Module 3

Quality Tools
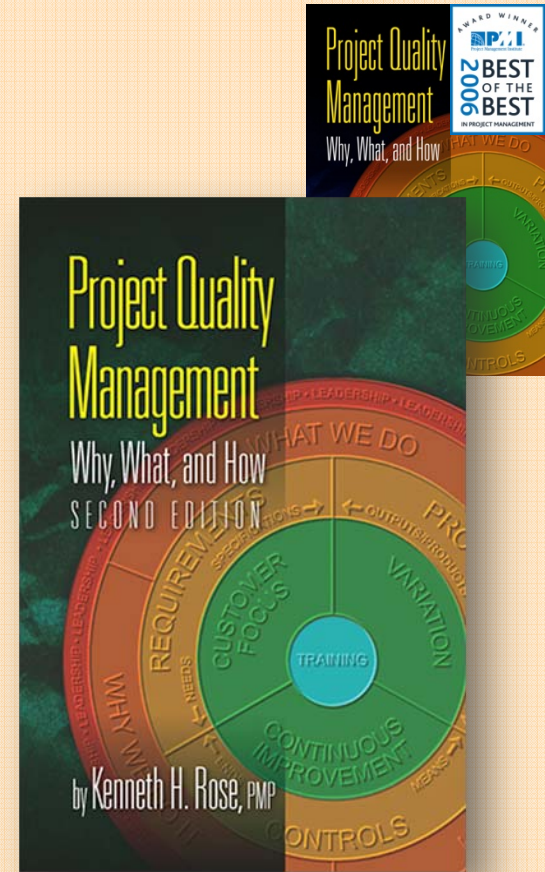
The material presented in this module

is based on:

Project Quality Management
Why, What and How
Second Edition
By Kenneth H. Rose, PMP

Objective

- Enable you to manage project quality using proven tools and techniques

- Provide a tool kit of quality tools that you may use during project implementation

- Describe these tools in a logical order of use

Quality Tools for...

- Collecting data

- Understanding data

- Understanding processes

- Analyzing processes

- Solving problems

- …and two commonly used tools

Seven Basic Tools

- Check sheet

- Graph

- Histogram

- Pareto chart

- Scatter diagram

- Control chart
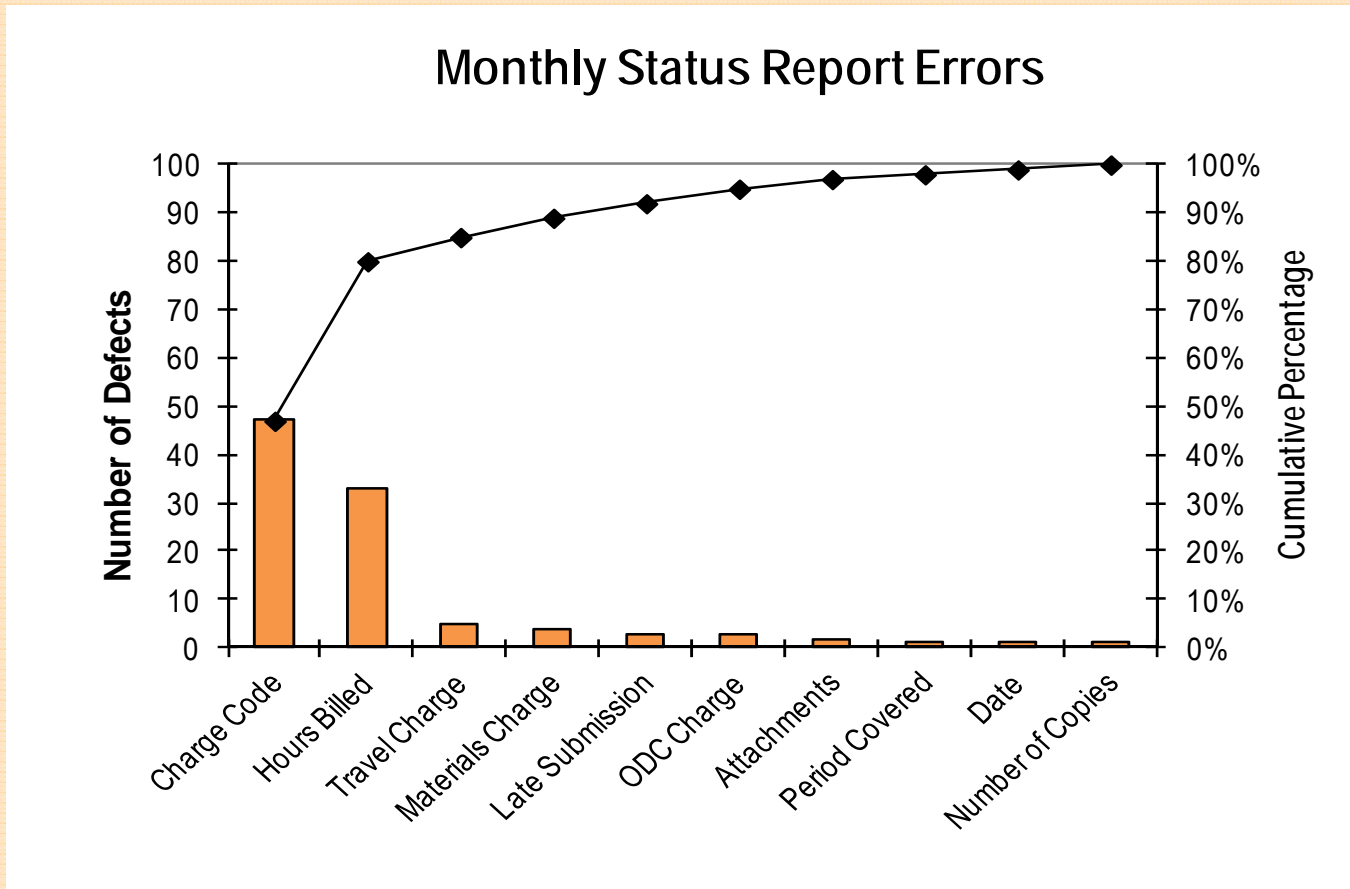
- Cause-and-effect diagram

