



Category: Applied Research in Health and Medicine

ORIGINAL

Design Of Workshops For The Management And Prevention Of Occupational Risks In Puichig- Mejía Agua Potable 2022

Diseño De Talleres Para La Gestión Y Prevención De Riesgos Laborales En Puichig- Mejía Agua Potable 2022

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ABSTRACT

The work that was developed in the Design of workshops for the management and prevention of occupational risks in Puichig-Mejía Agua Potable 2022, focused on the risks to which workers are exposed during their work activities. After conducting the surveys and seeing the results we can say that workers are exposed to different risks in their daily work activities due to different factors, either due to lack of communication between them, lack of order and cleanliness in the workplaces and lack of good risk control, among others.

The main problem is that workers do not have knowledge about the different means of protection and prevention in different jobs. To counteract this problem, the solution of conducting workshops has been found of management and prevention of risks, which cover different topics such as: Basic safety rules, Correct use of EPPS, Correct management of equipment and tools, Basic rules of work coexistence, with the aim of making workers aware of these issues since in their daily routines they are exposed to serious risks. Currently, workers do not receive talks, sizes or training in their jobs about the activities they are going to perform, as well as the risks and accidents that are generated day after day, that is why the Risk Management and Prevention Workshops will be implemented to minimize the chances of incidents occurring in the workplace.

Keywords: Occupational risk management; Accident prevention; Workplace training; Occupational safety; Personal protective equipment (PPE).

RESUMEN

El trabajo que se desarrolló en el Diseño de talleres para la gestión y prevención de riesgos laborales en Puichig-Mejía Agua Potable 2022, enfocado a los riesgos a los que se exponen los trabajadores

durante sus actividades de trabajo. Luego de realizar las encuestas y ver los resultados podemos decir que los trabajadores se encuentran expuestos a diferentes riesgos en sus actividades de trabajo diarias por diferentes factores, ya sea por falta de comunicación entre ellos, falta de orden y limpieza en los puestos de trabajo y falta de un buen control de riesgos, entre otros. El principal problema radica en que los trabajadores no tienen conocimientos sobre las diferentes medidas de protección y prevención en los diferentes puestos de trabajo. Para contrarrestar este problema se ha encontrado la solución de realizar talleres

de gestión y prevención de riesgos, los cuales abarcan diferentes temas como son: Reglas básicas de seguridad, Uso correcto de EPPS, Manejo correcto de equipos y herramientas, Normas básicas de convivencia laboral, con el objetivo de dar a conocer a los trabajadores estos temas ya que en sus rutinas diarias estos se encuentran expuestos a graves riesgos.

En la actualidad los trabajadores no reciben charlas, talleres o capacitaciones en sus puestos de trabajo sobre las actividades que van a realizar, así también a los riesgos y accidentes que se genera día tras día, es por eso que se va a implementar los Talleres de gestión y prevención de riesgos para minimizar las probabilidades de que ocurran incidentes en los lugares de trabajo.

Palabras clave: Gestión de riesgos laborales; Prevención de accidentes; Capacitación laboral; Seguridad ocupacional; Equipos de protección personal (EPP).

INTRODUCTION

In the field of occupational risk management, workshops play a crucial role in addressing the different types of risks that can occur in the work environment: physical, chemical, mechanical, biological, psychosocial and ergonomic. Each of these types of risks poses specific challenges that require a tailored approach and concrete solutions.

It was possible to identify the problem by not having information on occupational accidents and socializing with workers to raise awareness of occupational risk prevention. Through the project we identified all the risk factors of the company American Call Center informing the company to avoid future accidents.

For this reason, our research project will be focused on studying this problem within the project “Construction of the Redesign and Updating of the Puichig Drinking Water Supply System” located in the Canton Mejia, Machachi parish, because some of the workers are unaware of the safety measures that should be taken within the work environment.

We will proceed to develop the design of workshops for the management and prevention of occupational risks in the aforementioned company in order to improve the basic and necessary conditions in the field of safety and above all to reduce occupational risks that occur in the work environment.

Learning in the workshops is based on experience and action. This practical approach allows participants to immediately apply what they have learned, promoting a deeper and more lasting understanding. For example, through the “learning-by-doing” methodology, workers can practice the correct use of personal protective equipment (PPE), simulate emergency situations, or implement order and cleanliness techniques at their workstations. These activities not only reinforce theoretical concepts, but also develop tangible skills that improve work performance and reduce the risk of accidents.

In this process, the trainer plays a multifaceted role that combines leadership, teaching and observation. Their main objective is to guide workers in the development of key competencies, ensuring that each participant has the opportunity to learn and contribute. This requires solid training and a deep understanding of the group's needs, as well as the ability to adapt to emerging and dynamic activities according to the circumstances.

The worker, on the other hand, acquires an active and leading role in the workshop. Unlike traditional teaching models, where the student assumes a passive role, in the workshop the worker actively

participates in the learning process. This includes asking questions, solving problems and collaborating with their peers to achieve common goals. By being recognized as experts in their own experiences, workers also contribute to enriching the workshop content and co-creating solutions adapted to their realities.

The study site we are going to focus on is located in the city of Machachi in the parish of Aloasi Alto-Bajo in which green areas are designated for construction where the surrounding residents are not affected.

The project has 21 employees, who are unaware of the regulations and safety measures; they do not use protective equipment so their safety is insufficient. The level of exposure to mechanical, physical, and electrical risks is high in the project, and it is important to manage alternatives to control and prevent these risks.

In addition, the workshops allow for a comprehensive approach to prevention, considering not only the risks inherent to the work, but also the psychosocial conditions that affect the wellbeing of the employees. The inclusion of topics related to the work environment, effective communication and stress management contributes to creating safer and healthier workplaces. In this sense, the success of the workshops lies in their ability to adapt to the specific needs of workers and the environment in which they work.

Workshops are a strategy with a clear track record of application in various companies where the results are beneficial. It offers a considerable reduction in occupational accidents, as a result of workers learning about occupational risk prevention.

With respect to economic, technical and environmental resources, in the subsequent evaluation of the workshop implementation strategies, they will be fully covered by the researchers.

In the specific context of occupational risk prevention, workshops are configured as a key strategy to mitigate the immediate and root causes of accidents. Immediate causes, such as unsafe conditions or poor behaviors, can be addressed through education and the implementation of corrective measures. On the other hand, root causes, which include organizational, cultural and infrastructure factors, require deeper analysis and long-term strategies. Workshops, by involving all levels of the organization, provide a unique venue for identifying these causes and planning effective interventions.

In workshop design, methodology is a critical element. The techniques used must be appropriate to the objectives of the workshop and the characteristics of the participants. Methodologies such as “Flipped Classroom”, “learning by doing” and group dynamics have proven to be especially effective in work environments. These strategies not only encourage participation, but also promote meaningful learning and the practical application of the knowledge acquired.

In companies such as the Puichig Drinking Water Consortium, the development of workshops on occupational risk management and prevention is a direct response to the needs detected through previous diagnoses. The results of worker surveys highlight key areas for intervention, such as exposure to mechanical hazards, lack of order and cleanliness in work spaces, and the need to improve hazard identification and control. These findings underscore the importance of designing workshops that not only address these issues, but also promote a culture of safety and prevention in the organization.

Finally, the impact of workshops on occupational risk prevention transcends the individual level to influence the organizational culture. By empowering workers with knowledge and skills, workshops foster a safer and more collaborative work environment. This cultural change not only reduces the incidence of workplace accidents and illnesses, but also improves employee satisfaction and engagement, thus contributing to the long-term success of the organization.

We will provide information on occupational hazards at the site in order to resolve needs and obligations and in turn put them into practice to cultivate a culture of safety and thereby ensure a comfortable work environment and the safety of workers.

In which we will generate a diagnosis of risks that may occur in construction, this will help us to get to get a method to help workers.

We will evaluate and help to see if all the workers that are doing the work have previous knowledge about all the implements and machinery that they are going to use, if they have all their safety equipment and we will also see how is the work environment in which they perform their work and also about the prevention of occupational hazards.

General Objective

Elaboration of workshops to raise awareness of the safety and dangers of workers and to avoid injuries.

How to contribute to the strengthening of the prevention of occupational hazards in the Potable Water Service Project of the Puichig sector in the city of Machachi, Parish of Aloasí, in the year 2022?

METHODS

As part of the subject of Methodology of Scientific Research of the first level of the career of technology in Safety and Prevention of Occupational Risks, it has been proposed the application of a questionnaire addressed to the collaborators of the Consorcio De Agua Potable Puichig in order to determine the conditions in which workers work, also their protection measures used in order to verify whether it is necessary to implement workshops and thus we can safeguard the lives of workers.

