

### Process Charts

- **Process chart:** An organized way of documenting the activities performed by a person or group of people at a work station, with a customer, or on materials.
- Five categories of process charts:
  1. Operations that change, create or add something.
  2. Transportation (materials handling): Moving something.
  3. Inspection: Checking or verifying something.
  4. Delays: Time spent awaiting further action.
  5. Storage: When something is put away until a later time.

© 2007 Pearson Education

## Process Chart for an Emergency Room Admission

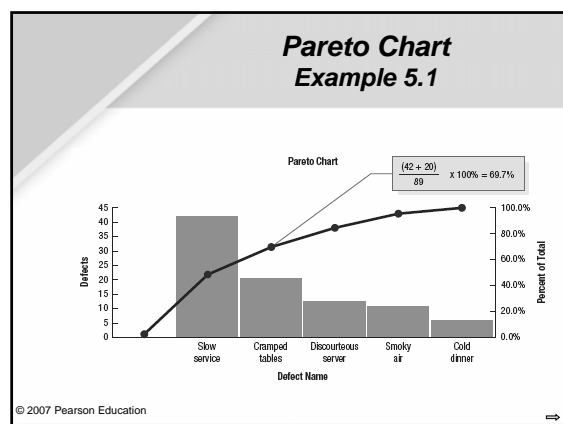
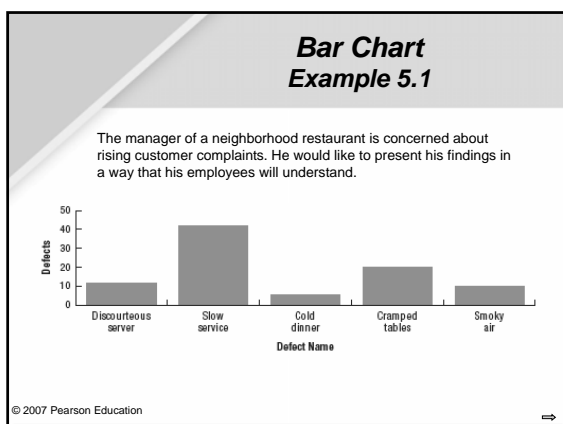
<b>Process:</b> <u>Emergency room admission</u> <b>Subject:</b> <u>Ankle injury patient</u> <b>Beginning:</b> <u>Enter emergency room</u> <b>Ending:</b> <u>Leave hospital</u>		<b>Summary</b> <table border="1"> <thead> <tr> <th>Activity</th> <th>Number of steps</th> <th>Time (min)</th> <th>Distance (ft)</th> </tr> </thead> <tbody> <tr> <td>Operation</td> <td>5</td> <td>23</td> <td>—</td> </tr> <tr> <td>Transport</td> <td>9</td> <td>11</td> <td>815</td> </tr> <tr> <td>Inspect</td> <td>2</td> <td>8</td> <td>—</td> </tr> <tr> <td>Delay</td> <td>3</td> <td>8</td> <td>—</td> </tr> <tr> <td>Store</td> <td>—</td> <td>—</td> <td>—</td> </tr> </tbody> </table>				Activity	Number of steps	Time (min)	Distance (ft)	Operation	5	23	—	Transport	9	11	815	Inspect	2	8	—	Delay	3	8	—	Store	—	—	—
Activity	Number of steps	Time (min)	Distance (ft)																										
Operation	5	23	—																										
Transport	9	11	815																										
Inspect	2	8	—																										
Delay	3	8	—																										
Store	—	—	—																										
<div>Insert Step</div> <div>Append Step</div> <div>Remove Step</div>																													
Step no.	Time (min)	Distance (ft)	●	◐	◑	◒	◓	▼	Step description																				
1	0.50	15					X		Enter emergency room, approach patient window																				
2	10.0	—					X		Sit down and fill out patient history																				
3	0.75	40					X		Nurse escorts patient to ER triage room																				
4	3.00	—					X		Nurse inspects injury																				
5	0.75	40					X		Return to waiting room																				
6	1.00	—						X	Wait for available bed																				
7	1.00	60					X		Go to ER bed																				
8	4.00	—						X	Wait for doctor																				
9	5.00	—						X	Doctor inspects injury and questions patient																				
10	2.00	200						X	Nurse takes patient to radiology																				
11	3.00	—						X	Technician x-rays patient																				
12	2.00	200					X		Return to bed in ER																				
13	3.00	—						X	Wait for doctor to return																				
14	2.00	—						X	Doctor provides diagnosis and advice																				
15	1.00	60						X	Return to emergency entrance area																				
16	2.00	180						X	Check out																				
17	2.00	—						X	Walk to pharmacy																				
18	4.00	—						X	Pick up prescription																				
19	1.00	20						X	Leave the building																				

