

# Quality Management for Industrial Projects

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## Abstract

Project quality management includes the processes necessary to ensure that a project meets the requirements for that it was undertaken to. Considering these aspects, this paper highlights the role of quality management in industrial projects and its integration within the specific project management processes. Thus the study refers to the implementation of quality management within an industrial project with the detailed specification of the input data, the appropriate methods, as well as the analysis of the results, with the aim of achieving the project's objectives.

## Keywords

project management, project quality management, industrial project, Deming cycle

## 1. Introduction

Quality represents a fundamental aspect in the project management domain and involves the following: products, systems, defects, processes and customers. The quality management methods and techniques must be integrated into all project management processes. Particularly, the statistical methods have a diverse application in project management, but it have value in project quality management [1].

Generally, any project consists of three primary objectives: performance, time and cost. Of course, the goal of any project manager is to be successful in all aspects of the project, in this manner these tree elements become equally important for the success of the project and for an effective project management. To fulfil project objectives, project managers must make trade-offs between these primary elements, during the planning and implementation of the project in order to accomplish the objectives and satisfy customer expectations [2, 3].

Quality can be considered as the fourth element of the equality. Projects and their objectives are generated by some specific market needs or some customer requirements, quality being linked with these necessities.

Industrial projects generate specific products, either for a specific customer or to be sold on a large scale. In this context, quality can be seen in two ways: quality of the project itself and quality of the product of the project. Quality of the project is determined by the performance of specific planning, implementation and control processes, within budget and time constraints, while a quality product is obtained by complying specific processes with the customer's specifications. Also, the product quality depends on the lack of compromises regarding quality during the implementation of the project [4].

Correlating all these considerations it can be mentioned that project quality management represents an essential component of industrial projects because it certifies the fulfilment of customer' requirements and the objectives achievement in accordance with the principles of quality management.

It includes the defining and fulfilment the quality policies, procedures and other specification in order to ensure that an industrial project meet the defined project objectives. Actually, fulfilling the project goals in accordance with customer accomplishment requirements implies more and more efficient project management [5].

## 2. Project Quality Management

The processes of quality management process are: quality planning, quality assurance, quality control and continuous improvement [5, 6, 7]. The entire project management processes are

characterized by Deming cycle – P-D-C-A. Therefore, the project quality management implies adequate techniques and methods with the aim of reaching the proposed objectives.

The dependency of project quality management and the project management processes are illustrated in Figure 1.

