Project Quality Management
Objective

- The Objective of Project Quality Management is to ensure that the Project deliverables are aligned to both customer and performing organizational quality parameters.
- Tailor the applicable processes and activities from the organizational Quality Management Systems as appropriate to meet the Project and Product requirements besides providing a framework for Continual Improvements.
- The session will cover aspects relating to Plan Project quality, Perform Quality Assurance and Controlling quality measures as appropriate.
Quality – Definition

- **Fitness for use.**
  - Joseph M. Juran

- **"Conformance to requirements."**
  - Philip B. Crosby

- **"Uniformity around a target value." and "The loss a product imposes on society after it is shipped."**
  - Genichi Taguchi

Quality is defined as “The degree to which a set of inherent characteristics fulfill requirements” ISO 9000

- *PMBOK®* Guide 5th Edition
# What is Quality?

<table>
<thead>
<tr>
<th>What</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Results</strong></td>
<td>• adhere to Requirements.</td>
</tr>
<tr>
<td><strong>Conformance</strong></td>
<td>• to Product requirements.</td>
</tr>
<tr>
<td><strong>Zero Defects</strong></td>
<td>• no defects in the delivered product or service.</td>
</tr>
<tr>
<td><strong>No deviation</strong></td>
<td>• to Requirements.</td>
</tr>
<tr>
<td><strong>No rework</strong></td>
<td>• Do it right the first time.</td>
</tr>
</tbody>
</table>
Who is effected by Quality?
Key Quality Terms

- **Quality plan**
  - Identifying and documenting the quality requirements and applicable standards for the project and the approach for compliance

- **Quality Assurance**
  - The process of auditing to ensure that planned quality standards and process are followed

- **Control Quality**
  - The process of monitoring and recording the results of project quality activities and provide recommendations (if any) for improvements
Key Quality Terms

- **Grade**
  - Quality and grade are not the same.
  - Grade is the classification of products based on its features / Characteristics.
  - It is the responsibility of the project team members to choose the right grade of raw materials / resources to meet the customer specifications / requirements

- **Accuracy**
  - Closeness to the target value

- **Precession**
  - Closeness between repeated measurements
### Grade v/s Quality

<table>
<thead>
<tr>
<th>Grade</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade is a category assigned to products or services having the same functional use but different technical characteristics</td>
<td>Quality is the “degree to which a set of inherent characteristics fulfill requirements”</td>
</tr>
<tr>
<td>Low grade may not always be a problem</td>
<td>Low quality is always a problem</td>
</tr>
<tr>
<td>Example - Low grade may be limited number of features v/s high grade may be numerous features</td>
<td>Example - Low quality refers to many defects, poor documentation etc. versus high quality which means no defects</td>
</tr>
<tr>
<td>Precision</td>
<td>Accuracy</td>
</tr>
<tr>
<td>--------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td>Precision means values of repeated measurements are clustered and have little scatter</td>
<td>Accuracy means measured value is very close to the true value</td>
</tr>
<tr>
<td>Precise measures may not always be accurate</td>
<td>Very accurate measure may not necessarily be precise</td>
</tr>
</tbody>
</table>
APPROACH FOR QUALITY MANAGEMENT
The approach of quality Management focuses on the principle of reducing variation and improving the conformance to requirements (“right first time and every time”).

Following are key focus areas which will help achieving the stated quality Objectives:

- Customer Satisfaction and Focus
  - Project must produce what is expected – “Fitness for Purpose”
  - Product / Service must satisfy Customer Requirements – “Fitness For Use”
- Customer is the key for the business/ project success
- Design, develop and Deliver Product/ service/ solutions that fulfill their needs
Approach for Quality Management

- Prevention over Correction
  - Do it right at the first time
  - Eliminates Reworks and Rejections
  - Cost of prevention is lesser than correction
  - Quality should be planned, defined and built into the project’s deliverables
  - It should not be inspection driven (reactive)

- Cost of Quality
  - Focus on Optimizing Prevention Costs, Reducing Appraisal Costs and Minimizing/Eliminating Cost of Poor Quality
Approach for Quality Management

- Management Commitment and Responsibility
  - Commitment and personal involvement is required from top management
  - Helps in creating and deploying well defined process, systems, methods and resources

- People Involvement
  - Employees at all levels are to be involved in the quality management process.
  - Involvement enables team work
  - Organisation will receive quicker and better solutions to problems
- Process Approach
  - Organization has to develop and deploy well defined set of process
  - A well defined process ensures consistency in the output.

