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## Polishing Knowledge: A Study of Marble and Granite Processing

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## Abstract

The aim of this article is to understand the work situations and highlight aspects of the knowledge invested by workers when performing marble and granite processing activities. The survey is qualitative and was based on the reality of a small industrial company that deals with processing activities. The case study was based on theoretical and analytical ergology tools by analyzing the organizational documents and safety and health standards that regulate activity. It involved conducting individual interviews with nine workers, organizing a focus group with these workers, and directly observing work for four months while recording a field notebook. The workers' experiences in the **renormalization** of working processes, or the introduction of improvements guided by singular aspects of the local work organization, were identified. The workers, through **use of oneself**, place more importance on meeting deadlines and production targets than on their own safety. Worker competency is directly related to the professional training obtained on the job and is associated with working experience in the absence of an *a priori* formal education. This article contributes to the field of organizational studies and human resource management because there is a lack of studies on workers from this field that describe the competencies used in actual work. Thus it may guide theoretical and practical management aspects in such working environments and small businesses regarding safer work organization.

**Key words:** marble and granite; work; ergology; competency.

## Introduction

Studies that aim to understand working situations, such as this study<sup>(1)</sup> of the marble and granite processing industry, are important to organizational studies. This relevance arises from the lack of studies in this field that are focused on the topics of work, management and subjectivity, as verified by a search of different international (International Journal of Human Resource Management; Human Resource Management; Human Resource Management Review; Revista Laboreal) and Brazilian (Revista Psicologia e Sociedade; Revista Psicologia, Organizações e Trabalho; Revista Labor; Revista de Administração de Empresas [RAE]; Revista de Administração Contemporânea [RAC]; Brazilian Administration Review [BAR]) journals, primarily from the last five years. The search for the terms **ornamental rocks, marble and granite** and **mining** showed a considerable number of articles focused on the development of technologies with emphasis on the reuse of waste generated by this segment and on new machinery and inputs for materials processing. Therefore, it seems that there is a lack of studies using this article's proposed approach for this specific work sector.

Studies like this, based on capturing aspects from actual work that are relatively invisible, can contribute to people management, by considering elements for constructing a theory focused on small business management skills and safer organizational work practices in marble and granite field, a contribution that alone would be socially relevant. Moreover, French ergonomists have demonstrated that work analysis is a prerequisite to the prevention of occupational accidents, training, knowledge work content and evaluating qualifications (Wisner, 2012), among others, which are all important for any industrial activity.

The transformations that have occurred in labor in recent decades have provoked new questions about workers' roles within this context of flexibility, continuous improvement and professional competency management (Biazzi, 2012; Boltanski & Chiapello, 2009) as important agents for the transformation and reinvention of their own activities (Sato & Oliveira, 2008; Schwartz, Durrive, & Duc, 2010).

Consequently, it is important to understand how knowledge production occurs in working situations so that one can understand human resource management aspects in a more appropriate way with consideration for workers' actual situations in the marble and granite industry, and in other industries with similar working conditions. This is in accordance with a proposal by Dobbins, Cardy, Facteau and Miller (1993), which states the importance of "integrating the reality of situational factors into the performance management process" (p. 5). This industry, located in the southern region of the state of Espírito Santo (ES - an important state for this industry) comprises many small companies, many of which have harsh working conditions, aspects of which this study aims to clarify through discussion and analysis.

In an attempt to understand how local organizations engage in industrial development, one can see that generally, according to Castro, Marcon, Freire and Almeida (2011), organizations that attempt to improve worker activities are limited by the lack of financial resources and a context of precariousness in which worker knowledge is devalued.

Triginelli (2011) claimed that worker practices, knowledge and experience are the foundation of the work organization in the marble and granite industry and that these must be developed along with formal education and technical training in order for the worker to perform his/her tasks, because a lack of planning might increase the risk of on-the-job accidents. Santos (2011) corroborates this idea by stating that a great challenge faced by marble and granite companies is the articulation of worker knowledge, as they "cry out for the valuing and consideration of their knowledge" (Santos, 2011, p. 93).

This research is focused on answering: How does a marble and granite worker perform his/her work activities compared with the prescribed standards and performance challenges posed by the environment? The outlined objective is to understand work situations, based on the study of activities.

To evaluate these complex aspects that involve working situations in processing activities by studying a company in the industry – one located in the southern region of Espírito Santo (ES) –, this paper is structured as follows: first, the subjects are introduced, and transformations in labor regarding capitalist context, work and ergology, and work and competencies are described. Next, the industry and the research are contextualized by explanation of the research method. Finally, the results obtained from the company studied are discussed and possible outcomes are noted.

## **Labor Transformations in a Capitalist Context**

Work has undergone many modifications over the last twenty years, and these have introduced difficulties to the exposure of work characteristics. Schwartz, Durrive and Duc (2010) stated that even though work is ever more intellectual, stress currently observed in workers proves how physical aspects are still important. The authors affirmed that while jobs now require much more initiative than before, procedures have been standardized, creating a paradox. The subject of paradoxical management was also very pertinently addressed by Gaulejac (2011), who showed that this type of pressure could result in workers' exclusion.

According to Trinquet (2010), current work in this industry can be brutalizing, alienating, traumatizing and even deadly in many cases. However, according to the author, it is not work "in its fundamental and ontological function that results in these perversions, but the working conditions that are imposed" (Trinquet, 2010, p. 111), which are sometimes imputed by men themselves. However, according to the author, men can change these conditions and make them favorable to everyone's interest, and not only for the interest of a selfish and dangerous minority.

When addressing the ideological changes that have occurred simultaneously with recent transformations in capitalism and consequently in labor, Boltanski and Chiapello (2009) presented a singular analysis that focused on "the various ways in which people commit themselves to an action, their motivations, and the meaning that they give to their acts" (p. 33), thus differentiating themselves from most discourse on globalization. According to the authors, human beings both make history as well as suffer from its effects.

