

145 - ERGONOMICS AND POSTURE: RELEVANT ASPECTS IN CONSTRUCTION

FÁBIO BADOTTI (Fisioterapia/2010)

JOSÉ MOHAMUD VILAGRA (Dr./Fag - Unioeste)

Fundação Assis Gurgacz - Cascavel-PR; Universidade Estadual do Oeste do Paraná - Cascavel - PR.

fabio_badotti@hotmail.com

INTRODUCTION

Ergonomics has a direct relationship between human and machine. For both this study is a broad discussion of environmental and postural activities in construction. The article is organized in two phases with the first part presented some concepts of ergonomics in the second part proposes the application of ergonomics in civil construction. When approached the subject ergonomics, almost, automatically leads to consider quality of life of individuals, regarding the manner in which this relates to the way in which they work and under what conditions they are subjected. This dimension is also possible to relate aspects posture adopted in the environment, which may facilitate or impede the performance of the employee. (Grandjean, 2004)

Due to the large scope of the concepts of ergonomics, they addressed different approaches to taking into account the views of the authors. Mont'Alvão and Moraes (2003) define as a single, specific technology-human interface system. However, as a science that deals with the development of knowledge about the capabilities, limitations, and other characteristics of human performance, relates to the design of interfaces between individuals and other components of a system. As for Aberg (2000) Ergonomics, above all, involves professional attitude, added to the practice of a profession defined. In this respect, it is possible to speak of a doctor ergonomist, a psychologist ergonomist, ergonomist a designer and so on. This professional attitude stems from the definition established by the Brazilian Association of Ergonomics, based on a worldwide debate. According to the Brazilian Association of ergonomics, this aims to change the work systems to suit the activity within it the characteristics, abilities and limitations of people with a view to its efficient performance, comfortable and safe.

For a better understanding of the concept of ergonomics is needed in the short passage to the issues of worker behavior in relation to your posture.

According to what we show Morales et. al. (2003) ergonomics is facing a great challenge regarding the postural requirements, especially in adapting to the needs of the employee inserted into your work environment. These aspects are derived from knowledge of the areas of biomechanics, physiology and anthropometry, as some moments involve or produce wear postural muscles, heart and lung. Parallel to the movements and posture, appear to issues of weight lifting, that although the systems are automated, there is a lack of craft. Moraes et. al. (2003) believes that external factors can influence positively or negatively on the implementation of activity either positively or negatively, this influence is directly dependent on the degree of complexity in the environment in which it appears. Contextualizing this vision, defines the environment as everything is 'out of the system', there is the problem of drawing the boundaries systems / environment, very difficult task. Also corroborating the same design Laville (1977), says that typically, many buildings are located in an environment that introduces them noise, light, heat or cold, is a question of implementation, architecture and materials that make up the results in the greater the effect of external environment on work and workers. A poorly architected environment can affect the results and performance of the employee due to the influences received, for example, if a shelf with studs or joists is not adequate to reach the height of a worker with the function of the carpenter his point stretching beyond theyour nervous system to achieve contract may cause complications, muscle sprains of the arms or lower back, healthy environment of the worker. (LAVILLE, 1977)

According to Rosa et.al. (2000) weight lifting has shown incidence rates of back pain in workers, particularly in the building industry, due to wear, or repetitive movements performed daily. Even against these harmful effects, many studies involving body weights do not meet the ergonomic requirements, due to direct exposure of the worker, before repetitive, and that this is a numerically significant group in the population, the need for more research on the rates of occurrence of RSI next to them.

Considering the particular characteristics of the construction industry in particular the need for weight lifting, note the importance that should be given to the case, for now focus on occupational diseases, especially the World Health Organization (WHO) classifies as diseases that are related to the work in two categories, the first linked occupational diseases, those themselves that have well-defined causal agent. A clear example of silicosis, caused by chronic inhalation of fine particles of silica. The second category represents the work-related diseases, which constitute only part of the question, therefore, not well defined, in the cause-effect relationship as linear as with occupational diseases. (ROSA, FERREIRA; BACHION, 2010)

Work activity must be adequate to the possibilities of human metabolism and muscle and it is also the physical ergonomics, as the physiology of work. Also addressing the issue of weight lifting, Vidal (1999) conjecture that the skeletal system to move and stay in certain positions, he is bound to the muscular system which can be primarily treated as a set of extension cords in opposition. The muscular system is the property of being able to contract and relax and conversely if this property requires energy, supplied to the body by metabolism, which is the wonder of nature that turns food into energy and air inside the body.

