OTC
Owner Team Consultation

Fit-for-Purpose Specifications for Project Development and Implementation

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Introduction

Stephen Covey states that “beginning with the end in mind” is based on the principle that things are created twice (Covey, 1990). This is also true for the process of generating or customising specifications. In Covey’s words: “there's a mental or first creation, and a physical or second creation to all things.” Before embarking on writing, or customising, a specification, one must have clarity on what it is one wishes to achieve with it.

This article will focus on industries where owner organisations own, maintain and customise in-house specifications for use in capital projects, procurement and manufacturing. Another approach would be to subscribe to specifications of, for example, the Construction Specifications Institute (CSI) and other similar bodies. This approach is not discussed in this article, but can be very appealing to smaller organisations.

Every project has unique objectives that must be met by the project manager, who achieves this by managing deliverables such as cost, schedule and technical integrity of the project. After project completion, business operates, maintains, and finally decommissions the plant. Specifications should contribute during project execution to minimise cost and schedule, and deliver technical integrity, and during plant operations to meet operations requirements such as maintainability, reliability, operability, throughput, product quality and safety.

Unique project requirements require that specifications are adjusted for every project. This is referred to as customisation of specifications.

Some definitions

I’ve only used the term ‘specifications’ up to now, but some may ask whether this is not the same as a standard or a code. Before we get started, it is important to understand the meaning of each term.

Standards: According to the definition of the International Organisation for Standardisation (ISO, undated), a standard is a document that provides requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, products, processes and services are fit for their purpose. Well known examples are:

- ISO 9001 for Quality management;
- ISO 14001 for Environmental management; and
- ASTM International engineering standards.

Codes: Codes are generally the top-tier documents, providing a set of rules that specify the minimum acceptable level of safety for manufactured, fabricated or constructed objects. These may incorporate regulatory requirements and will often refer out to standards or specifications for specific details on additional requirements not specified in the Code itself. Examples of some commonly used Codes are the:

- ASME Boiler and Pressure Vessel Code (B&PVC); and
- AWS D1.1 Structural Welding Code – Steel.

Specifications: A specification is a set of conditions and requirements of precise and limited application that provide a detailed description of a procedure, process, material, product, or service for use primarily in procurement and manufacturing. Standards may be referenced or included in specifications. A specification might include, but is not limited to:

- Descriptive title, number, etc. of the specification;
- Date of last effective revision and revision designation;
- A logo or trademark to indicate the document copyright, ownership and origin;
- Person, office, or department responsible for questions on the specification, updates, and deviations;
- The significance, scope or importance of the specification and its intended use;
- Terminology, definitions and abbreviations to clarify the meanings of the specification;
- Test methods for measuring all specified characteristics;
- Material requirements in terms of physical, mechanical, electrical, chemical, etc. properties, with targets and tolerances.
- Drawings, photographs, or technical illustrations;
- Safety, health and environmental considerations and requirements;
- Quality control requirements in terms of acceptance sampling, inspections, and acceptance criteria;

- Person, office, or department responsible for enforcement of the specification;
- Provisions for rejection, re-inspection, rehearing, corrective measures;
- Change record to summarise the chronological development, revision and completion if the document is to be circulated internally; and
- Annexes and appendices that expand details, add clarification, or offer options.

Do specifications add value?

During any discussion on specifications, the first questions asked always include: why do we need specifications and what value is added? If an owner organisation wishes to generate an in-house specification for all possible aspects of a project and/or operating plant, the answer may be no, because of the cost and time required. However, if the intention is only to develop specifications for the essential applications, the answer is yes.

Specifications add value in projects and running plants by:

- Driving standardisation of designs of units and sub-units and manufacturing thereof;
- Driving standardisation in the layout of assemblies, e.g. pump/motor/valve station;
- Optimising of procurement of materials and number and types of spares, as well as the interchangeability of spares;
- Shortening plant and process design cycles;
- Improving the maintainability, operability and thereby safety of plants;
- Facilitating sharing of best engineering practices;
- Facilitating training and development of engineers and artisans; and
- Driving consistency of documentation.

The value of specifications should be understood and endorsed by the leadership of a business. One of the members of the executive team should take sponsorship of the whole process, monitor performance and give feedback to the executive team.

