Quality Function Deployment (QFD)

Outline
- Introduction
- QFD Team
- Benefits Of QFD
- Voice Of The Customer
- House Of Quality
- Building A House Of Quality
- QFD Process
- Summary

Introduction
- Dr. Mizuno, Prof. Emeritus
- Mitsubishi Heavy Industries
  - Kobe Shipyards, 1972
- Toyota Minivans (1977 Base)
  - 1979 - 20% Reduction In Start-Up Costs
  - 1982 - 38%
  - 1984 - 61%
- Dr. Clausing, Xerox, 1984
- Any Manufacturing Or Service Industry

QFD Team
- Significant Amount Of Time
- Communication
- Two Types Of Teams
  - New Product
  - Improve Existing Product
- Marketing, Design, Quality, Finance, Production, Etc.

Benefits Of QFD
- Customer Driven
- Reduces Implementation Time
- Promotes Teamwork
- Provides Documentation

Customer Driven
- Creates Focus On Customer Requirements
- Uses Competitive Information Effectively
- Prioritizes Resources
- Identifies Items That Can Be Acted On
- Structures Resident Experience/Information
Reduces Implementation Time
- Decreases Midstream Design Change
- Limits Post Introduction Problems
- Avoids Future Development Redundancies
- Identifies Future Application Opportunities
- Surfaces Missing Assumptions

Promotes Teamwork
- Based On Consensus
- Creates Communication At Interfaces
- Identifies Actions At Interfaces
- Creates Global View-Out Of Details

Provides Documentation
- Documents Rationale For Design
- Is Easy To Assimilate
- Adds Structure To The Information
- Adapts To Changes (Living Document)
- Provides Framework For Sensitivity Analysis

Voice Of The Customer
- Driving Force Behind QFD
  - Customer Dictates Attributes Of Product
  - Customer Satisfaction
  - Meeting Or Exceeding Customer Expectations
  - Customer Expectations Can Be Vague & General In Nature
  - Customer Expectations Must Be Taken Literally, Not Translated Into What The Organization Desires

Collecting Customer Information
- What Does Customer Really Want?
- What Are Customer’s Expectations?
- Are Customer’s Expectations Used To Drive Design Process?
- What Can Design Team Do To Achieve Customer Satisfaction?

Types Of Customer Information
- Solicited, Measurable, Routine
  - Cus. & Market Surveys, Trade Trials
- Unsolicited, Measurable, Routine
  - Customer Complaints, Lawsuits
- Solicited, Subjective, Routine
  - Focus Groups
- Solicited, Subjective, Haphazard
  - Trade & Cus. Visits, Indep. Consultants
- Unsolicited, Subjective, Haphazard
  - Conventions, Vendors, Suppliers
House Of Quality

Building A House Of Quality
- List Customer Requirements (What’s)
- List Technical Descriptors (How’s)
- Develop Relationship (What’s & How’s)
- Develop Interrelationship (How’s)
- Competitive Assessments
- Prioritize Customer Requirements
- Prioritize Technical Descriptors

QFD Matrix

Customer Requirements (What’s)

Technical Descriptors (How’s)

L - Shaped Diagram
Prioritized Technical Descriptors

- Degree Of Difficulty
- Target Value
- Absolute Weight & Percent
  \[ a_j = \sum_{i=1}^{n} R_{ji} c_i \]
  \( R \) is Relationship Matrix
  \( c \) is Customer Importance
- Relative Weight & Percent
  \[ b_j = \sum_{i=1}^{n} R_{ji} d_i \]
  \( R \) is Relationship Matrix
  \( c \) is Customer Absolute Weights

QFD Process

Phase I
Product Planning

Phase II
Part Development

Phase III
Process Planning
**Phase IV Production Planning**

- **Key Process Operations**
  - Production Requirements
  - Production Launch

**QFD Summary**

- Orderly Way Of Obtaining Information & Presenting It
- Shorter Product Development Cycle
- Considerably Reduced Start-Up Costs
- Fewer Engineering Changes
- Reduced Chance Of Oversights During Design Process
- Environment Of Teamwork
- Consensus Decisions
- Preserves Everything In Writing