New capitalist configurations require construction of a new subjectivity with regard to work, because the current transformations, as discussed, might affect workers' personal and professional identities and also induce effects that promote new collective actions by workers (Biazzi, 2012; Cunha, 2007).

The transformations in capitalism support new ways of being and living that change worker requirements (Boltanski & Chiapello, 2009; Leidner, 2001). Understandings of the transformations in labor and individuals' construction of meaning with regard to his/her organization, as well as what contains symbolic connotations of difficulty, challenge, teamwork, progress, pleasure and professional growth are very important in ergology studies, as these consider the worker as someone who holds his/her own values, beliefs and rules and also constantly reinvents his/her relationship with the environment in which he/she lives (Athayde & Brito, 2011; Schwartz *et al.*, 2010).

## Work and ergology

According to Gernet and Dejours (2011), to work means to face prescriptions and procedures and also the ability to care for or shelter others. However, work activity is inevitably confronted with reality, such that “the arrangements a subject makes to recover the difference between what is prescribed and his/her effective activity can never be entirely foreseen, as they are reinvented at each time” (Gernet & Dejours, 2011, p. 62).

According to Schwartz (2003), if the fact that work is permeated by the workers’ stories and the working environment is not considered, then there exists a **mutilation** of individuals’ activities as history makers because these men and women question knowledge and permanently reproduce new tasks for this knowledge, which is then produced and modified to further change the prescriptions of such activities.

According to this author, prescription for an activity cannot incorporate all anticipated factors required for its execution, so a worker must use his/her knowledge according to his/her values, experience and history to fill the gap between what is prescribed and what is performed, thus reconfiguring the previous prescription (Schwartz, 2003).

Managers do not necessarily need to consent or participate as a boss for these reconfigurations to occur, because, according to Schwartz (2004), there is no separation between the managed and the managers. This means that all workers manage their own activities. For this reason it is relevant to study work as a human activity rather than as a task.

Through ergology, work situations can be studied from an approach that is centered on analysis of actual work situations. According to Athayde and Brito (2011), ergology emerged in France to maximize the amplitude of analysis for all dimensions of human activities as if they were observed through a magnifying lens. It appeared as an extension of ergonomics and is based on the study of human work complexity. “Ergology is the permanent study of the debates of norms and values that indefinitely renew the activity; it is the intellectual discomfort” (Schwartz *et al.*, 2010, p. 30).

According to Bendassoli and Soboll (2011, p. 12), ergology originates from the principle that an activity that requires a perpetual debate of experiences “is responsible for a permanent learning of the norms and values projecting the individual to a constant process of knowledge-transformation of his/hers activity”. Its foundation, as previously stated, is the goal of a better understanding of work to facilitate intervention and transformation (Bendassoli & Soboll, 2011).

Lima and Bianco (2009) state that, through an ergological approach, it is possible to unveil subjects’ attitudes towards work organization and determine the sources of pressures, difficulties and challenges, as well as those subjects that are susceptible to pleasure and uneasiness. Ergological analyses focus on workers’ active participation in the performance of work activities and consider three factors that are intimately linked: **Preceding Norms, Renormalizations and Use of Oneself**.

Preceding Norms are all norms that drive an action in a previously conceived direction. This concept “refers to what is given, demanded and presented to the worker before the job is performed” (Telles & Alvarez, 2004, p. 72). Preceding Norms are linked to the rules, procedures and technologies present in a work situation and are responsible for determining necessary basic job parameters. According to Almeida (2007, p. 15), preceding norms are permeated by the “values, culture and science, in the collective, social sphere. Furthermore, they encompass the physical means (materials and equipment) necessary to perform activities up to the management technologies themselves”.

It is important to identify the factors that drive a worker to deviate from the norm, because, according to Cunha (2007), these factors will reveal elements in the workplace conditions and organization that might contribute to extreme situations for workers. “In this way it would be the starting point to call for changes to the means and objectives of the work in order to reduce the risk of extreme situations” (Cunha, 2007, p. 157).

Moreover, according to the author, in cases of deviation from norms, the regulatory procedures are much more complex than simple approximations that are prescribed for actual work, because the procedures can constitute continuous “physical (involving postures and movements), cognitive (search for relevant information and previous experience) and psychosocial mobilizations (fear or concern with the time spent in performing a task)” (Cunha, 2009, p. 159), which can present a new situation, **Renormalization**.

Renormalizations correspond to workers’ actions during a work activity that follow his/her own interpretation within a context of preceding norms, because activities involve variables to be followed, choices and considerations; in other words, it is the process of reworking the preceding norms in all work situations. Schwartz (2003) affirmed that if history is always partially unfinished, then history is also permanently rewritten and new norms of knowledge construction, social construction and unceasing renormalizations occur wherever human groups mobilize for production. Schwartz *et al.* (2010) mentioned that norms cannot anticipate everything, and because working requires risk-taking, it also requires **Use of Oneself**.

Use of Oneself refers to self-experimentation situations in confrontations between preceding norms and needs for renormalization. According to Schwartz *et al.* (2010), each person will address shortcomings in norms in his/her own way because it cannot be done in a standardized manner. Machado, Toscano, Bianco and Souza (2007) mentioned that if work situations are not limited by prescribed norms, the use of oneself becomes necessary because it is the decisive factor that induces a worker to utilize his/her capabilities in order to achieve the goal of his/her activity. When working, one must make choices; therefore, it is never a simple matter of applying prescribed norms. Therefore, life infiltrates every work situation and demands a repositioning in the face of precedent (Athayde & Brito, 2011; Parks, Ma, & Gallagher, 2010; Schwartz, 2011b).

To understand the situations that involve the use of oneself, it is necessary to consider what happens in actual activity. According to Schwartz *et al.* (2010), it is always necessary to make choices, and these choices are based on values. However, choices are also risky because it is necessary to fill gaps in the norms and deficiencies in guidelines and acquired experience that are part of rules or procedures (Schwartz *et al.*, 2010). Therefore, one can state that work always involves management and choice because preceding norms, the use of oneself and renormalization are always interlinked.

