https://doi.org/10.4322/rae.v14n2.e202013.en

ABERGO 2020
XX Congresso Brasileiro de Ergonomia VIRTUAL
23 a 27 de novembro de 2020

THE SECRET OF MASS: THE WORK OF THE PLASTER FROM THE PERSPECTIVE OF PARTICIPANT OBSERVATION

Yago Rios Freitas
UNIFEI – Itabira
yagoriosf@gmail.com

Raoni Rocha Simões
UNIFEI - Itabira
raoni@unifei.edu.br

Summary

This work presents the results of research carried out in a small plaster manufacturing industry, located in the city of Itabira/MG. Through the study of the plasterer's position in the manufacture of frames, an Ergonomic Work Analysis (AET) was developed, followed by the application of Participant Observation, a tool that is based on greater interaction with the activity through its execution by the work analyst. The study was developed in order to investigate what are the most important difficulties encountered by plasterers, what regulations are adopted in manufacturing, and how these contribute to the production process and the safety of the system. The results show differences in the level of data collected in AET and Participant Observation. If with AET it was possible to identify distinct regulations used by workers during work activity, Participant Observation allowed greater knowledge about the origin of these regulations and, consequently, another category of observations was created, perceptible only when carrying out the activity. The present work argues that Participant Observation can serve as an important support in the fine understanding of human work.
Keywords: Ergonomics. Ergonomic analysis. Participant observation. Regulation.

1. INTRODUCTION

The technological development provided by industry 4.0 seeks to add more and more speed and fluidity to the way goods are manufactured and services provided, at the same time that it threatens several types of professions that currently exist. In the early 2000s, several studies already demonstrated this, such as that by Frey et.al (2003), suggesting that around 47% of North American jobs tended to be replaced by artificial intelligence in a short period of time.

On the other hand, in certain activities human action is irreplaceable, both due to the specificity of the movements performed and the tacit and incorporated knowledge that individuals carry (Dreyphus and Dreyphus, 2012). A plasterer, for example, uses methods that do not require digital technology to manufacture a set of frames that

They will later be installed in homes, businesses and indoor environments. In this activity, manual and manufactured tools are used to prepare the raw material and achieve the final product, namely, plaster moldings.

The natural raw material for construction plaster is the ore called gypsum, commercially known as “natural plaster” (Aguiar, 2004). During the hydration of the gypsum paste, characteristics of workability, setting time and dimensional variation of the pastes are generally observed (Pinheiro, 2011).

For Cincotto et al. (1988), knowing the properties of the material is essential for the design of plaster components and for quality control. In the case of plaster, the aspects to be analyzed are the setting time and the workability of the material.

The difficulties encountered by these workers are related to patterns that can be identified in all types of work: each function, regardless of what must be performed, has its “tricks”. But how can you understand what these tricks are about? Where did they originate from and what is the difference in perception, by the analyst, between external observation and the execution of the real activity? With the use of specific tools, it is possible to carry out and analyze the activity from another perspective, other than just that of the observer.

The present work aims to report and characterize the experience in a company that manufactures plaster moldings, seeking to show that there is a difference, in terms of understanding the activity, between observing and carrying out such activity, using as the main methodological tool the “ Participant observation”, in which the person who studies and analyzes also participates in the actions carried out.

2. THEORETICAL FRAMEWORK

2.1. Interviews and observations in Ergonomic Work Analysis

Initially developed by the French school of ergonomics (Wisner, 1974; Duraffourg et al. 1977; Guérin et al. 1991), ergonomic intervention is today a method of understanding and transforming real activity, seeking to develop the health and safety of individuals, as well as as well as process efficiency (Vidal, 2001).

It is through Ergonomic Work Analysis - AET that the ergonomist comes to know the complexity and difficulties throughout production, favoring the visualization of events that previously remained hidden, thus being able to radically modify the conditions and the way work is carried out (Wisner 1987). To achieve this, the ergonomist, or work analyst, mainly uses interviews and open and systematic observations of the activity.

