101 - ERGONOMICS ANALYSIS ON A GARMENT INDUSTRY

MARIANA GUISDANA GROSSCHOPF[1];
RICARDO ANTONIO BETTINELLI PADILHA[2];
RODRIGO EDUARDO CATAI[3]
[1,2,3]UTFPR – Campus Curitiba, PR, Brasil
[1,2]UTFPR - Curitiba - PR - Brasil
[3]Professor da Graduação e do Mestrado em Eng. Civil/UTFPR - Curitiba - PR - Brasil
marigrosschopf@hotmail.com
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1 - INTRODUCTION

The Brazilian industrialization process occurred very late in relation to the other countries, and between the oldest industrial activities of humanity there are Textile and Apparel Industries (TEIXEIRA, 2005).

Since your emergence until nowadays, the garment process, which initially used to be done manually, adapted to the industrialization. Today, the sector followed the modernization of equipments and adapted to work methods in your process, seeking a higher productivity (ARAÚJO, 1984).

Between the transformation industries, the textile and garment sector is the second larger employer in Brazil, characterized also by the predominance of female labor, according to data of Ministry of Labor and Employment. And, due the large growth of this industry branch, it's very common the outsourcing of part of the process, generally the sewing, performed by "faction industries". In this type of industry, the work is characterized by the productivity charging, where should be reached production quotas at the end of the workday. The apace of work and the ergonomic conditions which they are submitted reflects in the health of the workers (GARCIA JÚNIOR, 2006).

This way the goal of this study is to perform an analysis of the ergonomic conditions and the existent risks in a Garment Industry, located in the city of Carlópolis, in the state of Paraná, aiming to obtain actions for the improvement of the work environment, in order to attend the requirements of NR-17 – Ergonomics, taking also as reference the norms related to the individual protection equipments, Safety at Work in Machinery and Equipment, Sanitation, Sanitary conditions and Comfort in the Workplace and Safety Signs.

2 - LITERATURE REVIEW

2.1 The Garment Industry

The garment industry that have as basic function process the fiber into yarns, the yarns into tissues and tissues into garments, have several segments (JONES, 2005). In a simple way, starts obtaining the fibers, followed by the wiring, weaving, knitting, and confection, being this last the sector of study in this work.

The garment industries can be responsible for all the confection process that encompasses basically the cut, the sewing and the finishing. But, due the demand, its common most part of these industries outsource the sewing services, then where are the denominated "faction industries", which are factories specialized in the sewing process that a lot of times their services are done exclusively for others garment industries (GARCIA JÚNIOR, 2006). The focus was in the sewing process and in these "faction industries".

The work in the garment industry it's in general, characterized by the production charged by the companies to reach the required quotas, the intense and fast-paced rhythm affects not only the mood to perform your tasks but also the reasoning. These factors determine the emergence of some disorders as, the prevalence increase of repetitive strain injuries, occupational dermatoses, induced hearing loss, pneumoconiosis and psychological distress (GARCIA JÚNIOR, 2006).

2.2 Ergonomics

According to Couto (2007), the ergonomics can be defined as the inter professional work that, based in a set of sciences and technologies, looks for the mutual adjustment between the human being and his work environment in a comfortable, productive and safe way, basically always seeking the adaptation of the work to the people, the workers.

The ergonomics practice has the intention to reduce the harmful impacts that the work may cause to the human being. It collaborates with the prevention of the health and physical integrity of the workers, since it absence may lead in the limitation of workers, affecting negatively the tasks which should be performed, generating errors and accidents (ALMEIDA; PEREIRA, 2006).

In Brazil, the Standard governing the ergonomic issues it's the Regulatory Standard RS-17, that aims the adaptation of the psychophysiological work conditions to the person (BRASIL, 2013b).

3 - METHODOLOGY

For the purposes of this study it was performed visits to a confection, located in the city of Carlópolis, Paraná, which provides outsourced sewing services for the branch industries in the region, observing the organization and production ways and the daily conditions that the workers are submitted, focusing especially in workloads and furniture, registering the main risk factors that may affect their health and safety.

Also were performed interviews with the employees in order to obtain information about the work conditions, hygiene, health and safety in their job, obtaining a qualitative survey of the possible factors that may represent physical and mental wear, affecting their health and signs of illness.

