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Analysis on integrated management of the quality, environment and safety on the industrial projects

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Abstract

The aim of this work is to analyse from a qualitative point of view, the possibility of managing integrated quality, environment and safety in the industry projects, by integrating traditional systems associated with international standards ISO 9001:2015 quality, ISO 14001:2015 environment, OHSAS 18001:2007 for safety and health at work. It will develop an integrated system of management that results in sustainable economic benefits from the perspective of social responsibility of business.

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1. Introduction

Many companies have implemented systems of quality management, environment and occupational risk prevention to ensure profitability and reliability of its results. Thus, the integration of these systems allows reversing a notable reduction in costs for companies [1]. The integration of management systems is a goal in companies that have already installed a standard of quality management and environmental and coming managing health and safety standards or from published models.

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Environmental, health and safety (EHS) departments, also called SHE or HSE departments, are entities commonly found within companies that consider environmental protection, occupational health and safety at work as important as providing quality products, and which therefore have managers and departments responsible for these issues. EHS management has two general objectives: prevention of incidents or accidents that might result from abnormal operating conditions on the one hand and reduction of adverse effects that result from normal operating conditions on the other hand.

Total Quality is an effective system that integrates all efforts to define, design, fabricate and install a product or service costing the cheapest possible while providing total customer satisfaction [2]. ISO standards and the certification process based on these standards, marked the consolidation scenario Quality systems in Europe and the world have decided to work according to the requirements of ISO 9000 Standard ISO 9001 informs and raises awareness among managers of the significant advantage. It can make an objective and realistic implementation of a system of quality management in their organizations to improve their competitiveness and, consequently, their business results.

ISO 9001:2015, published on September 2015, incorporates the risk-based Systems Quality Management approach. Although it is, a commonly applied technique so far was not aligned with the quality management system [3]. ISO 14001:2015, published on September 2015, considered the prospect lifecycle, risk management or improving environmental performance and ensures organizations full integration of environmental management strategies business [4].

The aim of this paper is to analyse from a qualitative point of view, the possibility of managing integrated quality, environment and safety in the industry projects, by integrating traditional systems associated with international standards ISO 9001:2015 quality, ISO 14001:2015 environment, OHSAS 18001:2007 for safety and health at work. It will develop an integrated system of management that results in sustainable economic benefits from the perspective of social responsibility of business.

2. Methodology

It analyse the degree of implementation in different industries of systems of quality, environment and safety, during a period of 4 years based on the international standards ISO 9001 quality, ISO 14001 environment and OHSAS 18001.

Most of the standards for management systems are ISO Standards. The OHSAS 18000 standard has been developed to be compatible with ISO 9001 and ISO 14001 in order to facilitate the integration of quality, environmental and occupational health and safety management systems by organisations, should they wish to do so.

The OHSAS specification gives requirements for an OH&S management system, to enable an organisation to control its OH&S risks and improve its performance. It does not state specific OH&S performance criteria, nor does it give detailed specifications for the design of a management system.

Many countries have also developed national standards for OH&S, which can be certified through independent auditors. A new standard for corporate responsibility, ISO 26000, is being developed. Corporate Social Responsibility addresses concrete questions related to human rights, business practices, communications and community involvement. Equality, safety, working conditions and child labour are examples of topics covered by the principles.

The ISO 9001 standard describes a System of Quality Management generically applicable to all organizations [5-6]. The criteria for managing quality systems are applicable to any company and in all aspects of managing them [7].

The model EFQM Quality Management is based on nine criteria on which an evaluation and scoring. Thus, a methodology is performed to improve operational processes of manufacturing or service delivery processes, business processes or management, which have potential for improvement [8].

Environmental impact is defined as any change in the work environment, whether adverse or beneficial to the employee, being a result of activities, products and services of the organization is defined as Environmental Impact [9]. Environmental management is an aspect of the overall management of the company. Through the same is achieved implement environmental policy of the organization and a tool for improvement, competitiveness and participation.

It can define an Environmental Management System as a framework or method used to guide an organization to achieve and maintain an operation in accordance with established goals and responding effectively to changing regulatory, social, financial and competitive pressures, as well as environmental risks [10].

To design and implement an Environmental Management System, there are currently voluntary standards by which the company can obtain certification or registration. The standard ISO 14001 international level "Environmental Management Systems", and European Council Regulation laying allows industrial companies adhere voluntarily to a Community eco-management and audit scheme [11]. The figure 1 show Deming cycle for continuous improvement.



Fig.1: The Deming cycle for continuous improvement

There are various studies examining the use of EMAS. Schucht (2000), focusing on French companies, showed that the adoption of management through EMAS has a positive impact in a number of areas (especially waste generation, resource use and consumption of water), but did not quantify the magnitude of improved [12].

