

# EVOLUTION OF QUALITY IN TECHNIQUE

dr inż. Jerzy OBOLEWICZ  
Białystok Technical University  
j.obolewicz@pb.edu.pl

---

## Abstract

Quality is the term commonly used in modern engineering, which evolved historically from the beginning of time. In each stage in the evolution meant compatibility with the quality requirements. Requirements were conditioned by the level of technology of the period. Today, quality is inherent to the technique by which seek all participants of the market economy.

The article presents the historical process of formation of quality problems in the technology.

**Keywords:** technique, engineering, quality, quality management systems

---

## 1. The essence of quality

An important problem of the development of modern technology is the engineering required for achieving the satisfaction of human needs, covering a range of theoretical and practical issues of creating objects in the areas of economic, legal, technological, organizational and logistics in terms of quality. Quality issues are in the process of design, construction, distribution and use in all areas.

Quality is a word commonly used in modern engineering that accompanied humanity since ancient times and was as historically. From the dawn of history was a term generally understood, however, clear and precise definition of this concept caused a lot of problems. The difficulty of defining the term quality resulted mainly from differences in interpretation. Over the centuries, a number of definitions of quality. The various definitions dominated various aspects (philosophical, technical, economic, legal and psychological), depending on the needs of what industry or field of knowledge were created. Quality in theory and practice differ between each other and had many meanings. The discrepancies resulted from different interpretations of engineers, economists, philosophers, psychologists and others who represented different areas and different points of view and possessed a different conceptual apparatus.

One of the first definition of quality was the definition of Plato in the fourth century BC, in which the predominant philosophical aspect. The concept of quality defined on the word „poiotēs” and claimed that not all phenomena can be measured and fully describe. Another figure who explored the essence of the quality of Cicero. He introduced the word „qualitas”, which gave the name to the modern quality, for example. -quality English or German – die Qualität.

In the Dictionary of Polish Language [1] quality is defined as a property type, grade, value; a set of features representing that an object is the subject, and not the other.

The concept of quality was also considered by theoreticians and practitioners. J.M. Juran said that

the quality is the degree to which a specific product meets the needs of specific customer [2]. However, according to W. E. Deming's quality it was a predictable degree of uniformity and reliability at the lowest possible cost and matched to market requirements. T. Boris [3] shared definitions of quality into two main groups:

- definitions of quality in terms of the descriptive, descriptive responding to the question what is the nature of objects or collections of objects,
- definitions expressing the content of evaluative responding to the question what is the object or set of objects.

Among the descriptive definitions could distinguish the definition of technical quality. The most common characteristics of the product were associated with the so-called. technical quality, mostly dependent on raw materials and process associated with the production of the product. The quality of raw materials was dependent in the first instance from their original chemical composition. Properties of raw materials then exert influence on processes during which occurred change the properties of the quality of manufactured products. During the discussion of the technical quality of products we drew attention to the physical and chemical properties that are measurable and they can be expressed in terms of technical standards in terms of capital, domestic or international.

The quality of a specific good consisted of the combination of features of tangible and intangible, through which the entity offering its range of products on the market trying to satisfy and meet the needs and expectations of customers [4]. Material qualities were all the properties associated with the so-called. technical quality, while the intangible qualities were called. equipment product. They formed in the mind of the buyer specified image, referred to as the image of the product and the company. M. Urbaniak [5] to the characteristics scored intangible elements such as brand (product, manufacturer, supplier intermediary), the reputation of the supplier and the price of the product (product, service, idea).

Over time, the quality took on more and more importance and became one of the basic factors characterizing

the contemporary market. She has performed alongside such factors as customer, competition, marketing, sale, advertising and increasingly was recognized as the most important feature of the product that meets customer requirements. As a result of the evolution of philosophical gave a result of wider recognition of quality as a set of features that distinguish objects from one another without the formulation measure this diversity. Increasingly began to be treated as a quality level to meet user requirements [6].

Today, the issue of quality is combined with the problems of management and, in many cases treated as quality management covering all activities in the field of general management, which determine the quality policy, objectives and tasks and their implementation within the quality system through planning, control, assurance and improvement.

These measures should pay special attention to ensuring and improving quality.

Quality assurance means implementing, or take into account the importance of quality

concept or strategy of the organization through planned, systematic and documented activity, which is necessary to give confidence that the product meets established quality requirements [7]. Quality assurance is a continuous process, according to the Deming wheel (Figure 1.1).

