

UNIT-VI

ISO-9000 and its concepts of Quality Management - ISO-9000 series - Taguchi method - JIT in some details

ISO-9000 and its concepts of Quality Management:

The ISO 9000 family addresses various aspects of quality management and contains some of ISO's best known standards. The standards provide guidance and tools for companies and organizations who want to ensure that their products and services consistently meet customer's requirements, and that quality is consistently improved.

ISO 9001:2015:

ISO 9001:2015 sets out the criteria for a quality management system and is the only standard in the family that can be certified to (although this is not a requirement). It can be used by any organization, large or small, regardless of its field of activity. In fact, there are over one million companies and organizations in over 170 countries certified to ISO 9001.

Sector-specific applications of ISO 9001:

ISO has a range of standards for quality management systems that are based on ISO 9001 and adapted to specific sectors and industries. These include:

ISO/TS 29001 – Petroleum, petrochemical and natural gas industries

ISO 13485 – Medical devices

ISO/IEC 90003 – Software engineering

ISO 17582 – Electoral organizations at all levels of government

ISO 18091 - Local government

ISO 9000 Quality Management Principles:

The ISO 9000:2015 and ISO 9001:2015 standards are based on seven quality management principles that senior management can apply for organizational improvement:

1. Customer focus:

- ✓ Understand the needs of existing and future customers
- ✓ Align organizational objectives with customer needs and expectations
- ✓ Meet customer requirements
- ✓ Measure customer satisfaction
- ✓ Manage customer relationships
- ✓ Aim to exceed customer expectations
- ✓ Learn more about the customer experience and customer satisfaction.

2. Leadership

- ✓ Establish a vision and direction for the organization
- ✓ Set challenging goals
- ✓ Model organizational values
- ✓ Establish trust
- ✓ Equip and empower employees
- ✓ Recognize employee contributions
- ✓ Learn more about leadership and find related resources.

3. Engagement of people

- ✓ Ensure that people's abilities are used and valued
- ✓ Make people accountable
- ✓ Enable participation in continual improvement
- ✓ Evaluate individual performance
- ✓ Enable learning and knowledge sharing
- ✓ Enable open discussion of problems, constraints
- ✓ Learn more about employee involvement.

4. Process approach

- ✓ Manage activities as processes
- ✓ Measure the capability of activities
- ✓ Identify linkages between activities
- ✓ Prioritize improvement opportunities
- ✓ Deploy resources effectively
- ✓ Learn more about a process view of work and see process analysis tools.

5. Improvement

- ✓ Improve organizational performance and capabilities
- ✓ Align improvement activities
- ✓ Empower people to make improvements
- ✓ Measure improvement consistently
- ✓ Celebrate improvements
- ✓ Learn more about approaches to continual improvement.

6. Evidence-based decision-making

- ✓ Ensure the accessibility of accurate and reliable data
- ✓ Use appropriate methods to analyse data
- ✓ Make decisions based on analysis
- ✓ Balance data analysis with practical experience
- ✓ See tools for decision-making.

7. Relationship management

- ✓ Identify and select suppliers to manage costs, optimize resources, and create value
- ✓ Establish relationships considering both the short and long term
- ✓ Share expertise, resources, information, and plans with partners
- ✓ Collaborate on improvement and development activities
- ✓ Recognize supplier successes

ISO-9000 series:

ISO 9000 is a set of international standards on quality management and quality assurance developed to help companies effectively document the quality system elements to be implemented to maintain an efficient quality system. They are not specific to any one industry and can be applied to organizations of any size.

ISO 9000 can help a company satisfy its customers, meet regulatory requirements, and achieve continual improvement. However, it should be considered to be a first step, the base level of a quality system, not a complete guarantee of quality.

ISO 9000 vs. 9001

ISO 9000 is a series, or family, of standards. ISO 9001 is a standard within the family. The ISO 9000 family of standards also contains an individual standard named ISO 9000. This standard lays out the fundamentals and vocabulary of quality management systems (QMS).

ISO 9000 Series standards

The ISO 9000 family contains these standards:

- ISO 9001:2015: Quality management systems - Requirements
- ISO 9000:2015: Quality management systems - Fundamentals and vocabulary (definitions)
- ISO 9004:2009: Quality management systems – Managing for the sustained success of an organization (continuous improvement)
- ISO 19011:2011: Guidelines for auditing management systems

ISO 9000 certification

Individuals and organizations cannot be certified to ISO 9000. ISO 9001 is the only standard within the ISO 9000 family to which organizations can certify.

ISO 9000:2000

ISO 9000:2000 refers to the ISO 9000 update released in the year 2000.

