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FEAR:

DESIGN AND IMPLEMENTATION OF A PLAN FOR SAFETY AND HEALTH AT WORK IN THE COMPANY TEXTILE "MAQUILA CONFECCIONES" OF THE IBARRA CITY.

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DESIGN AND IMPLEMENTATION OF A PLAN FOR SAFETY AND HEALTH AT WORK IN THE COMPANY TEXTILE "MAQUILA CONFECCIONES" OF THE IBARRA CITY.

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SUMMARY

The nature and the characteristics of the work environment can cause health problems for the workers, affecting not only their overall physical and mental health and well-being, but also in productivity. The presence of certain conditions in the working environment, such as substances, inputs, machinery, psychosocial characteristics and individual expectations, constitute a risk agent in the world where the employee lives daily. (Henao Robledo, 2009)

Safety and health at work is the field acting on the workers and their working environment, referring to actions that control the circumstances that can lead to sudden events that could result in an injury, so that the security in this field acquires an important value to be the means to prevent possible harm comes to produce. (Gonzalez Ruiz, Floria, & González Maestre, 2009)

To control risk through corrective or preventive action is necessary to go through previous phases of identification and evaluation of the different risk factors (physical, mechanical, chemical, biological, ergonomic and psychosocial).

KEYWORDS

Safety and Health at Work, Risk, Risk Factors, Prevention, Physical, Mechanical, Chemical, Biological, Ergonomic, Psychosocial.

1. INTRODUCTION

Undoubtedly recognize that what makes highly productive companies is their talent, it is why the importance of ensuring safe working conditions.
This study was conducted at the company "Maquila Confecciones" which is located at Pastora Alomia street 4-49 Drivers fortress Colombia, city of Ibarra, Imbabura province; economic activity is the production and marketing of garments. It has 15 workers engaged between administrative and operational activities, which are exposed to different risk factors specific work activities.

For such an application the identification and initial assessment of the risk factors using the methodology of the National Institute for Safety and Hygiene at Work (INSHT 1996), which later the most

significant risks themselves that were measured was established was carried evaluated and compared with current Ecuadorian legislation.

To develop preventive management possible solutions that integrate human welfare within the production process for which it was important to design and implement a Plan of Security and Health at Work was raised, this plan aims to fulfill Reporting Standards ordered by the control bodies Ministry of Labour Relations and Ecuadorian Institute of Social security and generate within the company a culture of prevention and monitoring of safety and health at work with what would be achieved keep workers healthy and safe in each of jobs and prevent direct and indirect costs in terms of labor for compensation for damages of machinery, equipment, etc. that can be generated in the business, always making the best use of their work.

2. MATERIALS AND METHODS

Level and type of research

The study comprises two phases, descriptive research in which the identification of the initial conditions under which workers perform their tasks as well as considering the organizational structure is determined, processes and threads that are developed and explanatory research type which is responsible for searching the reason of the facts by establishing cause-effect relationships, so that the circumstances relating to the assessment, prevention and control of occupational hazards to explain.

Population and sample

Because of the number of people working in the company, population and sample of the research work all conform both administrative and operational staff of the company "Maquila Confecciones" with 15 workers.

2.1 Initial diagnosis of the company "Maquila Confecciones"

Company Description: structure and processes.

“Maquila Confecciones” has seven (7) jobs (manager, secretary, operator cutting, embroidery, printing, sewing and finishing) areas for the production and marketing of the various products that the company produces (sweaters, vests, shirts, bags, backpacks, work clothes, etc.).

The company has fifteen (15) workers who perform operational activities for the preparation and administration, as presented in Table 1.

Table 1. Distribution of personnel in “Maquila Confecciones”

ÁREA	N° PERSONNEL		JOB
Administration	2	1	Manager
		1	Secretary
Production	13	2	Cut
		1	Embroidery
		1	Stamping
		7	Confection
		2	Finishes

Preliminary analysis of occupational safety and health: identification and initial estimate of the risk factors for job

Through field observation and interviews with workers, different hazards in each of the jobs were identified; for which a list of 56 risk factors considered grouped by type:

- Mechanical (falls of people at different and the same level, falling objects, collision with stationary and moving objects, entrapments, electrical contacts, etc.)
- Physical (fires, explosions, heat stress, thermal contacts, radiation exposure, noise, vibration, lighting)
- Chemical (exposure to gases, vapors, aerosols, toxic substances, corrosive, etc.)
- Biological (exposure to viruses, batteries, parasites, fungi, etc.)
- Ergonomic (overload, awkward postures, repetitive movements, etc.)
- Psycho-social (mental workload, autonomy, personal relationships, etc.)

