APPENDIX MATERIAL FOR FIE PAPER 96-320

PRODUCT DISSECTION **- A Tool for Benchmarking in the Process of Teaching Design**

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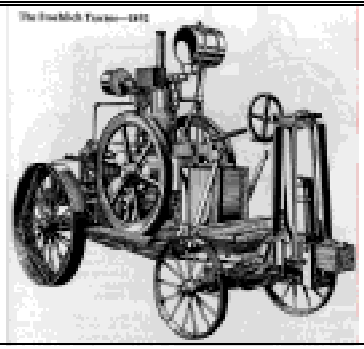
APPENDIX: Course Outline and Benchmarking Assignments

Appendix A-1 ME 395 Course Outline

DEPARTMENT OF MECHANICAL ENGINEERING **ME 395 Introduction to Design** **Winter Quarter 1996** **COURSE SCHEDULE**	
Monday , January 1 **Recovery day!** Watch Bowl Games, eat chips and relax	**Wednesday , January 3** **Discuss:** 1) The usual first day stuff. Course objectives, overview of activities .. 2) What is design & the design process **Quiz #0** Who are you? **Exercise:** Working In Teams **Assignment:** HW #1, Design #1; The Bird Feeder **Reading:** Chapters 1 and 2 (skim) **Handout:** Drill Survey & Consumer Report
Monday, January 8 **Discussion:** 1) The design process and communicating the design **Exercise:** Review the bird feeder design and provide production drawings **Assignment:** Drill dissection exercise **Reading:** Chapter 3 (skim) **Handout:** Design for assembly (Boothroyd) **Due:** HW #1**,** The bird feeder design	**Wednesday , January 10** **Discussion:** Design for Assembly **Exercise:** Drill Dissection **Reading:** Chapter 15 (skim) Patents: pp. 93-95 and 631-40
Monday , January 15 **M. L. King Birthday (Holiday)**	**Wednesday , January 17** **Discussion:** Intellectual Property Rights and Patent Law Guest Lecture: Gregory Haut, @ UW **Handout:** Notes on Patents (G, Haut) **Reading:** pp. 106 - 114, and 128 - 138 **Due today:** Drill Dissection Report & Discussion

Monday , January 22 **Discussion:** Library Tour Review of FR's, FC's & DP's **Assignment:** HW #2, Bird Feeder Patent Assignment **Handout:** Product Benchmarking Dissection Exercise Hand Held Mixer Pre-lab	**Wednesday , January 24** **Discussion:** Industrial Design and Design Patents; (93-96) Guest Lecturer: Indle King Corporate Design Mgr. Fluke Mfg. **Exercise:** Mixer market survey **Reading:** Chapter 8
Monday , January 29 **Discussion:** Engineering Economics **Exercise:** Cost analysis (Bird feeder) **Assignment:** Bird Feeder Cost Analysis (in-class) **Reading:** Chapter 5 (skim), Chapter 9 **Due today:** Mixer Market Survey	**Wednesday , January 31** **Discussion:** Engineering Economics **Exercise:** Hand Held Mixer Dissection **Assignment:** Hand Held Mixer Re-design (4 -5) **Reading:** pp. 606 - 610, Chapter 9 **Due today:** Hand Held Mixer Pre-lab (1- 3)
Monday February 5 **Discussion:** Bechmarking & Hand Held Mixer Re-design Project (pp. 91 -93) **Exercise:** **Test #1;** Design Process **Assignment:** Hand Held Mixer Redesign Teams **Handout:** Benchmarking Notes **Due today:** Hand Held Mixer Re-design (4 -5)	**Wednesday , February 7** **Discussion:** Design DFA The HP Ink Jet Printer Guest Lecture: Randy Krauter, Senior engineer, HP Vancouver Division **Assignment:** HW #3 Software Economics Problem **Reading:** pp. 342 - 344, 606 - 610, Chapter 12 **Due today:** Bird Feeder Patent Write-up
Monday February 12 **Discussion:** Review Hand Mixer Redesign Design Axiom and Analysis **Exercise:** Software Problem Spread Sheet **Handout:** N. Suh, Chapters 2 & 3 **Due today:** Hand Mixer Dissection Report **Assignment:** HW #4 Design Problem #2 (Faucet)	**Wednesday , February 14** **Discussion:** Design Axiom and Analysis **Exercise:** Create the Hand Mixer Design Data Base. Start Hand Mixer Re-design **Due today:** HW #3 Software Econ. Problem, Part 1 **Assignment:** HW #3 Software Econ. Problem, Part 2
Monday February 19 **Presidents' Day Holiday**	**Wednesday , February 21** **Discussion:** Product liability and product law Guest Lecturer: Robert Scheibe Failure Analysis Associates **Exercise:** Present Software Econ. Problem Part 2 **Due today:** HW #3 Software Econ. Problem, Part 2 **Assignment:** HW #5 Design Problem #3 (See-Saw)
Monday February 26 **Discussion:** Ethics/ The true steel affair **Exercise:** **Test #2** Functional Requirements & Concept Design Analysis Re-Design of Hand Held Mixer **Due today:** Outline of Mixer Redesign Report	**Wednesday , February 28** **Discussion:** Communicating Your Design **Exercise:** Re-Design of Hand Held Mixer **Due today:** HW #4 Design Problem #2 (Faucet)
Monday March 4 **Exercise:** Re-Design of Hand Held Mixer	**Wednesday , March 6** **Exercise:** Re-Design of Hand Held Mixer **Due today:** HW #5 Design Problem #3 (See-Saw)
Monday March 11 **Presentation:** 2:30 PM Mixer Redesign **Finals Week**	**Wednesday , March 13** **Due today:** Mixer Product Redesign Report is due at 5:00 PM in ME Main Office. **Finals Week**

