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MANUAL TRANSPORT OF LOADS

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ABASTRACT

This article addresses the manual transport of loads, a very old activity carried out solely and exclusively by means of human power, that is, an activity used since the beginning without the use of any mechanism, tool and/or technological instrument. It is an activity that requires a lot of care and guidance, since when developed incorrectly it can cause irreparable damage to the human body, including serious injuries, especially to the spine, through which the sciatic nerves pass. The main objective is to present the importance of transporting manual loads correctly, in order to mitigate the appearance of occupational diseases related to the development of the activity of manual transport of loads, always observing the technical recommendations for this. This is an exploratory study that was based on bibliographic and documentary research.

Keywords: Manual Cargo Transport. Consequences. Safety.

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INTRODUCTION

Historically, the manual transport of cargo came into existence from the moment that human beings had the need, through their physical strength, to move their belongings from one region to another, since they were nomadic (they did not have a fixed home). Everything was carried by them, from their food to even the material for the construction of their house. Such a need made these primitives continuously seek new techniques to facilitate the development of these activities, thus ensuring a quality of life.

Human evolution, technological development and globalization have given rise to equipment and machines with the central objective of ensuring speed and agility in the execution of complex tasks, especially those that require a greater number of labor. However, not all areas of the market have benefited from these devices.

The European Agency for Safety and Health at Work (2007) states that the manual handling of loads makes the worker's work instrument his own body and that this movement, due to its characteristics or unfavorable ergonomic conditions, entails risks for him, especially in the lumbar region. In this context, it can be stated that accidents or incidents at work and occupational diseases are linked to four factors: the weight of the load, the task to be performed, the work environment and the individual characteristics of the worker.

Each and every job has two components: the physical and the mental, which need balance to provide well-being and health to workers, as people have different heights and physical constitution. These very distinct characteristics must be taken into account in the planning of tasks and working conditions, where good training can minimize the risks of accidents or incidents and occupational diseases, but the worker must also give importance to technical recommendations and properly use the safety equipment offered by the company, since all this will only be valid if both parties are aware of the importance of these techniques and practices.

The present work aims to address several aspects related to the manual transport of loads, seeking to contribute to improve the development of this activity in order to mitigate, reduce and/or exclude any and all risk of injuries and damage to the health of those who perform it.

This study seeks to analyze the manual transportation of cargo from reflections on this human activity from its concept and the changes that occurred in its development from human evolution.

The problem question is presented as follows: What is the importance of correctly transporting manual loads? What knowledge do companies have about the importance of

correctly performing the manual transport of loads to minimize the constant risks of injuries and damage to the health of workers?

In view of the above associated with the contents discussed during the Production Engineering course, the theme Manual Cargo Transport was chosen due to its importance in the issue of reducing diseases caused by effort at work, seeking to prevent and reduce accidents.

In order to analyze the development of manual cargo transport since the beginning and all the changes that have occurred in this development from human evolution and the damage caused to human beings when the execution of this activity occurs in the wrong way, the present work is divided into three topics. The first addresses the concepts of manual cargo transport. Technological advances, the existing competition in the globalized market that occurred with human evolution and the standards established to ensure the quality of life and health of the worker will also be analyzed.

In the second topic, issues pertinent to the types of injuries and accidents resulting from the improper use of human force for the execution of manual cargo transport are discussed, in which it is sought to verify the importance of knowledge about how to perform this activity correctly in order to ensure the maintenance of the worker's health and avoid greater damage.

The third topic addresses the prevention of accidents and diseases related to the manual transport of loads, evaluating the importance of having a healthy work environment as the first step to ensure quality in the safety and health of the worker. This environment must be designed in a correct ergonomic way to contribute to the prevention of accidents and occupational diseases.

MANUAL CARGO TRANSPORT: CONCEPTS, TECHNOLOGICAL ADVANCES AND STANDARDS

The manual transport of loads, or material handling, arose to meet the needs of man since his existence, since he needed to move around and at the same time maintain his existence. The first act of transport came at the time when he had to transport game and fishing for his food, then with the need to build his residences, it became necessary to transport all the material necessary for this activity.

Initially, all transport was done exclusively using physical force, since there was no technology, but the difficulties encountered required man to invent some techniques that could facilitate and speed up the development of this task, seeking to save physical strength and reducing the number of labor. Thus, manual cargo transport can be defined as

any activity in which a load is manually transported or supported using human power, either through dragging or loading.

For Campos, Tavares and Lima (2006), the handling of materials can be divided into three categories: lifting, transporting and storing; All depend on human strength and action to be carried out and must be seen by the organization with great attention, due to the importance that this activity has, since it, when performed without much care and attention, that is, in the wrong way, can cause accidents or work incidents, in addition to occupational diseases.