After determining the dangers jobs initial assessment is done through INSHT matrix, which estimates the level of risk through the probability and consequence. 140 risk factors identified and evaluated initially 7 jobs analyzed "Maquila Confecciones" was obtained, as detailed in Figure 1.

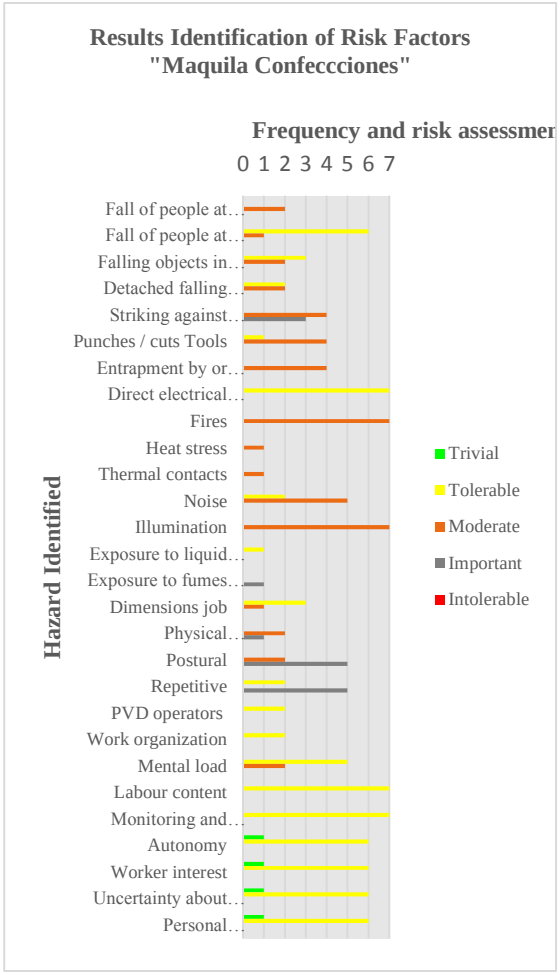

Figure 1. Analysis of the initial identification and assessment of risks

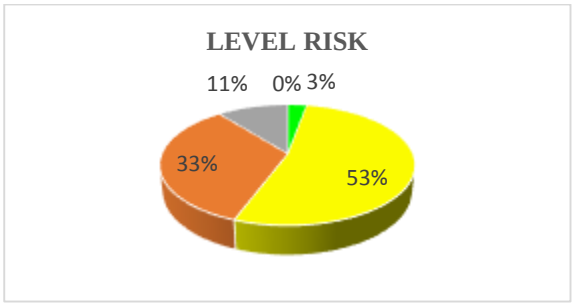

Figure 2. Percentage of risk level

In Figure 2 the percentage of the risk levels of the identification and initial estimate than 3% of these factors corresponds to a trivial level, 53% is equivalent to a tolerable level occurs, a 33% moderate risk and 11% of significant risk.

2.2 Analysis of risk factors

According to the identification and initial assessment of the risk factors are prioritized those with significant values for which measurements and blunt assessments are developed in order to obtain objective data which later will allow comparison with the applicable regulations and take the decisions suitable.

