

Engineering Ethics and Changing Jobs

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Abstract: Engineers have become fairly adept, in recent years, with ethical dilemmas concerning rights to continued employment in the aftermath of events such as “whistle blowing.” In fact, since relationships in the aftermath of whistle blowing have been codified, they reveal *legal*, rather than *ethical* dimensions. Similarly, ethical dilemmas concerning proprietary information and intellectual property have been considered and written into statutes and employment contracts, spelling out employer and employee obligations upon termination. But what ethical rights and obligations concerning the end of employment is the engineer or the engineer’s employer morally obliged to respect, how are those rights affected by investments or personal behavior, and *ought* ethical rights limit or supercede contractual stipulations?

This paper will examine the moral dynamics of changing jobs in the engineering marketplace from the ethical perspectives of virtue, duty, utility, and care. Examples will be drawn from Herbert Hoover’s career as a mining engineer. Suggestions will also be made concerning the integration of this discussion into a lecture or module of instruction on engineering ethics.

Engineers seldom stay with the same employer for an entire career. Corporate downsizing and the loss of employment is not just a remote possibility, limited to a few, well-known, volatile segments within the engineering profession. Certainly, engineering jobs never held the realistic expectation of lifetime employment. Alternately, since “promotion from within” presents the engineer with problems of shifting relationships and resentment, “fast-tracking,” by changing jobs, has become an important means of career advancement.

Accepting a new job or a new employee entails cost, both emotional and financial. How do these costs affect ethical considerations when the engineer’s employment is ended? How are the obligations of employment altered by the provision of continued professional development (for example, by employers who pay outside vendors to meet the general professional education needs of their engineers), or by engineers who devote personal resources to develop skills needed by their employer? How are obligations affected by the costs of relocation (again, both financial and emotional, whether assumed by the engineer or reimbursed by the employer)? Does the engineer’s age, health, or competence; or the firm’s market share, changing ownership, or product obsolescence change the ethical responsibilities inherent in the employment relationship?

As engineering educators, we have the responsibility to mentor our students toward their *first* professional steps. But their continued professional growth will be as an ancillary of their practice—working with *new* mentors and colleagues. To develop the needed depth and breath—as technical specialists and management generalists—most of them will *need* to change jobs.

They will need to seek new opportunities and mentors—and, in turn, will have an obligation to mentor and create opportunities for other engineers.

As professional engineers, our climb from the “trades” began with the introduction of engineering into the university curricula. This has given us more than a century of collective experience. What are some of the special considerations that might constrain our students as they sever one employment relationship and begin another? What ethical (non-contractual) obligations exist for engineers as employers *and* employees? I’d like to consider these obligations in terms of the ethical perspectives of virtue, duty, utility, and care; but also in terms of one of the 20th Century’s most successful mining engineers, Herbert Hoover.

Herbert Hoover

Hoover was orphaned at the age of 10 and raised by relatives. By 15, Hoover was working in his uncle’s land settlement office in Salem, Oregon, but was inspired to seek an engineering education by Robert Brown—an engineer traveling in Oregon from the east coast, where the nation’s few engineering schools were then concentrated. However, Leland Stanford was organizing a new university in California, on a farm near Menlo Park, and Hoover found his way into Stanford’s “pioneer” class, graduating in 1895.

As an undergraduate, Hoover was mentored by his professors (notably Joseph Swain and John Branner), and by Waldemar Lindgren of the United States Geologic Survey. Upon graduation, Hoover gained his first practical experience by pushing an ore cart in the Grass Valley mining district. Soon, he found employment with international mining expert Louis Janin in San Francisco, but gained this entry position as a clerk, because he had learned to touch-type in his uncle’s office. However, Hoover had also (at Stanford) learned a thing or two about mining claims litigation, proved his worth to Janin, and quickly moved into more responsible, engineering activities.