© 2007 Pearson Education

### Evaluating Performance

- **Checklist:** A form used to record the frequency of occurrence of certain service or product characteristics related to performance.
- **Histogram:** A summarization of data measured on a continuous scale, showing the frequency distribution of some quality characteristic (the central tendency and dispersion of the data).
- **Bar chart:** A series of bars representing the frequency of occurrence of data characteristics measured on a yes-or-no basis.
- **Pareto Chart:** A bar chart on which factors are plotted in decreasing order of frequency along the horizontal axis.

© 2007 Pearson Education



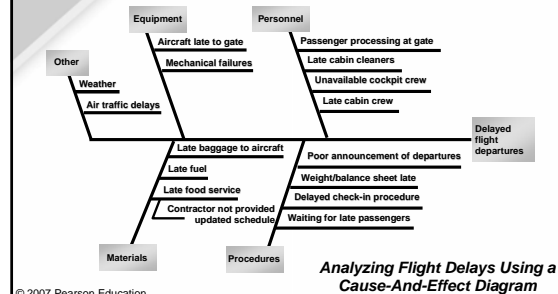
### More Tools for Evaluating Performance

- **Scatter-diagram:** A plot of two variables showing whether they are related.
- **Cause-and-effect diagram:** A diagram that relates a key performance problem to its potential causes.
  - Sometimes called the **fishbone diagram**.
- **Graphs:** Representation of data in a variety of pictorial forms, such as line charts and pie charts.

© 2007 Pearson Education



### Checker Board Airlines Example 5.2



© 2007 Pearson Education



### Wellington Fiber Board Co. Example 5.3

The Wellington Fiber Board Company produces headliners, the fiberglass components that form the inner roof of passenger cars. Management wants to identify which defects were most prevalent and to find the cause.

They decide to use the following tools:

- Step 1. Checklist
- Step 2. Pareto chart
- Step 3. Cause-and-effect diagram
- Step 4. Bar chart

© 2007 Pearson Education



### Wellington Fiber Board Co.

#### Example 5.3 Checklist

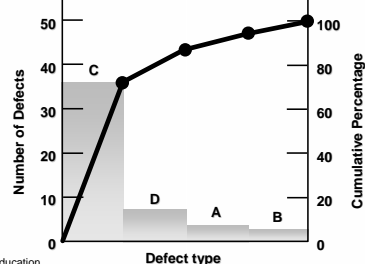
Headliner Defects		
Defect type	Tally	Total
A. Tears in fabric	////	4
B. Discolored fabric	///	3
C. Broken fiber board	/// <i>II</i> <i>II</i> <i>II</i> <i>II</i>	36
D. Ragged edges	/// <i>II</i>	7
	<b>Total</b>	<b>50</b>