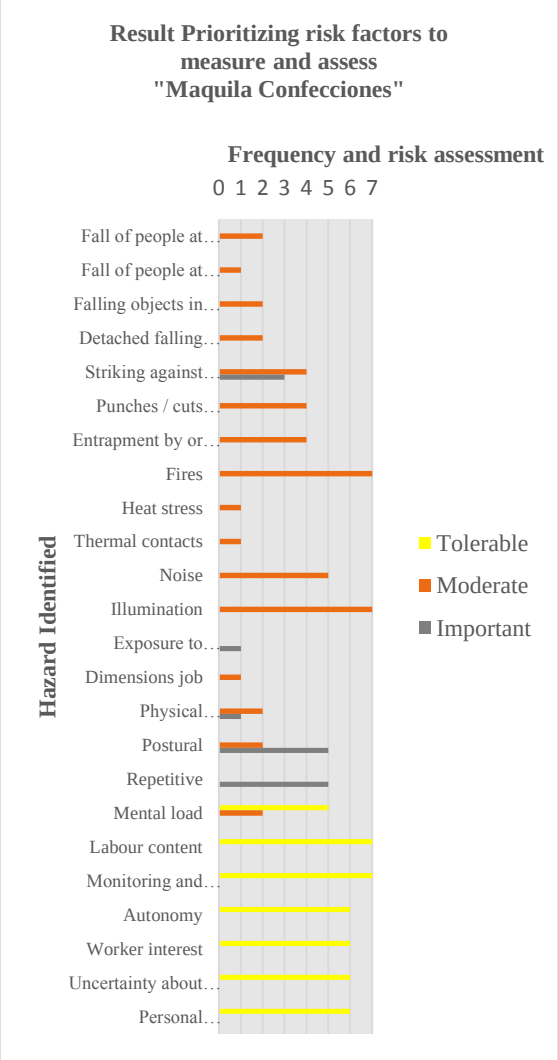

Figure 3. Analysis of the prioritization of risks

2.3 Measurement and evaluation of risk factors prioritized

For the measurement and evaluation of various risk factors prioritized, methods and / or nationally recognized and in the absence of these internationally techniques are employed.

For mechanical factors William Fine methodology that analyzes the likelihood and exposure accordingly applied. In “Maquila Confecciones” it is valued mechanical risks putting the risk of collision with stationary objects as the biggest problem with a degree of dangerousness of 100 points that frames within a level of "high" risk.

Physical factors for the following values:

Fire, implementation of methodology Meseri analyzes aspects of company and its processes, raw materials and infrastructure. The value of certain dangerous for “Maquila Confecciones” corresponds to 5,44 points I played with the parameters that mark the method is considered the risk of fire with "medium" level.

Lighting, measurements were made with light meter and its evaluation is interpreted according to the regulations (Executive Decree 2393, Art 56)

Table 2. Evaluation of lighting in “Maquila Confecciones”

JOB	VALUE ILLUMINANCE		OBSERVATIONS
	Regular (Lux)	Measured (lux)	
Gerente	300	270	Fails
Secretaria	300	367	Meets
Corte	300	693	Meets
Bordado	300	306	Meets
Estampado	300	393	Meets
Confección	300	954	Meets
Acabados	500	180	Fails

Noise, measurements were made with a sound level meter and its evaluation is interpreted according to the regulations (Executive Decree 2393, Art 55.)

Table 3. Evaluation of noise in "Maquila Confecciones"

JOB	MIN dBA	MAX dBA	L(eq) dBA	OBSERVATIONS
Corte	69,8	81,5	76,2	Meets
Bordado	77,4	86,2	80	Fails
Estampado	66	74,1	70,1	Meets
Confección	55.5	72,4	63,2	Meets
Acabados	58	62	59,8	Meets

Hot surfaces, measurements were made with an industrial laser thermometer. The measurement values obtained in the stamping area reached values between 100.5 ° C and 225 ° C, which is considered high risk to personnel exposed in this area.

Heat stress, the measurement of this factor was performed on a normal working day to determine the TBGH index (temperature Wet Bulb Globe), the value obtained was 26 ° C and their interpretation with the Executive Decree art. 54 determines that the risk is mild however, preventive measures can be considered.

Chemical factors, an analysis was conducted based on the safety data sheet based product used for stamping such as the "Plastisol", having greater involvement on the health of staff.

Ergonomic factors evaluation method employed corresponds to "RULA" once played with the methodology is considered critical to the job of cutting and stamping who scored 7 which corresponds to a performance level 4 and what urgent changes required in the work done.

Psychosocial factors applying methodology ISTAS 21 short version with the implementation of a staff survey company and analyzing same categories (psychological demands, job control, insecurity about the future, social support and quality of leadership, estimated).

2.4 Development and implementation of health and safety plan at work for the company "Maquila Confecciones"

Plan safety and health at work and its implementation is structured as follows:

Generalities:

Relevant information on the company and its informative data, the objectives and scope of SST Plan and the respective background concerning safety and health at work is determined.

Preventive management:

For preventive management developed in the company "Maquila Confecciones" it is proposed and implemented security measures as provided in the regulations (Resolution CD 333, 2010), measures acting on the source, transmission medium and receiver.
Developed and implemented actions acting on the risks identified with higher incidence and a high level of involvement, through the application of the following plans:

- Fitness plan and infrastructure, containing actions such as:
  Reorganizing work areas as the biggest problem facing the company it is limited in certain areas of work (cutting, sewing, printing, finishing) physical space; For this reason, redistribution and extension of the areas of work was done.
  Ventilation system for print area, applying general ventilation to remove the heat and the concentration of contaminants through an extractor.
  Actions on lighting, due to changes in infrastructure is necessary to submit a new distribution of the lighting system in certain areas of work (cutting, sewing, printing, finishing, storage, management) therefore the calculation of luminaires needed was conducted (zonal cavity method) to achieve the required lighting.