Janin was known for his mentoring of young engineers, and Hoover was no exception. When Bewick, Moreing, and Company asked Janin to help them locate a mid-career, mining expert with experience in telluride ores, Janin and Lindgren managed to get Hoover the job (although Hoover was only 22). In spite of his youth, Hoover was a gifted mining engineer, proved his value to Thomas Bewick and C. Algernon Moreing, and was eventually made a partner in the firm. As the firm was reorganized in 1902, Bewick retired, Moreing became senior partner with a 50% interest in the firm (Moreing focused on mine finance), Stanley Rowe remained a junior partner with a 20% interest (functioning as the firm’s clerk and accountant), mechanical engineer, Thomas Wellsted (who stayed mostly in London) received 10% of the firm, and Hoover (who traveled extensively to evaluate and organize mining interests) received the remaining 20%.

Bewick, Moreing prospered from Hoover’s expertise, and Moreing had personally become quite wealthy, largely with the benefit of “insider” information (most of the world’s mine evaluations, even those not generated by Hoover, were channeled through Bewick, Moreing’s London office, because Bewick, Moreing had the most reliable global communications contacts). While Hoover had a comfortable income, he never became wealthy with Bewick and Moreing, largely because Stanley Rowe had embezzled something in the neighborhood of a million

dollars, shortly after the new partnership was formed. Since Moreing was outside the United Kingdom when the embezzlement came to light, Hoover (acting on the advise of a Moreing confidant) committed the firm to repay all of the embezzlement losses. To cover his share of the losses, Hoover had to borrow against his interest in the firm's future earnings. Although by 1904 he had already decided to leave Bewick and Moreing, Hoover agreed to extend the partnership (accepting a 1/3 interest) until 1912, and eventually managed to pay the last of the embezzlement debts in July of 1907.

Hoover gained much of his mining experience with Bewick, Moreing, and after contracting malaria while investigating mines for the firm in Burma, he asked to be relieved of his partnership duties. In June of 1908, Hoover brought his friend, W. J. Loring into the firm to cover his responsibilities of mine evaluation and organization, selling his share of the firm's "good will" to Loring for \$150,000. Because of Hoover's reputation as a mining engineer, Moreing had demanded that Hoover accept a 10-year non-compete agreement, in exchange for ending Hoover's obligations to the partnership in 1908 rather than four years later.

Hoover signed the agreement, but without the pressure of his duties, he quickly regained his strength (Moreing suspected that his recovery was a little *too* quick). Because of his professional background, Hoover sought to reestablish his practice as a mining engineer. The non-compete agreement only covered mining activities in the British Empire, but because London was the global center for mine evaluation and finance, Hoover established an office in London, as well as in New York, San Francisco, and Paris. When Hoover's work brought him into competition with Moreing over the development of oil pipelines in Russia, Moreing brought suit against Hoover in London. This culminated in a re-writing of the non-compete agreement, and a fair amount of hard feelings between the two (as well as on the part of Loring, who had purchased Hoover interest in Bewick, Moreing).

Hoover was the product of much mentoring, and he continued throughout his life to mentor fellow engineers. Hoover had also been nurtured by his society, and he spent much of his life nurturing others—including the war relief in Europe during and after the First World War, which arguably saved more humans from starvation and/or malnutrition than any other single effort. Hoover believed in using his power and resources to reciprocate, in gratitude for the beneficence of others toward him. But what did Hoover, by way of gratitude, owe *Moreing*? And what did Moreing, by way of gratitude toward a faithful employee and partner, owe *Hoover*? Was Moreing ethically obliged to allow Hoover the free practice of his profession? In the lawsuit, Hoover made the rather weak argument that a petroleum pipeline wasn't mining. Of course, Russia wasn't part of the British Empire, either; but Hoover was residing in London at the time, and working from his London office. Was Hoover ethically obliged (neglecting any casuistic arguments that might equivocate the non-compete agreement) to avoid *any* competition with Moreing, in which he might benefit from the reputation he developed *at* Bewick, Moreing?

