Initial Design Phase

PL ET 497E

Initial Design

- Most Important Phase
- Gather all information from customer
- Several Designs may be proposed and investigated
- Customer must be actively involved in the preliminary designs
- Material selection

Roles in Design Process

- Sales Engineer
  - Representative of Customer
  - Interface between design team and customer
  - Should be involved in decision making process
Roles in Design Process

- **Design Engineer**
  - Make sure design is optimum
  - Lowest part/material cost
  - Part will perform to specifications

- **Industrial Engineer**
  - Fit/Feel of Product
  - Ergonomics

- **Manufacturing Engineer**
  - Can the part geometry in the mold be manufactured
  - Cost of manufacturing

- **Mold Designer/Tool Maker**
  - Mold that makes the best part in the shortest amount of time (lowest cycle & lowest cost)

- **Process Engineer**
  - Find the best process that results in the lowest cycle.
Roles in Design Process

- All members have different outlooks on how to get to the final product
- All have the same overall goal
  - To make the best product

Roles in Design Process

- Traditional Process
  - Linear
- Concurrent/Team Based Engineering
  - All involved from the start

Identify Customer Needs

- Client
- Designer
- User
Identify Customer Needs
- Gather Data from Customer
- Interpret Customer Needs
- Organize
  - Primary, Secondary, ...
- Rank Importance of Needs
- Reflect on Results
- Define "Mission Statement"

Identify Customer Needs
- Break Problem into Sub-Problems
- Responsibility Tree
- Project Management
- Paper Trail

Product Attribute List
- Desired Features
- Product Function
- Similar Products?
Product Attribute List

- For Each Feature:
  - What Does This Mean?
    - To the Product
  - How Will We do That?
  - Why do We Want That?

CAE in Initial Design

- Not very useful in developing preliminary concepts
- 2D Layout for concepts
- Solids Modeling not as useful
- Hand Sketches better at developing initial concepts

CAE in Initial Design

- Solids Model - Once a design concept has been formalized
  - Design for Manufacturing
    - Parting Line
    - Draft
    - Potential Gate locations
    - Ejection
CAE in Initial Design

- CAE Tools
  - Mold Advisor /Part Advisor
  - Pro/Mechanica - Design Optimization
  - Built into CAD Package