



Problem Understanding MCHE 470: Fall 2013

Dr. Joshua Vaughan

Rougeou 225

joshua.vaughan@louisiana.edu

[@Doc_Vaughan](#)

Phases of Design



1. Problem Understanding
2. Specification Development
3. Conceptual Design
4. Detail Design
5. Production Specification
6. Manufacture
7. Disposal

What we'll talk about.
The most nonlinear part.

Machine Design

The entire process is iterative.

Problem Understanding



- Who is the customer?

- end-user?
- reseller?
- sales team?
- ...???



Who *are* the *customers*?

- These customers *will* have some conflicting needs/
demands

Quality Function Deployment



- 1988 Harvard Business Review article
- Developed from study of Kobe Shipyards

Design is a team effort, but how do marketing and engineering talk to each other?

The House of Quality

by John R. Hauser and Don Clausing

Digital Equipment, Hewlett-Packard, AT&T, and ITT are getting started with it. Ford and General Motors use it—at Ford alone there are more than 50 applications. The “house of quality,” the basic design tool of the management approach known as quality function deployment (QFD), originated in 1972 at Mitsubishi’s Kobe shipyard site. Toyota and its suppliers then developed it in numerous ways. The house of quality has been used successfully by Japanese manufacturers of consumer electronics, home appliances, clothing, integrated circuits, synthetic rubber, construction equipment, and agricultural engines. Japanese designers use it for services like swimming schools and retail outlets and even for planning apartment layouts.

A set of planning and communication routines, quality function deployment focuses and coordinates skills within an organization, first to design, then to manufacture and market goods that cus-

tomers want to purchase and will continue to purchase. The foundation of the house of quality is the belief that products should be designed to reflect customers’ desires and tastes—so marketing people, design engineers, and manufacturing staff must work closely together from the time a product is first conceived.

The house of quality is a kind of conceptual map that provides the means for interfunctional planning and communications. People with different

John R. Hauser, at the Harvard Business School as a Marvin Bower fellow during the current academic year, is professor of management science at MIT’s Sloan School of Management. He is the author, with Glen L. Urban, of Design & Marketing of New Products (Prentice-Hall, 1980). Don Clausing is Bernard M. Gordon Adjunct Professor of Engineering Innovation and Practice at MIT. Previously he worked for Xerox Corporation. He introduced QFD to Ford and its supplier companies in 1984.

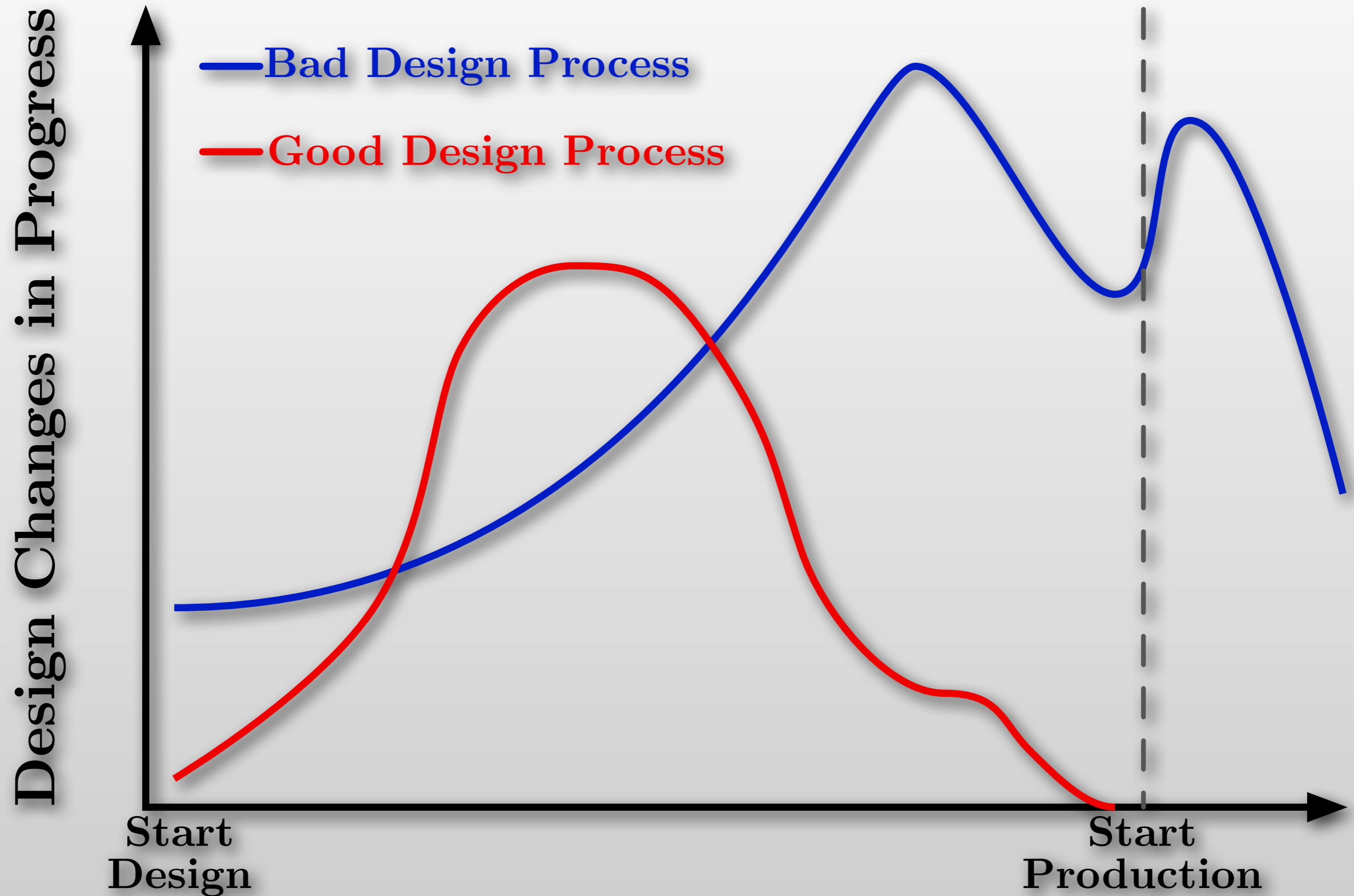
Quality Function Deployment (QFD)