- Statistical Approach
  - Data and Metric driven decision making must be the basis for an effective quality management initiative.
  - Organizations have to identify metrics and measurements for the organization as a whole and also specific to the projects
Continuous Improvement (Kaizen)
- Continuous improvement of all operations and activities is the key for effective quality management
- The PDCA (Plan-Do-Check-Act) cycle is the basis for quality improvement
- Improving the process will lead to improvement in product quality, resulting in increased customer satisfaction
- Organizations have to continuously look for opportunities to improve their Process, Product, Systems and Resource capabilities
- Well known quality improvement theories include: Total Quality Management and Six Sigma.
PDCA Cycle

also known as Deming Cycle or Shewhart Cycle
Project Quality Management

- Applicable to all projects
- For both process and product quality
- Can be formal or informal
  - depending on the size and complexity of the project
- Project Manager is responsible
  - The project manager must ensure all quality functions are established and implemented in a project throughout its life cycle.
Quality Theories

- Six Sigma
- Just in Time
- Total Quality Management
- Just in Time
- CMMi
- 80-20 Rule
- Zero Defects
Quality Theories: Six Sigma


DMAIC: is the Six Sigma methodology to conduct Root Cause Analysis

- 1 Sigma: 68.27%; 317.5 defects/1000 units
- 3 Sigma: 99.73%; 2.7 defects/1000 units
- 6 Sigma: 99.99985%; 0.0034 defects/1000 units
Quality Theories: ISO

- ISO: provides guidance and tools to ensure products and services consistently meets customer requirements and that quality is consistently improved.

- Focuses on:
  - Customer Satisfaction
  - Prevention over Inspection
  - Continuous Improvement
  - Cost of Quality

- Is a Management Responsibility
Quality Theories: CMMi

- Capability Maturity Model integration
  - Developed by Carnegie Mellon University
  - Improves overall Software Quality (design, development, deployment)
Quality Theories

- **80-20 Principle**
  - 80% outcomes can be attributed to 20% of the causes

- **Zero Defect – Philip Crosby**
  - Management led program to eliminate defects in Industrial Production
  - Cost of poor quality, prevention over inspection and Zero Defects
  - Quality is ‘Conformance to Requirements’
Evolution of Quality Management
PLAN QUALITY MANAGEMENT

Planning Process Group

Plan Quality Management
Perform Quality Assurances
Control Quality
Plan Quality Management

- Is the process of identifying project quality requirements and/or standards applicable to both project process and product
- Provides an approach for achieving compliance to the project’s processes/standards and validate its effectiveness throughout the project lifecycle.
Plan Quality Management

INPUTS
- Project Management Plan
- Stakeholder Register
- Risk Register
- Requirements Documentation
- Enterprise Environmental Factor
- Organizational Process Assets

TOOLS and TECHNIQUES
- Cost Benefit Analysis
- Cost Of Quality
- Seven basic quality Tools
- Benchmarking
- Design Of Experiments
- Statistical Sampling
- Additional Quality Planning Tools
- Meetings

OUTPUTS
- Quality management Plan
- Process Improvement Plan
- Quality Metrics
- Quality Checklists
- Project Document Updates

Plan Quality – Inputs, Tools and Techniques and Outputs
Plan Quality Management

Inputs

- Project Management Plan
  - Scope Baseline
    - Scope Statement
    - WBS
    - WBS Dictionary
  - Schedule Baseline
    - Provides the project manager with the required information to identify the Metrics, Measurement and control process to be included in the quality plan
  - Cost Performance Baseline
    - Provides the project manager with the required information to identify the cost metrics and measurement and control process to be included in the quality plan.
- Other Management Plans
Plan Quality Management

Inputs

• **Stakeholder Register**
  • Stakeholder Register contains the information about the identified project Stakeholders
  • Stakeholders’ needs and expectations with respect to quality have to be identified
  • The project Manager must ensure effective Stakeholder participation while developing the quality plan.