Appendix A-2 Benchmarking Assignment

DEPARTMENT OF
MECHANICAL ENGINEERING

ME 395 Introduction to Design
Winter Quarter 1996

Hand Held Mixer Pre-Lab

Assigned:
Monday, January 22, 1996

Dissected Hand Held Mixer

Interdepartmental Memo

To: Hand Held Mixer Product Group

From: Jens Jorgensen, V. P Product Development
James Fridley, V. P. Marketing & Products Sales
Quality Home Products Company

Subject: Hand Held Mixer Products Line

Due to sagging sales over the Holiday Season the company is considering a re-design of our current marked line of hand held mixers. To provide input to this process we suggest that we use the competitive bench marking process as starting point for the re-design effort.

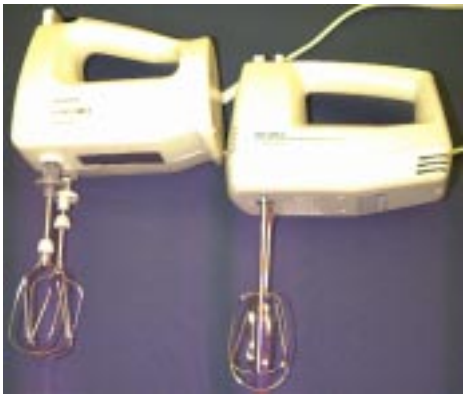
The enclosed material should be a guide to the marketplace response to the current product lines. we suggest the following approach:

1) A market survey of current products (see next assignment)
2) Selection of representative products in both the price and performance ranges we currently produce
3) Dissection of each product selected in (2) above
4) Determine the best practices in all the comparison group
5) Working with marketing determine the functional, operational, and cost parameters that will make us competitive
6) Translate the data in (5) to the new design specifications
7) Provide a re-design of our product line by first week in March, 1996

Due dates: Steps #1 through #3 by Wednesday, January 31st, 1996
Step #4 by February, 1996
Steps #5 through #6 by February 12, 1996

Enclosure: 'Portable mixers with a difference', Consumer Reports, July 1991

Appendix A-3 Define Customer Expectations

DEPARTMENT OF **MECHANICAL ENGINEERING** **ME 395Introduction to Design** **Winter Quarter 1995** **Hand Mixer Benchmarking** **Assigned:** **January 22nd, 1996** **Due:** **Beginning of class Wednesday, January 31, 1996**	 **The Hand Held Kitchen Mixer, which is better?**

We want to identify best-in-class features in home kitchen hand mixers [1].

1. Generate a list (as many as you can think of) of features and functions that could possibly be important to the total success of a home kitchen hand mixer.
2. What factors most account for hand mixer user satisfaction? Are there other customers? What factors most account for their satisfaction?
3. What are the major costs (or cost drivers) of hand mixers?
4. Which functions in hand mixers represent the highest fraction of the cost?
5. Which functions have the greatest room for improvement?
6. Which functions have the greatest effect or potential effect for differentiating a hand mixer from other hand mixers?
8. What five factors do you believe will have the greatest impact on the success of hand mixers in the marketplace.
9. How could the five factors be evaluated? What metrics could we use?
10. Identify as many hand mixers (real ones) as you can. Evaluate them (to the extent possible without disassembly) in light of the above.
11. Which hand mixers appear to be leaders in each of the factors or features?

Reference:

1. 'Portable Mixers with a Difference', Consumer Report, July 1991

Appendix A-4 Individual Teams Benchmarking Dissection Report

Department of Mechanical Engineering **ME 395 Introduction to Mechanical Engineering Design** **Hand Held Kitchen Mixers:** **Benchmark Dissection Report** **Due Monday, February 5th, 1996**	

The purpose of your report and presentation are to inform the class about the products you dissected and how they faired relative to the Customer Expectations (or features). As a class we wish to determine the 'Best in Class' and start the assignments for the redesign effort.

Your presentation should not exceed 10 minutes and should make extensive use of visual aids and contain the information requested below:

For each unit dissected:

- Manufacturer
- Model Number
- Technical Information listed on the unit
- Copy of any specification/operations manual
- Sketches and the photos you have made/taken of the device
- Parts list
- A summary dissection sheet (see table below)
- Any comments you made regarding the device and its design and assembly

Copy entries on the above information from your journals

Consumer Expectations (Features)	**Your Dissection #1**	**Yoour Dissection #2**
Controls	•	
Handle	•	
Balance	•	
Power cord	•	
Versatility	•	
Overall sense of quality		
Power		
Tipover stability	•	
Manufactruing: Ease of assembly Materials	•	
Overall appearance	•	
Total weight	•	
Other (add what other features you considered		