Lab Section Lectures

ME 481

Mehrdad Ghasemi Nejhad, Professor

Department of Mechanical Engineering
University of Hawaii at Manoa
2540 Dole Street, Holmes 302
Honolulu, HI 96822

- **Designing a System:**
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- System ----→ Subsystem ----→ Components ----→ Parts

  Example:

- Automobile----→ Engine----→ Pistons Assembly ----→ Piston, Rings, Pins, etc.

Finalize the Design Teams with the following Officers

- Project Manager: PM (Managerial)
- System Integrator: SI (Technical)
- Fiscal Manager: FM
- Marketing Manager: PM
- Competition Manager: CM

Subsystem Groups with the following Officers

- Subsystem Lead
- Subsystem Co-Lead

• I. RULES OF BRAINSTORMING:

a) Criticism is ruled out

b) The wilder the idea, the better the outcome

c) Quantity is needed

d) Participants should seek ways to improve the proposed ideas

• II. ORGANIZATION OF A BRAINSTORMING SESSION:

a) A one-page outline of information about the session should be given to panel members a few days before the session

b) The problem to be brainstormed should be defined

c) A moderator (not a leader) should be selected to be in charge of the session

d) The moderator should not permit long responses that would slow down the flow of ideas

e) Each team member should generate at least three ideas

f) A recorder should produce the list of ideas gathered during the session for distribution among the participants

SELECT BEST IDEAS FROM THE IDEAS GENERATED DURING THE BRAINSTORMING SESSION. USE THE SELECTED IDEAS OR THE MODIFICATION AND/OR COMBINATION OF THE IDEAS

Decision Making Matrix (DMM)

Example:

Manufacturing of a Crane Hook for a Ladle

Decision Making Matrix for a Crane Hook

$\Sigma w_r = 1.0$ (sub objective) & $\Sigma w_t = 1.0$ (level)

Score: is based on Approach II (i.e., rank order, 0-10)

Value = Weight factor * score

Lets say from objective trees

Objective	Weight factor (w_r or w_t)	Parameter	Built-up plates:welded			Built-up plates riveted			Cast hook		
			Magnitude	Score	Value	Magnitude	Score	Value	Magnitude	Score	Value
Material cost	0.10	¢/lb	25	8	0.8	25	8	0.8	20	9	0.9
Manufacturing cost	0.20	$	1500	7	1.4	1200	9	1.8	2000	4	0.8
Time to produce	0.05	hours	40	7	0.3	25	9	0.4	60	5	0.2
Durability	0.15	experience	high	8	1.2	high	8	1.2	good	6	0.9
Reliability	0.30	experience	good	7	2.1	excellent	9	2.7	fair	5	1.5
Repairability	0.20	experience	good	7	1.4	very good	8	1.6	fair	5	1.0
Overall utility value	1				7.2			8.5			5.3

FIGURE 3-15
Decision matrix for the crane hook design.

Gantt Chart/Project Scheduling

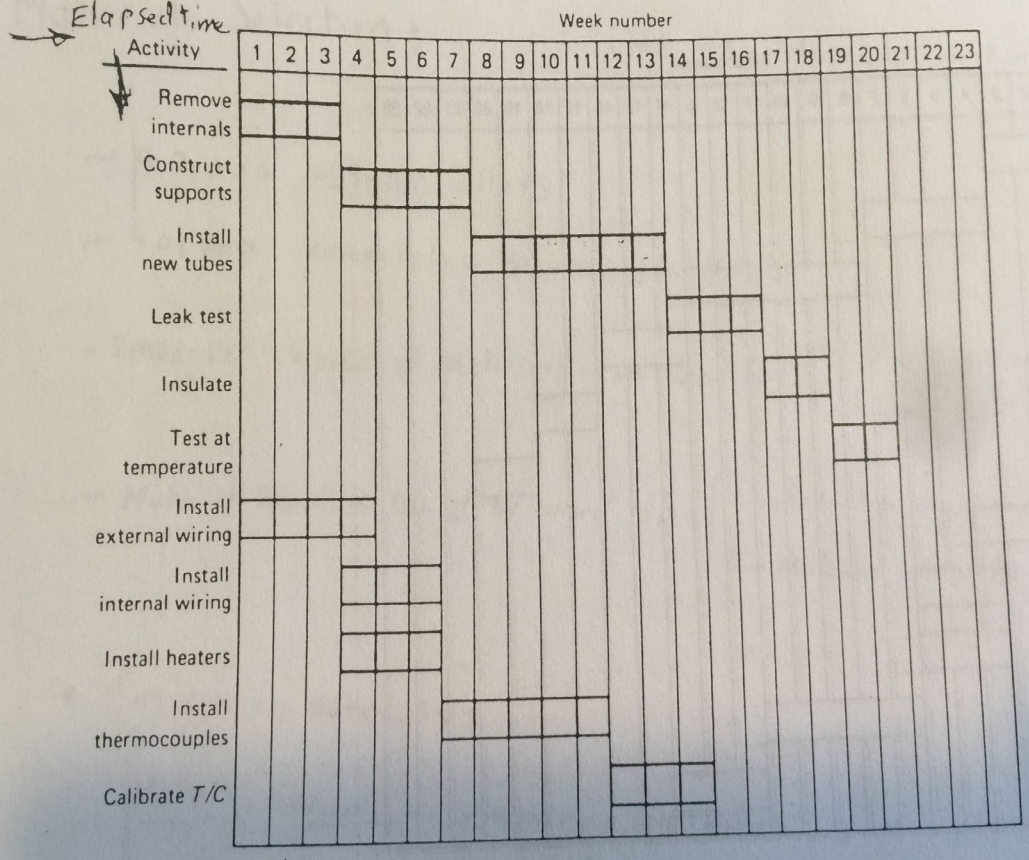

FIGURE 10-1
Bar chart for prototype testing a heat exchanger. (Gantt Chart)

Budget

System	Items	Est. Cost	Actual Cost	Vendor Info
Subsystem 1				
Subtotal 1				
Subsystem 2				
Subtotal 2				
ETC.				
Subtotal				
Margin (10%)				
Total				