

QUALITY MANAGEMENT

A General Look

QUALITY MANAGEMENT

A General Look

Quality Management

	Initiating	Planning	Executing	Monitoring & Controlling	Closing
Quality Management	0	1	1	1	0

→ Plan Quality Management // Planning

→ Manage Quality // Executing

→ Control Quality // Monitoring & Controlling

QUALITY MANAGEMENT

A General Look

What is Quality?

→ Quality is about the level you satisfy the requirements

Project 1 →



Project 2 →



QUALITY MANAGEMENT

A General Look

What is Grade?

→ Technical classification indicating common function

Project 1 →



High Grade & High Quality

Project 2 →



Low Grade & High Quality

QUALITY MANAGEMENT

A General Look

Gold Plating

→ Gold Plating is NOT ALLOWED!

Expected Product →



Product Produced →



Prepared by S. DUY

QUALITY MANAGEMENT

A General Look

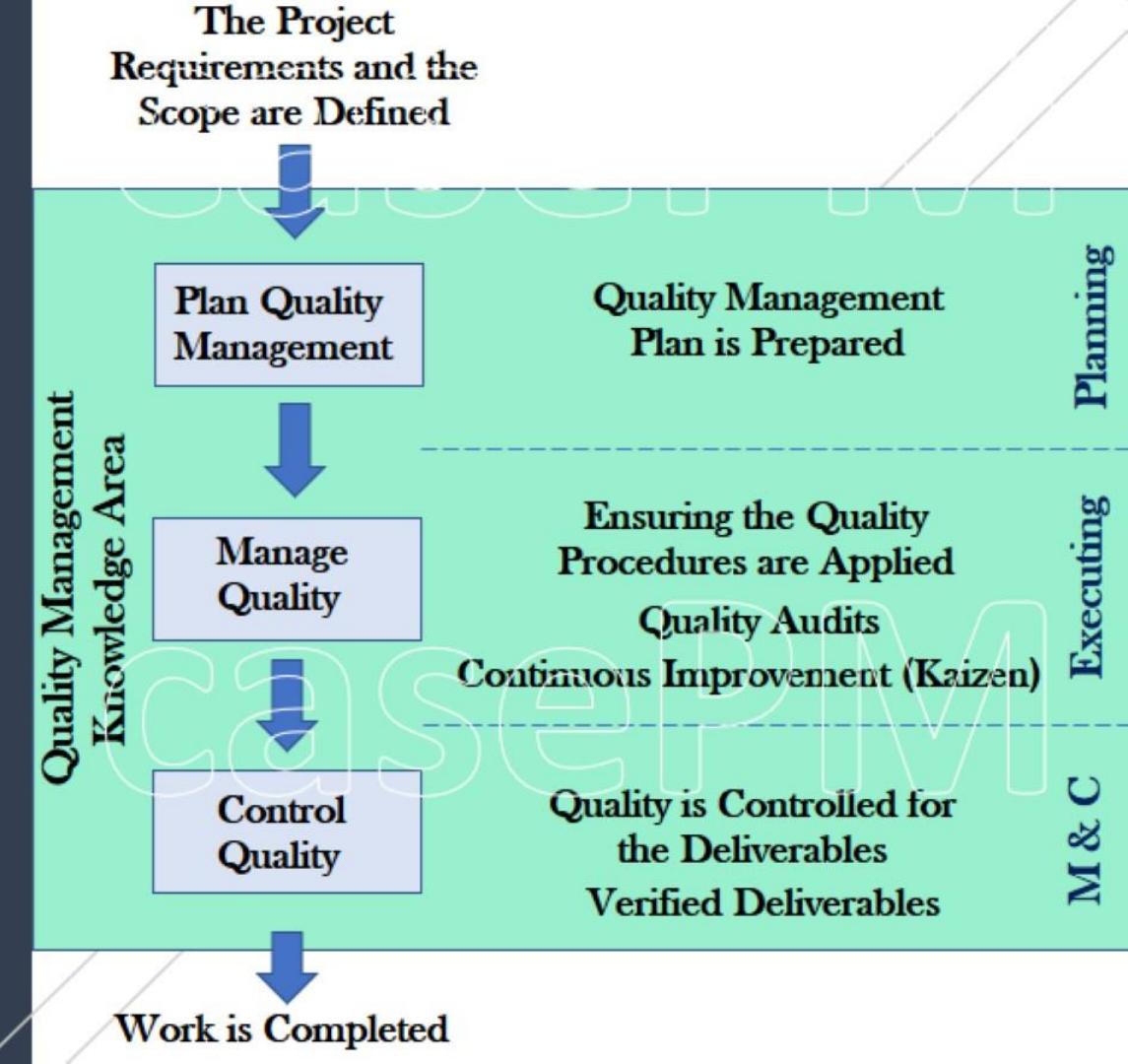
Who is responsible for quality?

- ➔ The Project Manager has the main responsibility
- ➔ Other team members should also care about the quality

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QUALITY MANAGEMENT

A General Look



QUALITY MANAGEMENT

Plan Quality Management

QUALITY MANAGEMENT

Plan Quality Management

Plan Quality Management

→ Quality Management Plan is prepared

- *How will we achieve the desired quality level?*³
- *What processes will we use?*³
- *What will we do for the process improvement?*³
- *Who is going to be responsible for which Quality requirements?*³
- *How and who will do the testing and inspecting Works?*³

QUALITY MANAGEMENT

Plan Quality Management

Plan Quality Management

- ➔ Quality Management Plan is prepared
- ➔ Quality Metrics are determined
 - *The defect percentage*
 - *The client approval score*
 - *The subcontractor scores*
 - *The number of Change Requests*
 - *The number of Changes*

Prepared by Sharif CUSI - casePM

QUALITY MANAGEMENT

Plan Quality Management

Plan Quality Management

- ➔ Quality Management Plan is prepared
- ➔ Quality Metrics are determined
- ➔ Performed in parallel with other planning processes
- ➔ Iterative

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Plan Quality Management Process

What Do We Need? What Do We Use? What Do We Get?

Part - 1

QUALITY MANAGEMENT

Plan Quality Management

What do we get?

- Quality Management Plan & Quality Metrics

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QUALITY MANAGEMENT

Plan Quality Management

What do we get?

- Revisions in:
 - Risk Management Plan

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QUALITY MANAGEMENT

Plan Quality Management

What do we get?

- Revisions in:
 - Risk Management Plan
 - Scope Baseline

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Plan Quality Management

- Risk Management Plan
- Scope Baseline

Project
Management
Plan

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Plan Quality Management

What do we get?

- Revisions in:
 - Risk Management Plan
 - Scope Baseline
 - Lessons Learned Register
 - Requirements Traceability Matrix
 - Risk Register
 - Stakeholder Register
-
- The diagram illustrates the output of the 'Plan Quality Management' section. It shows a main list of revisions, with the first item ('Revisions in') expanded into a sub-list. Brackets on the right side group these items: a bracket groups the first four items (Risk Management Plan, Scope Baseline, Lessons Learned Register, Requirements Traceability Matrix) under the heading 'Project Management Plan'; another bracket groups the last three items (Risk Register, Stakeholder Register) under the heading 'Project Documents'.

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Plan Quality Management

What do we need?

- Project Charter

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Plan Quality Management

What do we need?

- Requirements Management Plan

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Plan Quality Management

What do we need?

- Risk Management Plan

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Plan Quality Management

What do we need?

- Stakeholder Engagement Plan

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Plan Quality Management

What do we need?

- Scope Baseline

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Plan Quality Management

- Project Charter
- Requirements Management Plan
- Risk Management Plan
- Stakeholder Engagement Plan
- Scope Baseline

Project
Management
Plan

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QUALITY MANAGEMENT

Plan Quality Management

What do we need?

- Assumption Log

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Plan Quality Management

What do we need?

- Requirements Documentation

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Plan Quality Management

What do we need?

- Requirements Traceability Matrix

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Plan Quality Management

What do we need?

- Risk Register

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Plan Quality Management

What do we need?

- Stakeholder Register

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Plan Quality Management

- Assumption Log
- Requirements Documentation
- Requirements Traceability Matrix
- Risk Register
- Stakeholder Register

Project
Documents

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Plan Quality Management

What do we need?

- EEF & OPA

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Plan Quality Management Process

What Do We Need? What Do We Use? What Do We Get?

Part - 2

QUALITY MANAGEMENT

Plan Quality Management

What do we use?

- Expert Judgment

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QUALITY MANAGEMENT

Plan Quality Management

What do we use?

- Data Gathering Techniques like Benchmarking, Brainstorming, Interviews, and etc.

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QUALITY MANAGEMENT

Plan Quality Management

What do we use?

- Data Gathering Techniques like **Benchmarking**, Brainstorming, Interviews, and etc.

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QUALITY MANAGEMENT

Plan Quality Management

What do we use?

- Data Gathering Techniques like Benchmarking, Brainstorming, Interviews, and etc.

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Plan Quality Management

What do we use?

- Data Analysis Techniques like Cost-benefit Analysis, Cost of Quality, and etc.

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Plan Quality Management

What do we use?

- Data Analysis Techniques like **Cost-benefit Analysis**, **Cost of Quality**, and etc.

**Cost of the
planned
Quality**

vs

**Benefits of
the Quality
Management**

Training Costs
Testing Costs
Measuring Costs
Auditing Costs

Customer Satisfaction
Increased Productivity
Decreased Costs (because
of the less rework)

QUALITY MANAGEMENT

Plan Quality Management

What do we use?

- Data Analysis Techniques like Cost-benefit Analysis, **Cost of Quality**, and etc.

Conformance Cost

Training Costs
Testing Costs
Measuring Costs
Auditing Costs

Non-conformance Cost

Cost due to rework
Not-accepted material cost
Guarantee Costs
Lost Business

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Plan Quality Management

What do we use?