The interview can be considered as a type of directed conversation with certain pre-defined objectives (Iida, 2005). We can classify them into 3 types: structured, semi-structured and unstructured. First, in the structured interview, the content and procedures are previously defined, with questions that follow a script and guarantee standardization in the responses collected. Next, the semi-structured interview makes data processing less explicit and less immediate, with previously defined content and procedures, but in this type the researcher is allowed to change the sequence of questions or add new ones. Finally, in the unstructured interview, only a preview of the relevant topics is made and the dialogue method is similar to that of an informal conversation (Lima, 2003).

Activity observations are initially carried out in an open manner, without well-defined hypotheses. We then speak of "free observations", which occur mainly during the first visits to the workplace. In addition to these, there are also observations focusing on collecting certain categories of information with precise objectives. In this case, we speak of "systematic observations", or those with better defined hypotheses (Guérin et.al, 2001).

In free or open observation, the worker is observed so that the ergonomist/analyst has a better understanding of the activity performed, the difficulties experienced and the regulations developed, or the way in which the individual, through the activity, faces and controls the temporal pressures, environmental restrictions, inconveniences or work

difficulties (Rocha, 2017).

Open observations allow the analyst to begin to establish relationships between the constraints of the work situation, the activity carried out by the operators and the consequences of this activity for the health of workers and the safety of systems (Lima et al., 2015).

After the first open observations, it is possible to establish a pre-diagnosis of the situations observed. Therefore, based on this pre-diagnosis, “a systematic observation plan is defined, with the aim of verifying the hypotheses raised and proceeding with the treatment and validation of the data obtained” (Abrahão, 2009, p.231).

According to Abrahão (2009), the characteristics of systematic observation involve the choice of the category of variables, the choice of the nature of the data, the definition of the situations to be observed, the minimum intervention on the situations in addition to the replicability of these situations.

2.2. Participant Observation as a way to deepen the analysis

Participant observation refers to a research situation where observer and observed are in a relationship of direct interaction through the activity, in which the data collection process takes place in the work environment of those observed, who become seen not more as objects of research, but as subjects who interact in a given study project (Serva and Junior, 1995).

In general, the researcher who uses this tool tries to learn what the life of an individual inside the system is like, even if he inevitably remains an outsider (Mack et al., 2005). This occurs when the perspective of those who observe an ongoing action in order to study it and the perspective of those who perform the action merge, that is, the researcher is the same person who performs the action and who experiences the result of his action (Silva, 2013).

Participant observation therefore studies people in their natural environment, gaining a depth of insight into behavior that not only comes from observation, but also from the researcher's own experience in the group being studied (Silva, 2013).

It is possible that different levels of involvement are established between the analyst, situations and individuals and that different results are obtained from these interactions. These interactions can range from a low level of participation to higher levels, in which participation becomes moderate, followed by active or complete participation (Spradley, 1980).

Through this method of investigation, analysts are led to share habits and roles of those who make up the observed group, therefore, positioning themselves in favorable conditions to observe behaviors, situations and facts that would either be changed in the presence of strangers or that would not occur (Brandão , 1984; Marshall & Rossman, 1995).

Participant observation thus constitutes an investigation technique, which usually complements semi-structured or free interviews in ethnographic research (Correia et. al., 1999).

3. METHODOLOGY

Initially based on an AET developed in a plaster factory, located in the city of Itabira, Minas Gerais, in which the plasterer's position (the one who manufactures plaster frames) was analyzed, this study discusses the tools applied, seeking to understand the activity and, subsequently, bringing previously unseen elements to light with the help of Participant Observation.

These tools are intended to facilitate the identification and breakdown of regulations as they were identified in the process.