Virtue

While all moral philosophy deals with obligation (seeking to determine how we "ought" to live) the focus of virtue ethics is obligation to self. The idea is that our final cause (our "destiny," or the cosmic role we were created to fill) is the human excellence (*arête*, or virtue) of which we are capable. This includes intellectual virtues—developing useful talents—but also moral virtues,

or the character traits that define the best attributes of humanity. The precise nature of those character traits has been disputed over time. For example, a key Homeric virtue (thankfully, no longer considered a moral virtue) was the ability (and inclination) to kill or enslave your enemies. Aristotle¹ includes the moral virtues of magnificence (creating an appropriately sumptuous, personal lifestyle) and high-mindedness (pride being the virtuous, “golden” mean between the excess of vanity and the deficit of humility). Aquinas² and other theists considered faith a primary virtue, and Benjamin Franklin seemed to see moral virtues in punctuality and cleanliness.³ However, most of the “universal” virtues, such as justice and beneficence, while enabling the attainment of individual excellence, are also social, or other-regarding.

Hoover was prudent (bright and capable) and showed an abundance of intellectual virtues, but he also owed it to himself to develop and preserve a virtuous character. In terms of classic virtues, Hoover did show courage (under “fire” during the Boxer Rebellion), temperance (living well, but within his means and seeking selfless service after he had accumulated sufficient personal wealth), beneficence (even toward Rowe, but quietly supporting countless individuals), and justice (shielding those who had made “good faith” investments with Rowe as a Bewick, Moreing partner). We may work for *companies*, but the employee/employer (worker/manager, if you’d prefer) relationship is between *individuals*. What are the virtues that we “owe” it to ourselves to develop? If virtue is also other-regarding, what obligation do we have to support the development of virtue in others? And how does the final cause of a virtuous character impact the employment relationship?

Moreing gave Hoover lots of opportunities to develop intellectual virtues, but *Moreing* received primary benefit from Hoover’s developing expertise (in financial terms, Hoover himself gained comparatively little in the exercise of his expertise under Bewick, Moreing). Hoover contracted malaria while serving the firm, and Moreing’s demand for a non-compete agreement seems a little petty. Having *signed* the non-compete agreement, virtue would seem to demand that Hoover honor it (the virtuous need to keep their promises with virtuous and unvirtuous, alike). Virtue would also seem to demand that Hoover respect the wishes of Loring, concerning the “good will” in the firm that Loring purchased from Hoover.

It’s difficult to abet virtue, with anything like the efficiency used to support vice, and perhaps the insight of virtue ethics, as it relates to an engineer like Hoover changing jobs, is the requirements of the virtue we normally refer to as justice. It was *just* that Hoover feel grateful for the nurture he received from Moreing early in his career. But if Moreing’s nurture of Hoover were solely for Moreing’s own benefit, then any gratitude *Hoover* felt would be the result of an illusion showing at least a lack of intellectual virtue. The extent to which Moreing’s dealings with Hoover benefited Moreing rather than Hoover, would tend to relieve Hoover’s obligation of gratitude. Certainly, justice wouldn’t demand that Hoover *always* put Moreing’s interests (or Loring’s) ahead of his own. Hoover probably should have informed Moreing of those plans, which might adversely affect Bewick, Moreing (there is some indication that he did this, in 1904 when he decided to eventually leave the firm, and in 1910, when he and Moreing came at cross purposes over the oil pipeline proposal in Russia).

The implications of Virtue Ethics for engineers subject to changing employment relationships is that employers should provide opportunities for the growing competence of their

engineers *without* the expectation that such competence be used forever, solely at their own discretion, or for their own benefit. It is not just for employers to demand eternal gratitude from those they mentor (it is perhaps unjust to “demand” gratitude at all). In addition, it is imprudent for an employer to assume rights of ownership to a skill that was developed by practice (study or labor, which the employer may have “purchased”), but my means of the employee’s previous knowledge, dispositions, and talents (which are the employee’s and cannot be ethically sold *or* purchased).

Employers need to respect the investment that the engineer makes in his or her own competence. For their part, engineers need to respect those investments made by companies in the anticipation of continued employment. Respect for those who *plan* a continuing employment relationship, requires disclosure when those plans become knowingly obsolete. Since those who nurture and mentor are seldom in need of reciprocal beneficence, debts of gratitude from recipients of nurture are best paid in kind, through emulation of beneficence toward others.

