

## IMPROVEMENT OF QUALITY MANAGEMENT SYSTEM – CASE STUDY OF A METAL INDUSTRY COMPANY

**Witold Bialy<sup>1</sup>, Ewa  
Wanda Maruszewska<sup>2</sup>**

<sup>1</sup>Silesian University of  
Technology, Zabrze,  
Poland

<sup>2</sup>University of Economics  
in Katowice, Katowice,  
Poland

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### SUMMARY

*Continuous monitoring and improvement of quality management system is a must for a modern company to operate smoothly. Properly conducted audits and application of preventive correction actions are important elements of the system as well. The paper presents the results of research conducted in a large metal industry company with a tradition exceeding one hundred years. The main focus was placed on internal audits and on handling with customer complaints. Corrective and preventive actions were presented in order to eliminate the causes of existing and potential nonconformities within the existing quality management system.*

### Keywords:

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## 1. INTRODUCTION

Quality management system (QMS) improvement is a basis for the efficient work of a contemporary enterprise. However, quality is frequently perceived in a fragmentary way, without taking into consideration the complexity of the problem and mutual influences of its particular aspects [2]. For this reason, the improvement of quality management systems is gaining more and more importance in management, as it shapes the image of an enterprise. To be fully used, a quality management system requires the results of audits to be analysed on a regular basis and corrective and preventive actions to be undertaken [4]. Another important issue is creating an improved system on the basis of the already made changes [1, 3, 5].

Therefore, examining the quality management system according to ISO 9001:2008 standard [6], which has been used in a big company operating for nearly 20 years provides a possibility to thoroughly explore the system and to assess it in an objective way. As a result of conducted studies (analyses) on the current condition of QMS, directions for further actions aimed at improving the existing system have been specified.

The mission of the enterprise having a more than one-hundred year's tradition is manufacture of highest quality products, the safety of employees as well as respect for natural environment. The company's vision is to operate as a quality leader, strengthen its competitive position owing to the quality of manufactured products as well as the observance of law regulations and achieving the best possible economic results.

## 2. RESEARCH RESULTS

A quality management system based on ISO 900 series standard imposes an obligation to conduct audits, which are indispensable instruments for these systems' improvement. According to PN-EN ISO 9001:2008 standard (paragraph 8.2.2) "An organisation should conduct internal audits at planned time intervals, in order to determine whether the quality management system:

- a. complies with the planned arrangements ..., with the requirements of this International Standard as well as the quality management system requirements established by the organisation,
- b. is effectively implemented and maintained" [7].

An organisation should conduct internal audits and establish an obligatory auditing procedure –

„a documented procedure has to be established in order to define responsibility and requirements related to the planning and conductance of audits, record keeping and presenting of records”[7].

Conclusions from audits (conformity or nonconformity) provide input data for reviewing the management system and should constitute an element of improvement of the quality management system effectiveness (paragraph 9.5.1 of PN-EN ISO 9001:2008 standard).

The quality management system in the enterprise in question was implemented in 1966 and certified by Lloyd’s Register Quality Assurance.

The conducted analysis of the quality management system covered the years 2012 and 2013.

### 2.1. Internal audits analysis

In the years 2012 and 2013 a total of 25 internal audits were conducted, 12 of which were carried out in 2012 and 13 in 2013. As a result of audits conducted in 2012, sixty eight nonconformities were found, most of which concerned the documentation [6]. The number of remarks by category has been presented in a graph (Fig. 1). In the year 2013 there were 82 nonconformities related to various categories (Fig. 2).

