Management and Planning Tools

ME – 2110
Creative Decisions and Design

Thomas R. Kurfess, Ph.D., P.E.
HUSCO/Ramirez Distinguished Chair in Fluid Power and Motion Control
Woodruff School of Mechanical Engineering
Georgia Institute of Technology
Atlanta, Georgia USA
8 Management & Planning Tools

- Gantt Chart (1)
- Affinity Diagram (2)
- Interrelationship Digraph (3)
- Tree Diagram (4)
- Prioritization Matrix (5)
- Matrix Diagram (6)
- Process Decision Program Chart (PDPC) (7)
- Activity Network Diagram (8)
Continuous Quality Improvement (CQI)

- Management goal = CQI
- The 8 MP tools are part of the “plan” segment of CQI.
  - Tools encourage the participation and input from more people.
- Tools organize the non-quantitative information from “a chaotic situation [into] an implementable action plan” (p. 7, MJP).
8 Management & Planning Tools

- Gantt Chart (1)
- Affinity Diagram (2)
- Interrelationship Digraph (3)
- Tree Diagram (4)
- Prioritization Matrices (5)
- Matrix Diagram (6)
- Process Decision Program Chart (7)
- Activity Network Diagram (8)
Relationship of 8 MP Tools to QFD

1. Affinity Diagram
2. Interrelationship’s Digraph
3. Tree Diagram
4. Prioritization Matrices
5. Matrix Diagram
6. Competitive Assessment
7. Activity Network Diagram

- Characteristics
- (How) Product Characteristics
- Requirements
- Prioritization
- (What) Customer Requirements
- Interrelationships
- How Much
- Importance
- Target Values
- Importance Ratings

QFD Development Matrices
# Gantt Chart

## Timeline of Required Tasks: Design an Aerial Lift

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3</td>
</tr>
<tr>
<td>Understand Problem</td>
<td></td>
</tr>
<tr>
<td>Study Existing Lifts</td>
<td></td>
</tr>
<tr>
<td>Develop Concepts</td>
<td></td>
</tr>
<tr>
<td>Produce Prototype</td>
<td></td>
</tr>
<tr>
<td>Finalize Design</td>
<td></td>
</tr>
</tbody>
</table>
Affinity Diagram

- **Purpose:**
  - Creative process (generate ideas)
  - Gathers language data

- **Start with:**
  - What is issue under discussion?

- **Then:**
  - Brainstorm ideas

- **Then:**
  - Gather ideas under affinity headings
Affinity Diagram Example

- Reduce Data Entry Complexity

- Improved Training
  - Error Prevention
  - Problem Solving

- Improved Hardware
  - Optical Scanning System
  - On-Line System at Customer Site
  - Voice Activated System
  - Automated Entry

- Friendly Software
  - Inlet
    - Menu Driven
    - Improve Prompts
  - Outlet
    - Display Only Non-Standard Info. On Screen

- Clear Paperwork
  - Standardize completion Format
  - Increase Size to Increase Legibility
  - Train Clerical Sales and Customer Service Personnel
  - Shorten 11-Digit Product Code
  - Color Code Forms by Product Group
  - Forms Contain Only Non-Standard Customer Information
Interrelationship Digraph

- **Purpose:**
  - To show causality between items
  - To identify drivers and bottlenecks
  - Can be used to fill in roof of house of quality

- **First:**
  - Place items to be discussed

- **Then:**
  - Draw arrows between items
  - From \( \rightarrow \) to indicates causality

- **Arrows**
  - Most out arrows \( \rightarrow \) primary: driver
  - Most in arrows \( \leftarrow \) secondary: bottleneck
Issues involved in repeated service calls

- Lack of Knowledge of Job by Subcontractor Interviewer
- Wrong Person Sent
- Lack of Good People
- Lack of Clear Job Expectations by Subcontractor
- Unreasonable Customer
- Wrong Tools
- Lack of Info. on Job
- Lack of Formal Record of What Final Job is
- Lack of Knowledge of Matching People to Job Requirements
- Unclear Customer Expectations
- Advertising Promises
- Lack of Trades Experience in Management
**Tree Diagram**

- **Purpose:**
  - Paths and tasks to accomplish primary goal and its related sub-goals

- **First:**
  - List main what (goal)

- **Then:**
  - List “Hows” (means)
  - These become goals (“Whats”) for next level

- **Continue until you get to assignable tasks**
Tree Diagram Example

- Reduce Data Entry Complexity

  - Improved Training
    - Clerical
    - Sales
    - Customer Service Reps.

