10 Stages Of the Engineering Design Process

By: Oklahoma Robotics

(http://okrobotics.com/)
Design (Definition)

- The process of originating and developing a plan for a new object
- Requires research, thought, modeling, interactive adjustment, and re-design
1. Identify the Problem

- Engineers are Problem Solvers
- Understand the scope and the nature of the problem
- Identify the correct issues and background of the problem
2. Define Working Criteria and Goals

- Establish preliminary goals
- Develop working criteria to compare possible solutions
  - Specifications
  - Constraints
3. Research and Gather Data

- Stay consistent with working criteria while researching
- Use resources to help research including: Internet, Library, newspaper, etc.
- Keep info found through all steps of the design process and add to it
4. Brainstorm and Generate Creative Ideas

- Develop as many creative ideas as possible
  - No idea is a bad idea
  - Document all ideas
  - Combine ideas to create new ideas
  - Do not evaluate
- If time permitted, hold a second session to give people time to consider additional options
- Goal: Long list of ideas!
5. Analyze Potential Solutions

- Eliminate duplicate ideas
- Clarify ideas
- Select ideas to analyze in more detail
  - Qualitative analysis
  - Quantitative analysis
  - Democratic analysis
6. Develop and Test Models

- Develop models for the selected solutions
- Types of models: descriptive, functional, mathematical, computer, and scale.
- Test each model against working criteria and goals
- Test for functionality and performance
7. Make the Decision

- Evaluate the results of testing to determine the solution to use.
- If none of the solutions are ideal, return to stage 4 or 5.
- Once a solution is selected, continue to stage 8.
8. Communicate and Specify

- Document the design’s specifications and measurements and communicate to all groups
- Communication between groups is especially important in this stage
  - Meetings
  - Presentations
  - Reports
  - Drawings
9. Implement & Commercialize

- Final design revisions
- All groups should agree on the proposed project, including: Management, Technical, Business, and legal support representatives
- Production
10. Post-Implementation Review and Assessment

- Review the product’s performance
- Assess the product’s strength and weaknesses and document
- Make suggestions for future improvements
Source Citation