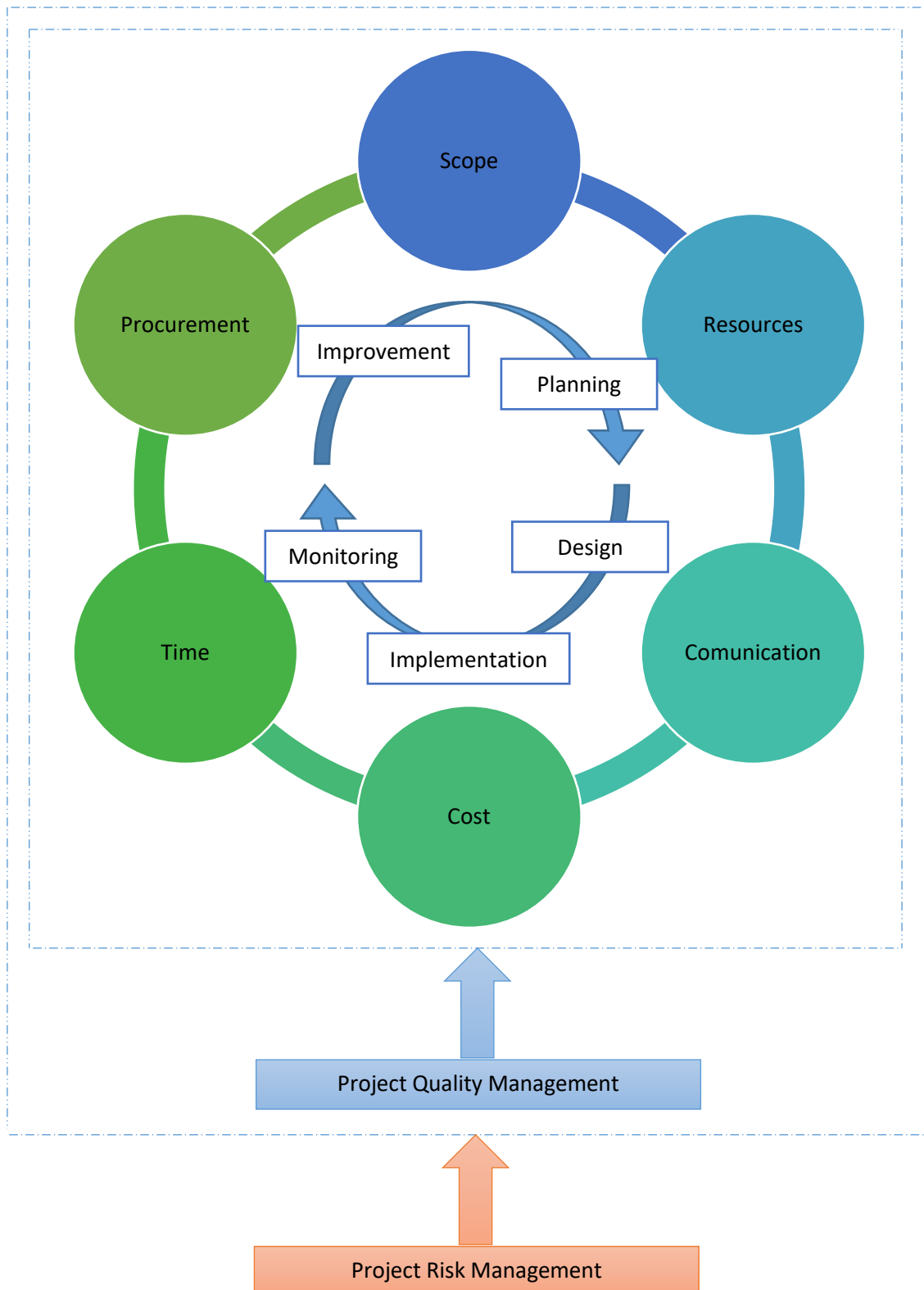


Fig. 1. The project management processes

### 2.1. Project quality planning

The project quality planning phase consists of:

- Quality policy defining in accordance with project goals;
- Legal and other requirements;
- Project quality team;
- Process flowchart;
- Indices / metrics established in order to achieve the objectives;
- Control plan, etc.

Among the most important aspects, it can be listed:

- reducing the risk of critical quality problems: the target is zero complaints and zero defects at customers;
- providing better performing products and services than those offered by the competition;
- minimization of waste, diminish of non-quality costs and internal errors.

A proper quality planning process allows us to identify and define quality requirements, to plan the needed to achieve project objectives.

It is necessary to define the methods to achieve, monitor, control, predict, and verify the specific project objectives. It is recommended to include the quality management tasks in the project plan in order to verify and report the degree of fulfilment of the quality indicators.

The outputs of the planning process must be developed in such a way as to respect the input data. The results must contain information about the acceptance criteria of the project and product, information that specifies essential characteristics for proper and safe use and identify critical conditions with an influence on operational safety.

### 2.2. Project quality assurance

Quality assurance is the part of quality management that certifies that all quality criteria will be met.

Quality assurance has two main purposes. The first is to ensure that the launched project has an acceptable level of quality. The second is to detect errors in stages where corrections are less time-consuming and at lower costs.

The quality assurance process includes:

- quality assurance through periodic control;
- quality assurance through the implementation of appropriate statistical methods;
- ensuring quality by motivating staff;
- integrative quality assurance concepts, etc.

The quality assurance of the project refers to the fulfilment of the requirements regarding the progress of the project: compliance with the deadlines, the budget, information within the project, etc.

By applying both qualitative and quantitative metrics, it can measure the project quality and meet the customers' satisfaction. The monitoring and control the achievement of goals and identify the need for corrective actions can be made by periodically quality audits. In this respect, the quality assurance methods permit to obtain the quality metrics and goals.