The company is made up of eight people, namely: the owner, an assistant, a secretary, two bricklayers and three plasterers. The analysis revolved around the activity of plasterers who operated in the company's manufacturing environment.
The three plasterers were accompanied, one of them being the main manufacturer, working whenever there was demand (plasterer 1); the second analyzed lived in the company and only manufactured frames when working overtime (plasterer 2), this being the most experienced in the field, working only when the demand was very high; he usually worked in the field with facilities. The third plasterer worked for around a month as a manufacturer (plasterer 3), covering the main plasterer's holidays.
All employees analyzed were registered with the company and received a fixed remuneration based on working hours. The number of frames produced did not influence their payment.
AET's observation and construction work was carried out between March 2019 and October of the same year, on a weekly basis or according to the availability of plasterers, as manufacturing depended on demand. In total, 18 visits of approximately two hours per period were carried out. During these visits, the activity of manufacturing the frames was observed directly, through filming and through interviews at specific moments.
In addition to the observations, interviews were also carried out with the individuals, seeking to understand the determinants and consequences of the observed activities.
To carry out participant observation, the researcher received one day of training. From this, around 20 manufactures were carried out and with each process, new observations were made. Participant observation lasted a total of three months. Each molding process lasts 45 minutes and, on average, for each manufacture, two cycles of the same process were repeated, totaling one and a half hours per manufacture. This process was repeated once or twice a week.
The most diverse difficulties that appeared during the process and, together with the execution of the activity, generated questions, causing some of the analyst's perceptions to emerge. These perceptions were recorded, aiming to demonstrate the difference between observing and carrying out real activity.

4. RESULTS AND DISCUSSIONS

4.1. Contextualization of the field

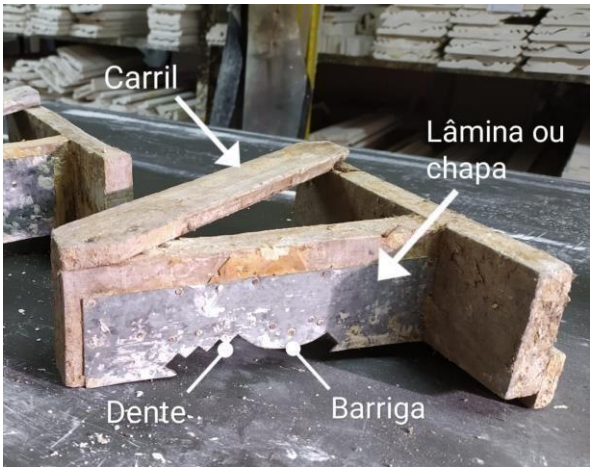
The place used to manufacture plaster moldings houses a stock of molds spread across the walls and ceiling. On the other side of this same environment, a large shelf is intended for storing already manufactured frames available for immediate delivery or left over from production. In the center, a 4.5 by 1.2 meter slate table is used throughout the process.

The formats to be manufactured can vary in origin, being these from the internet, from the company's showroom, through pieces removed from installations or by analyzing the handmade notebook that was available to potential interested parties. Each model occupies a price range that goes from R$3.00 to R$7.00 for the unit only and from R$10.00 to R$14.00 per meter of product installed.

The fact that the frames do not have identification means that the plasterer often has difficulty finding the specific shape and asks others who work in the same space to help him in the search and thus reduce the time spent.

These have developed their own language in which they call square regions as “teeth” and round regions as “bellies”. Figure 1 demonstrates the main tool used in manufacturing: the Rail. Its triangular shape is characteristic of the company, and was designed by the manager.

Figure 1: Rail..



With the appropriate rail in hand, the plasterer only puts on an apron and does not use gloves or a protective mask. The process of cleaning the table begins with the help of a spatula and trowel. During the period observed, the table sometimes had objects and marks from previously manufactured items.

After ensuring that the table conditions are ideal, the dough preparation begins. It is up to the plasterer to determine the amount of putty that will be used according to the dimensions required.

The container used is generally impregnated with plaster remaining from the last manufacture and, therefore, it is necessary to use a stick similar to a broomstick that the plasterer uses to strike the bucket to make it easier to remove the plaster.

solid part. In addition to this process, the employee throws the bucket on the floor and steps on it to ensure that solid waste deposited on the walls inside the bucket comes off. While the plaster and water mixture settles, a combination of diesel oil and washing powder is spread with the help of a sponge on the table. The mixture has

function to grease and facilitate removal of the frame when it is ready.