Questionnaire

1.1 General data

1. Gender

Male

Female

2.Age

18-25 years old

25-36 years

36-50 years old

2.2 Working Environment

3.Work experience.

1-5 years

5-7 years

4.Exposure to noise and vibration?

Low

Medium

High

5.What hazards are you exposed to when working in the construction area?

Ergonomic

Physical

Chemical

Mechanical

Psychosocial

Biological

6.Is the workspace neat and clean?

Always

Almost always

Sometimes

Never

7. Does the company perform correct hazard identification?

Always

Almost always

Sometimes

Never

8. A risk control assessment is performed to adopt more appropriate improvements?

Always

Almost always

Sometimes

Never

9. Workers receive prior training and instructions when performing their established duties correctly and safely?

Always

Almost always

Sometimes

Never

10. Standardized signals are used where these are needed?

Always

Almost always

Sometimes

Always

11. Do the activities carried out have proper supervision by a person who has knowledge of occupational risk prevention?

Always

Almost always

Sometimes

Never

12. How often do you receive trainings to perform the job activities?

Semi-annually

Annually

Monthly

Daily

Quarterly

Never

13. Are hazards arising from working conditions identified?

Always

Almost always

Sometimes

Never

14. Does the company provide adequate personal protective equipment for the performance of work?

Always

Almost always

Sometimes

Never

15. Do they have a good physical environment and safe infrastructure?

Always

Almost always

Sometimes

Never

16. Do you have ergonomic preventive measures in place?

Always

Almost always

Sometimes

Never

17. How often does the company conduct one or another activity to educate employees about occupational safety and security?

Semi-annually

Annually

Monthly

Daily

Quarterly

Never

18. In the company do you carry out preventive and health operatives or talks?

Always

Almost always

Sometimes

Never

19. Does the company have a good environmental remediation plan?

Yes

No

20. Work accidents are investigated to eliminate their causes?

Always

Almost always

Sometimes

Never

21. Do you consider that new staff receive preparation for them to perform tasks they are unfamiliar with?

Always

Almost always

Sometimes

Never

22. Do you have opportunities for advancement in other job roles?

Always

Almost always

Sometimes

Always

23. Do you consider that in the workplace there has to be a good attitude of people?

Always

Almost always

Sometimes

Never

24. Would you be interested in receiving workshops on occupational risk management and prevention?

Absolutely agree

Disagree

Totally disagree

Neutral

25. What topics would you like to include in the workshops?

Basic safety rules

Correct use of EPPS.

Correct handling of equipment and tools.

Basic rules of coexistence at work.

26. What day would you like to receive the workshops?

Day

Day Monday Tuesday Wednesday Thursday Thursday Friday Saturday

Morning (8am to 12pm)

Afternoon

(12pm to 4pm)

Evening

(4pm to 8pm)

27. How much time would you devote to these workshops?

1 hour

2 hours

3-4 hours

28. What methodology would you like to receive the workshops?

Theoretical-practical

Collaborative work

Learn by doing

Flipped classroom

29. What type of trainer would you like to have provide workshops?

Internal to the company.

External to the company.

30. What dynamics would they like to receive in the application of the workshops?

Outdoor techniques

Recreational games

Participation games

Group dynamics

31. At the end of the implementation of these workshops how would you like to be evaluated?

Questionnaire

Formational Evaluation

□ Summative Evaluation

Tabulation of data
Graph No. 1.



Source: Own elaboration.

In the company Consorcio Puichig, out of 20 people surveyed, 50% stated that exposure to noise is medium, 35% are exposed to medium level, and finally 15% are exposed to low noise and vibration.

Graph No. 2.



Source: Own elaboration.

According to the survey conducted we can say that 40% of the workers are more exposed to mechanical risks, 25% consider themselves exposed to physical risks, while the other 25% are exposed to chemical risks, which are the ones to which the workers are most exposed.

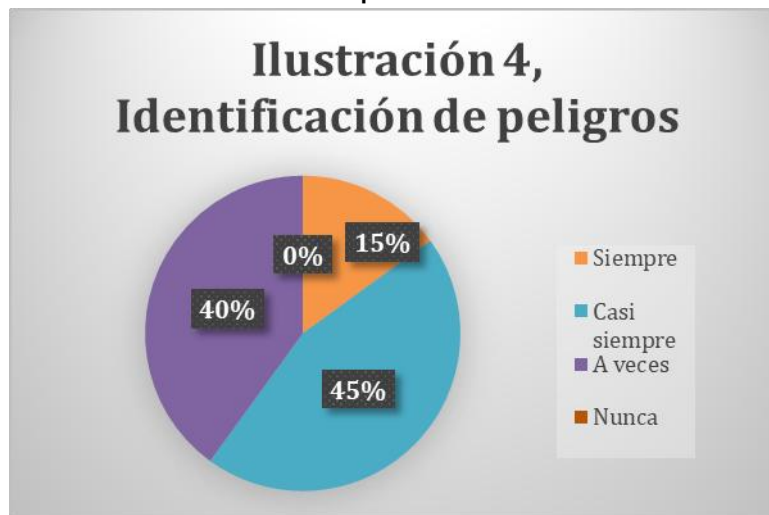
Graph No. 3.



Source: Own elaboration.

In the company Consorcio Puichig, out of 20 people surveyed, 40% of those surveyed stated that the level of order and cleanliness is clean sometimes. The other 30% of the people surveyed stated that the workstation is almost always kept clean and tidy and the other 25% considered that the workspace is never clean, which allows us to corroborate that in these areas more attention to order and cleanliness is required to improve working conditions.

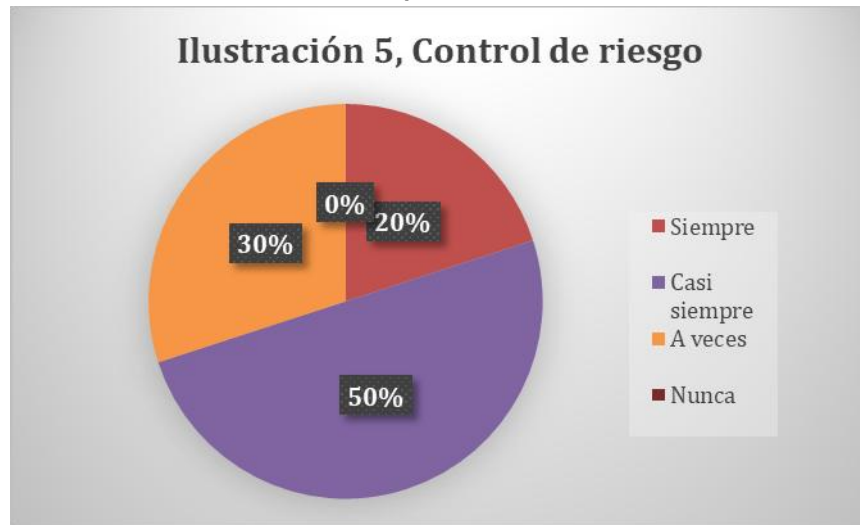
Graph No. 4.



Source: Own elaboration.

In the company Consorcio Puichig, 45% of the 20 people surveyed stated that they almost always carry out a correct identification of the hazards. However, the other 40% of the people surveyed stated that they sometimes manage to identify the hazards, 15% said that they always carry out hazard identification, which corroborates that they should carry out a good identification of hazards to provide them with an adequate work environment and a considerable reduction of risks.

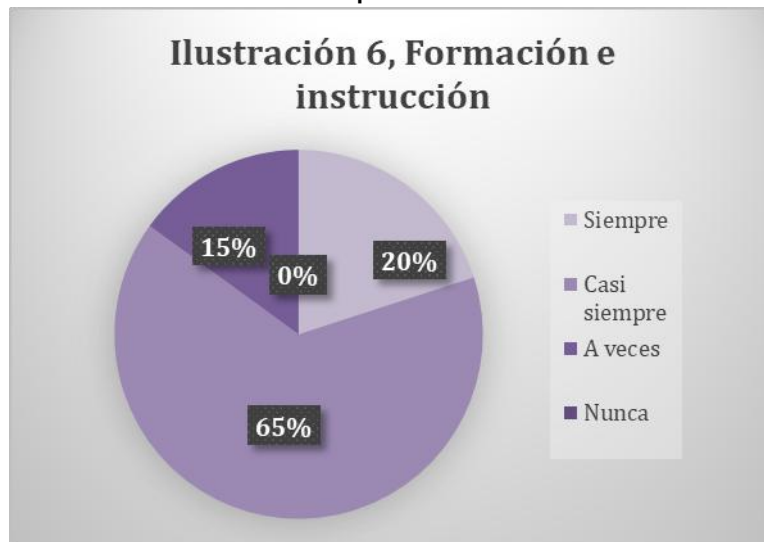
Graph No. 5.