  - Improved Hardware
    - Automated Entry
      - Input
      - Output
    - Manual Entry

  - Friendly Software
    - Form
      - Coding System
      - Standardized Completion Format

  - Clear Paperwork
    - Error Prevention Training
    - Sequential Inspection Training
    - Problem Solving Training
    - Optical Scanning System
    - On-Line System at Customer Site
    - Increase Monitor Size
    - Voice Actuated System
    - Menu Driven
    - Improve Prompt
    - Auto Check on Standard price Database
    - Display Only Non-Standard Information on Screen
    - Increase Size to increase Legibility
    - Forms Contain only Non-Standard Customer Information
    - Color Code Form by product Group
    - Shorten 11-Digit product Code
    - More Obvious Difference Among product Groups Codes
    - Train Clerical, Sales and Customer Service Personnel
Prioritization Matrix

- Purpose:
  - To prioritize items by:
    - Prioritization against themselves
    - Prioritization against criteria

- This allows you to focus resources
### Prioritization Matrix (Against Self)

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Sigma C_1$</td>
<td>$\Sigma C_2$</td>
<td>$\Sigma C_3$</td>
<td>$\Sigma C_4$</td>
<td>$\Sigma C_5$</td>
<td>$\Sigma C$</td>
<td></td>
</tr>
</tbody>
</table>

$\Sigma R_1 / \Sigma C$

$\Sigma R_2 / \Sigma C$

$\Sigma R_3 / \Sigma C$

$\Sigma R_4 / \Sigma C$

$\Sigma R_5 / \Sigma C$

Total

$$(+) = 5; (-) = 1/5$$
# Prioritization Matrix (Coffee Example)

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>%</th>
<th>( \Sigma R_i / \Sigma C )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taste</td>
<td>A</td>
<td>X</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>0.2923</td>
</tr>
<tr>
<td>Smell</td>
<td>B</td>
<td>+</td>
<td>X</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>0.3846</td>
</tr>
<tr>
<td>Poisonous</td>
<td>C</td>
<td>-</td>
<td>-</td>
<td>X</td>
<td>+</td>
<td>-</td>
<td>0.1077</td>
</tr>
<tr>
<td>Color</td>
<td>D</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>0.0154</td>
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<tr>
<td>Temperature</td>
<td>E</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>X</td>
<td>0.2000</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>( \Sigma C_1 )</th>
<th>( \Sigma C_2 )</th>
<th>( \Sigma C_3 )</th>
<th>( \Sigma C_4 )</th>
<th>( \Sigma C_5 )</th>
<th>( \Sigma C )</th>
</tr>
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<tbody>
<tr>
<td>5.6</td>
<td>0.8</td>
<td>15.2</td>
<td>20</td>
<td>10.4</td>
<td>52</td>
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</tbody>
</table>

**Total** 100.00

**Reading Across the Rows**

(+) = 5; (-) = 1/5
## Prioritization Matrix (Against Criteria)

<table>
<thead>
<tr>
<th></th>
<th>1 (Hi)</th>
<th>2 (Low)</th>
<th>3 (Hi)</th>
<th>4 (Hi)</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Criteria:**

1 =
2 =
3 =
4 =
**Prioritization Matrix (Coffee Example)**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Value</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taste</td>
<td></td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
</tr>
<tr>
<td>Smell</td>
<td></td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
</tr>
<tr>
<td>Poisonous</td>
<td></td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
</tr>
<tr>
<td>Color</td>
<td></td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
</tr>
<tr>
<td>Temperature</td>
<td></td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
</tr>
</tbody>
</table>

Criteria:
1 = Taste Jury Rating  2 = Smell Jury Rating  3 = LD 50  
4 = Color Spectrum 5 = Burn Level

○ = Strong (9)  O = Medium (3)  △ = Weak (1)
Matrix Diagram

- **Purpose:**
  - To show relations between two sets
  - To show strength of relations

- **Basic types**
  - QFD
  - Job responsibilities
House of Quality
## Matrix Diagram

### Job Responsibilities

<table>
<thead>
<tr>
<th>Job</th>
<th>Person A</th>
<th>Person B</th>
<th>Person C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Job 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Job 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Job 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Job 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Job 6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

○ = Primary Responsibility, O = Secondary Responsibility
△ = Needs To Know
# Matrix Diagram (Interview Example)

## Job Responsibilities

<table>
<thead>
<tr>
<th></th>
<th>Boss</th>
<th>Organizer</th>
<th>Staff person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel</td>
<td>$\Delta$</td>
<td>$\circ$</td>
<td>$\circ$</td>
</tr>
<tr>
<td>Pick Date</td>
<td>$O$</td>
<td>$\circ$</td>
<td>$\Delta$</td>
</tr>
<tr>
<td>Schedule</td>
<td>$\Delta$</td>
<td>$\circ$</td>
<td>$O$</td>
</tr>
<tr>
<td>Benefits Discussion</td>
<td>$\circ$</td>
<td>$O$</td>
<td>$\Delta$</td>
</tr>
<tr>
<td>Dinner</td>
<td>$O$</td>
<td>$\Delta$</td>
<td>$\circ$</td>
</tr>
<tr>
<td>Follow-Up</td>
<td>$\circ$</td>
<td>$O$</td>
<td></td>
</tr>
</tbody>
</table>

$\circ$ = Primary Responsibility, $O$ = Secondary Responsibility

$\Delta$ = Needs To Know
Summary

- Management and planning tools allow you to:
  - Plan more formally
  - Organize information
  - Deal with qualitative information
  - Show relations between items and issues

Use Them!!!