CHAPTER - IV

CONCEPTS OF STANDARDS AND SPECIFICATIONS

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4.0 INTRODUCTION

Standards are becoming increasingly important as a means of mitigating some of problems of our modern society. They are also important means of bridging many communication gaps.

Standards have many values and mean things depending on the use and user.

1. F.A Sweet expressed four values of standards as follows :-

(a) They educate, they set forth ideals or quality goals for the guidance of manufactures and users alike. They are invaluable to the manufacturer who wishes to enter a new field and to the naive purchaser who wants to buy new products.

(b) They simplify, they reduce the number of sizes the variety of processes, the amount of stock and the paper work that largely accounts for the over head costs of making and selling.

(c) They conserve by making possible large-scale production of standard design, they encourage better tooling, more careful design and more precise control thereby reduce the production of defective and surplus pieces.

(d) They are the base upon which to certify. They serve as hall-marks of quality which are intenstimable value to the advertiser who points to the proven values and to the buyer who sees the accredited trademark, name plate or label. Standards are essential tools in the interaction of people with their environment. They are essential as a means of assuring consumers protection in the use of myriad products that constantly
increases our choice and selection of what we have come to regard as the necessities of living.

The interpretive factor for understanding and observing regulative controls is best expressed in the form of standards. Even in disciplines not directly connected with engineering and sciences, some understanding of the basic nature of standards is becoming increasingly relevant. For example an Economist must have a knowledge of standards and how they originate in order to recognise their effect on production and trade and their influence on international exchange of goods and services.

As the organisation becomes more complex, more controls needed. Standards are the documents that carry these controls throughout the social structure.

It is not necessary that every one affected by standard understand what every standard says. Just as it is not possible to know all the laws, only few specialise generally understand the more technical standards.

Standardisation is the process of formulating and applying rules for an orderly approaches to a specific activity for the benefit and with the co-operation of all concerned and in particular for the promotion of optimum overall economy taking, due account of functional conditions and safety requirements.

It is based on the consolidated results of scientific techniques and experiences. It determines not only the basis for the present but also for future development and it should keep pace with progress. Standardisation is defined a process for not only formulating but
applying certain rules. It is not a cult or faith to be taken for granted or for that matter a mandate to be imposed by authority.

It is simply a process both for making and for implementing certain rules to ensure an orderly approach to any given activity of man, such as manufacturing, selling or constructing. The approach is to be orderly in the sense that in carrying out the activity in question there should be little chance of waste of time, effort or resource. Here co-operation becomes a basic principle particularly for formulating the rules. The implementation of which is automatically facilitated being as it is to the common advantage of the parties concerned.

The definition goes on to include the concept of the benefit to be derived by all concerned by particularising the promotion of over all economy. It is always possible that when considered on a short term basis or when applied to a limited circle, the benefit may not be all inclusive.

Standards:

"Very appropriate concept of "standardisation is to industry, what culture is to society".

2 "Standard" is an emotive, almost unfortunate term. To some people there are undertones of superior quality, almost to the extent of a standard being something highly desirable but rarely achievable. For work to 'Come up to standard' suggests making an exceptional effort, either by having to work harder or by having to obey a seemingly unnecessary or in appropriate constraint. Standards can help people to cope with the increasing technical complexity of resent times. Strongly, in
almost all countries lack of information on standard in the schools and society, even in countries where technology is highly advanced. There is a need for more knowledge of standards and their significance. Following sections will give meaning, definitions, types, etc of standards and specifications.

Specifications

A specification is a detailed set of requirements to be satisfied by a product, material, process or system, indicating the procedures for checking conformity to these requirements. For information or guidance a check list is provided of matters related to but outside the scope of the specification requirements, on which contractual agreement is appropriated. The main purpose of requirements specification is to capture and record a description of what a purchaser or a user of the system wishes to obtain. Normally the specification would define the purchases requirement in terms of function, performances, interfaces and design constraints. The purpose is to enable system developers and supplier to understand exactly what the purchaser want. The aim of requirement specification is to provide a clear, consistent, precise unambiguous statement of the requirements. It covers all aspects of the functionalities, performances, interfaces, design constrains and other significant characteristics of the proposed system.

