



# The Engineering Design Process

# Ten Stages of the Engineering Design Process

1. Identify the problem you need to solve
2. Determine the goals and objectives of the project
3. Conduct background research
4. Hold a brainstorming session
5. Evaluate possible solutions
6. Develop a testing program of the solutions
7. Decide on the best solution
8. Finalize the design
9. Implement the design
10. Review the effectiveness of the design after implementation

# Stage 1: Identify the Problem

- ◆ Make sure the problem is clearly defined
- ◆ Identify who or what is available to help solve the problem

# Stage 2: Determine the goals and objectives of the project

◆ Decide what is most and least important

◆ Factors

- Cost
- Safety
- Ease of use
- Durability
- Appearance
- Size
- Weight
- Constructability
- Time

# Stage 3: Conduct background research

- ◆ Do your Homework. Find out what has already been done.
- ◆ Some resources to consider
  - Library (Books, magazines, journals)
  - Internet
  - Television
  - Other engineers in your company
  - Other engineers not in your company

## Stage 4: Hold a brainstorming session

- ◆ Generate as many ideas as possible
- ◆ Be positive. Do not evaluate or rule out ideas at this stage.
- ◆ Write the ideas down

# Stage 5: Evaluate possible solutions

- ◆ Narrow down the list from the brainstorming session
- ◆ Refer back to Stages 1 and 2.
- ◆ Do the possible solutions solve the problem and meet the goals and objectives of the project?

# Stage 6: Develop a testing program of the solutions

- ◆ Make the design work or find out if it won't work
- ◆ Develop testing models
  - Mathematical models using engineering principles and design guidelines
  - Computer simulations
  - Experiments

# Stage 7: Decide on the best solution

- ◆ Based on what was discovered in Stage 6, decide which solution best solves the problem (Stage 1), and meets the goals and objectives of the project (Stage 2)

# Stage 8: Finalize the design

- ◆ Complete all refinements to the design
- ◆ Develop a set of working drawings which will be used to manufacture the product
- ◆ Complete any reports or technical documents for the design
- ◆ Give presentations on your design

# Stage 9: Implement the design

- ◆ Begin production, advertising, and distribution

# Stage 10: Review the effectiveness of the design after implementation

- ◆ Determine if the finished product performed as expected
- ◆ Did it solve the problem?
- ◆ Did it meet the goals and objectives of the project?
- ◆ What improvements could be made in the product and in the design process?