- QFD is a planning tool
 - Customer Needs → Product Dev. Requirements
 - Establishes where time and effort should be focused
 - Establishes where time and effort should ***not*** be focused

- QFD in *not* quality control

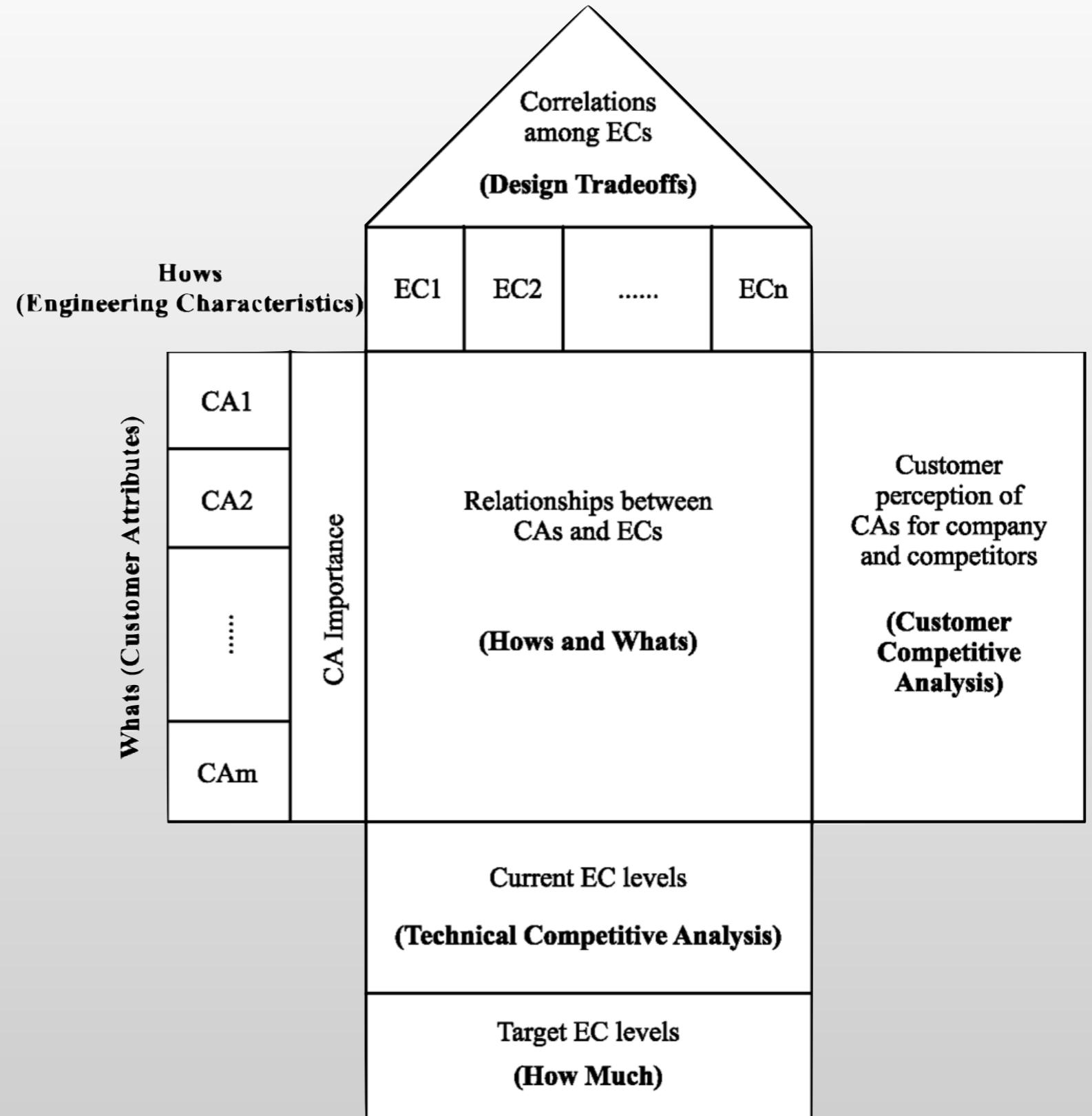
Design Change Comparison



The House of Quality



- A lot of the utility is completing the tool
- A “living” document



The Problem Understanding Form



- The “middle” of the House of Quality