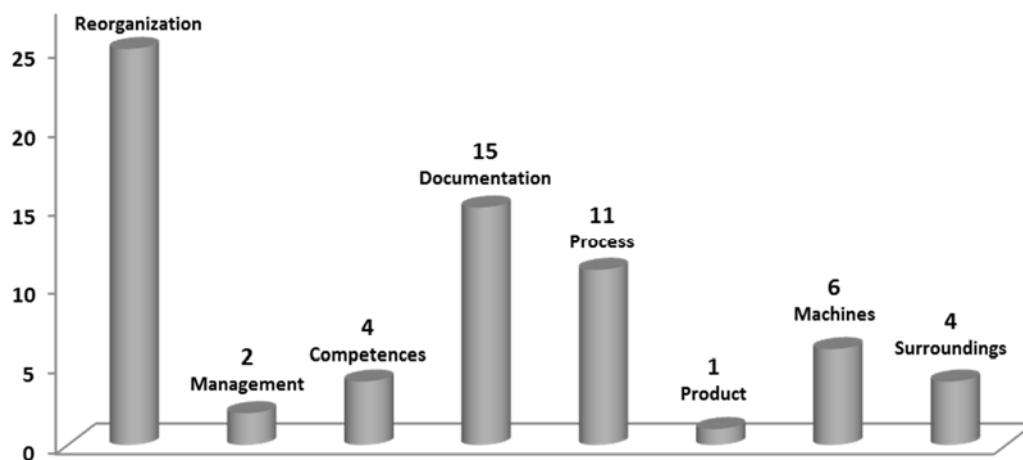


Figure 1. Internal audit results in the year 2012

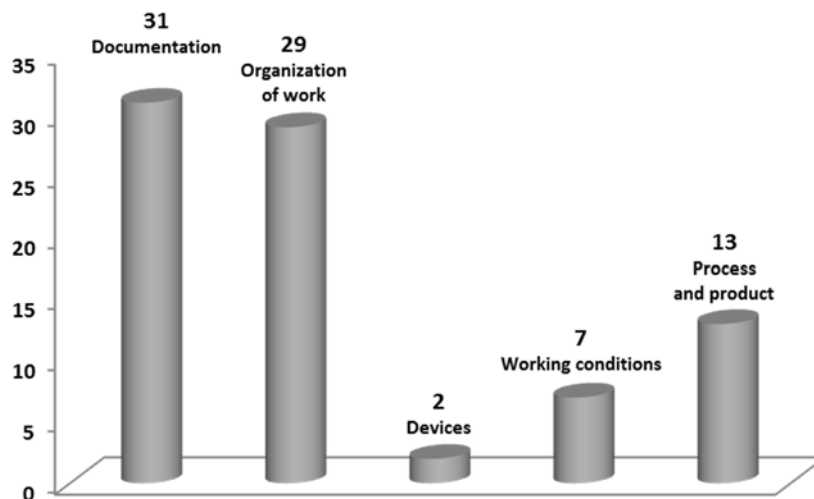


Figure 2. Internal audit results in the year 2013

The role of internal audits was to evaluate the usefulness of the changes introduced in the process of QMS restructuring. A total of 25 remarks were formulated in connection with the conducted restructuring.

The remarks related to the production process included the following:

- failure to observe guidelines concerning the storage of products withheld due to improper quality,

- missing updated records in machine maintenance books,
- inconsistencies between the records and documentation related to the labelling of products which do not fulfil the requirements.

The most important conclusions resulting from the conducted audits are as follows:

- documentations needs to be periodically reviewed in detail,
- supervision over the fulfilment of requirements contained in the procedures should be increased,
- station documentation has to be updated,
- supervision over the completeness of documents needs to be exercised.

## 2.2. Analysis of corrective and preventive actions

The role of corrective and preventive actions is to ensure that activities aimed at eliminating the causes of nonconformities and potential nonconformities are undertaken. The procedure described in the standard defines the manner in which corrective and preventive actions should be undertaken. Each employee is obliged to report any discovered inconsistencies, which pose a potential threat to quality. After the implementation of corrective measures, preventive actions should be initiated in order to

prevent a particular nonconformity in the future. The sources of information on nonconformities are:

- results of the conducted internal and external audits,
- inspection results,
- complaints and conclusions of customers,
- employees' conclusions.