In order to draw up the specification some research is needed to determine the requirements to be met. However in case of new techniques or technology - oriented standards, it may be decided to
develop broad proposals by the committee from which draft standards are specified.

4.1 Aims of Standardization

The aim of standards is to establish standards and co-ordinate standardisation work. Another its important task is to publicise standards and standardisation. The activities would cover the following aims:

1. To promote the quality of products, processes and services by defining those features and characters that govern their ability to satisfy given needs that is their fitness for purpose:

2. To promote improvement in the quality of life, safety, health and protection of the environment;

3. To Promote the economic use of materials, energy and human resources in the production and exchange of goods:

4. To promote clear and unabmiguous communication between all interested parties, in a form suitable for reference or quotation in legally binding documents;

5. To promote international trade by the removal of barriers caused by differences in national practice; and

6. To promote industrial efficiency through variety control.
The graphs indicate the aims and functions of standards and specifications.

Diagrammatic representation of standardisation space

4.2 Principles of Standardisation:

Standardisation involves both preparation and use of standards. The main principles of this activity are described as follows:

1. Standard should be wanted;
2. Standard should be used;
3. Standard should be impartial;
4. Standard should be planned and
5. Standard should not be duplicated.
4.2.1. Standard should be wanted

The production of standards relies upon the willingness of all parties concerned to reach voluntary agreement among themselves for one or more stated purposes.

4.2.2. Standard should be used

The standards rely upon the voluntary commitment required in the preparation being extended to their use. The extended application of a standard should clearly understand at the start and borne in mind throughout its preparation. They should be concise, clear unambiguous and arranged and indexed to assist speedy retrieval of required information. Different types of standard are written different ways for particular purposes for example
- specifications for products, materials, processes or services;
- codes of practice;
- various kinds of methods and
- glossaries of terms.

Verification of conformity to specified requirements should always be possible within a realistic time and at a reasonable cost.

4.2.3. Standards should be impartial

The standard should be prepared in order to benefit the whole community. The provisions should not give exclusive advantage to the product or service of any individual supplier.

4.2.4. Standards should be planned:

The social and or economic benefits of a standard should be compared with the total cost of preparing, publishing and maintaining it.
Standards should be reviewed at regular intervals and appropriate action taken. A standard that is not kept up-to-date with changing circumstances or technological advance may become irrelevant or inhibit progress.

4.2.5. **Standard should not be duplicated**

Standardisation can be pursued at different levels by individuals, firms, associations, countries, regions and worldwide. For economy of total effort, a standard should logically be prepared at the broadest level consistent with meeting the needs of interested parties within an acceptable timescale. The simultaneous preparation, at different levels, of standards on identical aspects of identical subjects should be avoided as far as practicable. The aim of the international and European standardisation is the adoption of national standards of harmonised documents that ideally are identical, or at least technically equivalent in each country.

4.3 **Basic Objectives:**

In general, following are the basic objectives of standardisation.

1. To unify the technical language by economic partners;
2. To reduce costs, by solving recurrent problems;
3. To update and maintain the common fund as the starting point of innovation;
4. To provide the essential technical data for developing industrial and trade strategies and targeted quality". Standards and Specifications are documents which state how materials and products should be manufactured, defined, measured or tested.
4.4 Definitions of Standards and specifications and Structure

There have been many discussions in the beginning over the definitions of a standard. Some authenticated authors and organisations mentioned in their records that "Standard is a tool which enumerates specified limits to produce a product or a material to the optimum utilisation of an individual or to the society". In the next context many other associations and institutions enlightened that "standard is a document whose function is to control some aspects of human endeavour, which is an exceedingly vast area".

A specifications is a detailed set of requirements to be satisfied by a product, material process or system, indicating the procedure for checking conformity to these requirements. For information or guidance a check list may be provided of matters related to, but outside the scope of the specifications requirements, on which contractual agreement is appropriate. Alternatively, such information may be published separately in the form of a British Standard method of specifying. In such cases all that is standardised is a particular way of setting down requirements for contractual purposes.