• **Risk Register**
  • Provides key inputs when preparing the quality plan as identified risk may impact the project quality requirements.

• **Requirements Documentation**
  • Product and Project Specific Quality requirements.
Plan Quality Management

Inputs

• Enterprise Environmental Factor
  • Standards, rules and guidelines
  • Legal and Government Regulations
  • Working and Operating Environments

• Organizational Process Assets
  • Quality policies
  • Procedures and guidelines,
  • Historical databases and
  • Lessons learned from previous projects
Cost Benefit Analysis

- Cost and benefit tradeoffs of meeting quality requirements to be taken into consideration when planning the quality activities.

The primary cost of meeting Quality Requirements is expenses associated with quality management activities.
Cost Of Quality
- The performance of the quality system can be measured with the cost associated with it over the period of time.
- There are three major cost components namely Failure cost, Appraisal cost and Prevention cost.
- Optimum Quality is achieved when the incremental cost spent on prevention activities matches the incremental revenue from reduction in non conforming products.

Cost of Conformance
- Prevention Cost
  - Training
  - Document Processes
  - Equipment
  - Time to do it Right
- Appraisal Cost
  - Testing
  - Inspections

Cost of Non-Conformance
- Internal Failure Cost
  - Rework
  - Scrap
- External Failure Cost
  - Liabilities
  - Warranty Work
  - Lost Business

Money spent to AVOID failures
Money spent because of failures
Plan Quality Management
Tools and Techniques

Seven Basic Quality Tools

- Cause & Effect Diagram
- Flowcharts
- Checksheets
- Pareto Diagrams
- Histograms
- Control Charts
- Scatter Diagrams
Plan Quality Management
Tools and Techniques

- **Cause and Effect Diagram**
  - Used in root cause analysis
  - also called a fishbone diagram or Ishikawa diagram
  - used to organize brainstorming ideas about the potential causes of a problem.
  - helps you visualize relationships between a problem and possible underlying causes
  - Root cause can be uncovered by asking “Why-Why” or “How – How”
  - Also used in Risk analysis
Plan Quality Management
Tools and Techniques

Cause and Effect Diagram

Defect = Late Deliveries

- Wrong directions from customer
- Ice
- Road Work
- Road Conditions
- Other
- Trucks
- Breakdown
- Flat Tire
- Too slow
- Don’t know the route
- Poorly Trained
- Drivers

Sometimes called “fishbone” or Ishikawa diagrams
Flow Charting
- Representation of a process or Process Maps. It gives the reader a clear understanding of the input, output and process steps to be performed in a sequential order for a given process. There are various flowcharting tools available like Process Flow diagram, Cross Functional Process Maps, SIPOC etc.
Flowcharting

- A flow chart shows how a process or system flows from beginning to end and how the elements interrelate.
- Flowcharts show the activities, decision points, branching loops, parallel paths and the overall order of processing.
- Flowcharts may prove useful in understanding and estimating the cost of quality in a process.
Plan Quality Management
Tools and Techniques

Checksheets

– Also called as Tally Sheets used for gathering data. These form standard templates for structured data gathering for effective analysis of the performance data

<table>
<thead>
<tr>
<th>SI No.</th>
<th>Defect Classification</th>
<th>No. Of Defects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>User Interface Defects</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>Unexpected exceptions</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>System Crashes</td>
<td>25</td>
</tr>
<tr>
<td>4</td>
<td>Wrong calculations</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Integration Failures</td>
<td>7</td>
</tr>
<tr>
<td>6</td>
<td>Others</td>
<td>22</td>
</tr>
</tbody>
</table>
Histogram