Table 4. Corrections on Ilumination

JOB/AREA WORK	ILLUMINANCE MINIMUM REQUIRED	LAMPS	
		N°	FEATURES
Gerente	300 luxes	1	Double slash
Corte	300 luxes	2	Double slash
Confección	300 luxes	2	Double slash
Estampado	300 luxes	1	Double slash
Acabados	500 luxes	2	Double slash
Bodega	200 luxes	1	Double slash

- Filter mask (N95), ear (NRR 23), metal mesh gloves, lumbar belts: staffing plan personal protective equipment (EPP), provision and use of the following EPP is required.
- Emergency plan and signaling is necessary to implement the respective resources for prevention, protection and control of fires such as signaling (ban obligation, caution, safe condition, fire), fire extinguishers and smoke detectors; in addition to the development and dissemination of a risk map where the evacuation routes and resources is displayed.
- To complement the prevention management develops certain job security protocols that become working guidelines for staff and contains the following documentation: rules of Safety and Health at Work for what one looks at the ministerial agreement 22 structuring a policy based on the Resolution CD IESS 333 and the respective procedures (secure jobs, housekeeping, inspections of working conditions, use of personal protective equipment, maintenance, and training induction).

3. RESULTS

The development and implementation of this study will bring benefits in the short, medium and long term gradually what may be mentioned:

- The culture of prevention and health surveillance with which now has staff accompanied the company while improving working conditions made, actions taken for the sole purpose of maintaining healthy, safe and above all satisfied and committed workers with their work; and to devise and indirect beneficiaries families of workers as to an accident or occupational disease type are those left unprotected and with serious emotional damages.
- The cost savings that will get the company, because with this study would help avoid direct and indirect costs for severance payments, medical expenses,

damage to machinery, equipment, etc. that can be generated in the company after the occurrence of an accident or occupational disease; plus the respective fines and penalties imposed by the various entities of control as the IESS basically depend on the type of damage done to the person or by the MRL imposed fines ranging from $ 50 to 20 basic unified wage per affected worker.

- Legal compliance regarding health and safety at work is concerned, in addition to the corporate recognition that reaches the company to its external customers.

4. CONCLUSIONS

- In the analysis of the initial situation of the company existing gaps in occupational safety and health, which are being shown through the identification and estimation of risk factors is determined; This preliminary analysis identified 140 risk factors in their respective jobs "Maquila Confecciones" detected; than 3% of these factors corresponds to a trivial level, 53% is equivalent to a tolerable level, moderate risk by 33% and 11% significant risk.
- 105 most significant risk factors (level of major and moderate risk), on which the measurement and evaluation was performed by applying tools and methodologies nationally and internationally recognized to be major problems identified were prioritized: collision with stationary objects, trapping and striking objects due to limited work areas, fires by the economic activity of the company due to the handling of synthetic fibers, poor lighting according to the tasks running on each of the jobs space, noise generated by machines (embroidery, cutting, sewing, printing) used during the production process, forced and psychosocial factors postures.
- We designed and implemented a Safety Plan and Health at Work in order to provide solutions to problems; for what corrective actions acting at the source, in the middle of transmission, the receiver and complementary type of risk and which specific prevention and risk control as executed arose:
  - Infrastructure adjustments in order to offset the limited physical space in certain areas of work
  - Lighting corrections reaching appropriate levels according to the requirement of the regulations.
  - Staffing and improvements according to working tools.
  - Provision of personal protective equipment (EPP) Development of an emergency plan and signaling determining the necessary resources to higher-risk situations
  - Job security protocol that provides for the development of safety rules and also the commitment of the company represented in policy, various complementary management in prevention of occupational risks (insurance procedures, housekeeping, inspection, using procedures EPP, maintenance, and training induction)
  -Training activities.

- After making the respective corrective measures acting on the unsafe condition and unsafe act their positive aspects

being achieved in regard to outcomes were assessed:

- Security concerning legal documentation that currently the company has (policy, regulation, made of SST structure, risk plans and evacuation routes)
- Preventive management (identification study, estimation, measurement, evaluation and control of risk factors), (adjustments made on infrastructure, EPP, signage, training);
- Impact on staff: the commitment by both management and workers in safety and health at work.

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