As obtaining source of data, in October 2013, it was applied a questionnaire for the workers that in your basic structure had three segments: personal data, workers main complaints related to their function, furniture, work conditions and rhythm and lastly the safety in the work environment. There was difficulty to perform the interviews, since the company didn't allow contact with your workers outside the work environment. Beyond that, only 50 of 200 employees were released, chosen randomly, with time-controlled about 10 minutes per interviewed due the pressure and charge per production imposed by this type of establishment.

4 - RESULTS AND DISCUSSION

4.1 Work Environment Analysis

The garment embraces the sewing, finishing and ironing sectors. It has your installations in a shed and counts with a total area of approximately 1300 m2 and right foot of 8 meters. The walls have smooth texture and light tint and the floor is non-skid. The traffic routes have 1,20 meters of width and they are clear. The environment is clean, without dust or textile waste.

Figure 1 shows a typical job in the sewing industry.



Figure 1 - Workplace Sector Sewing. Source: The authors (2013).

The machines have “start” and “stop” devices that attend to the requirements and the noises from the machines are constant during all the workday.

The lighting is by natural and artificial ways, which is enough. The ventilation is insufficient, and generates a big dissatisfaction problem between the workers, because of the heat. Attempting to soften the excessive heat, which is worse in certain seasons, portable ventilators are utilized, worsening another problem, the dust coming from the tissues.

The furniture is inadequate and don't attend the standards required on NR-17 (BRASIL, 2013a). The counters from the finishing and ironing sectors (Figure 2) don't have height regulation neither rounded front edges, but in the sewing sector the tables attend these requirements. The chairs in this same sector don't have height regulation, back and comfortable seat, feet support, five wheels that aren't swivel and it's common the workers adapt foam pads to obtain a minimum comfort.

The restrooms are separated by sex, have dimensions of 1,30x0,80 meters and the access door for each restroom have width of 0,60 meters. However, they communicate directly with the workplace. The sink is collective and share space with the water fount. The ventilation is precarious due the fact that the restrooms don't have windows, resulting in low light.

Regarding the Safety Signs, the place doesn't have plates or others warning devices alerting the workers about the existent risks.



Figure 2 - Tour of the ironing sector work. Source: The authors (2013).

The emergency exit, which is also used as front door by the employees, hardly is clear, because it stays next the posting place, being utilized as garage. Have width of 2,90 meters and sliding door that stays open during the entire workday. It has easy access and direct connection with the outside through a ramp, but is not properly signalized.

The firefighting equipment can be found in enough amount, in their expiration date and signalized, but they are in inappropriate places, with gaps and in the presence of objects that can difficult your access. In relation to the IPE's, hearing protections and respiratory masks are provided, but their use it's not done by all the workers. Equipments for eye protection against objects weren't observed as well as fingers protection for the workers in the ironing sector.

4.2 Workloads Analysis

The work environment in addition to not offer comfort to the workers in their functions, these functions are performed generally under constant pressure to maintain the high production required and intense rhythm, such that the pauses are limited during the workday, beyond the inappropriate furniture, resulting in incorrect position, machine noises for a long period, heat and dust.

The seamstresses perform their jobs permanently seated, where most of the times they improvise foam pads and back for the seat, seeking for any comfort. The chairs are made of wood, they are not swivel and don't have height regulation, resulting in a discomfort due the effort done by the hip to do the rotation movement of material transfer, resulting also in constantly back pain. The seamstresses force your upper and lower limbs in their functions due the repetitive effort to stretch the arm, feet movement to activate the pedal of machine movement and needle lifting. In regards of accidents, there are the risks of cut and drilling the fingers and eye's impact caused by break of needles.

The workers from the finishing sector perform your functions standing during all workday, being prohibited seat to rest, since the place doesn't have chairs, this way forcing the lower limbs causing frequent leg, feet and hip pains. In the ironing sector, the work is performed standing, requiring intense effort in the arms. The workers suffer with the heat blown by the equipment – iron, mostly reaching chest and upper limbs of the worker, which is also exposed to the iron metallic parts, being frequent fingers burns, once that they don't utilize any protection equipment, also because they believe that would disturb the function, decreasing the production that is charged.

4.3 Questionnaire

From the questionnaire applied in the workers, regarding the socio-economic aspects, is noteworthy that the workers from the Confection are in majority females (76%), of age (94%), white (82%), single (50%), have one or more dependents of their compensation (78%) and have high school (60%). The salary is correspondent to the minimum established from Workers Union of the Clothing Industry, and 68% of the workers are dissatisfied. The workday is of 40 weekly hours, with break for meals. Most part of the workers (72%) is in the company more than one year, and hardly changes of function.