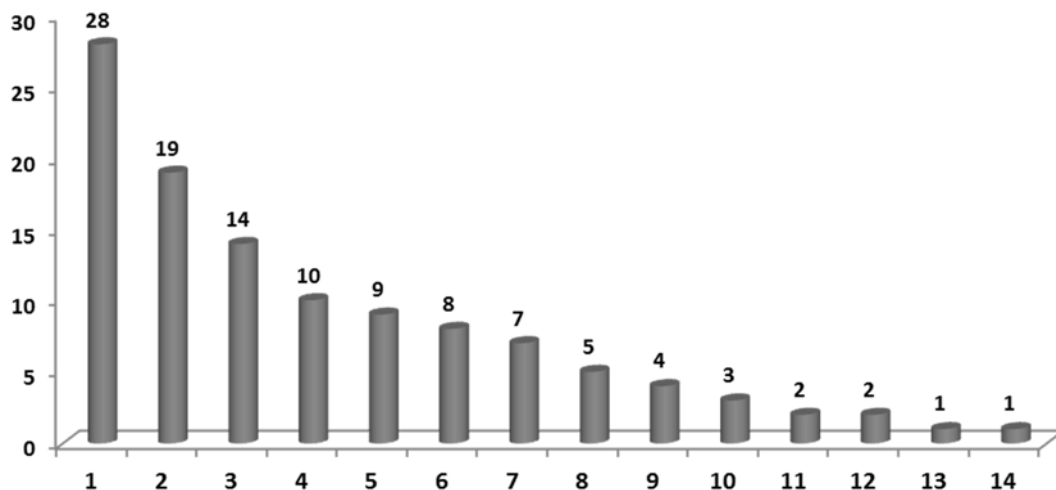
Corrective actions (their number) that were conducted in the year 2013 in particular units of the plant have been presented in Fig. 3.

There is no need to explain how important are properly conducted internal audits in a plant. Also customers' complaints are a source of corrective measures. The chart (Fig. 4) presents internal audits against the background of other forms of control, including complaints.

The chart (Fig. 4) presents that out of 113 sources of corrective measures, 76 are actions resulting from internal audits and complaints, which accounts for as much as 67%.

## 2.3. Complaints

The analysis of complaints (percentage) shows that they concern mainly foreign customers (Fig. 5).



**Figure 3.** Number of corrective actions in plant units, where:

- 1 – pipe and rod production department, 2 – laboratory, 3 – tape and rollers production department, 4 – automatic control engineering department, 5 – strategic raw materials purchase department, 6 – foundry department, 7 – maintenance department, 8 – finished products warehouse, 9 – technical office, 10 – sales department, 11 – purchasing department, 12 – management office, 13 – QMS plenipotentiary, 14 – IT department

