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SCIENTIFIC ARTICLE PRIOR TO OBTAINING THE TITLE OF INDUSTRIAL ENGINEER.

THEME:

PROPOSAL FOR PREVENTION AND CONTROL OF OCCUPATIONAL RISK FACTORS IN THE AREA OF PROCESSING QUINUA MINISTRY OF AGRICULTURE, FISHERIES AND AQUACULTURE (MAGAP) IN THE CITY OF IBARRA

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SUMMARY

This study was conducted at the processing plant quinoa MAGAP of Ibarra, where he was the need to create a plan for prevention of occupational hazards to prevent the worker is prone to hazards that may cause injury or property damage and psychological.

The project begins with the development of theoretical foundations that were used to carry out the investigation. analysis of the current situation of the processing plant quinoa, gathering information and description of the processes is then performed. After application of method INSHT got all factors prioritized risks to establish control measures and prevent incidents, accidents and occupational diseases for which the worker is in a suitable and safe environment to develop their business activities and thus increase their productivity.

Thus, this study emphasizes the importance for workers so go to work properly in a healthy environment in which they are guaranteed their safety; it will be done through improvements in different workplaces, the provision of relevant personal protective equipment, training and staff motivation, thereby achieving a healthy environment and achieve a measurable improvement of production and productivity.

1. INTRODUCTION

Health and safety at work, includes sanitary and preventive measures to protect life, preserve and maintain the physical and psychological integrity of workers, prevent, reduce, eliminate or isolate the factors of risks of different jobs, stimulate, awareness and develop a positive activity in the prevention of accidents and diseases arising from work activity.

This work is done according to the requirements of the technicians responsible for production as concerned about the health and safety of its employees have seen the need for sustainable technical study and updated the various occupational hazards that are present within this area; to mitigate this way, diminish or possibly eliminate them and consider economic losses and penalties stipulated in the labor code in case of an accident, the lack of a study of this type.

2. THEORETICAL FRAMEWORK

Introduction to industrial safety

Safety and Industrial Hygiene in recent times has taken on major importance in industrial activity, because the objective has been understood as strength in productivity; unfortunately in our country little or nothing is done on issues of Occupational Safety and Health; Security doing at work is investing in the future, whose investment involves first protect the lives of workers who are critical elements of production and productivity when it comes.

Evaluation method

The method taught by National Institute of Occupational Safety of Spain (INSHT) for risk assessment analyzes two basic criteria:

- Probability
- Consequences

Niveles de riesgo

		Consecuencias		
		Ligeramente Dañino LD	Dañino D	Extremadamente Dañino ED
Probabilidad	Baja B	Riesgo trivial T	Riesgo tolerable TO	Riesgo moderado MO
	Media M	Riesgo tolerable TO	Riesgo moderado MO	Riesgo importante I
	Alta A	Riesgo moderado MO	Riesgo importante I	Riesgo intolerable IN

Description of the evaluation method.

The evaluation method is a procedure originally intended to control risks whose measures used to reduce these are not very common. INSHT This method allows an analysis with the degree of danger with the identified risk was estimated.

The criteria are evaluated;

- Probability
- Consequences

Which we obtain some combinations that help control them.

Steps to be followed for the evaluation of INSHT Method.

- The first step is the identification of risk.
- Then comes the weighting, which is the qualification of the risk (estimate qualitatively the discretion of the analyst), criteria inherent in their materialization will be taken into account in the form of industrial accident, occupational disease or impact on mental health worker.

Probabilities.

This factor refers to the probability that once the risk presented, the events of the complete sequence of the accident happen in time, causing accident and consequences.

The probability that the damage occurs can be adjusted from low to high, with the following criteria:

• High probability: Damage will occur always or almost always

• Average probability: Damage happen sometimes

• Low probability: Damage will occur rarely

Consequences or severity of damage.

To determine the potential severity of the damage should be considered

- Body parts that will be affected
- Nature of damage, graduándolo from slightly harmful to extremely harmful.

Slightly harmful

- Surface damage: cuts and irritation of the eyes from dust.
- Discomfort and irritation, for example: headache.

Harmful

- Lacerations, burns, major sprains, minor fractures.
- Deafness, dermatitis, asthma, disease leads to less disability.

Extremely harmful

- Amputations, major fractures, poisoning, fatal injuries.
- Cancer and other chronic diseases that severely shorten life.

Ranges to classify the risk and acquires color.

Risk levels indicated in the table form the basis for deciding whether it is necessary to improve existing controls or introduce new ones, as well as the timing of actions.