- a graphical grouping of data showing the distribution of variables

- Each bar in the histogram represents a character/problem and the height of the bar indicates the frequency of occurrence

- This tool helps in grouping the causes of problems.
Pareto Chart
- is a form of bar charts
- each bar represents a character/problem and the height of the bar indicates the relative frequency
- used as prioritizing tool to identify the vital few.
- based on the 80/20 rule, which says 80 percent problems are due to 20 percent causes
- also called ordered histogram
- is used when
  - Volume of data for analysis is large
  - To Identify main cause of problems
  - When communicating data with Stakeholders
  - To Prioritize tasks
  - To see the relative importance of data
Control Chart
- Provides a graphical representation of the process behavior over a period of time
- Helps in determining whether a process is in control or out of control.
- Process performance / results are measured over a period of time and plotted in a graph.
- Changes in process behavior will be indicated by abnormal points on the graph.

Control limits
- Usually the control limits are set at ± 3 sigma (i.e. standard deviation) of the process
- Tolerance limits or Specification limits are not same as control limits.
- Control limits will be within the tolerance or specification limits.
Control Chart

- Variations
  - Any variation within the control limits without showing any trend is due to common cause variation
  - Observation falls outside the upper or lower control limits and observation which falls within control limits, showing any trend is due to special cause variation
- Some of the indications of special cause variation.
  - One or more points falling outside the upper control and lower control limits
  - Seven or more consecutive points in one side of the centerline, also known as Rule Of Seven
Plan Quality Management
Tools and Techniques

Control Chart

Out of Control
Rule of Seven
Plan Quality Management
Tools and Techniques

Control Limits

- + or – 3 standard deviation (SD) 99.73% of data covered
- + or – 2 SD 95.44% of data covered
- + or – 1 SD 68.26% of data covered
Run chart
- Graphical representation of the product or process measurement over a period of time.
- Specific measurements are collected over predetermined intervals and plotted on a time scale.
- Helps in understanding the trend in process/product characteristic over a period of time.
Scatter Diagram
- a tool to identify the correlation/association between a cause and an effect
- Measurements are taken for the quality the characters and suspected causes for various levels
- The values are plotted against each other to see whether there is any association between them
Plan Quality Management

Tools and Techniques

- No Correlation
- Positive Moderate Correlation
- Positive Strong Correlation
- Negative Strong Correlation

Speed of Vehicles vs. Number of Accidents

1. No Correlation
2. Positive Moderate Correlation
3. Positive Strong Correlation
4. Negative Strong Correlation

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Energising Digital Governance
7 QC Tools

- Traces complaints about quality problems.
- Process showing relationships among process steps. Process Map.
- Effective collection of data about potential quality problem. Inspection.
- Histogram. 80-20 rule. Identify & prioritize problem areas.
- Central tendency, dispersion. Frequency.
- Results of a process over time. Identify process gaps. Preventive.
- Relationship between two variables.
Plan Quality Management

Tools and Techniques

• Benchmarking
  • The project planned or actual project quality practices can be compared with those of other projects
  • best practices can be considered for quality Planning.

• Design of Experiments (DOE)
  • statistical method by which the factors influencing the output of a process or product can be optimized
  • It is a planned set of tests on the variable with one or more inputs.
  • It allows changing all the important factors or inputs at a time and helps conduct experiments
  • results are then analyzed to identify the optimum value of each factor.
  • Used to determine number and type of tests required for optimum quality
  • Once factors are known that influence product, quality checklists can be developed

• Statistical Sampling
  • selecting and evaluating the characteristics/ performance of a representative portion of the population
Additional Quality Planning Tools

- **Brainstorming**
  - an effective way to generate several ideas on a specific scenarios

- **Force Field Analysis**
  - Useful technique for looking at all the forces FOR and AGAINST a decision
  - Help you to improve its probability of success

- **Nominal Group Techniques**
  - Also a form of Brainstorming,
  - The generation of idea is done by a small group
  - Ideas generated are reviewed by another bigger group.

