

ACCIDENT PREVENTION TRAINING AT THE CFE TLAXIACO PLANT IN OAXACA, OAXACA

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Abstract -- Training for the prevention of occupational accidents is an extremely important issue, since protecting workers from the risks they may suffer as a result of their work is one of the fundamental axes for the prevention or reduction of occupational accidents or diseases. For this reason preventive activity implies a series of rights and obligations for both the worker and the employer. However, we cannot forget that it implies a series of rights and obligations on both sides, both in the worker and in the employer, thus sowing a preventive culture in the company with a Prevention Plan from minute one.

The project was developed at the Comisión Federal de Electricidad (CFE) plant in Tlaxiaco, Oaxaca, where we analyzed the incidence of training for the prevention of occupational hazards when performing their activities inside and outside the plant. In order to obtain concrete results before the proposed approach, a survey was conducted in the plant, this in to perform various analyses and obtain various results which helped us to reject or accept our hypothesis. From the results obtained it was observed that the correlation analysis between the variable is 33.5% to obtain these results we used the SPSS 25 program as this is a program that performs data capture and analysis to create tables and graphs with complex data.

Key words: prevention, accidents, training.

Abstract -- Abstract -- Training for the prevention of occupational accidents is a topic of utmost importance since protecting workers from the risks they may suffer due to the performance of their work is one of the fundamental axes for the prevention or reduction of accidents or occupational diseases. For that reason Preventive activity implies a series of rights and

obligations for both the worker and the employer. However, we cannot forget that it entails a series of rights and obligations for both parties, both the worker and the employer, thus sowing a preventive culture in the company with a Prevention Plan from minute one.

The project was developed at the plant of the Federal Electricity Commission (CFE) in Tlaxiaco, Oaxaca; where the impact of training for the prevention of occupational risks when carrying out their activities inside and outside the plant was analyzed. To obtain concrete results regarding the proposed approach, we carried out a survey in said plant, this with the purpose of carrying out various analyzes and obtaining various results which will help us reject or accept our hypothesis. From the results obtained, it will be verified that the evaluation analysis between the variable is 33.5%, which indicates that our hypothesis is rejected. To obtain these results, the SPSS 25 program was used since this is a program that captures and Data analysis to create tables and graphs with complex data.

Key words - prevention, accidents, training, health.

INTRODUCTION

The reason for this project is to analyze the prevention of accidents at the CFE Tlaxiaco, Oaxaca plant; Nowadays it is essential to have the necessary safety measures for the prevention of accidents, especially in the area where work performed at maximum risk, since it is of utmost importance to safeguard the physical and mental integrity of workers generating confidence in them, since CFE is responsible for the generation, transmission, distribution and marketing of electricity being a risk area for those who work in it, which is why it is necessary to review the standards and specifications for design and construction of equipment and facilities.

The objective is to investigate the strategies developed by the CFE plant in Tlaxiaco in terms of training, their

application and its impact on the prevention of occupational accidents.

It is essential to establish actions that promote a gradual, orderly and cautious reopening of safety measures, protecting the health and lives of all personnel, in accordance with the ethical values of respect that work in the CFE Tlaxiaco Oaxaca plant, after reviewing the literature on the subject, it is possible to suggest that by implementing mechanisms that lead employees to be more motivated and with better attitudes, they may be more willing to adopt strategies that favor organizational and precautionary changes (Castaño-González, 2012).

The literature mentions that the success of this Protocol depends on the participation and commitment of the parties involved, with a timely and reliable management of the information, protecting the health of everyone, the main occupational hazards derived from work with electricity are generated by direct contact and indirect contact, workers who perform work in which they are exposed to the dangers of electricity must know the risks to which they are subjected and the preventive measures to avoid as many accidents as possible, for this it is necessary to comply with the safety measures set by the regulations and implement the recommendations to ensure that the facilities are in perfect condition and the operation is not threatened by poor quality maintenance. The safety and hazard prevention measures must be adapted and updated at all times, a task that will also be checked by the technicians in hazard prevention when workers are preparing to perform tasks in which they must manipulate an electrical installation, the source of nutrition must be trimmed so that there is no danger of discharge (Moreno, 2015).

From any point of view the safety of workers is vital and it is necessary to convince and encourage the workers involved to achieve good compliance, since it is of utmost importance to acquire the appropriate protective equipment, as it is also favorable that a worker uses it in the right way with the appropriate checks and precautions during the activities in which it is under any risk.

From this arises the need to follow up and update on the prevention of accidents in the CFE Tlaxiaco, Oaxaca plant, since with this we can obtain better results in the use and handling of work equipment and in the integrity of the workers, since it is also important to raise awareness, as well as the socialization of information, to have personal integrity in all aspects.

