Operations Management and Inventory Control

Chapter 6

QUALITY MANAGEMENT AND INTERNATIONAL STANDARDS

Quality Expert
Edwards Deming's Fourteen Points
To implement TQM

1. Create consistency of purpose
2. Lead to promote change
3. Build quality into the product; stop depending on inspection
4. Build long term relationships based on performance, not price
5. Continuously improve product, quality, and service
6. Start training
7. Emphasize leadership

Table 6.1

Deming's Fourteen Points

8. Drive out fear
9. Break down barriers between departments
10. Stop haranguing workers
11. Support, help, improve
12. Remove barriers to pride in work
13. Institute a vigorous program of education and self-improvement
14. Put everybody in the company to work on the transformation

Table 6.1

Seven Concepts for effective TQM Program

- ☑ Continuous improvement
- ☑ Six Sigma
- ☑ Employee empowerment
- ☑ Benchmarking
- ☑ Just-in-time (JIT)
- ☑ Taguchi concepts
- ☑ Knowledge of TQM tools

Continuous Improvement

- ☑ *TQM requires a never- ending process of continuous improvement*
- ☑ *Involves all operations and work centers including suppliers and customers*
  - ☑ *This process covers People, Equipment, Materials, Procedures*

Walter Shewhart's (a Pioneer in QM) PDCA Model

Plan-Do-Check-Act
(PDCA)
A continuous circular improvement model of plan, do, check, act

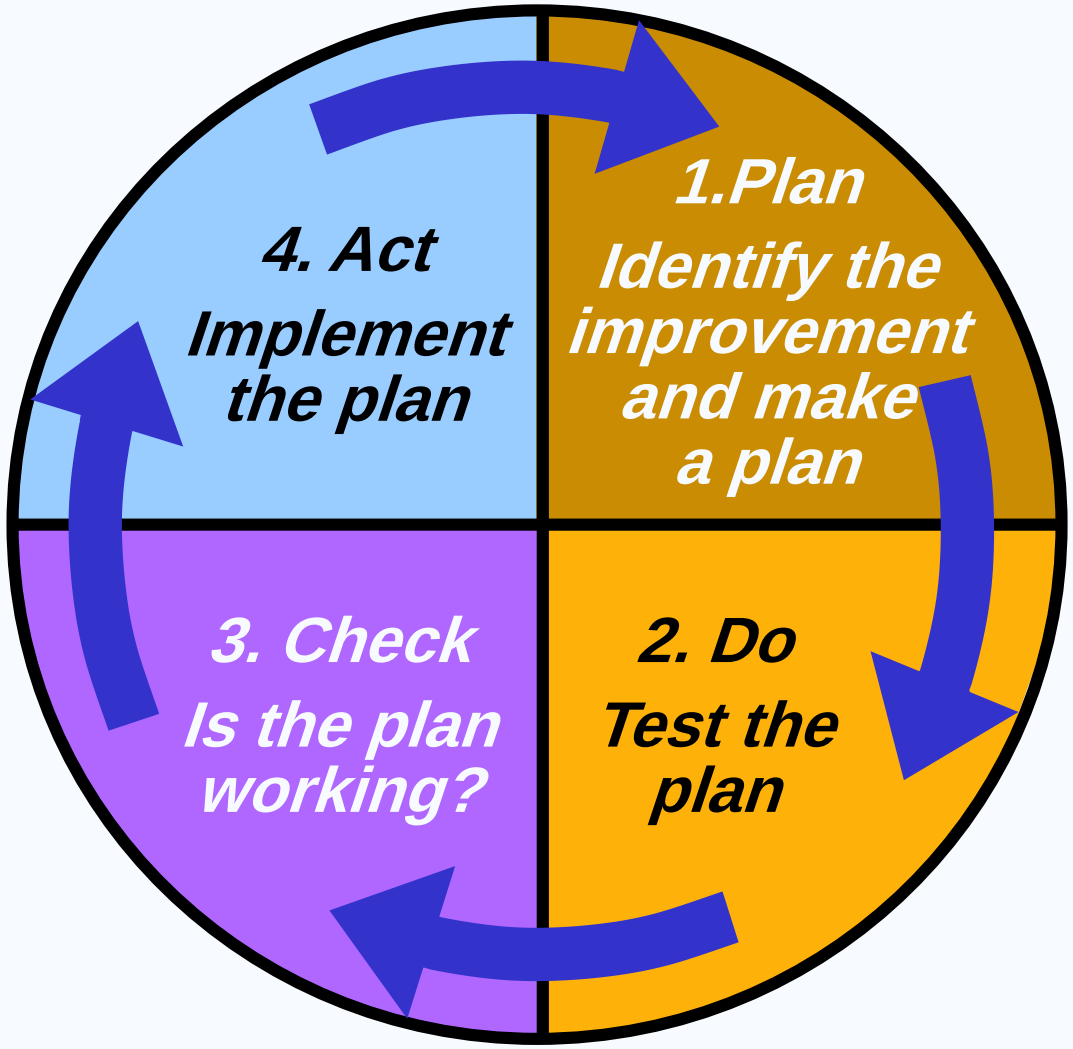


Figure 6.3

Six Sigma

- ☑ ***Originally developed by Motorola, Six Sigma refers to an extremely high measure of process capability***
- ☑ ***A Six Sigma has two meaning in TQM:***

In a statistical : it describes a process, product, or service with extremely high capability (99.9997%) accuracy.

