



**Article Research**

**PROPOSAL FOR AN OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM IN A COMPANY FOR CONSTRUCTION IN THE STATE OF TLAXCALA, MEXICO**

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**ABSTRACT**

This article shows the proposal for an Occupational Health and Safety Management System in a company in the construction sector Tlaxcala, Mexico. Which objective was offering the company a system that effectively manages the occupational risks that affect employees, the system was structured according to the ISO-45001-2018 standard in all with the PROY-NMX-SAST-310010 standard. -IMNC-2017, finally, the implementation and measurement of the system in the construction company for risk control was proposed.

**Key Words:**

Safety, Construction, Risk, Management System

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**INTRODUCTION**

The health and safety at work nowadays is a transcendental dimension of the organization management, that involves workers rights to conditions that reduce the professional accident and disease risks on the basis of maintain the dignity and living standards of those that enable, the entrepreneurship dynamic<sup>1</sup>. Arévalo, *et al*, claim that the management system are based on international rules which provide the appropriate guidelines to help monitor and control the multiple stages of an organization, based on the perspectives designed, like the quality of their product or service, the environmental effects or occupational safety and health at work<sup>2</sup>. taking into account to Ardila, Naranjo & Vente the SGSST poses, among other transformations, a more decisive solution to risks and opportunities. In terms of standards, it is important to prevent injuries and illnesses caused by the working conditions to which workers are exposed<sup>3</sup>. Also the international labor organization mentions that the Occupational Health and Safety Management System in a company is defined as a logical method and by steps to decide what should be done, and the best way to do it, monitor progress towards the achievement of stablished targets, assess the effectiveness of the measures taken and identify areas for improvement<sup>4</sup>.

Consistent with this approach Duque, *et al*, they conceptualize that the SG-SST is an essential element throughout organization, is the one who is responsible for the promotion and dissemination to prevent occupational disease and accidents, through this the employees are care and self-care of each member of the business community<sup>5</sup>. Carrasco explains that with the implantation of a SG-SST in a company in Perú reduces the accident rate by 32.5%<sup>6</sup>. The construction industry produces a wide range of products and companies are equally diverse, however, the vast majority of on-site construction companies are small, accidents at work have human, social and economic cost<sup>7</sup>. Solís points out that the Mexican southeast accidents in the construction sector prevail three times more in private works compared to public works, assuming that government agencies have better management of safety and health<sup>8</sup>. Zamora also carried out an investigation in companies in the construction sector in Tlaxcala obtaining results in which it highlights the lack of a commission on safety and health at work<sup>9</sup>. Macias, *et al* also mentioned that the diagnosis in a construction company dedicated to public works showed that the lack of use of protective equipment and the lack of guidance provide an accident rate of 40% of the total number of workers in a company<sup>10</sup>.

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These circumstances justified the need for a proposal for a Health and Safety Management System in a company based on the international standard ISO-45001-2018<sup>11</sup> in the company, this in order to assist and improve Health and Safety at Work for employees of the company.

defines descriptive investigation as the characterization of a fact, phenomenon, individual or group, in order to establish its structure or behavior<sup>13</sup>.