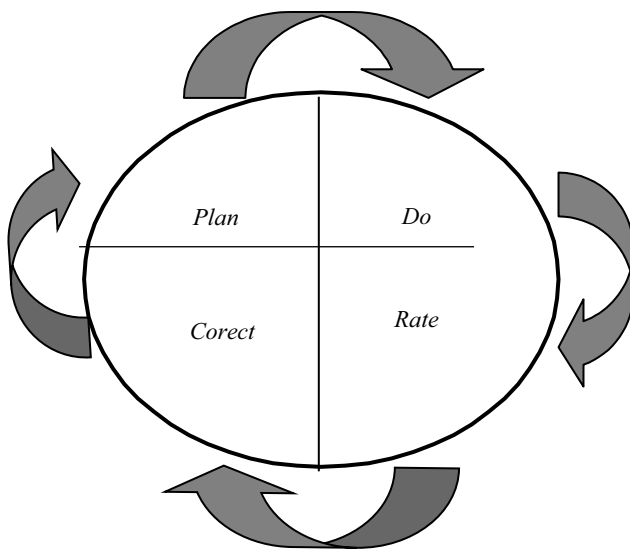


Fig. 1.1. Quality assurance by Deming Circle.

Source: own study based on [7]

## 2. The evolution in the approach to quality management

For the first mention of the issue of quality is assumed provisions in the Code of Hammurabi from 1750 BC, which were established penalties for the builders in case of collapse of the home because of inadequate quality. This code contained in its essence the principle of product liability. According to the Code, was to punish the death of the builder, if built his house collapsed and caused the death of the owner. Equally old are the first

descriptions of methods for monitoring and evaluating the performance of products (Egypt, Central America). Work on the Egyptian pyramids were among the first efforts of man's efforts to make the product within the specified quality. Egyptians achievements in the field of engineering science and arithmetic, geometry led to the pyramids, which reached the quality still amazes people today.

Also, the ancient Greeks and Romans left a legacy related ensuring a certain quality. The contribution of the ancient Greeks concerned the area of mathematics and art, while the ancient Romans contributed to the development of quality standards in the field of the invention, eg. High-quality concrete, which was used for construction of roads, bridges and other buildings.

In medieval times, dominated by small-scale processing and the quality was different dimension. The quality was usually provided by the persons directly carrying out certain products. They were craftsmen, who focused organizations called features and they decided about the quality of products.

With the industrial revolution began a violent change in the interpretation of quality.

Changed the organization of production plants, which forced the provision of the required quality. There were already craftsmen's workshops, but smaller or larger companies, in which the main role played by the owners or the managers supervising everything that has happened in the company, also in the aspect of quality assurance. With the increase in the size of production facilities and the number of workers in their employment need was felt for people whose main task was to control the quality of products. Since then, the quality has developed in parallel with the industry. In 1910. In a Ford plant in America it was first applied quality principles developed by Frederick Taylor, which allowed the mass production of cars that meet the standard requirements. Separated the control function of the production function [8].

Another breakthrough in the approach to the issue of quality was the use of statistical quality control. Methods of statistical quality control developed by W. A. Shewhart become a panacea for the growing drawbacks relating to the use of routine inspections, which compared with an increase of production became a time-consuming and absorbing the financial resources of a form of quality control and thus uncomfortable.

The development of arms production and demand for products associated with the activity of the war led to the further development of statistical methods for quality control resulting in the development and publication of the first standards for quality management.

They were developed standards in the United States adopted later in the UK known as the British Standards 1008.

Years of the 60th century united with the development of the space industry. At the time, the events connected with the conquest of space made it necessary to ensure the high quality of all components of spacecraft. This resulted in a new approach, which developed new concepts such as quality

circles, Ishikawa diagram, Deming cycle, or zero defects [8]. Gradually, over time, control prevented the problems or defects of the involvement of all employees in improving the quality of manufactured products became a universal principle. This could be seen in Japan. In this period of great popularity, especially among Japanese companies gained so. the concept of total quality created by A.V. Feigenbaum. This concept has said that the responsibility for quality control is in all cells of the company and not just in cell quality control, and therefore each of them should create a high quality [9].

In the 70s there were further changes in the approach to the issue of quality. Fuel crisis and Japanese competition have become the main driving force of change. The example of the Japanese companies began to make changes in work methods and approach to the role of man in the company. Quality problems have become an integral part of the strategy of large companies and corporations. The successes of the Japanese economy based on the concept of total quality caused a further evolutionary development of approaches to quality problems.