Is a program designed to reduce defects to help lower costs, save time

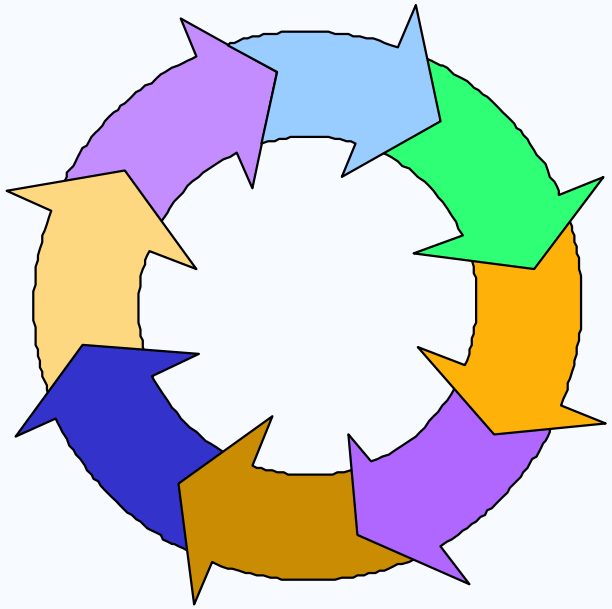
- ☑ ***Highly structured approach to process improvement***

Six Sigma
A comprehensive strategy
(since it focuses on total customer satisfaction)
- A discipline
(since it follows the formal six sigma improvement model)
- A program
- A set of tools
For achieving and sustaining Business success

Six Sigma

1. ***Define*** the project's purpose, scope, and output, then identified the required process information
1. ***Measure*** the work and collect process data
2. ***Analyze*** the data
3. ***Improve*** by modifying or redesigning existing process
4. ***Control*** the new process to make sure new performance is maintained

DMAIC Approach



Employee Empowerment

- ☑ Means Getting employees involved in product and process improvements
- ☑ Techniques (for building Employee Empowerment)
  - ☑ Build communication networks that include employees
  - ☑ Develop open, supportive supervisors
  - ☑ Move responsibility from managers and staff to employees
  - ☑ Build a high-morale organization
  - ☑ Create such formal organization as teams and quality circles

Quality Circles

- ☑ *Group of employees who meet regularly to solve work related problems*
- ☑ *The members receives Training in planning, problem solving, and statistical methods*
- ☑ *generally meet once a week*
- ☑ *Often led by a facilitator (a specially trained team member)*
- ☑ *Very effective when done properly (a cost – effective way to increase a productivity and a quality)*

Benchmarking

Selecting best practices , a standard of products, services, costs that represent the best performance for processes or activities.

The steps for developing benchmarking

- ☑ ***Determine what to benchmark***
- ☑ ***Form a benchmark team***
- ☑ ***Identify benchmarking partners***
- ☑ ***Collect and analyze benchmarking information***
- ☑ ***Take action to match or exceed the benchmark***

Use internal benchmarking if you're big enough

Just-in-Time (JIT)

JIT is related to quality via three ways:

☑ ***JIT cuts the cost of quality***

Because there is less inventory on hand and so inventory costs are less, inventory hides bad quality.

☑ ***JIT improves quality***

☑ ***Better quality means less inventory and better, easier-to-employ JIT system***

And so JIT allows firms to reduce all costs associated with the inventory.

JIT
designed to produce or deliver goods just as they needed

Taguchi Concepts

Since most of quality problems are the result of poor product/ process design:

- ☑ ***Genichi Taguchi has provided us with three concepts aimed at improving both product and process quality:***
- ☑ ***Taguchi Concepts***
  - ☑ ***Quality robustness***
  - ☑ ***Quality loss function***
  - ☑ ***Target-oriented quality***

Quality Robustness

- ☑ *Ability to produce products uniformly in adverse manufacturing and environmental conditions*
  - ☑ *Remove the effects of adverse conditions*
  - ☑ *Small variations in materials and process do not destroy product quality*

Quality Loss Function

- ☑ *Shows that costs increase as the product moves away from what the customer wants*
- ☑ *Costs include customer dissatisfaction, warranty and service, internal scrap and repair, and costs to society*
- ☑ *Traditional conformance specifications are too simplistic*

Quality Loss Function QLF

A mathematical function identifies all costs connected with poor quality and shows how these costs increase as a product quality moves from what the customer wants.