Perhaps, in an attempt to present a conceptual framework based on the view of these authors, it could be said that it should describe the relationship between **work activities, context, contingencies and renormalization** (Biazzi, 2012).

## Work and competencies

This discussion is based on a French perspective of competencies that focuses on the mobilization of skills in certain work contexts (Le Boterf, 2003; Zarifian, 2001, 2003). One might say that the French debate on competencies arose from questions about the concept of qualification and the processes of technical and professional training.

According to Colbari (2004), competency is less defined by inherent work attributes and much more by intrinsic worker qualities; the latter is produced in a personalized manner through continuous learning.

According to Boltanski and Chiapello (2009), the competency model is unbound from work position or a rigid structure and is related to a concept of work and organization that is centered on a set of flexible moral and behavioral postures, both of which are adaptable to market trends and requirement-defined changes. Therefore, general professional and technical knowledge is insufficient because competency development depends on a worker’s ability to mobilize the knowledge and experiences acquired throughout his/her life while considering actions during actual processes, as well as unpredictability and management dilemmas (McIver, Lengnick-Hall, Lengnick-Hall, & Ramachandran, 2012; Zarifian, 2001).

This revisits discussions concerning the importance of a reframed notion of competency from the point of view of human activity. Zarifian (2001) described the relationship between competency and organizational field transformations throughout the history of work. According to the author, at one time, work relations in industrial capitalism did not account for the worker as a subject, let alone his/her personal capabilities and knowledge.

According to the author, the concept of competency includes everything “that arises from the resources (knowledge, skill and behavior) and was acquired by the individual through education or the exercise of professional activities” (Zarifian, 2003, pp. 36-37). According to Zarifian (2003, p. 37), competency is the practical utilization of these resources and is “a new way of qualification ... a way of qualifying”.

Le Boterf (2003) stated that competency could be defined as the knowledge of responsible action, which is recognized by others. According to the author, this implies an understanding of how to mobilize, integrate and transfer such knowledge, resources and abilities within a given professional context. For Zarifian (2001, 2003) and Le Boterf (2003), competency is demonstrated in action and is usually associated with event-filled situations, therefore requiring the mobilization of subjects who have direct responsibility for their actions.

From the approaches that link work to competency (Le Boterf, 2003; Zarifian, 2001, 2003), one can see that work is a direct extension of individual competency. These competencies are used to solve unexpected situations and usually require communication processes to achieve main organizational goals through the delivery of services to new classes of customers and end-users with increasing demands.

Studies that involve competency are linked to ergology because it is not possible to fully control for unexpected events when organizing work and production. Thus, workers must seek individual or collective ways to face and solve such events in the most adequate manner. This confrontation requires the use of workers' competencies, which according to Schwartz *et al.* (2010) use the knowledge that arises from the activity. In this way, job understanding provides a context for discussions of norms and values that enable workers to formalize their experiences and therefore their competencies.

It is notable that, because this study concerns the marble and granite industry, the statement by Petinelli-Souza and Machado (2007, p. 106) that “there is, at least up to now, much more use of the notions on competencies than the use of the organizational practices linked to the competencies (remuneration, personnel selection, training)” remains valid. For investigative purposes, a case study was developed to identify how the workers operate within the transformation processes of the required practices for the marble and granite processing industry. This case study will be contextualized in the following section.

## Context and Study Method

According to the Brazilian Ornamental Rock Industries Association (Associação Brasileira da Indústria de Rochas Ornamentais, as cited in Instituto Brasileiro de Mineração [IBRAM], 2013), the ornamental rock industry in Brazil has a turnover of approximately US\$ 2.1 billion per year. This figure includes commerce within both domestic and international markets, as well as transactions of machinery, equipment, inputs, consumables and services. The industry comprises approximately 105,000 workers in approximately 10,000 companies. The amount of rock extracted in Brazil is approximately 5.2 million tons per year.

The states of ES, Minas Gerais (MG) and Bahia (BA) are responsible for 80% of Brazilian production. ES has the largest marble reservoir in the country and a large granite reservoir. It also has the largest processing basis in Latin America (Associação Brasileira da Indústria de Rochas Ornamentais [Abirochas], 2012) and is currently responsible for 56% of Brazilian ornamental rock

production. In this context, the average 2011 salary in the southern region of ES for workers in specific manufacturing functions, such as polishing, cutting and finishing, was approximately R\$ 850.00 (approximately US\$375.00), according to the 2011/2012 Collective Labor Agreement (Convenção Coletiva do Trabalho [CCT], Sindirochas, 2011).

Information about the number of companies in this industry in ES in 2012 was obtained from interviews with two directors of the Marble and Granite Workers' Union (Sindimármore) and is shown in Table 1, below:

Table 1

### Marble and Granite Companies in the Espírito Santo State

Number of active companies in the marble and granite industry in ES	2,641
Number of active companies in the marble and granite industry in the southern region of ES	1,618
Number of companies with specific activities in the marble and granite industry in the southern region of ES	820
Number of direct jobs generated by the marble and granite industry in the southern region of ES	4,320

**Note.** Source: Interviews with Sindimármore.

The above data justify the importance of conducting the study in this region. Regarding the study methodology, a bibliographic search was first performed to identify publications about the marble and granite industry. Most of the findings referred to studies of technical and technological aspects of the industry and showed a lack of studies on the work situations surrounding processing activities. In addition to the data, interviews with two directors of Sindimármore yielded a better understanding of job aspects and the difficulties faced by the workers, according to the directors' perspectives.