Before starting molding, the worker performs a texture test on the dough with his index finger and only starts the process when, through touch and observation, he identifies

the sweet spot. The molding process begins and the operator repeats the cycle a few times, refilling the plaster at the beginning of the process whenever necessary. A cycle in the situation in question was considered a passage of the rail along the side of the table on which the frames will be made. This cycle aims to model, remove holes and leave the part with ideal dimensions.

When the process is finished, the frames are marked with the saw so that each piece is 1 meter long, using as a reference a piece of tape measure or the table itself which has yardage marks. Once the pieces are sawn, they are removed from the table using specific techniques such as using hands together, in addition to a technique that consists of using the first removed frame to apply a small horizontal force to the second, thus causing it to come loose. of the table.

Once the frames are removed, they are stored on the shelf located in the room. factory.

4.2. Regulations at work

Based on the results of the AET, the identified regulations were then broken down according to the individuals' intentions in carrying out each of them. Criteria more related to space, production methods and quality criteria were found, as described below.

4.2.1. Knowledge inherent to manufacturing

When a certain form is not found, the employee asks the manager to manufacture the part. Many times it is not possible to find the mold to be used and only the company manager manufactures them.

Before starting manufacturing, the employee cleans the table and tools that will be useful in the process, in addition to checking the availability of plaster in the crate. “You need to clean the tools before you start working with the dough, because then the time is running out. If you make a plaster and need to make another without having plaster in the box, it is dangerous for the frame to dry without being ready” (plasterer 1).

The plasterer passes the rail that will be used (simulating the tool passing on the table) with the aim of marking and facilitating visualization of the path to be taken by the putty.

If the metal sheets of the molds are rusted or scratched, the frames from such molds tend to have horizontal marks similar to scratches. To prevent this from happening, it is necessary to sand the molds in the region that gives the frame its shape.

The exact weight of the plaster to be used per process is not defined, due to the different volume and shape of each frame, in addition to the fact that some rails have double formwork.

The plaster must not contain lumps, and after adding it to water, the mass begins to harden. It is through touch that the plasterer identifies the ideal moment

dispersion on the table to start the process. “If you run your finger over the dough and it is smooth, covering the scratch you made again is still not good, but if you pass it and see that the dough is firmer, leaving the mark made by your finger remaining in the dough, it is in the way.” (plaster 1). The ideal point is defined when, after the texture test, the path made by the finger in the dough remains clear. This point indicates that the plaster is ready to be manipulated.

The use of clean water makes a difference in the production process. In one of the manufactures, water from a barrel installed in the production environment was used to wash hands and objects used in manufacturing.

The fact that the barrel was contaminated with traces of diesel oil, washing powder and previously hydrated plaster caused the chemical compositions of the mixture to be altered in some way, thus generating a mass with the characteristics of a “dead mass” even with the appropriate proportions of plaster and water.

It is known by employees that the impregnated plaster dries and forms layers that overlap the rail, creating deformations in the frame and hindering the development of the activity.

When the molding process is finished, plasterer 1 marks the entire frame with the saw before actually sawing the solid plate that is formed. For him, it is faster to mark beforehand and saw all the marks at once.

In the allo-confrontation, plasterer 2 stated that he prefers to use a spatula to cut newly manufactured frames; In this case, at the end of the rail passage, the plaster is solid, but it adopts a slight state in which, with the appropriate force applied, it undergoes a precise cut.

When removing pieces from the table, caution is required: plasterer 1 uses a physical shock technique between frames where he removes the first and uses this to apply a small force to the next one to be removed, while plasterer 2 prefers to remove each section in turn. time, pulling the table frame so that it comes apart in parts.

Lack of knowledge of techniques for removing table frames can cause them to come out broken or cracked, thus rendering the manufactured object unusable.

The proximity of the shelf where the frames are stored and the manufacturing table facilitates transport after production and reduces the risk of breakage. Figure 2 shows the moment when the plasterer removes the frames on the table and positions them on the shelf.

Figure 2: Storage of manufactured frames.

4.2.2. Time optimization

After dispersing the plaster in the water, while waiting for it to decant, with the help of a sponge, the plasterer applies a mixture of soap powder and diesel oil, which greases the table and reduces the adhesion of the already dry frame at the end of the process. .

