

Good research paper on engineering ethics

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ABSTRACT:

It is essential to acknowledge the fundamental reality that face engineers when subjected to conflicting interests within their performance and in offering technical expertise. It is the duty of an engineer to uphold the well-being of the public health, safety, and the welfare during the course of execution of the professional duties. As outlined below, an engineer who commits to the decision of defending his recommendations will often be faced by the risk of losing their jobs and positions. However, we must acknowledge the fact that we would be refuting our professional obligations and responsibilities, as specified by the Professional Code and to the engineering profession, if on matters concerning community safety, health, and welfare were compromised.

INTRODUCTION:

As the sole water management engineer in Philippine Islands, at a vast company, my operations were smooth and well defined. This status had a number of advantages; it was unusual for people to disagree with me, in all the water management projects and installations. It was possible to get involved in everything, and apparently I served as my own boss. The reason for this was that many of the people around did not comprehend the technical aspects of water management, hydrodynamics, and water resource designs, which I was well versed. Nonetheless, this had a number of disadvantages, especially in seeking advice and consultations on complex aspects. Simply because one carries the title of an engineer does not imply that one understands every aspect of engineering. For example, a mechanical engineer that designs pistons and hydraulics might not

understand the technical aspects of suspension system design. However, in the course of operations, mega engineering projects involving a chain of parties, office, and stakeholders' spheres would arise. Due to the complexity of the projects, I was required to liaise with different departments and individuals. One possibility is that there will arise a conflict of interest, where different parties espouse different propositions regarding the project. Some of the conflicting interests could, in some way, contravene the code of professional ethics or even detrimental to the community. In addition, some of the measures adopted, for example, in protecting the immediate environment from damage and harm, particularly from the construction works would be overlooked.

During my tenure as a civil engineer in Philippines, between 2000 and 2005, I was to oversee a number of dam construction projects, which came after corporate gold mining, particularly along major rivers within the designated areas. The areas where gold mining was done was along river-banks. Despite the low quantities of gold deposits along these river valleys, the mining activities attracted many parties and hence involved a number of stakeholders. The government, the corporate (private sector), foreign investors, and the local communities.

My role as a civil engineer, together with a team of experts, was to carry to carry out resource mapping and auditing, on both the merits on mining gold and the implications that would come with the venture. Along River Agno in Benguet, the generation of hydro-electric power was in progress. Also, the farmers along the river-valleys carried out extensive rice growing. The hydro projects were privately owned and operated. In the region of Benguet, mining has been practiced for over a century. Hence, the area is marked

with abandoned mines, diversion tunnels and tailings dams, open pits mine sites, waste-dumping- sites, underground tunnels and canals. After conducting the resource mapping and full audit, it was clear that any further mining and exploration would be adverse to the integrity of River Agno. Considering the many dams and underground tunnels, the region had become unstable, and vulnerable from collapse and mass-wasting. The report showed that the new dams would be incapable of containing the increased volume of water and tailings from the gold-mines and mills, particularly during the typhoon seasons.

Moreover, the region remained vulnerable from the constant earthquake that has rocked the region within the past one decade, between 1990 and 2001. With the new mining developments, siltation would be much pronounced along the riverbeds and in the already existing dam. Therefore, this would reduce the amount of the water available for power generation. This reduction in water levels would mean that the power-generation-capacity within this river would go down significantly.

ETHICAL DILEMMA:

After a second phase of thorough resource audit and analysis, there was sufficient evidence that the project would cause more damage on the environment despite the new development. At the onset, the many stakeholders involved looked forward to a ‘ better’ outcome, with the assumption that the project should accord optimal benefits with no regard to setbacks and collateral damages. However, the damage seemingly exceeded the common good.

Therefore, the most advisable action as an engineer, and the technical

expertise, was to declare the short-comings of the project and defend the ground. Since the professional code of conduct comprises of several elements: implementing meaningful work, the moral psychology, personality and virtues, self-betrayal and self-accomplishment, commitment to ideals should be avoided at all costs. It is imperative to consider the consequences of every action. However, due to the conflict of interest, with the notion of a certain “good” or “evil”, the aspect of ethical dilemma became prevalent.