(Ishikawa: *Guide to Quality Control*)

Other Tools

- Flow chart

- Run chart

- Brainstorming

- Affinity diagram

- Nominal group technique and multi-voting

- Force field analysis

- Pillar diagram

Understanding Data
Pareto Chart: Example

Monthly Status Report Errors

Understanding Data
Scatter Diagram

- Purpose: Identify possible relationships between two variables

  – Define theoretical relationship

  – Collect 50-100 paired samples of data

  – Plot the data on X-Y axes

    - X-axis: independent variable

    - Y-axis: dependent variable

  – Interpret the data

Understanding Processes
Control Chart

- Purpose: Monitor, control, and improve process over time
  - Discloses nature of variation in the process
  - Indicates what should be expected
  - Indicates what lies outside expectations
  - "Voice of the process"
  - Uses sample data to generalize about population
  - May use attribute or variable data
  - Eight different basic charts

Understanding Processes
Control Chart: Example (Situation)

- Management is dissatisfied with current costs of erroneous claims and with the level of expressed customer dissatisfaction with returned claims

- Management has directed an analysis of the situation to determine how many erroneous claims are slipping through the collection center screenings

- Management has directed that a system of rewards and punishments be established for good and bad performance

- You have been appointed to manage this project

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Understanding Processes
Control Chart: Example (Action)

- You have selected four collection centers at random to collect sample data

- Each center will randomly pull 50 claims after screening has been completed and the claim has been approved for forwarding to Accounting Division and do a thorough, detailed review to determine if it is correct

- Samples will be pulled on five consecutive days beginning two weeks from Monday

Understanding Processes
Control Chart: Example (Data & Statistics)

	Center A	Center B	Center C	Center D	Total	Average
Monday	17	8	9	10	44	
Tuesday	6	7	9	16	38	
Wednesday	7	10	14	8	39	
Thursday	6	8	16	11	41	
Friday	5	11	12	9	37	
Total	41	44	60	54	199	
Average						9.95

k =20   n = 50   UCL = 18.41 = 18

Σnp = 199 Σn = 1000   LCL = 1.49 = 1

np-bar = 9.95   p-bar = .199

Understanding Processes
Control Chart: Example (Chart)