When the dough and the table are ready for the manufacturing process, the dough is dispersed on the table and using the rail, the plasterer repeats movements that shape the mixture. It is necessary for the operator in question to channel the newly added soft plaster into the mold and observe the deficient parts, guiding the mass so that it fills spaces that have not yet been filled.

While one hand holds the rail and passes it across the table, the other hand carries out repetitive movements as many times as necessary so that the frame no longer deforms.

When asked about the origin of the movement, plasterer 1 stated that in addition to observing the previous plasterer, he realized for himself the importance of using these movements, which advance the process of directing the plaster to unfilled areas, thus reducing the time spent on the plaster. production.

When analyzing the video of the “clash between frames”, plasterer 1 stated that he uses the technique with the aim of reducing the waiting time for the slabs to dry, as they would come off the table without difficulty if the waiting time were longer: “... sometimes there are more than 8 meters of frame and we have to do the same thing twice. If waiting for it to dry takes too long, then we know when it's almost completely dry and knock one frame against another to make them come loose more easily” (plasterer 1).

As soon as the process is finished, residue remains stuck to the bucket and, after a certain time, when this residue is completely dry, it becomes brittle, which makes it easier to clean and remove unused plaster. This factor justifies the fact that the plasterer does not clean the container immediately after using it.

4.3. From observations to execution: results of participant observation

After the training received by the analyst, the demands began to be carried out by him himself together with the plasterer 3. From that moment on, the process of participant observation begins, the results of which are described below.

4.3.1. Rail manufacturing tips

The manufacture of the rail was carried out only by the company manager and, basically, through the use of a model (either from the reference notebook, drawn on paper or with a piece of the frame to be manufactured) the mold is created and, with the With the aid of carbon paper, the “silhouette” of the expected shape is transposed onto a metal plate.

After comparing the marks made on the sheet and confirming the similarity between the mold features, the cutting process begins. Using specific scissors for cutting metal sheets and the help of tools such as a file and sandpaper, the blade is formed.

Manual skills are essential in this process. The cuts must be precise and, if errors occur, the plate must be discarded and replaced with another that has already gone through the previously mentioned processes.

Throughout the study, the analyst had the opportunity to manufacture a rail, which, due to inexperience regarding the number of nails needed to fix it between

The wooden parts resulted in the manufacture of an inefficient piece that, after a short period of use, failed.

For the rail to have sufficient strength for the process, it would be necessary to use a larger nail accompanied by two or more smaller nails that ensured that the tool did not lose its firmness throughout the molding process, explained plasterer 1.

The manufacture of the form is not present in all manufactures, considering the fact that it is often already ready, requiring only its location. One of the problems identified during the first visits to the company was the failure to list the forms. This factor meant that the plasterer spent an average of 15 minutes
until it found the desired shape and caused delays in production.

4.3.2. The “recipe secret”

The process of preparing the mixture is, if not the main one, one of the most fundamental for manufacturing the frame. Knowing the ideal point characterizes the quality of the product that will be made and the time that the plasterer will have to carry out the molding process. Small variations in the amount of plaster added directly influence the “setting time” of the mass, which determines how long the plaster will last.
available for repeating movements in manufacturing.
A mixture with a lot of plaster solidifies very quickly, making molding difficult and making it necessary in most cases to make a new putty to complete the required molding. As explained above, too little plaster tends to generate dead mass.
If too little plaster is added or the mixture is contaminated, this will result in a “dead mass” as known by plasterers, a mass that does not fully solidify and if used will generate brittle frames with no commercial value.
For an ideal mass, the gypsum powder must be dispersed evenly over the water placed in the bucket until the gypsum begins to penetrate the surface of the water. After waiting for it to settle for around 5 minutes, the mixing movement makes the plaster get closer to its ideal setting faster and removing a certain amount of it guarantees a smaller portion of softer mass, which makes it easier to use in the final stages. of manufacturing.
It takes around 7 minutes to prepare a mixture of plaster and water, therefore, the lack of dough throughout the process increases the time spent on manufacturing, if there is no precision on the part of the plasterer.
The average time spent by plasterers who have experience to create 4 meters of molding (a table) is around 45 minutes and for this time to be reached, it is necessary that the plaster channeling movements are precise, as with the guidance Suitable material easily fills empty holes.
A mass with ideal concentrations adopts a more rigid liquid texture that remains in the same state for a longer period. Higher concentrations of gypsum reduce this available time and cause the mixture to dry quickly, also reducing the possibilities for adjustment and demanding speed from the operator if he does not want to repeat the mixing process again.