Seeking to answer the research question presented, this study adopted a qualitative approach to data gathering and analysis and is a descriptive study with the intent to understand work situations, starting from an organizational context chosen for the case study. The organization was chosen because of its size; it is a small company that represents the reality of most companies in the southern region of ES, according to the Brazilian Support Agency for Small Businesses (Serviço de Apoio às Micro e Pequenas Empresas [SEBRAE], 2007). Additionally, the choice was driven by the openness of the company's managers, who allowed access to the factory and direct contact with the workers during the performance of work processes in the factory. A manager from the studied company was also interviewed to gather specific information about the organization and working conditions.

Throughout the study, analysis was inspired by theoretical and analytical ergology tools. The operational procedures were obtained from a search of the Brazilian Job Classification registry (Ministério do Trabalho e Emprego, 2012) a document that standardizes the recognition, naming and coding of job titles and contents in the Brazilian labor market and contains enumerative and descriptive classifications (considering that there was very little formal documentation concerning work prescriptions and activities) and from the health and safety standards as defined by regulatory agencies. These documents were guidelines used to compare to actual work situations during the study period (July to October, 2012). During this process, direct work observations were conducted of daily work for hours on various days of the week, and situations observed were recorded in field notebooks (Creswell, 2003). Individual interviews were conducted with participating workers and a finally with the entire group (in other words, a focus group was conducted to validate the data and analyses). This validation is an important aspect of ergological analysis, which provides a confrontation between the academic-conceptual pole and the working-situational pole.

The *locus* of the study is the company **O Frade e a Freira Mármore e Granitos<sup>(2)</sup>**, which is located in the southern region of ES. The selection criteria for the group of workers in the study were



defined according to the work processes related to the processing activities and workers' shifts (workers in the same shift). A total of nine workers were monitored during work situations; these included (according to the CBO) a cutter, a cutter's assistant, two crane operators, one resin applicator, a yard assistant, two polishers, one polisher's assistant and a production supervisor. All were invited to participate, and those who agreed signed a Free and Informed Consent Form. To protect worker anonymity, all received fictitious names in annotations (Ademir, Aécio, Alceir, Durval, Fabrício, Geraldo, João, Márcio and Stéfano).

Content analysis was performed after data entering and transcription to analyze and interpret the data gathered during the study (through notebooks and interviews). According to Bardin (2004), content analysis is: "A group of techniques for communication analysis that, through systematic and objective procedures of message content description, aim to obtain indicators (quantitative or not) that allow one to infer knowledge relating to the production/reception conditions of these messages" (Bardin, 2004, p. 42).

For content analysis, all material was carefully read in light of the theory referenced in this study to find analytical categories that involved subjects that were considered relevant and that were frequently mentioned by the interviewees. Three subjects of analysis were evidenced in this article: worker competencies and events, work activity transformations and actual work and safety.

Data analysis of the studied company will be presented in the next section.

## Data Analysis

### The company: O Frade e a Freira Mármore e Granitos

The company is located in the southern region of ES, is formally incorporated and has the characteristics of a family business. Its trajectory is similar to that of many companies in the industry (Pacheco, 2010). It was created in 1990 when a truck driver bought a machine and started the business with very few employees, scarce financial resources and a great degree of improvisation. Initially, the owner learned about the business along with his employees (interview with the manager).

During more than 20 years of activity, the company created an industrial group along with a mining company based in BA, which extracts marble from a specific deposit. Other than block extraction from the quarry in BA, the company also processes marble and granite in both the state of BA and the southern region of ES. The main processing activities include block cutting, resin coating<sup>(3)</sup>, honing<sup>(4)</sup> (only in the BA unit) and polishing<sup>(5)</sup>. The company also cuts blocks for third parties. All other activities are performed exclusively for the company's products, which are extracted from the company's quarry but may also be bought on the market. The company then sells the polished slabs (interview with the manager).

The company's processing sector comprises twenty employees. All employees participate in safety training immediately after hiring. This training takes eight hours and includes the use of personal protective equipment, risks and occupational diseases and first-aid. Additionally, new employees participate in a course on slab handling, circular saw operation and industrial maintenance; this training has been mandatory since 2011 and is provided by the company (interview with the manager). After this course, the worker participates in a month-long training session with a professional who is responsible for the job position (polisher, sawyer, crane<sup>(6)</sup> operator or resin applicator). This professional will follow the day-to-day activities of the worker until the latter is considered prepared to perform his/her activities.

A notable and important aspect of his company's work organization is that the factory workers are multifunctional and are given some degree of autonomy (Marx, 2011). These characteristics are

influential and important to this study from an analytical point of view. The educational level of the surveyed workers, shown in Table 2, is another relevant aspect.

Table 2

### Levels of Participating Workers' Education

Participating Worker (Function)	Level of Education
Supervisor, Resin applicator, Polisher	Primary - Complete
Crane operator (two), Sawyer, Yard assistant, Sawyer assistant	Primary - Incomplete
Polisher assistant	Secondary - Incomplete

Discussion and analyses that are based on the previously mentioned analytical categories are described in the following sections.

### Worker competencies and events

Before introducing the situations analyzed, Table 3 presents some of the worker reports on the notion of competence. These notions are similar to findings of Santos (2011) and bring new aspects, such as **domain** and **anticipation of the facts**. Some of them are highlighted.

Table 3

### The Notion of Skills According to the Workers

Interviewed	Report	Notion
Ademir	"Do the right thing".	Correction.
Alceir	"If you see a stone in the way, remove it, otherwise the supervisor will come and tell you to remove the stone, then immediately he makes you understand. It precedes the situation".	Initiative. Anticipation of events.
Márcio	"Being competent is to be responsible. Monday I have to put resin on a block there, I have two blocks to work on. I know you have to line the scale, you have to line the resin pots, you have to prepare the container straight, prepare the shuttle, and we know that if you make forty plates today, there are sixty-two hours that you'll have to wait for them to dry, so Thursday we already have material to polish. So, what I can do on Monday I will and I know it'll be in favor of the firm. If there's more material, I'll do it on Thursday".	Domain. Responsibility for the work processes. Anticipation of the facts.
Aélcio	"A man is not competent because he is a good professional. You know, he accepts the other ideas that his companions are having".	Respect
Stéfano	"To do things without having to ask others to do it all the time. I think that is competence".	Anticipation of the facts. Responsibility.

