

INTEGRATION OF “QES” SYSTEMS ON THE SMALL AND MEDIUM SIZE FOUNDRY COMPANIES IN PORTUGAL

Gilberto SANTOS*, Joaquim BARBOSA*, Cláudia PEDRO**

*Universidade do Minho, Departamento de Engenharia Mecânica
4800 – 058 Guimarães
Portugal

**Kupper & Schmidt
3720-502 Oliveira de Azeméis
Portugal

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ABSTRACT

This paper presents the present situation concerning the integration of the quality, environment and safety systems on industrial companies. A case study performed by the authors on the Portuguese foundry is presented.

The present situation of this activity sector, on what concerns the application of the quality, environment and safety (QES) systems, is characterized, and the short time needs, procedures and initiatives that are being taken, or will be taken in a near future, to accomplish such demands, are identified and discussed.

INTRODUCTION

Quality certification is only the first step in order to achieve market and customers demands. For the time being, the majority of the Portuguese foundries have a passive attitude in areas like research and product development, limiting its participation to the foundry activity itself: mould production, melting, pouring and finishing operations. Although, other aspects of the foundry activity, disregarded and forgotten until a very few years ago, are becoming more and more relevant to the success of the foundry business. Production of sound castings at competitive prices requires much more than the existence of a simple quality manual, nevertheless its value and quality.

On the last years, a new total quality concept was born, and very fast developed: Quality is just an item of the management system, and it must be supported by effective environment and safety regulation and procedures. It is not possible to

keep low levels of scrap and rejections and high production rates if all the intervenient in the process don't believe on its capacity and safety. On the other hand, the success of any activity can not be synonymous of neighbourhood disturbance and negative environment impact, as the social costs arising from such dysfunctions are usually too important to be accepted, or neglected.

However, a total management system, including quality, environment and safety regulation can very fast represent an enormous bureaucratic weight, with lots of documents moving around, doubling or triplicating the same tasks. This situation very easily discredits the management system, and it may have an opposite effect to the one aimed by the system itself.

In order to overcome such problems, the integration of all systems is believed to represent a good solution to simplify the system implementation and control.

THE STANDARDS – A SHORT OVERVIEW

ISO 9001:2000 standard is a label for quality systems. This standard is voluntary and it is based on the plan-do-check-act model. It is not a legal prerequisite to selling manufactured products in the world. However, their ultimate focus is to improve customer satisfaction. And we know that customer requirements are a crucial factor to improve the casting products overall quality. Many foundries measure the customer satisfaction and the results are an important indicator to evaluate, and improve if necessary, both their production process and the casting products.

Environmental Management Systems (EMS) are based on the ISO 14001 and are then designed to support the environment policy. We know that the laws become from year to year, more restrictive concerning environment. Hence, all foundries must develop procedures to identify the ways for their systematic improvement and pollution prevention.

The OHSAS 18001 standard is being adopted for health and safety management systems by many foundries and other organizations. However it is not a standard aggregating international consensus.

Portugal has a high index of work accidents in general, and their social and economic costs have never been calculated. It has a corrosive effect on worker morale. The workers know that an occupational disease or fatalities are never forgotten. Hence, the certification of the safety system is quite important as may help to decrease the number of work accidents.

SYSTEMS INTEGRATION

There are some similarities between these three standards. Hence, a foundry or an organization *“can get a high return or investment by taking advantage of the*

similarities between the three standards and integrating their quality, environmental and safety management systems”[1].

In an integrated system, a company will strive to incorporate quality, environmental and safety concerns into a single procedure that addresses the activity of interest. We know that *“quality, environment and safety problems have a common root cause – entropy. Environment and safety are really subsets of quality and are thus amenable to the quality approach. There is a powerful trend toward international standards for quality, environment and safety. Thus, there is a powerful synergy, as yet untapped, except by a small number of elite organizations”* []. Pascal Dennis [2] summarized these concepts in fig.1.

Thus, *“the helix represents entropy, the root cause of quality, environment and safety problems. But it is also the helix of continuous improvement. The triangle represents the management system that controls the chaotic force of entropy. The three sides of triangle represent the system triad: quality, environment and safety”*[].