4.4. Participant Observation as support

As demonstrated in the results, the development of AET generated data related to the activity that brought more clarity regarding the regulations and the ways individuals found to continue developing their functions.

The use of Participant Observation did not discredit or eliminate the hypotheses arising from AET, but served as a basis for new aspects to be observed. The hypotheses raised throughout the Ergonomic Analysis provided data for the researcher, thus facilitating the directing of systematic observation to details not yet answered by the hypotheses.

Leininger (1985) states that the process of systematic observation, when there is detail, description, documentation and analysis of patterns, is fundamental to understanding culture, whether local or on a larger scale.

It was through the participant observation tool that different moments were observed, enabling participation in different situations that, if they had not been experienced, would go unnoticed in the eyes of the person analyzing, since active participation in the process increases the level of interaction between the analyst and the information available in the environment (Spradley, 1980).

The fact of developing contact with the tools used in production, interacting with those who have the knowledge and practice the activity daily, in addition to executing the manufacturing process without interference from third parties makes it possible for adversities to arise and with them the need to regulate in order to the quality expected by management and the executor himself.

In fact, the perspective of the researcher and the executor merged through the development of the activity, as stated by Silva (2013) when referring to the fact that participant observation is a qualitative protocol that aims to help researchers to understand which perspectives are usually adopted by the populations under study.

Participant Observation increased the level of detail of the hypotheses, for example: the amount of gypsum added to the water. This quantity directly influences the quality of the mixture (a factor that will determine the time available to carry out the process), and the quality of the product that will be generated (resistance and uniformity). Knowing that the mixture is made of plaster and water is the result of open observation and interviews. Know about “how is the mixture made? ”, was not enough for the analyst to perceive, for example, the moment when the consistency of the mixture presented ideal characteristics to be used. It was necessary to use the participant observation tool, because through it the analyst carried out the mixing process several times and was able to realize how fundamental this part of manufacturing is for the process.

5. FINAL CONSIDERATIONS

This work presents several analyzes of the plaster manufacturing activity, including the execution of the activity by the analyst himself, with the aim of deepening the understanding of the plasterer's work. The Participant Observation tool allowed the analyst to reach a level of detail only possible by those who are very close to operational reality.

The script used by the analyst to carry out the activity in the latest fabrications was no longer exactly the same as the sequence adopted by experienced plasterers, but rather a

combination of what was learned and intuitively perceived as a possibility closest to the ideal.

When the activity stopped being just observed and started to be executed, it became clearer to the analyst the reality experienced by the plasterers, the temporal and quality pressures experienced daily, and how the regulations previously perceived in AET have their

importance to each part of the process.

Observations and interviews at different levels provided theoretical knowledge about how the manufacturing process is developed. This information is fundamental for building knowledge and as a reference for carrying out the activity, but only practice and experience of real work make it possible to understand the variables in more depth and ways to deal with them.

With the development of this work, it was possible to directly experience participation in a living organization, in addition to confirming how the use of tools with different observation approaches, in ergonomics, consequently generate a greater number of data to compose a research.

This research corroborates the content of its theoretical framework and demonstrates how active participation in the execution of an activity allows us to lay bare reality, bringing to light situations that were previously “hidden” in the middle of the process. Therein lies the importance of using participant observation as a qualitative tool for analyzing work.

6. REFERENCES

Abrahão, J. et al., 2009. Introdução à ergonomia da prática à teoria. São Paulo: Edgard Blücher.

Aguiar, G, 2004. Estudo de argamassas produzidas com agregados reciclados contaminados por gesso de construção. Escola Politécnica da Universidade de São Paulo.

