AC 2008-540: MUST ENGINEERING ETHICS PRESUME A SECULAR FOUNDATION?

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Must Engineering Ethics Presume a Secular Foundation?

Abstract

Current formulations of engineering ethics presume a strictly secular foundation, despite the strong influence religious perspectives have historically exerted on moral philosophy, particularly in the West. This paper explores a Christian foundation for engineering ethics, and addresses three principle questions:

- “Why allow for a non-secular foundation for engineering ethics?” This question is important because diverse sources assert that a valid engineering ethics must necessarily be universally acceptable, and hence necessarily preclude religious perspectives.

- “What are the requisite presuppositions for a robust engineering ethic?” That is, what foundational questions must first be answered for a system of engineering ethics to be warranted? Engineering ethics needs a theoretical foundation and that foundation must necessarily provide reasons for humanitarian and environmental responsibility. That necessitates a philosophical system in which the individual, the community and the environment are so meaningful that they morally obligate the engineer.

- “How might a Christian articulation of engineering ethics contribute to the broader cause of progress in engineering ethics scholarship and practice?” Here the paper examines a Christian rationale for traditional themes in engineering ethics (such as product safety), and then suggests other avenues in which Christian perspectives might advance future scholarship.

The case is made that engineering scholars and practitioners from both secular and religious perspectives should encourage dialogue with religious insights into the challenges facing engineering ethics.

Introduction

This paper expresses my personal pursuit of intellectual integrity. Contemporary theologian John Piper credits Jonathan Edwards (1703-1758) with having taught him, “If God exists, then he is the measure of all things, and what he thinks about all things is the measure of what we should think.” Given I agree with Piper’s and Edwards’ conception of God, their argument compels me to agree, while admitting that I do not presently think in this way (even if I should). Furthermore, my agreement with their understanding of both humanity and nature demands that I not harbor two conceptions of life, meaning, and ethics: one for my private life and one for my secular work context. No, instead, I must wrestle to ground some conception of the engineering vocation which is both consistent intellectually with my worldview, and yet sensible and defensible in the pluralistic context in which I teach.
“Why allow for a non-secular foundation for engineering ethics?”

So, why should any care that I personally integrate these themes? First, many engineers do hold religious convictions. For the Christians among them, I would urge them to contemplate their work in such a way as to see integration across the entire domain of their thought lives. Edwards asserts above that we’re morally obliged to do so. The Christian is ethically compelled to think theocentrically about ethics, even the secular practice of engineering ethics. Coincidentally, the Christian has no duty to embrace secular pragmatism or complacency.

As we will see below, a Christian perspective on the major domains of engineering ethics does not immediately yield particular conclusions substantially different than those accepted today by the broad secular consensus. I’ll assert that the foundation of that consensus is much stronger when built upon biblically informed presuppositions. Hence, the Christian will hopefully see our ethical responsibilities as more compelling when viewed through this particular lens; with such an integrated view, any ethical responsibility necessarily becomes a moral, spiritual duty as well.

Many more will not share my presuppositions. Why should they care whether Christians, or any other, integrate their vocational ethic with the balance of their worldview? The secular proponent may not find the biblical foundation appealing or compelling, but given their pragmatism, how can they object to a situation in which others strive more intensely towards ethical conduct? Surely most who prize moral conduct in the professions would hesitate to object to any around them finding heightened internal motivation for ethical behavior, whatever the source of the motivation, particularly where those ethical conclusions are largely congruent. Their self-interest is served by the religious principles of others.

The most common objection I’ve heard is that a Christian engineering ethic would be globally and culturally constrained. Peers assert that engineering requires a secular ethic that can be universally embraced, as other religious systems or worldviews would be justified in rejecting a religiously derived ethic.

We must recognize the strong current seeking to secularize all of modern life, particularly scholarship. Historian George Marsden exhorts non-secular scholarship in part because it challenges the presuppositions of academia, “the most relevant part of the liberal (academic) tradition is that it prefers secular accounts of reality.” And this bias, Marsden asserts, undermines the integrity and vitality of the pluralistic academy. We can’t dismiss non-secular perspectives, simply because they discomfit secular perspectives; they’re necessary for the integrity of pluralism.

Paraphrasing philosopher Alvin Plantinga’s expression of this objection in the sciences: “If ethics is to be understood as universal, it cannot employ assumptions or commitments that are not universally shared.” Plantinga rebuts that we should distinguish between those domains of science and learning that appear independent of metaphysical presuppositions, and those where one’s metaphysical commitments will
necessarily influence the progress and results. The former he calls “Duhemian” and the latter “Augustinian.” In the former case, methodological naturalism is appropriate in the sciences since the goal is knowledge in which we might find universal agreement, and the results are not sensitive to metaphysical commitments. Physics and astronomy are clear candidates. Plantinga commends Augustinian learning for those domains touching metaphysics, though the result may not find universal accord. He insists that the Christian scholar not summarily dismiss or ignore what they know from their metaphysic, and should not be concerned that their contribution isn’t accepted simply because of its presuppositional commitments. The absence of universal acceptance does not imply that the result is not true knowledge, and that knowledge might only be attained reasonably by working from that metaphysical base.