Structure for development, revision & withdrawal of specifications

The development, revision and withdrawal (dr&w) of specifications should be centrally co-ordinated and governed with support and participation from across the whole business to ensure buy-in and quality of deliverables. Different representatives are allocated to the specification dr&w group, as illustrated in Figure 1. The corporate sponsor for specifications should identify and appoint members of the Specification Steering Committee.

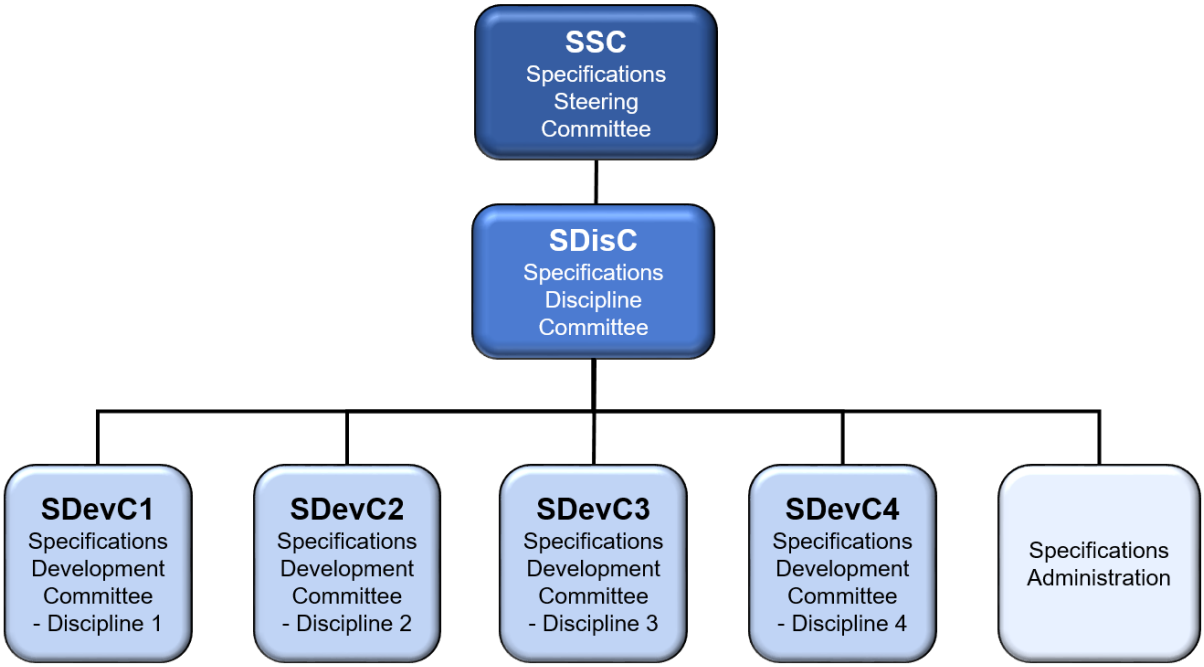

Figure 1: Specification Development, Revision and Withdrawal Group

We now look in more detail at each of the committees or groups in Figure 1 in the paragraphs that follow.

Specification Steering Committee (SSC): Different business units nominate members to the SSC. Members should represent production, maintenance, engineering disciplines and technical services departments (welding, manufacturing, and inspection). This committee sets direction, monitors performance and supports different work teams. The chairperson of the Specifications Discipline Committee (SDisC) is also a member of this committee.

Specifications Discipline Committee (SDisC): This committee comprises the chairpersons of the different development committees, as well as representation from production, maintenance, technical services departments (welding, manufacturing, and inspection) and procurement. The SDisC is accountable for:

- Approval of discipline specification dr&w schedules
- Approval of composition of specification dr&w teams
- Monitoring performance of different discipline committees and reporting to SSC

Specification Development Committee (SDevC): The chairperson of each of these different engineering discipline SDevCs, is the person accountable for that specific discipline in the organisation, and is usually from the engineering function in the business. The SDevC Electrical Engineering (as an example) is responsible for all specifications allocated to the electrical engineering discipline. SDECs scan the environment for emerging trends, changes in codes, standards and specifications of

other disciplines (referenced in their specifications), age of specifications, and relevance (performance) of specifications. They compile dr&w schedules and allocate members to different specification development teams. The chairperson also approves dr&w specifications. The work process is described in the following section.

Lastly, there should be a specifications administrative function to ensure that the latest version of a specification is used and that no specifications are older than five years without revision.