Currently, the strategies and actions that are carried out in the workplace with respect to accident prevention will have an impact on every human being who works, because if it is understood in a clear and concise manner, everyone will be responsible and aware.

It is therefore necessary to work with a systemic approach to the issue of training for the prevention of accidents, so that accidents are not only avoided, but also prevented; it is extremely important and essential to conduct a thorough examination and pay attention to the workplace to be aware of the causes and consequences, and the way in which we control them, analyzing the methods and practices of work, therefore, excellent training is paramount.

If we really want to create and spread a safety culture in the work center and among the personnel, it is necessary to make the worker aware of the correct use and handling of work equipment, this task is incumbent upon all members of the CFE plant from any position, therefore, the provision of equipment must also be done in a responsible manner, since the user will be responsible for his own safety.

The safety inspection is the performance of observations, planned or informal, which aims to detect and systematically evaluate all those conditions or attitudes that may give rise to accidents or diseases, verifying the level of compliance and effectiveness of legal regulations, instructions and internal procedures issued for that purpose, and establishing the necessary measures for the effective control of the observations detected (Hernandez, 2011).

Man is the beginning and end of accidents, that is to say, he is responsible for them happening and is the one affected by them, sometimes, one person is the one who produces the accident and another who suffers the consequences, because of this we can say that there is always a human being behind an accident, although in response to the fact that it is the human being who is the main cause of accidents, in the same way it is the human being the only one who can put a solution to accidents.

Although training does not solve these fundamental problems, it is a valid instrument for transmitting knowledge about health risks, the rights and duties of social actors and for promoting changes in attitudes in the business sector and in the working community, aimed at incorporating new patterns of conduct, where the welfare of those who work is taken into account first as an ethical value and then as a factor of quality and productivity.

To the extent that workers' representatives and their organizations strengthen their participation and knowledge, they will consolidate their capacity to promote a labor relations system in which health and safety issues are on the negotiation agenda. The deepening and updating of their knowledge will place them in a better position to train and inform the workers' collective, so that they can watch over their own quality of life at work and become agents of change in each place.

The improvement of working conditions through the joint work of production actors thus becomes a meeting point between social and economic needs and the ethical values pursued (Escobar, 2017).

A job well done brings numerous benefits to the health of the individual, mentally contributes to professional fulfillment, improves self-esteem and makes access to health programs possible.

The expression of occupational health is better in an environment where work is performed in a dignified manner, under equitable conditions and in an optimal environment, where there are conditions for development, access to health and social security.

When clear policies are developed, training and information programs should be administered to workers, where they acquire the necessary awareness and responsibility to efficiently carry out actions aimed at caring for the health of personnel and the work environment. The work safety climate developed during the working day contributes to the respect of safety standards (Adame, 2004).

Safety in the workplace is one of the pillars of social development. The rules to be observed and the elements to be used on a daily basis form the backbone of safe work.

They must be selected according to the risk to which they will be exposed, their use is mandatory for the worker and their supply is mandatory the employer. For these reasons, personnel must be trained regarding their use, care, characteristics, selection and limitations.

When an element shows signs of damage, it is the worker's obligation to report the deterioration or damage of the element and it must be replaced.

DEVELOPMENT

Methodology

In the research carried out on Accident Prevention Training at the CFE Tlaxiaco Plant, Oaxaca. The deductive method was used, where it is analyzed from the general to the particular. In order to obtain these conclusions, the mixed method was compiled, analyzed and integrated, which includes qualitative and quantitative research, since it will give us a better understanding of the research problem, which would be impossible to obtain with any other method.

In this project the non-experimental design was used, since it performs its study without altering or manipulating any of the variables of the phenomenon, limiting itself only to the measurement and description of the same, this non-experimental research design, the researcher cannot control, manipulate or alter the subjects, but relies on the interpretation or observations to reach a conclusion.

The population at this site is made up of a total of 50 workers.

decided to use the entire population for the application of the instrument.

In the Conceptualization and Operationalization of Variables, the two variables were analyzed as in Figure 1 and Figure 2.

Table 1. Operationalization of the Independent Variable.

