Management of Occupational Safety and Health

Using VC-OHSAS 18001 v 1.0

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Abstract

This article presents the development of a modular software called VC-OHSAS 18001 v1.0 for the integral evaluation of the activities defined in the occupational health and safety management system in accordance with the OHSAS 18001 standard, in order to improve the company's health and safety conditions based on an occupational health policy that includes the key objectives that must guide the work teams in order to achieve results in terms of improving working conditions and staff satisfaction. The software makes it possible to determine the responsibilities of the different levels of the organization in terms of health and safety, starting from the identification and assessment of risks, through the definition of action plans to the monitoring and evaluation of the effectiveness of the measures, in order to establish new improvement cycles. Likewise, the software allows the participation of work teams in the identification of hazards and the definition of prevention and control measures to be determined. In order to validate the software, the results of applying it to a service sector company in Colombia are presented, which allowed the organization to easily manage, track
and report its health and safety metrics and processes within a unified solution throughout the organization.

**Keywords:** OHSAS-18001 standard, occupational health, risk, hazard, management system

**1. Introduction**

With industrialization, occupational safety and health (OSH) has become an important issue in all industrial and human activities [1]. Risk analysis makes it possible to avoid or reduce risks arising from work on the basis of activities, measures adopted or planned in all phases of the company's activity [2]. The prevention of occupational risks is essential since their implementation and the correct execution of this helps to eliminate occupational accidents, which are one of the essential problems to eliminate for any company. Ensuring health and safety conditions [3].

The prevention and control of occupational risks requires the implementation of a health and safety management system that allows companies to carry out safety practices in a structured and coordinated manner and integrates all their activities and decisions [4], so that the OHSAS 18001 standard developed for the assessment of health and safety at work provides a framework for the management of occupational health and safety risks. [5] The OHSAS 18001 standard was created in 1998 by a group of certifiers from 15 countries who came together to create the world's first standard for certifying occupational health and safety systems. [6] Based on a sample of 211 manufacturing companies listed in the United States with OHSAS 18001 certification, it was found that certification generates significant increases in safety performance, sales growth, [7], in addition to risk prevention, another reason for adopting safety management systems is linked to the objective of reducing material losses and interruptions in the production process [8].

The audits that control the OHSAS 18001 certificates not only verify compliance with the standard, but also offer recommendations for the company to increase its resources, processes and systems and, therefore, can be seen as tools to control occupational risk, which helps the company to manage its business risk through a continuous philosophy of improvement, which has recently begun to be done through computer-aided applications.

To implement improvements related to safety and health in the workplace, the active participation of the entire corporate structure is necessary. To this end, many companies have begun to use modern training software to train employees in occupational safety that provides them with the knowledge, skills and abilities necessary to perform their tasks safely [9]. However, an empirical study of 149
companies in the period 2006-2009 found that security systems are valuable investments with strategic implications [8], since security management practice is a tool that can substantially improve security and operational performance, and the software available on the market for this type of activity is very expensive and requires rigorous training [10].

Therefore, the main contribution of this article is to present the development of the VC-OHSAS-18001 v 1.0 software, which is a functional, user-friendly and low-cost application that allows risk analysis to be performed in any type of company. The software determines the responsibilities of the different levels of the organization in health and safety, based on the identification and evaluation of risks, to achieve new improvement cycles.

2. Methodology

Below is a detailed description of the fundamental purpose of the software developed, as well as the main views of the program, a flow diagram of the operations of the steps to be followed in the process that the program carries out to minimize any labor risk.

2.1 General aim of the software

The VC-OHSAS-18001 v 1.0 software, which is an intuitive interface that allows both engineers who have not yet graduated and junior engineers to minimize the risks to which workers of any company are exposed. The software is based on some components that allow organizations to centralize, accelerate and standardize data management to ensure that the health and safety of company employees is not negatively affected in all their work operations.

The software was created at such a high level of complexity that it allows graduate engineers to quickly visualize, analyze and understand the data captured by the platform. This program is integrated with a series of modules that allow organizations to carry out the collection and complete monitoring of company health and safety data.