Source: Own elaboration.

In the company Consorcio Puichig, out of 20 people surveyed, 50% consider that they almost always perform an evaluation for risk control, the other 30% claim that they sometimes perform an evaluation for risk control and 20% of those surveyed consider that they always perform risk control. This corroborates that they comply with the controls in order to prevent accidents and occupational hazards that affect the health of workers and in which this level of evaluation should go up from almost always to always.

Graph No. 6.

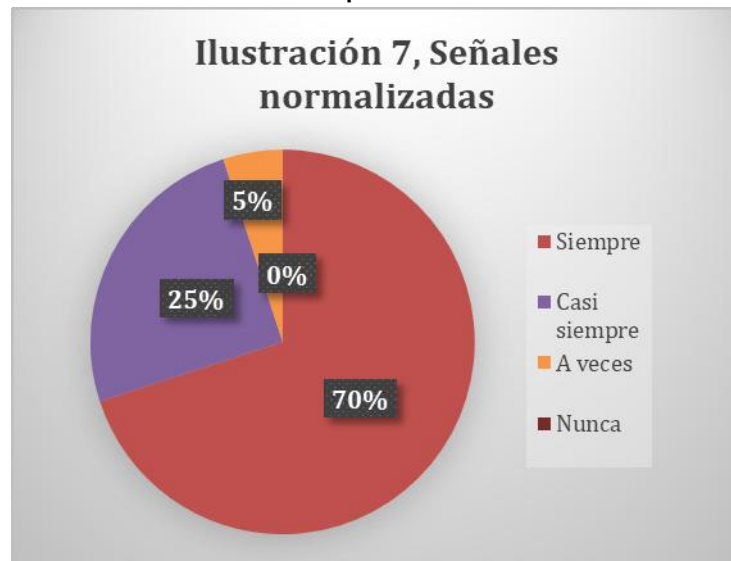


Source: Own elaboration.

In the company Consorcio Puichig, out of 20 people surveyed, 65% say that they almost always receive prior training before performing the activities, 20% say that they always receive prior training before performing the activities, and the remaining 15% say that they sometimes receive training to perform the

different activities. This confirms that these training instructions should be given more frequently so that the worker can carry out the planned activity correctly and thus not affect their health.

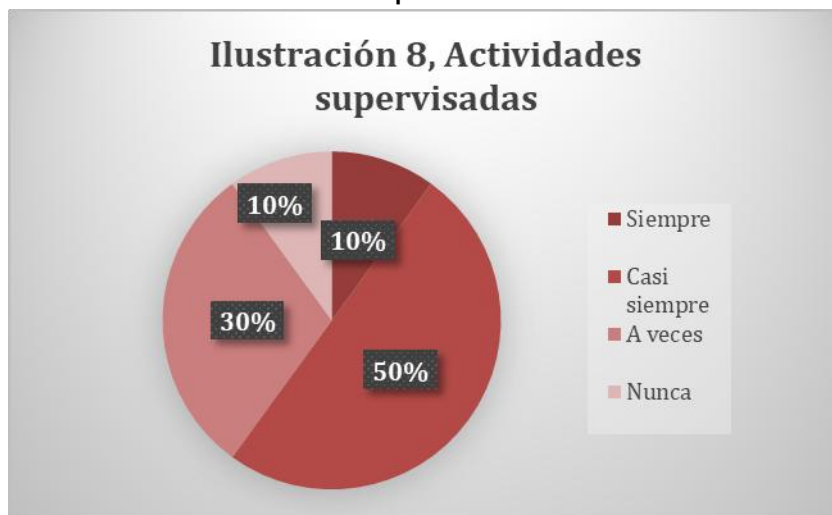
Graph No 7.



Source: Own elaboration.

In the company Consorcio Puichig, 70% of the 20 people surveyed consider that there is always signage in the places or work stations where it is required, 25% say that there is almost always signage in places or work stations, and the remaining 5% say that sometimes there is signage in the appropriate places. This corroborates that the signage system in this company is favorable but could still be improved.

Graph No 8.



Source: Own elaboration.

In the company Consorcio Puichig, out of 20 people surveyed, 50% say that there is almost always a person who supervises them and has knowledge of risk prevention; 30% of those surveyed say that they sometimes have a person who supervises them. Therefore, it is established that they are going to create the necessary mechanisms to prevent occupational risks.

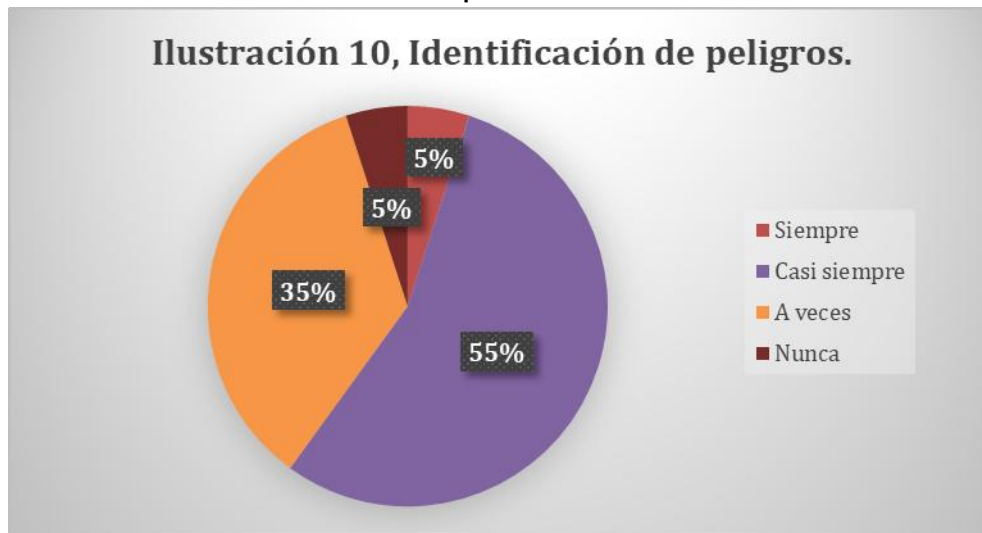
Graph No 9.



Source: Own elaboration.

In the company Consorcio Puichig, out of 20 people surveyed, 100% of the workers stated that they receive monthly training.

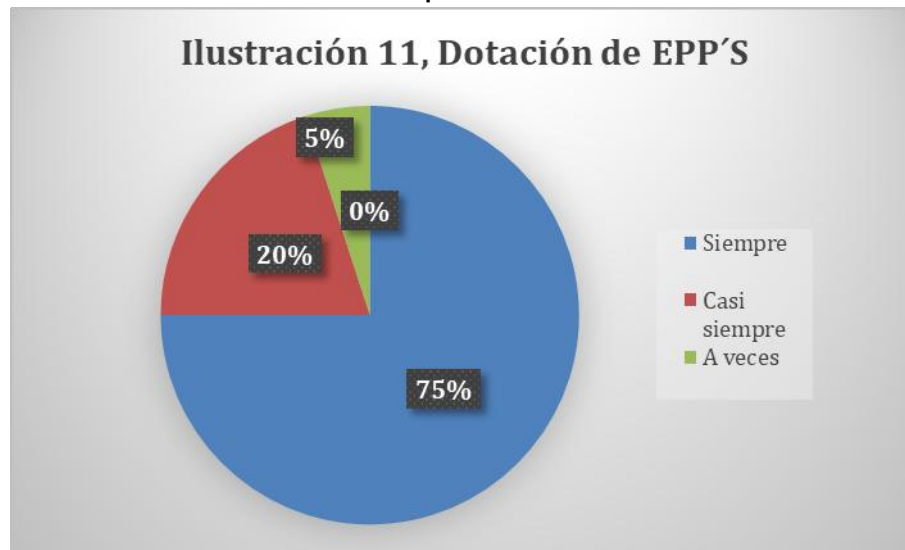
Graph No 10.



Source: Own elaboration.

In the company Consorcio Puichig, out of 20 people surveyed, 55% corroborate that almost always the identification of hazards of working conditions is performed, 35% say that sometimes the identification of hazards is performed. This generates a good identification of hazards which helps to anticipate them and thus safeguard the health of workers with some preventive measure.