The incidence of back pain usually has a cause-effect, this effect, let us examine some of ergonomic principles that can solve such problems by identifying the requirements of postural factors that are directly related, as the view of Weerdmeester and Dul (2001) - a) Production (manual or mechanical), b) the organization of work (design work, frequency of surveys), c) the job (the position in relation to body weight), d) the type of load (as weight, handles); e) lifting accessories; f) Method of work (individual or collective).

Ergonomics understood this thought turns to the changes and necessary amendments to improve the quality of human life in order to provide greater security and comfort to the individual, including the environment.

ROUTING METHODOLOGIES

This research is a qualitative study made use of the research methodology of a literature review, focusing on analysis and concept of ergonomics in general aspects related to the subject: the concepts of ergonomics and its applicability in civil construction activity. The review relied on the contribution of articles and publications obtained from SIEL, LILACS and PPEPS Federal University and Santa Catarina, from 2000 until 2010, while descriptive conspires with the qualitative nature because there is the author's interpretation on the theme ergonomics and postural aspects in construction. The key words used were:

ergonomics, posture, construction.

RESULTS AND DISCUSSION

Data from the IBGE - DIEESE (2010) emphasize the importance of building industry in the Brazilian economy, showed that in the years 1998 and 1999, this sector accounted for 10.3% of Gross Domestic Product (GDP) and by 6, 6% of occupations in the job market. These numbers lead to an estimate that the building occupies more than 4 million and 700 thousand workers, of whom only 954 000 (20.1%) working with professional card signed.

As to results of Rose (2010) by interviewing 105 construction professionals in Goiania, among them carpenters, laborers, construction workers, machine operators and owners, represented as complaining of pain and expressive 47 of them (45%) incidence of pain in characteristic areas of RSI. The professional piercers stone had 66.60% in complaints of backache. Another category was also reached to the owners of hardware, with 33%, but with the builders of low back pain accounted for 87.50%. Almost all of the carpenters suffer backaches. The servants of masons have proportionally more complaints than the masons, being affected by back pain in 60%. Many removals by a medical certificate because the occurrence of accidents at work, are consequences of the manipulation of weight and constant use of joints. These effects occur because of the overload on the joints and muscles in repetitive activities performed, followed by back pain in workers. Raising exercises stretching work to relieve muscle stiffness and prevent wear and tear due to constant esrço professional, as Rose et. al. (2010).

In research Vidal (1999) found that a worker of 1.70 m has not satisfactorily achieve as a bookcase located 2.20 m above the ground. Doing so will certainly improper handling can cause the fall of the object itself or handled. It is noted here that the material losses and accidents can have the same origin. However, this worker believes that he can not drop the box of bulbs that attempts to take this stand. For lack of a ladder accessory or equivalent may be required to improvise with what is available. The accessory may also inadequate cause the same problems - or worse! We see here that the organization of work may also worsen an anthropometric inadequacy that has not already been considered. And not enough to have a fixture for this operator is 1.70 m, it can be replaced by a 1.60 m in the next shift. Imagine if we must choose the height of the staff as a criterion for team building. This latest revelation made by Vidal, dates back to the paradigm of ergonomics satisfactorily meet the needs of human beings in that suit the needs of organizations.

The search for Rose (2010) confirms the principles of these authors' Mont Moraes and genuineness, which say that inadequate postures or movements produce mechanical tension in muscles, ligaments and joints resulting in pain in the neck, back, shoulders, wrists and other parts the musculoskeletal system. The inadequacy anthropometric produces postural imbalance static causal factor of RSI, but also for back pain, sciatica and other problems psychiatric.

Also relevant is the contribution of Laville (1977), it suggests how appropriate procedure to favorable conditions for the lifting, taking into account that the heavy lifting to be around (23 kgs), including: - Keep the load close the body (horizontal distance between the hand and ankle about 25 cm - Before the survey is necessary that the load is placed on a bench 75 cm high - should not exceed 25 cm vertical displacement; - Must to hold with both hands the weight - How to safely load / weight should be provided with straps or holes to snap the fingers - should be possible to choose the best posture in weightlifting - The trunk should not be twisted during weightlifting - The frequency of surveys should not be more than one per minute - The duration of the survey should be no more than an hour and should be followed by a rest period (or lighter tasks than 120 per percent of task duration of lifting).