Years of the 80th century is the birth and development of the concept of total quality management called. TQM (Total Quality Management). TQM was a new kind of comprehensive collective effort oriented to continuous quality improvement in all aspects of the organization, and the effectiveness of the spheres. By J. Chabier TQM meant implementation of the general culture of concern for the quality management process conducted by senior management with the involvement of the entire staff in all divisions of the company and throughout the life cycle of a product, service or idea.

The basic philosophy of TQM culture lay the technical and organizational treated as a system of ideas, norms and values shared by company employees. This concept had its roots in the thinking of employees, which influenced the formation of the desired site within the working conditions and relations with the environment.

To achieve the benefits of implementing TQM wanted to meet the following conditions [10]:

- conviction and actively promote the quality of the management,
- attitude of the company to attract the customer,
- company culture as a determinant of quality.

The aim of TQM was:

- ensure continuous quality improvement today and in the future,
- gaining customer confidence in the competence of the manufacturer and the service provider and the products and services, which stimulate confidence in the organization and its logo, which became a specific quality mark,
- to create transparency of internal procedures, including within its scope the whole organization,

- security for possible use in the case of proceedings in respect of liability for a product, service or idea.

An important aspect of TQM was perceiving wider business ties with the environment and concern for complete harmony in terms of safety and working conditions, as well as in environmental and other social conditions.

Still the most important aspect of the TQM philosophy remained the man interacts with other people, working as a team to achieve success. Teamwork, thanks to the possibility of joint discussion, consultation and cooperation during the implementation of the following problems and tasks, allowed to achieve better results than would be the case if the team members acted alone. People connected to the concept of TQM in teams, under the leadership of leaders pursue a strategy and objectives of the company and the adopted programs (plans) leading to success, which was a benefit measured customer satisfaction. The key to success was leading the meshing of the strategic, organizational, personnel and technical projects in quality assurance. The man remained a focal point in the philosophy and spirit of teamwork was this requirement.

### 3. The regulation of the quality management

In parallel with the evolution in the approach to the issues of quality management developed quality standards in the form of quality systems [5]. Already in the 50s of the twentieth century, attempts were made to determine uniform standards for providers of NATO, and the result was the development of the NATO expert committee set of documents recognized as Allied Quality Assurance Publications (AQAP). In the following years he followed the development of standardized quality systems, as a result of which, in 1978, established the concept of standard BS5700. Further development was connected with the necessity of internationalization of standards for quality system, resulting in 1987, the Technical Committee 176 of the International Organization for Standardization (International Organization for Standardization) has published and recommended for widespread use of the ISO 9000 series, along with the standard ISO 8402 technology.

In 1987, the International Organization for Standardization, which is a worldwide federation of national standards organizations, to focus on developing a unified set of standards, which in turn led to a series of standards ISO 9000 Standards ISO 9000 due to its universal character have been adopted in many countries. The versatility of standards began to dominate in industry and in other sectors of the economy.

The family of standards ISO 9000 offered three models of quality management systems (Table 3.1).

Table 3.1. List of basic standards ISO 9000

Number	Name of standards	Characteristic
1.	ISO 9000	Quality management and quality standards – Guidelines for selection and use, or the standards of management and quality assurance – guidelines for model selection and application explains the basic concepts related to the quality and the relationship and differences between the applicable standards notions of quality and deliver guidance for the selection and use with international standards in terms of quality, which can be used in the enterprise for internal (ISO 9004) and external (ISO 9001-9003), management and quality assurance.
2.	ISO 9001	Quality systems – Model for quality assurance in design / development, production, installation and servicing, namely Quality systems – model presentation quality in the design, manufacture, installation and customer support / service
3.	ISO 9002	Quality systems – Model for quality assurance in production and installation; <i>czyli System jakości – model prezentacji zapewnienia jakości w produkcji i montażu</i>
4.	ISO 9003	Quality systems – Model; for quality assurance in final inspection and test; <i>czyli System jakości – model prezentacji zapewnienia jakości w ramach badań ostatecznych.</i>
5.	ISO 9001-9003	Models of quality assurance for companies with different operating range. These standards define the requirements and are the basis for submission of Quality Management System assessment customer or certification bodies.