Risk	Action and Timing
Trivial (T)	No specific action is needed
Tolerable (To)	It is needed to improve preventive action. however it should be considered more cost-effective solutions or improvements that do not pose a significant economic burden. Periodic checks are required to ensure the effectiveness of control measures remains
Moderate (M)	Efforts should be made to reduce the risk, determining the necessary investments. Measures to reduce the risk should be implemented in a given period. When the moderate risk is associated with extremely harmful consequences, further action shall be required for more accurately Chance for damage basis for determining the need for improved control measures
Important (I)	Should not start work until they have reduced the risk. Considerable resources may be required to control risk. When the risk

	corresponds to a job being performed must be remedied the problem in less time than the moderate risks
Intolerable (IN)	You must not begin or continue work until the risk is redusca. If it is not possible to reduce the risk even with unlimited resources work should be prohibited

3. SITUATIONAL DIAGNOSIS OF PLANT.

Currently the process plant is installed in the premises of the Ministry of Agriculture, Livestock and Fisheries of the city of Ibarra, which provides services washing quinoa grain to all farmers in the province.
Depending on the capabilities of the machines, you could say that the plant would be able to process approximately 20 bags of 45 kg of quinoa per day in a day of 8 hours per day.

Objective quinoa processing plant.
Providing quality service on time and in the right place by the correct use of machinery, equipment and good manufacturing practices to deliver a product with the physical characteristics required by small and medium farmers in the province of Imbabura.

Process description.

Acquisition of Raw material.- The quinoa then go through the process of harvesting, threshing, drying and bagging in the field, it is brought to the processing plant, which must meet the requirements of good agricultural practices.

Reception and Pesaje.- The raw material is weighed on a scale, in an amount of 100 lbs or 45 kg, where he also explains to owners of quinoa that in every process there is lost.

Clasificado.-test performs a sorting machine -. Vac where deleted from 1% to 2% of impurities of 100 lbs, leaving 98 lbs. Ready for the next process.

Escarificado.- The main function of the machine is clean escarificadora saponin quinoa, leaving it clean and ready for the next process.

Lavado.- Removing bitter saponin or quinoa, it performed by the method of wet-washing consisting quinoa by recirculating cold potable water in a time of 10 to 15 min, the tank capacity wash is 10 qq.

Escurrido.- Its function is to drain the quinoa and leave as much water and then be carried to the next process.

Centrifugado.- quinoa washing, is discharged in two centrifuges in an amount of 1 qq machine, which eliminate the water content in the grain up to 80%, this time requires 3 to 5 min.

Secado.- The baskets each centrifuge are manually transported to the dryer, this is driven by a motor of 7.5 hp and a fan that absorbs the flow of industrial gas and brings it into the drying chamber to be distributed evenly . The drying temperature is 75o C, and the drying time is 1 hour and 8 qq 1 hour and a half to 10 quintals.

Cepillado.- dry grain is placed in the planer in order to remove dust that is in the grain. This process takes 30 to 45 minutes per qq.

Finished packaging and brushing immediately pesado.- grain is weighed in an amount of 45 kg, the ready bushels are stored and stacked in rows of 3 quintals, in an environment with good ventilation and adequate moisture.

4. RESULTS OF THE IPLEMENTATION OF THE METHOD INSHT.

MATRIZ DE IDENTIFICACION Y EVALUACIÓN DE RIESGOS

MÉTODO INSHT

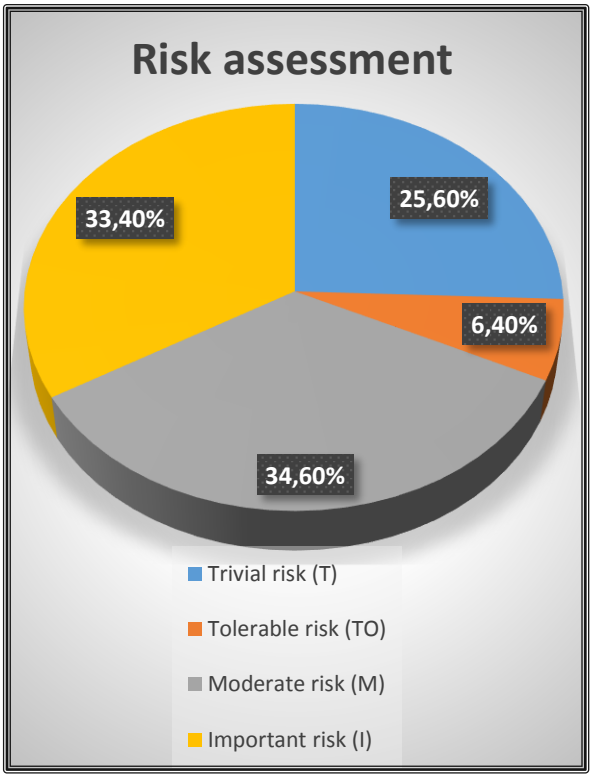
							CONSECUENCIAS PROBABILIDAD	Ligeramente Dañino	Dañino	Extremadamente Dañino
Empresa:	MAGAP	Evaluación								
Dirección:		Inicial:	X	Periodica:			Baja (B)	Riesgo Trivial	Riesgo Tolerable	Riesgo moderado
Nº de Trabajadores:		Fecha de Evaluación:					Media (M)	Riesgo Tolerable	Riesgo moderado	Riesgo Importante
Evaluador		Fecha última evaluación					Alta (A)	Riesgo moderado	Riesgo Importante	Riesgo Intolerable

