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ORGANISATIONAL AND SAFETY CLIMATE – CASE STUDY OF A CONSTRUCTION COMPANY

Dissertação elaborada com vista à obtenção do Grau de Mestre em Ergonomia

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Resumo

Com a melhoria do desempenho de segurança das empresas os muito utilizados índices de sinistralidade acabam por não ser reveladores do nível de segurança destas. O clima de segurança é um indicador de desempenho proativo que pode fornecer a compreensão do desempenho da segurança antes de acontecerem acidentes. O gradiente de realidade de segurança também pode ser usado para identificar oportunidades para melhorar o desempenho de segurança fazendo uma comparação entre as visões da gestão de topo e dos trabalhadores.

Este estudo teve como propósito compreender o nível do desempenho de segurança, para isso os objetivos são a avaliação dos climas organizacional e de segurança e o cálculo o gradiente de realidade de segurança. Para isso foi aplicado, a uma empresa da construção no Reino Unido, um questionário de clima organizacional e de segurança (OSCI) e avaliado o gradiente de realidade de segurança para comparar as perceções da gestão de topo, dos trabalhadores e destes divididos nas duas áreas (fábrica e obra).

A escala do clima organizacional apresentou um resultado de 5.56 e a de Segurança de 5.11, numa escala de Likert de 1 a 7. Para o gradiente de realidade de segurança, a dimensão Efeitos dos ritmos de trabalho e Ações da Gestão de Topo foram as dimensões com os valores mais altos, 49% e 43% respetivamente, valores perto dos 50%, mostrando uma diferença significativa entre gestão de topo e trabalhadores.

Com este estudo foi possível sugerir melhoramentos como a consulta aos trabalhadores, implementação de políticas (segurança, notificação de incidentes, emergência) e procedimentos claros (formação de indução, avaliação de riscos da fábrica e explicação dos RAMS para a obra) ou a necessidade de análise do planeamento do trabalho.

Palavras-chave: Clima Organizacional; Clima de Segurança, Gradiente de Realidade de Segurança; Higiene e Segurança no trabalho; Construção; Indicadores Reativos; Indicadores Proativos; Cultura de Segurança; Segurança

Abstract

With the improvement of companies' safety performance, the widely used accident rates no longer reveal their safety level. Safety climate is a proactive performance indicator that can provide an understanding of safety performance before accidents occur. The reality gradient of safety can also be used to identify opportunities to improve safety performance by comparing the views of top management and workers.

This study aims to understand the level of safety performance of a construction company having as objectives assessing the organisational and safety climates and the reality gradient of safety. For these, an organisational and safety climate inventory (OSCI) was administered to a construction company in the UK, and the reality gradient of safety was assessed by comparing the perception of top management, workers and those into the two areas (factory and site).

The organisational climate scale presented a result of 5.56 and the Safety scale a result of 5.11, on a Likert scale of 1 to 7. For the safety reality gradient, the dimensions “Effects of Work Rhythms” and “Management actions to safety” had the highest values, 49% and 43% respectively, values close to 50% showing a significant difference between Top Management and Workers.

With this study it was possible to suggest improvements as consultation with workforce, implementation of clear policies (general safety, incident reporting, emergency response) and procedures (safety company induction, factory risk assessments, and explanation of RAMS for site) or need for analysis of work planning.

Key-words: Organisational Climate; Safety Climate; Reality Gradient of Safety, Health and Safety at Work; Construction; Lagging indicators; Leading indicators; Safety Culture; Safety

Table of contents

Figures index

Graphics index

Tables index

Introduction

Concern for the health and safety of workers has been growing in modern societies. This increasing demand for better working conditions has been reflected by an increase in safety legislation and therefore pressure on senior management regarding their moral responsibilities.

With the new challenges faced by modern societies, such as the development of new technologies and climate change, organisations are confronted with a climate of uncertainty and constant change. This dynamic environment places significant pressure on various areas, including health and safety. Therefore, Regulators have been putting pressure on companies to guarantee that these changes do not negatively impact the health and safety of workers.

This has been echoed on the EU Strategy Framework on Health and Safety at work 2021-2027 to improve workers' health and safety, addressing rapid changes in the economy, demography and work patterns as key priorities. With foresight projects aiming to anticipate risks and identify priorities as it is the example of a project to look at the impact on work of the development of digital technologies as artificial intelligence (European Commission, 2021).