Duty

Kant differentiates perfect duties, which we owe to others, from imperfect duties, which we owe to ourselves.⁴ This seems to be the one hierarchic distinction Kant is willing to make, so while we do have a duty to ourselves (primarily to develop a good will) the priority of *duty* might be seen as typically other-regarding. But duty isn’t a *quid pro quo*. Duty exist independent of the tit-for-tat relationships of prudence. The engineer can enter a prudential contract, such as Hoover’s non-compete agreement, and have a duty to “honor” that contract—but the duty is directed toward honor, and not toward the contract. The duty, in Kant’s perspective, is to govern one’s actions through rules that are self-proposed and recognized as *a priori* by the moral sense reposed within all rational beings.⁵

Hoover had a duty to honor his agreements, both explicit agreements such as his partnership contract or the non-compete agreement made with Moreing, and implicit agreements such as those assumed to be in force by the mining investors that Rowe had managed to swindle (because of Rowe’s *explicit* membership in the Bewick, Moreing partnership). Moreing had a duty to respect Hoover’s autonomy—to respect the fact that Hoover had his own conception of the good—and not simply to use Hoover as a means by which Moreing might achieve his own ends.

If Hoover was really unable to perform his function at Bewick, Moreing, then Hoover appeared to be doing the honorable thing—stepping down from his position and bringing in someone he trusted to perform in his place. Hoover did “sell” his interest in the firm, but the non-compete agreement might be seen as Moreing’s declaration that he didn’t place much stock in Hoover’s protestations of medical incapacity (and because of Hoover’s quick recovery, we might join Moreing in his skepticism). The partnership dissolution, and the non-compete agreement are pretty firm indications that there was no particular love lost between Hoover and Moreing. Their ten-year professional relationship *should* have left them on better terms, but employment relationships can often end on a sour note.

The distinction is sometimes drawn between *contract* relationships (generated by prudential agreement) and *covenant* relationships⁶ (generated by other-regarding sentiments). Our

relationships “ought” to be of the later type, because relationships work better if both parties have a genuine concern for the other’s welfare. However, sometimes our relationships aren’t what they ought to be, and when we end relationships that are self-regarding, the counsels of prudence require us to do the best we can for our own interests. As Kant would be quick to point out, the counsels of prudence lack moral authority.

The command of morality—our duty—is to respect moral autonomy, reflect on the circumstances and needs of other as well as on our own needs, and act in a rational, universal, predictable way. This duty enters our employment relationships in that we need to understand the explicit and implicit agreements inherent in the continuing relationship, and we need to see that these agreements are understood by everyone affected. We “ought” to act, in our employment relationships with other-regarding sentiments, because such relationships simply work better—and if we can’t, we should seek an honorable termination of the relationship, and seek other opportunities where the employment relationship might be more mutually other-regarding.

Utility

While our obligations to develop a virtuous character, and to honor our duty can seem a little esoteric at times, utility is, at least on the surface, straightforward: that action (or rule) is morally required, which leads to the greatest balance of pleasure over pain for the largest surplus of sentient beings⁷ (beings capable of sensing pleasure or pain). A simple, *rational* example would be that an outcome resulting in 5 apples would be better (5 times better) than an outcome resulting in one apple (assuming that I like apples). An *ordinal* example would be that if I have 5 apples that must be eaten instantly, I should share them with four friends—because diminished utility would give me less pleasure (eating them all myself) than the pleasure derived by five people eating one apple each (again, assuming that we all like apples). The ethics of utility is quantitative—Mill’s protestations⁸ about the quality of pleasures to the contrary—because if we prefer one pleasure to another, that preference is only reasonable if the preferred pleasure is “greater” (or “better,” or subject to some other, at least ordinal quantifier).

But we’re not always reasonable—we’re often fooled by our *senses*, let alone by our *imaginings*—and the literature is full of odd scenarios under which the dictates of utility run counter to our “sense” of morality. For example, several^{9, 10} have discussed the dilemma of stopping a “run-away” trolley by pushing a fat bystander onto the trolley track in order to save the lives of five transit workers. Some utilitarians^{11, 12} have pointed out that utility is just the rational component of an ethical deliberation which assumes the universal preference for pleasure over pain (egotistical hedonism), our intuition or common sense about the requirements of moral behavior (which has evolved, in a sense, over thousands of years, subject to frequently *recurring* events—which have little in common with run-away trolleys), and our rational inference that an equal amount of pleasure (whatever might cause that pleasure) has equal value regardless of which individual might arbitrarily be experiencing that pleasure.