**Note.** Source: Interviews (our translation).

To understand work situations and transformations of set work practices, it is important to understand how the workers use their competencies not only during routine and prescribed activities but also when facing unusual situations and events. Each worker has competencies that are shown in action (Le Boterf, 2003; Zarifian, 2001) and that demand initiative and responsibility in situations. In other words many times "it is above all, acting here and now" (Schwartz *et al.*, 2010, p. 205) that must be put into action.

One situation demonstrates the role of worker competency (Biazzi, 2012). Amid the noise (a characteristic of the equipment involved in work processes), a tense situation was noticed in a corner of the factory (Field notebook). The polisher, who was paying attention to the movements of the polishing machine heads and the sliding of the slabs through the machine, suddenly left to help his assistant unload the conveyor. The slab was in a horizontal position and needed to be turned with a claw. Alceir took over the job from Fabrício, his assistant. He took a squeegee and rapidly removed the excess water from the slab to improve the grip. He took control of the claw, positioned the slab and unloaded it onto a trestle. Due to his experience, Alceir already noticed that the slab was cracked, so he performed the movements very carefully. The crack did not extend throughout the entire slab length; nevertheless, the polisher said that, because the slab was marble, the possibility of a process failure was increased, and this could cause more cracks, more crumbling and more breaks (due to intrinsic characteristics of marble). The worker did not want to jeopardize the work with the possibility of an accident (Field notebook).

This situation showed that the worker took over responsibility for his assistant's job. He took action according to workplace expectations, his experience and the autonomy and trust that he received from the organization (Biazzi, 2012). The staff is small, one of the reasons for allowing multifunctionality and for it to be valued in the organization (Interview with manager). When faced with an unusual or even a recurrent situation, the worker chooses an alternative of action (Bruns, 2009; Schwartz, 2000; Wisner, 2012) among those available at that moment and takes responsibility for the choice (Cunha, 2009; Zarifian, 2003). At that moment, experience and cognitive knowledge are much more important than simple compliance with the preceding norms, as anticipated by Zarifian (2001, p. 72), who stated that "competency is the practical understanding of situations that is supported by the acquired knowledge and transforms this knowledge as it increases the diversity of the situations".

Another exchange that was observed between Alceir and his assistant Fabrício is illustrative. A slab broke into three pieces during removal from the polishing machine conveyor. In response, Alceir again took control of the claw and removed the pieces of broken material. There was some tension among the workers during this processing step (Field notebook) because it was necessary to use a crowbar to adjust the claw on the slab, and the slab was transported at an unusual inclination.

Alceir was uncomfortable with the slab breaking and checked for irregularities in the polishing machine (Field notebook). He found that the conveyor lining was torn. The lining wrinkled when a slab was put on the machine for polishing, and therefore the slab was unexpectedly lifted and pressed against the heads of the machine, which caused it to break. If the task had not been stopped and analyzed, the coating could remain folded and other pieces would have been damaged, thus causing operational losses.

Next, the decision-making process was demonstrated. Alceir immediately turned off the polishing machine, found the section supervisor and communicated the situation. The supervisor then took the necessary actions to fix the machine (Field notebook). The event demonstrated a sequence of accountability and communication actions in the face of an event (Zarifian, 2001, 2003), the actions were performed (Schwartz, 2000) responsibly and autonomously by the workers and the final actions were performed by the supervisor.

The polishing process stopped after this event, but immediately Alceir told Stéfano that he would clean the machine during the idle time before maintenance technicians arrived (Field notebook). In an interview, one can ascertain that cleaning the machine was usually performed once per month and consisted of the removal of the rubble and mud that had accumulated under the machine. Alceir and his assistant scraped the bottom of the machine and carried the residues to an appropriate location. All of this was performed quickly in response to the machine stopping, and Stéfano did not need to request that this activity be performed (Field notebook). Again, the workers took over and chose to use the idle time to perform an activity recommended by the best up-to-date industrial practice manuals (Corrêa & Corrêa, 2006).

In this situation, it was determined that, despite the individual roles and activities that were presented, the individuals involved worked as a team and cooperated in a manner guided by the production process through a commitment to a common goal (Le Boterf, 2003).

The factory supervisor's activities also showed how decisions were made. One day during the study, Stéfano appeared to be upset and bothered, which was unusual because he was generally quiet and kind. When questioned, Stéfano said that he had argued with the office staff. To explain the reason for the argument, Stéfano took an aluminum profile and showed how the slabs must be aligned when sawed. At that moment he placed the profile next to the slab and showed that the slab was perfectly cut such that the slab was aligned with the profile.

Stéfano identified this characteristic as a normal situation. He then showed a block of completely bent slabs. When he put the profile next to the bent slabs, one could see the defect and how it extended to all of the recently sawed slabs.

Stéfano explained that such defects occur when the block moves in the saw after placing it in the saw machine and starting the process, causing the slabs to bend. This event causes losses of manpower, equipment time and the materials used in the process, which include grit, electrical power and water. Furthermore, in many cases the company processed third-party material that had to be scrapped, therefore causing additional losses.

To fix the block, it is necessary to cement it to the trolley that is placed into the gang saw. However, even after being fixed, the machine cannot be recalibrated once the process starts, even if the block moves inside the gang saw during cutting. This results in a quality problem in the cutting of the whole block.

In this situation, energetic action is demanded from the supervisor to identify and punish those responsible for the failure, as determined by the normative standard in the enterprise. Stéfano's discomfort was evident when he said: "I wish that they (the office personnel) were in my place for a couple of months so they could see that it is not possible to treat the workers the way they want", because the supervisor acts as the intermediary between management, who wants results, and the workers involved in the process. According to the supervisor, a mistake does not indicate guilt. However, process improvements are needed to prevent future errors.