Some organizations in different industries, where some foundries are included, have successfully integrated portions of their management systems and *“each has experienced significant returns from reduced operating costs management system complexity and time required to manage the processes”*[3]. According to the experience of the authors of this paper, the first certificated system is, normally, the quality system. After that, when the system is totally implemented and specific knowledge and experience had been achieved, comes the environmental system certification that in some cases is integrated with the implemented quality system. This has been made easier with the introduction of ISO 19011, “Guidelines on quality and environmental management systems auditing” and represents an important step for both systems integration. In the end comes the certification of health and safety system.

Thus, to start, let us introduce a new term: Total Quality and Environmental Management System (TQEMS) where all employees work together to continually improve quality and environment in their organizations. This partial integrated system contains one manual that addresses the combined quality management system and the environmental management system requirements. *“Existing quality procedures are modified to capture the specific elements that each governing standard mandates”*[4]. Later, when this partial integration is consolidated, other new term can be defined: **Total quality, environmental and safety management system (TQESMS)**, or in a simple form **Total Integrated System (TIS)**.

When the implementation of an integrated management system comes to an end, the organizations will discover that employee satisfaction often improves once an integrated approach to job descriptions, work instructions and priority setting is implemented. *“From an operational viewpoint, a fully integrated system creates an umbrella that covers all aspects of business, from product quality and*

customer service to maintaining operations in a safe and environmentally acceptable way”[4].

According to other authors [1, 2], among other aspects, integrated system processes must include:

- definition of responsibilities;
- definition of objectives;
- control of documents;
- definition of the necessary training for employee;
- instrument calibration;
- internal audits;
- corrective and preventive actions;
- risk analyses;
- control of non-conformances;
- cost reduction;
- reduction or elimination of customer complaints;
- creation of a good work environment;
- process continue improvement;
- development of a new mentality – better products, reduce pollution, lower costs.

In general, no matter the nature and specificities of an organization, an integrated management system has positive and negative aspects that must be very clear in mind, when a company manager decides to pursue such objective. Some of the main benefits and limitations of integrated management systems are quite well known, but it is always important to focus and identify them:

Main benefits of integration

- Simplification of systems resulting in less bureaucracy;
- Resources optimisation;
- Objectives integration in the enterprise strategy;
- Improvement of organizational performance;
- Less costs.

Main limitations to integration

- Over documented process resulting of a body of non-integration;
- Some requirements have difficult integration;
- Resistance to a new challenge;
- Professionals who know only one system are usually resistant.

Thus, quality, environmental and safety professionals must strive to broaden their knowledge and take a multiviewpoint, multidisciplinary approach. They must

break down the barriers between their respective specialties and utilize the potential synergy. An accident or environmental incident is really just a “ non-conformance”.

THE PRESENT SITUATION AT THE PORTUGUESE FOUNDRY INDUSTRY

The Portuguese Foundry Industry is no longer supported by low level labour costs. During the last decade, an important technological development was seen, with high investments in high-tech equipment, human resources requalification and quality system certification. As a consequence, at the present time, a very significant quantity of foundry companies is highly competitive in the production of high-tech products, with high added value.

However, on the next years, many companies, where foundries are included, will have to face new challenges, mostly due to the XXI century new demands, based on the implementation of the so called integrated systems (Total Quality, Environment and Safety Management).

In Portugal, about 2500 organizations that have their quality system certified, including around 2% of foundry companies. Concerning the environmental system certification there are only a few. The three systems (Quality, Environment and Safety) are implemented in just one foundry. This individual case is presented and analyzed on the following *case study*.

CASE STUDY

In the north of Portugal, a medium sized company named Kupper & Schmidt, is the only foundry in the country to have Quality, Environment and Safety certification.

The company supplies exclusively the automotive market, and more than 98% of its production is exported to the European and American markets.

As a consequence of this policy, just a few years after starting its activity, the company had its Quality System already certified by the main customers. In 1997 it was certified by ISO9002 standard, in 1998 by QS 9000 and in 1999 by VDA 6.1 standards. In 2000, the company focused in the environment certification, and got certification according to ISO 14001 standard. Since 2002 the company has its Health and Safety System certified according to OHSAS 18001.