From the perspective of utility, our employment relationships need to support the “greatest good.” This is explicit in most of our ethical canons as they regard “holding paramount” the public safety. Assuming that acts of engineering tend to support the greatest good (which shouldn’t be assumed for individual acts, and needs to be part of our ethical deliberations) the

greatest good is served by enhancing the competence of engineers (competence in engineering, and competence in ethical deliberations to determine which engineering acts are warranted). The competence of engineers requires continued professional development—investing our own efforts to become more competent (something regarded by Kant as an imperfect duty), and investing the resources of our companies to enhance the competence of employee engineers. Gaining the greatest competence for our investment also seems to require that employee engineers be freely allowed to pursue self-chosen opportunities—from competing firms, if those opportunities are not available internally.

Louis Janin actively promoted the cause of Hoover's employment with Bewick, Moreing—even though this meant that Janin himself would be losing a valuable employee—because he believed that it would allow Hoover to maximize his personal growth as a mining engineer. Janin sacrificed the interests of his firm for both Hoover's interests, and the interests of their profession. These are clearly two different things. First, Janin felt that the greater good would be served by mining engineers with the greatest competence, and that someone like Hoover should be encouraged to develop such competence. But Janin was also other-regarding in his personal relationship with Hoover. Janin could not have mentored Hoover without coming to actually *care* about him—without respecting Hoover as an autonomous being, complete with a personal conception of the good and the need to pursue his own vision.

Autonomy, so important to Kant in his formulation of categorical duty, is also important from a utility perspective, because personal efforts are maximized in pursuits of our own choosing. When we direct our own efforts, those efforts are stimulated by internal motivation rather than external incentives. Our commitment is greater, and is not subject to the removal or displacement of incentives. If we accomplish *more* by being self-directed, then autonomy has a *universalistic* utilitarian function.

But respecting the autonomy of others also has an *egotistic* utilitarian function. Janin's relationship with Hoover was much more personally satisfying than Moreing's relationship with Hoover. Utilitarians like Sidgwick are quick to point out that sympathy, the ability to draw personal pleasure from the pleasure experienced by others, makes the *individual* life more pleasant, and thereby adds to the surplus of pleasure over pain among all sentient beings. Other-regarding sentiments underlie virtues like beneficence and justice, direct our perfect duties to respect the autonomy of other rational beings, and enable the optimal balance of both universal and egotistical hedonism.

Care

Perhaps the Ethic of Care is *naturally* applicable to the problems of changing employment, since care focuses on the relationship between individuals who are unequally dependent on each other.¹³ Accordingly, obligations between employers and employees have to reflect the inequality and dependence inherent in the relationship. For example, when Rowe's embezzlement became known, Moreing was the only firm principal with resources adequate to indemnify Rowe's victims. If Bewick, Moreing allowed the investors to be defrauded, Hoover and Wellsted would be ruined (financially and professionally). While the scandal of embezzlement losses would have also ended Moreing's mining career, as well as his interests in

becoming a Member of Parliament, Moreing had enough personal wealth (which was not subject to seizure, since the firm was an English Limited company) to live the rest of his life comfortably. However as the senior partner (and as the partner who placed Rowe in his position) Moreing seemed to have a responsibility to protect Hoover and Wellsted, because of their special relationship.

In a similar way, the other partners of Bewick, Moreing were dependent on Hoover, since he was the only firm principal with such a highly developed understanding of mine valuation and management. Hoover's obligation, in ethically exiting the partnership, seems to have been met by finding a willing replacement of similar competence (Loring). But Hoover felt an obligation to care for others subject to much less formal relationships of dependence (to care for other engineers, to care for fellow Americans stranded in Europe at the beginning of the First World War—even caring for Rowe, particularly caring for Rowe's family during his 10-year imprisonment).