- Decision Making Techniques like Multicriteria Decision Analysis, and etc.

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Plan Quality Management

What do we use?

- Data Representation Techniques like Flowcharts, Logical Data Model, Matrix Diagrams, Mind Mapping, and etc.

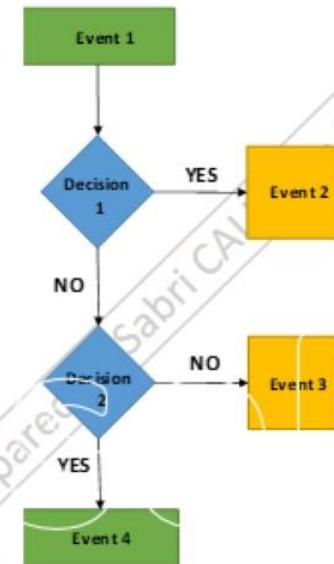
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Plan Quality Management

What do we use?

- Data Representation Techniques like **Flowcharts**, Logical Data Model, Matrix Diagrams, Mind Mapping, and etc.

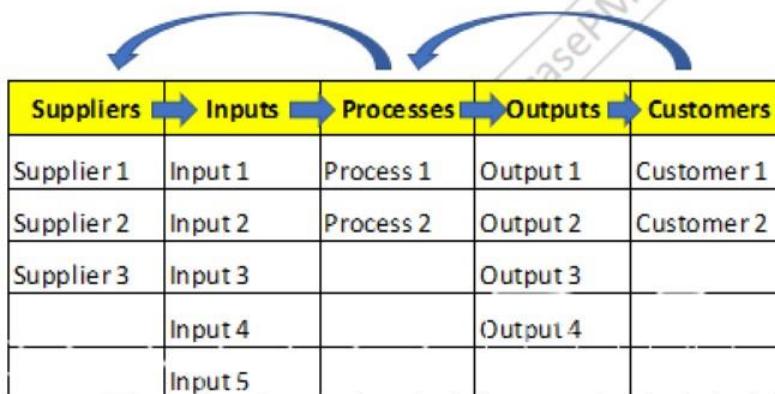


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Plan Quality Management

What do we use?

- Data Representation Techniques like **Flowcharts**, Logical Data Model, Matrix Diagrams, Mind Mapping, and etc.



QUALITY MANAGEMENT

Plan Quality Management

What do we use?

- Data Representation Techniques like Flowcharts, **Logical Data Model**, Matrix Diagrams, Mind Mapping, and etc.

Entity 1	Relationship	Entity 2	Relationship	Entity 3
Attribute 1		Attribute 3		Attribute 7
Attribute 2	Name 1	Attribute 4		Attribute 8
Attribute 3		Attribute 5		
		Attribute 6		
		Attribute 7		

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Plan Quality Management

What do we use?

- Data Representation Techniques like Flowcharts, Logical Data Model, **Matrix Diagrams**, Mind Mapping, and etc.

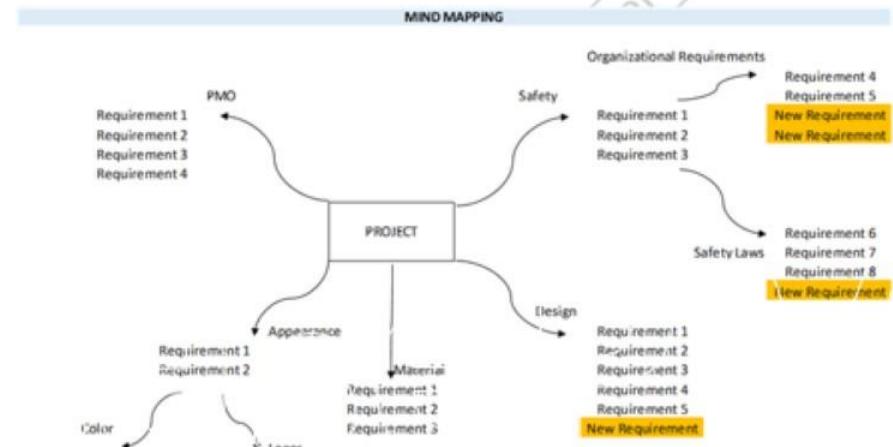
		Quality Metrics									
Requirements		Metric 1	Metric 2	Metric 3	Metric 4	Metric 5	Metric 6	Metric 7	Metric 8	Metric 9	Metric 10
	Requirement 1	✓	✓	✓			✓				✓
	Requirement 2		✓		✓			✓	✓	✓	
	Requirement 3	✓			✓	✓		✓	✓	✓	
	Requirement 4		✓				✓			✓	
	Requirement 5	✓	✓		✓			✓	✓		
	Requirement 6	✓				✓		✓	✓	✓	✓

QUALITY MANAGEMENT

Plan Quality Management

What do we use?

- Data Representation Techniques like Flowcharts, Logical Data Model, Matrix Diagrams, **Mind Mapping**, and etc.



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Plan Quality Management

What do we use?

- Test and Inspection Planning

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Plan Quality Management

What do we use?

- Meetings

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QUALITY MANAGEMENT

Manage Quality

QUALITY MANAGEMENT

Manage Quality

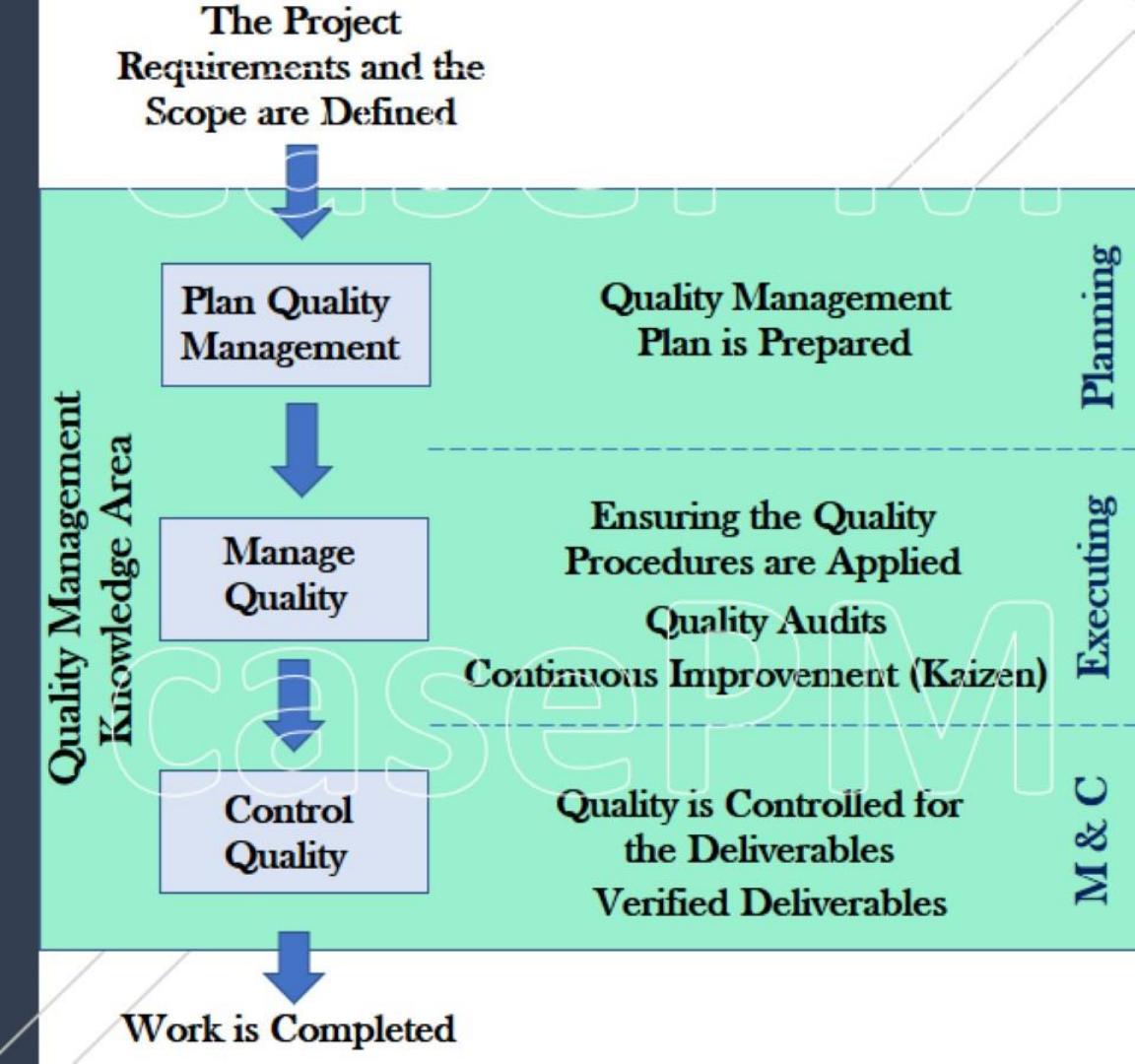
Manage Quality

- ➔ Applying the Quality processes while executing the Project
- ➔ It may be called Quality Assurance
- ➔ Manage Quality is about preventing the Quality problems

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QUALITY MANAGEMENT

Manage Quality



QUALITY MANAGEMENT

Manage Quality

Quality Audits

→ We try to understand if the Quality procedures, policies and the standards are being applied or not.

- Structured and planned
- Internal Audits, Customer Audits and Third-party Audits
- The results should be documented

Prepared by Sabri SALISI
Project Management

QUALITY MANAGEMENT

Manage Quality

Manage Quality

→ Test and Evaluation Documents

→ Quality Reports

Control charts, checklists, and requirements traceability matrices can be used

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QUALITY MANAGEMENT

Manage Quality

Manage Quality

- ➔ Test and Evaluation Documents
- ➔ Quality Reports

The results of the Manage Quality and the Control Quality processes are reported graphically, numerically and qualitatively.