STAKEHOLDER CONSIDERATION:

Consequently, it became evident that at least the non-governmental organizations, backing ecological integrity and sustainability, stood up to sue against the project. Also, the environmental lobby groups within Benguet came up against further mining prospects along Agno River Valley, defending against the loss of the endangered plant species along the river valley. With the projected loss of the river valleys, which serve as agricultural areas and as rice growing grounds, the local farmers were disturbed that the mining activities would lead to food insecurity and loss of income. As a result, they teamed up against the project, through boycotts and demonstrations

Conversely, the private sector, the government, and foreign investors were in favor of this mega mining project, from the notion that it would meet their immediate utility and interests, that is, revenue from gold mining. After presenting the report to the various parties and offering my insights on the status of the prospective project, it was clear that my position as a civil engineer was at stake. The recommendations were rejected and. It was definite that the Chief Mining Advisor would hire another engineer for my

roles. What was right or rational? Join in the project and retract the audit report assertions or quit from the mining contract? For the safety of the people, it was ethical to refuse any further mining activities along Agno River Valley.

RELEVANT ETHICAL THEORIES AND CODES:

PROFESSIONAL OBLIGATIONS:

It is the obligation of an engineer to hold principal the well-being of the public- health, safety, and the welfare of the people in the execution of the professional duties. In addition, the premise upon which the professional obligation engineering rests- the engineering registration procedures- this is rooted in the proposition of public welfare protection. And it is to the authority of the state to regulate, by law, the practice of the profession.

PROFESSIONAL RESPONSIBILITIES:

This aspect refers to the moral, character, and the forward-looking attributes as the professional responsibility of an engineer. This consideration is the most basic. An engineer is meant to defend lives and property while maintaining development at the agreeable and sustainable levels. It is easy to state this in the abstract, that acting along moral inclinations and protecting the well-being of the public is paramount, however, effecting this on practical grounds proves challenging. Often, the ethics exists on a delicate balance between competing and opposing obligations.

However, it should be clear that where the discord exists between one significant obligation, loyalty, and public welfare protection, it is then the responsibility of the engineer to opt for the latter-public protection. In many instances, engineers have presented their superiors with differing view-

points, that is, opposing the views of their seniors by safeguarding the interests of the public. Consequently, most of these engineers end up on probations with the first warning. And if the performance does not ‘improve’, the engineer is terminated from performance.

According to the National Society of Professional Engineers (NSPE) Professional Code, it is right for the involved engineer to withdraw from the project and report to the relevant higher authorities, if the prospective project involves endangerment.

ENGINEERING CALCULATIONS:

TECHNICAL COMPETENCE:

ALTERNATIVES ANALYSIS:

Before the project was implemented, the team of expert was to conduct the assessment report on the adverse effects of the gold mining project. To start with the production of hydro-electric power, it was predicted that the existing plant, which was by then generating 345 mega-watts would decline to 18 mega-watts. In addition, the projection that the new dams and tailings would not support the magnitude of the milling wastes and increased water impacts from the typhoons, the probability was rated at 0.89 out of 1.

The table below outlines the outcomes of the audit report and the various ratings, both from the team of mining expertise and myself. The frequency rating indicate the value attached to the premise of implementing the project, while the serious rating points to the recommendations against the mining project. A higher Serious Rating figure denotes weightier support to the termination of the project.

Team of expertise polling report analysis:

APPROPRIATE COURSE OF ACTION:

With the projected siltation and the unsteady subterranean ground, it was predicted that flooding would be accelerated. The flooding would in return settle the settling and agricultural land by up to 69 percent. With loss of arable land, this would give way to food insecurity and demand for squatter settlement schemes.

Moreover, this would decline the annual income, from rice export by over USD 527 million, against the gold mining project which was estimated to generate up to USD 200 on an annual basis. With these set of statistics, it was essential to retract the mining and demands for initiating the mining project, instead maintain the Agno River valley as a rich agricultural ground as well as retain its vulnerable biodiversity.

CONCLUSION:

In closing, it is important to acknowledge the fundamental reality that must face all civil engineers confronted with similar decisions. As outlined above, an engineer who commits to the decision of defending his recommendations will often be faced by the risk of losing the professional position. While we appreciate this sobering fact, we would be negating our professional obligations and responsibilities, as stipulated by the Code and thus to the engineering profession, if on matters regarding public safety, health, and welfare we would decide otherwise.

For an engineer to allow his or her professional obligations and responsibilities to be compromised to the extent of endangering the public health and safety, conducts serious injury to the image and interests of all

the engineers, and contravention to the National Society of Professional Engineers (NSPE) Professional Code of Ethics.

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