For the engineering educator, this distinction is particularly valuable because our scholarship is mostly in domains where the Duhemian is most appropriate. The conclusions I might reach in materials science or fluid mechanics are hardly influenced by my view of humanity. I’d expect to find near universal agreement regarding the scientific foundation of my applied discipline. As soon as I move into engineering ethics, I should ensure that epistemic assumptions from my disciplinary work, where universal agreement can be presumed, aren’t uncritically imported into my ethical thinking, which is impacted by questions of larger meaning.

Plantinga also notes that the more a domain of studies involves the attempt to understand humanity the more we might expect this tension to arise. Such is clearly the case as we technologists move from the rigorous science of our disciplines to a realm such as ethics touching so strongly upon our understanding of the nature and value of life and humanity. Hence, my faith will necessarily condition my understanding of fields which particularly touch upon the origin, nature, purpose and destiny of humanity. So, the Christian is not bound to make his ethic globally acceptable, rather to live and act according to his principle (challenge enough).

Next, the global ethic is a mirage. World civilizations simply have not held congruent ethical views across a broad front. Historian George Marsden notes that secular perspectives prove no more sure at providing the sought after consensus:

“attempts to extend the empirical model of natural science to other fields of academic inquiry have failed to unite people on the larger questions concerning society and human relationships. Contemporary [secular] academia is just as divided on these larger questions as it was in eras when ruled by contending religious faiths. On the larger questions of life, empirical science is not competent to provide definitive answers, so academia is ruled largely by secular sects motivated by political interests. The idea that reliance on empirical scientific models will eliminate sectarianism is simply false.”

True, within Christianity, within Judaism and within Islam, one finds disagreement on particular ethical duties. Those faiths are not homogeneous. Some reject religious perspectives on the basis of that very true observation. It does not follow however that all are wrong because of this observation.
Next, the objection that engineering ethics be necessarily universal and globally acceptable also overlooks the historical fact that other religious and cultural systems have embraced peculiar values whose origin was religious, e.g.- modern notions of human rights, civil liberties, self-determination, intellectual property rights, due process, women's rights, *lex rex*, and science all owe debts to Judeo-Christian principles. John Stuart Mill insisted that his notion of liberty had been substantially influenced by the Reformation, which he called “that great and decisive contest…for liberty of thought.”

Mill’s secular conception of liberty increasingly informs the global outlook on the subject. Kant and Mill weren’t writing biblical ethics, but they were influenced by biblical categories and the cultural consensus of the religiously informed cultures in which they lived. Globalization hasn't depended upon Easterners dressing like Westerners, but it has depended upon Western notions of law and justice.

The West has a long history of secularizing moral reform causes brought to public consciousness by religiously motivated zeal. In such cases, religiously inspired reformers pushed a cause forward *on religious principle* yet which a broader audience eventually appreciated and embraced, and subsequently advanced on secular grounds. English abolitionists surrounding William Wilberforce were candid in campaigning on Christian principle, yet now the West’s abhorrence for slavery has been fully secularized *within the West*; it is part of the West’s secular ethos. Note that it’s largely the West’s Christian press which remains most vocal on the subject of the remnant slave trades persisting today. Victor Hugo and Charles Dickens advanced social reform agendas on Christian principle, yet their agendas found fulfillment once secularized and accepted by their broader societies. More recently, the American Civil Rights movement was instigated from within the robust African-American church of the South, and while religiously initiated (and lamentably resisted by some Christians), the cause eventually saw wide secular advocacy and acceptance. So, the secular thinker should welcome religious insights, if only out of tribute to its historic positive contribution to reforms that the broader culture has eventually embraced.

All moral reform has *not* been religiously initiated. Environmental ethics is an area in which secular and Christian authors have justly scolded the church for not having led reform, given Christendom’s sufficient religious grounds. Though tardy to this conversation, Christians might yet influence thoughtful development of our understanding. Martin and Schinzinger, in *Ethics in Engineering*, explicitly invite religious perspectives to this conversation: “the potential for world religions to advance ecological understanding is enormous.”

Marsden nicely summarizes this point, urging openness to religious perspectives as we collectively seek to advance the dialogue on the subject of engineering ethics:

“Even though religious people should honor the rule that they cannot offer their special revelations as the public evidence for their views, they can still reflect on the implications of such revelation within the bounds of the mainstream academy by talking about them conditionally. That is, it is perfectly legitimate to ask an academic question in the form of ‘if this religious teaching were true, how would it change the way we look at the subject at hand?’”
While Marsden and I are both Christian, and candidly seek to encourage a Christian voice in scholarship, the argument above would affirm the propriety and desirability of participation from any religious perspective. I’ll speak below from an exclusively Christian perspective because that’s what I know, encouraging others to contribute their own distinctive viewpoints.

"What are the requisite presuppositions for a robust engineering ethic?"