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Manage Quality Process

What Do We Need? What Do We Use? What Do We Get?

Part 1

QUALITY MANAGEMENT

Manage Quality

What do we get?

- Quality Reports & Test and Evaluation Documents

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Manage Quality

What do we get?

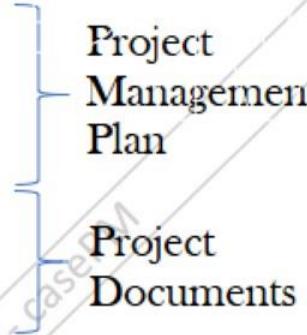
- Change Requests

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QUALITY MANAGEMENT

Manage Quality

What do we get?

- Revisions in:
 - Quality Management Plan
 - Scope Baseline
 - Schedule Baseline
 - Cost Baseline
 - Issue Log
 - Risk Register
 - Lessons Learned Register
- 
- Project Management Plan
- Project Documents

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QUALITY MANAGEMENT

Manage Quality

What do we need?

- Quality Management Plan ➔ Project Management Plan

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QUALITY MANAGEMENT

Manage Quality

What do we need?

- Lessons Learned Register

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QUALITY MANAGEMENT

Manage Quality

What do we need?

- Quality Control Measurements

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QUALITY MANAGEMENT

Manage Quality

What do we need?

- Quality Control Measurements



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QUALITY MANAGEMENT

Manage Quality

What do we need?

- Quality Control Measurements

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QUALITY MANAGEMENT

Manage Quality

- What do we need?**
- Quality Metrics

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QUALITY MANAGEMENT

Manage Quality

What do we need?

- Risk Report

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QUALITY MANAGEMENT

Manage Quality

- Lessons Learned Register
- Quality Control Measurements
- Quality Metrics
- Risk Report

Project
Documents

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QUALITY MANAGEMENT

Manage Quality

What do we need?

- Organizational Process Assets

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Manage Quality Process

What Do We Need? What Do We Use? What Do We Get?

Part 2

QUALITY MANAGEMENT

Manage Quality

What do we use?

- Data Gathering (Checklists)

→ Checking the acceptability of the repetitive activities

Prepared by Sabri



QUALITY MANAGEMENT

Manage Quality

What do we use?

- Data Analysis techniques like Alternatives Analysis, Document Analysis, Process Analysis, Root Cause Analysis, and etc.

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QUALITY MANAGEMENT

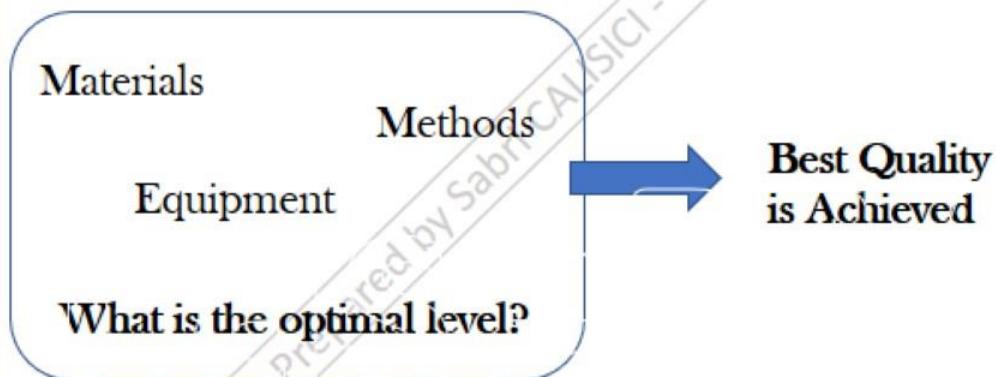
Manage Quality

What do we use?

- Data Analysis techniques like Alternatives Analysis, Document Analysis, Process Analysis, Root Cause Analysis, and etc.

Design of Experiments

→ What is affecting what Quality processes



QUALITY MANAGEMENT

Manage Quality

What do we use?

- Data Analysis techniques like Alternatives Analysis, **Document Analysis**, Process Analysis, Root Cause Analysis, and etc.

We analyze the existing documents to determine the processes which are not supporting our aim to achieve the desired quality.

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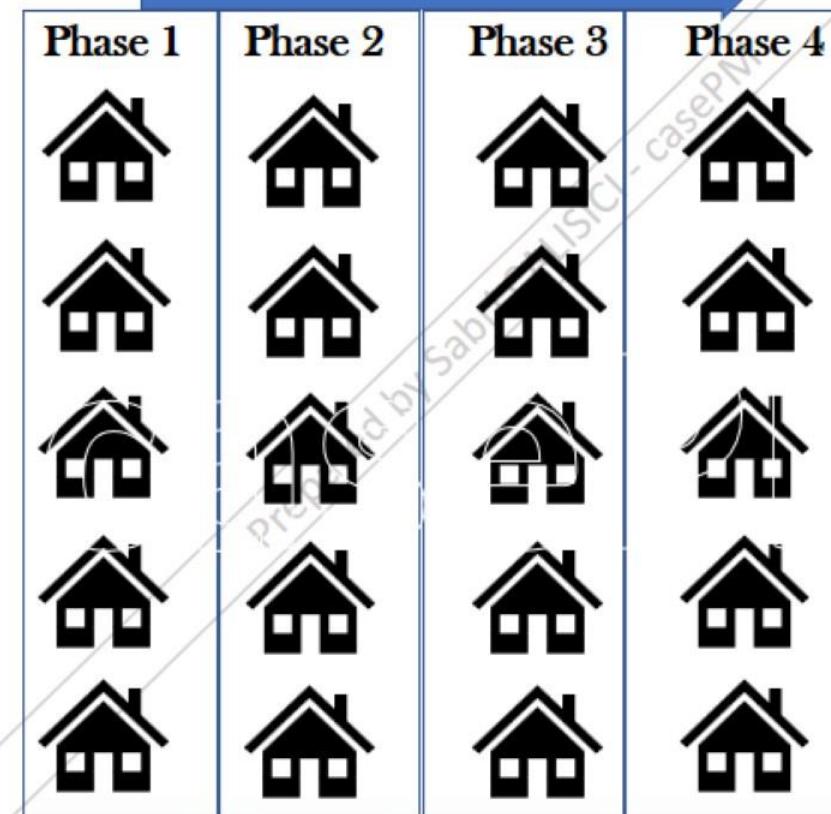
QUALITY MANAGEMENT

Manage Quality

What do we use?

- Data Analysis techniques like Alternatives Analysis, Document Analysis, **Process Analysis**, Root Cause Analysis, and etc.

Continuous Improvement



QUALITY MANAGEMENT

Manage Quality

What do we use?

- Data Analysis techniques like Alternatives Analysis, Document Analysis, Process Analysis, **Root Cause Analysis**, and etc.

➔ Failure Analysis: Determining the Root Cause of the failure

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QUALITY MANAGEMENT

Manage Quality

What do we use?

- Decision Making techniques like Multicriteria Decision Analysis, and etc.

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QUALITY MANAGEMENT

Manage Quality

What do we use?

- Data Representation tools like Affinity Diagrams, Cause and Effect Diagrams, Flowcharts, Histograms, Matrix Diagrams, Scatter Diagrams, and etc.

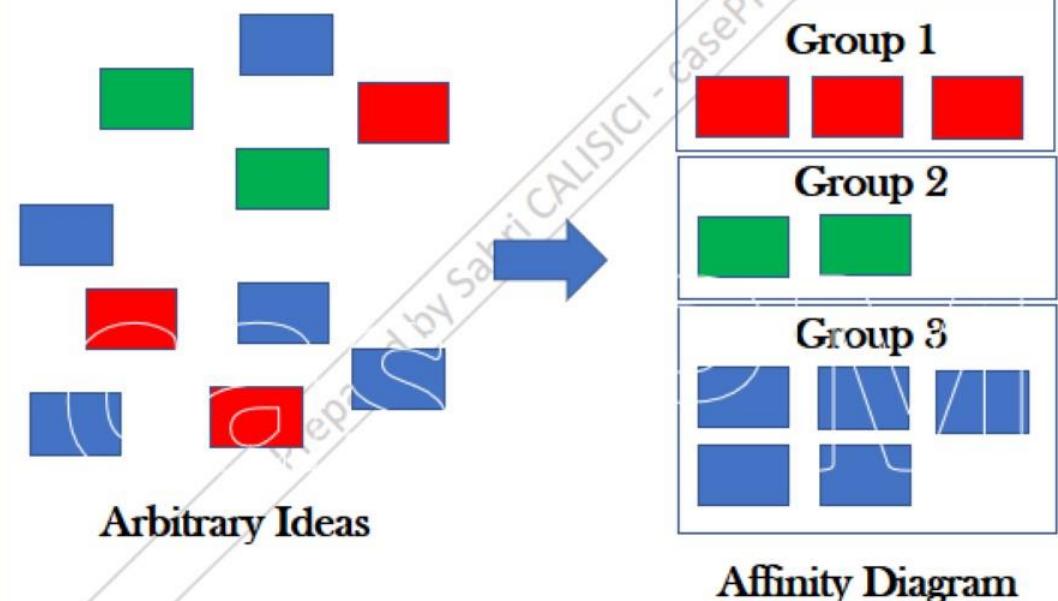
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QUALITY MANAGEMENT

Manage Quality

What do we use?