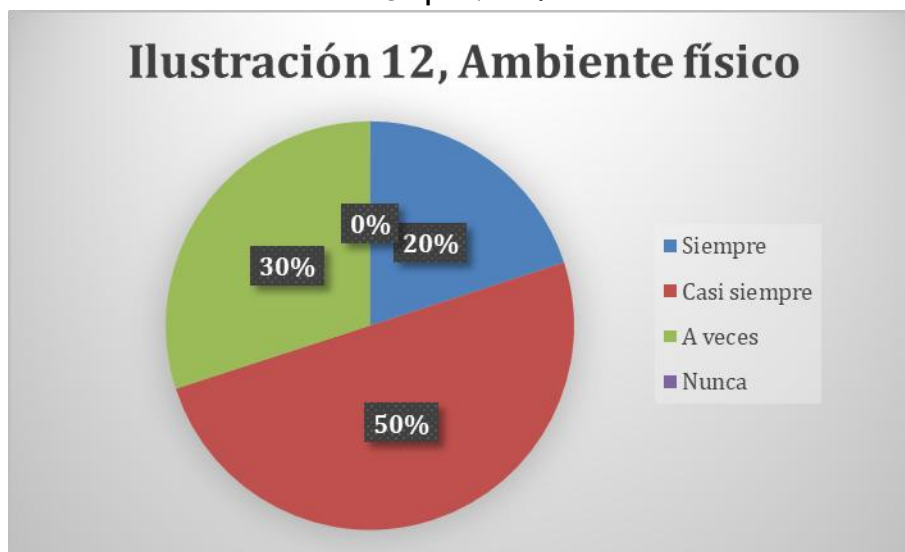
Graph No 11.



Source: Own elaboration.

In the company Consorcio Puichig, 75% of the 20 people surveyed said that the company always provides them with the necessary PPE for different activities, the remaining 20% said that they almost always receive the necessary PPE, and 5% said that they sometimes receive PPE, which helps us to corroborate that the distribution of PPE is deficient, but could be improved.

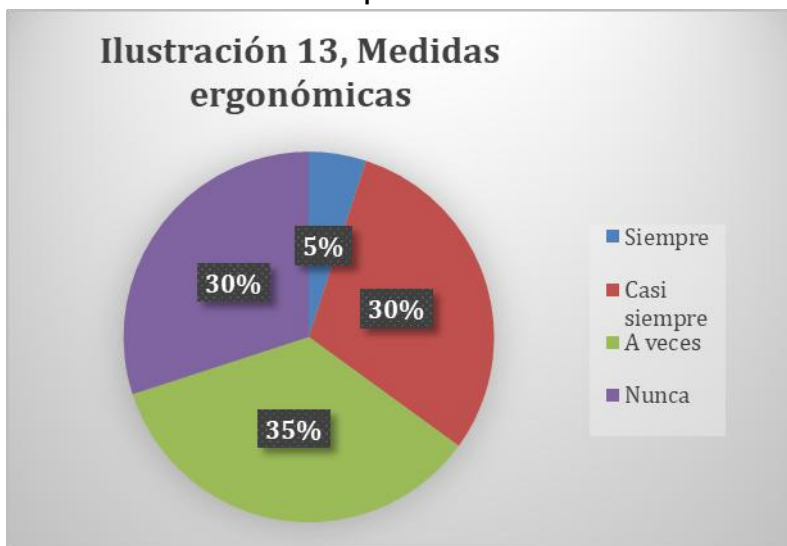
Graph No 12.



Source: Own elaboration.

50% of the people surveyed, representing the majority, say that they have a safe physical environment and infrastructure, and 30% say that this is sometimes, which means that we must improve the environment and infrastructure in order to avoid damage or injury to health.

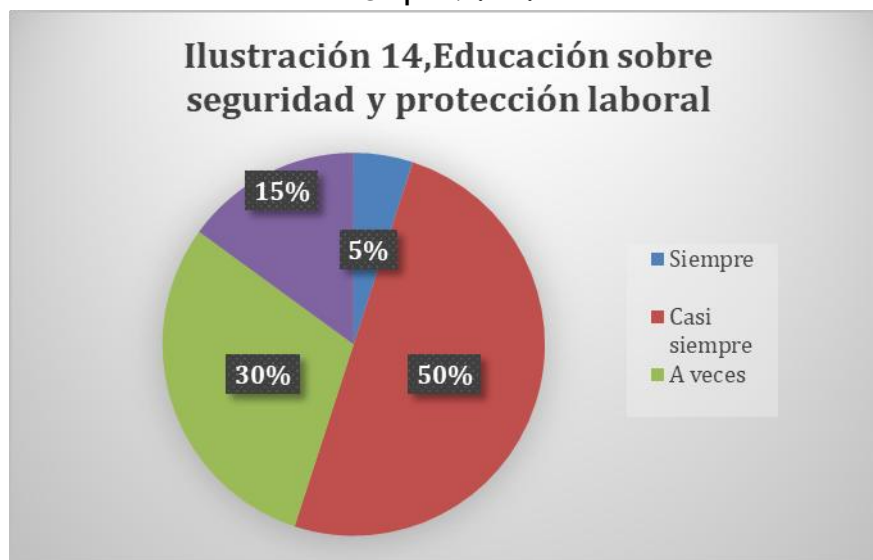
Graph No 13.



Source: Own elaboration.

35% of the population indicated that their perception of the ergonomic level is sometimes, 30% perceive the ergonomic risk at a level never, the other 30% perceive the ergonomic level almost always and only 5% state that the ergonomic measures are always.

Graph No. 14.



Source: Own elaboration.

50% of the respondents stated that the company almost always carries out activities that focus on educating employees about safety and prevention at work, despite the fact that the company's priority is to ensure the safety and health of its employees, according to these respondents.

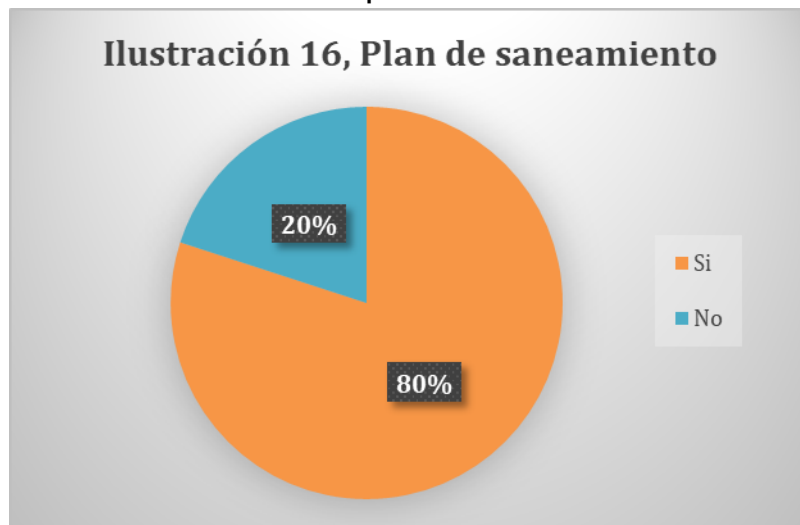
Graph No. 15.



Source: Own elaboration.

50% of the people surveyed in the company Consorcio Puichig, say that the level of operations and talks on prevention and health is almost always, being necessary to train and design more instruments that focus on the workers' participation and interest in learning about prevention and health through these operations.

Graph No. 16.



Source: Own elaboration.

The 80% that represents the great majority of the respondents testify that they have a good environmental sanitation plan, which establishes as a positive aspect for the company in the field of occupational health and safety.

Graph No.17.



Source: Own elaboration.

For 60% of the people surveyed, representing the majority, who say that accidents at work are almost always investigated, 20% say that accidents at work are sometimes investigated, and finally 10% corroborate that the investigation of workers is always carried out. Therefore, a more thorough investigation of work accidents should be carried out in order to eradicate accidents and to find out where accidents occur most frequently.

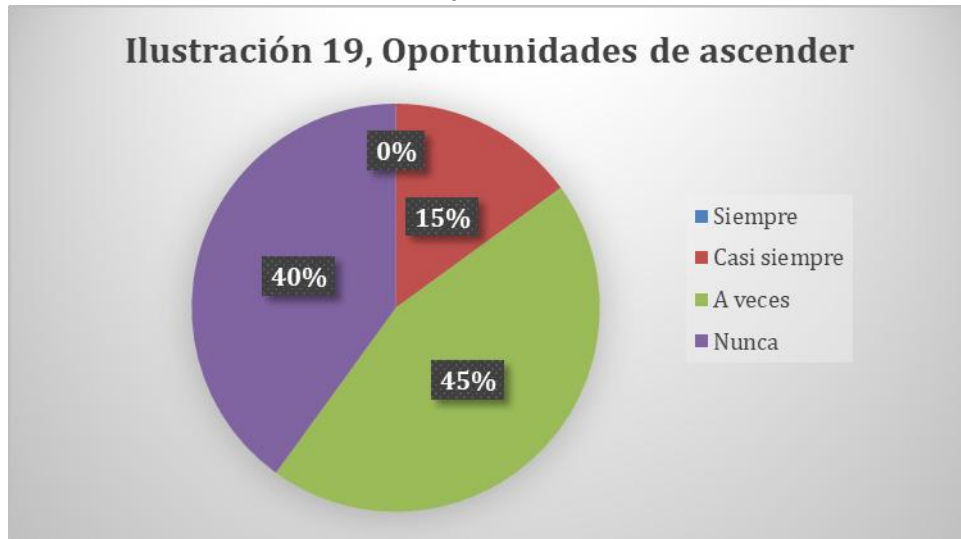
Graph No 18.