© 2007 Pearson Education



### Wellington Fiber Board Co.

#### Example 5.3 Pareto Chart

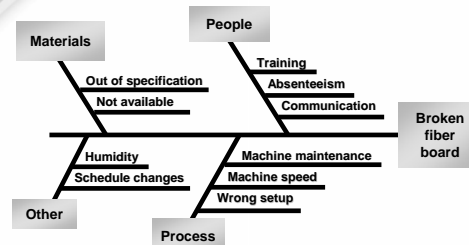


© 2007 Pearson Education



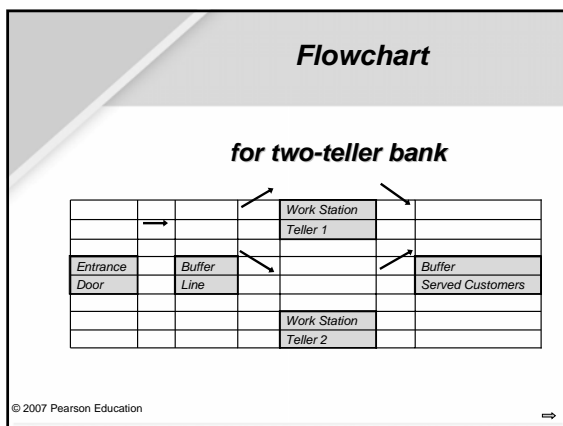
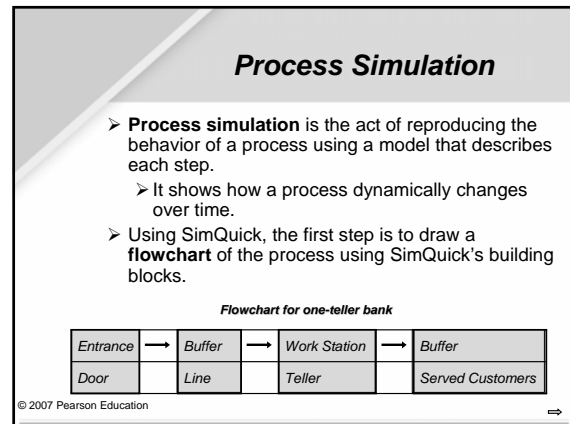
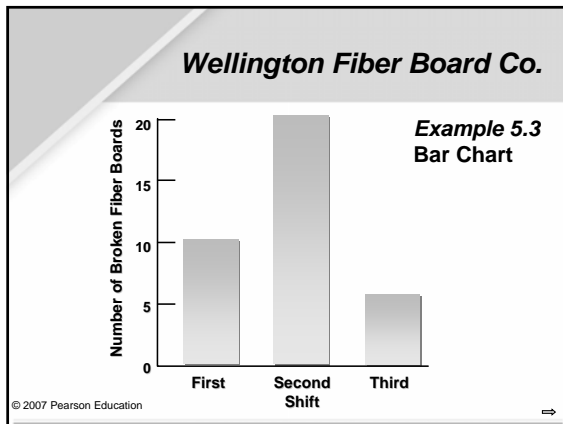
### Wellington Fiber Board Co.

#### Example 5.3 Cause-and-Effect Diagram



© 2007 Pearson Education

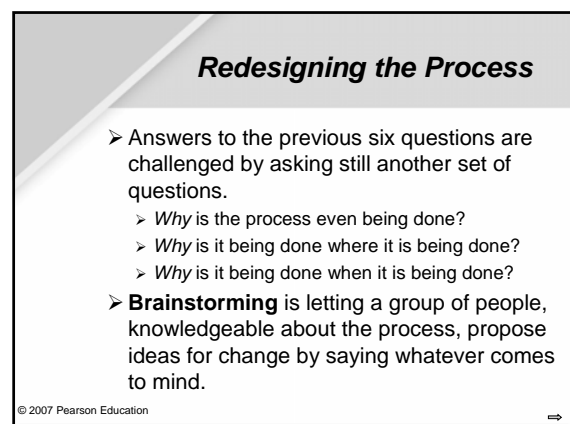
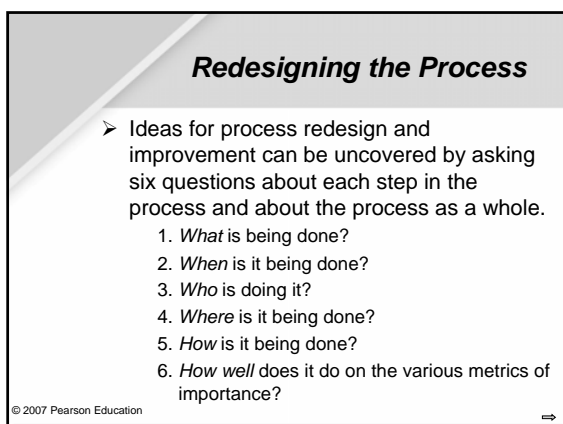