When situations such as this occur in an organization, the sector supervisor remains in the middle of two opposed parties: on one side, the office personnel, who want the supervisor to take harsher actions; and on the other side, the supervisor's subordinates, who are respected and supported by the supervisor. Stéfano's reaction is justified by Schwartz *et al.* (2010), who affirmed that it is dangerous to appoint only one individual as responsible for a given situation because many variables are involved in the work process, and these are usually beyond the worker's control. Additionally, Kane (1993) discussed situational aspects that affect performance. In her article, which was based on Peters & O'Connor, Kane presented situational constraints for different functions and work categories that were related to job-related information, tools and equipment, materials and supplies, budgetary support, required services and help from others, task preparation, time availability and work environment.

In spite of worker involvement and engagement, in some cases it was clear that the workers needed to attend to process variability management and take responsibility for tasks that they were not always prepared to perform. These workers had to do coworkers' jobs, sometimes without proper knowledge, as in the case of the crane operator who had to changed the gang saw blades:

"I was changing the blade (his function is crane operator and the blade is in the gang saw) ... I was putting in a wrong part, and then Aélcio said: You are wrong!... I had no idea what I was doing, I was in an area I didn't understand, but I was there to help ... To put in the blades, you have to put the harness. It had to be put in one way, but I was putting it in another way, I was trying, but Aélcio was not seeing it, then he checked and he saw that everything was wrong". (João, crane operator).

The situation shows that the workers are committed to production. However, this commitment to the process and its results is not sufficient because the workforce must be trained to be flexible and multi-functional. This technical competence is essential to the operational process (Zarifian, 2001, 2003). Thus, the workers complained many times about the company requirement that workers perform more comprehensive jobs and said that they felt exhausted and unable to perform their activities.

Due to the high work volume and reduced number of workers in the organization, the workers frequently switch functions. This is a characteristic of current industrial workplaces (Boltanski & Chiapello, 2009) that makes the workers feel completely absorbed by work and physically tired. When the workers were asked how they felt about being considered multifunctional, they said that they felt wronged. The statement below exemplifies the situation:

“I love the resin area, but we have a big problem here ..., here we are not resin applicators, we also have to load trucks, help to change blades, work in the polishing machine ... I feel that my body is very limited; from Wednesday onwards I feel very tired” (Marcio, resin applicator).

Although these situations made the workers feel uncomfortable, it was possible to detect through worker language and actions that multifunctionality is an already established situation in the company, and the same could occur in other small companies in the industry. From the manager’s point of view, this is justified by business survival as well as job preservation such that “it is not a matter of being more or less competent, but a matter of necessity (João, crane operator). In other words, the workers resist but they also adopt the survival discourse. This is something that must be addressed under the lens of the paradoxical management strategies (Gaulejac, 2011) that have been established in companies that are part of global competitive chains, a characteristic of the marble and granite industry and that have been impregnated by the mainstream discourse in contemporary capitalism (Boltanski & Chiapello, 2009; Leidner, 2001).

The transformations in capitalism support new concepts and interpretations of work, and thus change the demands and expectations of workers (Boltanski & Chiapello, 2009). Now the worker is even more accountable for a job process from which he/she was alienated for decades and which currently needs all of his/her knowledge and commitment. This commitment makes the worker feel accountable for activities that he/she does not even know how to do. Furthermore, the worker considers this situation to be normal and necessary to guarantee his/her own survival. Biazzi (2012) adds

competences and motivation – operates basically at the individual level, and when conveniently weighed comprises ... a virtuous circle that may lead to successive cycles of learning through the development of skills to execute the task, and also skills to act in improvement and problem-solving activities and, consequently leading to new levels of performance (Biazzi, 2012, p. 6).

The worker is required to be available for all workplace demands, and he/she must manage the variability in the situations that might appear, even if he/she does not have enough command or knowledge of the work process. It is difficult for the worker to manage such work. He/she must address an activity that is simultaneously complex and unique and must also meet the demands of the activities that are interrelated with the process.

## **Work activity transformations**

The discussion of work activity transformations in the studied company refers us to two previously discussed concepts, preceding norms and renormalizations. The first concept, an achievement of all human society (Schwartz, 2011a), is also considered a combination of achievements and risks that can be presented in either an oppressive or a facilitating way, depending on the context. It guides decision-making in both the personal and professional lives. The second concept is seen as indispensable because a situation in which all possible anticipations had been presented is inconceivable (Schwartz, 2011a).

In small companies such as the study object, normalizations are usually verbal because there are no manuals or specific documents that guide the work activities. In other words, Schwartz's concept of preceding norms makes sense. Normalization occurs through the passing of knowledge from one worker to another, mainly during the training periods for new workers, with very little task formalization.

The substitution of trowels with Technyl rollers is an example of how work activity transformations occurred in a simple but efficient way in the studied company. The method of resin application was renormalized by the equipment substitution, which also generated input savings. This renormalization was triggered by questions and proposed solutions from the workers themselves (Sato & Oliveira, 2008; Schwartz *et al.*, 2010; Wisner, 2012).

Márcio (resin applicator) explained that previously, the resin application was performed with a trowel and is currently performed with a Technyl roller. Márcio and João (crane operator) noticed that, with the Technyl roller, it was no longer necessary to apply the resin required with other types of small rollers. Additionally, the resin could be applied to the edges with a **rag shuttlecock** [*peteca de trapo*], a bundle made from pieces of cloth:

“On the edges, in order not to drip, we do not apply the roller, instead we leave the corners that we previously did with a small roller; now **my brother and I had another idea** to take a piece of cloth and make a kind of shuttlecock, no? We apply insulating tape to the tip, and we use it in the corners. In the afternoon, we throw it away. We don't use any type of roller anymore, so we are transforming, and the gain is higher”. (Márcio, resin applicator).

