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Civil engineering is, at its core, a service based profession that works towards the betterment of life for humanity. Consequently, engineers have a fundamental obligation to protect the community and make the decisions necessary to fulfill this obligation. However, the duality of a civil engineer's responsibility lends itself to answer to federal and local law as well as the needs of the people. At times, this duality can cause internal conflict due to regulations and ethics being misaligned with one another, and makes adhering to both when performing engineering duties a unique challenge. In particular, legal implications are predominantly placed above ethical implications as a result of their immediate and concrete consequences, yet, this prioritization purposefully fails to consider the fact that ethics informs the adaptation of regulations, and thus the two are not mutually exclusive entities. In order to balance the legal and moral complications that arise in the practice of civil engineering, regulations should be taken as a baseline for minimally safe applications while ethics should be taken as the succeeding action towards cautious and conscious applications.

The legal and moral obligations of a civil engineer are best outlined by two comprehensive guidelines: the American Society of Civil Engineers' (ASCE) Code of Ethics and locally enforced building codes. The ASCE Code of Ethics provides an organized framework for engineers to understand their ethical duties; it is updated regularly to respond to changing moral duties, taking, for example, the code update in 2020 in response to the infrastructural failings exposed by the pandemic and growing environmental concerns. To establish the ethical duties of a civil engineer in a concise manner, the code highlights the various stakeholders present in the

work engineers perform which—in order of importance—includes society, the natural and built environment, the integrity of the profession, clients and employers, and peers. Above all, the most integral guideline set forth by the Code of Ethics is that engineers must "protect and advance the health, safety, and welfare of the public through the practice of civil engineering" (ASCE Code of Ethics, 2020). To a similar point, the purpose of regulations is to provide clear limits and standards for the safety of the public. In the United States, building regulations are primarily local as a result of different environmental conditions across the country, although most states utilize the International Building Code (IBC) as a guideline for minimum general requirements. The scope of regulations include but are not limited to technical definitions, specifications, and guidelines, while the objective is to have a basis on which projects can be equally designed and evaluated. These clear legal limits typically work in tandem daily with ethical standards to ensure the safety of millions.

Although ethics and regulations typically work together in equal respects as they should, there are times when ethical demands exceed what is necessary of legal expectations and, as a result, are not held in equal regard, with legal expectations taking precedence over ethical demands. Historical mistakes of this nature, however, become crucial learning experiences that can inform future engineering practice on how best to balance legal and moral obligations. Two major, past engineering projects that encompass the practice of meeting only legal requirements but not ethical requirements are the construction of Dodger Stadium along with the subsequent destruction of Chavez Ravine and the recently canceled Keystone XL Pipeline. Civil engineering is a practice that involves creation and improvement, but what is lost in place of this creation or what is destroyed are not as deeply considered when the end goal is to make something stand, not make something fall.

The Dodger Stadium construction and the proposed Keystone XL Pipeline are both projects that are within perfectly legal means in terms of planning and construction, yet violate core tenets of the ASCE Code of Ethics. Examining the older and long since completed project, the first construction of Dodger Stadium explicitly evicted and displaced the three primary Latino neighborhoods originally onsite, a community known collectively as the Chavez Ravine. Working class landowners, of whom were predominantly Mexican American, were initially forced off the land by the city of Los Angeles through the use of eminent domain, with plans to utilize the newly acquired land towards the development of public housing. Many families acquiesced to city demands because they were promised relocation to the planned public housing to be built in the neighborhoods' place. The election of Mayor Norris Poulson, a conservative vehemently against public housing, canceled these plans immediately and instead gave the land to owner of the then Brooklyn Dodgers, Walter O'Malley, as a means to entice a move to LA for the team. This action would violate at least one tenet in the Society stakeholder section—the most important stakeholder—of the Code of Ethics which states engineers must "acknowledge the diverse historical, social, and cultural needs of the community, and incorporate these considerations in their work" (ASCE Code of Ethics, 2020). Thus, while all legal regulations were likely met in this case, ethical demands were almost completely ignored.