Source: Own elaboration.

Fifty percent of the workers surveyed believe that training should always be given to new personnel, the other 30% believe that training should sometimes be given to new workers, and 15% believe that training should almost always be given to new personnel. However, training should be given to all new workers who enter the company so that they do not have an accident and do not cause material damage to the company.

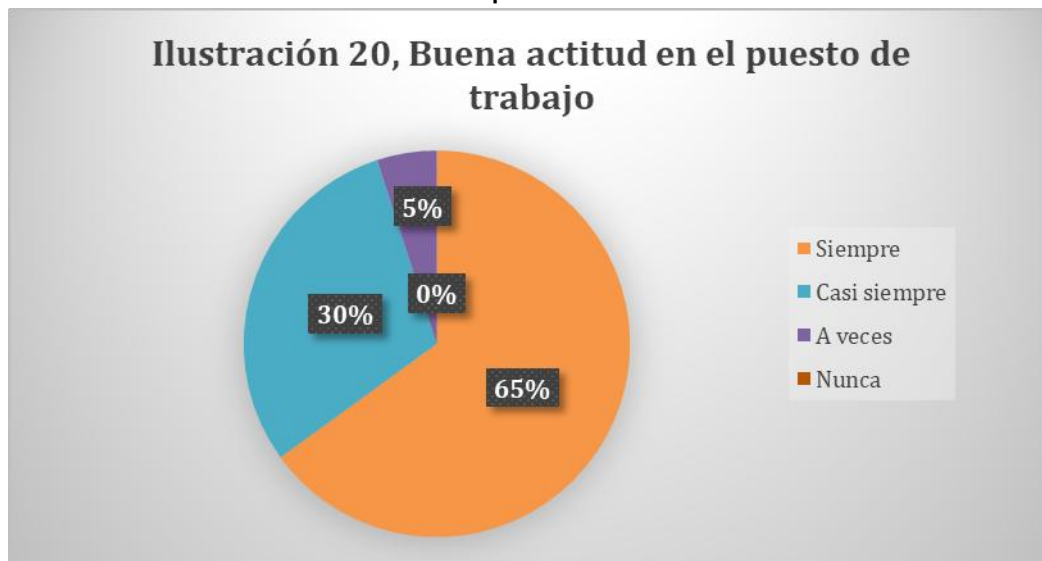
Graph No 19.



Source: Own elaboration.

45% consider that sometimes they have the opportunity to move up to other jobs, 40% that they will never have the opportunity to move up to other jobs, the remaining 15% say that they almost always have to move up to better jobs, so systems should be implemented in which workers can access higher education and thus have opportunities to access different jobs.

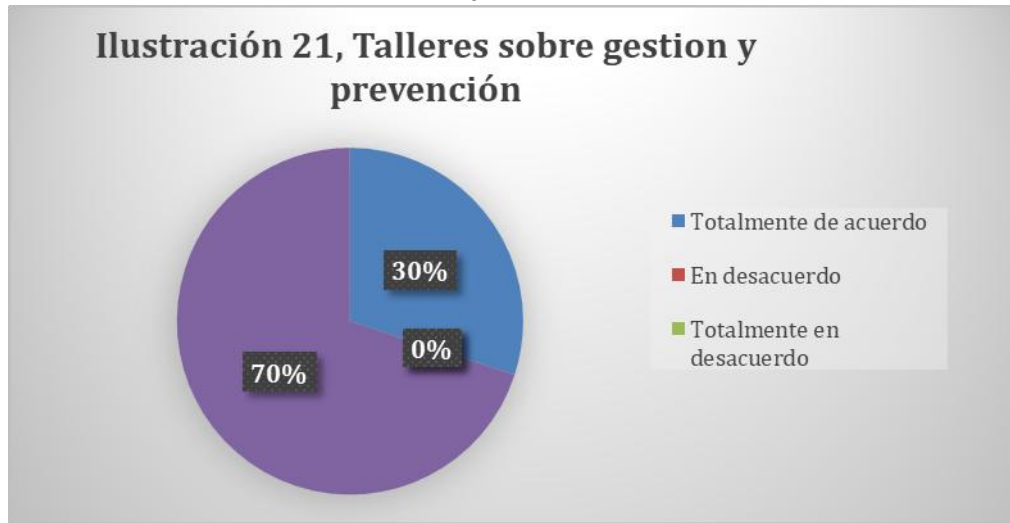
Graph No 20.



Fuente: Elaboración propia.

65% say that they always perform their activities with a good attitude, which means that a good attitude is necessary to have a good work environment.

Graph No. 21.



Source: Own elaboration.

70% of the people agree to receive these workshops because it is very useful for their daily work activities.

Graph No. 22.



Source: Own elaboration.

35% of those surveyed would like to receive workshops on the topic of Basic Safety Rules, 30% would like to receive the topic of Correct Use of EPPS, 25% would like to receive the topic of Correct Handling of Equipment and Tools, and only 10% of those surveyed would like to receive Basic Rules for Labor Coexistence.

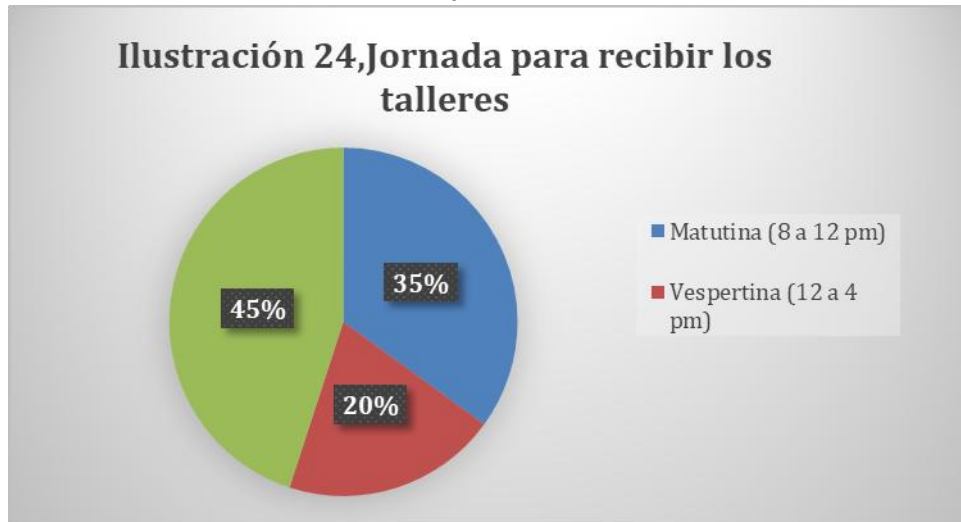
Graph No 23.



Source: Own elaboration.

According to the survey, 30% of the workers prefer to receive the workshops on Fridays, 15% on Saturdays, 15% on Thursdays, 15% on Mondays, 15% on Wednesdays, and the remaining 10% on Tuesdays, which leads us to the conclusion that the workshops will be held on Fridays.

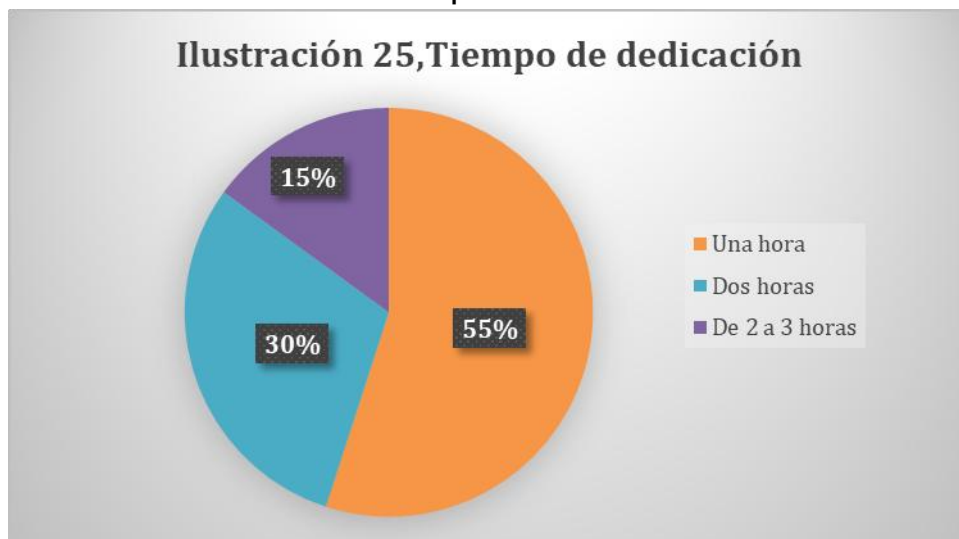
Graph No 24.