Source: Own

ISO 9000 was first published in 1987. They are periodically reviewed as a result of which a decision is taken to leave them unchanged, or, to revise or withdraw. Such reviews are designed to provide news and meet the needs of international users of standards.

The first substantial overhaul of norms came in 2000. It takes into account the development that has taken place in the field of quality and changing market needs. As a result of the amendment (15 December 2000). Published three new standards of ISO 9000: 2000:

- ISO 9000: 2000 Quality management systems – Fundamentals and vocabulary,
- ISO 9001: 2000 Quality management systems – Requirements,
- ISO 9004: 2000 Quality management systems – Guidelines for performance improvements.

The amendment to the standard ISO 9000 version 2000 introduced significant changes to the existing standards system. The ISO 9000 version 2000. Was the quality management system, which required companies to more than just the development of quality assurance procedures. It required a certain quality culture covering more and more areas require cooperation between customers, employees and suppliers of the company, with the aim of a constant search for new and better models, new and better opportunities for improvement. Thus understood, a quality management system was close to the assumptions contained in the system of total quality management. Of these reasons, a series of ISO standards has become universal and have been possible to introduce and use in any organization production, trade or service. Increasingly frequently they used them distribution companies and service providers, as well as various public institutions, ie. Offices, hospitals, research institutes, local government administration offices.

ISO 9001: 2000 introduced a process approach, thus approached more holistic management system in the enterprise. This approach allowed for the creation of the enterprise closed-loop management to prevent the occurrence of errors and inconsistencies. Over time,

the revised standard ISO 9001: 2000 replaced the fully ISO 9001: 1994, ISO 9002: 1994 and ISO 9003: 1994 and the organizations that in the past handling the those standards may use the new international standard ISO 9001: 2000.

The revised series of standards adopted concept of the use of the term product as a result of the process. The result of a process can be four categories of product: material object, intellectual product, service or recycled materials. In contrast, the product offered could be a combination of all four categories of the product. The adoption of this concept was to replace all the amended standards previously used the term product and / or service date of the product. The other, the fundamental differences between the current standard and its amendment were the following:

- focus on the customer and his requirements – the previous standard customer expectations expressed were only part of the specification of the product or service, while the new standard sets out the need to identify the needs of even not formulated by the recipient. Therefore, they adopted a customer-oriented strategy, and the main determinant of the effectiveness of the system was to meet his expectations.
- process approach – standard treat measures implemented in the framework of quality assurance processes as the input to which were acquired relevant information and whose output united with the analysis of their results and the data obtained,
- modern human resource management – ISO version 2000. Broadened the requirements for development of qualifications and skills of employees of the need to implement procedures awareness to staff the importance of their activities in the development of quality. An earlier version of the standard was limited to training. Procedures Awareness should cover all employed persons, without exception, which means modern approach and willingness to engage all employees, even the lowest levels in the quality problem.

- continuous improvement of the system – was another principle derived from the philosophy of TQM and blended into the new character standards. The idea of improvement in previous standards, was virtually ignored and businesses are often underwent the illusion that it is enough to submit the procedure established assumptions. Often, because the situation was that in the daily work with abandoned comply with the requirements according to the standards, and reiterated to them at the moment the external audit.
  - measurement and analysis of information, including the measurement and monitoring of customer satisfaction measurement and monitoring of processes and products / services, including the use of statistical methods – requirements, emphasizing the modern approach to raise and the use of information resulting from the activities of the company and its environment, the information was treated as a resource and formulated requirements for the effective management of resources.
- The implementation of a quality management system based on the ISO 9000 series of standards in the 2000 version allowed for certain benefits that can replace m. In. the acquisition of new or maintain existing customers, improving the company’s image, drop the complaint products, or increase customer confidence in the company and its products.

Using the experience of practitioners to the main reasons for interest in enterprise quality management systems compliant with the requirements of the ISO 9000 series may include the [10-12]: customer requirements, treatment of the quality management system as a tool to organize and improve management methods and treatment certified management system as an important asset promotional shaping image of the company in dealing with the environment, and especially with customers, which it can guarantee a certain level of product and processes that relate to its implementation.