- **Quality Management and Control Tools**
  - Tools to logically sequence and link the activities to identify and remove non-value added activities
Meetings

- This is a forum where all relevant Stakeholders from the project team, who are responsible for Planning and Executing quality related activities, meet to discuss the applicable tools and techniques to be used in the project in terms of how, where, when and its effectiveness. This will be documented in the Project Quality Management Plan.
Plan Quality Management

• **Quality Management Plan**
  
  Contains details as to how the project management team is going to implement the quality policy and other quality activities such as quality assurance and quality control

• **Quality Metrics**
  
  Quality metrics clearly describe the operational definition of process or product attributes in specific terms along with Project Defined Tolerance Limits/Thresholds tailored from Organizational Capability Baselines

  Some of the quality metrics include but not limited to
  
  ✓ Schedule variance
  ✓ Cost Variance
  ✓ Effort variance
  ✓ Defect rate
  ✓ Defect frequency
  ✓ Defect Density
  ✓ Defect removal efficiency
  ✓ Mean Time Between Failures
  ✓ Mean Time to Repair etc.
Plan Quality Management

Outputs

• Quality Checklists
  • A structured verification aid that helps in ensuring all Project specific quality requirements/standards are captured in the form of a tool or other means, which when used effectively (on-time), will help identify and address potential deviations or non-conformances before it is delivered to the client or end users

• Process Improvement Plan
  • Addresses how to measure the effectiveness or efficiency of the process and enhance their value.
  • This will consider
    ✓ Process boundaries
    ✓ Process Configuration
    ✓ Process Metrics along with thresholds applicable for the project
    ✓ Target for Improved Performance – Project Specific Goals and Objectives
Plan Quality Management

Outputs

- Project Document Updates
  - Documents that may get updated include, but not limited to
    - Stakeholder register
    - Responsibility assignment matrix – like RACI
    - WBS and WBS Dictionary
Plan Quality Management

Outputs (RACI)

Matrix-based charts
(RACI charts)

- Responsible (Performer)
- Accountable (Decision Maker / Approver)
- Consultation (Provides input)
- Informed (FYI)

Organization Charts & Position Descriptions

Work Package
- Create Charter
- Create PMP
- Gather Requirements
- Development

Sponsor
- A
- C
- C
- I

PM
- C
- A
- C
- A

BA
- C
- R
- I
- I

Developer
- I
- I
- R
- R

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PERFORM QUALITY ASSURANCE

Executing Process Group

Plan Quality Management

Perform Quality Assurance

Control Quality
Perform Quality Assurance

- Is the process of evaluating overall project performance through planned, systematic activities
- Creates confidence that the project will employ the appropriate processes and satisfy standards for quality
- Provides a framework for facilitating continual improvements
- Is the element of Executing Process Group.
Perform Quality Assurance

**Inputs**
- Quality Management Plan
- Process Improvement Plan
- Quality Metrics
- Quality Control Measurements
- Project documents

**Tools and Techniques**
- Quality management and Control Tools
- Quality Audits
- Process Analysis

**Outputs**
- Change Requests
- Project Management Plan Updates
- Project Documents Updates
- Organizational Process assets updates

Perform Quality Assurance – Inputs, Tools and Techniques and Outputs
Perform Quality Assurance

Inputs

- Quality Management Plan
- Process Improvement plan
- Quality Metrics
- Quality Control Measurements
- Project Documents
  - All Project Documents which are maintained as part of configuration management, that are required for successful execution of project in meeting the customer requirements
Perform Quality Assurance
Tools and Techniques

Quality Management and Quality Control Tools
- Affinity Diagram
- Process Analysis
- Process Decision Program Charts (PDPC)
- Interrelationship digraphs
- Tree Diagram
- Prioritization Matrix
- Activity Network Diagrams
Quality Management and Quality Control Tools

- **Affinity Diagram**
  - tool used to group complex and unrelated data into natural and meaningful groups of data
  - allows groups to quickly collect and organize hundreds of ideas and then organize and summarize them into natural groupings.

