INTERNATIONAL STANDARD

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Quality management — Guidelines to quality in project management

Management de la qualité — Lignes directrices pour la qualité en management de projet

Contents

Page

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 10006 was prepared by Technical Committee ISO/TC 176, *Quality management and quality assurance*, Subcommittee SC 2, *Quality systems*.

Annexes A to C of this International Standard are for information only.

Introduction

This International Standard provides guidance on quality system elements, concepts and practices for which the implementation is important to, and has an impact on, the achievement of quality in project management and supplements the guidance given in ISO 9004-1.

These guidelines are intended for a wide audience. They are applicable to projects which can take many forms from the small to very large, from simple to complex. They are intended to be used by people who have experience in project management and need to ensure that their organization is applying the practices contained in the ISO 9000 family of standards, as well as those who have experience in quality management and are required to interact with project organizations in applying their knowledge and experience to the project. Inevitably, some groups will find that material presented in the guidelines is unnecessarily detailed for them, however they should remember that other readers may be dependent on it.

It is recognized that there are two aspects to the application of quality in project management: the quality of the project processes and the quality of the project product. A failure to meet either of these dual aspects may have significant effects on the project product, the project stakeholders and the project organization. This also emphasizes that the achievement of quality is a management responsibility, requiring a commitment to quality to be instilled at all levels within the organizations involved in the project, who each retain responsibility for their respective processes and products.

The creation and maintenance of process and product quality in a project requires a systematic approach. This approach should be aimed at ensuring that the customer's stated and implied needs are understood and met, that other stakeholders' needs are evaluated, and that the organization's quality policies are taken into account for implementation in the management of the project.

Quality management — Guidelines to quality in project management

1 Scope

These guidelines use project management processes to serve as a framework to discuss their application.

This International Standard is applicable to projects of varying complexity, small or large, of short or long duration, in different environments, and irrespective of the kind of project product (including hardware, software, processed material, service or combinations thereof). This may necessitate some tailoring of the guidance to suit a particular project.

This International Standard is not a guide to project management itself.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 8402:1994, *Quality management and quality assurance — Vocabulary*.

ISO 9004-1:1994, *Quality management and quality system elements — Part 1: Guidelines*.

NOTE — Annexes A, B and C contain further information and additional references on achieving quality in project management.

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 8402, together with the following, apply.

3.1 project: Unique process, consisting of a set of coordinated and controlled activities with start and finish dates, undertaken to achieve an objective conforming to specific requirements, including the constraints of time, cost and resources.

NOTE 1 An individual project may form part of a larger project structure.

NOTE 2 In some projects the objective(s) is(are) refined and the product characteristics defined progressively as the project proceeds.

NOTE 3 The outcome of a project may be one or several units of product.

NOTE 4 The organization is temporary and established for the lifetime of the project.

NOTE 5 The interactions among project activities may be complex.

3.2 project product: That which is defined in the project product scope and delivered to the customer.

NOTE — The project scope may be updated as the project proceeds.

3.3 project plan: Document setting out what is required to meet the objective(s) of the project.

NOTE 1 A project plan should include or refer to the project's quality plan.

NOTE 2 The project plan also includes such other plans as organizational structures, resources, schedule and budget.

3.4 stakeholder: An individual or group of individuals with a common interest in the performance of the supplier organization and the environment in which it operates.

[ISO 9000-1:1994,3.5]

NOTE 1 In the context of this definition the supplier organization is the project organization.

NOTE 2 Stakeholders may include:

— customer, recipient of the project product;

— consumer, such as a user of the project product;

— owner, such as the organization originating the project;

— partner, as in joint-venture projects;

— funder, such as a financial institution;

— subcontractor, organization supplying products to the project organization;

— society, such as jurisdictional or regulatory bodies and the public at large;

— internal personnel, such as members of the project organization.

NOTE 3 There may be conflicting interests among stakeholders.

3.5 process: Set of inter-related resources and activities which transform inputs into outputs. [ISO 8402:1994,1.2]

NOTE 1 Resources may include management, services, personnel, finance, facilities, equipment, techniques and methods.

NOTE 2 Project processes include project management processes.