|	MA	MB	MC	MD	TA	TB	TC	TD	WA	WB	WC	WD	ThA	ThB	ThC	ThD	FA	FB	FC	FD
Defects	17	8	9	10	6	7	9	16	7	10	14	8	6	8	16	11	5	11	12	9
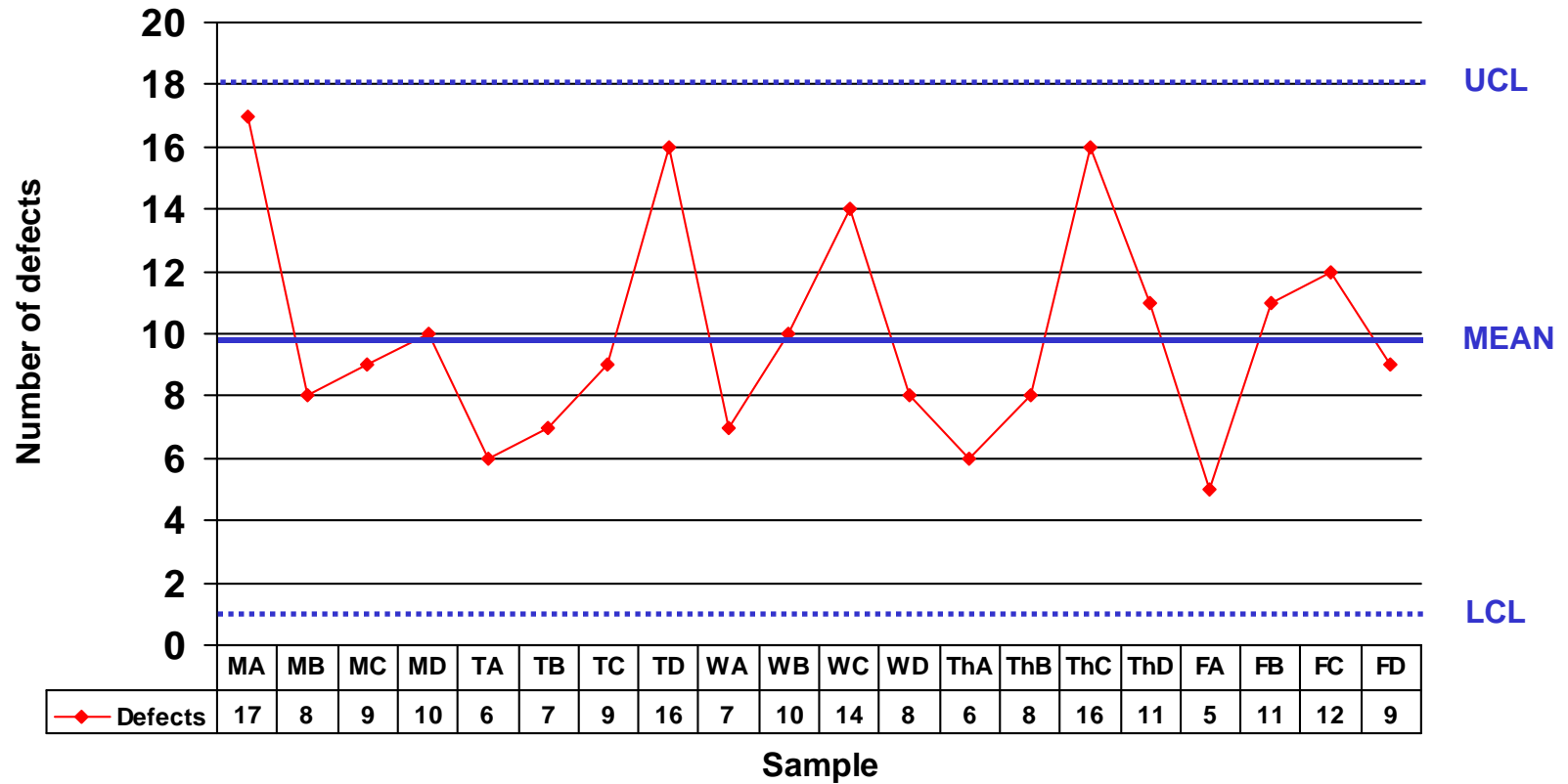
Understanding Processes
Control Chart: Example (Meaning)

- Control charts are run charts with added control limits

- Control charts show the range of variation that may be expected in the process as it is currently performing

- Any value within the control limits may be expected in the future if the system does not change

- Values between control limits result from <u>random cause</u> variation (common cause)

- Values outside the control limits result from <u>special cause</u> variation (assignable cause)

