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THE DIFFERENT SOURCES OF CODES OF ETHICS AND THE IMPLICATIONS OF THESE ORIGINS

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I'm going to talk to you about engineering ethics and my reason for doing so is to provide some insight into how engineers look at their ethical obligations and that obviously has global ramifications. Many of the problems we're dealing with today either have their origin in engineering or have their solution in engineering, so that's important to talk about. But beyond that, I think there are some lessons that we can extrapolate from engineering to other domains. But first I was thinking about who would be a good engineering exemplar that everyone would be familiar with. And my choices were Tony Stark or Scotty. So I went with Scotty. […plays clip from Star Trek Into Darkness where Mr. Scott resigns his post rather than go against his ethics]. I really like that clip because it nicely captures the tension that engineers are sometimes faced with by what they're directed to do by their employers or someone else in authority and what's good for the welfare of the public. In this case, Scotty is, of course, concerned about the welfare of the crew, and so he's faced with this dilemma between listening to his captain and his friend and doing what's best for the Enterprise. Scotty resigns his position at the end of this, as a kind of principled stand against what was being asked. I thought this would set the stage nicely for this discussion.

I work for the Murdough Center for Engineering Professionalism and National Institute for Engineering Ethics. There are a number of resources that we've developed over the years, videos, and case studies. I want to focus on what we do in the realm of education and service and even intervention. Our center offers undergraduate engineering ethics courses. I teach several sections every semester. We offer graduate engineering ethics courses, and we also offer ethics courses for practicing, licensed engineers. These are professional development courses, and usually we see people taking these because they either need to keep up with continuing education requirements as a part of their license or, because they've somehow done something wrong according to their state board and they're sent to us as a kind of ethics community service and corrective action. Finally, we do workshops on ethics. We're periodically asked to come out to major engineering firms or professional organizations and talk about

ethics. That experience is really what I'm going to be drawing on in terms of my comments.

I have two degrees in philosophy and I am working on a Phd in Systems and Engineering Management. This means that I'm uniquely qualified to answer the important questions like 'Does that bridge exist and if so, what's its epistemic status?' In all seriousness, I do think that this background hopefully demonstrates the connection between philosophy and engineering. That is to say, they don't exist on opposite ends of the spectrum, but rather there's a high degree of overlap and hopefully some of that will come through. And if nothing else, this will help you understand why and how I'm approaching what I'm up to here. And we philosophers, after all, are interested in why.

So, why engineering ethics? Why am I talking about this here? Well, I think there are a couple of obvious answers to that. First of all, engineering failures and disasters. We're certainly not wanting for recent examples of engineering failures and disasters. We have the situation with Samsung that's unfolding right now. We have the recent, shady manipulations that Volkswagen engaged in. We have issues with GM. The Flint water crisis certainly rates a mention. The gulf oil spill and so on.

Additionally we have in engineering what I've come to call "marquee-type" issues. As in issues of data integrity. Is it ok to massage the data? Or, what do we do if we have an obvious conflict of interest? Or what happens if our supervisor's asking us to do something that compromises the safety, health, and welfare of the public? What I want to make sure to convey here though is to think of engineering ethics as the sum total of engineering failures and marquee issues is really to miss a lot of what engineers actually engage in. To be sure, engineers might come across these kinds of issues at some point in their careers, but, more often than not, the kinds of challenges engineers are faced with are issues of competing goods. These tend to be very complex problems with some high degree of situational sensitivity. Engineering ethics then, enables us to recognize when we're in such a situation, where there are competing goods, and then provides us with some methodology and hopefully tools that allow us to engage and solve those complex problems in a way that's ethically permissible.

We're not wanting for examples of complex problems. How do we manage water resources? How do we address global climate change? How do we deal with the impact that technology's going to have and look at whether or not that affects everyone evenly or are there issues

of justice and fairness? So, given this complexity, where do engineers go for guidance? One pretty straightforward answer to that is to engineering codes of ethics. Now when I say it as engineering codes of ethics that makes it sound like it's fairly monolithic in nature, but actually that's not the case. I want to talk about sources of codes of ethics, highlight the advantages and disadvantages with those sources, and paint a more complex and hopefully more realistic picture.