Oddly enough, it was probably Hoover's sense of special relationships that caused him (and the rest of America) so much grief during the early years of the Depression. During the First World War, Hoover had been very willing to organize massive amounts of welfare in the relief effort. But Hoover had a clearly prejudicial attitude in favor of Americans—who embodied a kind of individualism that represented (for him) a higher, more ethical—other-regarding mode of life.¹⁴ When Americans found themselves in need of the same kind of relief Hoover willing offered Europeans, Hoover felt that such relief in America would destroy individualism, and our willingness to create voluntary associations for the common good. This ability was something Hoover saw as precious, but uniquely American and beyond the capacity of traditional Europeans. Hoover felt a duty to nurture those virtues he saw within the grasp of proximal development—which made acceptable relief efforts different in America and Europe. As President, Hoover felt a greater duty to protect our individualism—even if it meant the kind of suffering he would not have allowed in Europe.

There is probably a lesson in Hoover's difficulties as our President, for engineers in their employment relationships; Americans during the Depression were dependent on Hoover for more than their individualism. As engineers, we need to have a firm understanding of the *levels* of dependence that typify our working relationships, and we need to take these into consideration in our ethical deliberations. We need to assume the obvious transience of working relationships and cooperate in training others (inside and outside our organizations) who might one day need to take over our jobs. This runs counter to the impulse to “feather” our own nests. An ethic of care is helpful here, because it is naturally other-regarding—drawing us out of our preoccupation with personal interests and helping us to focus on those in relationships of dependence.

However, the other side of the dependence problem, created by unequal relationships, is the tendency toward paternalism. It was Hoover's paternalistic instinct (toward Americans) that created so much difficulty. It's easy to see a little Herbert Spencer¹⁵ in Hoover's writings, and Hoover, as a product of his time, might be excused for feeling that Americans needed to struggle (and evolve) through their adversity.

Employers must find a delicate balance in their duty to nurture employees, and their duty to respect their employees' autonomy—to allow the employee experiences, which might even be considered negative. Hoover probably should have placed the call for succor above his political ideology, and employers should at least be willing to consider placing the desires of their employees first. However when the decision is made to end the employment relationship—from either side—our students need to be able to support (or at least accept) the rational decisions of others that may run counter to their own desires.

Conclusions

Many of our students have already had their first job with an engineering firm—sometimes gaining (like Hoover) a motivation to study engineering because of their working relationships with an engineer. Over their professional careers, our students will experience changing employment relationships many times, and they need to be prepared to reflect on the moral implications of those changes. Since the ethical dimensions of changing employment is more “real” to our students (certainly more real than run-away trolleys, and probably more real than nuclear melt-downs, exploding booster rockets, or even bio-degradable textiles) the discussion of these dimensions might serve as a useful focus for the introduction of engineering ethics in terms of the four perspectives considered. There are other perspectives (for example, the cultural perfectionism of Nietzsche), and other perspectives within the four general considerations (such as duty derived from an implicit social contract—or from an explicit, inclusive discourse; or utility based on maximizing agape,¹⁶ or Christian “love” rather than pleasure). But these four other-regarding perspectives, virtue, duty, utility, and care—seem a good place to start.

Hoover was a prolific (and sometimes eloquent) writer—often more coherent than like-minded contemporaries, such as Arthur Morgan. As engineering educators, we should be familiar with two of his more important political tracts: *American Individualism* (1922) and *The Challenge to Liberty* (1934). We should also be familiar with the first volume (of three) of his *Memoirs: Years of Adventure* (1952). George H. Nash wrote an excellent, multi-volume biography, the first volume of which, *The Life of Herbert Hoover: The Engineer* (1983) bears on Hoover's engineering career. Finally, the eighth chapter of Edwin T. Layton, Jr.'s *The Revolt of the Engineers* (1971) contains a fascinating analysis of Hoover's participation in the attempted reform of the American engineering societies in the aftermath of the First World War. Hoover, arguably the most influential engineer of the 20th Century, has been ignored by engineers far too long.

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