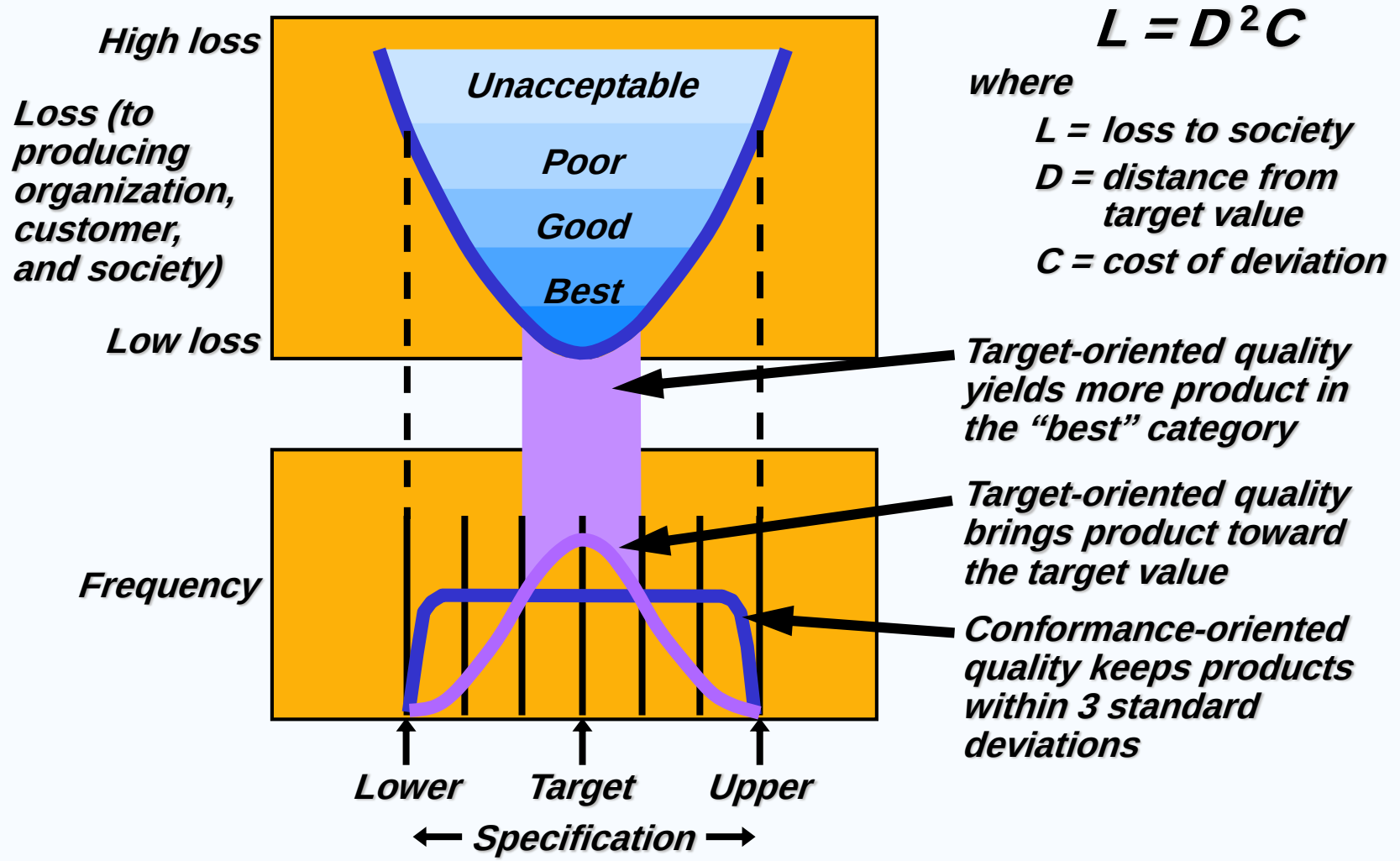


Figure 6.4

Tools of TQM

- ☑ Tools for Generating Ideas
  - ☑ Check sheets
  - ☑ Scatter diagrams
  - ☑ Cause and effect diagrams
- ☑ Tools to Organize the Data
  - ☑ Pareto charts
  - ☑ Flow charts
- ☑ Tools for Identifying Problems
  - ☑ Histogram
  - ☑ Statistical process control chart

Seven Tools for TQM

(a) Check Sheet: An organized method of recording data

	Hour							
Defect	1	2	3	4	5	6	7	8
A	///	/		/	/	/	///	/
B	//	/	/	/			//	///
C	/	//					//	////