Every requirement of a standard specification should be written with regard to the interface, typically purchaser and supplier, stated in or implied by the scope. If there is likely to be any ambiguity, the interface should be stated. Such a requirement may convey information to other parties but the form of words adopted will normally be appropriate to one interface only.
For ease of reference and implementation a separate specification for each separate interface is preferable where a succession of interface is involved. Care should be taken to avoid specifying requirements in a standard that can be complied with only by some one concerned with a different area of control. For specifications that establish requirements for a sequence of processes or operations which are individually incomplete but collectively directed to the completion of a definable task or the constructing of a discrete product or installation, a single comprehensive specification may be preferable. In such cases, the separate interfaces involved should be clearly identified in the scope, and the requirements and references to methods of verifying conformity applicable at each interface should be grouped together in separate sections within the specification.

There is an occasional need for a specification to define some particular attributes or parameters through an interactive procedure of information exchange between the parties concerned according to the circumstances of the application of the standard. If practicable, such standards should be divided into separate parts being a specification for the characteristics that can be defined objectively and the other a method of specifying, as a basis for documenting agreement.

Structure

All applicable requirements of a specification have to be satisfied in compliance with it is to be claimed. These requirements are stated in the clauses forming the normative elements of the specification. Many specifications provide ranges of values and multi-choice characteristics,
from which a purchaser needs to make a selection when ordering. If a
specifications covers several grades of product, manufacturers may not
necessarily make all of these. It should therefore be made clear in any
making clause that care should be taken that claims of compliance are
made only for the relevant grades of product. Statements that particular
sizes, forms, techniques, etc are 'preferred' do not constitute
requirements. Such statements need to be clearly justified by their
benefits to all users. It should be scrutinised carefully to ensure that they
do not confer commercial advantage. When values are specified, it should
be made quite clear whether they are maximum or minimum values or
subject to tolerances that should be stated or whether they are nominal
values.

The wording of a specification should enable conformity to its
requirements to be verified equally by supplier and purchaser or
independent party certifier.

The term "standard" used in two ways
1. In connection with measurement of length, mass, time, temperature
etc, a standard unit is maintained generally in national laboratory.
2. To describe printed 'standard specifications' concerned with quality,
fitness for purpose and performance of manufactured articles and
materials.
3. Websters New world dictionary defines a standard as "something
established for use as a rule or basis of comparison in measuring or
Judging capacity, quantity, content, it may take the form of:
4a) a document containing a set of conditions to be fulfilled;
b) a fundamental unit or a physical constants and
c) an object for physical comparison”.

The term 'standard in a library is used to cover publications that include specifications, codes of practice recommendations, rules of sampling and inspections, test methods, nomenclatures etc.

"Specifications are generally purchase documents that contain description process or service which are desired to meet purchaser's particular needs. They apply to a specific users or industries"

"Standardization is a process by which limitations are imposed by common agreement and cooperation on the quality, size shape of industrial products etc".

Specification, unification and simplification are the main features of standardization. Standards are conventional rules aimed at specification, unification and simplification in all fields with a view to achieving "improved efficiency". These are formulated with the cooperative agreements between the parties. In industry and commerce 'Improved Efficiency' is achieved only by:

1) Preventing wastages of resources and power;
2) Enabling safety, speed and productivity;
3) Ensuring uniformity reliability and excellance of product quality; and
4) By achieving overall efficiency and economy. For this purpose, conventional rules stating a particular frame work are necessary. Standards are such rules to provide efficiency.

To become standards, the conventional rules must be approved by a recognised authority (body), to provide for common and repeated use.
The characteristics, rules and guidelines are contents of standard which are aimed to achieve the optimum degree or order in given context.

Therefore a standard is a rule or model or a norm to be followed which is established by authority, custom or general consent.

Ultimately, according to Tayal, "standards are documents which are formulated by agreement authority or custom of sponsors to define product, material, process to procedure, quality construction, operating characteristics, performance, nomenclature and other like facts".

This definition recognises two special attributes of a standard.

1. It is a written and
2. It must be established by some recognised authority.

Hence standard is a basis of comparison or measurement. It may be defined as carefully thought methods of performing a function or operation or carefully drawn specification covering material, equipment or commodities. To gain optimum efficiency in the operations such as production, standard methods are used. A standard is a method that can be devised for performing a function at the time the standard is formulated.

