Dentist's Office

- **Receptionist**: 3 patients/hour (12 patients/hour = 25% Capacity Utilization)
- **Hygienist**: 3 patients/hour (4 patients/hour = 75% Capacity Idle)
- **Dentist**: 3 patients/hour (6 patients/hour = 50% Capacity Idle)
- **Appointment Secretary**: 3 patients/hour (20 patients/hour = 15% Capacity Idle)

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Capacity Utilization

- Three Ways to Change Capacity Utilization (efficiency approach):
  - Change the Capacity Required (Demand)
  - Change the Time Available
  - Change the Processing Time

- Effectiveness approach
More Org. Performance Measures

- **Customer Satisfaction**
  - Customer Retention/Loss
  - New Customers
  - Sales Volume and Market Share
  - Complaints
  - ??????? – good measures??

- **Sears study – customer complaints**
More Org. Performance Measures

- Customer Cancellation and No-Show Rates
- Employee Satisfaction
- Flexibility/Bandwidth of the Organization – Agility
- Surveys
Measuring Yield

Yield(%) = \frac{\text{Good Outputs}}{\text{Total Outputs}}

Yield(%) = \frac{\text{Number of Sales}}{\text{Number of Calls}}

Yield(%) = \frac{\text{Number of Sales}}{\text{Number of People Who Visit Website}}
More Measures

- Dependable Delivery
- Waiting Time
- Financial Measures
- ???
From Last Time...

1. QFD
2. DOE
3. SPC
Some Philosophical Basics

- **Old View**
  - Quality & Productivity conflict

- **Deming**
  - Improve constantly and forever the system of production and service, to improve quality and productivity, and thus constantly decrease costs

- **New Philosophy**
- **Role of Management**
Taguchi's Loss Function

- Quality Loss - "Loss imparted to society during product use as a result of functional variation and harmful effects."
Variation

- **Focus on variation in function**
  - Outer Noise - external source effects
  - Inner Noise - internal changes
  - Variational Noise: Process uncertainties

- **Process variation**
  - Common cause variation affects every service process outcome – often produce normal pattern of variability
  - Special cause variation
Importance of Quality

- Must produce goods and services that are desired by customers, rather than sell just what we produce – requires a customer focus

- Benefits
  - Improved Customer Loyalty
  - Higher Market Share
  - Improved competitive position (cost, profit)
Quality Design

- **Quality Function Deployment (QFD)**
  - Developed in Japan to provide customer input at the product design stage
  - The process results in a matrix, referred to as a “house of quality”, for a particular product that relates customer attributes to engineering characteristics.
  - Can use to find the features of the service process
## Service Package Features

<table>
<thead>
<tr>
<th>Service Package Feature</th>
<th>Attribute or Requirement</th>
<th>Measurement</th>
<th>Nonconformance Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supporting facility</td>
<td>Appearance of building grounds</td>
<td>No flaking paint</td>
<td>Repaint</td>
</tr>
<tr>
<td></td>
<td>Air-conditioning and heating</td>
<td>Green grass</td>
<td>Water grass</td>
</tr>
<tr>
<td>Facilitating goods</td>
<td>TV operation</td>
<td>Reception clear in daylight</td>
<td>Repair or replace</td>
</tr>
<tr>
<td></td>
<td>Soap supply, Ice</td>
<td>Two bars per bed</td>
<td>Restock</td>
</tr>
<tr>
<td>Explicit services</td>
<td>Room cleanliness, Swimming-pool water purity, Room appearance</td>
<td>Stain-free carpet, Marker at bottom of deep end visible, Drapes drawn to width of 3 ft</td>
<td>Shampoo, Change filter and check chemicals</td>
</tr>
<tr>
<td>Implicit services</td>
<td>Security, Pleasant atmosphere, Waiting room</td>
<td>All perimeter lights working, Telling departing guests “Have a nice day”, No customer having to wait for a room</td>
<td>Replace defective bulbs, Instruct desk clerk, Review room cleaning schedule</td>
</tr>
</tbody>
</table>
Quality Service Implementation

- **Poka-yoke (fail-safing) (idiot-proofing)**
  - Shingeo Shingo: low-cost, in-process, quality-control mechanisms and routines can achieve high quality without costly inspection
  - Errors occur, not because employees are incompetent, but because of interruptions in routines or lapses in attention
Quality Service Implementation

- **Poka-yoke Examples**
  - Height bar at amusement park
  - French fry scoop at McDonald’s
  - Bank teller’s eye-contact requirement
    - enter customer’s eye color on a checklist
  - Automatic spell checking in word processing software