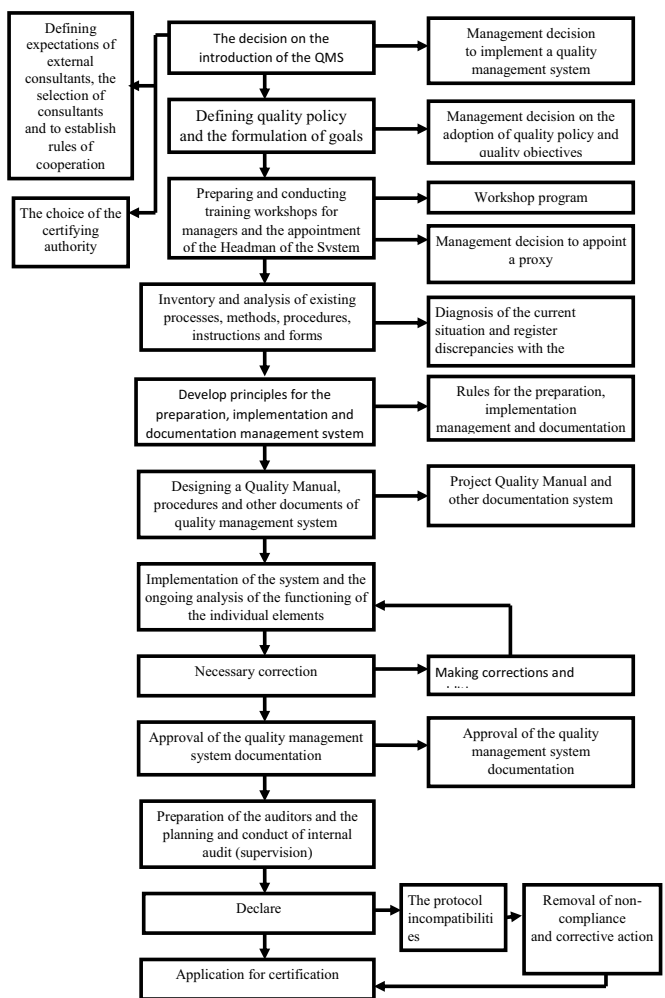
**4. Procedures for the implementation of quality systems**

According to W. Mantura [13] work on developing a quality management system can be divided into three main phases, at the same time defining the cycle of his existence: the phase of design, implementation, maintenance and improvement. A prerequisite for the start of the design phase is the presence in the enterprise need to organize matters of quality. This need can be caused by external compulsion or its own development strategy. The first phase should begin with research to enable the formulation of the design assumptions. The scope of this study covers internal and external conditions. It should be emphasized that there is an unlimited number of problems both in the environment and within the company, which must be analyzed in order to optimally design a quality management system. The system can be developed and put into practice in two ways:

- using its own human resources, where the organization has the service quality and the staff is adequately trained in the requirements of ISO standards and documentation development,
- with the help of outside experts, eg. The organization consulting employees cooperator holding its own quality management system that carries out appropriate training for management, executives and those responsible for the preparation of documentation.

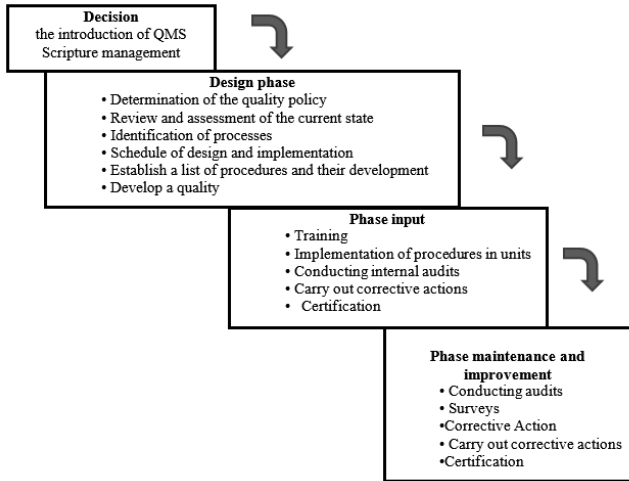
The various periods and phases of implementation of the quality management system are interwoven. The implementation process is presented in the form of an algorithm management system implementation in Figure 4.1 and the sample phase and activities in the design and implementation of quality management system in Figure 4.2.

After making the decision and formalize the introduction of quality management system one of the most important challenges and problems it is to convince employees about the importance of the changes with particular emphasis on the benefits for both the entire organization as well as for the employed workers.