"The International Organisation of Standardization (ISO) describes a standard is the result of a particular standardization effort approved by a recognised authority. Effective solutions at all levels. viz., general management, designs, purchasing and stores, manufacturing, quality, marketing and distribution".

Standards and their development are closely related through a large variety of parent industries, suppliers, purchases and consumers.
together with government orders and regulations, legal decisions and technological advances.

The World of Normative Information

![Diagram of Standardisation Documents](ISO/Access to Information on Standards 1986)

10 "Many standards are, of course, set by custom or general consent. There are standards for the nutritive value of foods, the use of drugs, the packing of canned goods; standards of identity, quality and quantity".

11 "In the context of libraries, the standards are based on criteria which can be instrumental in the measurements or assessment of the library services. These criteria are determined by the professional librarian in order to attain and maintain the objectives they set unto themselves. Library standards are not only helpful in the library work but they serve administrators and heads of institutions in planning and administering the libraries".
The Aeronautical standardisation wing defines "Standards are conventional rules established with the co-operation and consensus of parties concerned, aimed at specification, unification and simplification in all fields with a view to achieving improved efficiency".

The second, very concise definition to three key-words which are the ground stores of standardisation;

'Specification. To define characterisations and performance for achieving fitness for purpose.

Unification: To enable interchangeability

Simplification: "To achieve variety reduction to produce mere cheaply".

Defence standardisation body defines "A standard is a written formulation, or a physical representation in the form of a graph or sample or model, which serves to define, designate or specify criteria features of a unit or basis of measurement of an object, an action, a process, a method, a practice, a capacity, a function, a performance, a measure, an arrangement, a condition, a concept or a conception".

To write a standard, there should be valued reasons for doing so, and standards should satisfy the reasons.

4.5 Types of Standards

In this direction the pioneers identified two basic approaches to standards.

i.e. (a) Active standard

(b) Reactive standard

Active standards are planned, structured, and well designed standards resulting from forethought as to their need and content.
Reactive standards are not planned in advance. It is developed along with process than to have to write standards later to solve problems created by new introduction.

In this context the scope of the standards in both written and unwritten form, control conditions, aspects, or behaviour are practically possible. In continuation the pioneers also identified the authenticity of standards to "keep people honest".

Since the dawn of human society, knowingly or unknowingly people started interacting and interchanging each other in many ways. In this process of interchanging the people started unfair dealings and false measurements. This resulted in establishing the standards to enforce justice and honesty.

Voluntary Standards:

Although it would seem that voluntary standards ought to be standards which can be either used or rejected, this does not hold good in practice. Our society places a high value on conformity, as soon as a number of people come to accept a voluntary standard, they expect others to confirm. Individuals that insist on doing things their own way may find themselves at an increasing disadvantage.

There are many good reasons why voluntary standards ought to be considered as something a little stronger than 'voluntary'. Although they are created by voluntary action of some group there would be no reason for the effort and cost of the developing standard unless it was expected that people who use the document would benefit by doing so.
Application of Voluntary Standards

The field of standardisation is infinitely complex, and it is difficult to discuss any portion of it without encroaching on other areas. In general, voluntary standards in the industry exert a broad control over materials, methods and products while allowing considerable flexibility as to the manner of application.

Mandatory Standards

Mandatory standards are laws. Unlike the case of voluntary standards which may or may not have consequences for non observance, failure to obey laws will invoke legal sanctions and penalties. Many voluntary standards evolve into mandatory standards. On the theory of the greatest good for the greatest number.

In this context national and international organisation started developing standard with their own well planned design, structure, measurements and formulas, then started implementing in producing a model product. Once the model product, accepted by the people, and be the organisations, it becomes a "Specification" for their product. This specification has been structured and written with a specific designers and by a specialist committee. In practice and in continuation the specification is called as a "Standard" i.e, before drafting a standard a proper specification needs to be drawn up. In order to draw up the specification, some research work is needed to determine the requirement to be met.
Applications of Mandatory Standards

Mandatory standards are obligatory they are generally detailed, limited in scope and very specialised. They are usually based on governmental controls. The business concern has little choice but to observe the limitation placed on it if it wants to remain in the operation.