We agree that there’s a need for the ethical, thoughtful practice of engineers; the capacity of technology for harm is manifest. But the question is begged, “Why should we care?” A simple appeal to intuition should disappoint us; none of us rely on intuition alone for our other professional judgments. Why would we then content ourselves with intuition alone as the basis for our moral judgments? It seems that the answer to the “why care?” question requires some intellectual framework that accounts for such vital concepts as humanity’s innate value, and social and environmental responsibility. We intuit that the engineer should see moral duty with regard to the safety of his products, their benefit or hazard to communities, and their environmental impacts. But what is the foundational view of all of life such that these intuitions are rationally defensible duties? What must be true about the world for engineering ethics to be a reasonable and noble concern, rather than merely pragmatic or legal? What are the preconditions to the intelligibility of engineering ethics?

First, let’s clarify what we mean by engineering ethics. Egbert Schuurman nicely captures the essence of what is typically implied:

“In ethics as a science there is reflection on the good and responsible actions of man. An ethics of technology must therefore concern itself with man's good and responsible conduct in and through technology, i.e. man must fulfil the normative aspects of reality within which technology functions.”

This definition itself presupposes so many things, and begs so many questions. What are the “normative aspects of reality”?

Disagreement on ethical matters can frequently be traced to conflicts in presuppositional commitments. If we were to trace our ethical pronouncements back to first principles, what would we expect to find? What are the first principles that provide the requisite foundation for our demands that engineers attend to ethical obligations?

Three themes recur in the most commonly referenced texts on Engineering Ethics: Product Safety, Environmental Responsibility (and Sustainability), and Fiduciary Responsibility. I’ll concentrate on the first two. Engineering ethics needs a theoretical foundation which provide reasons for humanitarian and environmental responsibility—a philosophical system in which the individual, the community and the environment are so meaningful that they morally obligate the engineer. Furthermore, that system must inform moral obligation. Hence, engineering ethics requires answers to the following:

- Why do we need an engineering ethic? If these behaviors (or virtues) are so desirable and beneficial, why are we not naturally bent toward them, but apparently bent away from them to narrow self-interest? Why do those whom we
admit to be of good character still struggle with living consistently with that which they confess to be right and true?

- Why safety? The concern for safety implicitly values human life. Furthermore, the engineer bears responsibility for safeguarding not only the life, but the broad welfare of those who come in contact with the fruit of their work. What is the basis for the implied value of human life?

- What’s the origin of environmental responsibility? Does environmental responsibility extend beyond simple pragmatism? A case can surely be made that environmental responsibility can be posed as an expression of extended self-interest. Why should one care about environmental impact of one’s work, particularly if the environmental impact is delayed many years beyond the engineer’s life? Why would it trump the engineer’s financial interests or those of their clients? Is the environment invested with inherent value? If so, how and why?

- Why be civically minded?

- If these duties are genuine, and transcendent, how can they be known?

- Some would assert that the engineer bears an aesthetic responsibility of ethical import. What’s the ground of meaning for beauty and aesthetics?

In the language of the philosophers, *engineering ethics needs an anthropology (theory of humanity), a metaphysic (theory of nature), and an epistemology (theory of knowledge), and these three must cohere with the ethics that we propose*. I’ll provide two diverse secular accounts of frustration with this very issue of secularism’s nagging questions.

Yale Law Professor Arthur Allen Leff describes his discomfort with secularism’s lack of cogent answers to these questions in his essay “Unspeakable Ethics, Unnatural Law.”

“I want to believe—and so do you—in a complete, transcendent, and immanent set of propositions about right and wrong, findable rules that authoritatively and unambiguously direct us how to live righteously. I also want to believe—and so do you—in no such thing, but rather that we are wholly free, not only to choose for ourselves, individually and as a species, what we ought to be. What we want, heaven help us, is simultaneously to be perfectly ruled and perfectly free, that is, at the same time to discover the right and good and to create it.”

Leff reasons that since we must presume that there is no God, no such law or ethic exists waiting for our eventual discovery. (Note: He does not explain why atheism is a necessary presupposition.) He concludes despairingly:

“All I can say is this: it looks as if we are all we have. Given what we know about ourselves and each other, this is an extraordinarily unappetizing prospect; looking around the world, it appears that if all men are brothers, the ruling model is Cain and Abel. Neither reason, nor love nor even terror, seems to have worked to make us “good”, and worse than that, there is no reason why anything should. Only if ethics were something unspeakable by us, could law be unnatural, and therefore unchallengeable. As things stand, everything is up for grabs.

Nevertheless:
Napalming babies is bad.
Starving the poor is wicked. 
Buying and selling each other is depraved. Those who stood up to and died 
resisting Hitler, Stalin, Amin, and Pol Pot—and General Custer too—have earned 
salvation. 
Those who acquiesced deserve to be damned. 
There is in the world such a thing as evil. 
[All together now:] Sez who? 
God help us.”

Ethics, Leff laments, is foundationally irrational.

Anthropologist Carolyn Fluehr-Lobban expressed the identical tension in an essay 
published in the *Chronicle of Higher Education*. She specifically questions the 
responsibility of western scholars with respect to non-western practices in the area of 
woman’s rights. She is torn. Her academic values abhor Western judgmentalism towards 
non-Western cultures; her feminist loyalties abhor such cultures’ practices. She concludes, 
“when there is a choice between defending human rights and defending cultural 
relativism, anthropologists should choose to promote human rights.”