**Fig. 4.1.** Algorithm implementation of the quality management system.

Source: [14]



**Fig. 4.2.** Examples of phases and activities in the design and implementation of quality management systems  
Source: [13]

For this purpose, training must be given the board of the company and employees. Training Board of Directors is to prepare substantive executives for creating, implementing, and improving the functioning of in the quality system. The degree of preparation and training of management will depend on the effectiveness and reliability of the system. The course information is communicated

the scope: the notion of quality, content and interpretation of ISO standards (interpretation should be carried out in relation to the of a company), quality management system documentation, design, writing and verification procedures, preparation of quality manual (including its supervision), conducting internal audits, implementation of corrective and preventive actions. After the training board of the company should be carried out initial training of employees using a prepared staff and in the case of a company not having skilled workers in this field, using a consulting company.

After training the next action is to organize the internal audit. Internal audits are intended to provide information about the functioning of the quality management systems in the company and the possible, resulting inconsistencies.

Conducting internal audits is a requirement of quality standards. They should include impartial, systematic study carried out by previously trained personnel in order to obtain an independent assessment of the quality system in place and to quickly identify and eliminate the resulting discrepancies.

Another important step would be to appoint a representative on the board. Quality management system. It is assumed that this person should also perform other functions in the enterprise and, equally importantly, should belong to the top management.

A further stage of the procedure should be to make an inventory and analysis of the functioning of the enterprise system, with a particular emphasis on areas that have an impact on the achieved level of quality. The aim

of the inventory and assessment of functioning of the system should be to obtain answers to questions [13]:

- what processes are implemented in the organization?
- that there are discrepancies and inconsistencies between state and the requirements arising from the norm?
- what are the opportunities to improve the efficiency of the processes occurring in the organization?

Background The design and implementation of the quality management system should be documented. It is recommended that documents have a hierarchical structure containing three levels (Figure 4.3).



**Figure 4.3.** Hierarchy of the documentation in the quality management system  
Source: Own

In preparing documentation plays a key role developing the book quality as the parent document in relation to the other, containing information concerning the rules of conduct in all activities of the company [15].

Another important step in the implementation of the system is the implementation of all objectives and their continuous monitoring in the form of audits all areas of the entire system and management review. Regular audits should constitute the basis for determining the appropriate state of the system and introduce corrections.

The next point of the procedure is the occurrence of the company to the certification body for certification [13]. Certification of the quality system is designed to confirm the responsibility of organizations for the quality of the product (services, ideas). Quality management system certification can perform specialized units having the legally required permissions. Selecting the certification body should be preceded by a careful analysis taking into account the needs of organizations in the field of certification. Certification audit is to confirm the compliance of the organization adopted the model of quality management with a specific standard. The process of certification of quality management system is shown in table 4.1.

**Table 4.1.** The process quality management system certification.

Number	Name of step	Characterisation of step
1.	Preliminary information	Exchange of information about the objectives and benefits of certification principles and processes, as well as in the field of certified management system. In this way, it collects the information necessary for the preparation of the offer.
2.	Offer and Agreement	The offer includes information on the scope, time and cost assessment. This step is fundamental to the preparation of the contract.
3.	System analysis	The study begins with an analysis and evaluation of system documentation and a preliminary review of the objectives and results of management reviews and internal audits. During this process, it determines whether the management system is developed and implemented, including assessment of its effectiveness. The expert explains the results and the further procedure, identify areas, processes, and if applicable, the location for further investigation. On can be prepared a detailed report.
4.	Expertise system	Extensive testing and evaluation management system is carried out on a place in the enterprise. Its purpose is to determine compliance with the requirements of the system, as well as an indication of potential improvement.
5.	Rating system and the granting of the certificate	Receipt of a written report on the results of expertise.
6.	First report support	Conducted on-site review and assessment of the essential elements of the management system and the definition of potential improvement.
7.	The second report support	Virtually repeated stage of expert support. Conducted on-site review and assessment of the essential elements of the management system and the definition of potential improvement. Written report.
8.	Expertise resuming	Before the expiry of validity of the certificate (usually within three years), again, extensive testing and evaluation system to meet the requirements and standards to define potential improvement. Written report. Renewal of the certificate.

Source: [12]

During the course of the process of quality management system certification may be irregularities and errors. Potential causes of failures to which the organization may encounter when designing and implementing a quality management system may include the [16-21]:

- the lack of clearly defined objectives,
- lack of management support,
- the lack of a systemic approach
- too optimistic assessment of the time and cost of planned,
- underestimating the psychological barriers encountered when introducing changes,
- imprecise delegating responsibilities and the responsibilities and powers and enforcement capacity,
- inefficient information system, including a lack of self-control current,
- the lack of identification of the causes of deviations from the plan (removal of only the effects of the causes).