Regarding the aspects related to the health of the workers, most of them consider it in good condition (78%) and (68%) believes that the work over the time can affect the health negatively. The main complaints regarding the health it's about headaches, lack of appetite, sleep disturbances and digestive. In relation of the performance of your tasks, it was registered difficulty to perform your works and to concentration. Between the psychoemotional complaints are the nervousness, tension,

worry, stress, impaired thinking, often fright, sadness, crying and lack of usefulness. Regarding the factor skeletal muscle, fatigue easily, tired all the time, pains to press or movement, tremor, tingling or stabbing, tenderness in upper, lower, neck and lower limbs are the main complaints registered by the workers. When questioned about the work situations, comfort and safety the most frequent complaints were nuisance related to heat, dust, noise and furniture. Not all of the workers utilize Personal Protective Equipment. It was registered 5 victims of cut, drilling and finger burning accidents.

5 - CONCLUSION

The results obtained by analysis of the environment and from information provided by the workers proved that the confection in study doesn't attend to the requirements of NR-17, needing of actions for comfort improvement, eliminating or decreasing the risks, consequently avoiding accidents and diseases caused by work.

The risks observed and the more frequent complaints registered by the workers are related to environment ergonomics, referent to the physical aspects as heat. Noise, dust and furniture (especially chairs and counters), amongst workloads, repeatability of movements, rigid control and accelerated pace of production that is required to reach the targets imposed. The workers are submitted to high workloads, generating discomfort, fatigue and health problems related to worker's physical and psycho.

In order to accomplish the requirements of the existent rules, aiming a higher comfort in the workplace and ensuring the health and safety of the worker, it's necessary perform a rearrangement of the environment, correct signalization and proper furniture to execute their activities. Also, the rhythm and workloads reduction, introducing periodic pauses for rest, implementing the labor activity, and perform trainings for the awareness about existent risks and the importance of the use of Personal Protective Equipment.

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Prof. Dr. Rodrigo Eduardo Catai. Rua Deputado Heitor de Alencar Furtado, 4900
Bairro: Ecoville - CEP 81280-340 - Curitiba - PR – Brasil

ERGONOMICS ANALYSIS ON A GARMENT INDUSTRY

ABSTRACT

This article have as goal to develop an ergonomics analysis of the work environment focused in furniture and workloads in a garment industry located in the city of Carlópolis, in the state of Paraná (Brazil). Visits to the establishment were performed and a quantitative survey of the profile and main complaints of the workers was done through the interview. The environmental conditions observed showed a deficit in the physical arrangement of the environment organization. Insufficient ventilation, dust arising from the tissues and the noise from the machines were present all the workday, in addition of the problem of the inappropriate furniture. It was observed absence of signalization, restrooms, emergency exits and extinguisher, in disagreement with the Regulatory Standards of the Ministry of Labor and Employment. Beyond the environment doesn't offer comfort to the worker in their function, they generally work under constant pressure for production, intense rhythm, rigid control, repetitiveness of movements and absence of resting pauses. These factors cause discomfort, physical and mental fatigue, muscle aches, LER/DORT, psychosocial issues, among others, beyond accidents. From the applied questionnaire, the workers profile was obtained and was possible to quantify the main complaints reported by them, where prevail the ones referent to work situations and environmental comfort and security conditions, beyond the ones related to health, where is highlighted the psychoemotional and skeletal muscle.

KEYWORDS: Ergonomics, Garment Industry, Sewing, Security, Risks.