Brandão, C. R, 1984. Participar-pesquisar. In C. R. Brandão (Org), Repensando a pesquisa participante (pp.7-14).São Paulo: Brasiliense.

Cincotto, M. A.; Agopyan, V e Florindo, M. C., 1988. Tecnologia de Edificações - O gesso como material de construção - propriedades físicas e mecânicas. 2ª parte (Coletânea). Instituto de Pesquisas Tecnológicas do Estado de São Paulo S.A. Pini Editora.

Correia, M. C., 1999. A Observação Participante enquanto técnica de investigação. Pensar Enfermagem.

Dreyphus, H. & Dreyphus, E. 2012. Expertise intuitiva: para além do pensamento analítico. Belo Horizonte: Fabrefactum, 316 p.

Duraffourg, J. et al., 1977. Analyse des activités de l’homme en situation de travail, principes de methodologie ergonomique. Paris: Laboratoire de Physiologie du Travail et d’Ergonomie.

Entrevista: Yves Schwartz, 2006. Trab. educ. saúde, Rio de Janeiro, v. 4, n. 2, p. 457-466.

Frey, K., 2003. Desenvolvimento sustentável local na sociedade em rede: o potencial das novas tecnologias de informação e comunicação. Rev. Sociol. Polít.; 21:165-85.

Guérin, F. et al., 2001. Compreender o trabalho para transformá-lo: a prática da ergonomia. São Paulo: Edgar Blucher. P86

Hatano, G. & Miyake, N., 1991. What does a cultural approach offer to research on leaming? Learning and Instruction, 13273281.

Iida, I., 2005. Ergonomia: projeto e produção (2ª ed.). São Paulo: Edgard Blücher.

Lima, F. P. A., Diniz, E. H., Rocha, R., Campos, M. (2015). Barragens, barreiras de prevenção e limites da segurança: para aprender com a catástrofe de Mariana. Revista Brasileira de Saúde Ocupacional, 40 (132). DOI: https://doi.org/10.1590/0303-7657ED02132115

Lima, J. A. de A., 2003. Metodologia de Análise Ergonômica. Monografia de Especialização do Curso de Especialização em Engenharia de Produção, Univer sidade Federal da Paraíba.

Leininger, M., (1995). Qualitative research methods in Nursing. Orlando. Grune & Stratton.

Mack, N. et al. Qualitative research methods: a data collector's field guide. U.S. Agency for International Development (USAID). Carolina do Norte (USA): 2005.

Marshall, C., & Rossman, G. B., 1995. Designing qualitative research (2nd ed., 78-79. Thousand Oaks: CA. Sage Publications.

Pinheiro, S. M. de M., 2011. Gesso reciclado: avaliação de propriedades para uso em componentes. 330 f. Universidade Estadual de Campinas.

Rocha, R., 2017. Atividade coletiva na redução da carga de trabalho: uma articulação entre regulações quentes e frias. Revista Brasileira de Saúde Ocupacional - 42: e5. DOI: https://doi.org/10.1590/2317-6369000005316

Serva, M., Jaime J. P., 1995. Observação participante e pesquisa em administração - uma postura antropológica. In: Revista de administração de empresas. São Paulo: FGV, v. 35, n. 3.

Silva, R. da S., 2013. Contribuições da ergonomia para projeto de engenharia: utilização de método baseado na observação participante. 2013162 f. Dissertação (mestrado) - Escola Politécnica, Universidade de São Paulo, São Paulo.

Spradley, J. P., 1980. Participant Observation.Orlando- Florida. Harcourt Brace Jovanovich College Publishers

Vidal, M. C. R. Ergonomia na empresa: útil, prática e aplicada. Rio de Janeiro: Virtual Científica, 2001.

Wisner, A., 1987. Por dentro do trabalho – ergonomia: método & técnica. Tradução de Flora Maria Gomide Vezzá. São Paulo: FDTcap. Componentes cognitivos e psíquicos da carga de trabalho, p.172-189. Título original: Analyse de la situation de travail, méthodes et critéres.

7. DISCLAIMER

The authors are solely responsible for the information included in this work and authorize the publication of this work on the ABERGO 2020 scientific dissemination channels.