10

MANAGEMENT TOOLS IN CONSTRUCTION INDUSTRY

Over time, new technologies have taken over the outdated ways of construction work for smooth and timely project construction. For that, the role of quality assurance and quality control cannot be disregarded. Hence, this chapter wraps up quality assurance and quality control discussion, followed by total quality management, lean construction, value engineering and risk assessment and analysis.

10.1 QUALITY ASSURANCE AND QUALITY CONTROL

Before jumping into the quality assurance and quality control debate, understanding the term "Quality" is important. Quality means meeting the customer's needs and fulfilling the standards and specifications. In a construction project, the quality of a product can be achieved by fulfilling the customer's requirements. Quality in the construction project is associated with many factors, such as supplying the right materials, finishing the project within budget, on schedule and safely without any conflict or dispute. Quality in the construction project is also about guaranteeing that the building structure will fulfil the long term needs of the final user.

With the rising quality standards over time, a bunch of quality standards were set under ISO 9000, which bounds the company to follow and meet customer satisfaction. International Organization for Standardisation (ISO) introduced ISO 9000 in 1987. ISO is a specialised international agency for standardisation, followed by more than 160 countries. ISO 9000 is a set of international standards on quality assurance and quality management, established to assist companies to set and maintain the quality system. These standards are not for any industry specifically but are applicable to all industries. Considering ISO 9000 as a first step toward the quality system helps the company to satisfy the customers by following the quality standards and achieving their desired goal. ISO 9000 is a family

or series in quality management standards, whereas ISO 9001 is the standard. In the ISO 9000 family, there is also an individual standard with the same name. Other standards in ISO 9000 family are ISO 9000:2015, ISO 9001:2015, ISO 9004:2018 and ISO 19011:2018; the description is provided in Table 10.1 [89]. The quality management principles defined by ISO 9000:2015 are presented in Figure 10.1.

Table 10.1 ISO 9000 Description

S. No	ISO 9000 Type	Name
1	ISO 9000:2015	Quality Management Systems - Fundamentals and Vocabulary
2	ISO 9001:2015	Quality Management Systems - Requirements
3	ISO 9004:2018	Quality Management - Quality of an Organization - Guidance to Achieve Sustained Success
4	ISO 19011:2018	Guidelines for Auditing Management Systems

Understanding the customer's needs is essential while constructing any project. The focus should not be only on the present needs, but also on future requirements as the primary aim is to keep customer satisfaction. The vision of leadership in assessing the deliverables is important, and one has to establish such a vision that covers all the aspects of a project. It is the ultimate responsibility of the team leaders to utilise the full abilities of the teammates, and later, they can be made accountable for failure. Open discussion should be made; in that way, the suggestions come up. Each project follows a defined process where all activities should be managed under a process approach. There are various tools for analysis that can be applied at this time. Improvement can be brought with continuous efforts in the construction project. The role of effective decision-making and relationship management is significant for project productivity.

Quality Assurance (QA) implies the management system to deliver high-quality work reliably and is utilised by construction companies. QA is a way of avoiding defects and mistakes in constructed products and delivering them to the customers as per ISO 9000 standards. With the help of QA, it can be determined whether a product meets requirements or not. To ensure a quality assurance system, various companies have adopted ISO 9000 as a lead toward QA. Quality Control (QC) refers to the work inspection to ensure that the work outcomes meet the quality standards that have been stipulated in a contract. Such as in projects where the government acts as a client, appoints an inspector whose job is to inspect the work, accept that work as per specifications and reject those tasks that are not fulfilling the requirements. In short, QC is related to the inspection of the work outcome. For QC, various tests can also be performed as quality control functions. Quality assurance and quality control are mostly mixed up and considered two names for one process; however, both have different concepts and purposes. QA is a management practise, whereas QC is an inspection. QA responsibilities contain all the quality systems,