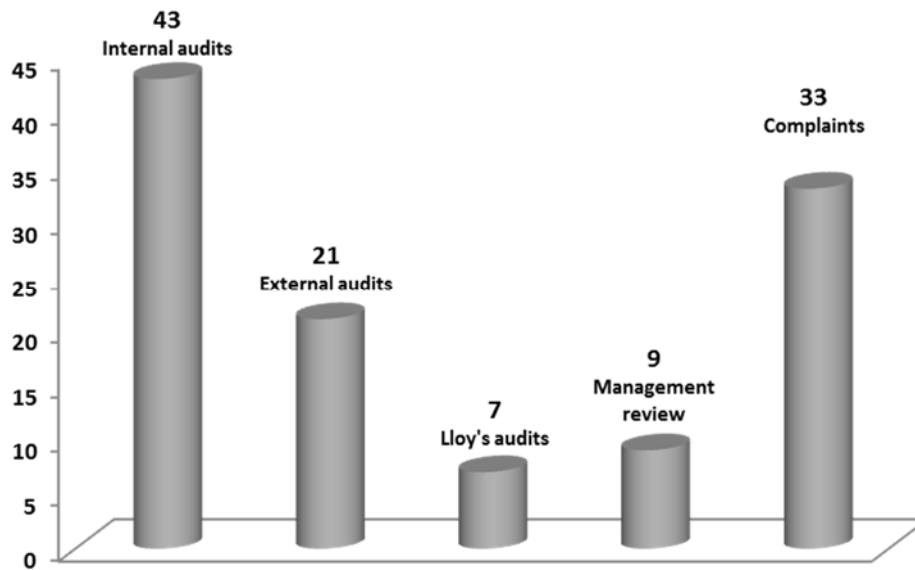


Figure 4. Sources of corrective actions

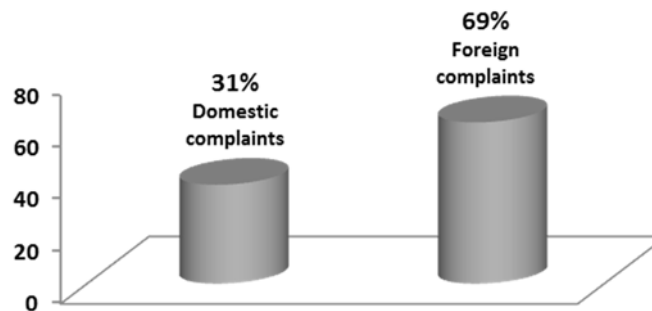


Figure 5. Product complaints in the year 2013

The situation regarding complaints in previous years was similar: the year 2012 – 68% of foreign complaints, 2012 – 71% of foreign complaints. A comparison of the complaints allows concluding that they are similar – they are mainly connected with two departments of the plant and concern identical defects – shape and size. The chart (Fig. 6) shows complaints by quantity in the years 2011-2013.

Each complaint reported by a customer is thoroughly analysed. Moreover, corrective actions adjusted to each incident are instantly undertaken so as to avoid a similar situation in the future. Despite implementing the corrective measures the defects keep occurring. However, they do not influence the image of the plant, as the number of orders for products increases year by year.

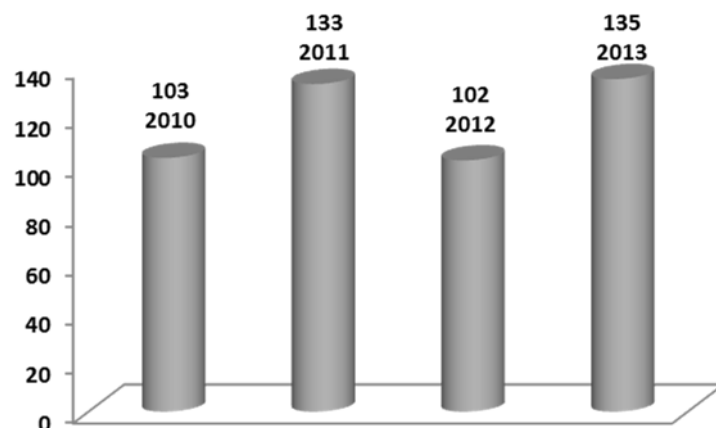


Figure 6. The number of complaints filed in the years 2010-2013

#### 2.4. Customer satisfaction survey

In every organisation customer satisfaction is an indicator of the organisation's functioning on the market. This is also the case in the discussed enterprise. For this reason, it is subject to continuous monitoring in the following areas:

- company's image in the eyes of customers, trust for the company,
- opinion on the products – assortment, prices, terms, logistics,
- quality of products and services offered,
- analysing the number of customers who use the company's services for the second and subsequent time,
- direct conversations with customers, employees, interested parties,
- analysis of reported complaints,

- customer surveys,
- external audits evaluations.

Information obtained this way serves further improvement of the manufactured products. The analysis of research results shows that more than 90% of customers are satisfied with co-operation.

The evaluation of the analysed enterprise's co-operation with other enterprises providing the same kind of products indicates that as many as 71% of them assess it as good and very good, 22% of respondents evaluated the enterprise as an average one, while 7% were not satisfied with co-operation (Fig. 7).