The same can be said for the potential development of the Keystone XL pipeline, proposed by TC Energy. This pipeline was projected to span almost 1200 miles between Alberta, Canada and Steele City, Nebraska, delivering oil from oil sand fields in Calgary to ease the cost of transport to refineries. The expansion project has undergone a series of contested delays and approvals since it was first proposed in 2008, with President Barack Obama first delaying it due to environmental concerns as well as concerns about the disruptions it would cause to Native

American land. Upon taking office, President Donald Trump attempted to approve construction of the pipeline with the argument that it would create employment opportunities and benefit local construction material industries such as steel production, only to have the project canceled completely by President Joe Biden. If this project were to be completed, it could be legally constructed according to building regulations, however, in terms of ethical commitments, it would pose a threat to fragile ecosystems in Nebraska such as the Sandhills region as well as have the potential to poison any habitat along its 1200 mile stretch with possible oil spillages. Constructing the pipeline would be in violation of the same Society section tenet violated by the construction of Dodger Stadium as well as the entirety of the Environmental section of the Code of Ethics, namely that it could not uphold mitigating "adverse societal, environmental, and economic effects" and using "resources wisely while minimizing resource depletion" (ASCE Code of Ethics, 2020).

Despite the purposeful grievances of past civil engineering projects, pressure from forces outside the scope of engineering can topple the balance of ethics and regulations. While an engineer makes the conscious decision to transgress legal or ethical tenets, the conscious aspect of this decision implies that the consequences were well thought through and that alternative action could have come at a cost equally as detrimental to the public. Maintaining a balance between ethics and regulations first involves actively choosing to hold both in equal regard and then working within the available means to compromise wherever possible when the two core tenets cannot be upheld equally. Excluding political pressure as displayed in the Dodger Stadium example which cannot be dealt with in the scope of civil engineering, the primary misalignment of ethics and regulations results from regulations simply being unable to match pace with the rate

at which ethical guidelines evolve as can be seen by the uncertain legal approval of expanding oil pipelines such as the Keystone XL project.

Another layer is present in the relationship between ethics and regulation. Ethics plays a significant role in updating and forming new regulations as well, Love Canal being a historical example that elucidates this hopeful relationship. Love Canal, started in 1894, was an attempt at building a canal near Niagara Falls for the purpose of producing hydroelectric power for New York City. This project ultimately failed due to financial issues that arose as a result of the Great Depression and was subsequently abandoned. After being abandoned for about a decade, Hooker Chemical and Plastics Corporation negotiated a deal in 1942 with the then title owners, allowing the corporation to dump their chemical waste into the canal by entrenching it into the impermeable clay soil. Five years later, Hooker bought out the property and the surrounding lands and, in 1950, stopped the improper disposal. Hooker Chemicals and Plastics then aimed to seal the dumping site to prevent seepage of the hazardous wastes, later going as far as donating the land for the development of a school once it was safe due to pressure from the local government to correct their actions.

Carelessness by the local government when the land was developed led to the removal of a majority of the precautions taken by the corporation. This would expose students and faculty in the school building to hazardous chemicals and cause a variety of medical issues ranging from miscarriages and respiratory problems, all due to the gross negligence that the government practiced for the purposes of profit. The clear ethical and legal violations committed by a governing body led to the creation of the Environmental Protection Agency, a larger agency intervening and passing legislation to prevent events like the Love Canal incident from occurring again. In 1980, the EPA passed the Comprehensive Environmental Response, Compensation and

Liability Act (CERCLA) which allows the EPA to clean up sites such as Love Canal and make the parties that are responsible for the contamination of the sites pay for the clean-up efforts. And although the actions taken by the local government were unethical and illegal, the actions taken by the company are a better example of how an entity can balance ethics and regulation and that one value does not need to be prioritized over the other.

The aforementioned discussion gives rise to the question of how future engineers will balance ethics and regulations. How can engineers be trained to go above and beyond? It starts in their education. A regular and rigorous discussion of ethics is a necessity. This allows students to be exposed to ethical dilemmas early in their education and allows students to learn how to tackle these challenges in a safe space under the purview of those who have experienced these challenges before. This can prepare engineers to be more mindful when in their future practice, and this necessity is more dire today than at any other point in time. The society that engineers design for is rightfully becoming more diverse and intricate socially and culturally, which warrants the necessity for more mindful engineers.

Ethics and regulation are two core tenets of civil engineering that dictate the framework for a mindful engineer. However the two pillars of the field are not always in line with one another, which makes the adherence to both simultaneously a challenge that engineers have to reckon with. Ultimately, civil engineering is a civil profession. Its purpose lies in the protection and betterment of humanity. This necessitates that engineers be ethical to all their stakeholders first and foremost. The moral duty of an engineer to the public is inflexible, while the legal duty of an engineer is purposefully malleable.

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