Variable	Concept	Dimensions	Indicators
Accident prevention	An unplanned or uncontrolled event in which the action or reaction of an object, substance, person or radiation results in injury or likelihood of injury (Heinrich, 1930).	Efficiency	1. Efficiency level of each action used accident prevention.
			2. Effectiveness of inspections to prevent accidents at work and occupational diseases
			3. Inspections of equipment and workplaces
			4. Internal audits of the management system for the accident prevention
			5. Evaluation of the efficiency of training activities
		Celeridad	1. Estimated time to implement accident prevention measures
			Estimated time to attend an accident
			3. Frequency and trend of near misses
			Severity and frequency of accidents
			Number of days consecutive years with no occupational accidents
		Planning	1. Number of drills established per year
			Compliance with the number of trainings
			3. Achievement of established objectives
			4. Budget
			5. Total number of trained personnel

Source: Own elaboration

Operationalization of the Dependent Variable.

Variable	Concept	Dimensions	Indicators
Training	Training is related to the creation of reflective processes where intertwines a relationship between practice and the theory	Availability	Time available for get trained
			Number of trainings per year
			3. Time determined by training
			Prioritization of issues
			5. Extra time spent by the workers.

	(Freire, 1997)	Attitudinal	Incentives from the company
			2. Commitment on the part of the employees to respect the guidelines
			Level of company support
			Sanctions by the company
			Level of reliability among workers
		Knowledge	1. Satisfaction by training
			Evaluation of the knowledge acquired in the training
			3. Application of knowledge acquired
			4. Socialize knowledge
			5. Training acquired

Source. Own elaboration.

To obtain a favorable data collection we used a questionnaire with polytomous questions. The questionnaire has 32 questions in which 16 were for the variable "Training" which had 3 dimensions which were availability with 5 items, attitudinal with 5 items and knowledge with 6 items; the rest for the variable "Accident Prevention" which had 3 dimensions which were efficiency with 5 items celerity with 5 items and planning with 6 items. The hypothesis of the project is that the strategies developed in the CFE plant, Tlaxiaco, improve training for accident prevention.

DISCUSSION AND ANALYSIS OF RESULTS

The study sample consisted of 50 workers, of which 18 were women and 32 were men.

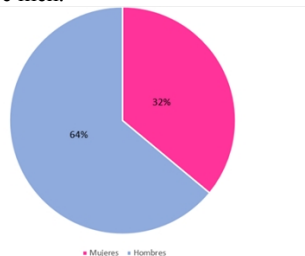


Figure 1. Gender of workers.

Within the treatment of the variables, a reliability analysis was performed, which refers to an index to measure the internal consistency of a scale that serves evaluate the extent to which the items of an instrument are correlated (Rodrigues,2013). Cronbach's alpha is a coefficient which is used to measure the reliability of a measurement scale. In this case it was very useful because it was used to obtain the exact amounts in the items, with which the amount of 11.5584 was obtained in the variance of each item, the amount of 26.2624 in the total variance of the items, using the following formula:

$$\alpha = \frac{k}{k-1} \left[1 - \frac{\sum v_i}{v_t} \right] \quad \text{Eq. (1)}$$

In the correlation analysis, based on the surveys applied to the workers of the CFE Tlaxiaco plant, it can be observed that the time available is related to the indicator of extra time dedicated to training ($r=0.422$), the satisfaction with the number of trainings given in the company is related to the frequency in the process of socialization with the knowledge acquired in the trainings among ($r=0.426$), the commitment to respect the guidelines in the prevention of accidents is related to the frequency in the application of the knowledge acquired through the trainings ($r=0.422$), as well as the support of the company in case of any eventuality is related to the frequency in the application of the knowledge acquired through the trainings ($r=0.422$). commitment to respect the accident prevention guidelines is related to the frequency in the application of knowledge acquired through training ($r=0.422$), as well the support of the company in any eventuality is related to the frequency in the application of knowledge acquired through training ($r=0.422$).

the frequency in the application of knowledge acquired through training ($r=0.460$), the protective equipment used in the company is related to total compliance with training ($r=0.629$), the frequency in which accidents occur in the CFE Tlaxiaco plant is related to the required training per year ($r=0.426$), the number of days without accidents at work is related to the required training per year ($r=0.460$).

Correlation Analysis.

Correlations	Availability	Attitudinal	Knowledge	Efficiency	Celeridad	Planning
Availability	1	.422**	.284*	-0.12	0.057	.426**
Attitudinal	.422**	1	-0.03	0.091	-0.005	0.129
Knowledge	.284*	-0.03	1	0.167	0.07	.460**
Efficiency	-0.12	0.091	0.167	1	0.132	0.139
Celeridad	0.057	-0.005	0.07	0.132	1	-0.031
Planning	.426**	0.129	.460**	0.139	-0.031	1
** The correlation is significant at the 0.01 level (bilateral).						
* The correlation is significant in the 0.05 level (bilateral).						

Source. Own elaboration.

From the results obtained it was observed that the correlation analysis between the variable is 33.5%. With this result the hypothesis is approved since it is positively and significantly related.

