a list of “key words” and, as you might imagine, the key words for a set of essays devoted to a rather narrowly defined subject such as this is relatively small, and the same words keep popping up. Thus one essay, in its key words, defines engineering ethics as, “application of ethical principles in the field of engineering,” while the following essay tells us “Ethics: A set of moral principles, especially ones relating to or affirming a specified group, field or form of conduct.” And the next piece tells us: “Engineering ethics: professional ethics applied to the practice of engineering.” These banalities are not limited to the keyword lists. For example, one writer observes: “What students and teachers should understand is that engineering ethics is important and everyone needs a certain level of intelligence in the subject.” Who would have guessed this? The book has a strange inconsistency about whether engineering ethics is a singular or plural noun. A copyeditor might have settled this question. More about this later.

There are certain themes that arise repeatedly here. One is that unlike the professions of law and medicine, in many countries engineers are not licensed, and licenses are not a requirement for practicing the profession. The latter is true in the United States. A doctor or lawyer who screws up can lose his license (or be disbarred), but an engineer who does so might not have a license to lose. One author (Didier) makes the point that the situation is different in Canada, where an engineer’s malfeasance might lead to her not being allowed to practice her profession. Given that in many countries an engineer whose unethical behavior might not lead to serious punishment, there remains the question of how ethical standards are to be enforced.

Another leitmotif of the book is the failure to find any agreement, even within a given country, of how ethics are to be taught to engineers. In the United States, for example, the accrediting board for college engineering and technology programs (ABET) requires that students receive an “understanding of professional and ethical responsibility.” This is part of a long list — there are 11 entries — of what a program must do, and it is so far down the list that it carries no particular saliency. How do colleges achieve this goal? Reading this book one comes away with no clear answer. Should all engineering students be required to take a course on ethics? Should the students be taught what ethical behavior is or should they see ethics as an exercise in dialectics in which students must hammer out the meaning of ethical behavior? Should this course be directed to engineers and deal with engineering questions, or should it be a course in the philosophy of ethics where one might study for example Plato, Socrates, Kant, Bentham, and Mill? Presumably this would be taught by a professor of philosophy, not an engineering professor. But perhaps instead, ethical considerations should be embedded directly in engineering courses and
would become the responsibility of the engineering professor in charge, e.g., “So, Miss Primrose, I see that you have designed a computer power supply. What do you think the chances are that it might catch on fire and what would happen if it did? And how much would it cost to make certain that the chances are vanishingly small? And since, as you guess, this increases the cost of the product, is it worth it or should your employer simply increase his liability insurance and use your design?”

A paper by Karl Stephan, unfortunately not mentioned in the book, is useful here [1]. This reinforces the fact, gleaned from reading Sethy’s book, that the most common way to have engineering students in the U.S. learn about ethics is through embedding the issues in technical courses. One reason for is that the number of courses that engineering students are required (or allowed) to take in the humanities is quite limited in the standard four-year program. Enforcing that of those courses be in philosophy limits the students’ range of options. One recurring theme in the papers is the disdain that engineering students often feel for courses deemed “soft.”

This too may account for the tendency to embed ethics within technical courses. American law and medical schools typically have stand-alone courses. One reason for is that the number of courses that engineering students are required (or allowed) to take in the humanities is quite limited in the standard four-year program. Enforcing that of those courses be in philosophy limits the students’ range of options. One recurring theme in the papers is the disdain that engineering students often feel for courses deemed “soft.”

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A number of the papers describe case histories in engineering that involve ethical issues. The most cited is probably the disaster of the American space shuttle Challenger, which shattered in January 1986 about a minute into its launch. Seven people were killed. The source of the problem was a O ring seal in a booster rocket that failed during takeoff. Roger Boisjoly, an engineer for Morton Thiokol, a NASA contractor, is generally regarded as the tragic hero of the episode. He had foreseen the possible failure of the launch, owing to its scheduling for an exceptionally cold day, but his employer and NASA, filled with “launch fever,” downplayed his concerns and those of several of his fellow engineers.

Students will rightly see Boisjoly as the model of the ethical engineer. Given the circumstances he faced, they will undoubtedly believe that they would react in the same way, perhaps thinking that they would behave even more heroically in seeking to postpone the mission.

Although such stories should be taught, there is something disingenuous about courses that are composed of such case studies. There is no indication in these 17 essays that an engineer’s ethical dilemma is seldom confined to the workplace — an engineering decision may have more distant personal implications.

Consider this hypothetical case. Mary, an electrical engineer, age 40, is designing a piece of hardware to be used in an automobile. She is five months pregnant. Her boss is holding her to a strict deadline imposed by the automobile manufacturer. On the day that the project is due she has reason to think the device may fail — she is not at all sure — putting the driver at risk. She hesitantly confesses as much to her boss, who is angered that she had not worked harder on the project and produced a safe piece of hardware in the required time period. Morning sickness may have slowed her progress. Mary supports her husband, a disabled veteran. She likes her company — they have generous family leave benefits. Unfortunately, she is fired. She sinks into a depression and has a miscarriage. She has no children and doubts whether she might become pregnant again. Did she make the correct decision? Now that is something to discuss with a class. And one might further address the question of whether there is a difference between an ethical decision and a wise decision.