They have generally a legal basis, an explicit description of limits to which an industry must adhere to. Under ideal circumstances which are seldom, attainable, these standards operate for a public good, in such areas as health, safety and environmental protection.

Sub-categories of Industrial standards

There are hundreds of industrial associations and establish committees written standards for their own needs. The fact that such co-operative endeavor has been voluntarily entered into by competing companies. There should be a strong argument against the need for government control. Manufacturers have recognised the need for common application of methods and means for manufacturing, them with the necessary standards. Since the objective of business is to make a profit, it is clear that standards to be a good investment.

Company Standards

Inspite of the advantage of similar methods of manufacturing, every company develops certain ways of solving problems. They are not easily changed and they may become ‘CAST IN CONCRETE’ by inhouse procedures and specifications.
Personal Standards

The standards that control a company or an industry are the product of human interaction. They exert an influence on the nation or relationship's between nations. We can see in our daily routine many controls which we have voluntarily accepted and which affect our personal behaviour and attitudes. Standards are after all, the product of people trying to avoid problems by forethought.

Engineering Standards

They are the standards applied in technically designed work, testing and measurement properties of materials, drafting and so on.

Product standards

The standards are intended to describe attributes and ingratiate manufactures items, formula, materials list, description of models.

Process standards

Process standards are standards showing process method, operations and equipment included in Technical Specifications, inspection and test methods etc.

Purchasing and stores standards

It covers specifications for materials, parts, equipment and supplies brought by the firm.

Office procedural standards

These standards refer to record keeping for production and inventory control, report, forms, methods of analysis, budgetting and cost accounting and other administrative practices.
Safety standards

These standards are concerned with industrial fire, Air, wastage, plant house keeping and identification of environmental hazards.

Besides, there are also many variety of standards such as equipment and tool standard, quality standards.

4.6 Need for Standardisation

Product quality, compatibility safety and reliability are the needs of the standardisation programme. Programmes are to be designed for standards depending upon proven performance and extensive testing. The need of a standard arises when speed of manufacture, improves efficiency like quantity, extents, values and methods of activities.

- Standards need to promote the manned, sustained and accelerated growth of industry.

- Standards need to provide the basis for industrial development. They must facilitate identification of the need of the consumers and assessment of manufacturers capability.

Disturbing any one of the four supports-Men, machine, money and standards will de-stabilize the economy. The modern industrial society demands an ever increasing volume of quality good labour saving devices, competitive prices, high degree of reliability. Due to the globalisation of trade, the exchange of goods and technology at the international level has reached very high calling for commonly understood means of communication breaking the language and cultural barriers. These have posed a challenge for the effective management of resources and trade, it is here that, need for standardisation's plays a
significant role in providing a tool for effective and efficient management of resources and contributes to an improved overall economy.

4.7 Role of Standards

- Design standards for materials, finishes, electronic components, mechanical and electromechanical components, equipment construction practices etc, help designers in the selection of right inputs.
- In the process of conversion of know-how into various systems for collaboration projects.
- Control of part numbers brought out items to facilitate effective inventory control, ensuring quality and to avoid duplicate part numbers.
- Providing information on obsolescence of electronics components, new technologies, products and processes.
- Standards on numbering and engineering documentation systems facilitate uniform presentation of design and manufacturing data.
- Screening of change proposals for engineering documents of brought out items for proper co-ordination and to ensure quality.

Role of Standards in Materials Procurement

- Establishing approved vendors for materials, electronic components and mechanical components to facilitate purchase of quality products.
- Participation in the finalisation of purchase proposals for items for ensuring conformity with requirements and quality aspects.
- Providing alternative solutions to problems in procurement
- Interaction with vendors for development of new sources.
Role of Standards in Production

- Participation in production study of new products to ensure trouble free production.
- Standardisation of process, workmanship and quality requirements to enable uniformity in production and to achieve pre-determined levels of quality.
- Suggesting solutions to production problems.