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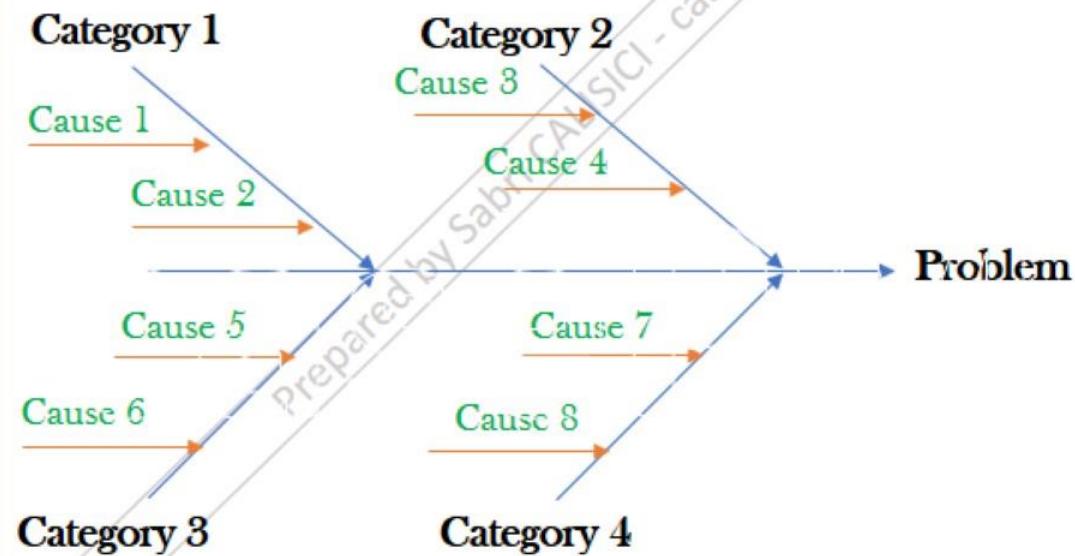
QUALITY MANAGEMENT

Manage Quality

What do we use?

- Data Representation tools like Affinity Diagrams, Cause and Effect Diagrams, Flowcharts, Histograms, Matrix Diagrams, Scatter Diagrams, and etc.

Cause and Effect Diagrams (Fishbone, Ishikawa, Why-why)

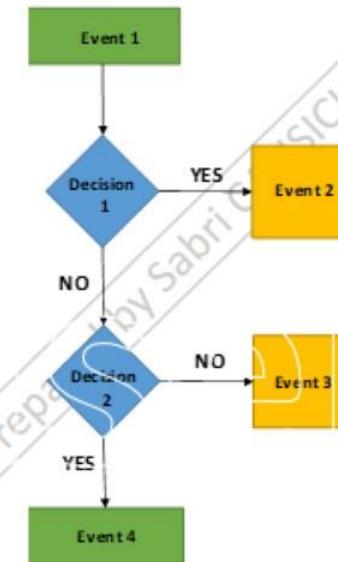


QUALITY MANAGEMENT

Manage Quality

What do we use?

- Data Representation tools like Affinity Diagrams, Cause and Effect Diagrams, **Flowcharts**, Histograms, Matrix Diagrams, Scatter Diagrams, and etc.

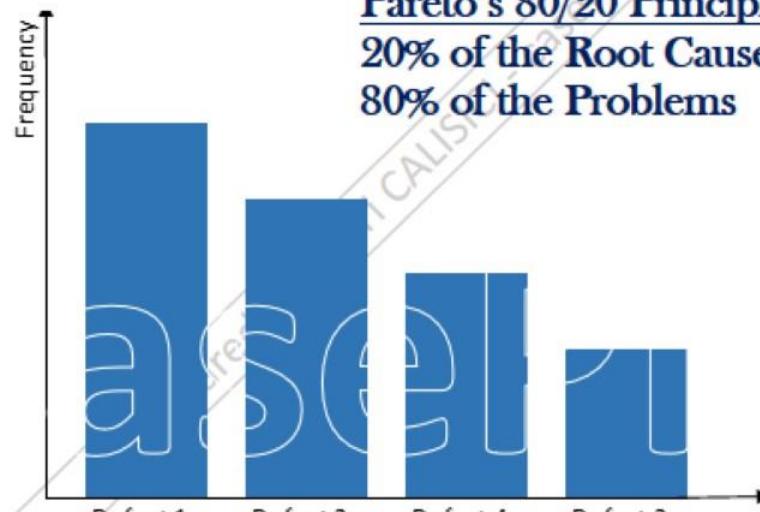


QUALITY MANAGEMENT

Manage Quality

What do we use?

- Data Representation tools like Affinity Diagrams, Cause and Effect Diagrams, Flowcharts, **Histograms**, Matrix Diagrams, Scatter Diagrams, and etc.



Pareto's 80/20 Principle:
20% of the Root Causes result in
80% of the Problems

Pareto Chart

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Manage Quality

What do we use?

- Data Representation tools like Affinity Diagrams, Cause and Effect Diagrams, Flowcharts, Histograms, **Matrix Diagrams**, Scatter Diagrams, and etc.

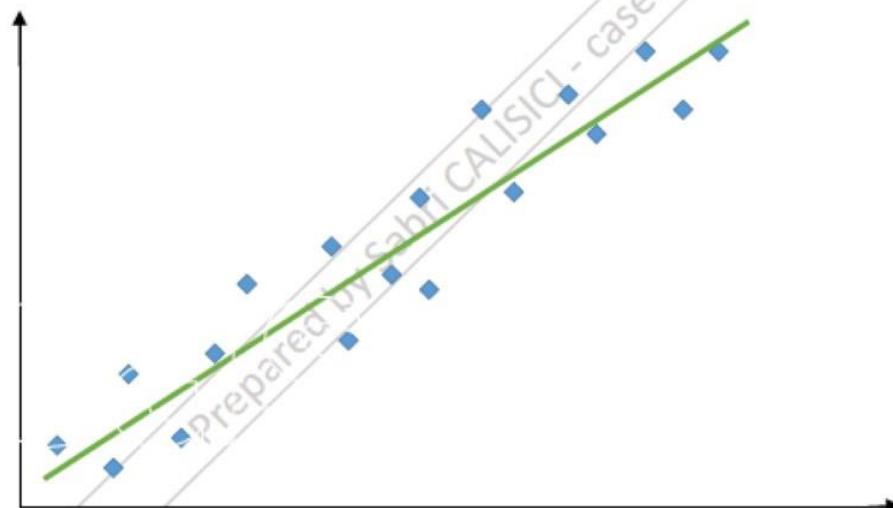
		Causes									
Defects		Cause 1	Cause 2	Cause 3	Cause 4	Cause 5	Cause 6	Cause 7	Cause 8	Cause 9	Cause 10
	Defect 1										
	Defect 2	✓	✓					✓		✓	
	Defect 3			✓	✓			✓			
	Defect 4		✓				✓			✓	
	Defect 5	✓			✓						
	Defect 6	✓				✓		✓	✓	✓	

QUALITY MANAGEMENT

Manage Quality

What do we use?

- Data Representation tools like Affinity Diagrams, Cause and Effect Diagrams, Flowcharts, Histograms, Matrix Diagrams, **Scatter Diagrams**, and etc.



QUALITY MANAGEMENT

Manage Quality

What do we use?

- Audits

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QUALITY MANAGEMENT

Manage Quality

What do we use?

- Design for X (DfX)

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QUALITY MANAGEMENT

Manage Quality

What do we use?

- Problem Solving

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QUALITY MANAGEMENT

Manage Quality

What do we use?

- Problem Solving

How to solve a problem?

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Manage Quality

What do we use?

- Problem Solving

How to solve a problem?

- 1) Identify the Problem
- 2) Find the root cause of the Problem
- 3) Examine the problem in detail
- 4) Define all of the probable solutions and their effects on other parts of the Project
- 5) Determine the ideal solution
- 6) Apply the solution
- 7) Turn back and approve the effectiveness of the solution

QUALITY MANAGEMENT

Manage Quality

What do we use?

- Quality Improvement Methods like Plan-Do-Check-Act, Six Sigma, and etc.

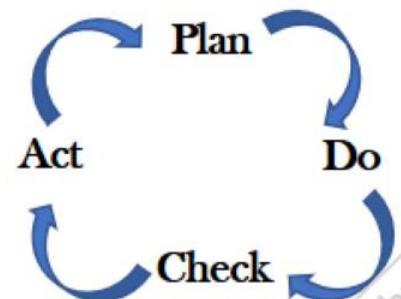
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QUALITY MANAGEMENT

Manage Quality

What do we use?

- Quality Improvement Methods like Plan-Do-Check-Act, Six Sigma, and etc.



Deming Cycle

Plan	= Plan
Do	= Perform
Check	= Monitor
Act	= Improve

QUALITY MANAGEMENT

Manage Quality

What do we use?

- Quality Improvement Methods like Plan-Do-Check-Act, Six Sigma, and etc.