In the UK, the Health and Safety Executive (HSE) strategy for 2022-2032: Protecting People and Places; has been taking into consideration the changing world and the new and emerging risks, where one of the objectives is to enable industry to innovate to move towards net zero in a safely manner (HSE, 2022).

Construction industry is characterised by having a high risk environment, complex supply chains, constant pressure to meet deadlines and budgets and a diverse demographics with workers from different cultural backgrounds with varying levels of education and different levels of understanding of English.

According to HSE (2023a; 2023b), there were 135 fatal accidents in the UK in 2022/23. Of these, 45 (33%) occurred in the construction sector, making it the sector with the highest number of fatalities. Construction is also the second industry with the highest cases in musculoskeletal disorders, and it has the highest number of Workplace non-fatal injury but less Work-related ill health cases compared to the

average of all industries. However, accident reporting in the UK follows RIDDOR 2013 and not all accidents need to be reported.

Construction sector in UK has tried to invert these statistics where the industry leads the way in fatal accidents. This has happened by having more regulations, training demands from principal contractors, guidance from HSE. However, accidents statistics continue to show that construction industry is at the top of the list. The approaches used by the industry to manage safety and reduce accidents and more specifically fatal accidents have not produce a change in the outcome.

Historically, accident and incident rates have been considered acceptable indicators of an organisation's safety performance. These lagging indicators are typically the most commonly used metrics for assessing safety performance. However, with the improvement of safety performance, many companies struggle to know their safety level and what areas need improvement with just accident and incident rates. And there are also situations where low safety performance does not necessarily lead to an accident.

Safety climate is a proactive performance indicator that can provide understanding of safety performance before accidents have happened (Yule et al., 2007). By using safety climate as a leading indicator, organisations can proactively manage and enhance their safety performance, ultimately leading to a safer work environment and reduced incidents.

Safety Culture involves a deeper and more stable aspects of organisational values, beliefs, norms, and behaviours regarding safety. It represents the overall safety-related mindset and practices that are deeply ingrained in the organisational fabric over the long term. On the other hand Safety Climate refers to the current perceptions, attitudes, and behaviours related to safety within an organisation at a specific point in time. It is more tangible than safety culture and assesses immediate perceptions of safety, such as the effectiveness of safety policies and procedures, management commitment, communication and training.

Measuring safety climate provides a snapshot of how safety is perceived and practiced within the organisation at present. It focuses on actionable items such as

identifying current strengths and weaknesses in safety practices, which allows for targeted interventions and improvements. Because safety climate is more immediate and responsive to current conditions, it can provide quicker feedback on the effectiveness of safety initiatives and changes within the organisation.

Safety climate allows for targeted interventions to improve safety outcomes while still contributing to the broader goal of fostering a positive and enduring safety culture over time.

However, when studying safety culture and safety climate, it is necessary to consider the perspective of power and conflict to better understand the organisational dynamics and be able to improve safety culture. By understanding the existence of conflict view, it can enable learning and be a safety resource (Antonsen, 2009).

Pillay et al. (2010) propose to use the reality gradient of safety to identify the varying perceptions of safety within an organisation and how these perceptions align (or misalign) with the actual safety performance and practices. This is done with a comparison between the views of management and the views of workers.

The overall safety culture of an organisation is heavily influenced by the collective perceptions and attitudes towards safety at all levels. When there is a significant reality gradient of safety, it can lead to a fragmented safety culture where different levels of the organisation have inconsistent views on safety priorities and practices.

This will allow to have an indication of the difference between the perceptions of the people that plan the work (Top Management) and the people that execute the work (Workers).

The aim of the study is to understand the level of safety performance of a construction company without the use of lagging indicators as accident rates, as this organisation hasn’t had an accident since they started (5 years ago).

To achieve this, one of the objectives is to assess organisational climate and safety climate. It is important to assess both climates as organisational performance will inevitably have an impact of safety performance.