ANALYSE ERGONOMIQUE SUR UN INDUSTRIE DU VÊTEMENT

RÉSUMÉ

Cet article vise à développer une analyse ergonomique du lieu de travail, en se concentrant sur les meubles et les charges de travail dans un secteur de l'habillement dans la ville de Carlisle, dans l'état de Paraná. Visites à la propriété et une enquête quantitative et le profil des principales plaintes des travailleurs au moyen d'entrevues ont été menées. Les conditions environnementales observées ont montré un déficit dans l'agencement physique et l'organisation de l'environnement. Ventilation insuffisante, la poussière provenant des tissus et le bruit des machines étaient présents tout au long de la journée, et avait encore le problème de meubles qui à son tour était inapproprié. Le manque de signalisation, toilettes, sortie de secours et des extincteurs ont été également noté, pas en conformité avec les normes du ministère du Travail. Outre l'environnement ne fournit pas de confort pour les travailleurs dans leur emploi, ils travaillent souvent sous la pression constante de la production, le rythme intense, commande d'entraînement, la répétabilité des mouvements et pas de pauses. Ces facteurs provoquent une gêne, la fatigue physique et mentale, des douleurs musculaires, RSI / TMS, les problèmes psychosociaux chez les autres, ainsi que les accidents. Du questionnaire, nous avons obtenu le profil des travailleurs et permet de quantifier les principales plaintes par eux, l'emporterons où ceux qui font référence à des situations de travail et les conditions environnementales de confort et de sécurité, en plus de ceux liés à la santé, où tenir le muscle psycho-affectif et squelettique.

MOTS-CLÉS: ergonomie, Vêtements industrie, machines à coudre, les risques de sécurité.

ANÁLISIS ERGONÓMICO EN UNA INDUSTRIA TEXTIL
RESUMEN

Este artículo tiene como objetivo desarrollar un análisis ergonómico del lugar de trabajo, centrándose en los muebles y las cargas de trabajo en una industria de la confección en la ciudad de Carlisle, en el estado de Paraná. Se llevaron a cabo visitas a la propiedad y un estudio cuantitativo y el perfil de las principales quejas de los trabajadores a través de entrevistas. Condiciones ambientales observados mostraron una deficiencia en la disposición física y la organización del medio ambiente. Una ventilación insuficiente, el polvo proveniente de los tejidos y el ruido de las máquinas estuvieron presentes durante toda la jornada laboral, y todavía tenía el problema de los muebles que a su vez era inapropiado. La falta de señalización, aseos, salida de emergencia y extintores de incendios también se señaló, no se ajusta a las Normas de la Secretaría de Trabajo. Además del medio ambiente no proporciona comodidad a los trabajadores en sus puestos de trabajo, que a menudo trabajan bajo presión constante para la producción, el ritmo intenso, control de la transmisión, repetición de movimientos y no hay descansos. Estos factores causan molestia, la fatiga física y mental, dolores musculares, RSI / WMSD, problemas psicosociales, entre otros, así como los accidentes. Desde el cuestionario, se obtuvo el perfil de los trabajadores y pueden cuantificar las principales quejas por ellos, prevalecer donde los que hacen referencia a las situaciones de trabajo y las condiciones ambientales de confort y seguridad, además de los relacionados con la salud, donde soportar el músculo psicoemocional y esquelético.

PALABRAS CLAVE: Ergonomía, Ropa de Industria, Costura, riesgos de seguridad.

ANÁLISE ERGONÔMICA EM UMA INDÚSTRIA DE CONFECÇÃO
RESUMO

Este artigo teve como objetivo desenvolver uma análise ergonômica do ambiente de trabalho, com foco no mobiliário e cargas de trabalho em uma indústria de confecção situada na cidade de Carlópolis, no estado do Paraná. Foram realizadas visitas ao estabelecimento e um levantamento quantitativo do perfil e das principais queixas dos trabalhadores através de entrevista. As condições ambientais observadas mostraram a deficiência no arranjo físico e na organização do ambiente. A ventilação insuficiente, a poeira oriunda dos tecidos e o ruído das máquinas estavam presentes durante toda a jornada de trabalho, e ainda se tinha o problema do mobiliário que por sua vez era inadequado. A falta de sinalização, sanitários, saída de emergência e extintores também foram constatados, estando em desacordo com as Normas do Ministério do Trabalho. Além do ambiente não oferecer conforto aos trabalhadores em suas funções, os mesmos trabalham geralmente sob pressão constante por produção, ritmo intenso, rígido controle, repetitividade de movimentos e ausência de pausas para descanso. Estes fatores ocasionam desconforto, fadiga física e mental, dores musculares, LER/DORT, problemas psicossociais entre outros, além de acidentes. A partir do questionário aplicado, obteve-se o perfil dos trabalhadores e pode-se quantificar as principais queixas relatadas por eles, onde prevalecem aquelas que fazem referência às situações de trabalho e condições ambientais de conforto e segurança, além das relacionadas à saúde, onde se destacam as psicoemocionais e músculo esqueléticas.

PALAVRAS CHAVE: Ergonomia, Indústria de Confecção, Costura, Segurança, Riscos.