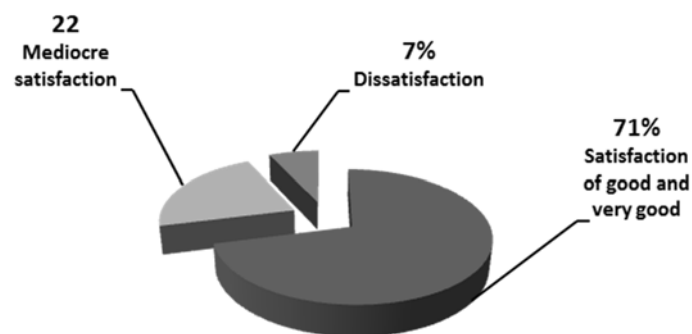


Figure 7. Evaluation of the examined enterprise's co-operation with customers

### 3. QUALITY MANAGEMENT SYSTEM – BENEFITS

„An organisation should constantly improve the effectiveness of its quality management system by using a quality policy, audit results, data analysis, corrective and preventive measures as well as management reviews” ((PN-EN ISO 9001:2008 standard, paragraph 8.5.1).

An efficient quality management system allows a QMS plenipotentiary to control organisational mechanisms and analyse management system benefits. Continuous improvement offers benefits also to customers, as they can be sure that:

- they are provided with a product which is high quality, fulfils their declared needs and is manufactured by a reliable enterprise,
- the product is manufactured in a way that prevents a negative influence of the production process on people and environment,

- the product is manufactured in conditions which do not pose a threat to employees' lives,
- the production process is compliant with the legislation in force,
- the amount of waste and consumption of raw materials are reduced,
- the product is manufactured in time,
- documentation is kept in a proper way,
- corrective and preventive measures are applied.

Continuous improvement of the enterprise's quality management system has considerably reduced the number of nonconforming products (complaints), which has a considerable impact on the costs as well as the efficiency of the company's functioning.

The enterprise is an important partner for many recipients and keeps acquiring new customers. This is related not only to the high quality of products offered, but also the efficient organisational activities.

**6. REFERENCES**

- [1] Hąbek P.: *Jak osiągnąć trwały sukces rynkowy? Podejście ISO 9004:2009*. Instytut Organizacji i Zarządzania w Przemysle „ORGMAZ”, Ekonomika i Organizacja Przedsiębiorstwa, nr 4. 2010, Warszawa.
- [2] Kołodziej S., Goszczyńska M.: *Psychologiczne uwarunkowania przedsiębiorczości młodych Polaków*. Ruch Pedagogiczny, LXXVIII, 2007. s. 29-45.
- [3] Midor K.: *Wprowadzenie systemu zarządzania jakością zgodnego z normą ISO serii 9000:2000 – ryzyko czy szansa dla współczesnej organizacji*, Międzynarodowa Konferencja: Veda a krízové situácie MLADÁ VEDA 2008 – Žilinská univerzita 2008.
- [4] Molenda M.: *Effectiveness of planning internal audits of the quality system*, Scientific Journals Maritime University of Szczecin, 2012, 32(104) z. 1 pp. 48-54.
- [5] Zasadzień M.: *Using the Pareto diagram and FMEA (Failure Mode and Effects Analysis) to identify key defects in a product*, Management Systems in Production Engineering. Nr 4 (16), 2014.
- [6] Zyżański K.: *Doskonalenie systemu zarządzania jakością na przykładzie...* (Praca niepublikowana), Katowice 2014.
- [7] Norma PN-EN ISO 9001:2008. PKN, Warszawa 2009.

**Corresponding author:**

**Dr. Ewa Wanda Maruszewska**  
**University of Economics in Katowice,**  
**Faculty of Finance and Insurance**  
**40-287 Katowice, ul. 1 Maja 50, Poland**  
**e-mail: ewa.maruszewska@ue.katowice.pl**