In this procedure, the resin (another worker creation) is no longer wasted because the product does not drip along the edges of the slabs. Moreover, it is not necessary to use other tools to finish the resin coating procedure. Attention to the use of the word “brother”, this term is permeated with values and it appears similar to the study of Allsop and Wray (2012, pp. 223-224), in that the term “A ‘marra’ is someone you chose to work with; to be paid within a collective system of piecework; to rely on in the dangerous and changing environment that is the mine”.

The company had frequent problems with defects in electronic devices; for example, the sensors in the polishing machine were defective, so the machine had to be controlled manually, which increased the risks associated with the activity. One of the gang saw machines was also defective, and thus the inputs for the sawing process had to be fed manually, as mentioned there are demands that require repositioning at work (Athayde & Brito, 2011; Parks *et al.*, 2010; Schwartz, 2011b).

“It causes many problems. In the past it finished the operation by itself, but now it has stopped. The operation has to be completed by hand since it is a machine defect, a problem with the automation. So we have to monitor the automatic mode so it doesn't cause problems, **we notice it from the noise** ... In our work area, the main thing is to watch the noise, you may be a bit far away but **you have to pay attention to the noise** ... from the noise you can detect many things (lack of inputs, lack of water)” (Aélcio, sawyer).

It can be said that each person handles the deficiencies in norms in his/her way on a per-case basis because this process cannot be standardized. Each individual must make choices to the deficiencies in the norms and guidelines in the rules and procedures (Schwartz *et al.*, 2010) while understanding that the work always incorporates management and choice because the preceding norms, the **uses of oneself** and the renormalizations are interlinked.

The work transformations demonstrated by the substitution of the trowel with a conventional roller and then a Technyl roller and the edge finishing with the **rag shuttlecock** show that, while performing their work, the workers acquire knowledge, use this knowledge, transform the knowledge into practical actions, acquire new knowledge, and transform and implement their work methods. The workers make associations between ideas and cases and between theory and practice and therefore renormalize their activities (Lima, 2007; Lima & Bianco, 2009). Furthermore, in the intent to meet the process objectives, the workers not only improve the work itself but also benefit both the company,

from an economic and financial point of view, and the worker through his/her role as a knowledge producer and the satisfaction from a well-performed job.

### Actual work and safety

Safety is an aspect that permeates ergological analyses, as it involves both the worker's uses of oneself and the uses by others. As such, safety is understood as a way to preserve the worker's own life and the lives of his/her colleagues. This topic considers how the workers perceive and use the safety rules.

Some reports are highlighted in Table 4, below, concerning safety aspects in work activities.

Table 4

### Safety Aspects at Work

Interviewed	Report	Context
Durval	“He taught me everything I can't and shouldn't do. A security issue, for example: you shouldn't pass between two blocks when they are on the bridge, because it can impact the person, causing his/her death. You shouldn't pass up on the door-block with the load open, shouldn't walk beside the holder block when you're carrying the load for sawing”.	Refers to the role of the security professional on the training conducted when the employee was hired by the company in focus.
Durval	“It's uncomfortable. It's dangerous because it has a wood that holds the block. This wood can give and also the water that comes in the face can catch the eye. It's uncomfortable and dangerous, but it is the only way to wash the plates”.	Refers to an improper posture for holding the washing of the plates. It needs to be positioned above the block in order to separate plate by plate.
Alceir	“I work in the polishing machine. It's front is open, so I was talking to members of CIPA, with the security work professionals, because you have to put a protection. There was a day that a piece of abrasive flew. Little pieces of stone also flied. So, it's very dangerous. It also throws water on us, it wets us a lot. (He is asked about the use of the apron). I use, but there I am not using it because it does really bother us. Sometimes we go out to push a plate and that hinders us very much because it holds our legs, but the most dangerous is the abrasive, if it's released, it released with me once there, but if you break the tip of a plate, it can fly and spread”.	Refers to the adjustments needed to make more effective the safe handling of work equipment. However, ends by stating that it does not make proper use of safety equipment.
Márcio	“At the time of the rush, you never strictly follows (the prescription)”.	Refers to the daily production and the pressures of labor productivity in manufacturing of marble and granite.
João	“The danger is constant. When you raised the plate to a suction equipment, the danger is already prowling, so it requires attention on your part because you don't know ... it may fall at any time”.	Refers to daily production in industry processing of marble and granite.
Geraldo	“(The company) provides Individual Safety Equipment, but we sometimes don't use it as due”.	Refers to the non-use of individual safety equipment, however he claims that this is provided by the company. (Understanding the context, he says he doesn't use it because it doesn't seem important).

Note. Source: Interviews (our translation).

It is important to identify factors that make the worker deviate from the norm (Trinquet, 2010), as these will reveal work conditions and organizational elements that could become extreme situations for the workers. One might say, “it would be the starting point for demanding changes in the means and the work objectives toward reverting the risk of extreme situations” (Cunha, 2007, p. 157). Also, it is pertinent remember Schwartz *et al.* (2010), the choices are also risky because it is necessary to fill gaps in the norms.

As mentioned previously, multifunctionality is a characteristic of the studied company; being a small-sized company, it justifies this multifunctionality by the unfeasibility of hiring a worker for a single function. For example, the company has only one polishing, so if the machine breaks or is under maintenance, the professional who operates this machine must perform another activity. Another example involves the resin applicator; because the resin must dry for seventy-two hours after it is applied, the applicator must do something else in order not to stand still. Without addressing the size of the company or labor issues, this type of work organization is in accordance with the concept of providing more worker flexibility, autonomy and responsibility, which is a part of the current capitalism (Boltanski & Chiapello, 2009).