To understand the level of safety performance, it is also considered important to understand the level of implementation of the policies, procedures and rules in the company, and this is the second objective. For this it was deemed important to understand the perceptual disconnect between different groups that can lead to misunderstandings about the effectiveness of safety measures and the actual safety culture experienced by employees. Therefore, it was decided to study the reality gradient of safety to compare the perception of Top Management – who plans the work; with the perception of the Workers – who do the work.

To achieve these aims and objectives this study was divided into six main chapters: Introduction, Literature Review, Methodology, Results, Discussion of Results and Conclusion.

To put into context the research a literature review where the evolution of the research of safety culture, organisational and safety climate is presented. Safety culture is not part of this study however, it was considered pertinent to frame this concept because of the links to safety climate.

On the chapter of Methodology there will be an explanation of type of study, a description of the setting where the study was done, a description of the research instrument, explanation of the sampling strategy and data analysis techniques.

The results chapter will describe the results from the socio demographics characteristics of the sample, the results from the application of the research instrument - organisational climate and safety climate from the entire company - and those obtained for the subgroups: Top Management, Workers, Factory and Site. It will also present the results of the reality gradient of safety.

On the discussion of the results there will be a ranking of the results of the organisational and safety climate for the total sample studied and for the different subgroups. It will also analyse the reality gradient of safety by comparing the results of both climates from the different subgroups. Moreover recommendations for interventions are given, problems and limitations of this study are presented and

The last part will be the conclusion where a reflection of the study will be completed also with recommendations for further research.

I Literature Review

I.1 Introduction

Through history there has been attempts to find out the best approach to manage safety. As stated by Pillay et al. (2010) there have been five ages of safety. The first one from XIX century to the end of World War II – technical age; the second one between the two World Wars and the 1970s – human error age; the third one between the 1970's and the 1980's – socio-technical age; the fourth one between the 1980's and the 2000's – cultural age; and the last one after the 2000's – resilience engineering. The transition from one age to another did not mean the abandonment of the theories of the previous one but an increment of knowledge.

According to Pillay et al. (2010), the technical age focus on technological development to improve safety and the importance of training and enforcement in the prevention of accidents.

The human error age had an increment of theories about human factors, and start considering human error as the cause for accidents. According to Hale and Howden (1998) and Vierendeels et al. (2018), human factors started being introduced to improve occupational safety when engineering/technical factors as preventive measures could not solve all problems.

The socio-technical age started seeing organisations as socio-technical systems where humans had to interact with other parts of the system. Causes of accidents were no longer attributed solely to humans and complex interaction of different components of the system (including humans) were the base of human performance (Pillay et al., 2010).

The cultural age appears as a response to high profile accidents as Chernobyl, Bhopal, or Challenger. It takes in consideration the impact of organisational and cultural factors on the safe performance of organisations. High reliability theory started becoming important to explain high safety performance of organisation in complex and highly dangerous sectors as air traffic control or nuclear power facilities (Pillay et al., 2010).

According to Pillay et al. (2010), the last age represents the complexity and uncertainty, where people play a key role because humans can be the element of the system that can adapt and compensate and allow the system to recover from a verge of disaster (Reason, 2008). Safety and accidents are now seen as complements in the correct functioning of modern technological systems (Pillay et al., 2010).