Nowadays, with technological advancement and competition in the globalized market, many equipment and machines have been invented and developed in order to promote more efficiency and effectiveness in the development of manual cargo transportation, since reducing the losses caused by this activity, the organization will be better able to compete equally for position within the capitalist market. However, it is essential to permanently train the worker to use this equipment and machines, and at the same time the awareness that this worker must have about the importance of obeying the rules and techniques established by the organization.

According to Campos, Tavares and Lima (2006), standards such as NR 17 of Ordinance No. 3,214, deals with ergonomics and with regard to lifting loads establishes some obligations, including:

- The manual transport of loads by a worker whose weight is likely to compromise his health or safety shall not be required or permitted.
- Every worker assigned to the regular manual transport of loads, other than light loads, must receive satisfactory training or instructions as to the methods of work he should use, with a view to safeguarding his health and preventing accidents.
- The lifting of material carried out by manual mechanical equipment shall be carried out in such a way that the physical effort made by the worker is compatible with the capacity of strength and does not compromise his health or safety, with a view to limiting or facilitating the manual transport of loads, appropriate technical means shall be used.
- When women and young workers are assigned to the manual transport of loads, the maximum weight of this load must be significantly lower than that allowed for men, so as not to compromise their health or safety.
- The transport and unloading of materials made by pushing or pulling carts on rails, wheelbarrows or any other mechanical apparatus must be carried out in

such a way that the physical effort made by the worker is compatible with his strength capacity and does not compromise his health or safety.

From this standard, it is clear the company's responsibility for the risks offered to its employees in its physical environment, that is, it is not just an optional issue for the company, but also rules that must be complied with, being aware that non-compliance with them will result in possible inconveniences such as the interdiction of activities, fines, legal issues, among others.

Campos, Tavares and Lima (2006) draw attention to the standards contained in NR11 of Ordinance No. 3,214 that deals with the transportation, movement, storage and handling of materials and establishes obligations for companies, including the manual transport of bags, which is any activity carried out continuously or discontinuously, in which the weight of the load is fully supported by a single worker, also including the lifting and disposal of the material.

Thus, based on the aforementioned norm, the authors point out that a worker can only transport bags traveling a maximum distance of 60.00m (sixty meters) and must always have the help of some type of mechanized traction. In addition, it is also defined that when dealing with loading or unloading in a truck or wagon, the worker must have the help of an assistant.

The storage of bags, established by the standard, must respect the level of resistance of the floor, the shape and resistance of the packaging materials and the stability, based on the geometry and type of lashing, to define the maximum height of the stacks.

Efficiently and effectively complying with the standards established for the safety of the worker who performs the manual transport of loads, requires that the work environment be adequate, as it is essential to avoid accidents. Thus, when it comes to stacking, stair structures must meet the specific standards of NR 11, however, the standard defends and advises, in this case, the use of moving walkways or forklifts.

However, in the case of using ladders for access to the manual transport of loads, they must be removable made of wood, with the following characteristics:

a) single flight of steps with access to a final landing;

b) the minimum width of 1.00m (one meter), with the landing having the minimum dimensions of 1.00m x 1.00m (one meter x one meter) and the maximum height, in relation to the ground, of 2.25m (two meters and twenty-five centimeters);

c) a convenient proportion must be kept between the floor and the tread of the steps, and the mirror cannot be higher than 0.15m (fifteen centimeters), nor the floor width less than 0.25m (twenty-five centimeters);

d) it must be reinforced, laterally and vertically, by means of a metal or wooden structure that ensures its stability;

e) it must have, laterally, a handrail or guardrail at a height of 1.00m (one meter) along the entire length;

f) perfect conditions of stability and safety, and any defect will be replaced immediately.

For Campos, Tavares and Lima (2006), another important factor for maintaining worker safety in storage is related to the warehouse floor. This, in turn, must be made of non-slippery material, without roughness, preferably using asphalt mastic, and kept in perfect condition. It is essential that this floor is always dry, which is why the company requires the company to provide appropriate coverage for the loading and unloading of sacks.

The storage of materials must also comply with some requirements established by the standard, in addition to respecting the structure of the floor, the piles must be arranged in order to avoid obstruction of doors, fire equipment, emergency exits, etc. They must also be at least 0.50m (fifty centimeters) away from the side structures of the building.

