

# Writing 50E (Bradley)

## Assignment #B— Engineering Design

The engineering design section is the heart and soul of your proposal. Using both text and graphics, it describes how your proposed product or service works, including form and function, material selection, parts, and testing.

### Description of the Assignment

The engineering design section of your proposal should consist of a minimum of 5–6 double-spaced pages of text, plus support graphics. Be sure to include the following elements:

- *Overview*: Draft a one-page (maximum) summary of your product or service. What is it and how will it work? Stick to the “broad strokes” and save fine details for later sections (see below). After reading the overview, your reader should have a basic understanding of what you are proposing.
- *Description*: Both products and services share some similar design elements; however, there will be different emphases, depending upon your project. Read the points below for both products and services, then address as many of them in your engineering design as possible.

If you are designing a **product**, include the following:

§ Design essentials: Include basic drawings and a detailed textual description, answering the questions, “How does it work?” and “How will the customer use it?”

§ Materials selection: Which materials will you select and why? Which materials did you reject and why? What are their properties and characteristics? Make a crude bill of materials (BOM), listing major components and sub-assemblies.

§ Manufacturing. How will your product be manufactured? Which processes will be used (casting, molding, machining, etc.)? Will your product be manufactured domestically or built “offshore?” Why?

§ Testing and quality assurance. How will you test your product to ensure quality and safety?

If you are designing a **service**, include the following:

§ Ordering. Describe the customer experience, answering the questions, “How does it work?” and “How will the customer use it?” Include schematic-block drawings and/or flowcharts or “mind maps” to describe your service.

§ Processing. How are orders processed? What system will you use to accept, track and conclude a transaction?

§ Distribution. How is your service distributed? Explain delivery and communications.

§ Billing. How does the customer pay you? Will you offer financing? Show a typical billing invoice, explaining how data are generated and processed.

§ Testing and quality assurance. How will you test your service to ensure quality and safety?

## ***Headings / Sub-headings***

Be sure to use headings and subheadings to organize sections and sub-sections of your engineering design section. These should visually stand out in the text by enlarging the font, bolding, italicizing, underlining, etc., and help readers navigate your proposal.

## ***Appendix***

Your final proposal will include an Appendix for extra materials you may have downloaded that help explain your product or service. This extra material can be cited in various sections of your proposal, including the engineering design section. For example, if your product is a motorized skateboard, you might call out a specific motor and its key specifications in your engineering design section, then include any downloaded product materials in your Appendix:

[...] After a rigorous product review of DC motors, the Baldor Model X123 motor was selected for the final design of the PowerSkate motorized skateboard. With a torque of X Newton-meters, yet drawing a minimum amperage of Z A., the Model X123 seems ideally suited to the demands of a battery-powered skateboard. The motor includes a 24-month OEM factory warranty, which supports our design objective of providing an unconditional, one-year product guarantee. For detailed manufacturer specifications of the Baldor Model X123 motor, the reader is directed to Appendix section A3. [...]

## ***Cite Sources!***

The engineering section (and all other sections) should source all cited data, statistics, and/or expert interviews. Sources should be compiled into a list of references at the end of each section, or you can compile sources together at the end of your final proposal in a single, unified bibliography.

Cite sources as you go, for example:

[...] Stainless steel was selected over aluminum as a superior material for the trucks of the PowerSkate motorized skateboard. With a tensile strength of XYZ lbs and a Young's Modulus of abc (*Mark's Handbook*, 2007), #303 stainless steel ensures that torque transmitted from the motor will be coupled to the wheels while avoiding material failures due to vibration and shock. The rust resistance of stainless also recommends it as a weatherproof material. In contrast, aluminum has a tendency to steadily oxidize in the presence of water, resulting in gradual material strength loss and eventual failure (Alcoa Aluminum Designers Reference, 1999). [...]

In the bibliographic section of this proposal, both *Mark's Handbook* and the Alcoa Aluminum Designer's Reference would be listed, along with other sources.

You may use any bibliographic style you wish (APA, MLA, Chicago, CSE) as long as it is consistently applied throughout your proposal.