			RIESGOS IDENTIFICADOS Y EVALUADOS													TOTAL RIESGOS				
			RIESGOS MECÁNICOS					RIESGO FÍSICO		RIESGO ERGONÓMICO				RIESGO PSICOSOCIAL					
Puesto de Trabajo	Actividades	Nº de Trabajadores	Caída de personas al mismo nivel	Caídas manipulación de objetos	Espacios confinados	Desplome derrumbamiento	Proyección de partículas	Ruido	Material Particulado	Sobreesfuerzo	Manipulación de cargas	Posiciones forzadas	Movimientos Repetitivos	Manifestaciones psicosomáticas	Riesgo Tivial (T)	Riesgo Tolerable (TO)	Riesgo Moderado (M)	Riesgo Importante (I)	Riesgo Intolerable (IN)
Adquisición de materia prima		4		M		M		I	I								2	2	
Recepción y pesaje		4		M		M		I	I	I	I	I	M	M			4	5	
Clasificado		4		M			M	I	I	M	M	M	T	M	1		6	2	
Escarificado		4		TO			M	I	I	T	T	M	T	M	3	1	3	2	
Lavado		4	I	TO				I	I	T	T	M	T	M	3	1	2	3	
Escurrido		4	I					I	I	T	T	T	T		4			3	
Centrifugado		4	I					I	I	T	T	T	T		4			3	
Secado		4		TO				I	I	M	M	M	T	M	1	1	4	2	
Cepillado		4		TO				I	I	T	T	T	T		4	1		2	
Envasado y pesaje		4		TO		M		I	I	M	M	M	M	M		1	6	2	
TOTAL		40	3	8	0	3	2	10	10	9	9	9	9	6	20	5	27	26	

As a result of the identification and estimation of occupational risk factors, Table, global analysis of risk levels of staff processing area quinoa shown.

RISK LEVEL	No Risk	%
Trivial risk (T)	20	25.6
Tolerable risk (TO)	5	6.4
Moderate risk (M)	27	34.6
Important risk (I)	26	33.4
Intolerable risk (IN)	0	0
TOTAL	**78**	**100**

In the chart. analysis of the risk level personnel Processing Plant Quinoa shown.



In the following graph it is said that 25.6% is a trivial risk, 6.4% is a tolerable risk, 64.6% is a moderate risk and 33.4% character is a risk of a major character.

5. CONTROL MEASURES RISK FACTOR.

- Planning of maintenance: predictive. Preventive and corrective of machines, tools and equipment used.
- Provision and use of face masks with filter media. (The powder is very small and can easily enter the airways, causing injury and occupational disease)
- Provision of cars for loading.
- Give lectures on manual handling of loads and active breaks at work.
- Provision and use of hearing protectors, which have help, mitigate noise.
- Adaptation of the job, taking into account the anthropometry worker.
- Use water that is necessary for the process. (Otherwise, it watered in jobs.
- Clean and dry the floor every time a process is completed.
- Training on occupational diseases and manual handling of loads.

6. CONCLUSIONS

The study conducted at the processing plant quinoa, safety and occupational health generated a result of 78 identified occupational risks, which are divided between the different risk factors, prioritized their respective measures to eliminate and control them.

Evaluation of the 78 risks identified using the INSHT method and a result of 20 trivial risks 5 tolerable risk, 27 moderate risk and 26 major risks was obtained was performed, and risk control established by applying preventive management recommended by the risk identification matrix, which are prioritized all risks considered in the evaluation, intolerable and significant risks, which received proper treatment.

After conducting this study prevention measures were established for technicians and operators working in the plant can perform their work more safely and prevent the likelihood of some kind of accident or occupational disease, taking into account that the welfare of the technicians and operators is very important to labor insurance and increase productivity in your workplace.

GRATITUDE.

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Richard Javier Vargas Guanotoa, I am a native of the city of Ibarra, province of Imbabura, my intermediate studies conducted in the Victor Mideros "San Antonio de Ibarra" National College am a graduate of the Technical University of the North, Faculty of Engineering Applied Sciences, Industrial Engineering.