TYPES OF INJURIES AND ACCIDENTS

The improper use of human force in the manual transport of loads is largely responsible for injuries, accidents and work accidents, since overloading the body with an amount of weight in the wrong way can cause damage to the spine and/or trunk. Because the spine and trunk participate simultaneously in every movement of the body, this makes it vulnerable to any type of risk and possible diseases. Therefore, companies that perform this type of activity must be aware of these types of problems, since the individual, without any type of guidance and exposed to the action of heavy activities, may be susceptible to accidents and incidents that can cause minor injuries to more serious injuries that will leave him with irreparable disabilities for life, in addition to triggering several diseases in the near future.

According to Campos, Tavares and Lima (2006):

> The movement, transportation, handling and storage of materials are responsible for a large part of the injuries that occur in the industry and this can occur in any part of an operation, not necessarily in the warehouse or warehouse. Crushing by pressing, sprains, fractures and bruises are the usual damages and are due to unsafe acts and working conditions, such as lifting improperly, transporting loads beyond the established limit and using inadequate equipment. (CAMPOS, TAVARES AND LIMA, 2006, p. 301).

In this context, it is evident that handling certain loads incorrectly leads the individual to suffer injuries that may be reversible or irreversible. According to Kromer (2005) the manual transport of cargo is not only problems of loads on the muscles but also the wear and tear of the spine that nowadays can cause several injuries that can be reversible or not, depending on the injury and the stage it is.

The author also points out that diseases related to the manual transport of loads, in addition to affecting the muscles, tendons, nerves and bones, cause some problems for the company that are related to the high incidence of medical certificates, absenteeism and work overload, because, with a smaller number of employees than necessary in a production, there is greater physical and mental wear and tear of all workers in the sector, triggering a vicious cycle.

Kromer (2005) points out that one of the most common complaints of workers who perform manual cargo transport is muscle pain that may appear at the time of work activities. Corroborating the author, Lida (2005) states that:

> Pain is mainly caused by handling heavy loads or when improper posture is required, such as twisting the spine. Many other activities like pulling or pushing can also cause the pain. These pains can also occur with excessive stretching and inflammation of the muscles, tendons and joints. They are usually associated with strength, posture and exaggerated repetition of movements (LIDA, 2005, p. 163).

For Lida (2005), even though the human being has a musculature with a good performance, it is necessary to be careful that he does not exceed the limits of his resistance in the execution of this activity, given that at the moment when the work is defined as heavy, the worker needs to be rewarded with breaks for his recovery. Because, the manual transport of loads, when performed without some care and observations, can cause several problems in the spine, which according to Kromer (2005) can significantly aggravate the health of the worker.

The author points out that the problems acquired by the worker when performing the activity of manual cargo transport may appear in the company where he is working, however, this may be a problem arising from another company where he performed the same activity. Thus, it is necessary that it be evaluated by a specialist occupational physician to make sure what led the worker to trigger this occupational disease.

For Bellusci (2001) the problems presented in the spine cause significant pain and can be related to several problems that can be genetic and anthropological, hence the need to always be aware of the postures of the workers during the execution of their activity in order to avoid the appearance of low back pain that together with disproportionate loads can cause injuries, often irreversible to these workers.

IDENTIFICATION OF DISEASES RELATED TO MANUAL CARGO TRANSPORT

Bellusci (2001) states that the identification of diseases acquired in the performance of activities related to the manual transportation of loads occurs through periodic medical consultations with specialist physicians and specific exams that can assess all the physical health conditions of the worker. Such requirements serve as a parameter for the occupational physician to verify, in case of presenting any disease, whether this disease is directly linked to the work activity performed by him, or if it is linked to degenerative factors or to the development of activities that are not related to the current job.

In addition to periodic consultations, in order to safeguard the worker's right and the company's exemption from any disease presented, it is of fundamental importance that when joining the company, the worker must undergo consultations and exams that can verify his physical and mental capacity to develop the activity proposed by the company for which he applied. In the case of manual cargo transport, the worker must undergo X-ray, tomography and magnetic resonance imaging, in order to verify if the worker has any injury, what is the size of this injury and what is the most appropriate treatment for the identified disease.

It is worth mentioning that in addition to this medical care, it is essential that the worker undergoes a medical evaluation whenever returning to work after a period away from it, either due to sick leave or vacation and/or when there is a change in function, and when leaving the company, called a dismissal exam.

The Occupational Health Medical Program (PCMSO) is regulated by NR-07 and should be used by any and all companies, as it is responsible for evaluating all workers, through specific exams, according to the risks that each activity may present and identifying the fitness or unfitness of each worker at the time of their entry, maintenance or dismissal.

Evaluations such as those described are presented through an Occupational Health Certificate (ASO) that has the purpose of ensuring the suitability or not of the worker to carry out the work activity presented and also as a certification to the company that the worker had or did not have an occupational disease when joining it.