**Board 1 HAZOP method**

AREA: Public Works and machinery warehouse						Node 1: Personal protection equipment		
Variable	Detour	Causes	Consequences	Comments	Possible actions	Probability	Severity	Risk level
Use of personal protective equipment	Null	Resistance to change and possible lack of ergonomics in personal protective equipment	Potential risk of accident at site with exposed injury, crush and/or fracture	Periodically reviews protective equipment	Possible actions continuous review of its use, check list, penalties for residents	3	3	MEDIUM
AREA: Public Works and machinery warehouse						Node 2: Signage		
Variable	Detour	Causes	Consequences	Comments	Possible actions	Probability	Severity	Risk level
Signage (commitment to Safety and Health at Work)	Part of	Lack of budget on safety and exit at work, elimination by standers of signage	Can lead pedestrians and worker's to accidentes with machinery, cars, falls of different levels	Communication between municipality and senior managment on single care	Ensure that the signage is correctly displayed and visible	3	3	MEDIUM
AREA: Machinery warehouse						Node 3: Machinery		
Variable	Detour	Causes	Consequences	Comments	Possible actions	Probability	Severity	Risk level
Machinery moving	High	Lack of rear-view mirrors, revers alarms, recklessness of workers and operators	Potential risk in partial or total run-over of workers in blind spots	That top managment provide attention to own machinery and if it is a third implement a control of the requirements to be met by the machinery	Have a key point review point review procedure in machinery as well as constant training	4	3	HIGH
AREA: Public Works (nearby roads)						Node 4: Vehicle traffic		
Variable	Detour	Causes	Consequences	Comments	Possible actions	Probability	Severity	Risk level
Vehicle traffic	Along with	High vehicle flow in the construction site	Collision of vehicles, rolling of pedestians and employees	Communication whit road safety and construction manager	Temporarily close the adjacent roads, implement a road safety vehicle control by the municipality or state	3	4	ALTO
AREA: Public works						Node 5: Working equipment		
Variable	Detour	Causes	Consequences	Comments	Possible actions	Probability	Severity	Risk level
Occupational health and safety supervisor	More	Lack of new tool, tool not provided by the company	Crushing total or partial cutting of limbs, punching or traversing of limbs	Review with purchasing department	Purchase of new tool, review of existing tool	3	3	MEDIUM
AREA: Public works and machinery warehouse						Node 6: Supervisor safety and health at work		
Variable	Detour	Causes	Consequences	Comments	Possible actions	Probability	Severity	Risk level
Supervisor safety and health at work	Null	Lack of commitment to safety and health at work by senior management and the recruitment of staff trained in occupational safety and health	The imminent existence of risks not visible to workers in the work area (construcción)		Hire an occupational safety and health supervisor staff training	3	4	HIGH
AREA: Public works and machinery warehouse						Node 7: Fall of heights and at the same level		
Variable	Detour	Causes	Consequences	Comments	Possible actions	Probability	Severity	Risk level
Crashes	High	Lack of training and protective equipment of work at heights	Height fall, contunction, injury or injury exposed, fracture, death	Review of safety equipment	Procedure of work in height, signage, harness and lifeline	3	4	HIGH

Reference: Author's own creation

**Board 2 ¿WHAT IF? Method**

What if?	Consequences	Protections	Recommendation
Personal protective equipment is not used	Potential risk of an on-site accident	Continuous review of your usage. Check list daily	Ensure that workers use and wear personal protective equipment
The signage in the work in nonexistent	Can lead pedestrians and workers to accidentes with machinery and cars	Review and use of signage	Ensure that the signage is correctly put into operation with periodic review
The machinery has no reverse alarm	Potential risks in partial or total run-over of workers in blind spots	Review by the construction resident and machinery operators	Check List of mechanical and safety parts in the machinery
The tools are in poor condition	Crushing, cutting on hands or feet	Periodic review of tools	Check List manual tool conditions
Workers play in their activities	Imminent danger of accidents such as falling or crushing with machinery and tools	Worker supervision	Implement a talk about the risks that lead to certain behaviors
No occupational health and safety supervisor	The imminent existence of risks not visible to workers	Control and risks management	Have an occupation safety and health supervisor