Analyzing Processes
Cause-and-Effect Diagram: Detail
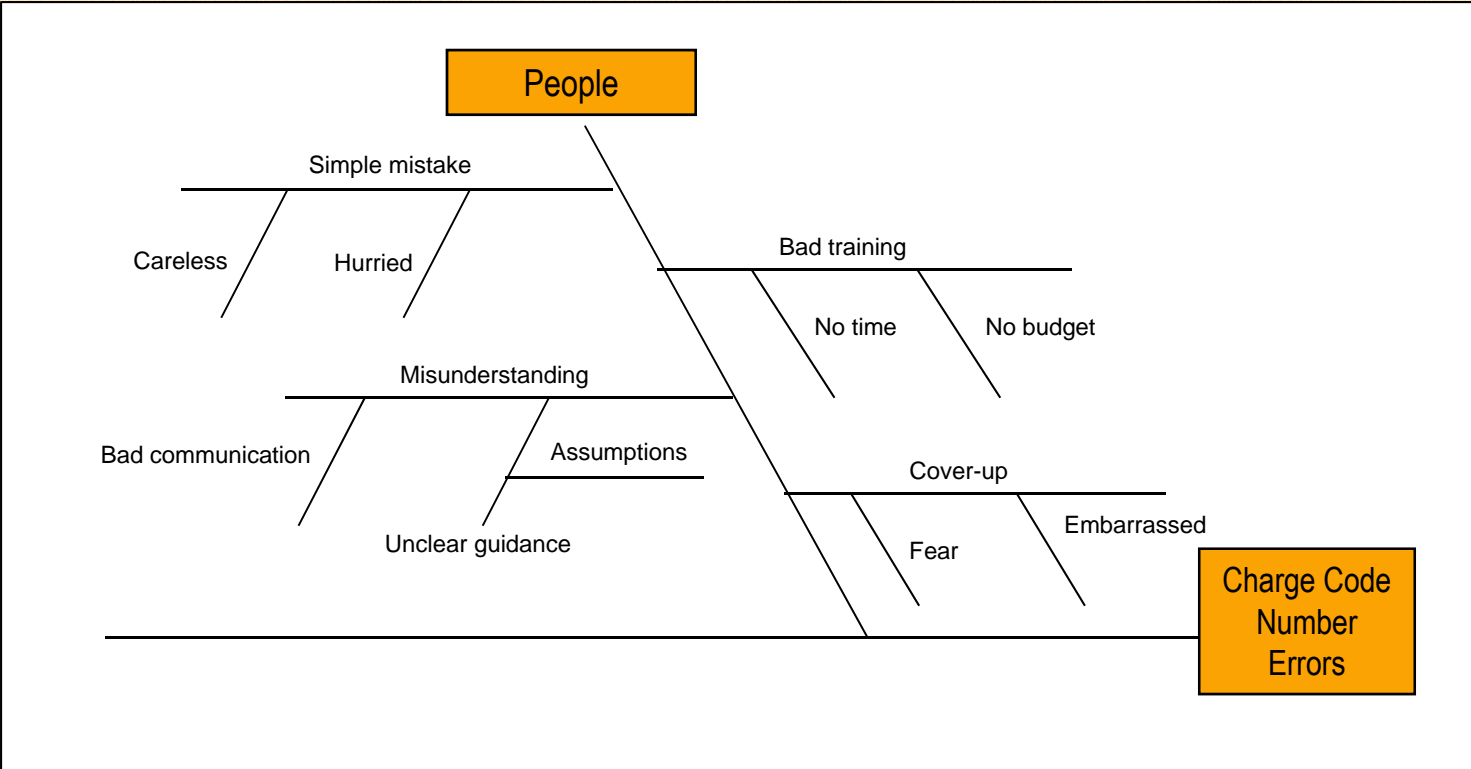
Solving Problems
Brainstorming

- Purpose: Creatively and efficiently generate a high volume of ideas free of criticism

  - Identify and define issue to be addressed

  - Creativity rules!

  - No criticism, clarification, prioritization, or discussion

  - Two approaches:

    - Structured - Round-robin

    - Unstructured - Free-for-all

  - Clarify, remove duplicates after process is complete

Summary   (more)

- To solve problems, project managers must take action. Quality tools help determine the right action to take.

- Problem solving and quality improvement involve change. Before you can make a change of some kind, you must understand the forces at play within the organization that influence change.

- Force field analysis identifies forces and factors that help or hinder problem solving. Helping forces must be made more influential or hindering forces must be made less influential. It is often easier to reduce the influence of hindering forces than it is to increase the influence of helping forces.

- Brainstorming is a tool for creatively and efficiently generating a high volume of ideas free of criticism. During brainstorming, creativity is the rule; no idea is too unconventional for consideration. No criticism, clarification, prioritization, or discussion of ideas is permitted as ideas are presented.

Exercises

1. Identify a situation with which you are familiar that includes multiple contributing factors. Prepare a force field analysis chart that will allow you to develop a plan to improve the situation.

2. With a group of classmates or colleagues, conduct a brainstorming session using each of the two approaches. Did one work better than the other? Were you able to stick to the "rules of the road"?

3. Pick a moderately complex problem or situation with multiple contributing factors. On your own, identify a large number of contributing factors. Organize them and make sense of them using an affinity diagram.

4. With a small group of classmates or colleagues, pick a problem or situation of moderate interest and analyze it using nominal group technique and multi-voting.

Review
Quality Tools

- Collecting data
  - Check sheet
- Understanding data
  - Graph
  - Histogram
  - Pareto chart
  - Scatter diagram
- Understanding processes
  - Flow chart
  - Run chart
  - Control chart

- Analyzing processes
  - Cause-and-effect diagram
  - Pillar diagram
- Solving problems
  - Force field analysis
  - Brainstorming
  - Affinity diagram
  - Nominal group technique
- Commonly used tools
  - Compliance matrix
  - Peer review