It is worth mentioning that when all the basic requirements for maintaining the worker's health are met, and at the same time seeking to prevent the onset of an occupational disease, the company's success and the longevity of the worker in the execution of their activities are guaranteed.

PREVENTION OF ACCIDENTS AND DISEASES RELATED TO MANUAL CARGO TRANSPORT

For better effectiveness in the development of a job, ergonomic conditions must be applied within the company in all tasks performed.

For Vergara (2000):

> Ergonomics is a working method that studies the Man-Machine system, from all possible perspectives, to achieve its perfect functioning. It is a way of thinking and planning the work, organizing it and adapting it to the capabilities and needs of the person who performs it. It is, in its simplest expression, a science that deals with adapting work to the worker. (VERGARA, 2000, page 14)

Thus, to ensure quality in the safety and health of the worker, it is essential that the work environment is healthy, because when this environment is not designed in an ergonomically correct way, the execution of activities is visibly hindered, causing dissatisfaction, discomfort and possible occupational diseases.

For the development of activities related to the manual transportation of cargo and the handling of materials, some preventive procedures must be adopted and respected in order to prevent any type of accident, injuries and also occupational diseases. To this end, the observation of the worker's behavior and posture, the use of facilitating equipment and load lifting techniques are fundamental for such prevention.

Vergara (2000) emphasizes the facilitating equipment, that is, mechanization, used for the development of manual cargo transport activities, can be carried out through the use of pulleys, belt conveyors, hoists, forklifts, transport carts, elevators, cranes, overhead cranes, among others.

When it comes to lifting techniques, the author points out that the basic principle is to always keep the spine straight and make the effort with the legs according to the following rules:

- Get as close as possible to the object to be lifted and support your feet firmly apart;
- Bending down by bending your knees, keeping your feet apart and your spine straight;
- Hold the load tightly, keeping it close to the body, so that it does not slip and fall;
- Elevate the object by straightening the legs, keeping it supported against the body and the spine straight;
- The head should remain raised and the load should be distributed between the two hands, whenever possible;

- Check that the load is not too heavy or difficult to handle by one person (at the slightest doubt you should ask for help and coordinate efforts with a partner);
- For the transport of objects with edges, flammable or corrosive material, it is recommended to use Personal Protective Equipment (gloves, aprons, glasses, among others);
- A load should never be carried at eye level, as it hinders visibility by causing shocks and falls;
- Finally, all people who manually handle loads must have basic training in handling techniques and training to avoid dangerous postures and movements.

In addition to the correct procedures to be followed, other occupational safety measures to be used to prevent injuries, accidents and occupational diseases when carrying out the activity of manual transport of loads must be carefully observed, including the correct choice of personnel who will perform this activity, the weight limit values that each worker can carry and the use of appropriate Personal Protective Equipment (PPE). efficient and effective for each activity to be developed.

The Brazilian Association of Technical Standards (2009) argues that weight limit values should be analyzed taking into account age, gender, duration of the task, frequency of lifting and transporting movement and the physical capacity of the worker, as well as technical knowledge about manual cargo transport procedures.

In order to ensure the health of the worker and avoid accidents, the association requires that all workers use the correct, adequate, efficient and effective PPE, and always give preference to the use of auxiliary mechanical means to ensure that the worker qualifiably develops his activity.

For the association, companies that operate with the activity of manual cargo transport must implement a set of preventive measures and good practices to reduce the exposure of workers to risks and prevent the effects on their safety and health. In addition to these procedures, it must also ensure that workers and their representatives in the company have information and training on the activities to be developed, as well as the measures to be correctly used to maintain their well-being and quality of life.

When planning the set of preventive measures and good practices, the employer must ensure that at all times there is constant surveillance of the health of workers due to the risks they are exposed to in the workplace. This vigilance will guarantee you, in addition to correcting the execution of the activities carried out, the adequacy of the environment where the activities are performed, thus always managing to correct any error and damage that may be presented.

CONCLUSION

Based on the premise that the manual transportation of cargo is a common and necessary activity in all companies and in view of their adversities and needs, it was evidenced that the way of working with the manual transportation of cargo must be part of the company's attention and concern, as its employees who perform this activity must be guided, qualified, trained and equipped to perform any task to which they are assigned; thus obeying labor laws and at the same time preventing accidents, incidents and injuries that harm the worker and cause losses to the company.

In order to minimize the penalties resulting from poor working conditions, it is recommended that you make a layout to save space and reduce the worker's movement as much as possible.

In this context, the study carried out was fundamental for the aggregation of information knowing that any and all learning is valid, since knowledge and improvements are fundamental for the development of a competent professional.

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