- **Process Analysis**
  - Is evaluating the process capability by analyzing its effectiveness and efficiency
  - Process is analyzed to determine the causes of problem and to identify opportunity for improvements
Process Decision Program Charts (PDPC)

A technique designed to help identify the consequential impact of failure on activity plans, and create appropriate contingency plans to limit risks. PDPC helps in

1. identifying what can go wrong (failure mode or risks)
2. consequences of that failure (effect or consequence)
3. possible countermeasures (risk mitigation action plan)
Interrelationship digraphs

- An interrelationship digraph is a visual display that maps out the cause and effect links among complex, multivariable problems or desired outcomes.

- Another type of cause-and-effect diagram is an inter-relationship digraph (di is short for directional). This type of diagram adds a layer of complexity, but helps identify problems that, when addressed properly, provide the greatest benefits.

- Affinity Diagrams are best used in conjunction with Interrelationship Diagraphs.
**Problem Statement**: High no-show rates. The basic steps for arriving at interrelationship digraph are as follows:

1. Brainstorm the potential causes of the problem, group similar concepts together, and label these nodes A, B, C, etc.
2. Identify cause and effect, and draw directional arrows. For example, too much paperwork (node G) leads to an overworked staff (node D), and consequently an unfriendly environment for clients and staff (node A). There may be cases when arrows point both ways, which typically indicates a vicious cycle. Again, if the problem is too complex, break up the diagram into manageable parts.
3. Count the number of arrows coming into and going out of each node. These counts determine:
   - **root causes**—the nodes that have the most number of arrows coming out of them,
   - **key indicators (Outcome/Effect)**—the nodes that have the most number of arrows going into them.
Focusing on the root causes (in this case, nodes C and G) provides the greatest benefits as they help resolve other problems down the stream. Measuring and monitoring the key indicators (such as node F) give clues on overall system performance.
Tree Diagram
A hierarchical map that shows a project or process broken down into increasing levels of detail. It starts with the main objective or top-level view and successively branches out into smaller and smaller components, showing the relationships involved in greater detail. Also called: systematic diagram, tree analysis, analytical tree, hierarchy diagram. It looks like a tree, with trunk and multiple branches.

It is used to break down broad categories into finer and finer levels of detail. Developing the tree diagram helps you move your thinking step by step from generalities to specifics. It is often used for WBS, RBS and EMV based decision trees.
Perform Quality Assurance
Tools and Techniques

• **Prioritization Matrix**
  The Matrix helps rank order alternatives vis-à-vis a set of criteria using weighted average method. The options are typically solutions for a given Project or Business Scenario.

• **Activity Network Diagrams**
  There are two types of representation in network diagrams which are called Activity On Node (AON) or Activity On Arrow (AOA). These are typically used for Project Scheduling using CPM, PERT or Precedence Diagrams.

• **Matrix Diagrams**
  A powerful quality management tool, which seeks to establish correlation between set of parameters defined in two dimensional matrix (eg: Project Goals or KPI Vs Business Levers)

<table>
<thead>
<tr>
<th>#</th>
<th>Defect description</th>
<th>Module1</th>
<th>Module2</th>
<th>Module3</th>
<th>Module4</th>
<th>Module5</th>
<th>Module6</th>
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<th>Module8</th>
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<th>Module10</th>
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<td>0</td>
<td></td>
</tr>
<tr>
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</tr>
<tr>
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<td></td>
</tr>
</tbody>
</table>
Perform Quality Assurance
Tools and Techniques
Quality Audits
- a systematic and independent examination to determine
  - whether quality activities and related results comply with planned ones
  - whether the planned activities are effectively implemented or not
  - Are the planned activities are suitable for achieving the quality objectives?
- Quality audits must be carried out by an independent reviewer
Perform Quality Assurance
Tools and Techniques

- Process Analysis
  - Is evaluating the process capability by analyzing its effectiveness and efficiency by way of analyzing the problems encountered, identifying and removing non-value added activities.
  - Process is analyzed to identify opportunity for improvements emanating through Corrective, Preventive actions and Lessons Learned.
Perform Quality Assurance

**Outputs**

- **Change Requests**
  - Due to nonconformities identified when performing the Quality Assurance activities
  - Requesting corrective and preventive actions to set right the non conformities
  - Must be initiated as per the integrated change control process of the project.