The survey showed that among the factors that prove vulnerable and a major challenge to ergonomics in this century, is the adequacy of preventive measures to correct the employee, in view of the quality of life for workers. It also became clear that the research would need to organize more activities to improve their quality of life and healthy conditions in the workplace. Another very important aspect analysis and implementation of ergonomic design in organizations not only in the physical, social and cultural worker, especially with regard to worker protection and risk prevention in the workplace, creating favorable conditions for the well being of individual, bearing in mind the quality of life in the workplace, however, the attacks against the fact that not all aspects can be taken to heart, because of human plurality, since the concept is the dynamic relationship of man and machine.

REFERENCES

- ABERGO - The certification of the ergonomist Brazil - Editorial Bulletin 1 / 2000, Brazilian Association of Ergonomics, 2000.
- ALMEIDA, Isabel Barreto Costa, SA, Santana Nunes, SILVA, Marlene; BAPTISTA, Abirão; MATOS, Almeida; LESSA, Ines. Prevalence of chronic low back pain in the population of the city of Salvador. Available at > http://scholar.google.com.br/scholar?q=artigos+publicados+scielo+sobre+dores+lombares+na+atividade+da+constru%C3%A7%C3%A3o+calendar&hl=enBR=0&as_sdtas_vis=1&hi=Scholaris.<Access: set/2010.
- CARDOSO, F. Francisco. Organization and production management in construction. Available > <http://www.allquimica.com.br/arquivos/websites/artigos/A-00252006528142052.pdf> <Accessed ago/2010.
- DIEESE. Department of Statistics and Socio-economic factors. The workers and restructuring the Brazilian construction industry. São Paulo: DIEESE, 2001. Available at > http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1413- <Accessed set/2010.
- GRANDJEAN, Etienne. Manual of ergonomics: adapting work to man. 4th ed. Porto Alegre: Bookaman, 2004.
- Kroemer, K.H.E., E. Grandjean. Manual of ergonomics: adapting work to man. (Translation - Lia Buarque de Macedo Guimarães). 4th ed. Porto Alegre: Bookaman, 2005.
- LAVILLE, Antoine. Ergonomics. (Translation - Marcia Maria Neves). São Paulo: Editora EPU, University of São Paulo, 1977.
- SLEEVE, Raimunda's Birth Matilde Gomez, Carlos Minayo; Thedim COSTA, Sonia Maria da Fonseca. Fatal accidents at work and lack of social protection in the construction industry in Rio de Janeiro. Journal of Occupational Health. São Paulo, 2008. Available at > http://bvsm.sau.gov.br/bvsm/periodicos/RBSO_118.pdf#page=49 <Accessed Set/2010.
- MORAES, Anamaria de; MONT'ALVÃO, Claudia. Ergonomics: concepts and applications. 3rd ed. Rio de Janeiro: IUSERA.de Moraes, 2003.
- NETO, Claudio Simon de Lucena. Ergonomic analysis and intervention as instruments for the prevention of occupational accidents and liability. Available in 4 / 2006 > www1.jus.com.br/doutrina/texto.asp?Id=8346 <Access in 09.2010.
- PASQUARELLI, Maria Luiza Rigo. Standards for the presentation of scholarly work. [ABNT/NBR-14724] / Maria Luiza Rigo Pasquarelli - 2nd ed. Osasco-SP.: [EDIFIER], 2004.
- ROSA, S.D.; FERREIRA, D.B.; BACHION, M.M. Work-related musculoskeletal disorders: Developments in Goiania. Electronic Journal of Nursing. Vol.02, No. 01, 2000, FEUFG. Available > www.revistas.ufg.br/index.php.fen <set/2010 access on

03. Vidal, Mário César. Introduction to ergonomics. (Manual of the Specialization Course in Ergonomics) RJ.: CESERG, 1999.
- WEERDMEESTER, B., J. Dul. Ergonomics practice. (Translation: Itiro Iida). 3rd ed. São Paulo: Editora Edgar Blucher Ltda, 2001.