Figure 6.5

Seven Tools for TQM

(b) Scatter Diagram: A graph of the value of one variable vs. another variable

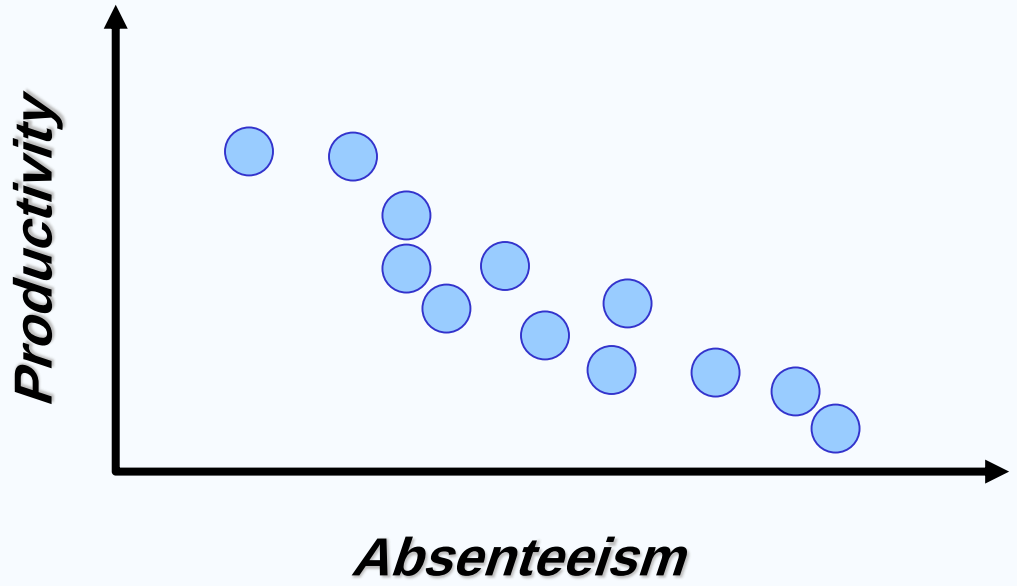


Figure 6.5

Seven Tools for TQM

(c) Cause and Effect Diagram: A tool that identifies process elements (causes) that might effect an outcome

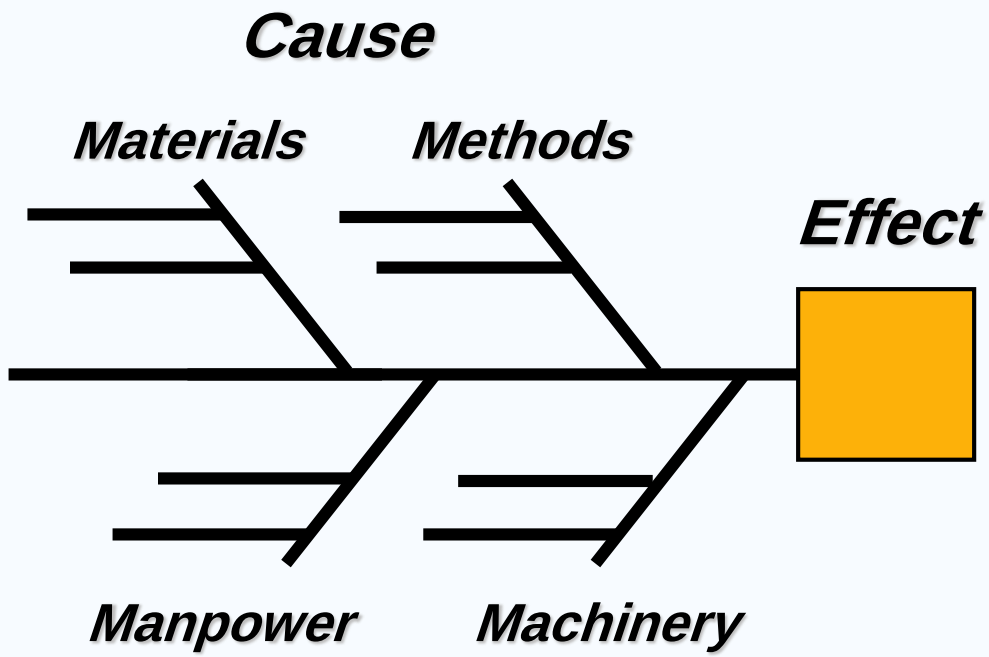


Figure 6.5

Seven Tools for TQM

(d) Pareto Charts: A graph to identify and plot problems or defects in descending order of frequency

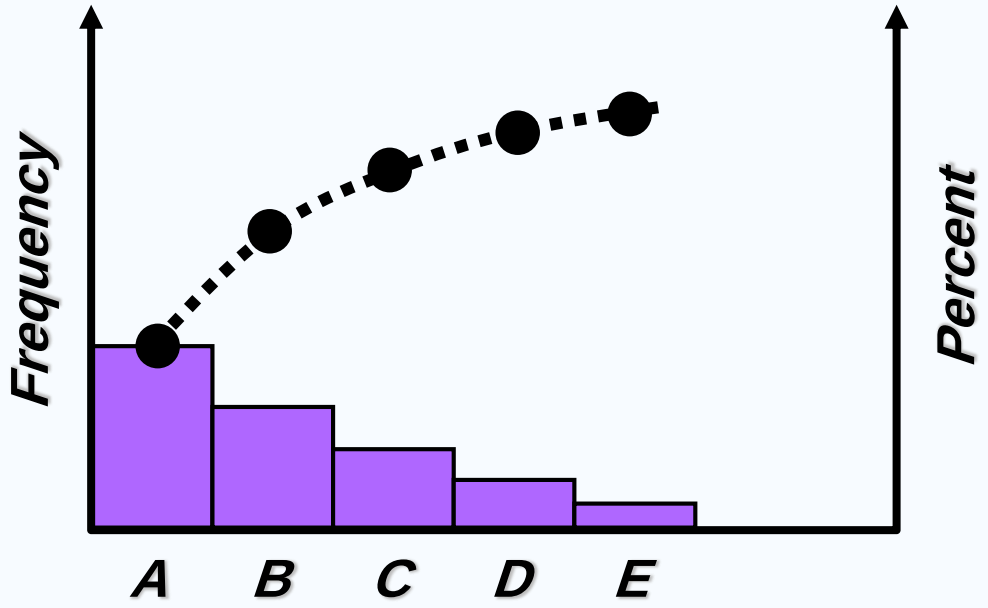


Figure 6.5

Seven Tools for TQM

(e) Flow Charts (Process Diagrams): A chart that describes the steps in a process