Several factors were taken into account on every certification step/phase. Although they are quite similar for the three different certified areas, some specific objectives are also included. In what concerns Quality certification motivation, the following factors were the most relevant ones:

- Request to keep supplying the automotive market;
- To implement a quality culture
 - that leads to the adoption of methodologies that emphasises prevention during new projects development, in order to anticipate eventual problems, according to the accumulated “know-how”;
 - on every process steps;
 - of continuous improvement, in order achieve new and more ambitious objectives.
- To involve every collaborator, by developing continuous training at all hierarchical levels, and looking for better communication means, either ascendant or descendent on the hierarchical organization.
- Process optimization, based on the identification of critical negative and positive points of the activity process.

Environmental certification was done with the following main purposes:

- To implement an environment management structure possible to be included, or linked to a total management system;
- To promote motivation of the whole human structure for environment concerns;
- As a differentiation factor to promote the company image;
- To anticipate a possible request of the automotive market on a near future.
- To make evident the environmental legislation accomplishment;
- To optimize resources and residues management, in order to preserve the surrounding and in house environment, as well as to pursue economical benefits (improvement of the processes efficiency);
- To accomplish several indicators that will arise from the future implementation of the concept “Best Available Technologies”.

The main objectives of Health and Safety certification were:

- To implement a management structure that may integrate every company activities, in order to assure health and safety conditions to workers, visitors, suppliers and any other human agents;
- To make public the risks associated to every human activity, at any hierarchical level;
- To make evident the safety legislation accomplishment;
- To improve accidents prevention, by identifying and eliminating possible risk factors;
- To promote continuous training and information on the areas of health and safety;
- To decrease labour accidents, in order to reduce absenteeism and related costs;
- To continuously improve comfort on the work places;
- To contribute to the correct and rational manipulation of equipments, tools and raw materials.

Although the routes and methodology followed to implement the three management systems were similar, as well as the respective objectives, the three systems were implemented in different phases and have different manuals, because some of their needs are different. Only after this step the systems integration was considered. According to Kupper & Schmidt experience, this is probably the best approach to implement a total management system. It is much easier to develop an environmental or safety system if the company has already experience on the subject. Trying to introduce a total management system in only one step/phase may introduce entropy and may lead to routines very difficult to control and to implement procedures with negative impact on the production routes.

The existence of three different systems can, however, lead to three similar approaches to problems that may have a same approach. Kupper & Schmidt found out that in many cases, a single document or procedure could be used in the different systems, avoiding the existence of three different documents to control/regulate similar needs. This was perhaps the most relevant factor taken in account on the decision of integrating all the systems.

Integration can not be total, as specific activities and needs of each system demand, for each individual case, specific documentation, procedures, and control. Although, Kupper & Schmidt was able to integrate some tasks, including the audits themselves (both internal and external ones). This aspect is extremely important, not only due to saving time, but also by decreasing the audits direct and indirect costs.

The overall management system of the company is shown in figure 2. The management system includes an individual system for each area (Quality, Environment and Safety), with its own procedures, rules and documentation, but having as much as possible common documents and procedures (IMP's), that are the hart of the integrated system. Examples of integrated procedures are presented in table 1.

Just as time goes by, other items of the management systems are intended to be integrated, until only very specific procedures and requests remain independent. As an example, items presented in table 2 will be integrated and become IMP's in a near future.

Following Kupper & Schmidt experience, both internal and external audits can be performed on an integrated way. Auditions results may be presented on one only report. However, non-conformities should be separated, in order to avoid creating difficulties and restrain the normal company activities, specially its production process.

FUTURE TRENDS

In spite of the importance of an integrated management system, the use of a common standard for that purpose is not so important as some try to make us believe in. A total or partially integrated management system can be absolutely suitable for an industrial activity, and its rules and procedures may report to different standards. A unique standard integrating quality, environment and safety management is quite difficult to develop, and even if it is achieved, its implementation will be a hard task, due to some specific needs and nature of those sub-systems.