ERGONOMICS AND POSTURE: RELEVANT ASPECTS IN CONSTRUCTION

ABSTRACT

Ergonomics is the science of designing user interaction with equipment aiming to modify working systems by fitting their existing activities to the limitations, abilities, and characteristics of workers owing to their safe, comfortable, and efficient performance. As literature review, this research seeks to clarify the importance of ergonomics aspects, taking into account adequate posture of construction workers, based on the basics of classic ergonomics work and scientific articles from the database of Sielo, Lilacs, and PPEPS at the Universidade Federal de Santa Catarina. This work is divided in two parts: in the first concepts of ergonomics, in the second one, ergonomics applicability in construction. Results demonstrate concern and urgency on ergonomics preventive measurements in construction in view of the high incidence of construction worker's complain comprising one of the greatest ergonomics challenge facing the diversity of factors and required demands in this area.

KEYWORDS: Ergonomics - Posture - construction.

ERGONOMIE ET POSTURE: LES ASPECTS PERTINENTS DANS CONSTRUCTION

L'ergonomie est définie comme la relation entre l'homme et la machine, avec l'objectif de changement de l'adaptation des systèmes de travail à l'activité en son sein caractéristiques, les capacités et limitations du travailleur en vue de son exécution efficace, confortable et sûr. Bien que l'examen de la recherche la littérature, nous avons tenté de préciser l'importance de prendre ergonomique ce qui concerne la posture du travailleur dans la construction, sur la base fondamentaux des œuvres classiques du génie de l'homme et articles scientifiques dans des bases de données données Siel, Lilas et PPEPS Université Fédérale de Santa Catarina. Le article est structuré en deux parties: la première partie de concepts l'ergonomie et le deuxième, son applicabilité dans la construction. Résultats obtenus démontrent une préoccupation pour les mesures préventives urgentes l'ergonomie dans la construction par rapport à l'incidence élevée de plaintes travailleurs de la construction, constituant un défi majeur vue ergonomique de la diversité des facteurs impliqués et les exigences cette activité.

MOTS-CLÉS: Ergonomie - Posture - construction.

ERGONOMIA Y POSTURA: ASPECTOS RELEVANTES EN LA CONSTRUCCIÓN CIVIL

RESUMEN

La ergonomía es conceptuada como la relación del hombre-máquina, con el objetivo de modificar los sistemas de trabajo adecuando a la actividad en el existentes a las características, habilidad y limitaciones del trabajador teniendo en vista suyo desarrollo eficiente, confortable y seguro. Mientras pesquisa de revisión de lectura se busco clarear la importancia de los aspectos ergonómicos llevando en cuenta la postura adecuada del trabajador en la construcción civil, se basando en fundamentos de obras clásicas de la ergonomía y artículos científicos en las bases de datos de la Sielo, Lilacs y PPEPS de la Universidad Federal de Santa Catarina. El artículo se encuentra estructurado en dos partes: la primera parte conceptos de ergonomía y la segunda suya aplicabilidad en la construcción civil. Los resultados obtenidos demuestran una preocupación y urgencia de medidas preventivas de la ergonomía en la construcción civil frente a elevada incidencia de quejas de los trabajadores en la construcción civil, se constituyendo uno de los grandes desafíos ergonómicos delante de la diversidad de los factores y de las exigencias envueltas en esta actividad.

PALABRAS – CHAVE: ergonomía, postura, construcción civil.

ERGONOMIA E POSTURA: ASPECTOS RELEVANTES NA CONSTRUÇÃO CIVIL

RESUMO

A ergonomia é conceituada como a relação do homem-máquina, com objetivo de modificar os sistemas de trabalho adequando a atividade nele existentes às características, habilidades e limitações do trabalhador tendo em vista o seu desempenho eficiente, confortável e seguro. Enquanto pesquisa de revisão de literatura buscou-se esclarecer a importância dos aspectos ergonômicos levando em conta a postura adequada do trabalhador na construção civil, baseando-se em fundamentos de obras clássicas da ergonomia e artigos científicos nas bases de dados da Sielo, Lilacs e PPEPS da Universidade Federal de Santa Catarina. O artigo encontra-se estruturado em duas partes: a primeira parte conceitos de ergonomia e a segunda a sua aplicabilidade na construção civil. Os resultados obtidos demonstram uma preocupação e urgência de medidas preventivas da ergonomia na construção civil frente a elevada incidência de queixas dos trabalhadores da construção civil, constituindo-se um dos grandes desafios ergonômicos diante da diversidade dos fatores e das exigências envolvidas nesta atividade.

PALAVRAS-CHAVE: Ergonomia – postura – construção civil.