3.6 progress evaluation: Assessment of outputs of project activities, carried out at appropriate points in the project life cycle across project processes, based on defined criteria for project processes and product.

NOTE — Revision of the project plan may be required as a result of progress evaluation.

4 Project characteristics

4.1 General

This clause deals with those characteristics of projects which are important to the application of this document.

4.2 Project management

Project management includes the planning, organizing, monitoring and controlling of all aspects of the project in a continuous process to achieve its objectives. The processes and objectives of quality management (see ISO 8402) apply to all project management processes.

4.3 Organization

For the purposes of this International Standard, the originating organization is the organization that decides to undertake the project and assigns the project to a project organization. The project organization is the organization that carries out the project. The project organization may be a part of the originating organization which may be constituted as a joint-venture or consortium, etc.

4.4 Project phases and project processes

A project is a process which can be divided into many different interdependent subprocesses. Implementing the sequence of subprocesses in an orderly and progressive manner may (in some cases should) require the consistent grouping of subprocesses into phases. To the organization responsible for the project, "phasing" gives a means of monitoring the realization of objectives (and assessing the related risks) in order to achieve a progressive commitment. Significant overlapping of phases may occur in the project life cycle.

To facilitate the discussion of the guidance to quality in project management, a process approach has been adopted in this International Standard. The project processes have been grouped into two categories: the project management processes and the project product-related processes (those which are concerned solely with the project product such as design, production and verification).

Guidance to quality in the project management processes is discussed in this International Standard and guidance to quality in the project product related processes is covered in ISO 9004-1.

NOTE — In this International Standard, the term process also covers subprocess.

5 Quality in project management processes

5.1 General

Table 1 lists and summarizes the project management processes which are considered to be applicable for the majority of projects. Not all the processes discussed in this International Standard will necessarily exist in a particular project, whereas in others additional processes may be necessary.

The project management processes are grouped according to their affinity to one another, for example all time-related processes are included in one group. Ten groups of project management processes are presented. The first one is the strategic process which legitimizes and sets the direction for the project. The second group covers the management of the interdependencies among the other processes. The other eight groups are processes related to scope, time, cost, resource, personnel, communication, risk and purchasing.

Each of the project management processes is presented in a separate subclause which includes a description of the process and guidance to quality in the process.

5.2 Strategic process

The strategic project process is a direction-setting process that organizes and manages the realization of the other project processes.

In setting the direction for the project, the following concepts, which are important to the achievement of quality in project management, should be considered:

— satisfaction of the customer's and other stakeholders' stated and implied needs is paramount;

— a project is carried out as a set of planned and interdependent processes;

— a focus on the quality of both processes and products is necessary to meet the project objectives;

— management is responsible for creating an environment for quality;

— management is responsible for continual improvement.

This subclause gives guidance on considering these concepts in the strategic process. Guidance on considering these concepts in the other processes is given in 5.3 to 5.11.

The achievement of quality in the strategic process is dependent on ensuring that these concepts are considered in all processes.

5.2.1 Satisfaction of the customer's and other stakeholders' stated and implied needs is paramount.

Customer and other stakeholder needs should be clearly understood to ensure that all processes focus on and are capable of meeting these needs.

Interfaces should be established with all the stakeholders and feedback obtained as appropriate throughout the project. Any conflicts between stakeholder needs should be resolved. Normally, when conflicts arise between the needs of the customer and other stakeholders, customer needs take precedence. Resolution of conflicts should be agreed to by the customer. Stakeholder agreements should be formalized. Attention to changing stakeholder needs, including those of new stakeholders, should continue throughout the project.

The project objectives should be defined to meet the agreed requirements and, if necessary, refined during the course of the project. They should describe what is to be accomplished, be expressed in terms of time, cost and product characteristics, and, where possible, be measurable.

5.2.2 A project is carried out as a set of planned and interdependent processes.

The project processes, their owners and the owners' responsibilities and authority should be identified and documented. Policies should be set for the project processes. The structure of the end product and its components should be considered to ensure that the appropriate processes are identified. The process interdependencies should be defined, coordinated and integrated. The processes should be designed to take into account processes that occur later in the product life cycle, such as those related to maintenance. A strategy for obtaining external goods and services should be considered, together with any impacts on the project organization.