## BIBLIOGRAPHY

- [1] Słownik Języka Polskiego, Wyd. PWN 2006
- [2] J.M. Juran, *Quality Control Handbook*, New York, McGraw-Hill, 1998
- [3] T. Borys, *Jakość jako jedna z podstawowych wartości gospodarczych i społecznych*, (w:) pod red. T. Borysa i S. Sudoła, Akademia Ekonomiczna w Krakowie, Kraków 1992
- [4] J. Szymczak, M. Urbaniak, *Jakość w decyzjach nabywczych konsumentów artykułów spożywczych*, Materiały konferencyjne, Akademia Ekonomiczna w Poznaniu, Poznań 1997
- [5] M. Urbaniak, *Zarządzanie jakością. Teoria i praktyka*, Difin, Warszawa 2004
- [6] T. Borys, P. Rogala, *Systemy zarządzania jakością i środowiskiem*, Wyd. Uniwersytetu Ekonomicznego we Wrocławiu, Wrocław 2012
- [7] T. Kiziukiewicz, *Audyt wewnętrzny w jednostkach sektora finansów publicznych*, Wyd. Difin, Warszawa 2009, s.458
- [8] R. Hafer, *Systemy zarządzania jakością w budownictwie przewag konkurencyjnych przedsiębiorstw*, Wydawnictwo Mikołaja Kopernika, Toruń 2003,
- [9] A.V. Feigenbaum, *Total Quality Control*, New York 1991,
- [10] J. Chabiera, *Zarządzanie jakością*, Centrum Informacji Menedżera, Warszawa 2000
- [11] J. Ejdyś, U. Kobylińska, A. Lulewicz-Sas, *Zintegrowane systemy zarządzania jakością środowiskiem i bezpieczeństwem*, Wyd. Oficyna Wydawnicza Politechniki Białostockiej, Białystok 2012
- [12] K. Lisiecka, *Systemy zarządzania jakością produktów: metody analizy i oceny*, Wyd. Wydawnictwo Uniwersytetu Ekonomicznego w Katowicach, Katowice 2013
- [13] A. Hamrol, W. Mantura, *Zarządzanie jakością. Teoria i praktyka*, Wydawnictwo Naukowe PWN, Warszawa 2002
- [14] W. Sokołowicz, A. Srzednicki, *ISO. System zarządzania jakością*, Wydawnictwo CH BECK, Warszawa 2004

- [15] H. Wojciechowski, *ISO 900 w praktyce*, ODDK Gdańsk 2000
- [16] R. Dziuba, J. Gruszka, A. Hamrol i inni, *Kierunki rozwoju w zarządzaniu jakością*. „Prace
- [17] E. Duliniec, *Badania marketingowe w zarządzaniu przedsiębiorstwem*, Wydawnictwa naukowe PWN, Warszawa 2002
- [18] S. Kaczmarczyk, *Badania marketingowe. Metody i techniki*, Polskie Wydawnictwo Ekonomiczne, Warszawa 1996
- [19] Z. Kędzior, K. Karcz, *Badania marketingowe w praktyce*, PWN Warszawa 1996
- [20] Polska Norma PN-EN ISO 9001, System zarządzania jakością, Wymagania



- x **PROJEKTY BUDOWLANE W ZAKRESIE ARCHITEKTURY, KONSTRUKCJI ORAZ INSTALACJI**
- x **PROJEKTY ZAGOSPODAROWANIA TERENU**
- x **PROJEKTY WYKONAWCZE**
- x **ARANŻACJE WNĘTRZ**
- x **ARANŻACJE OGRODÓW**
- x **INWENTARYZACJE ARCHITEKTONICZNO-BUDOWLANE**
- x **INWENTARYZACJE URBANISTYCZNE**
- x **ADAPTACJA PROJEKTÓW GOTOWYCH**
- x **PROJEKTY PLACÓW ZABAW ORAZ PARKÓW**

**Kontakt: ul. Obozowa 82A lok. 19,  
01-434 Warszawa  
Tel. (+48 22) 490 42 10,  
E-mail: OFERTA@CRB.PL**



**Centrum  
Rzeczoznawstwa  
Budowlanego Sp. z o.o.**