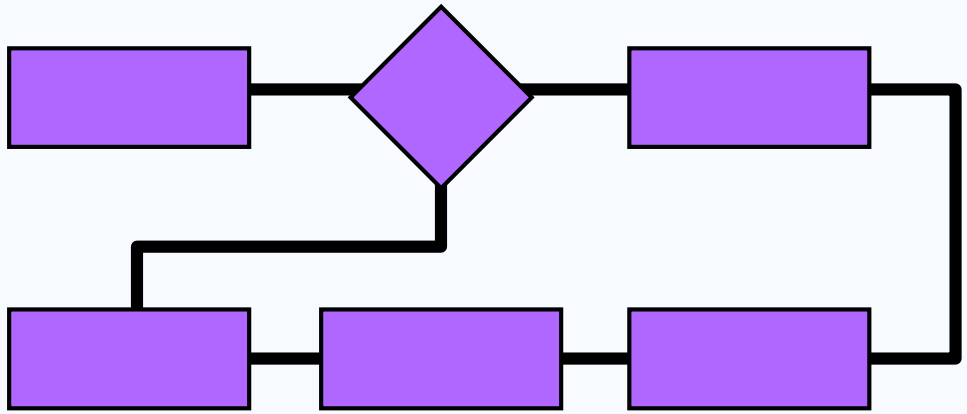


Figure 6.5

Seven Tools for TQM

(f) Histogram: A distribution showing the frequency of occurrence of a variable

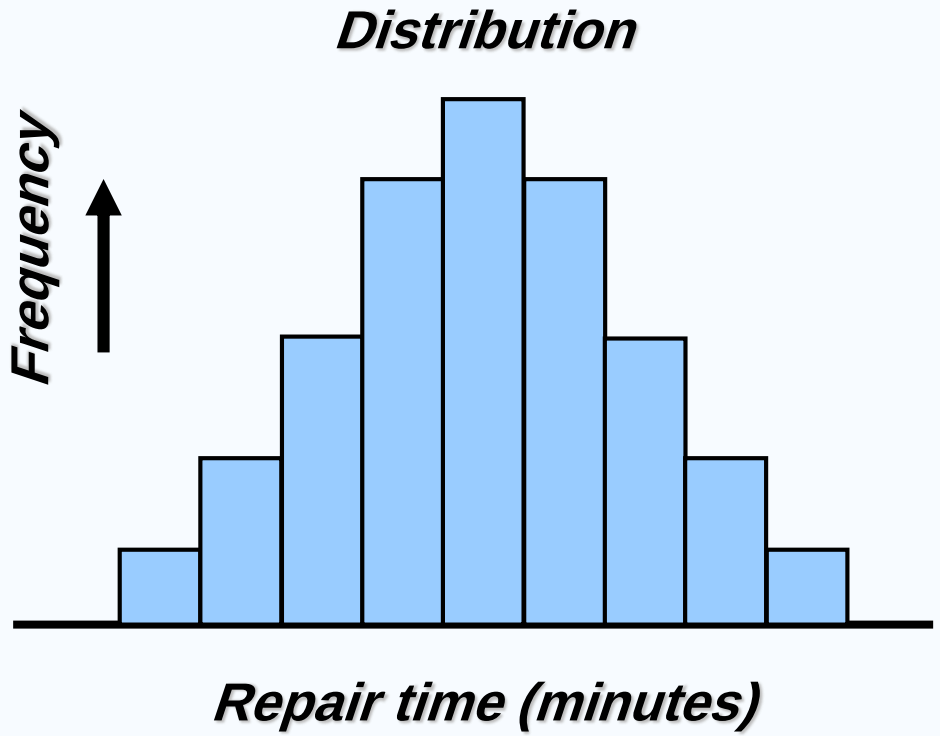


Figure 6.5

Seven Tools for TQM

(g) Statistical Process Control Chart: A chart with time on the horizontal axis to plot values of a statistic