- **Project Management Plan Updates**
  - Update the plan to set right the deviations in planned vs. actual value. Examples are
    - Project Quality Management Plan,
    - Cost Management Plan and
    - Schedule Management plan
### Perform Quality Assurance

#### Outputs

- **Project Document Updates**
  - Quality audit reports, training plan and process documents etc..

- **Organizational Process assets updates**
  - standards, templates, checklists
  - process specifications
  - organizational quality management systems
CONTROL QUALITY

Monitoring and Control Process Group

Plan Quality Management
Perform Quality Assurances
Control Quality
Control Quality

• Is the process of monitoring project work results to determine if they comply with relevant quality standards or not
• Is the process of identifying ways to eliminate causes of unacceptable performance
• Goal is to improve the results that meet customer and Stakeholder specifications
• Is an element of Monitoring and Control Process Group.
Control Quality – Inputs, Tools and Techniques and Outputs
Control Quality

Inputs

- Project Management Plan
- Quality Metrics
- Quality Check Lists
  - Work Performance Measurements
  - Helps in evaluating the project progress
  - These include
    - Technical performance
    - Cost performance
    - Schedule performance etc…
- Deliverables
  - Product/service or results of a work package/project phase or project that are required to be inspected
Approved Change Requests
- Quality Assurance and quality control activities may result in requested changes
- Once approved, these changes may result in changes to quality baselines, process or product specifications
- Approved change request may be
  - defect repairs,
  - revised process,
  - revised schedule,
  - budget etc....
- timely implementation of those changes has to be verified.

Organization Process Assets
- Organizational policies, procedures and standards and organizational policies can influence quality control process of a project.
Control Quality
Tools and Techniques

- 7 QC Tools
  - Cause and Effect Diagrams
  - Control Charts
  - Flow Charting
  - Histogram
  - Pareto Charts
  - Run Charts
  - Scatter Diagram

- Statistical Sampling

- Inspection
  - an activity to measure or check a work product to determine whether it is as per the specifications or requirements of the customer/user.
Control Quality
Tools and Techniques

Approved Change Request Review
- All approved change request to be reviewed for timely and effective implementation
- Has it produced the desired results or not?
- Quality Control Measurements
  - Results of quality control activities
  - Can include Process and product measurements

- Validated Changes
  - Changes implemented are inspected
  - Based on the inspection results either it will be accepted or rejected

- Validated Deliverables
  - Deliverables are validated for correctness to ensure that it meets the specifications.
  - Validated deliverable are the input to verify Scope to get the formal acceptance.

- Work Performance Information
  - Output of analysis of variances, actions taken, predictive performance metrics and process improvements
Change Requests
- As results of non conforming product or process
- Corrective action or preventive action will be recommended
- A formal change request will be raised as per the integrated change control process of the project.

Project Management Plan Updates
- Quality Management plan and process improvement plan may get updated as a result of quality control activities

Project Document Updates
- Quality Standards,
- Inspection reports,
- Lessons learned documents

Organizational Process Assets Updates
- Inspection reports, Completed checklist and lessons learned documents
Quality Assurance vs Quality Control

- **Quality Assurance**: An execution process. Focus is on work being done on the project. Ensures team is following organization processes, procedures and standards. Also helps in improving processes.

- **Quality Control**: Monitoring and Control Process. Examines the actual deliverables being produced and ensures deliverables are correct and meets planned levels of quality, find source of problem and address them.
Summary

- Discussion topics
- Q and A