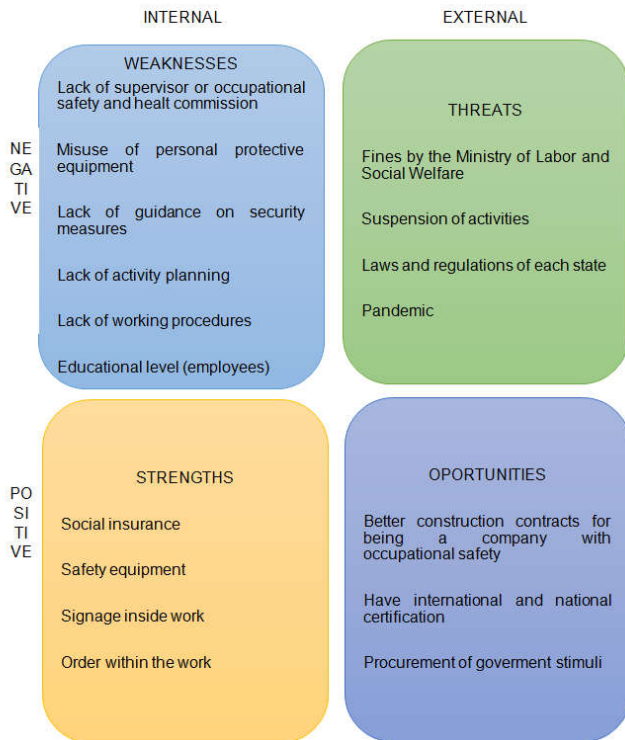
Reference: Author's own creations

**METHODOLOGY**

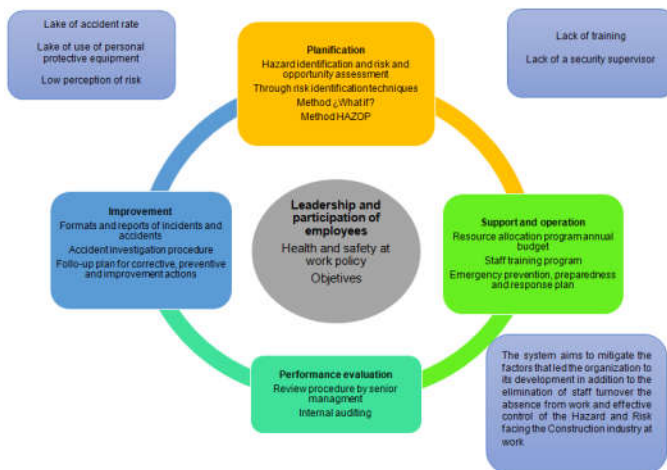
The investigation started from a descriptive approach, according to Hernandez, Fernandez & Baptista, a description investigation seeks to specify important properties and features of any phenomene being analyzed<sup>12</sup>, on the other hand Arias

Therefore a situational diagnosis through a SWOT (strengths, weaknesses, opportunities and Threats) the analysis consist of the evaluation of strong and weak factors that together diagnose the internal and external situation of the organization Thompson, *et al*, states that the SWOT analysis estimates the fact that strategy has to strike a balance or match between the

internal organizational capacity of the organization and its internal status, that is, opportunities and threats<sup>14</sup>.



**Figure 1** SWOT diagnostic  
Reference: Autor's own creation



**Figure 1** Proposal of an occupational health and safety management in a company  
Reference: Author's own creation

Likewise the application of a structured questionnaire validated by two stastical tests, the test of half consignments, at the same time the alpha of Cronbach as mentioned by Hernandez, Fernandez & Baptista<sup>15</sup>, revealed factors that gave way to the Occupational Health and Safety Management System in a company under the international standard ISO-45001-2018 (figure 1) and the use of risk identification tools like de HAZOP methodology, which according to the National Institute of Safety and Hygiene at Work, the HAZOP methodology was designed by the ICI in the 1960s for application in the design of plants for manufacture of pesticides, in order to detect situations of insecurity<sup>16</sup>. This method integrated with other complementary methods of analysis allows to face the study of the safety of the process, the findings found in high levels of risk were the movement of machinery, vehicle traffic, lack of safety and Health supervisor

at work, as well as falls (board 1), Zambrano & Almeida emphasized that the "what if?" method uses process-specific information such as process diagrams, pipe diagrams and instrumentation to generate a kind of checklist questions, in addition, make planning list using the questions "what if?"<sup>17</sup>, which are answered collectively in order to reach protections and recommendations (board 2), in accordance with the clauses and requirements set out in the standards, it proceeded to the proposal of occupational health and safety management system in a company Figure No 2.

## CONCLUSIONS

To conclude with the structuring of the occupation health and safety management system of the occupational health and safety management system in a company and its future implementation in the organization is intended to identify and control the causes that lead to accidents in the construction company, study case which will add value to this and all its collaborators which will be protected from the risks inherent in their work activities and the company will reduce the accident rates drastically, finally it is suggested the implementation and measurement of the system in order to continuous improvement that stablishes the standard ISO-45001-2018 in the Deming cycle for the company.

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