



# ABCs of Engineering Ethics – The Project Management Triangle

An Online Continuing Education Course for Engineers

**Course Number: ET-1066**

**Credit: 1 Hour / 1 PDH / 1 CPD**

# ABCs of Engineering Ethics – The Project Management Triangle

Mark J. Sheeran, P.E.

## 1.0 Overview

As you advance your professional engineering career, your role will likely switch from one that is purely technical to one that includes a mix of project management. When this happens, the worlds of professional engineering and project management begin to interact on a daily basis. Throughout this course, we will be exploring this interaction from the perspective of engineering ethics.

Central to being a Professional Engineer is adherence to the ethical requirement to protect the health, safety, and welfare of the public. Said another way, the Engineers' Creed opens with "as a Professional Engineer, I dedicate my professional knowledge and skill to the advancement and betterment of human welfare." The Engineers' Creed was adopted by the National Society of Professional Engineers in June 1954.

Central to project management is the tenet known as the Project Management Triangle, whereby the aspects of cost, scope, and schedule are balanced. For the Professional Engineer "project manager," it is important to realize that before we can begin to study the tradeoffs between cost, scope, and schedule via the Project Management Triangle, we must first study the ethics involved. Failure to do so will lead the Professional Engineer down a dangerous path.

In the sections below, you will be introduced to the Project Management Triangle and study the interactions between the Project Management Triangle and engineering ethics through case studies.

After completing this course, you will have an understanding of how engineering ethics should drive our project management decisions.

## 2.0 Introduction to Engineering Ethics

So how exactly do we define ethics? For the purposes of this course, we'll keep it simple: at its core, ethics is the study and practice of defining the differences between right and wrong in a given situation. Because of this, ethics often drives our decision-making process, helping us parse out the actions we *should* do from the greater list of actions we *can* do.

In the world of engineering, ethical issues are *everywhere*. As engineers, we are constantly asked to make decisions that could impact countless lives each and every day. Because of this,

it is imperative that all Professional Engineers acknowledge and adhere to their ethical responsibility to protect the health, safety, and welfare of the public.

The Engineers' Creed, adopted by the National Society of Professional Engineers in 1954, provides engineers with the necessary guidance on how to meet these ethical obligations. Similar to the Hippocratic Oath taken by medical professionals, the Engineers' Creed creates an ethical framework that should inform every decision we make as Professional Engineers to ensure that our decisions are in the best interest of the communities we serve. The Engineers' Creed is as follows:

*As a Professional Engineer, I dedicate my professional knowledge and skill to the advancement and betterment of human welfare.*

*I pledge:*

- *To give the utmost performance;*
- *To participate in none but honest enterprise;*
- *To live and work according to the laws of man and the highest standards of professional conduct;*
- *To place service before profit, the honor and standing of the profession before personal advantage, and the public welfare above all other considerations.*

*In humility and with need for Divine Guidance, I make this pledge.*

Given the importance of this Creed to our daily ethical behavior, let's take the time to break down each of these pledges and discuss how the text should guide our ethical behavior.

### *To Give the Utmost Performance*

Our profession demands absolute perfection, and with good reason: a single design error or miscalculation could have disastrous results for our communities. Although our work leaves little room for error, it is important to remember that engineers are not infallible; mistakes happen. As Professional Engineers, it is our responsibility to reconcile these two conflicting realities to ensure that our work always remains above reproach. We do this by committing to give our work our absolute best each and every day.

As Professional Engineers, we encounter countless challenges throughout the course of our careers. While it would be easy for us to blame our shortcomings on others, it is our moral imperative to hold our own work to the highest standards. By holding ourselves personally and professionally accountable for the success of every project we work on, we are always able to strive to do better than our previous best. This, in turn, allows us to learn and grow from our past mistakes and become better people and better engineers.