Sigma Level	Defects Per Million Opportunities
1	690,000
2	308,537
3	66,807
4	6,210
5	233
6	3.4

QUALITY MANAGEMENT

Control Quality

QUALITY MANAGEMENT

Control Quality

Control Quality

→ Measuring the deliverables, services, product or result in terms of Quality

Manage Quality



Control Quality



QUALITY MANAGEMENT

Control Quality

Control Quality

- ➔ Measuring the deliverables, services, product or result in terms of Quality
- ➔ The deliverables are internally verified before asking for the customer acceptance

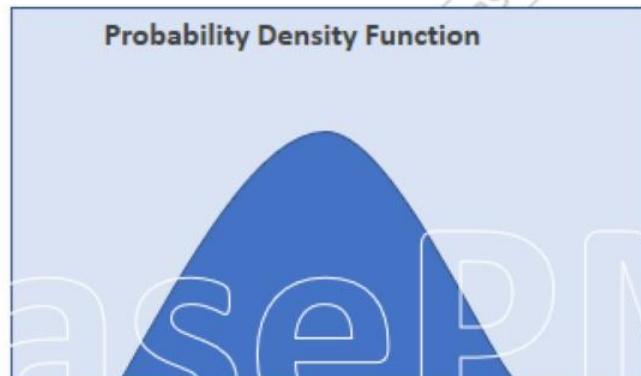
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QUALITY MANAGEMENT

Control Quality

Statistical terms to know for the exam:

- Normal Distribution
- Standard Deviation (Sigma) σ
- Probability
- Mutually Exclusive
- Statistically Independent



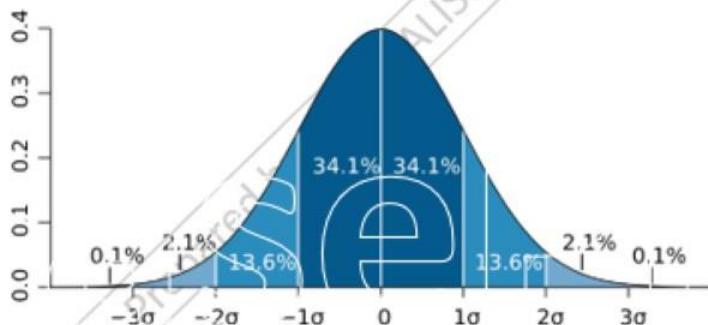
QUALITY MANAGEMENT

Control Quality

Statistical terms to know for the exam:

- Normal Distribution
- Standard Deviation (Σ)
- Probability
- Mutually Exclusive
- Statistically Independent

Probability Density Function



QUALITY MANAGEMENT

Control Quality

Statistical terms to know for the exam:

- Normal Distribution
- Standard Deviation (Sigma) σ
- Probability
- Mutually Exclusive
- Statistically Independent

How likely something is to occur.

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QUALITY MANAGEMENT

Control Quality

Statistical terms to know for the exam:

- Normal Distribution
- Standard Deviation (Sigma) σ
- Probability
- **Mutually Exclusive**
- Statistically Independent



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QUALITY MANAGEMENT

Control Quality

Statistical terms to know for the exam:

- Normal Distribution
- Standard Deviation (Sigma) σ
- Probability
- Mutually Exclusive
- **Statistically Independent**

First Roll



The probability of
Rolling the number 1
:16.67%

Second Roll



The probability of
Rolling the number 1
:16.67% (**not changed**)

Control Quality Process

What Do We Need? What Do We Use? What Do We Get?

Part - 1

QUALITY MANAGEMENT

Control Quality

What do we get?

- Quality Control Measurements

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QUALITY MANAGEMENT

Control Quality

What do we get?

- Verified Deliverables

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QUALITY MANAGEMENT

Control Quality

What do we get?

- Work Performance Information

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QUALITY MANAGEMENT

Control Quality

What do we get?

- Change Requests

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QUALITY MANAGEMENT

Control Quality

What do we get?

- Revisions in:

- Quality Management Plan → Project Management Plan
- Issue Log
- Lessons Learned Register
- Risk Register
- Test and Evaluation Documents

Project
Documents

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QUALITY MANAGEMENT

Control Quality

What do we need?

- Quality Management Plan → Project Management Plan

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QUALITY MANAGEMENT

Control Quality

What do we need?

- Lessons Learned Register

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QUALITY MANAGEMENT

Control Quality

What do we need?

- Quality Metrics

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QUALITY MANAGEMENT

Control Quality

What do we need?

- Test and Evaluation Documents

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QUALITY MANAGEMENT

Control Quality

- Lessons Learned Register
- Quality Metrics
- Test and Evaluation Documents

Project
Documents

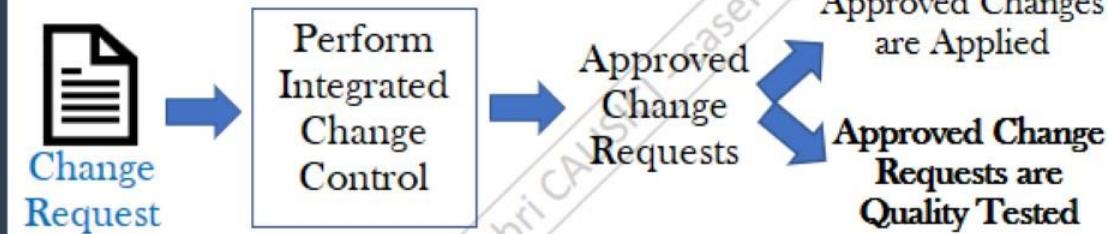
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QUALITY MANAGEMENT

Control Quality

What do we need?

- Approved Change Requests



QUALITY MANAGEMENT

Control Quality

What do we need?

- Deliverables

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QUALITY MANAGEMENT

Control Quality

What do we need?

- Work Performance Data

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QUALITY MANAGEMENT

Control Quality

What do we need?

- Enterprise Environmental Factors

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QUALITY MANAGEMENT

Control Quality

What do we need?

- Organizational Process Assets

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Control Quality Process

What Do We Need? What Do We Use? What Do We Get?

Part - 2

QUALITY MANAGEMENT

Control Quality

What do we use?

- Data Gathering techniques like **Checklists**, Check Sheets, Statistical Sampling, Questionnaires and Surveys, and etc.



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QUALITY MANAGEMENT

Control Quality

What do we use?

- Data Gathering techniques like Checklists, Check Sheets, Statistical Sampling, Questionnaires and Surveys, and etc.

Defect Type	Mon	Tu	Wed	Th	Fr	Total
Spray failure	I			III	II	6
Wrong color		III	I	I	II	7
Wrong part issued	I			I		2
Label is missed		I	I	I		3

Prepared by:

QUALITY MANAGEMENT

Control Quality

What do we use?

- Data Gathering techniques like Checklists, Check Sheets, **Statistical Sampling**, Questionnaires and Surveys, and etc.
- **Attribute Sampling**
- Variable Sampling

Defective or not (Yes or No)

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QUALITY MANAGEMENT

Control Quality

What do we use?

- Data Gathering techniques like Checklists, Check Sheets, **Statistical Sampling**, Questionnaires and Surveys, and etc.
- Attribute Sampling
- Variable Sampling

How much? How Good? How Bad?

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QUALITY MANAGEMENT

Control Quality

What do we use?

- Data Gathering techniques like Checklists, Check Sheets, Statistical Sampling, **Questionnaires and Surveys**, and etc.

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QUALITY MANAGEMENT

Control Quality

What do we use?

- Data Analysis methods like **Performance Reviews**, Root Cause Analysis, and etc.

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QUALITY MANAGEMENT

Control Quality

What do we use?

- Data Analysis methods like Performance Reviews, Root Cause Analysis, and etc.

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QUALITY MANAGEMENT

Control Quality

What do we use?

- Inspection

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QUALITY MANAGEMENT

Control Quality

What do we use?

- Testing and Product Evaluations

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QUALITY MANAGEMENT

Control Quality

What do we use?

- Data Representation tools like Cause-and-Effect Diagrams, Control Charts, Histograms, Scatter Diagrams, and etc.

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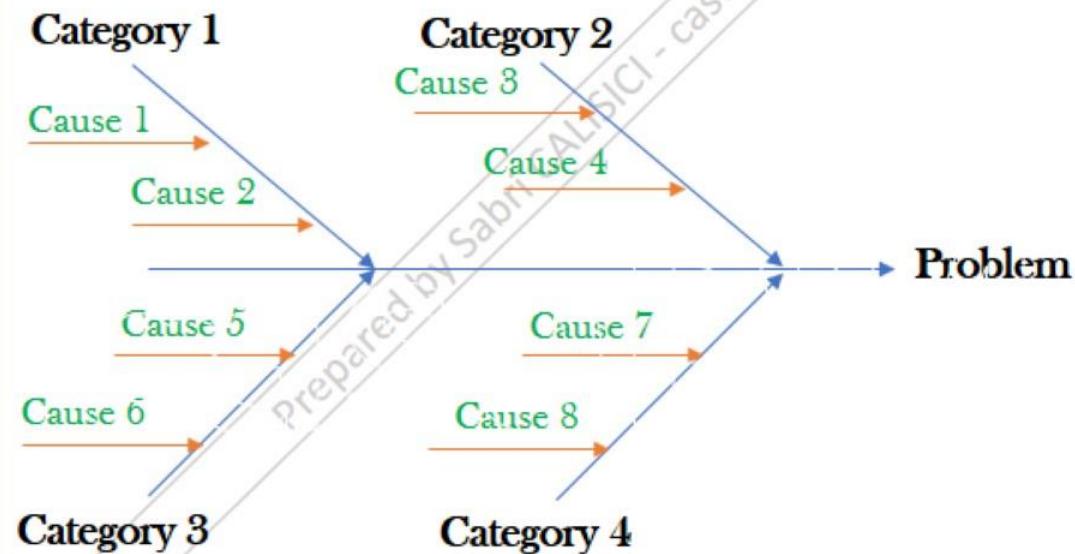
QUALITY MANAGEMENT

Control Quality

What do we use?

- Data Representation tools like **Cause-and-Effect Diagrams**, Control Charts, Histograms, Scatter Diagrams, and etc.