Role of Standards in Quality management

- Quality standards (QS) help in inspection of brought out terms, manufactured and processed parts and sub-contracted items.
- Evaluation and qualification approval of brought out materials and components.
- Publication of approved vendors directory
- Participation in failure analysis programmes for components in production and field usage.

4.8 Advantage of Standardisation

- Standards help all of us
- Standards move the wheels of industry faster.
- Standardisation has no enemy other than possibly the chaos that would develop without it.
- Standardise or Perish
- Distributing any one of the four supports men, machine, money and standards will destabilise the industry.
- Standards are not made so as to be show pieces in executives room but intended to be used by all concerned agencies, to bring about benefits both tangible and intangible.

- Standards provide a clear documentation of technology and practice based on study and experience. Absence of such standards documents will result in a situation similar to that of efforts for reinventing the wheel.

1. From the consumer point of view, standards help all of us. Standards ensure the fitness for the intended purpose of products and services.
2. Standards for quality, health and safety project: Consumer's interest.
3. Conforming to standards through certification builds consumer's confidence, giving them their money's worth.

**Industries point of view**

1. Terminology and symbol Standards help in better understanding.
2. Product standards encourage economic efficiency through.
3. Product standards help in ensuring good design and improvement in quality of products.
4. Process standards provide the means for improving manufacturing process.
5. Codes of practice establish good practices in all fields of installation, construction etc.
6. Testing standards set recognised level of repeatability and reproductivity.
7. All standards promote better understanding between buyer and seller and provide solutions to recurring problem.

8. Adopt standards to your design, planning, construction, contract, production, purchase and consultancy programmes to reduce operational cost and increase profits.

Government point of view

1. Standards provide a basis for legislation for controlling quality, consumer protection and ensuring health and safety.

2. Use of standards provide essential key to organise industrial development.

3. Use of standards lead to direct and indirect economic benefits.

4. Standards help in import substitution and export promotion. Standards promote the planned, sustained and accelerated growth of industry, incorporating the latest results of research and development. Standards help in achieving optimum utilisation of available resources, streamlining production processes, increasing productivity and building up consumers confidence and goodwill. Standardisation and quality systems are essential for building up a strong industrial base to meet effectively the domestic needs and also face the international competition. Standardisation at national level provide the basis for industrial development. They facilitate identification of the needs of the consumers and assessment of the manufacturer's ability. To facilitate international trade, international organisation for standardisation brought out the ISO-9000 series of standards on quality systems. For sheer survival we need to make our products to meet international quality and at the same time cost
effective. To achieve both these goals standardisation is a must. The benefits of standardisation was felt during the world war when standardisation was recognised as a useful tool in engineering activities enabling mass production, automation and interchangeability. Ever since, standardisation has gained imputes, it has emerged as an integral part of every manufacturing and management activity. The awareness for globally acceptable quality systems has lead to the formulation of a series of standards at all levels such as ISO-9000 at international level and IS-14000 series at national to enable quality to be built into products processes and services at all steps right from inception, thus changing the concept of quality control to quality assurance. Different languages within the same world itself causes confusion, but atleast they can communicate to groups who know the particular language. If there were no languages and script at all, it results in total breakdown of all communication both verbal and written, on which today’s world is completely dependent. Through standardisation, systems could be improved, quality could be assured in terms of measurable parameters, technology could be absorbed fast and resouces could be effectively managed. The mission of producing quality goods at reduced prices can be achieved by implementing standards. The technology of manufacturing machine tools has changed considerably. There is growing demand for high tech machines/special purpose machines to cater to the automobile, power, electronics and computer industry especially when there is mass production of quality goods at affordable prices at both national and international markets. This calls for the
upgradation of technology in the machine tool industry, the activity which has necessitated vide application of "Industrial Standards". There is virtually no field of activity of industry which is not amendable to some degree of standardisation. Company standards has to play a vital role as new technologies namely, advanced materials, automation, robotics and information technology are coming to the forefront, not only at the international level but also at the national level. Benefits of standardisation are well appreciated by the consumer. It is necessary that the industry looks towards standardisation of tangible and intangible needs of the consumer. Once the activities are standardised the environment would lead to more harmonious and error free working, resulting in total quality and excellance for the organisation. The standardisation activity has played a quite but palatable role in multifarious areas like:

1) Achieving economics and international level quality levels in production;
2) Vendor development and rapid indigenisation and
3) Consumer protection and attaining a competitive edge.