Source: Own elaboration.

According to the survey, 45% of the workers prefer to receive the workshops in the evening, 35% in the morning, and the remaining 20% in the afternoon, in order to be able to give the workshops in both shifts, since there is a high percentage of workers who prefer to receive the workshops in the afternoon.

Graph No 25.



Source: Own elaboration.

55% of the people surveyed will dedicate one hour of their working time to the workshops, 30% will dedicate two hours of their working time, while only 15% will dedicate 2 to 3 hours of their working time to the workshops.

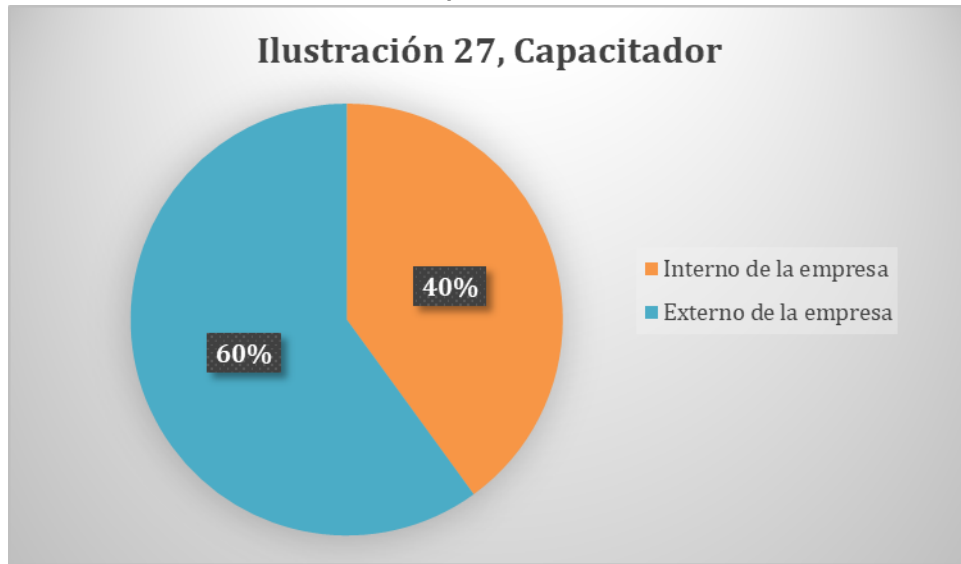
Graph No 26.



Source: Own elaboration.

35% of the people surveyed said that the methodology they would like to receive in these workshops is Flipped Classroom, 25% with the Theoretical and practical methodology and the other 25% learning by doing, which led us to the conclusion that the best methodology to teach the workshops is Flipped Classroom.

Graph No. 27.



Source: Own elaboration.

60% of the people surveyed prefer to receive the workshops from an external person of the company and 40% would like the workshops to be provided by an internal person of the company. They think that they can acquire new knowledge from an external person who is more qualified in the subject.

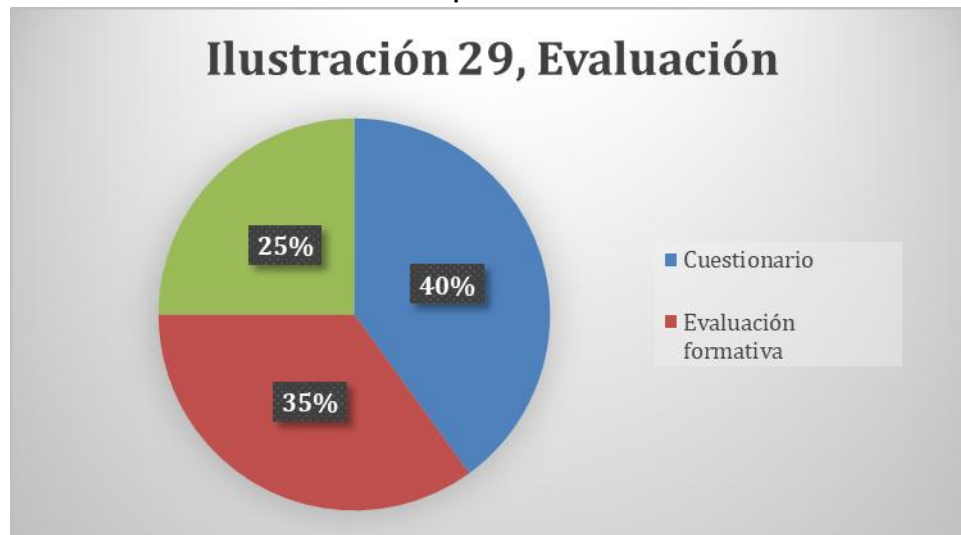
Graph No. 28.



Source: Own elaboration.

30% of the people surveyed said that the dynamics they would like to receive in these workshops is Participation Games, the other 30% with Group Dynamics, 25% would like to carry out the dynamics with Outdoor Techniques, while 15% would like to receive the workshops with Recreational Games. This led us to the conclusion that we can impart the 3 dynamics that are: Participation games, group dynamics and outdoor techniques, for the development of the workshops.

Graph No 29.



Source: Own elaboration.

40% of the respondents indicated that for the completion of this workshop they would like to be evaluated by means of a questionnaire, 35% would like to be evaluated by means of a formative evaluation and finally 25% would like to be evaluated by means of a summative evaluation.

RESULTS

Proposed solution to the problem.

Name of the proposal: Design of Workshops for the Management and Prevention of Labor Risks in Puichig-Mejía Agua Potable 2022.

Definition of the type of product

In this company, its managers and employees, as one of their main concerns is the control of risks that threaten the health of all those who are developing work activities, these can cause material and human losses.

Accidents and occupational diseases are factors that interfere in the normal development of the activity, negatively affecting productivity and threatening its solidity and permanence in the market, in addition there are serious implications in the labor, social and family environment. Taking into consideration the above mentioned, the administration and management of this company must seek and implement the necessary measures that contribute to an improvement of the efficiency levels in the company's operations and thus provide its workers with a safe working environment, involving them in educational programs on occupational hazards.

To do this, according to the provisions of the company's organization and the laws established in the country under the system of occupational hazards, we will apply a risk management and prevention workshop in order to preserve, maintain and improve the individual health of workers in each occupation and this should be developed in a multidisciplinary way.

Explanation of how the proposal contributes to solve the inadequacies identified in the diagnosis.

According to the levels of knowledge that the workers have the results indicate that most of the workers do not have knowledge about the risks, the workshops are intended to solve the risks to which they are exposed, it is considered that this workshop can be systematic, taking into account that the company does not focus on the knowledge of the workers.

What are the workshops?

It seeks to provide, in a direct and practical way, experiences recreating all kinds of situations that, making prevention more attractive, help to raise awareness demonstrating the effectiveness of the

implementation of preventive measures, has a vision which is to educate with prevention concepts, to all those involved in the work of this company for better performance and effectiveness of the activities.

General and Specific Objectives

General: To promote learning spaces to strengthen competencies and work skills for a successful performance in the workplace and thus contribute to the preparation and improvement of personnel.

Specific

- To select the fundamental contents of the workshops
- Evaluate the quality and propose an evaluation system for these workshops.
- The workshop meetings should be planned, structured, organized and adjusted according to the time requirements determined in the diagnostic study.

Proposal Development/Product Elaboration Procedures

Design of Workshops for the Management and Prevention of Occupational Risks in Puichig-Mejía Agua Potable 2022

In the development of the workshops, important topics are addressed to safeguard the physical and social integrity of workers, such as risk prevention, which is characterized by performing evaluations prior to possible work incidents, workers must know the risks to which they are exposed, it seeks to make known in a clear and precise manner and easy to understand the possible scenarios and risks to which they are exposed.

Topics

Types of risks to which they are exposed.

* Mechanical.

* Chemical.

* Physical.

Organization and cleanliness in the workplace.

* Methodology of the 5s.

Risk control level.

* Frequency of risk control.

* Impact of risk control.

* Risk analysis and control.

Topic 4. Training provided by the company on safety issues.

* Employee satisfaction.

* Increased employability and promotion possibilities both internally and externally.

* Reduction of risks and accidents at work.

Development of the contents

1. Types of risks to which they are exposed.

1.1 General

General

Minimize the risks that are exposed, avoid or reduce the possibilities that a worker may suffer some type of damage derived from his/her work.