First of all, companies oftentimes have corporate codes of ethics, and the advantages to these is that they apply to all employees. You don't necessarily need to be an engineer to be beholden to the company's code of conduct. There is certainly a motivational factor here. If my job is tied to following the rules that my employer has laid out, then I have a certain, self-interested motivation to make sure that I follow those rules. But there are some drawbacks, or some limitations here. Certainly they're only applicable to those people working at the company. So if I don't work for that company, I'm not beholden to that set of guidelines. And while I think it can be said that there are companies out there that are genuinely good companies, that have a genuine focus on their clients or even the public writ large, or the environment, I think generally speaking, corporate codes of ethics are intended to codify behavior that's good for the company. The scope is a little bit narrower on these corporate codes of ethics.

I mentioned earlier that we do have some engineers who go on to earn a professional engineering license. When they do that, they fall under the authority of a state licensing board and those state licensing boards have their own codes of ethics. The advantages here have to do with regional sensitivity. If I'm an engineer in Alaska, then I need to understand snow loads and cold weather, extreme cold weather and how that affects a structure in order to make sure I design something that's not only going to be helpful, but, also doesn't kill people. I have to demonstrate some level of technical competence and that, by extension, allows me to act according to my ethical obligations. Now if I have a license, that means that I'm able to do certain work that other people aren't able to do, and that's tied into my livelihood, and so if I am following this code of ethics that comes from a state licensing board then there's again this kind of enforceability and motivation to follow those rules. Because if they don't, engineers can be fined, they can be sent to me, or, they might even have their license rescinded. Or even, they could be completely excommunicated. This is a big deal that has major ramifications for them. On the other hand, that quasi-legal code of ethics is sometimes going to focus on establishing basement-level standards of behavior.

That is not to say that this isn't important of course, but it's something that we need to keep in mind. Roughly 25% of all engineers go on to get a P.E. license; there's a vast majority of engineers who aren't covered by these codes of ethics.

Finally, we have codes of ethics that come from professional societies. These enjoy broader membership. You see P.E.s and non-P.E.s as a member of this. You see professionals, you see students that are members of these organizations. So broader membership and also we see a bigger scope in terms of obligations and aspirations. And that is to say those codes of ethics tend to be a little more ambitious in nature. They focus on prohibitions. What you should not do, but also what you should do and what ideals you should strive for. But here again, there are limitations, membership is optional. We can rightfully ask with some of these societies, whether or not the standards that are codified are relativized to American standards. And that's something I think we need to be mindful of when we're talking about global ethics.

I want to close with a couple takeaways, lessons to learn from this. First of all, looking to the codes of ethics as the ultimate source of justification is problematic. And again this is true in the context of engineering as well as in other fields. Ultimately, our reason to be ethical is not because it's written down in a code somewhere, but because of the impact that we have on people. And given the disproportionate impact that engineers have on people, on the environment, on society, that's what really is the source of obligation for engineers. Canons and codes cannot be applied algorithmically. It's not a series of if-then exercises. There is no substitute for careful, critical judgment.

When we talk about protecting the safety, health and welfare of the public, we need to define what we mean by safety. Who do we mean by public? What do we mean by welfare? This leads me to my third point, the importance of teaching philosophy and including ethics in engineering, science, and other domains. That kind of philosophical inquiry leads to the careful critical thinking and conceptual analysis we need to rightfully apply and understand our obligations. And finally, I just want to talk about this exercise that I began with of comparing and contrasting codes. It creates an opportunity for dialogue. We can compare, for example, the American Society of Mechanical Engineers' code of ethics with other parts of the world, whether in Japan or other countries and look for similarities as well as differences and move towards a global ethic. Whether it's in engineering or otherwise.