Life without standards - Interchangeability

Interchangeability sometimes is a question of life and death. This situation actually happened in Egypt many years ago. An epidemic cholera brokeout and immediately United States sent syrings and Sweden has sent needles to help to fight the epidemic with serum. Unfortunately, the needles did not fit the syringes, by the time situation was corrected, thousands had died.
Measurement standards lead to interchangeability, interchangeability leads to variety reduction, variety reduction leads to cost reduction. Conversely, absence of standards will lead to specific and special items which will be costlier. Standardisation activity is all pervasive and applies to all activities of life, much so in industry. Impetus on standardisation started after industrial revolution. Standardisation is a very important management tool and an efficient technique for rationalisation, reduction in types and varieties, inventory control and reduction for improvement of quality and productivity in any organisation. Absence of clear specification and standards can really play havoc.

Not giving a clear and separate status and support to standards department will only result in not realising the enormous benefits in the treasure chest called standards.

The primary benefits that accrue from standardisation are as under:-
1. Fewer varieties and sizes of materials and equipment which would mean low inventory and greater interchangeability.
2. Decreased investment in stocks and spare parts.
3. Less deterioration losses in storage department.
4. Saving in storage space and transportation.
5. Conservation of resources
6. Ease in production and procurement
7. Easier inspection.
8. Better workmanship resulting from handling more of the something.
9. Easier servicing and maintenance by the user.

Standards assure reasonably fair value for our money. We do not have to personally double check everything we buy, because we know that the product has been developed according to standards to assure good quality and value. Standards promote the planned, sustained and accelerated growth of industry. Incorporating the latest results of research development standards help in achieving optimum utilisation of available resources, streamlining:

- Production process, builds up consumer's confidence and goodwill.
- Standardisation and quality systems are essential for building a strong base to meet effectively the domestic needs and also free the international competition. To achieve both these goals standardisation is a must. The benefits of the standardisation was felt during the world war when standardisation was recognised as a useful tool in engineering activities enabling mass production automation and interchangeability.

Ever since standardisation has gained impetus and today it has emerged as an integral part of every manufacturing and management activity.

Standards have offered channels for effective communication.

Standardisation has affected economic and cost control in manufacture through proper selection and use of scarce raw materials, adaptation of standardise manufacturing process and procedures through proper organisation.

**What standards do?**

1. Standards guides design engineer
2. Helps easy procurement
3. Provides framework for mass production
4. Increases productivity
5. Streamlines production process
6. Sets recognised level of quality.
7. Enhances workman efficiency
8. Ensures interchangeability.
9. Lower cost.
10. Aids safety.

Standard is a controlled degree in striving towards excellence.

In the present age, widespread application of high technologies calls for establishment of standards to provide basic guidelines for controlling development technologies. Without standards, high technology would not be able to get commercialised to provide benefits to industry and consumers.

Several countries have made efforts to link their national standards to international standards. Differences do exist, still continued efforts will certainly eliminate or reduce this gap. Standardisation has now become an important element of infrastructure required for healthy growth of a nation. As Rajagopalachari has rightly said "Standardisation is to industry and trade what culture and manners are to society".

4.8 Drafting of Standards and Specifications:

Standards are rarely developed from scratch and before drafting can commence, externally derived material should be examined. In drafting standards, authors always aim for specific application.
Standards written in terms which are independent of the particular environment, the parameters, for the environment include:

- Organisation
- Nominated personnel
- Hardware and other equipment
- Languages, operating system and other software
- Project applications

When the draft has been completed to the satisfaction, it is recommended for editing. The editing procedure has some criteria i.e., checklist

(1) Compatibility and (2) Effectiveness and usefulness.

The standards committee takes a collective decision on each draft and it approves. Once it is approved by the standards committee, it become "Proposed Standards".