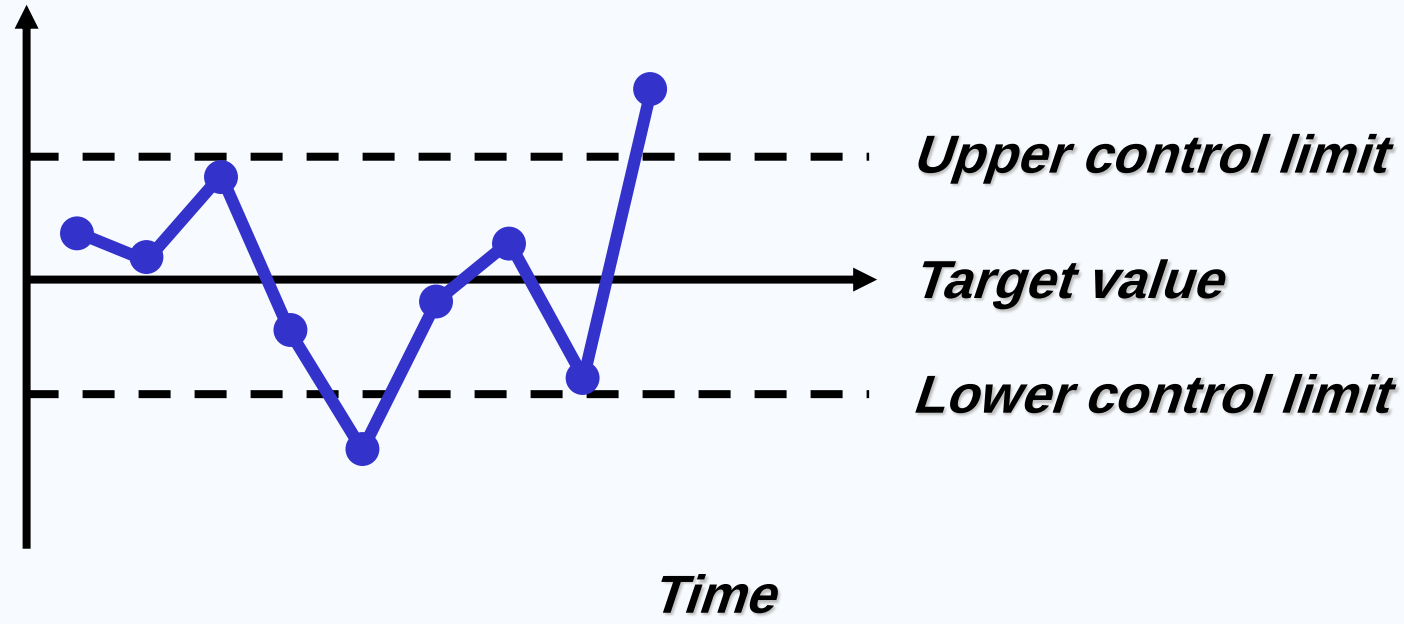


Figure 6.5

Cause-and-Effect Diagrams

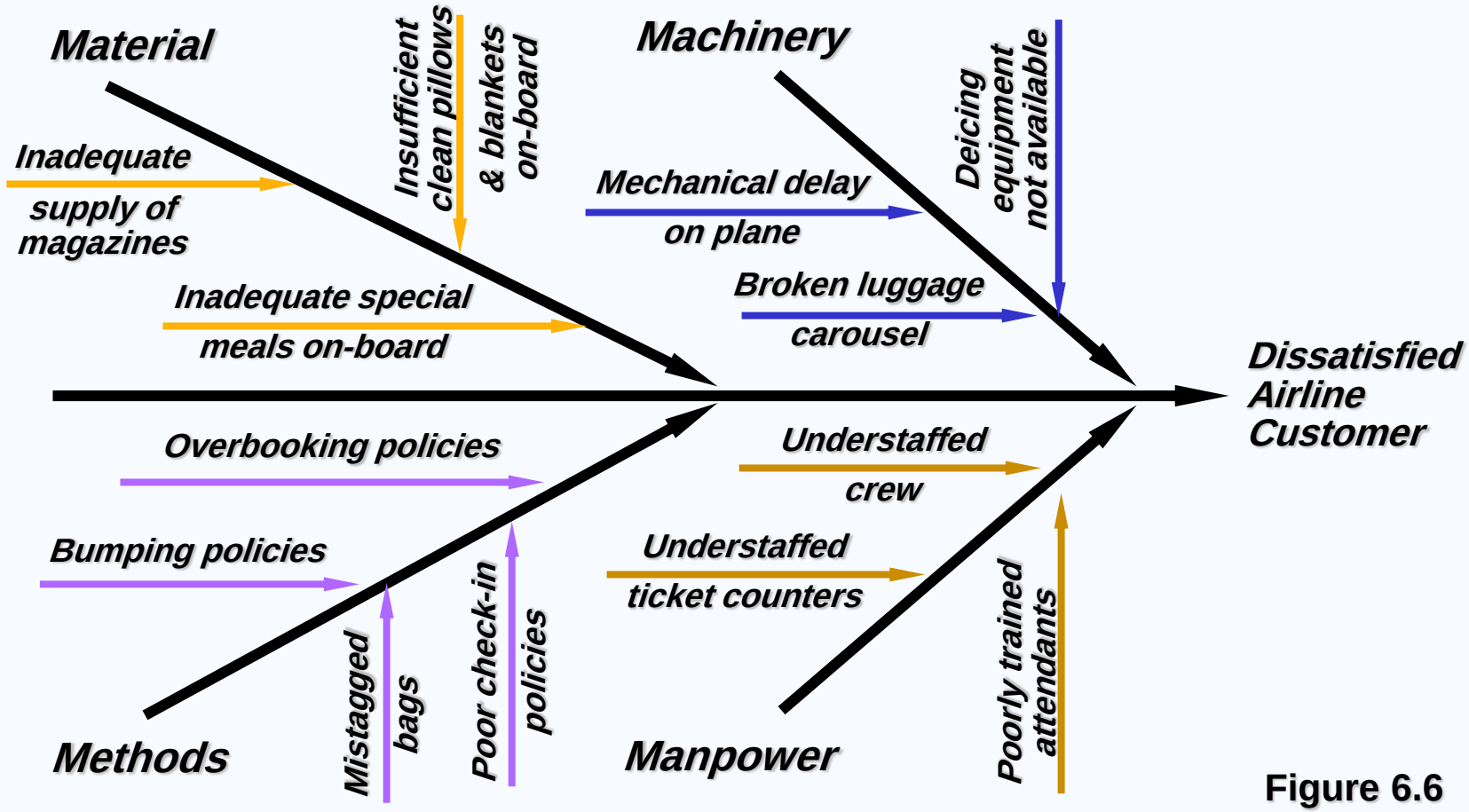
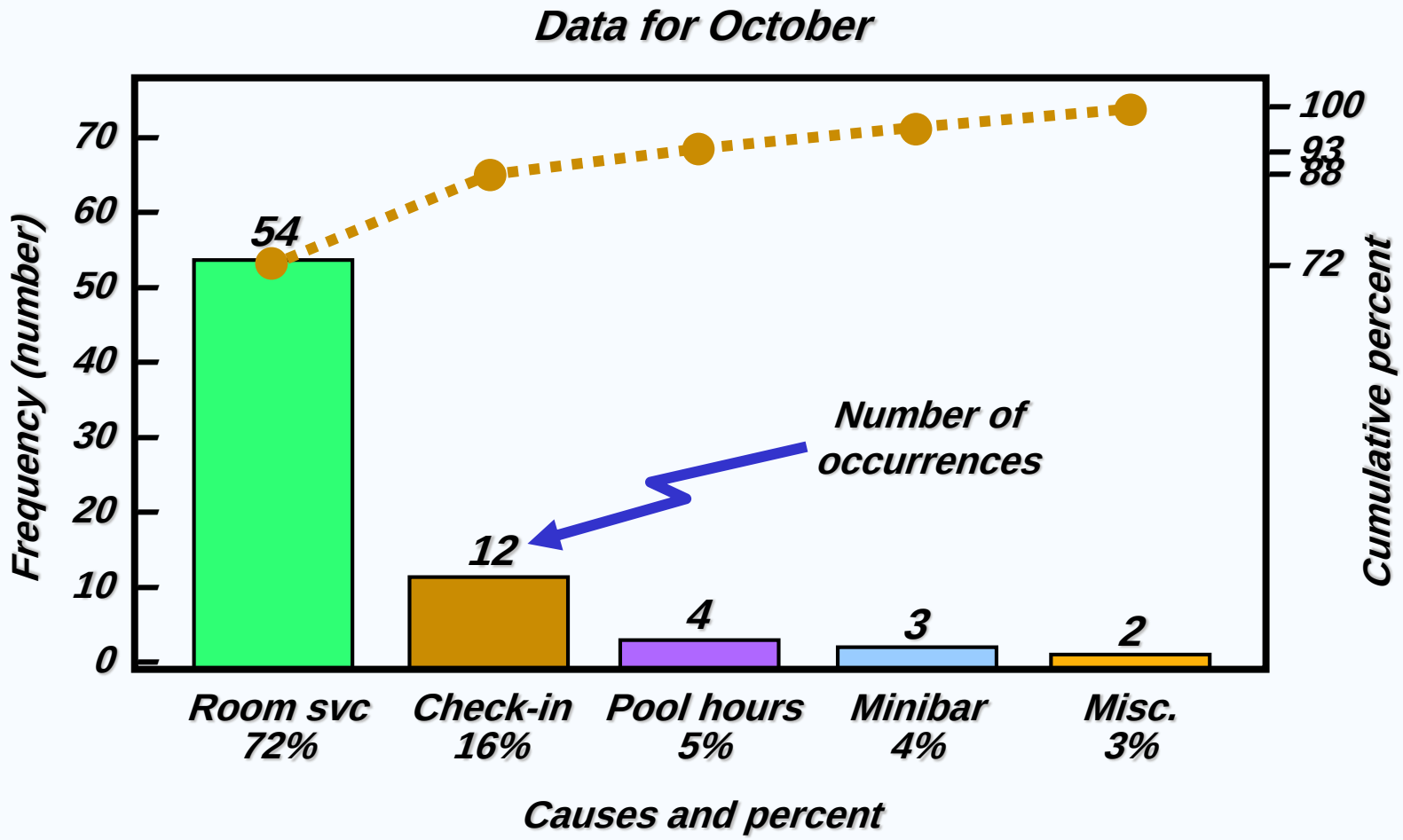


Figure 6.6

Pareto Charts



Flow Charts

Packing and shipping process

Statistical Process Control (SPC)

- ☑ *Uses statistics and control charts to tell when to take corrective action*
- ☑ *Drives process improvement*
- ☑ *Four key steps*
  - ☑ *Measure the process*
  - ☑ *When a change is indicated, find the assignable cause*
  - ☑ *Eliminate or incorporate the cause*
  - ☑ *Restart the revised process*