Relationships and a clear division of responsibility and authority between the originating organization and the project organization should be determined and formalized, as well as those with other relevant stakeholders.

Progress evaluations (see annex B) should be planned in order to assess the project status and, when required, provide information for revising the project plan.

5.2.3 A focus on the quality of both processes and products is necessary to meet the project objectives.

To meet the project objectives, emphasis should be placed on the quality of the project management processes and the quality of the project product.

The ISO 9000 family of standards presents a number of process- and product-related quality practices, such as documentation, audits and process controls, which help in meeting the project objectives. Typical practices applicable across project processes are listed in annex A.

5.2.4 Management is responsible for creating an environment for quality.

Management of both the originating organization and the project organization should cooperate in creating an environment for quality. The ways and means to create such an environment should include the following:

— providing an organizational structure and support conducive to meeting the project objectives;

— making decisions based on data and factual information;

— providing for progress evaluations and using them for quality (see annex B);

— involving all project personnel in achieving the quality of the project processes and product;

— establishing mutually beneficial relationships with subcontractors and other organizations.

Competent personnel should be allocated and appropriate tools, techniques, methods and practices applied to carry out, monitor and control the processes, to implement corrective and preventive action and to improve the processes.

A project manager should be appointed as early as possible. The project manager is the individual with the defined accountability, authority and responsibility for managing the project. The authority delegated to the project manager should be commensurate with the assigned responsibility.

NOTE — The title of the project manager may vary from project to project.

5.2.5 Management is responsible for continual improvement.

In an organization originating projects, management is responsible for continually seeking to improve the quality of its project processes by learning from experience. To learn from experience, project management itself should be treated as a process rather than as an isolated activity. A system should be put in place to collect and analyse the information gained during a project for use in a continual improvement process.

The project organization is responsible for continually seeking to improve the quality of its own project processes and activities. Provision should be made for self assessments, internal and possibly external audits, taking account of the time and resources needed.

NOTE — ISO 9004-4 gives guidance on quality improvement.

5.3 Interdependency management processes

Projects consist of processes and an action in one of these usually affects others. The overall management of the interdependencies among the project processes is the responsibility of the project manager. The interdependency management processes are the following:

— project initiation and project plan development: evaluating customer and other stakeholder requirements, preparing a project plan and initiating other processes;

— interaction management: managing interactions during the project;

— change and configuration management: anticipating change and managing it across all processes;

— closure: closing processes and obtaining feedback.

5.3.1 Project initiation and project plan development

A project plan including a quality plan should always be prepared and kept up to date. The degree of detail included will be a function of the size and complexity of the project.

The project plan should refer to the documented customer and other relevant stakeholder requirements and the project objectives. The input source for each requirement should also be documented to allow traceability.

The product characteristics and how they should be measured and assessed should be identified and included in the project plan.

Contract reviews should be performed if the purpose of a project is to fulfil the requirements of a contract.

During project initiation, projects that are the most similar among those already undertaken by the originating organization should be identified in order to make the best use of feedback from previous projects.

The project plan should identify and document the project processes and their intention.

The quality system of the project organization should be established and include provision for facilitating and promoting continual quality improvement. Since quality is an integral part of good project management, the quality system of the project should be an integral part of the project management system. The quality system should be documented in the quality plan.

As far as is practicable, the project organization should adopt and, if necessary, adapt the quality system and procedures of the originating organization. Reference should be made in the quality plan to applicable parts of the quality system documents from the originating organization. In cases where specific requirements for the quality system from other stakeholders exist, it should be ensured that the resulting quality system meets the project needs.

Project plan development involves integrating the plans resulting from the planning carried out in other project processes. These plans should be reviewed for consistency and any discrepancies resolved.

The project plan should identify, plan for and schedule reviews (see 'reviews' in annex A) and plan for retention of records. Reviews should include reviews of the quality system and of the project plan and their adequacy to meet the project objectives.

To provide a baseline for progress measurement and control and to provide for planning of the remaining work, progress evaluations (see annex B) should be scheduled and included in the project plan.

Requirements for quality practices (see annex A), such as documentation, verification, recording, traceability, reviews and audits throughout, the project should be established.

