

Quality control throughout the life cycle

[Business](#), [Management](#)



Project Lifecycle Quality Control In this project, my task is to assume the role of project manager involved in construction of 15 miles long road. For the purpose of simplicity, we would make assumption that the work has not been started yet while the project management plan has already been prepared. At this stage the customer has requested to increase the length of the road by 3 miles without adjusting the project completion date. Thus now we have a critical constraint on time with a change in project scope. According to PMBOK (2008), project scope management is primarily concerned with defining what is and is not part of the project. This may require measuring the project performance, modification to work breakdown structure and alternately revising the project management plan, particularly components of plan that include scope management plan, time management plan and cost management plans. Techniques like fast tracking would be one of our major option while planning for the schedule management. Also a number of risks may need to be reviewed including regulatory requirements to procurements and additional resource allocation. Further, effective implementation of a change control system to analyze and accept the changed scope for approval would also be crucial.

While managing the triple constraints of scope, time and cost, it is equally essential to effectively manage the quality of the project outcome. According to Sanghera (2010), controlling the quality is a critical to the project management requirement effective mitigation of the project risks. This suggests reviewing the quality management plan and risk management plan to complement the additional scope. Mulcahy (2011) highlights the use of seven basic tools of quality including Cause and effect diagram, Flowchart,

Histogram, Pareto chart, Run chart, Scatter diagram, Control chart to monitor and control the project quality. In project with change in scope, a mix of following quality tools is recommended.

Flow Charts. Flow Charts helps to identify the source of an existing or potential quality problem in the project and develop approaches to resolving these problems (PMBOK 2008). It is a graphical representation of all the project processes showing activities, their sequence and decision making points. In a construction project with additional scope having a same time bar, flow charts would be used to review the interaction of all activities and analyze any potential problem especially in case of fast tracking. A major merit of flow charts is to consolidate procedures and processes, for example, flow chart would easily help to identify the procedure for concrete mixing at field without testing but granting results based approval. A demerit of low charts is that these may become complex to a level that is not easily comprehensible by the team members particularly in case of large construction project spread over a longer period of time.

Cause and Effect Diagram. Cause and Effect Diagram, also referred to as Ishikawa or fishbone diagram, is used to identify various factors associated to an existing or potential problem and its effects (Mulcahy 2011). Cause and Effect Diagram could be used to identify the reasons or source for machinery failure at the construction site. For said purpose, check sheet are good tool to collect the data for downing time, machinery failure reason and confirmation if the procedure has been adopted as specified, for example, during rebar installation process. A demerit of the cause and effect diagram is that it does not help to focus on a particular cause of problem rather

provides information on possible causes.

Pareto Charts. Pareto Chart, a particular type of histogram, represents the defects with order of frequency from highest to lowest for guiding the corrective action (PMBOK 2008) and states that 20% of the categories would represent 80% of the defects (Mulcahy 2011). After having identified all possible sources and effects of a particular problem and data collection through check sheets, pareto chart helped to identify the problems and its source with largest occurrences. Unlike fishbone diagram, which is mainly a brainstorming technique, pareto chart helps to focus the efforts of the team in first solving the critical problems.

Control Charts. Control Charts are used to determine the stability of a process and predictability of its performance and help to identify the occurrence of a special cause and its effect on the process over a period of time (PMBOK 2008). Control charts are an effective tool in gathering data and monitoring the quality of materials during testing phase in construction projects like concrete, asphalt, soil and topography testing. One of the demerit of the control charts is requirement of extensive training on using control charts. Team members working on project and using control charts need to identify which type of control chart is appropriate for a particular type of data and related process and how to represent the data on the control charts. Another demerit could be difficulty in collecting the entire project on control.