Iraldo et al. (2009) applied an analysis based on data collected through questionnaires in the framework of a study, which revealed EVER positive effects of EMAS in improving environmental performance [13]. Daddi et al. (2011) conducted an analysis of trends in environmental performance in a sample of 64 Italian companies belonging to six different industries who have achieved EMAS registration for at least three years [14]. The performance of these companies was analysed by collecting and verifying environmental declarations of companies, which were validated by a third verifier. The study noted a positive influence on performance of EMAS in some environmental aspects such as water consumption and waste [15], while a weak influence on energy consumption [16-17].

The ISO 14001 standard specifies the correspondence of this with the ISO 9000 series of standards relating to quality systems, links and general technical correspondences between ISO 14001 and ISO 9001. In general, the possibility is contemplated some components of the overall management system may be common to different fields, allowing in such cases share documentation and records to avoid duplication [18].

For integrated the security management means the integration of safety into the business, mainstreaming or integrating absolutely, not contradictory, security objectives within the objectives of development. This is to prevent people suffer accidents or diseases in development work, since the establishment of prevention of occupational accidents and diseases, so that the work is carried out in safety, hygiene and environment suitable for workers [19].

3. Results and Discussion

The implementation of an integrated quality and environmental management system requires a certain tactic, since, while standards for each of the aspects offer certain similarities, they do not show a common methodology for the development of an integrated system. Es evidente que cualquier fallo en una operación de tipo industrial puede

tener efectos en la calidad del producto, pero a la vez puede tenerlos en la seguridad y la salud de los trabajadores, y en el medio ambiente.

The quality, environment and safety have followed a parallel development in the industry. Safety depends on human resources, while the quality makes operations and environment lies in technical areas (engineering, R & D, etc.). Figure 2 shows the integration of systems of quality, environment and safety.



Fig. 2: Integration of quality, environment and safety

Quality has developed strongly driven by competition, by the need to improve business competitiveness, while the establishment of government regulations and pressure from unions has boosted security, while the environment has done by law and society. Still, these functions had in the past a common management philosophy: the retrospective, based on the analysis of indicators that showed what had happened.

The quality management has evolved from the control at the end of the process to eliminate defective products, through statistical process control based on specifications to be met by operators and equipment to reach participatory Systems Quality Management Systems and Total Quality Management. The EHS Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). The Table 1 show the Good International Industry Practice.

Table 1. Good International Industry Practice

Group	Practice
Environmental	Air Emissions and Ambient Air Quality
	Energy Conservation
	Wastewater and Ambient Water Quality
	Water Conservation
	Hazardous Materials Management
	Waste Management
	Noise
	Contaminated Land and Remediation
	Releases to water
	Releases to land
	Use of raw materials and natural resources
	Energy emitted, heat/radiation/vibration
	Waste and by-products
Occupational Health and Safety	General Facility Design and Operation
	Communication and Training

	Physical Hazards
	Chemical Hazards
	Biological Hazards
	Radiological Hazards
	Personal Protective Equipment (PPE)
	Special Hazard Environments
	Monitoring
Community Health and Safety	Water Quality and Availability
	Structural Safety of Project Infrastructure
	Life and Fire Safety (L&FS)
	Traffic Safety
	Transport of Hazardous Materials
	Disease Prevention
	Emergency Preparedness and Response
Construction and Decommissioning	Environment
	Occupational Health and Safety
	Community Health and Safety

An integrated management system has a common structure and three branches corresponding to the three management areas: quality, environment and occupational health and safety. The organizational and allocation of responsibilities of a highly integrated system of management structures should reflect the hierarchy established at all levels to develop, implement, and maintain each of the branches that affect each particular area of management.

It is desirable that the organization appoint a person with sufficient authority and is responsible for coordinating the implementation and maintenance of Integrated Management System so that the person accountable to the Director of the organization.

4. Conclusions

An integrated system guarantees that any company can manage its activities and industrial processes ensuring a sustainable and eco-friendly way with the environment quality. However, the integration of the three systems can generate contradictory effects, because there may be incompatibilities between the demands of quality and efficiency, with safety.

There are several reasons for integration of management, the quality, the occupational health and Safety (OH&S) together with environmental management. Table 2 show the reasons detected:

Table 2. Reasons for integration of management, the quality, the Occupational Health and Safety together with environmental management.

Reasons for integration

Reduce duplication of activities and therefore costs
Balance conflicting objectives e.g. between occupational health and environment
Eliminate conflicting responsibilities and relationships
Harmonise and optimise practices
Create consistency
Improve communication
Facilitate training and development
Integrating the management systems facilitates the focus on the most important aspects in a company
Separate systems tend to put focus on each area instead of the common area

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