Engineering Design – Defining the Problem

The first step in the engineering design process is to define your problem. The simplest way to do this is to simply state the problem you are attempting to solve. But there can be more to defining the problem than just simply stating it. What kinds of expectations do you have for your solution? What kinds of limitations exist? Taking all of this into account can be included in defining your problem.

Many engineering projects begin with a design brief. This is a short write-up that would include the goal of your project and the specifications. To help you with this you will also want to conduct additional research about the problem so you can see what solutions have already been designed or attempted.

The specifications of your project will set the stage for the types of solutions you will be coming up with. For example, you could ask yourself questions about:

- Cost
- Safety
- Effectiveness
- Efficiency
- Legality

You may come up with even more categories that are important based on your specific problem. The answers to these questions will help you define which of the solutions that you come up with are best given your specifications.

This sheet will help you define your problem and the requirements for your solution. You should not answer these with a specific solution in mind, this is intended to help you narrow down the characteristics of possible solutions.

What problem do you intend to solve?

What are your expectations and limitations for your project?

What are your cost restrictions?

What types of safety precautions must be taken?

How effective must your solution be? (i.e. does it need to solve the problem 100% or will it simply address certain aspects of the problem?)

How efficient must your solution be? (i.e. how much power will be used? How quickly will this work?)

What kind of laws are in place concerning solutions to the problem?

Are there any other limitations or expectations do you have for your solution?

What other solutions have already been tried to solve the problem you intend to address? (You should conduct your research before answering this question. Be sure to cite your sources.)