Cause and Effect Diagrams (Fishbone, Ishikawa, Why-why)



QUALITY MANAGEMENT

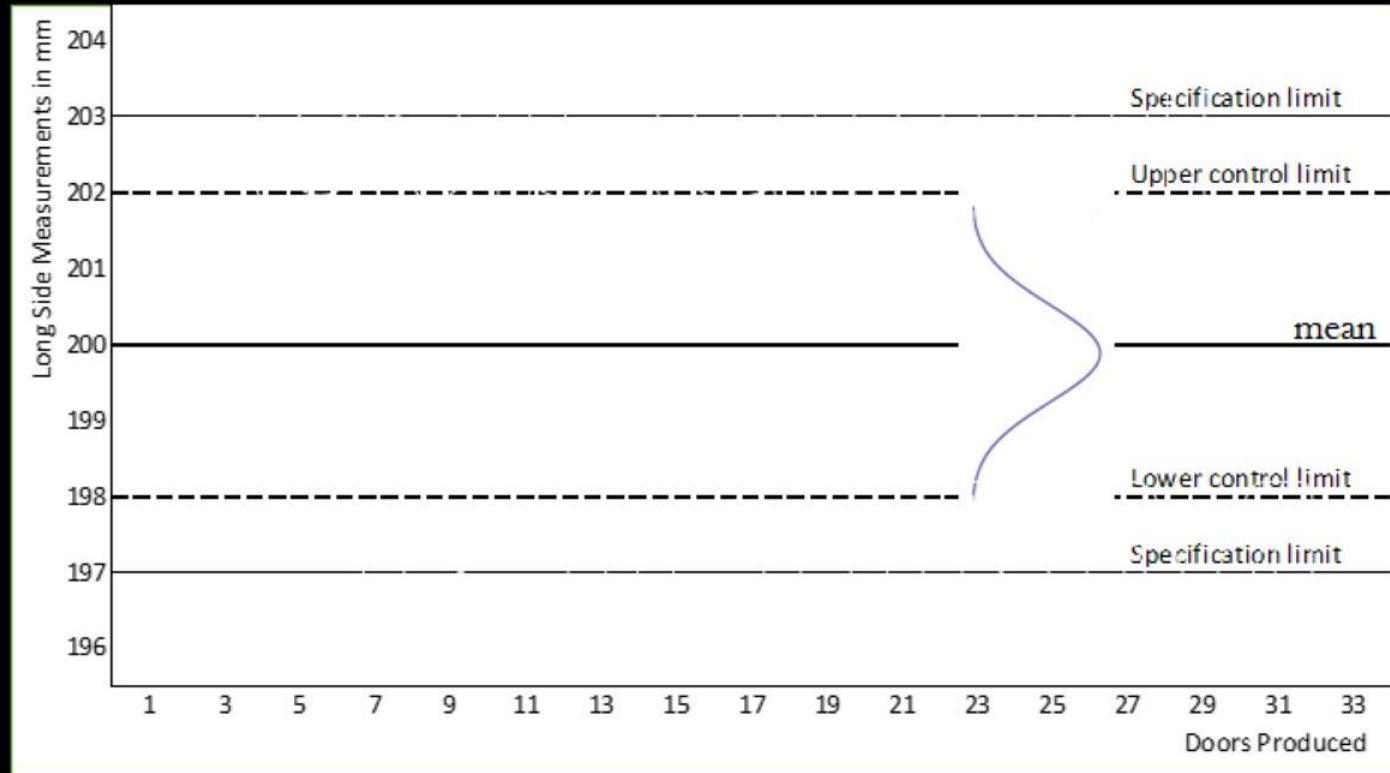
Control Quality

What do we use?

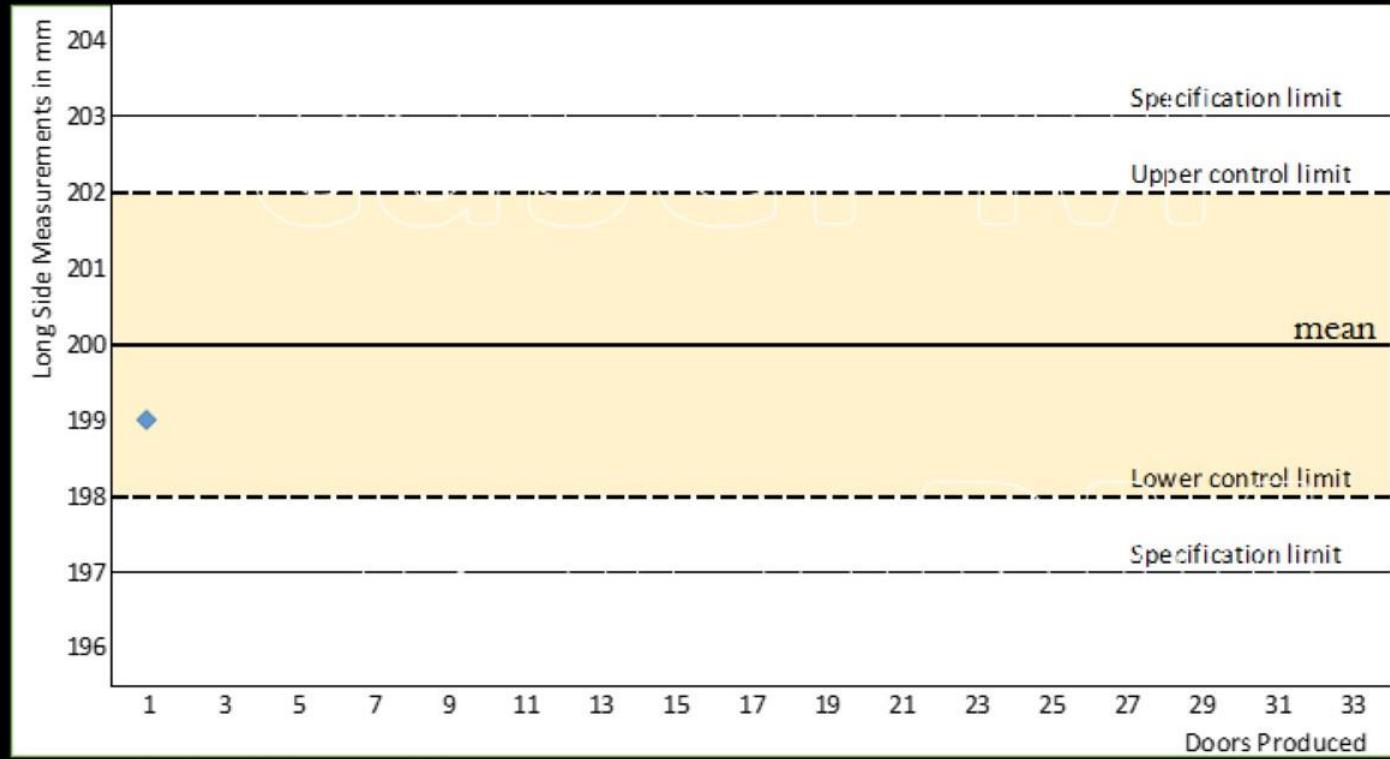
- Data Representation tools like Cause-and-Effect Diagrams, **Control Charts**, Histograms, Scatter Diagrams, and etc.