She cannot defend her revulsion, nor her conclusion, yet she’s certain she’s right. I agree. 
Marsden describes Fluehr-Lobban’s essay as “symptomatic”:
“The problem is not, as is often alleged, a lack of moral concern. Many academics 
have deep moral and political convictions. What they most typically lack is the 
ability to provide a compelling intellectual rational for these beliefs consistent 
with their other intellectual commitments.”

**Secular Attempts**

As we scan the breadth of secular ethical systems, most place their emphasis on 
answering one of three general questions. We can then categorize many of the myriad 
secular schools in one of four classes corresponding to each of these questions.

- **A Personalistic Ethic** asks, “What kind of person should I be?” “Courageous,” 
  “Honest,” “Self-less,” “Modest” and “Loyal” are all descriptors of “character.” 
  Those we disdain we describe as “Treacherous,” “Deceitful,” “Mean” or “Perverse,” again appealing to a personalistic standard. While we seem to have 
  this innate recognition and appreciation for this formulation, more questions 
  seem to emerge. “Why integrity rather than duplicity?” “Why fair-mindedness 
  and selflessness over selfishness?”

- **A Consequential Ethic** poses the question, “What goals or consequences should 
  we seek?” A Consequential ethic establishes right and wrong as the basis of 
  outcomes, and asserts “The end justifies the means.” The rub is identifying the 
  right end. Epicurianism, Hedonism, Marxism, Situationalism, Egoism and 
  Utilitarianism attempt to define particular ends that then justify means. The 
  latter dominates the modern landscape, and is commonly summarized as “the 
  greatest good to the greatest number.” Burning questions remain: “What is that 
  greatest good? How can we know it?” “Why is Marx wrong and Mill right?”
A Normative Ethic demands, “What rules should we obey?” Most normative systems staunchly defend the primacy of duty to principle, irrespective of consequence. Normative ethics have been prominent among the world’s major philosophical traditions. Kantian ethics and Natural Law have held prominence in the West. Outside the West, Buddhism and Islam both serve as examples of normative systems.

These ethical systems strive against one another for primacy. The West’s cultural consensus is a synthesis of answers, sometimes coherent, typically not. Secular thinkers have attempted to answer the “why care?” questions above. Mill’s *On Liberty* is an influential example. More recently, Kai Nielsen’s *Ethics Without God* would be another. My point is not the rebuttal of secular perspectives, but rather the assertion that a Christian perspective directly answers questions that secular perspectives consider vexing.

**What might a Biblical Perspective Contribute to Engineering Ethics?**

Engineering ethics needs an anthropology (theory of humanity), a metaphysic (theory of nature), and an epistemology (theory of knowledge), and these three must cohere with the ethics that we propose. The Christian Bible describes just such a system, a world and life view with a rich anthropology, sociology and metaphysic that cohere and answer the “why care” questions. It explains why the life of an individual, the community, and the environment are in the engineer’s moral interest. It answers, “why civic virtue?” And it explains why moral conduct proves so elusive, for me personally and the world around me.

Philosopher Ron Nash summarizes this world and life perspective: “Human beings and the universe in which they reside are the creation of the God who has revealed himself in Scriptures.” My exposition here is but a summary, but is necessary because we’re talking about presuppositional commitments which will ground ethical claims. Several excellent summaries should be consulted for those who seek more depth than I’m able to provide here. Furthermore, I recognize that Christian belief spans a very broad field of beliefs; I’ll attempt to be faithful to the traditional historic creeds.

The Christian understands God to be both transcendent and immanent. Transcendent means God pre-exists creation, outside the time and space of our experience, and yet he is immanently close to all his creation, everywhere and at all times. Moreover, in the Christian conception, God is personal, manifest in three distinct persons: Father, Son and Holy Spirit.

The Christian metaphysic begins with the *ex nihilo* creation of the entire physical universe by the spoken desire of God. This does not mean matter alone, but all aspects of the physical realm—matter, energy, time and space. This creation exists for the expression of God’s power and glory. Furthermore, God initiated and sustains all nature.
God created men and women as an expression of his glory, yet distinct from the rest of creation; man alone bears the image of God. Because of the Fall of Adam and our congenital rebellion against God (inherited from Adam), humanity is morally bankrupt, under the curse of God's judgment, needing redemption. This redemption is possible only through the work of Jesus Christ's sacrifice on the cross, available to all those receive it by faith. Despite the Fall, humanity’s chief end continues to be the glory of God, and the enjoyment of God. 

Francis Schaeffer incisively contrasts the modern and Christian view of man:

“Modern man does not see man as fallen, but he can find no significance for man. In the Bible’s teaching man is fallen, but significant.”