VC-OHSAS-18001 v 1.0, allows to enhance the work of the assistance staff in order to eliminate waiting time for employees, meeting the requirements of the OHSAS 18001 standard, generating easier, faster, safer and more collaborative care. For the engineers, the software is a tool that allows them to control and manage entrance exams, periodicals, and withdrawals in an easy and fast way, besides being able to take the medical history of all the employees, and thus be able to make graphical reports of the health conditions of each one of them.
2.2 Flow Chart of the Software

The VC-OHSAS-18001 v1.0 software was developed and tested with MATLAB® 7.0. System requirements depend on the version of MATLAB® used. VC-OHSAS-18001 v1.0 can be run on any version of Microsoft 32/64 bit. VC-OHSAS-18001 v1.0 software files use less than 694 MB of disk space. The steps are shown in Figure 2.

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Figure 1. Main views of software VC-OHSAS 18001 v 1.0.

Figure 2. Flowchart of the VC-OHSAS 18001 v1.0 software.
3. Results and discussions

The development and implementation of a model that meets the international standards that are governed by the OHSAS 18001 standard were implemented in a software for analysis of the health and safety conditions of employees. VC-OHSAS 18001 v 1.0 studied determining factors that affect compliance with satisfaction standards, considering manuals, matrices, process maps, strategic deployments and maintenance sequence characterizations. One of the matrices is shown in Figure 3.

<table>
<thead>
<tr>
<th>N°</th>
<th>THAT COMMUNICATES TOPIC/ACTIVITY OF PARTICIPATION AND CONSULTATION</th>
<th>OBJECTIVE</th>
<th>MEANS</th>
<th>RECEIVER</th>
<th>RESPONSIBLE</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HSEQ’S POLICY</td>
<td>MAKE ALL PEOPLE AWARE OF HSEQ’S OBLIGATIONS</td>
<td>POSTERS AND TALKS</td>
<td>ALL THE PEOPLE IN THE ORGANIZATION</td>
<td>INTERESTED PARTIES</td>
<td>HIGH DIRECTION</td>
</tr>
<tr>
<td>2</td>
<td>INFORMATION ON LEGAL REQUIREMENTS OF HSEQ</td>
<td>INFORM ON APPLICABLE LEGAL REQUIREMENTS</td>
<td>POSTERS AND TALKS</td>
<td>ALL THE PEOPLE IN THE ORGANIZATION</td>
<td>INTERESTED PARTIES</td>
<td>HIGH DIRECTION</td>
</tr>
<tr>
<td>3</td>
<td>ROLES, RESPONSIBILITIES AND AUTHORITY OF THE HSEQ</td>
<td>DEFINE ROLES AND RESPONSIBILITIES</td>
<td>POSTERS AND TALKS</td>
<td>ALL THE PEOPLE IN THE ORGANIZATION</td>
<td>HIGH DIRECTION</td>
<td>CONTINUOUS</td>
</tr>
<tr>
<td>4</td>
<td>ACCOUNTABILITY</td>
<td>PARTICIPATE IN ACCOUNTABILITY</td>
<td>TALK</td>
<td>INTERESTED PARTIES</td>
<td>ALL THE PEOPLE IN THE ORGANIZATION</td>
<td>HIGH DIRECTION</td>
</tr>
<tr>
<td>5</td>
<td>HAZARD COMMUNICATION</td>
<td>WARN AND INFORM ABOUT HSEQ RISKS PRESENT IN THE ORGANIZATION</td>
<td>SIGNALS/WARNINGS</td>
<td>ALL THE PEOPLE IN THE ORGANIZATION</td>
<td>CONTRACTORS AND VISITORS TO THE WORKPLACE</td>
<td>HIGH DIRECTION</td>
</tr>
</tbody>
</table>

Figure 3. View of communication matrix.