In order to monitor progress, performance indicators should be defined and provision made for their regular assessments. These assessments should facilitate preventive and corrective actions, and should confirm that the project objectives remain valid in a changing project environment.

Interfaces should be identified in the project plan. Particular attention should be given to the following interfaces:

— liaison with the customer and other stakeholders;

— the project organization's connection and reporting lines with the various functions of the originating organization;

— liaison between functions within the project organization.

5.3.2 Interaction management

To facilitate the planned relationships between processes, the interactions in the project need to be managed. This should include establishing procedures for interface management, having interfunctional project meetings, resolving issues such as conflicting responsibilities or changes to risk exposure, measuring project performance using such techniques as earned value analysis and carrying out progress evaluations to assess project status and plan for the remaining work (see annex B).

The progress evaluations should also be used to identify potential interface problems. It should be noted that the interfaces are usually where risk is greater and need to be specially coordinated.

Project communication is a key factor in project coordination and is discussed in 5.9.

5.3.3 Change management

Change management covers the identification and documentation of the need for and of the impact of change, and the review and approval of changes to processes and product.

Change management includes managing changes to the project scope and to the project plan. Before a change is authorized, the intent, extent and impact of the change should be analysed and those that affect the project objectives agreed with the customer and other relevant stakeholders.

Change management includes coordinating changes across interlinked project processes and resolving any conflicts.

Procedures for change management should include document control.

NOTE 1 For further guidance on change management, see also ISO 9004-1.

NOTE 2 For guidance on configuration management, see ISO 10007.

5.3.4 Closure

During the project, it should be ensured that all the project processes are closed as planned. This includes ensuring that records are compiled and retained for a specified time.

Whatever the reason for project closure, a complete review of project performance should be undertaken. It should take into account all relevant records, including those from progress evaluations and inputs from stakeholders. Special consideration should be given to feedback from the customer and other relevant stakeholders, which should be quantified where possible. Based on this review, appropriate reports should be prepared, highlighting experience that can be used by other projects.

The closure of the project should be formally communicated to relevant stakeholders.

5.4 Scope-related processes

For the purposes of this International Standard, "scope" includes a description of the project product, its characteristics and how they are to be measured or assessed.

These processes aim to:

— translate the customer and other stakeholder requirements into activities to be carried out to achieve the objectives of the project and to organize these activities;

— ensure that people work within the scope, during the realization of the activities;

— ensure that the activities carried out in the project meet the requirements described in the scope.

The scope-related processes are the following:

— concept development: defining the broad outlines of what the project product will do;

— scope development and control: documenting the characteristics of the project product in measurable terms and controlling them;

— activity definition: identifying and documenting activities and steps required to achieve the project objectives;

— activity control: controlling the actual work carried out in the project.

5.4.1 Concept development

Customer needs for product and processes, both expressed and implied, should be translated into documented requirements which should be agreed to by the customer.

Other stakeholders should be identified and their needs established, translated into documented requirements and, where relevant, agreed to by the customer.

5.4.2 Scope development and control

When developing the scope, the characteristics of the project product should be identified and documented as completely as is possible in measurable terms for use as the basis for design and development. It should be specified how these characteristics should be measured or how their compliance with customer and other stakeholder requirements should be assessed. Product characteristics should be traceable to customer and other stakeholder requirements.

Supporting evidence on alternative approaches and solutions, including the results of analyses performed, considered and included in the scope development, should also be referenced.

Managing changes to the scope is dealt with within the change management process.

5.4.3 Activity definition

The project should be systematically structured into manageable activities to meet customer needs for product and processes.

NOTE — Frequently, terms such as "activities", "tasks" and "work packages" are used for the elements of this structuring, and the result is usually known as a work breakdown structure (WBS). For the purposes of this International Standard, the term "activity" is used as the generic term for an element of the structure.

When defining activities, project management should involve the personnel who will carry out the activities, in order to benefit from their experience, and to gain their understanding and acceptance.

Each activity should be defined in such a way that its outputs are measurable.

The list of activities should be checked for completeness. Among the activities defined should be quality practices, progress evaluations and preparing a project plan.