**Bank Simulation Results**

Element	Element	Statistics	Overall
Types	Names		Means
Entrance(s)	Door	Service level	0.90
Buffer(s)	Line	Mean inventory	4.47
		Mean cycle time	11.04

© 2007 Pearson Education



## Benchmarking

- **Benchmarking** is a systematic procedure that measures a firm's processes, services, and products against those of industry leaders.
  - Benchmarking focuses on setting quantitative goals for improvement.
- **Competitive benchmarking** is based on comparisons with a direct industry competitor.
- **Functional benchmarking** compares functional areas in the firm with those of outstanding firms in any industry.
- **Internal benchmarking** involves using an internal unit with superior performance as the benchmark for other units.

© 2007 Pearson Education



## Benchmarking Steps

- **Planning:** Identify the process, service or product to be benchmarked and the firm(s) to be used for comparison. Determine the performance metrics and collect the data.
- **Analysis:** Determine the gap between the firm's current performance and that of the benchmark firm(s).
- **Integration:** Establish goals and obtain the support of managers who must provide the resources for accomplishing the goals.
- **Action:** Develop cross-functional teams of those most affected by the changes, develop action plans, implement the plans and monitor progress.

© 2007 Pearson Education



### Illustrative Benchmarking Metrics by Type of Process

#### Customer Relationship Process

- Total cost of "enter, process, and track orders" per \$1,000 revenue
- System costs of process per \$100,000 revenue
- Value of sales order line item not fulfilled due to stockouts, as % of revenue
- Percentage of finished goods sales value that is returned
- Average time from sales order receipt until manufacturing or logistics is notified
- Average time in direct contact with customer per sales order line item

#### Order Fulfillment Process

- Value of plant shipments per employee
- Finished goods inventory turnover
- Reject rate as percentage of total orders processed
- Percentage of orders returned by customers due to quality problems
- Standard customer lead time from order entry to shipment
- Percentage of orders shipped on time

© 2007 Pearson Education



### Illustrative Benchmarking Metrics by Type of Process

#### New Service/Product Development Process

- Percentage of sales due to services/products launched last year
- Cost of "generate new services/products" process per \$1,000 revenue
- Ratio of projects entering the process to projects completing the process
- Time to market for existing service/product improvement project
- Time to market for new service/product project
- Time to profitability for existing service/product improvement project

#### Supplier Relationship Process

- Cost of "select suppliers and develop/maintain contracts" process per \$1,000 revenue
- Number of employees per \$1,000 of purchases
- Percentage of purchase orders approved electronically
- Average time to place a purchase order
- Total number of active vendors per \$1,000 of purchases
- Percentage of value of purchased material that is supplier certified

© 2007 Pearson Education



### Illustrative Benchmarking Metrics by Type of Process

#### Support Process

- Systems cost of finance function per \$1,000 revenue
- Percentage of finance staff devoted to internal audit
- Total cost of payroll processes per \$1,000 revenue
- Number of accepted jobs as percentage of job offers
- Total cost of "source, recruit, and select" process per \$1,000 revenue
- Average employee turnover rate

© 2007 Pearson Education



## Process Management Mistakes

1. Not Connecting with Strategic Issues
2. Not Involving the Right People in the Right Way
3. Not Giving the Design Teams and Process Analysts a Clear Charter and Then Holding Them Accountable
4. Not Being Satisfied Unless Fundamental "Reengineering" Changes Are Made
5. Not Considering the Impact on People
6. Not Giving Attention to Implementation
7. Not Creating an Infrastructure for Continuous Process Improvement.

© 2007 Pearson Education