Controlling the project quality is critical when changes to the project scope occur. Scope changes should be approved and implemented through a change control system. These changes may result in risks to the project

demanding revisiting the plans and requirement for time, cost, scope and quality. According to Kerzner (2009), impact of quantitative methods is more important than the use of these methods. The statistical based analysis help to make objective decision on quantifiable facts rather than autocratic subject decisions. The benefits of this change include improved process, high quality, effective communication and team development. Thus selecting the right tool is crucial to controlling the quality throughout the project lifecycle. According to PMBOK (2008), “ quality is the degree to which a set of inherent characteristics fulfill the requirements”. In the project context, it is critical to analyze the customer’s needs, wants and expectations and turn these into requirements. These requirements are quantified and prioritized; however, unquantifiable requirements like customer satisfaction have a high risk of successful accomplishment. Determining the customer requirements is neither easy nor fast process. Different approaches like simply communicating with others, reviewing the requirements, informing people of negative consequences of not having stated requirements may be used to identify the customer requirements. However, there are things that the customers expect to happen to them, their company or their department as a result of completion of the project undertaken. Such things tend to be more ambiguous and intentionally or unintentionally hidden than the stated requirements or undefined requirements. Thus the expectations that are undefined would have a greater impact on the triple constraints of the project and are, therefore, needed to be converted into well-defined requirements.

The main advantage of meeting the quality requirements is lesser rework

meaning high productivity, lower cost and increased customer satisfaction. The cost required to meet the quality requirements is the expense made on quality management activities on the project. On the other hand, acceptance criteria of the completed product is the set of requirement for performance and significant conditions that must be met before the project deliverable is accepted. This criteria is also forms part of the inspection process measuring, verifying and examining the product related work accomplished during different phases of the project. If the project deliverables satisfy the acceptance criteria, then the customer needs are considered full filled. However, they may challenges associated with gathering the product acceptance criteria during early parts of the project because there may be instances when the customer himself is not clear what is the intended deliverable of the project, or product characteristics are not clearly defined, or market condition is volatile, consumer reaction to the product is unknown, etc. Other challenges may include change in customer expectations or requirements which were not translated to the project requirements in later part of the project. Such situations, generally, lead to refusal in signing off the approval of project deliverable by the client. Thus defining the acceptance criteria at the early of the project is critical for stating the project requirements, defining customer expectation, focusing the project team on project objectives, avoiding miscommunication and political maneuvering in the project.

Although we have based on response on the assumption that the project has yet not started and the project management plan has been developed, it is likely that there might not be much data available from the project activities.

However, much of information can be accessed through the expertise of technical people, project manager's experience, industry benchmarks and brainstorming sessions among the project. Definitely, not all the basic quality tool can be implemented at this stage; however, four mentioned above have high probability to providing project team with good guidance in leading the project towards completion. Since prior to additional scope request by the customer, the project team has developed the project management plan which includes work breakdown structure. This implies that activities for project execution has been identified and would be revised to accommodate the changed scope. Therefore, tools like Cause and Effect Diagram and Flow charts can readily be applied and may be revisited during the course of project. In this context, Control Charts and Pareto Charts can be developed; however, as the project would progress and more and more data is available, these tools are likely to play a significant role in quality monitoring and control throughout the project lifecycle.

If we assume that the change request was received in the middle or towards the end of the project, then considering the time constraint project team would have to seek a balance between quality and the triple constraints of cost, time and scope. The only cost associated with the quality is the cost of quality management activities; however, achieving the quality requirements and standards result in lesser rework, lower cost and higher productivity meaning less time consumed in turn. At this stage the most appropriate quality tool would be control charts to determine the process stability and performance predictability amid change in scope. This tool in parallel with other tools like pareto chart, run chart, scatter diagram and histogram can

help to identify the defects that may affect the project quality.

References

Kerzner, H. (2009) Project Management : A Systems Approach to Planning, Scheduling and Controlling. 10th ed. New Jersey: John Wiley & Sons.

Mulcahy, R. (2011). PMP Exam Prep. Burnsville, RMC Publications.

Project Management Institute. (2008). A Guide to The Project Management Body Of Knowledge (PMBOK Guide). Pennsylvania, Project Management Institute.

Sanghera, P. (2010) Project Management Professional Study Guide for the PMP Exam. 2nd ed. Boston: Course Technology.