With respect to knowledge, our capacity for knowledge and reasoning depends upon the reality of objective truth. We can think because we’re thinking God’s thoughts after him. The marvel of the human mind, its capacities and its liberties, expresses one of the prominent senses in which we are image-bearers of God. To understand our lives, he’s given us rationality, our senses, and intuition, all of which the Bible affirms as legitimate sources of true knowledge, yet checked and constrained by revelation. To understand the truth about eternal matters, God has revealed himself generally in nature and in the “männischness” of man, and specifically in the Bible and in the person of Jesus Christ.

Christian Ethics is founded on the character of God. “Good” means “God-like.” Details flow from our knowledge of God and his will as prescribed by the moral law found in the Bible. The Christian ethic affirms the questions posed above by secular ethicists; they’re good questions, and the secular answers above point to good but insufficient answers. The Christian ethic does not answer one, but all three questions.

- A Personalistic Ethic asks, “What kind of person should I be?” The Christian system answers, “Be imitators of God therefore as dearly loved and live a life of love, just as Christ loved us and gave himself up for us as an offering and sacrifice.” (Ephesians 5:29)

- A Consequential Ethic asks, “What outcomes should we seek?” The Christian system answers, “So whether you eat or drink, or whatever you do, do it all for the glory of God.” (1 Corinthians 10:31)

- A Normative Ethic demands, “What rules should we obey?” The Christian system answers: “These are the commands, decrees and laws the LORD your God directed me to teach you to observe in the land that you are crossing the Jordan to possess, so that you, your children and their children after them may fear the LORD your God as long as you live by keeping all his decrees and commands that I give you, and so that you may enjoy long life.” (Deuteronomy 6: 1-2)

Hence, Christianity does not dispute each question’s primacy. The imitation of Christ conforms with God’s commands, serving his glory—one answer to all three questions. Any articulation of Christian ethics is deficient which excludes its answers to any of the three questions.
Ethics must cohere with one’s view of God. Recalling Jonathan Edwards above, “If God exists, then he is the measure of all things, and what he thinks about all things is the measure of what we should think.” The atheist’s ethic must cohere with his denial of God, just as the Christian’s must cohere with his doctrine of God. Friedrich Nietzsche, no friend of Christianity, incisively saw the need for a theological base for Christian ethics: “When one gives up the Christian faith, one pulls the right to Christian morality out from under one’s feet. This morality is by no means self-evident. Christianity is a system, a whole view of things thought out together. By breaking one main concept out of it, the faith in God, one breaks the whole. It stands or falls with faith in God.”

The Bible’s thoughts on Engineering Ethics begins with the Christian doctrine of creation, forming the vital foundation for understanding, interpreting and applying the relevant normative passages which speak to both safety and environmentalism. From this broad doctrine, Professor John Bergstrom identifies three relevant principles which we’ll use to inform a Christian understanding of both product/public safety, and engineering environmental responsibility:

- Principle of Creation Value- “God created and therefore values all of His works of creation.”
- Principle of Sustained Order and Purpose- “God created and sustains all elements and systems in His creation within particular orders to meet certain ongoing purposes.”
- Principle of Universal Corruption and Redemption- “Everything in the created world and universe is subject to corruption by sin and ultimate redemption through Jesus Christ.”

Dutch Reformed scholar Egbert Schuurman winsomely paints this picture of these principles: “A responsible cultural development summons a representation of culture that depicts earth as a garden tended by humans, a garden as a community-house. Foremost in that picture is an unbreakable cohesion and the inherent value or nature of everything. The intrinsic values must be respected before we involve scientific-technological activities. Every human activity should begin with caring association and respectful treatment. Creation and creature have to be treated according to their nature, otherwise life will flee.”

Francis Schaeffer’s *Pollution and the Death of Man* elaborates the first two principles above, and seems to be found in the footnotes of every contemporary Christian writing about ecology.

“So the Christian treats “things” with integrity because we do not believe they are autonomous… The value of the things is not in themselves autonomously, but that God made them—and thus they deserve to be treated with respect… The Christian is a man who has a reason for dealing with each created thing with a high level of respect.”
“Thus God treats His creation with integrity: each thing in its own order, each thing the way he made it. If God treats His creation in that way, should we not treat our fellow-creatures with a similar integrity? … And for the highest reason: because I love God—I love the One who has made it! Loving the Lover who has made it, I have respect for the thing He has made.”

“What God has made, I, who am also a creature, must not despise.”

“Man has dominion over the lower orders of creation, but he is not sovereign over them. Only God is the Sovereign Lord, and the lower orders are to be used with this truth in mind. Man is not using his own possessions.”

“Man was given dominion over creation. This is true. But since the Fall man has exercised this dominion wrongly. He is a rebel who has set himself at the center of the universe… Because he is fallen, he exploits created things as though they were nothing in themselves, and as though he has an autonomous right to them.”

“So also the church has not spoken out as it should have done throughout history against the abuse of nature.”

Schaeffer is not the first Christian thinker to see these duties in the Bible. The third of the Ten Commandments adjures, “You shall not misuse the name of the LORD your God, for the LORD will not hold anyone guiltless who misuses his name.” The Westminster Shorter Catechism (1649) exposits this commandment’s demands, in its 55th question: “The third commandment forbids all profaning or abusing of any thing whereby God makes himself known.” As creation reveals God (Psalms 8 & 19, Romans 1), any abuse of creation profanes his revelation, thereby violating this commandment. Furthermore, that abuse entails anything which would compromise either creation’s beauty or its habitability:

He who created the heavens, he is God; he who fashioned and made the earth, he founded it; he did not create it to be empty, but formed it to be inhabited.