Specific

- To know the risks to which they are exposed in their work.
- To identify mechanical risks and the ways to intervene them.
- To analyze the identification, labeling and signaling systems.

What is?

El riesgo laboral es todo suceso que pueda poner en peligro tanto a los trabajadores como a los empleadores de una empresa, causando daños físicos o psicológicos. Así como existen varios tipos de trabajo, los riesgos y las gravedades también son diferentes.

The aim is to improve health and safety working conditions and develop prevention workshops to enable workers and employers to perform their duties in a safe place and thus reduce any injury or damage that may occur during the workday.

Types of risks to which they are most exposed

Mechanical: Mechanical risk is referred to as a set of factors that can cause injuries and is caused by machinery, tools, lifting equipment, installation, work surfaces, order and cleanliness. In the field of occupational safety, companies have started to understand the risks of machinery due to the increasing demand from the control authorities, but the understanding has not been achieved in the best possible way. Due to this lack, and often with well-established management systems, workers are exposed to serious accidents in high-risk workplaces.

Physical: This applies to all property-dependent environmental factors.

Physical effects on the body, such as physical exertion, noise, lighting, ionizing radiation, non-ionizing radiation, high temperatures and vibrations, which act on the tissues and organs of the worker's body and can cause harmful effects depending on the intensity and time of exposure.

Chemical: Chemical risk refers to the risk of uncontrolled exposure to chemicals that can cause acute or chronic effects and incidence of disease. Toxic chemicals can also cause local and systemic effects depending on the type of product and route of exposure.

2. Workplace Organization and Cleanliness

2.1 General Objectives: To solve the problems caused by disorganization, disorder and lack of cleanliness in the work area through the implementation of the 5s methodology.

Specific

- Maintain functional, safe and clean work areas.
- Generate organizational culture and teamwork.
- Adopt behaviors that ensure order and cleanliness in the workplace.

What is it?

Workplace order and cleanliness is designed to prevent collisions and falls due to cluttered or dirty environments, slippery floors, poor placement of materials and accumulation of excess or debris.

Actions to achieve the goal of keeping the workplace neat and clean are divided into different phases:

- Eliminating the unnecessary and sorting the useful.
- Customize the means to store and locate material easily and quickly.
- Avoiding messes and cleaning up right away.
- Create and strengthen work habits aimed at promoting order and cleanliness.

5s Methodologies

The 5s approach is based on 5 principles designed to promote work dynamics and improve aspects such as the use of the workplace, organization, hygiene, rules and the dynamics of coexistence within the company.

Seiri (subordinate, classify, discard)

It is necessary to start with the work and administrative areas, eliminating unnecessary operational elements. These items are placed in a temporary storage area where those that can be used for another activity are selected and those that are considered unusable are discarded or thrown away, thus freeing up space and eliminating obsolete tools.

Seiton (systematize, order).

“A place where everything fits, everything is in its place. Objects that are not removed, but are considered indispensable, their storage is delimited by lines, contours, markings, signage or the use, display and use of modular furniture, shelving, etc. space to give them room. This type of organization has enormous benefits for both the employee and the organization.

Seiso (sanitize and clean)

Systematic cleaning as part of daily work allows, in addition to regular maintenance, to check and identify problems of faults, wear, leaks or defects of any kind (FUGUAI), making the work environment safer, reducing the risk of dirt and special actions to be taken. The main reason for reducing contamination or clearance measures, as in the previous case, provide immediate benefits for the health and safety of employees, as well as for the organization itself.

Seiketsu (simplify, standardize and make consistent)

Follow the above steps to stay clean and organized. This stage can be considered the implementation phase. By standardizing, we will constantly maintain an efficient and flawless environment, keeping the following 3 principles in mind: - Choice: no unnecessary items. - Order: no chaos. - Cleanliness: no mess.

Shitsuke (sustaining the process, disciplining)

This stage is the one that keeps step by step all the previous stages and its programs are not broken.

Risk control level.

General Objectives: To know the method of evaluation and level of risk in each work place.

- Specific
- Minimize or mitigate risks that may adversely affect the company.
- Establish a strategic and consistent basis for decision making for each type of risk.
- Plan actions to reduce or eliminate potential risks to the company.

What is it?

The prevention of occupational risks can be defined as all measures, rules and activities that companies develop in order to avoid or reduce the probability that any of the employees may suffer an accident or injury within the workplace.

Performing a thorough analysis of the possible occupational hazards that may occur in the different areas of the company will help to implement preventive measures to reduce these accidents.

The measures that employers can take to take care of their employees can be of several types:

- Informative
- Training
- Infrastructure improvements
- Providing safety equipment according to the position held
- Implement good signage in danger zones.

All public and private companies must have a comprehensive occupational risk prevention plan, which will be constantly reviewed and evaluated for the benefit of workers.

For the implementation of this plan, companies require a technician in Occupational Risk Prevention, who will be in charge of developing risk assessments and propose the necessary measures. In this sense, UNIR offers the Master in Occupational Safety and Health with three areas of specialization: industrial hygiene, occupational safety, ergonomics and psychosociology.

Risk control frequency.

Frequency is understood as the probability of a risk occurring. In the risk matrix, this probability can be determined by means of qualitative and quantitative value scales, which can be three, four, five or more (determined according to the method chosen by each company).

Generally, the most commonly used scales are those of five values, for example:

Improbable: the probability of a risk occurring, i.e. materializing, is too low, almost nil.

Possible: the probability of occurrence is low, although it may occur.

Occasional: the risk may materialize at any time.

Probable: the materialization of the risk is high, in fact, it usually occurs.

Frequent: the probability of the risk occurring is very high.

This scale can also be done by percentages and with other names, thus, it could be:

Table No 1

Porcentaje	Valor cualitativo
0 - 20%	Muy baja
20, 1% - 40%	Baja
40, 1% - 60%	Media
60, 1% - 80%	Alta
80, 1% - 100%	Muy alta

Source: Own elaboration

Risk control impact.

It can be explained as the set of consequences caused by the materialization of a risk, i.e., the effect it would have on the company, and may be economic, legal, reputational, among others.

As in the frequency, in the risk matrix the impact is determined by means of scales, which, in one of five values, may be:

- Negligible: the impact does not represent a problem for the organization.
- Minor: the impact caused by the materialization of the risk on the company's objectives is minimal.
- Moderate: the materialization of the risk may cause a momentary loss.
- Major: generates significant delays that affect the achievement of objectives.
- Catastrophic: it can stop the company's operation, or even have consequences such as definitive closure.

These values can also be named differently, for example, Very Low, Low, Medium, High and Very High, this is defined by each organization taking into account its methodology and objectives.

Risk analysis and control.

By multiplying the frequency values by the impact values, the inherent risk level is obtained, thus, it can be placed in the cells of the matrix, this allows the company to make decisions regarding which controls to implement to reduce the frequency or mitigate the impact of the most important risks.

The controls to be applied can be preventive, detective or corrective and, depending on their effectiveness, they can reduce the level of risk, i.e. a risk can be moved from one value to another, or even from one cell of the matrix to another. With this, what is obtained is a residual risk (it has controls) and the values in the matrix change.

Finally, you must keep in mind that for the risk matrix to be an effective tool for risk management, it is essential to update and reevaluate it periodically, because, as the environment changes, so do the risks.

4. Training provided by the company on safety issues

4.1 General Objectives: To inform all workers of the importance of occupational health and safety, the main occupational hazards and the main preventive measures.

Specific

- Apply the theoretical knowledge learned in the specialization in each of the activities proposed for the company.
- To understand and apply concepts about safety specifications.
- To promote the development of an adequate culture of prevention in the field of occupational health and safety.

What is it?

The main objective of the training of the company's employees is to improve their personal and work competences, adjusting their attitudes for their own benefit and for the benefit of the organization itself.

It aims at achieving the company's general objectives, based on increasing the employability and productivity of the employees, so it is considered a cyclical process of continuous improvement, which is shaped according to the company's future projects. Investing in training has countless long-term benefits, as it keeps employees happy, motivates them to continue and makes them feel part of the company.

The socio-economic transformation of advanced capitalism promotes the development of a new professional training environment.

Employee satisfaction.

Increased job and personal satisfaction on the part of the employee who has received training (employee self-satisfaction and self-realization).

Increased commitment of the organization's workforce.

Increased employability and promotion possibilities both internally and externally.

It seeks to achieve the general objectives of the company, which are based on increasing the employability and productivity of employees, so it is considered a cyclical process of continuous improvement from the same projects in the future.

Reduction of occupational risks and accidents.