An SPC Chart

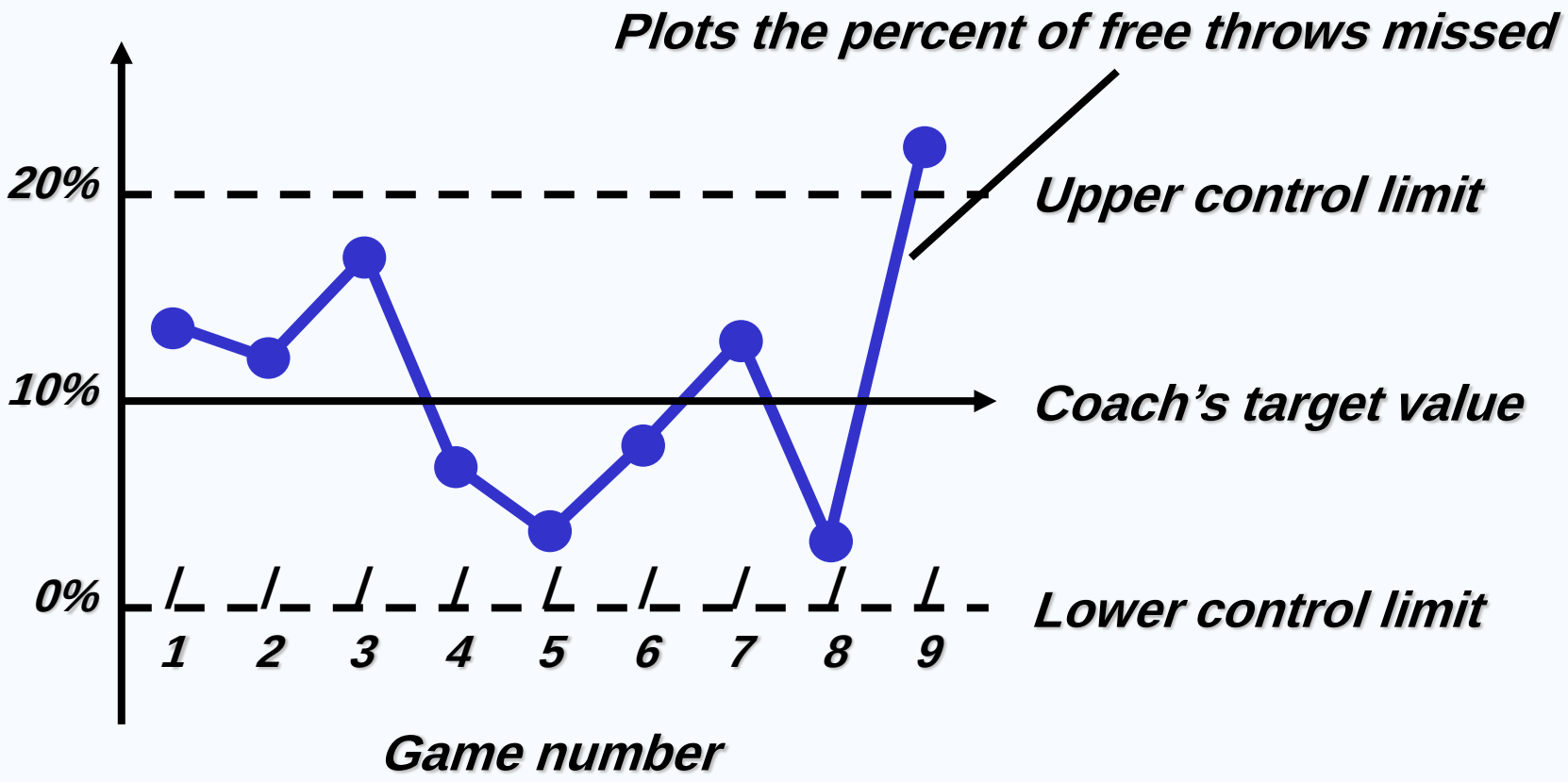


Figure 6.7

Inspection

- ☑ *Involves examining items to see if an item is good or defective*
- ☑ *Detect a defective product*
  - ☑ *Does not correct deficiencies in process or product*
  - ☑ *It is expensive*
- ☑ *Issues*
  - ☑ *When to inspect*
  - ☑ *Where in process to inspect*

When and Where to Inspect

1. At the supplier's plant while the supplier is producing
2. At your facility upon receipt of goods from the supplier
3. Before costly or irreversible processes
4. During the step-by-step production processes
5. When production or service is complete
6. Before delivery from your facility
7. At the point of customer contact

Inspection

- ☑ Many problems
  - ☑ Worker fatigue
  - ☑ Measurement error
  - ☑ Process variability
- ☑ Cannot inspect quality into a product
- ☑ Robust design, empowered employees, and sound processes are better solutions

Source Inspection

- ☑ *Also known as source control*
- ☑ *The next step in the process is your customer*
- ☑ *Ensure perfect product to your customer*

Poka-yoke is the concept of foolproof devices or techniques designed to pass only acceptable product

TQM In Services

- ☑ *Service quality is more difficult to measure than the quality of goods*
- ☑ *Service quality perceptions depend on*
  - ☑ *Intangible differences between products*
  - ☑ *Intangible expectations customers have of those products*

Service Quality

The Operations Manager must recognize:

1. ***The tangible component of services is important***
2. ***The service process is important***
3. ***The service is judged against the customer's expectations***
4. ***Exceptions will occur***

Determinants of Service Quality

- ☑ Reliability
- ☑ Responsiveness
- ☑ Competence
- ☑ Access
- ☑ Courtesy
- ☑ Communication
- ☑ Credibility
- ☑ Security
- ☑ Understanding/ knowing the customer
- ☑ Tangibles