Is it not enough for you to feed on the good pasture? Must you also trample the rest of your pasture with your feet? Is it not enough for you to drink clear water? Must you also muddy the rest with your feet? Must my flock feed on what you have trampled and drink what you have muddied with your feet?

As image bearers, Humanity reveals God more explicitly and hence falls under the protection of this commandment, and deserving another: “You shall not murder.” This commandment did not first appear in the Decalogue, but was instead expressed to Noah post-flood:

And from each man, too, I will demand an accounting for the life of his fellow man. “Whoever sheds the blood of man, by man shall his blood be shed: for in the image of God has God made man.”
This verse vitally informs a Biblical anthropology. While mankind had clearly borne God’s image at the point of his creation, one might think that that image had been forfeited in the Fall. Or, we might suppose that believers alone can claim to be image bearers of God. This verse denies both of these conclusions. The image of God may have been tarnished and shamed at the Fall, but all humanity continues to bear God’s image.

The Puritans likewise saw both these responsibilities in the Bible, both towards nature and towards man. Jonathan Edwards defined virtue as follows:

“True virtue most essentially consists in benevolence to being in general…. And it will seek the good of every individual being unless it be conceived as not consistent with the highest good of being in general.”

Preaching through the text of 1 Corinthians 13, on the nature of genuine love, Edwards remarked,

“A Christian spirit… disposes a person to be public-spirited man. A man of a right spirit is not of a narrow, private spirit; but is greatly concerned for the good of the public community to which he belongs…”

To clarify, Edwards doesn’t mean that Christians are naturally public-spirited, rather that one’s other-centeredness expresses the extent to which an authentic Christian spirit animates any individual. Piper summarizes Edwards lofty understanding of virtue:

“[Edwards] says that self-love is confined and narrow and selfish- and not virtuous—until it embraces or delights in the good of the whole universe of being, or more simply, until it embraces God.”

For Edwards, virtue is the emotionally and intellectually affected preoccupation with the good of the entire universe of being. For Edwards, the whole universe of being would necessarily include the spiritual realms of heaven, specifically God, but he also meant this to encompass both all humanity and all nature because they were contingent on God and existed solely to serve his glory.

Marsden starkly contrasts this view and its implications with the intellectual despair articulated above by Leff:

“If one believes that our species is no more than what has so far evolved, there is hardly a convincing basis for treating all people as having equal rights or for special concerns for the weak and the disadvantaged. Christian theism, on the other hand, at least provides grounds for supporting the moral intuitions that many academics share.”

The Christian’s response to both Leff and Fluehr-Lobban is to encourage and affirm them that their intuitions are both noble and justifiable; the intuitions themselves are out-working of the image of God within their intellects.

The Principle of Creation Value (humanity and nature) and the Principle of Sustained Order and Purpose inform how the Christian should view all of nature and all humanity, both generally and individually. These principals then guide us how we’re to handle the Bible’s case law, which we might otherwise dismiss as archaic. Surprisingly, the Law of Moses explicitly demands responsible ethical practice on the part of engineers, in Deuteronomy 22:8:
When you build a new house, make a parapet around your roof so that you may not bring the guilt of bloodshed on your house if someone falls from the roof.\textsuperscript{46} This strikes our modern mind as quaint, an artifact of an ancient culture’s architecture. Surely this is a relic intended for Palestine’s climate and culture, antiquity’s building code. Yet none of the other ancient legal codes share this injunction.\textsuperscript{47} It expresses the high value of the individual life in the Bible’s anthropology.

Deuteronomy 22:8 above is case law, expanding on the responsibilities of Genesis 9:6 and the Decalogue, explicitly demanding that a property owner deliberately safeguard the welfare of all those exposed to even latent hazards on his property. We find similar case law treating open wells.\textsuperscript{48} We should reasonably infer that those employed by the property owner who design and construct his parapet share this responsibility. The Mosaic statute stands therefore not as relic, but as an insightful case law revealing a civic duty transcending culture and architecture, and perpetuated by building codes today.

The phrase “guilt of bloodshed” underscores that this verse must be grasped as defining a moral, vice civic, obligation. Immediately following his rescue from the flood, Noah was abjured by God to forbid his children from murder lest they be guilty of bloodshed, and thereby assaulting the image of God himself. Human life is sacred because it bears God’s image; some of the most stern admonitions of the Old Testament likewise caution the reader lest they be guilty of bloodshed.\textsuperscript{49} God is serious; it’s clear from the warning to Noah that the guilt of bloodshed personally affronts God. The gravity of the offense demands protecting against even accidental injury, such as with the parapets; the bloodshed need not be deliberate or pre-meditated. Note that the property owner need not even be present to be guilty in God’s sight, culpable for failing to safeguard against reasonable hazards. God’s priceless image demands every reasonable safeguard. The engineer should see then in the prescription to build parapets an injunction to self-consciously labor ensuring his products and services account for the safety of all who may have contact with his work.