The reduction of risks and accidents at work in many cases is due to the acquisition of new knowledge related in many cases to the prevention of occupational hazards, aims to promote the improvement of the safety and health of workers at work through the adoption of measures and the implementation of the necessary actions to prevent risks arising from working conditions, and risk assessment as a basic tool which indicates us specialized knowledge of prevention in the workplace.

Table No. 2. Methodology of the agendas

Topics	Methodologies to be used	Facilitator/ Participants	Dynamics
1. Types of risks to which they are exposed	Flipped classroom. It seeks to achieve the general objectives of the company, which are based on increasing the employability and productivity of employees, so it is considered a cyclical process of continuous improvement from future projects.	Ability to interpret and perform tasks. Effective communication. Working in a coordinated manner. Motivational messages	Interaction of ideas
2. Organization and cleanliness in your workplace	Aprender haciendo. Es una herramienta muy importante para el docente, como estrategia de aprendizaje como acompañante para el estudiante, y para el mismo estudiante, es una nueva forma de aprender, aprender a sobrellevar y encontrar respuesta a los problemas diarios que se enfrenta en la vida.	Participation Action Reflection.	Group cleaning dynamics

3. Level of risk control.	Flipped classroom. It seeks to achieve the general objectives of the company, which are based on increasing the employability and productivity of employees, so it is considered a cyclical process of continuous improvement from future projects.	Flexibility Limitations Substitution Elimination	Participation dynamics Round of questions
4. Training provided by the company on safety issues	Theoretical and practical It is a general written evaluation that, in addition to the conceptual and theoretical basis, includes the use of an integrated approach, where the knowledge acquired during the course is tested, focusing on a specific module.	Theoretical reasons Practical reasons Personal reasons	Participation games: Trivia in the office

Source: Own elaboration.

Table 3. Evaluation of the agendas

Topics	Method of evaluation	Form of evaluation
Types of risks to which they are exposed	Questionnaire	<ul style="list-style-type: none"> ❖ Coherence of questions. ❖ Coherence and sequencing of questions. <ul style="list-style-type: none"> ❖ Answer options. ❖ Language of answers. <ul style="list-style-type: none"> ❖ Outstanding. ❖ Notable. ❖ Pass. ❖ Insufficient.
Organization and cleanliness in the workplace	Formative evaluation	<ul style="list-style-type: none"> ❖ Translates data and conditions into expressions. ❖ Expresses their understanding of operations in business activities. ❖ Justifies by means of his/her knowledge operations performed and identifies errors in arguments.
Risk control level.	Formative evaluation	<ul style="list-style-type: none"> ❖ Translates data and conditions into expressions.

		<ul style="list-style-type: none"> ❖ Expresses their understanding of operations in business activities. ❖ Justifies through their knowledge operations performed and identifies errors in the arguments.
Training provided by the company on safety issues	Questionnaire	<ul style="list-style-type: none"> ❖ Coherence of questions. ❖ Coherence and sequencing of questions. <ul style="list-style-type: none"> ❖ Answer options. ❖ Language of answers. <ul style="list-style-type: none"> ❖ Outstanding. ❖ Notable. ❖ Pass. ❖ Insufficient.

Source: Own elaboration.

Premises for its implementation (Feasibility)

To implement the workshop plan, these are supported by different agendas that will allow the attendees to learn the topics, and the effort made will allow to improve the quality of human resources, for this the following has been considered:

Each workshop application topic should include the following elements in each section.

Introduction and analysis of the seminar methods.

Methods, objectives and learning outcomes.

Use audio-visual material, forums, discussions and analysis groups.

Describe what you will do and how it will be evaluated.

Group dynamics.

Self-assessment exercises.

After having the results, the integration of each training will be evaluated and will allow the follow-up and control of the achievements. In addition, by evaluating the implementation of workshops and their development, the company will be able to estimate and calculate the effect that the workshops had on the workers and thus verify if the desired purpose was achieved.

And finally, for the validation of the workshops, the responsible coordinators should follow step by step the proposal which contains the objectives, methodology, development of the modules, chronogram of dates and times and the topics to be addressed. It should also be determined to what extent there were modifications in the behavior and knowledge of the economic capital in comparison to the initial level.

CONCLUSIONS

Once the analysis and interpretation of the results of the surveys applied to the workers of the company CONSORCIO “PUICHIG” belonging to the province of Pichincha, Canton Mejia, the following conclusions and recommendations have been determined.

Conclusions:

- It is important that all companies, at the national level, have a security system, either their own or adopted from existing ones. This system will provide guidelines, tools and controls for successful risk management.
- The process of change in safety has defined stages and therefore constant workshops should be implemented, because these are important to help sensitize, raise awareness and raise the safety culture of workers.
- The safety workshops are a commitment that the company has with the workers, in which different topics and guidelines are established with the purpose of educating the workers in prevention and in the different risks that can occur in their different activities.
- Any implementation of systems has limitations and difficulties, in order to reverse the situation of risks, it is essential the support and commitment of all staff.
- Safety cannot be achieved through reaction alone; it must be achieved through prevention and initiative.
- The development of workshop systems must be a continuous process, based on the evaluations and interests of management leaders to better perform their position and improve relations with workers.

Recommendations:

- The company CONSORCIO “PUICHIG” should elaborate work procedures for each activity, due to the fact that each of them have specific hazards and risks.
- Workers should have benefits and advantages they have when reporting incidents, since this would be a method to reduce any type of incident.
- Promote training and education, so that employees can improve their knowledge and skills and be able to perform in their jobs. The knowledge they should acquire should be in-depth, as this will help them to feel that their work is important and to take pride in doing it.
- Workshops should be formalized, consolidated and improved, taking into account the progress made in the area of security.

In the workshops, different topics will be implemented and as a recommendation, the employee should be considered as the most valuable element of the organization.

REFERENCES

1. Campos G. Seguridad ocupacional. Riobamba: Gutemberg; 2008.
2. Constitución Política del Ecuador 2008, Corporación de Estudios y Giraldo, Andrés. Seguridad Industrial. México: E-Copycenter; 2008.
3. Decreto Ejecutivo 2393. Reglamento de Seguridad y Salud de los Trabajadores y Mejoramiento del Medio Ambiente Laboral.
4. IESS. Dirección del Seguro General de Riesgos del Trabajo. Riobamba; 2008.
5. Llorca J. Manual práctico para la evaluación de riesgos. Pamplona: Ediciones Torres; 2009.
6. Andana E. Recopilación de teorías sobre prevención de riesgos; 2016.
7. Roselli C. La ausencia de marco teórico referente a la metodología del taller [Internet]. 2011 Aug 12 [cited date].
8. Martinez HA. Prevención de riesgos en talleres mecánicos.
9. Marco teórico seguridad laboral.

10. Fernanda P, Solis M. Edu.ec.
11. Escobedo A. Autocuidado marco teórico; 2016.
12. Delgado Leandro YC, Sánchez Saravia BD, Urday Velarde WG.
13. De Seguridad F, Ocupacional S, Diseño D, Sistema S, Marcelo L, Puga R.
14. B. ¿En qué consiste la formación en la empresa? [Internet]. 2018 May 24 [cited date].
15. Coordinación Especial T, Sleyther L, Duarte M, Andrés E, Davalos G, Ana I, Terán F, Msc A.
16. Seguridad F, Ocupacional S, Diseño D, Sistema S, Marcelo L, Puga R.
17. Examen de prevención de riesgos laborales. Examen de prevención de riesgos laborales - 2022.
18. Pedreros D. Programa de orden.
19. Programa de capacitación promoción y prevención en seguridad y salud en el trabajo E-SGI-ST-P004 Versión: 03 TIPO DEL PROCESO: Estratégico Fecha de emisión: 01/10/2018 PROCESO: Gestión del SGI.
20. ¿Qué es la prevención de riesgos laborales?; 2017.
21. Seguir C. Rúbrica 2: elaboración de una encuesta.
22. Teórico M. Capítulo I.
23. Chavez J. Empresa matriz: Qué es, objetivos y ejemplos [Internet]. 2022 Jan 6 [cited date].
24. Chavez J. Inteligencia colectiva: Qué es, características y beneficios [Internet]. 2022 Aug 31 [cited date].
25. Colmenares DM. Cómo crear un ambiente de trabajo positivo [Internet]. 2022 Jul 16 [cited date].
26. B. ¿Qué es la inteligencia intrapersonal? Características, ejemplos y actividades [Internet]. 2022 May 24 [cited date].
27. Módulo 5 - Metodología de la Investigación MTE.
28. Cortez J. Métodos de evaluación de riesgos laborales. 2004.
29. De B. ¿En qué consiste la formación en la empresa? [Internet]. 2018 May 24 [cited date].
30. Hernández A. Seguridad e higiene en el trabajo. 2005.

FINANCING

None.

CONFLICT OF INTEREST

None.