On the other hand, a totally integrated management system may present some drawbacks. An example of its negative aspects is, for instance, the non-conformity classification of an integrated system, due to a problem detected on one of the sub-systems. On such situation, a company could be forced to stop its activity due to a specific non-conformity on the safety system, for example. For many companies, such situation may represent the lost of a customer, specially when the market requirements are very demanding.

In a near future, we believe that the experience of Kupper & Schmidt on this subject will be the general route to management systems integration.

CONCLUSIONS

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Table 1 – Present integrated management procedures

Totally Integrated Management Procedures – IMP's
Auditors demands
Management of relevant documents used on the management systems
Archive of relevant documents and registry used on the management system
Documents diffusion
Professional training
Procedures preparation and processing

2 Management Systems Integration (EMP's and HSP's)
Internal audits
Legal demands
Emergency internal plans

Table 2 – Management procedures to be integrated in a near future

Suppliers homologation
Raw materials homologation
Labour qualification
Management of inspection, measuring and testing equipment
Maintenance plans
Continuous improvement
Product stocking and manipulation
Stocking areas

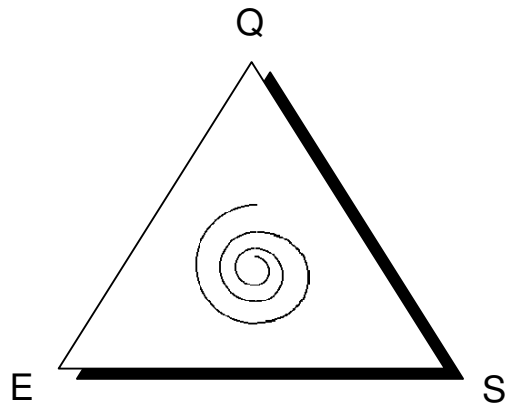


Figure 1 – Symbol of quality, environment and safety synergy [1]

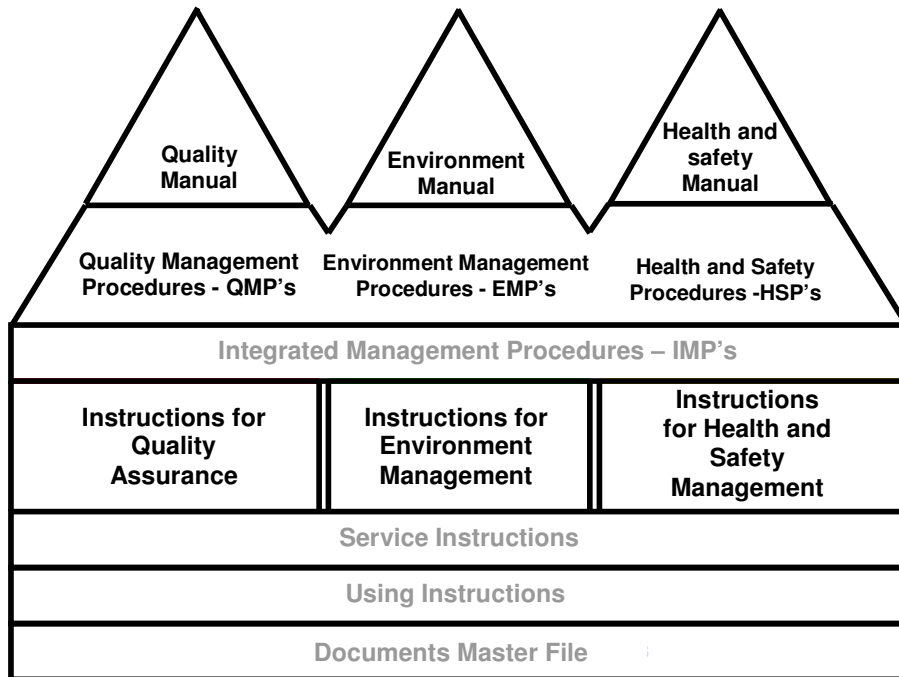


Figure 2 – Documental structure of the management systems at Kupper & Schmidt [5]