



# 10 Stages Of the Engineering Design Process

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# 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

- Gomez, Alan. Oakes, William. Leone, Les. *Engineering Your Future*. Great Lake Press, Inc. 2004. p. 352-363.