The several preceding verses in the same chapter of Deuteronomy provide case law with respect to respect extended to wild animals.

\begin{quote}
If you come across a bird’s nest beside the road, either in a tree or on the ground, and the mother is sitting on the young or on the eggs, do not take the mother with the young. You may take the young, but be sure to let the mother go, so that it may go well with you and you may have a long life.\textsuperscript{50}
\end{quote}

Some commentators assert that this peculiar injunction reflects a pragmatic concern for a specie’s economic value.\textsuperscript{51} I disagree; pragmatic wildlife management isn’t the proffered explanation. Instead, the verse itself explains that this is a moral imperative with moral implications; “so that it may go well with you” occurs eight times in Deuteronomy attached to a variety of moral duties. This injunction then is likewise case law amplifying the responsibility of the Principle of Sustained Order and Purpose above.

We also find case law amplifying this same principle with respect to agriculture, and the land. The land itself deserved a Sabbath rest.\textsuperscript{52} As for time of war, Hebraic \textit{jus in bello} proscribed unnecessary devastation of the land.
When you lay siege to a city for a long time, fighting against it to capture it, do not destroy its trees by putting an ax to them, because you can eat their fruit. Do not cut them down. Are the trees of the field people, that you should besiege them?53

At this point, all I’ve shown is that starting with biblical presuppositions, the case is easily made for the prominent domains of engineering ethics traditionally held within the broad secular consensus. For the Christian, I’ve established that they can confidently embrace their worldview as an appropriate, rational, and welcome foundation for the professional engineer’s code of ethics.54 That reader should see this as valuable to their noetic integrity. Safety and environmental responsibility are not right simply because they’re the law, or beneficial for market share. They’re right because they’re noble, and beautiful spiritual duties, honoring God. The non-Christian reader who’s still with me might reasonably object, “But all you’ve done is spiritualize the vocabulary for things I already believe as right and true (e.g. safety and environmental responsibility).” Bergstrom’s final principle gives us a vector forward—the Principle of Universal Corruption and Redemption, echoing Sir Francis Bacon (1561-1626) who expressed a succinct theology of technology:

“Man by the Fall fell at the same time from his state of innocence and from his dominion over nature. Both of these losses, however, even in this life, can in some part be repaired; the former by religion and faith, the latter by the arts and sciences.”55

The Fall of Man is hardly a popular concept in the pluralistic academy. But, it’s the foundation of biblical anthropology. Man is great, while totally depraved. The Bible’s meta-narrative of Creation-Fall-Restoration applies to everything that humanity touches. God is at work of restoring that which was undone by the Fall. We’re to be allied with him in pursuit of the repair.

Bacon saw breaches needing repair; Schaeffer describes wounds to be healed:

“On the other hand, what we should have, individually and corporately, is a situation where, on the basis of the work of Christ, Christianity is seen to be not just ‘pie in the sky,’ but something that has in it the possibility of substantial healings now in every area where there are divisions because of the Fall. First . . .[personally]. Second, . . . [psychologically]. Third, the sociological divisions of man from other men. And last, the division of man from nature, and nature from nature. In all of these areas we should do what we can to bring forth substantial healing.

“I took a long while to settle on that word “substantially”: but it is, I think, the right word. It conveys the idea of a healing that is not perfect, but nevertheless is real and evident.”56

Here then is a conception of our trade which might shake our understanding of engineering ethics. The present code of ethics reads as an adaptation of the Hippocratic oath for engineers; “Do no harm.” Proscriptions prevail. If we instead see the engineer as healer and repairer, and the trajectory of history as a restoration of the good, professional ethics would no longer describe the avoidance of evil, but the pursuit of the noble,
excellent and good. We should explore beauty as an ethical duty, and virtue as the pursuit of beauty in our products and the effect they have on people. Hence, we might then not only proscribe the unsafe and environmentally reckless, but also disdain the tawdry, dirty, ugly, or maliciously destructive. If Christians going into our fields were imbued with this sense of an engineer’s calling, it might shape their career choices and projects to which they devote their lives. If Christian scholars sought to further develop this understanding of technological responsibility, we might exert a reforming influence on attitudes towards technology beyond our theological sphere. If our churches fostered this understanding of technology and its relationship to the Cultural Mandate, we might catch up with Francis Bacon’s insight into the theological significance of science and technology.

In the 7th Century BC, the Jewish prophet Isaiah claimed that God’s people would be specifically known for their effect on technological and cultural renewal.

*Your people will rebuild the ancient ruins and will raise up the age-old foundations; you will be called Repairer of Broken Walls, Restorer of Streets with Dwellings.*

*They will rebuild the ancient ruins and restore the places long devastated; they will renew the ruined cities that have been devastated for generations.*

I’m certain that Isaiah’s metaphorical intent included psychological, cultural and sociological restoration, per Schaeffer above. He did however employ engineering as the metaphor and surely also intended to be understood in the plain sense that purposeful physical restoration was necessary as well—the work of engineers.