The Technical Committee responsible for the ISO 9000 family developed specifications for the ISO 9000:2000 revisions, leading to a significant advancement of the standards and reflecting contemporary concepts of quality management.

The ISO 9000:2000 revision had five goals:

1. Meet stakeholder needs
2. Be usable by all sizes of organizations
3. Be usable by all sectors
4. Be simple and clearly understood
5. Connect quality management system to business processes

ISO 9000:2000 was again updated in 2008 and 2015. ISO 9000:2015 is the most current version.

History & revisions: ISO 9000:2000, 2008, and 2015

- Originally published in 1987 by the International Organization for Standardization (ISO), a specialized international agency for standardization composed of the national standards bodies of more than 160 countries
- Underwent major revision in 2000; revised again in 2008
- Current versions of ISO 9000 and ISO 9001 were published in September 2015.

Taguchi method:

Taguchi are statistical methods, or sometimes called robust design methods, developed by Genichi Taguchi to improve the quality of manufactured goods, and more recently also applied to engineering, biotechnology, marketing and advertising.

Professional statisticians have welcomed the goals and improvements brought about by Taguchi methods, particularly by Taguchi's development of designs for studying variation, but have criticized the inefficiency of some of Taguchi's proposals.

Taguchi's work includes three principal contributions to statistics:

- A specific loss function
- The philosophy of off-line quality control and
- Innovations in the design of experiments.

1) Loss function:

Taguchi adopted a squared-error loss function for several reasons:

- ✓ It is the first "symmetric" term in the Taylor series expansion of real analytic loss-functions.
- ✓ Total loss is measured by the variance. For uncorrelated random variables, as variance is additive the total loss is an additive measurement of cost.
- ✓ The squared-error loss function is widely used in statistics,

2) Off-line quality control:

Taguchi realized that the best opportunity to eliminate variation of the final product quality is during the design of a product and its manufacturing process. Consequently, he developed a strategy for quality engineering that can be used in both contexts. The process has three stages:

- System design
- Parameter (measure) design
- Tolerance design

System design:

This is design at the conceptual level, involving creativity and innovation.

Parameter design:

Once the concept is established, the nominal values of the various dimensions and design parameters need to be set, the detail design phase of conventional engineering. Taguchi's radical insight was that the exact choice of values required is under-specified by the performance requirements of the system. In many circumstances, this allows the parameters to be chosen so as to minimize the effects on performance arising from variation in manufacture, environment and cumulative damage. This is sometimes called robustification.

Tolerance design:

With a successfully completed parameter design, and an understanding of the effect that the various parameters have on performance, resources can be focused on reducing and controlling variation in the critical few dimensions.

3) Design of experiments:

Taguchi developed his experimental theories independently. Taguchi read works following R.A.Fisher only in 1954.

Taguchi's framework for design of experiments is idiosyncratic and often flawed, but contains much that is of enormous value. He made a number of innovations.

Just- in-Time:

Just in Time (JIT), as the name suggests, is a management philosophy that calls for the production of what the customer wants, when they want it, in the quantities requested, where they want it, without it being delayed in inventory.

So instead of building large stocks of what you think the customer might want you only make exactly what the customer actually asks for when they ask for it. This allows you to concentrate your resources on only fulfilling what you are going to be paid for rather than building for stock.

Within a Just in Time manufacturing system, each process will only produce what the next process in sequence is calling for.

Objective of JIT:

JIT Manufacturing tries to smooth the flow of materials from the suppliers to the customers, thereby increasing the speed of the manufacturing process. The objectives of JIT is to change the manufacturing system gradually rather than drastically:

1. To be more responsive to customers,
2. To have better communication among departments and suppliers,
3. To be more flexible,

4. To achieve better quality,
5. To reduce product cost.

Benefits and problems:

Benefits that JIT concept can provide to the company are huge and very diverse. The main benefits of JIT are listed below:

1. Reduced set up times in warehouse - the company in this case can focus on other processes that might need improvement.
2. Improved flows of goods in/through/out warehouse - employees will be able to process goods faster.
3. Employees who possess multi-skills are utilized more efficiently - the company can use workers in situations when they are needed, when there is a shortage of workers and a high demand for a particular product.
4. Better consistency of scheduling and consistency of employee work hours - if there is no demand for a product at the time, workers don't have to be working. This can save the company money by not having to pay workers for a job not completed or could have them focus on other jobs around the warehouse that would not necessarily be done on a normal day.
5. Increased emphasis on supplier relationships - having a trusting supplier relationship is important for the company because it is possible to rely on goods being there when they are needed; 6. Supplies continue around the clock keeping workers productive and businesses focused on turnover - employees will work hard to meet the company goals.