### *To Participate in None but Honest Enterprise*

Engineers are responsible for shaping the world around us. As Professional Engineers, our communities place their fates in our hands every day with the belief that our work will keep them safe and secure. However, this belief is not unconditional; the implicit trust our communities place in our work is predicated on our professional integrity. Given the central importance of integrity to our work as a Professional Engineer, it is our ethical responsibility to ensure that we earn this trust from our communities by maintaining our credibility through honest, high-quality work.

### *To Live and Work According to the Laws of Man and Highest Standards of Professional Conduct*

With great power comes great responsibility. As shapers of the modern world, we as engineers must acknowledge that the work we do today will directly impact an incalculable number of people throughout our lifetimes and beyond. This burden is heavy and highlights the necessity for the highest standards of professional conduct in our ethical behavior. As Professional Engineers, we must always hold ourselves to the highest of standards and avoid damage to others at all costs to preserve our professional integrity.

### *To place service before profit, the honor and standing of the profession before personal advantage, and the public welfare above all other considerations*

All engineers are, to a certain extent, public servants; it is our job to keep our communities safe in their day-to-day interactions. As Professional Engineers, we must always work with this in mind and never compromise our service, honor, or the welfare of the public for profit or personal interests. By acknowledging that we have the responsibility to do the *right thing* no matter what we may have the *right to do*, we are able to better ourselves and our profession.

## **3.0 Introduction to the Project Management Triangle**

Now that we've covered the core concepts of engineering ethics let's switch gears for a moment and take some time to introduce a new topic that will help us create our construct for ethical project management: The Project Management Triangle.

The Project Management Triangle is a concept that describes the proportional relationship between the three primary constraints of any project: cost - the project's budget, scope - what it is that the client/owner will be getting in terms of specifications, quality, etc., and schedule - how long it will take. By using this model, we can see that these three constraints are interconnected and, therefore, must always be balanced carefully in order to avoid any unexpected changes to

our plans. Without careful consideration, for example, a gain in one aspect of the project (e.g., cost savings) may necessitate a loss in another aspect of the project (e.g., reduced quality, slower installation, etc.) with unintended consequences.

Your success as a project manager hinges on your ability to balance these three constraints to deliver the scope your client has requested within the time and cost allocated. Challenges typically arise when, after the three components are set (e.g., budget is agreed upon, the construction documents are complete, and the schedule is set), an external force puts one of the components into motion (e.g., the price of steel escalates and the material has not yet been bought). In these moments, the project manager is left to analyze tradeoffs to bring the project back into balance – but are cost, scope, and schedule the only components that a Professional Engineer “project manager” should be considering?

## 4.0 Ethics and the Project Management Triangle

Both the Engineers’ Creed and the Project Management Triangle provide Professional Engineers with a framework for understanding and solving complex problems in their day-to-day work by helping them define what they can or should do in a given situation. By helping to answer these distinctly different questions, these two tools should be used together to help us determine the most ethical course of action possible. So how can we apply these concepts to our work to produce better outcomes for our clients and communities?

I would argue that we must start by looking at ourselves. As Professional Engineers, we are trained as elite problem solvers and are often rewarded in our technical work for thinking through solutions in a binary fashion – yes/no, right/wrong, stop/go. Despite its many benefits in our day-to-day work, this absolute mentality may prevent us from seeing the bigger picture when faced with ethical challenges. Shying away from an ethical challenge to focus on the technical aspects (e.g., our comfort zone) of cost, scope, and schedule could prove problematic if, for example, there is no “right” tradeoff because the construct of the problem was unethical to begin with. That is why, before a Professional Engineer “project manager” can begin to study the tradeoffs between budget, scope, and schedule via the Project Management Triangle, they must first study the ethics involved. Failure to examine these ethical implications could lead any Professional Engineer down a dangerous path.

To drive this point home, let’s look at two case studies.