Speaking of case histories there is one that must be included in future editions of this book; its absence makes one wish that the book had been published a year later. Chapter 9 is by Prof. Carl Mitcham of the Colorado School of Mines in the U.S. He asserts that “Engineering ethics in Germany … has a more developed theoretical base than in the United States” and goes on to create an invidious comparison between ethical engineering practice in the U.S. and Germany where (in the latter) “ethics became integrated into discussions of professional engineering responsibility.”

The statement cries out for an update. In September of 2015 the U.S. Environmental Protection Agency accused the German automaker Volkswagen of deliberately programming the diesel engines on its cars to activate certain of their emissions controls only when the car was having its emissions tested. Otherwise the driver could be driving down the road happily emitting a significantly higher number of pollutants than were indicated when her car was under test. Up to 40 times the legal limit for nitrous oxides was spewing out. The EPA has definite statistics on the expected number of deaths due to such pollutants — and they are not small.

As of this writing, July 2016, VW has agreed to pay out a total of 15 billion dollars in the United States alone to settle a lawsuit against the company. Of this, 2/3 will go to American owners for repurchase or repair of their vehicles. The rest goes for environmental mitigation and the promotion of low emission vehicles. It is expected that members of the company will face criminal prosecution and jail time. It is...
certain that this episode will enter the canon of literature on engineering ethics. The case goes beyond mere negligence — the usual cause of engineering disasters: it is willful deception.

Perhaps the most memorable piece in the book is by Prof. James A. Stieb, a philosophy professor at Drexel Institute in the United States. Stieb comes out swinging — taking on a dictionary definition of ethics from Webster: “The embodiment of those values that the person or organization feels are important... and spell our proper conduct and appropriate action.” Of course this is an unsatisfactory definition — just because your organization (employer) feels that it’s ok to make and sell assault rifles to the American public, does that make it ethical? In fact, the definition, although it once appeared in Webster’s, is long gone. From the current Webster’s we have: “an area of study that deals with ideas about what is good and bad behavior: a branch of philosophy dealing with what is morally right or wrong.” In other words, ethics has evolved from a set of values to the study of the process of determining these values. Webster is one of several straw men in Stieb’s piece, although he does acknowledge, but only in a footnote, that his quote is dated. His own credibility as a philosopher is undermined by his assertion, “I have argued that no one knows what benefits humanity... everyone has a theory.” This carries moral relativism to a level of absurdity. Does getting fresh water pumped into a city and having the sewage safely removed benefit humanity? Ask someone in public health about the history of cholera and typhoid fever. Did the polio vaccine benefit humanity?

Additionally, I would question Stieb’s own ethics when he damns the work of David Haws, of Boise State University in the U.S. Haws ostensibly says that the class facilitator in a course on engineering ethics should be an engineer and needs to approach the course material “as a novice.” Stieb remarks that we don’t want novices teaching thermodynamics so why permit them to teach philosophy? But if we read Haws’s paper we find that the thermodynamics analogy breaks down. Looking up Haws’s publication on the Internet we find:

“...the course facilitator needs to be an engineer, and needs to approach the dilemma and the primary writings as a novice (like the student) rather than as an expert (as someone might with a Ph.D. in philosophy, or a lifetime exposure to ethical discourse). Finally, the discourse must include non-engineers, empowered as equals in a classroom community. These were the constraints that helped me to formulate the university core class, one topic of which is discussed in the remainder of this paper.”

I have added italics. Notice that Stieb has quoted Haws selectively — an ethical breach. Haws is describing his course on the question of the “just war.” His assigned writings show a considerable sophistication with assignments from Lao Tze, Cicero, Kant, Aurelius Augustinus, Peter Singer, Judith Jarvis Thomson, to cite just some. Haws may approach the course as a novice — he wants to think as his engineering students might, for them this is new and hard material — but he is obviously not a novice. Notice too his requirement that the classroom discussion must include non-engineers.

Finally, in a parting shot Stieb says of Haws: “...the professor (in such a course) must be a philosopher. Philosophers rarely make such bad arguments.” Oh yeah.

The book under review could by itself stand as an artifact for discussion in an ethics class. It sells for $215. A volume costing that much should have had a copyeditor. One wonders about the ethics of the publishing business. There are numerous spelling errors. Immanuel (sic) Kant needs attention, but worst of all is an article that refers repeatedly to a university called SUNNY Buffalo. Buffalo, a city in New York State, is famous for its snow, not its sun. The author means the State University of New York (SUNY) Buffalo.

And the publisher should have hired someone to write a decent index. This meager result could be improved by a 10-year-old. There are a total of 2 entries under the letter B (this is a 543 page book!), none under K or W, and one under N. I couldn’t find Germany, which I know must have had a copyedited back. The book under review could be by itself stand as an artifact for discussion in an ethics class. It sells for $215. A volume costing that much should have had a copyeditor. One wonders about the ethics of the publishing business. There are numerous spelling errors. Immanuel (sic) Kant needs attention, but worst of all is an article that refers repeatedly to a university called SUNNY Buffalo. Buffalo, a city in New York State, is famous for its snow, not its sun. The author means the State University of New York (SUNY) Buffalo.

The serious teaching of engineering ethics is relatively new compared to other engineering disciplines. It is already a contentious subject and the book edited by Sethy is a useful one for the years ahead as engineering ethics seeks to find its way.

Reviewer Information

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