Despite being seen as a functional deviation, the manager stated in an interview that this situation is quite usual in the smaller marble and granite processing companies in the region. However, when a work accident occurs, this characteristic provides difficulties because the company is liable for the consequences of this type of practice. Additionally, training, an issue that is referenced in several sections but not widely discussed in this paper, is another aspect that must be addressed more carefully by companies in the industry that are truly interested in promoting multifunctionality as a central point in the industrial work organization. This aspect is also pertinent to discussions of work safety.

For example, when questioned about the difference between moving a slab close to or far from the floor, the worker said that it is faster to move the slab at a higher elevation because there are no obstructions:

“When you raise it a little, there is nothing to obstruct it, but if it is low then you have to pass between the trestles, you have to pass here, there, make zigzags, you lose a bit of time” (Márcio, resin applicator).

However, the worker knew the safety rules for the industrial activities because, when asked “why is it more dangerous to move the slab at a higher elevation if there is nobody below it?”, the worker answered:

“Because if it comes loose up there, even if it doesn’t hit anybody, it will fall on other materials and the loss will be bigger, that is if it doesn’t take a life; now, down there, there is no problem, if it comes loose, it will just break itself” (Marcio, resin applicator).

The study revealed that knowledge of the standard does not guarantee its use because the situation is permeated by goals, performance variability (Bruns, 2009; Kane, 1993) and paradoxical management aspects (Gaulejac, 2011), along with other previously discussed issues. The safety standards are closely linked to the uses of oneself because these are the sources of confrontation between the preceding norms and the need for renormalization, in which every worker might decide how to act with consideration for the circumstances or a void in the norms (Schwartz *et al.*, 2010). The example shows the conflict between worker safety and the need to run against time to meet the deadline. In the end, this situation could create additional economic losses because other materials might be affected.

Furthermore, safety in task performance is a process of choices that are permeated by values (Schwartz *et al.*, 2010). Athayde and Brito (2011) stated that while working, one must make choices; therefore, it is never a matter of simply applying the prescription. As such, life infiltrates every work situation and demands a repositioning in the face of the precedent.



## Final Considerations

The authors conclude that the research goal was achieved because it was possible to understand the different work situations related to certain activities in the processing process and, also to identify work management aspects that are recognizable from an understanding of the knowledge put into practice by the workers.

The study enabled the identification of relative worker autonomy as a primary tool for the renormalization of work activities in a context permeated by an informal multifunctionality. Through making use of oneself and a **balance** of values, conditions and goals, the workers decided that meeting goals and deadlines is more important than their own safety in many of the experienced situations. In addition, this research helped to cover a gap in the studies of the industrial sector of marble and granite, which has several publications about technical analysis of materials and their properties and almost nothing about work situations involving human labor.

The worker competencies in the studied organization are not directly related to formal education or specialization acquired *a priori*, but to the qualifications and professional training acquired in the workplace and the experiences acquired throughout the professional life. The aspects identified in this paper are thought to contribute to a reformulation of human resource management practices and actions within the context of worker action-based competency development. In this sense, Biazzi (2012) wrote, it is fundamental that Human Resource Policies - training, compensation, job description, careers paths, and others - be consistently aligned with Work & Participation Practices for the development of specific sets of worker and manager competences.

Therefore, it is thought to be contributing with reflections for the future outline of a theoretical conception of management that takes into account emerging practices, valuing workers' knowledge. In large international companies, where the production system involves significant social risks, for example the nuclear industry, the transposition of knowledge about renormalization aspects done by workers is already a reality (Biazzi, 2012). Researchers in health and safety (among them Bourrier, 1999) show that these companies create committees of experts to validate, with some urgency, the renormalizations performed by workers which are favorable for the organization. Perhaps this is an example of a pattern to be adapted and followed.

When workers experiment, they transform their own jobs, develop a feeling of belonging to the organization and become committed to the organization's goals even in a context of hard work and low remuneration, compared to other industries. This feeling of belonging seems to be a relevant aspect of human resource management because the current work context requires more worker engagement, involvement and flexibility. In other words, the worker must feel that he/she is part of the organization and is also responsible for the organization's outcomes. Even under difficult conditions such as brutish activity, defective equipment, informal and little-valued multi-functionality and low training investment, one finds an appropriate environment for discussions of the most updated and demanding aspects of management practices.

The marble and granite processing industry presents high risks to worker health and safety and high noise and air pollution indices. In other words, any managerial action that contributes to organize work in a safer manner recognizes environmental challenges and brings value to descriptive skills actually mobilized at work. This is important to formalizing policies and practices for managing people in this industry as well as in other labor intensive industries. Thus, the ergology and competency frameworks provide a set of theoretical tools for administration researchers. The uses of these tools to study the implicit details and affections reveal fundamental management aspects, particularly those related to worker subjectivity, as interventional aspects in both work management and organizational outcomes. One might ask, what would be the outcome of that much worker effort and commitment in a more satisfying work environment?

Further studies should be conducted in large-sized companies in the region with the intent to continue the studies that focus on work in the ornamental rock industry. These companies are functionally specialized, unlike the multifunctional small-sized organizations, as demonstrated by the workers of the company studied. In this way, further studies could discuss and extend the debate on the relationship between competency, specialization and multifunctionality.

The establishment of an expanded research community could bring further contributions toward an articulation of knowledge about industry work and how transformations occur in such work (as indicated by Santos, 2011) through the participation of institutions of higher education, members of the academic community, workers and workers' unions in studies in ES.

## Notes

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<sup>2</sup> This is a pseudonym.

<sup>3</sup> Resin coating is the process used to seal the granite slabs through the application of specific resins. This step precedes the polishing of the slabs.

<sup>4</sup> Honing is the process of correcting granite slabs. A type of glue is applied to cover defects in the slabs, making them uniform and ready for the next steps of resin application and polishing.

<sup>5</sup> Polishing is the process performed using abrasive materials to finish the slabs and provide a shiny surface.

<sup>6</sup> A crane is the piece of equipment used to transport slabs and marble and granite blocks.

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