In drafting standards, authors should not hesitate to start writing, no matter how sketching. Drafts should, as far as possible, be written in terms of general applicability rather than for a specific situation. Decision have to be made on whether to circulate drafts for comment outside the standards committee or to issue with a request for comments before the implementation date. Proposed standards must receive the predefined level of authorisation.

HOW STANDARDS ARE DRAFTED

Standardising the detailed manner in which a standard may be drafted and published should naturally be the first of the few tasks to attract the attention of any newly organised standards issuing authority.
It would be contradictory to the spirit of the discipline of standardisation if different standards emerging from the same source were allowed to differ in style and presentation.

**Preparation of an Indian Standard**

1. Receipt of proposal
2. Approval of proposal
3. Consideration of proposal by sectional committee
4. Proposed draft Indian standard
5. Draft standard approved for wide circulation
6. Wide circulation draft prepared
7. Draft issued in wide circulation
8. Draft standard finalised
9. Approval of the standard by division council
10. Standard edited
11. Manuscript for press ready
12. Printed standard out

**Size**

One of the first few recommendations issued by ISA and subsequently adopted by ISO was the one which dealt with paper sizes. Most popular sizes that have come to be used are the so called A4 and A5.
Number of Standards

By numbering the standards with a code No. the standards authorities usually provide the facility to refer to them in a convenient manner.

Forms of Presentation

Two distinct practices prevail in the world in respect of the form in which standards are usually presented which for convenience may be referred to as:

1) Sheet form
2) The discussive form

Numbering of Elements of Standards

A systematic style of numbering of paragraphs, tables, illustrative figures and appendices within the body of standards is just as important as the numbering of standards themselves, and for the same purpose, namely providing facility for referencing and cross referencing.

Specifying numerical Values

Properties of materials and chart of products have necessarily to be expressed in terms of numerical quantities and it is essential that it be done in a consistent manner and as accurately as demanded by the circumstances.

Specifying Metric Values

Abbreviation

Standardisation of abbreviations to be used in standards is another concern of style manuals, which must be attended to separately for each language. Substantive material is the most important part of any
standard. In fact its very raising diameter has also be systematically
organised and presented in such a manner as to provide the maximum
facility for the user.

**Preliminary elements**

1. Title page
2. Brief history
3. Forward
4. Contents

**Body of standards**

1. Title
2. Introduction
3. Scope
4. Field of application
5. Definition
6. Symbols and abbreviations
7. Classification
8. Terminology
9. Manufacture
10. Characteristics and tolerance
11. Sampling
12. Methods or test & application
13. Designation
14. Marketing, labeling and packing
15. Annexes
16. Accessory elements
4.9 STANDARDISATION ACTIVITY

It supports to development of Engineering, production, materials management, quality management, human resources development programmes, and customer inspection agencies.
- Participation in National, Defence and Department of electronics standardisation programmes.
- Design and implementation of codification and documentation systems.
- Indigenisation of components and materials
- Development of multiple sources for indigenous and imported items.
- Participation in vendor rating programmes for indigenous bought out and sub-contracted items.
- Information services on standardisation and other related activities.

Standardisation forms

1. Simplification: Simplification and standardisation are two closely related concepts and when properly employed, they bring about economy. Simplification is defined as the process of examination and consequent elimination of number of types and varieties of stores. But this does not mean unwarranted restriction but a desirable avoidance of uneconomic diversity and multiplicity of stores.

2. Technical Analysis:

Technical analysis follows the process of simplification. It consists of analysis of the remaining varieties, types and sizes with a view to
further reduction by suitable redesigns and to ensure components and parts interchангability.

3. **Engineering standardisation:**

   Engineering standardisation is an integral part of total standardisation. It aims at dimensional and functional interchangibleity; uniform, method of communication viz. drawings, terminology etc; and standard engineering and production process, procedures and practices and packaging.

   **Prof. Gilman** has rightly pointed out that “Concept is stronger than a fact”. To predict the strategic issues in defence area, the usage of standards and specifications predominately requires the basic concept for adopting final application. As such the information covered in this chapter has formed the base for the future investigation.

   The following chapter V covers the historical growth of standards and specifications. This will give an insight of the past, present and future growth of standards and specifications.
References


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