Examples abound with engineering’s contribution to this effect, enriching lives of individuals and communities. Despite an advanced degree in electro-optics, I still marvel that we can control lasers with such precision that sculpting the cornea can now be considered a routine operation, erasing congenital defects. A cousin, whom I profoundly respect, has labored for thirty years in the world’s most remote locations, developing reliable sources of potable water and sanitation. A deep-seated humanitarian passion drives him; he’s living out Isaiah’s vision of engineers tangibly bringing wholeness to communities. My own background in armaments might wrinkle an eyebrow or two as inconsistent with the above, but I can confidently attest that my motivating interest has been security, while I wait the promised day when swords are beat into plowshares.

In 2001, David Haws published an article in the *Journal of Engineering Education* surveying the literature documenting the ethics education practices of a wide range of ABET programs. In an otherwise factual description of the span of what engineering schools are collectively doing, he singled out a single program for praise, lauding Messiah College for the integration of their capstone design efforts into genuine, self-less humanitarian assistance directed to the service of indigent communities in under-developed parts of the world. I have no affiliation with Messiah, other than our common faith, but I’m proud of their initiative in pursuing the integration of Christendom’s espoused values and the values the church models in the choices we make. We have a spotty record otherwise.
Christendom can’t claim to have consistently taken this view of technology. Though, in each century since the Reformation, there have been Christian scientists like Bacon who’ve articulated this understanding of technology. Dr. Francis Collins, Director of the Human Genome Project, is likely the most prominent today. The church should be holding forth for its own, a high view of the engineer’s calling and responsibility. The world outside the church, rather than urging its silence, should be exhorting it to live consistent with its principles.

Conclusion

Religious perspectives deserve broad consideration in advancing our understanding of our professional ethics. Moreover, the Christian worldview can distinctly contribute to this discussion, whether or not one subscribes to its presuppositions.

- “Why allow for a non-secular foundation for engineering ethics?” Foremost, the secular foundation doesn’t have a defensible claim to exclusivity. The secular, universalist project craves an elusive goal. Furthermore, the West’s history of moral progress owes considerable credit to religious perspectives and insights; it would be imprudent to presuppositionally exclude their insights and effectiveness at advancing reform.

- “What are the requisite presuppositions for a robust engineering ethic?” Engineering ethics needs an anthropology (theory of humanity), a metaphysic (theory of nature), and an epistemology (theory of knowledge), and these three must cohere with the ethics that we propose. Absent these, nagging questions are begged, undermining the foundation of rationality for our moral conclusions.

- “How might a Christian articulation of engineering ethics contribute to the broader cause of progress in engineering ethics scholarship and practice?” Prima facie, a Christian view of does not offer profoundly different conclusions with respect to our duties to protect life and to protect the environment. It does offer a substantially different foundation for such conclusions, as well as substantially different motivations for adherents. Furthermore, it offers an avenue for future discussion and development as Christians interact with our broader pluralistic society on the meaning, significance and purpose for technology.

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4 Plantinga, pg 110.
5 Marsden, pg 28.
11 Marsden, pg 52.
15 Marsden, pg. 86.
16 Philosophers call this class “deontological,” meaning duty-centered. In turn they use “normative” to describe a much broader class. I’ve chosen these terms in hopes they’ll be more accessible and easily recalled for those who haven’t a formal education in philosophy.
19 Westminster Confession of Faith (1647). This is the most famous of English creeds, developed in Scotland during the second phase of the Reformation. It remains today the official creedal statement for a significant minority of English-speaking Christians. See also Hoffecker, A. et al. Building a Christian Worldview (2 volumes), (Phillipsburg, NJ: Presbyterian and Reformed, 1986).
20 Gen 1, Col 1, Job, Psalm 19, Heb 11:3, Isaiah 45:18
21 Gen 1-3, Psalm 8 & 139, Romans 1
23 Eph 4, 1 Cor 2
24 The Ten Commandments
25 This formulation is called Triperspectivalism and can be found described in the Westminster Confession of Faith, and various works of Cornelius Van Til, John Frame, Greg Bahnsen, and Hoffecker (above).
28 Schuurman.
30 Schaeffer, Pollution, pg 32.
31 Schaeffer, Pollution, Pg. 33.
32 Schaeffer, Pollution, Pg. 36.
33 Schaeffer, Pollution, Pg. 40.
34 Schaeffer, Pollution, Pg. 41.
35 Schaeffer, Pollution, Pg. 42.
36 Deu 5:11. Scripture taken from the HOLY BIBLE, NEW INTERNATIONAL VERSION®. Copyright © 1973, 1978, 1984 International Bible Society. Used by permission of Zondervan. All rights reserved.
38 Isaiah 45:18
39 Ezekiel 34:18-19
40 Deu 5:17.
41 Gen 9:5,6.
44 Piper, pg 108, emphasis in original.
45 Marsden, pg. 87.
46 Deuteronomy 22:8.
48 Exodus 21:33
52 Leviticus 25:2-4
53 Deuteronomy 20:19
57 Isaiah 58:12
58 Isaiah 61:4