Correlation Analysis

Correlations			
		TRAINING	PREVENTION OF ACCIDENTS
TRAINING	Pearson correlation	1	.335*
ACCIDENT PREVENTION	Pearson correlation	.335*	1
* Correlation is significant at the 0.05 level. (bilateral).			

Source. Own elaboration.

The following histogram shows the data studied that are grouped below the curve.

A histogram is a graphical representation used to visualize and analyze the frequency with which a variable takes different values within a data set (Domenech, 2023).

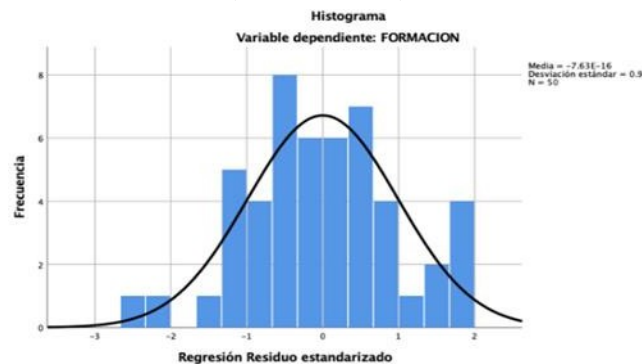


Figure 5. Histogram of dependent variable: training.

The following scatter plot shows the relationship between the variables studied, training and accident prevention.

The scatter diagram is commonly used to show how two variables are related to each other. Thus, it allows studying the relationships that exist between two factors, problems or causes related to quality, or a quality problem and its possible cause (Rivas, 2019).

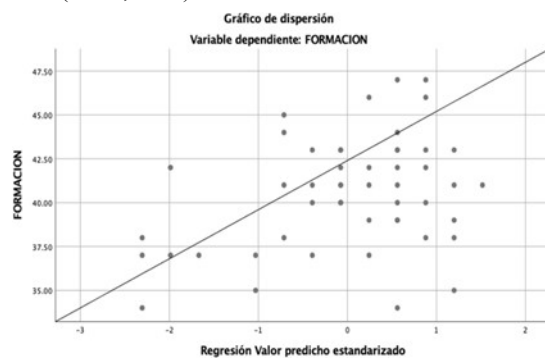


Figure 6. Scatter plot of dependent variable: training.

CONCLUSIONS

Training for the prevention of occupational accidents plays a key role in the safety and well-being of workers and in

efficiency of the companies. Throughout this process, employees acquire knowledge, skills and attitudes that will help them to improve the efficiency of the company.

enable them to identify risks, take preventive measures and act safely in their work environment. Through training, we foster a culture of safety in the workplace that reduces the number of accidents and injuries, reduces the costs associated with the health care and workers' compensation, and increases employee productivity and morale. This training not only benefits workers, but also organizations, as it contributes to compliance with occupational safety regulations and standards, avoids litigation, and enhances the company's reputation.

Moreover, in a global context of growing awareness of corporate social responsibility, companies that invest in training their employees to prevent accidents demonstrate their commitment to the safety and well-being of their staff.

In this case, accident prevention at the Federal Electricity Commission (CFE) is of vital importance to ensure the safety of workers, the continuity of electrical services and care for the environment. The CFE, as a key entity in the generation and distribution of electrical energy in Mexico, has the responsibility to operate in a safe and efficient manner.

and sustainable, considering the risks inherent to its industry. Therefore, CFE must prioritize the prevention of accidents through a strong safety culture, the implementation of effective safety practices and policies, and the constant training of its personnel. Investment in safe technologies and equipment, as well as the promotion of a safety culture, will contribute to reducing risks and preventing occupational accidents, protecting workers, preserving infrastructure and minimizing negative impacts on society. Accident prevention is not only a legal and ethical obligation for CFE, but also a critical factor for its long-term success and contribution to Mexico's well-being.

We can conclude by emphasizing that training in occupational accident prevention is essential to ensure a safe and healthy work environment, reduce the costs associated with accidents and promote a culture of safety in the workplace. It is an investment that brings benefits to both workers and organizations, and plays a crucial role in creating sustainable and responsible work environments.

The evaluation of action plans in case of accidents, the analysis of organizational factors that affect accident management are proposed as future lines of research. In addition, the analysis of work stress and its role in workers' performance.

ACKNOWLEDGMENTS

Infinite thanks to the workers who took the time to answer the survey that helped us to carry out the various studies described above, your contribution is of great importance to complement our research project and also to acquire more knowledge about the training for the prevention of accidents in the CFE plant located in the Heroic City of Tlaxiaco.

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