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Control Charts

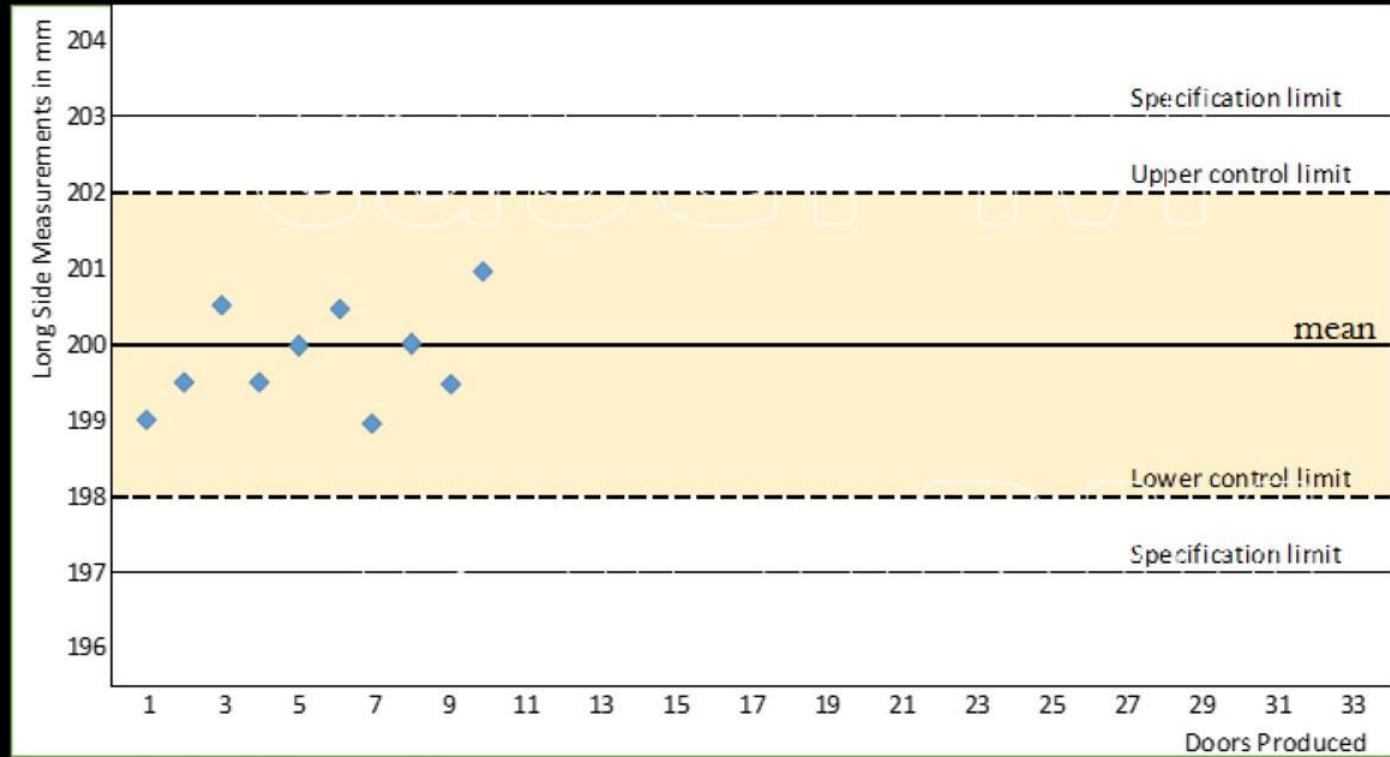


Control Charts



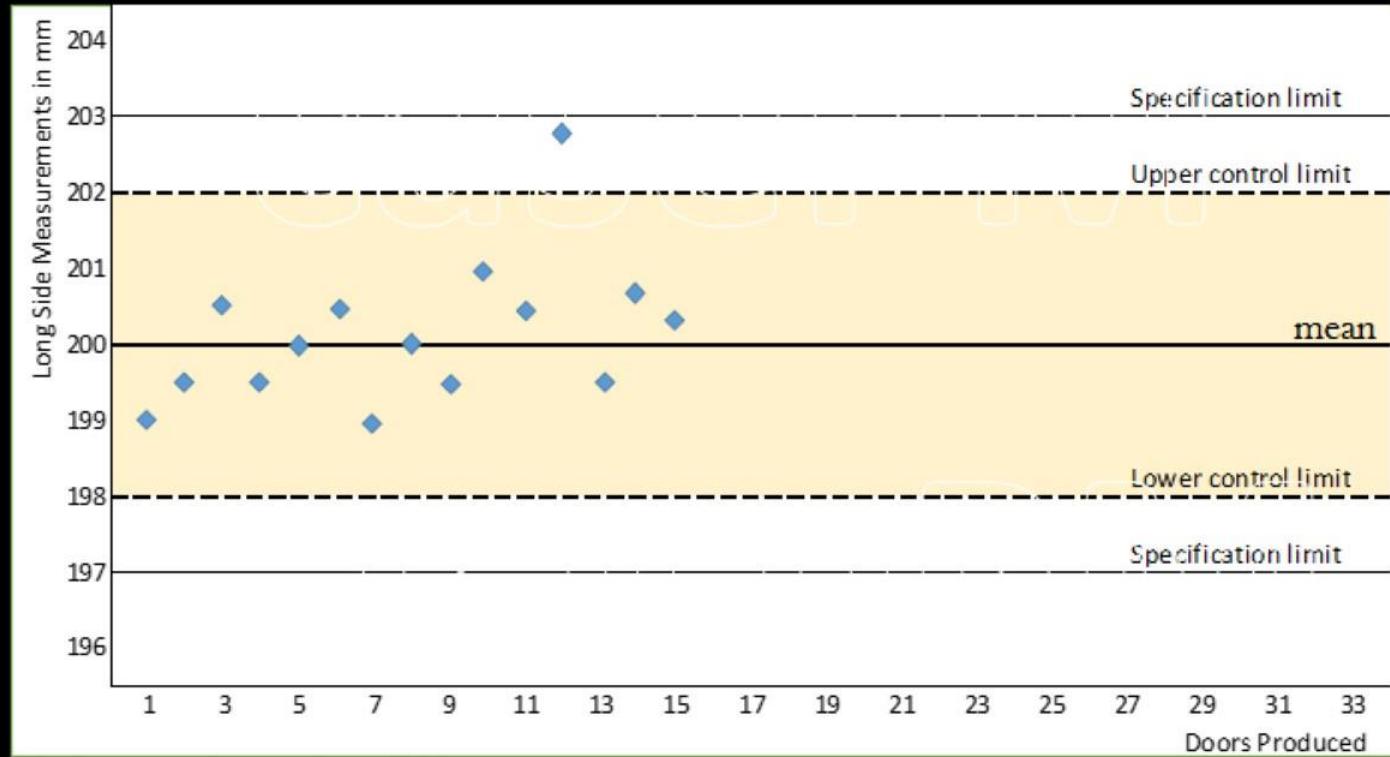
Stable (In control): No problem, normal.

Control Charts



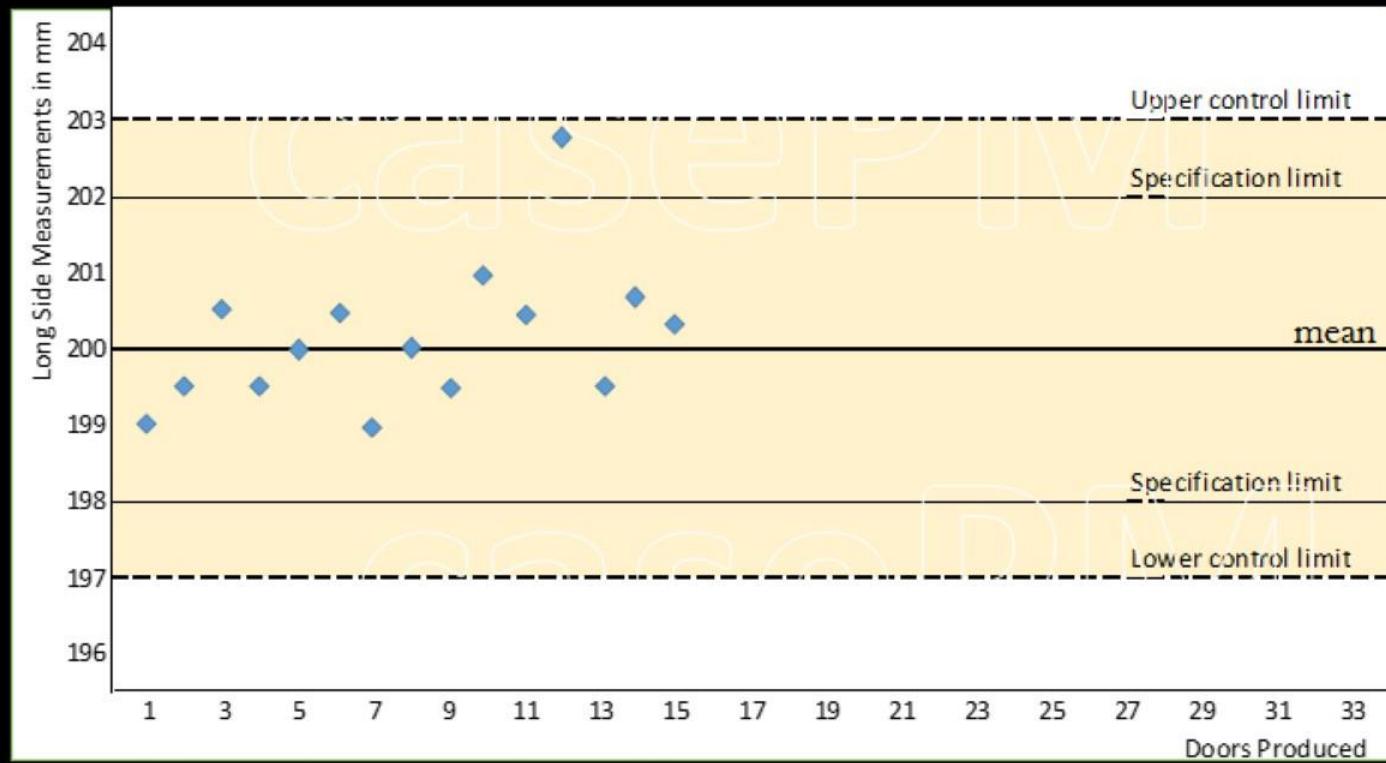
Stable (In control): No problem, normal.

Control Charts



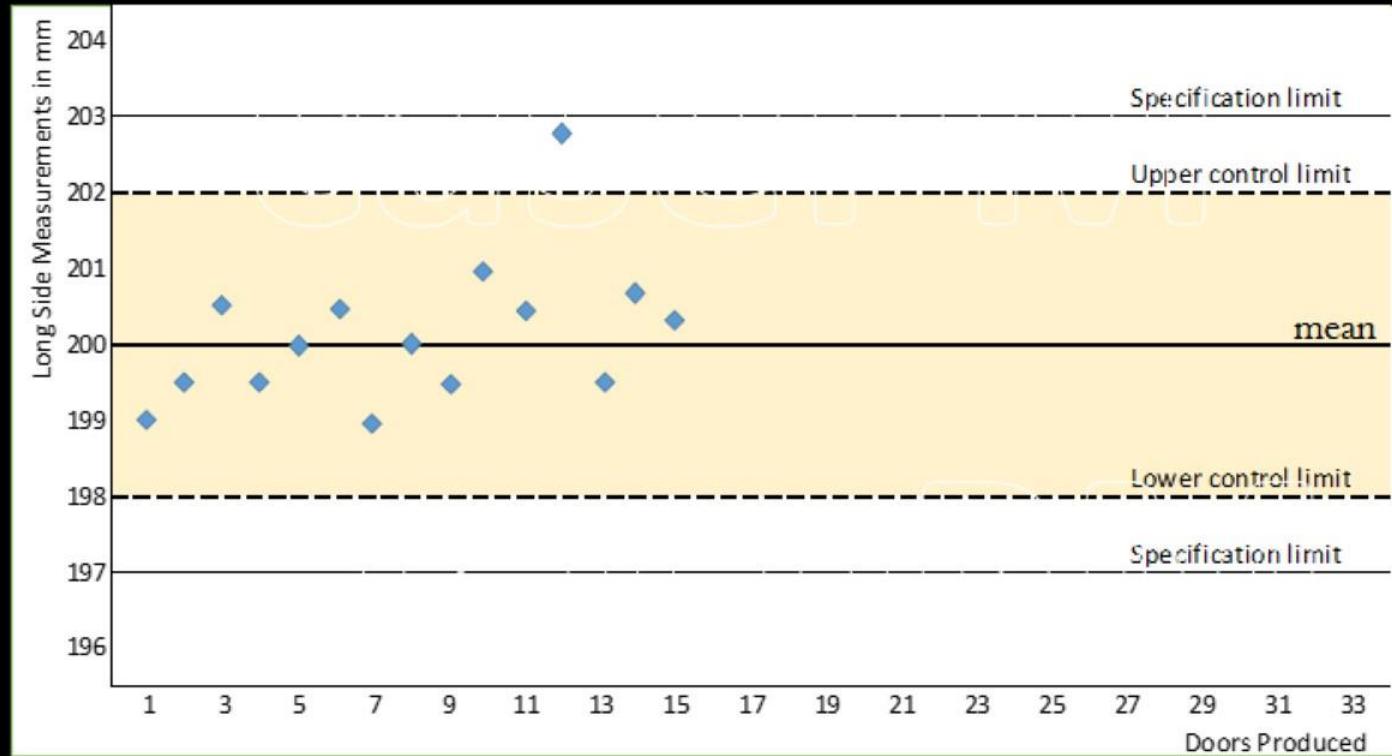
Unstable (Out of Control): Root cause analysis is needed; rework is needed