## 5.0 Case Study #1

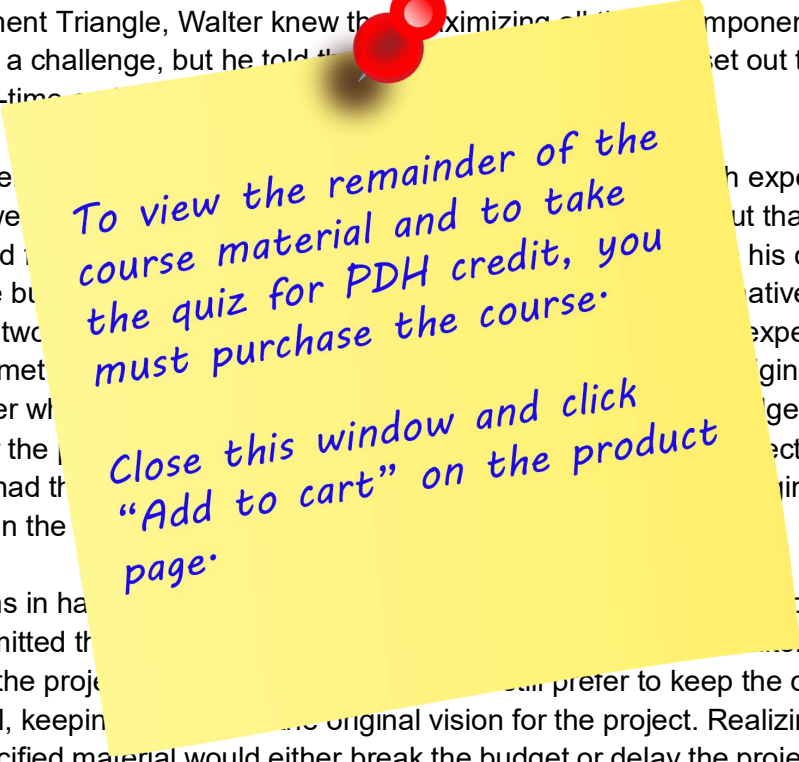
Meet Walter. After celebrating his six-year work anniversary at a small engineering firm in Texas, Walter was eager to take on more responsibility around the office and decided to take his Principles and Practice of Engineering exam to help advance his career. A couple of months after passing the exam and receiving his Professional Engineering license, Walter was assigned to manage the design of a new wilderness trail in his hometown.

At his first client meeting, the town board indicated that they had a very strict budget for the project, with no contingency allocated for surprises. They also told Walter that the town was looking for both a high-quality trail that matched the general aesthetics of the town itself and that they wanted to have the project completed in twelve months. Based on his understanding of the Project Management Triangle, Walter knew that maximizing all three components of the project at once would be a challenge, but he told the town board that he would set out to deliver a high-quality project on-time.

Walter worked tirelessly to find a solution that met the town's expectations. However, three weeks later, the town board informed him that the material originally specified was no longer available. Realizing that the budget was a strict constraint, Walter came up with two alternative options. He found a different supplier who could provide the material at a price within his client's budget, but it would not be able to deliver the product for several months. He also found a more expensive alternative that could deliver the product on-time but would not be able to meet the town's budget. Using the Project Management Triangle, Walter had to balance the cost of the project back within the town's budget.

With these options in hand, Walter presented them to the town board for their opinion. The architect admitted that the original material was not found and that the project would not technically meet the project requirements if they kept the originally specified material, keeping the project on the original vision for the project. Realizing that keeping the originally specified material would either break the budget or delay the project, Walter went to the town administrator for their feedback. During their conversation, the town administrator eventually relented and told Walter that the town would ultimately be willing to consider extending the project deadline if it meant staying within their budget.

With this conversation, it appeared that a solution had materialized: Walter could order the original material from the different supplier who could guarantee him a price within the budget, but would not be able to deliver the product for several months. With this solution, Walter would be able to bring the project back within budget and adhere to the architect's desire to maintain the originally specified material. The schedule of the project would slip; however, Walter was able to confirm with the town administrator that this would be the "lesser of two evils" and that the town would agree to the delay so long as the project came in within budget.



*To view the remainder of the course material and to take the quiz for PDH credit, you must purchase the course.*

*Close this window and click "Add to cart" on the product page.*