### 2.3. Project quality control

The achievement of quality control objectives is directly reflected in the economic results of the organization by reducing the weight of scraps, by increasing the volume of sales, by reducing the cost of products.

The project control is carried out on the basis of the project plan and takes into account the state of the project in certain predetermined periods. In case of deviations, the necessary corrective actions are defined. As project control is carried out, a project progress report is drawn up.

The project quality control consists in checking, through examination, analysis, testing, measurement, etc., of the levels of quality characteristics and their correspondence with values predetermined by standards, projects, contracts with beneficiaries or with implicit demands of consumers.

Criteria for the classification of control methods and forms it is presented in Figure 2.

An example of quality control of an industrial project, it is highlighted by Pareto chart, Figure 3.

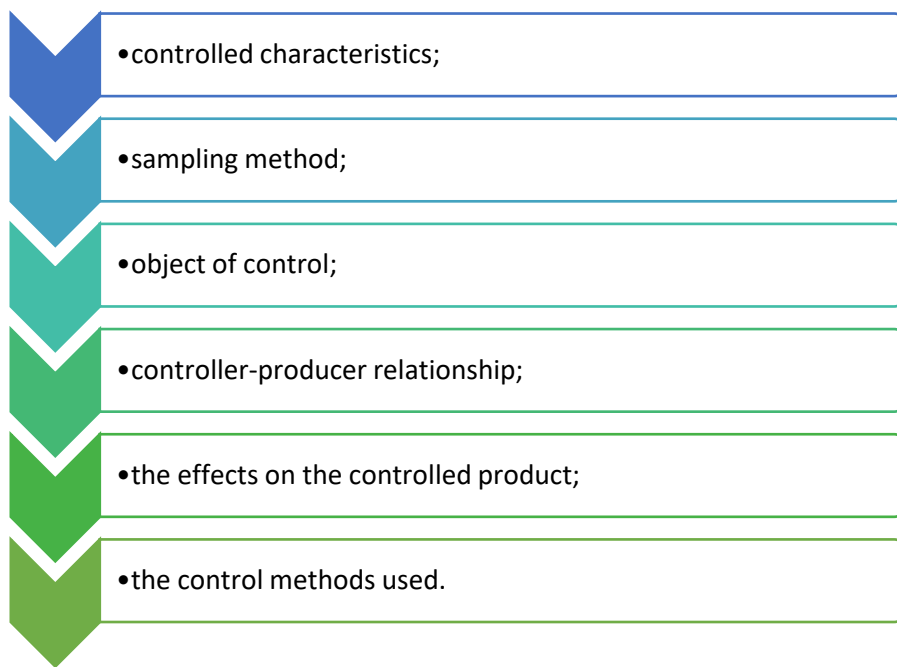


Fig. 2. Control criteria classification

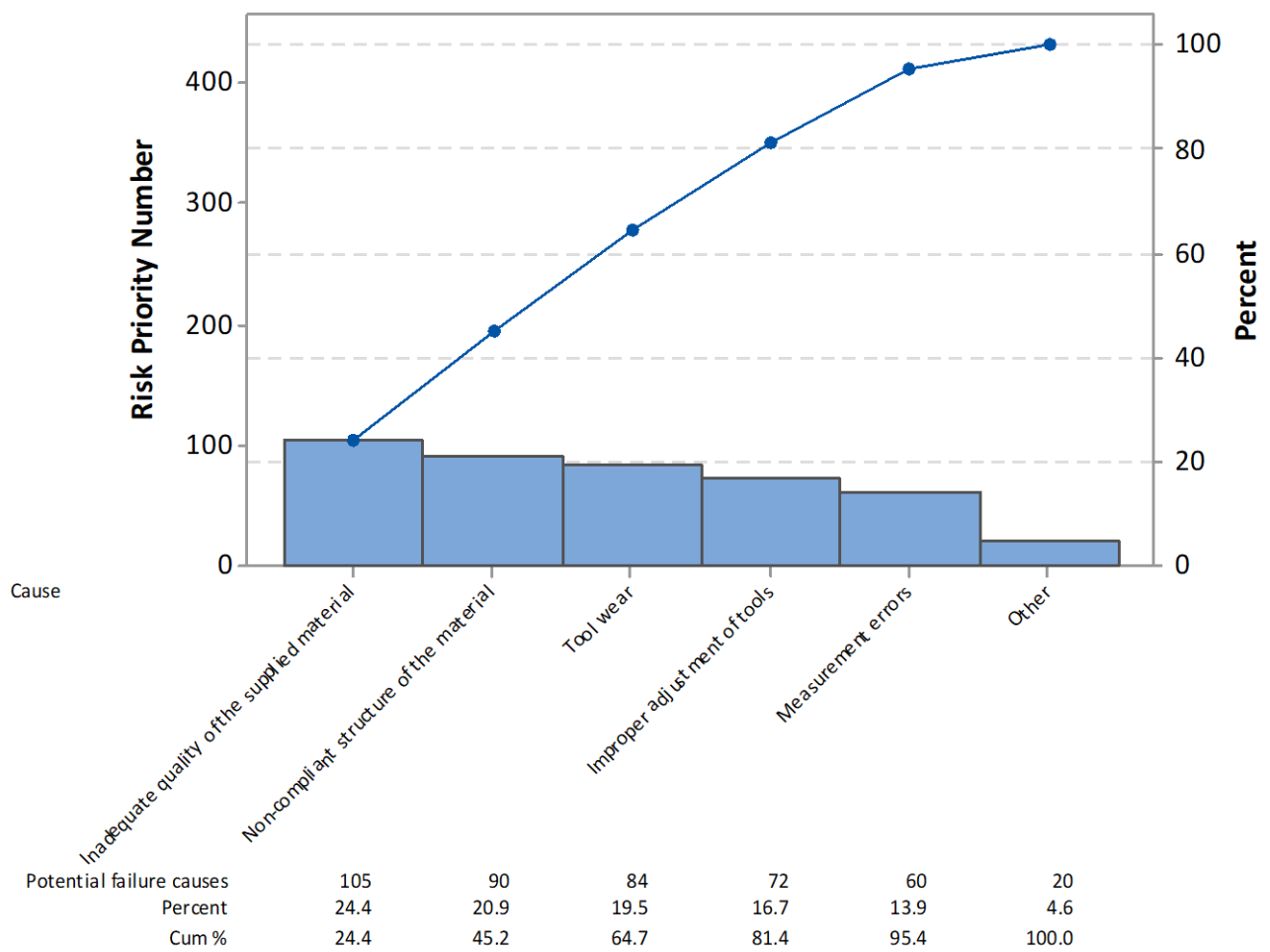


Fig. 3. Pareto chart

Analysing the potential failure causes, it can be observed that “The inadequate quality of the supplied material” records a cumulative percent of 24.4. Using Pareto chart, the specific causes are prioritized and corrective actions are implemented in order to minimize the defects and to improve the manufacturing process.

## 2.4. Project quality improvement

Improving the quality of the industrial project aims to minimize the rework and negative impacts to the project objectives, schedules and budgets.

The project improvements can be mentioned at:

- project quality requirements;
- quality management plan;
- potential failure analysis;
- implementation of quality control and assurance;
- project management processes;
- costumers complains and/or feedback.
- ensuring some processes, methods of supervision and an efficient information system, related to quality.
- ensuring the necessary resources.
- ensuring the necessary tools for the proper performance of the activities.

## 3. Conclusions

The analysis refers to the project quality management specifying the main steps as follow: quality planning, quality assurance, quality control and quality improvement.

An efficient and effective project management implies a balance of project costs in accordance with allocated time and resources, with the scope to fulfilling the project goals and accomplishment of customer requirements.

The implementation of an effective quality management aims at the following:

- customer satisfaction;
- achieving project objectives;
- leadership;
- optimization of allocated resources;
- defining the legal and specific requirements;
- reducing/keeping potential risks under control.

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