Strategic planning is a process that allows organizations to broaden their vision of work, oriented towards sound decision making. In a company where the integrity of its employees is at stake, the security of its strategic objectives in terms of finance, internal processes, training and growth must be guaranteed. The strategic concept defined by the vision, mission, values, strategies and strategic objectives was operationally translated into a system of management indicators as a mechanism or means to assess the extent to which the previously proposed strategic objectives are being achieved. The VC-OHSAS 18001 v 1.0 software allows to work in an organized and practical way, multiple variables that are directly related to the success of the compliance of the standard marked by the OHSAS 18001 standard.
One of the challenges for the software was to comply with the legal statutes presented in OHSAS 18001. The standard provides an appropriate framework for the identification and enforcement of all occupational health and safety legislation. Full implementation of the applicable Occupational Safety and Health legislation also takes place when the requirements are met, and the desired changes are achieved. The legal requirements OHSAS 18001 are mentioned in different places of the interface code, which means that they must be considered through the PHVA (Plan-Do-Check and Act) cycle of the Occupational Health and Safety Management System, and results in a simple and updated view of the current state of the company in the development of the health and safety policy and the definition of the proposed objectives.

<table>
<thead>
<tr>
<th>Type of hazard/Topic</th>
<th>Standard</th>
<th>N°</th>
<th>Year</th>
<th>Authority</th>
<th>Article</th>
<th>Description</th>
<th>YES</th>
<th>NO</th>
<th>Evidence of compliance</th>
<th>Actions to follow</th>
<th>Internal</th>
<th>External</th>
<th>Management</th>
<th>Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affiliation to the General System of Labor Risks</td>
<td>Decree</td>
<td>1295</td>
<td>1994</td>
<td>Minister of Government Of The Republic Of Colombia</td>
<td>Article 4 (d) and (e)</td>
<td>All employers must join the General Risk System. The affiliation of dependent workers is compulsory for all employers.</td>
<td>x</td>
<td></td>
<td>Maintain compliance</td>
<td>Ecosembrar S.A.S.</td>
<td>SST Coordinator</td>
<td>SST Coordinator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SST Programs</td>
<td>Decree</td>
<td>1443</td>
<td>2014</td>
<td>The President of the Republic</td>
<td>Article 1 - Article 30</td>
<td>Mandatory guidelines are defined for the implementation of the SG-SST, which must be applied by all public and private employers, personnel contractors under civil, commercial or administrative contracts, solidarity economy and cooperative sector organizations, and temporary service companies and have coverage of dependent workers, contractors, cooperative workers and workers in missions.</td>
<td>x</td>
<td></td>
<td>SG-SST is incomplete</td>
<td>Ecosembrar S.A.S.</td>
<td>SST Coordinator</td>
<td>SST Coordinator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SST Programs</td>
<td>Resolution</td>
<td>1111</td>
<td>1989</td>
<td>Ministries of Labour and Social Security and Health</td>
<td>Article 1 - Article 11</td>
<td>The SG-SST must ensure permanent, up-to-date and will consist of: Preventive Medicine Sub-program, Hygiene and Industrial Safety Sub-program.</td>
<td>x</td>
<td></td>
<td>Preventive Medicine Sub-program, Hygiene and Industrial Safety Sub-program.</td>
<td>Ecosembrar S.A.S.</td>
<td>SST Coordinator</td>
<td>SST Coordinator</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 4. Results of the management matrix in the software VC-OHSAS 18001 v 1.0.

One of the challenges for the software was to comply with the legal statutes presented in OHSAS 18001. The standard provides an appropriate framework for the identification and enforcement of all occupational health and safety legislation. Full implementation of the applicable Occupational Safety and Health legislation also takes place when the requirements are met, and the desired changes are achieved. The legal requirements OHSAS 18001 are mentioned in different places of the interface code, which means that they must be considered through the PHVA (Plan-Do-Check and Act) cycle of the Occupational Health and Safety Management System, and results in a simple and updated view of the current state of the company in the development of the health and safety policy and the definition of the proposed objectives.

Figure 5. View of legal matrix.
4. Conclusions

A company when hiring a professional who dedicated years of his life to study and prepare himself to contribute positively to the success and the proposed objectives of his employer must guarantee the minimum of occupational risks that will be measured under international health and safety standards. The interface shown in the last document shows in an organized, updated and simple way the results in terms of improved working conditions and staff satisfaction. The software presented on health and safety issues, identifying and evaluating the risks to which workers are subjected, considering the entire process, monitoring and providing new measures to improve risk prevention and control.

References


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