Control Charts

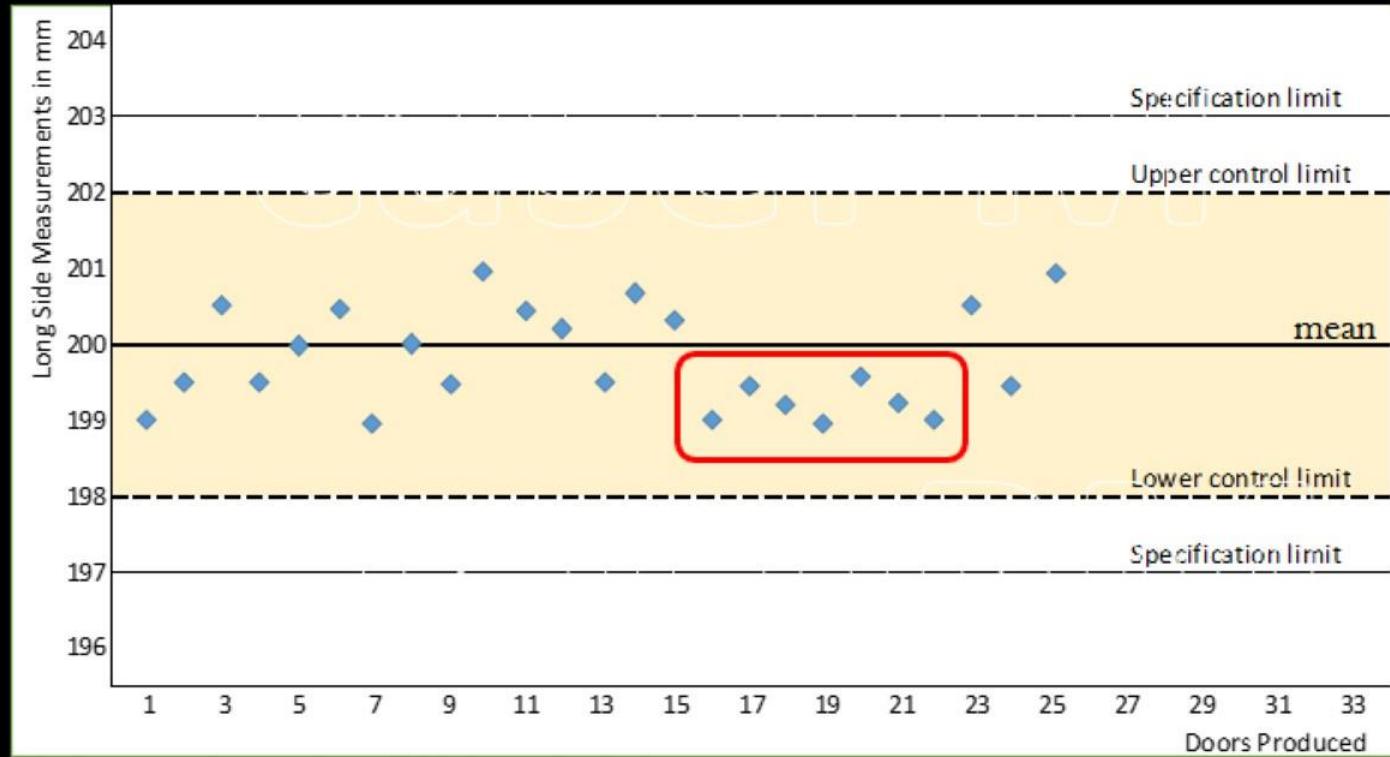


Stable (In control): But we need to make improvements!

Control Charts



Control Charts



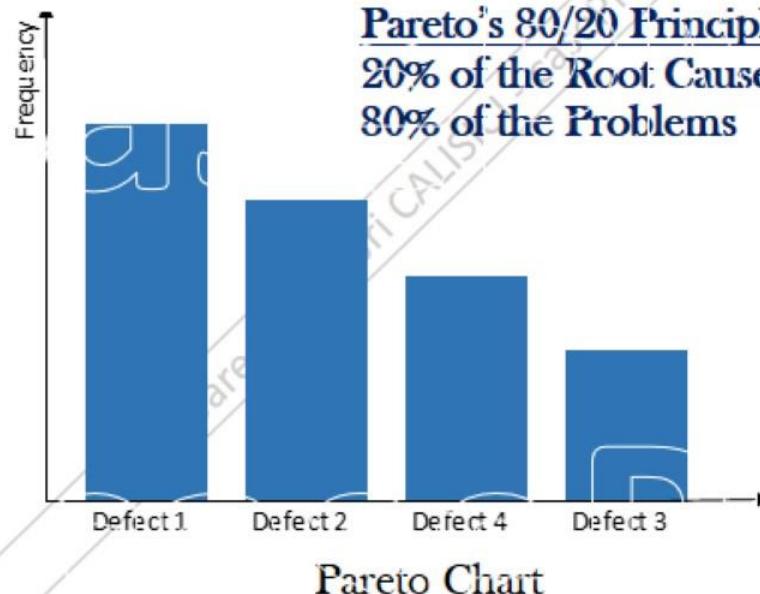
Unstable (Out of Control): Rule of 7!!!

QUALITY MANAGEMENT

Control Quality

What do we use?

- Data Representation tools like Cause-and-Effect Diagrams, Control Charts, **Histograms**, Scatter Diagrams, and etc.

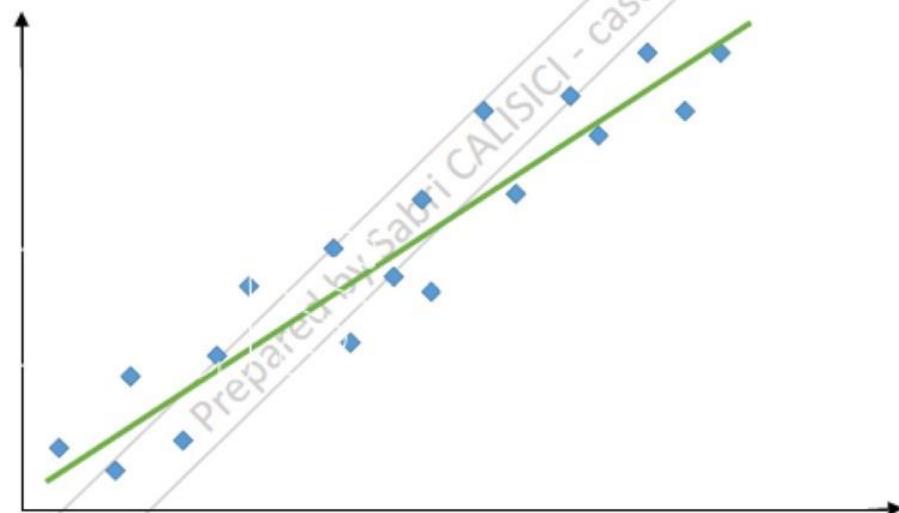


QUALITY MANAGEMENT

Control Quality

What do we use?

- Data Representation tools like Cause-and-Effect Diagrams, Control Charts, Histograms, **Scatter Diagrams**, and etc.



QUALITY MANAGEMENT

Control Quality

What do we use?

- Meetings

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QUALITY MANAGEMENT

Important Notes

QUALITY MANAGEMENT

Important Notes

Important Notes

- Quality: Providing the customer satisfaction by delivering exactly what the customer wants.
- Prevention is better than inspection.
- Overworking may cause Quality problems.
- Rushing through the Quality inspections may cause Quality problems
- If the product does not satisfy the Quality requirements, it needs to be fixed.
- The Quality processes, tools, and techniques have to be tailored by the Project Manager.
- Only the authorized processes and techniques should be applied.

QUALITY MANAGEMENT

Agile Considerations

QUALITY MANAGEMENT

Agile Considerations

Ex: IOS Application

- Feasibility
- Initiation
- Release plan
- Release
 - 1st Iteration
 - 2nd Iteration
 - 3rd Iteration
 -
- Close-out

Project Requirements are defined for each iteration just before the iteration.

After completion of each iteration:
Retrospective

Performance of the Quality processes are controlled

- Quality is checked frequently
- Quality issues are uncovered earlier
- Each iteration is better than the previous one
- Quality issues are solved/corrected less costly

QUALITY MANAGEMENT

Tailoring Quality Management

QUALITY MANAGEMENT

Tailoring Quality Management

Tailoring Considerations for Quality Management

While determining the Quality Management processes to be used in the Project:

- We need to consider the existing organizational governance related to Quality Management
- We need to consider the existing Quality standards, and legal regulations and restrictions
- We need to consider the Quality improvement processes within the organization
- We need to consider how collaborative our relationships with the stakeholders are