Procedure for dr&w of specifications

A specification development sub-committee is formed for every specification that is due for dr&w. The main role-players are the originator, reviewer and business representatives, as were identified during the dr&w planning phase.

The originator gets input from members and compiles the first draft. It is important to incorporate feedback from the lessons-learnt sessions after project closure, and concessions registered against a specification during project execution. The draft will be discussed and updated during (as many as needed) work sessions; until it is finalised. The reviewer reviews and finally signs the specification off, after which it is presented to the chairman of the relevant SDevC for approval and publication by specification administrative services.

For the proposed withdrawal of specifications from service, a brief motivation therefore is required, for sanction at the SDisC.

Customisation of specifications for a project

Value Improvement Practices (VIPs) are used during project planning and execution to improve the probability of project success. VIPs are out of the ordinary practises which can provide measurable and statistically demonstrable effects on cost, schedule and/or reliability of the constructed asset. Each VIP will follow a distinct and defined work process.

Customising Standards & Specifications is one of the many Value Improvement Practices (VIPs) that can be used. It is a systematic analysis to ensure that facility costs are not increased, and that product quality, operating cost as well as safety, are not negatively impacted, by adjusting requirements of codes, -standards and -specifications, which exceed the actual needs of the particular case (VM Services, 2012).

Customisation of specifications should be done at the optimal time during project execution to maximise the value creation. The best time is after the beginning of front-end loading 2, and completion early during front-end loading 3. This ideal timing is illustrated on a typical stage-gate model in Figure 2.

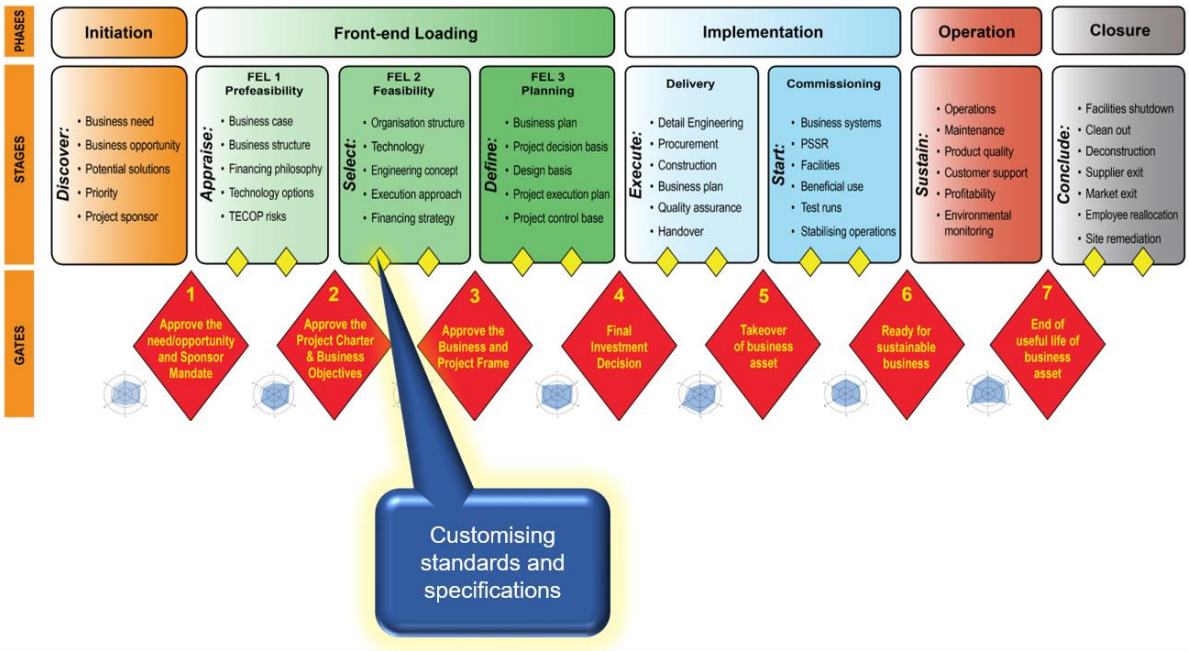

Figure 2: Ideal timing for customising standards and specifications

Concluding remarks

In-house specifications should reflect best practices of the business, be aligned with latest codes and standards, and well understood by users.

Customisation of specifications should be done by experienced engineers and other team members during the feasibility and early planning stages of project development and implementation.

Specifications provide excellent research opportunities and training material for the development of technical personnel.

References

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