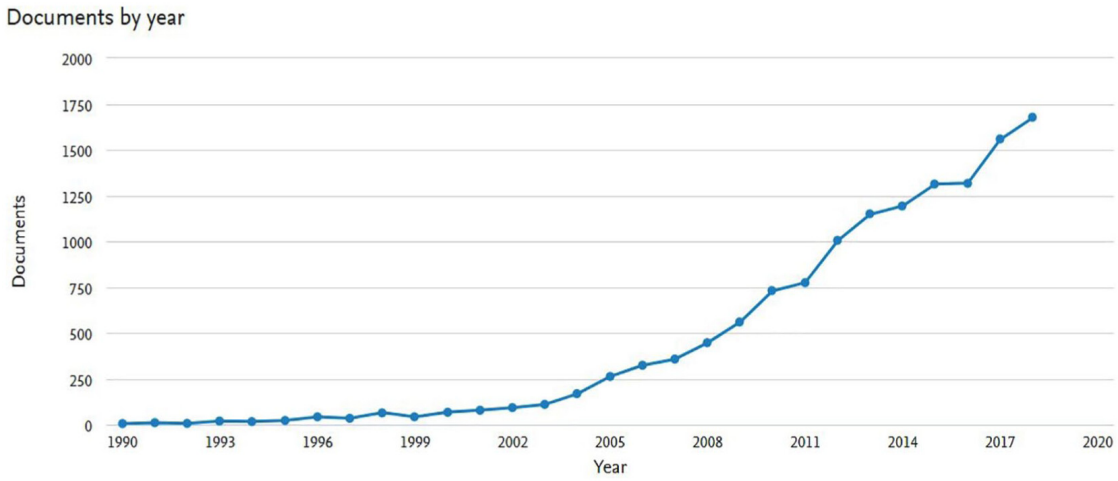
I.2 Safety Culture

The term 'Safety Culture' was initially introduced in 1986 by the IAEA in the INSAG's Summary Report on the Post-Accident Review Meeting on the Chernobyl Accident, published as Safety Series No.75-INSAG-l in 1986 as one of the causes for Chernobyl accident was the lack of safety culture (INSAG, 1986, cited in IAEA, 1991). On the next report - INSAG's Basic Safety Principles for Nuclear Power Plants, Safety Series No.75-INSAG-3, in 1988 – the term was emphasised as a vital management principle (IAEA, 1991). In 1991, Safety Series No.75-INSAG-4 was issued by IAEA to explain the concept of "Safety Culture" and to provide some guidance to how it can be assessed (IAEA, 1991).

On this report, INSAG admits that there isn't a consensus in the definition of Safety Culture, however they suggest a definition that represents the common view of its members: "Safety culture is that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance." (IAEA, 1991, p. 1). With this definition, INSAG intended to highlight that safety culture is structural as well as attitudinal, it associated to both organisations and individuals, and focus about the necessity to tie all safety issues with the right perceptions and actions. They also explained that Safety Culture is associated with "habits of thought" (IAEA, 1991, p. 1) and personal attitudes and also with the style of the organisation. For this reason, safety culture is intangible, however its features provide measurable expressions, and its key requirement is to develop ways to use the measurable expressions to test what is safety fundamentals in an organisation and help to identify potential improvements (IAEA, 1991).

Since that time there has been a significant increase in publications on safety culture (Figure 1) (Bisbey at al., 2019).

Figure 1 - Safety culture publication rate(in Bisbey at al, 2019, p.89)



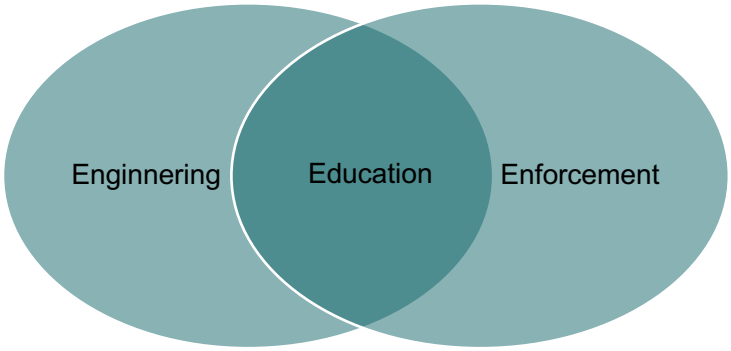
Choudhry et al. (2007) on their literature review on safety culture since 1998, emphasising the research on construction industry, found that from the 27 studies of their critical review only 8 provided a safety culture definition.

There seems to be a consensus that researchers cannot agree on a single definition of safety culture (Bisbey, et al., 2019; Choudhry at al., 2007; Vierendeels et al., 2018) Bisbey, et al. (2019) have investigated the different definitions of safety culture among researchers and found that the selected set of “definitions mention values, beliefs, norms, attitudes, roles, practices, perceptions, assumptions, competencies, patterns of behaviour, characteristics, priorities, and organizational features alongside employees, groups, organizations, systems, managers, customers, and members of the public”.

According to Vierendeels et al. (2018), the existent safety culture models refer several safety aspects as safety behaviours, safety attitudes, management commitment and safety procedures. However, according to them there isn’t a conceptual safety framework covering the different blocks that influence safety culture with their aspects and associated indicators and consideration for all lines of studies and models.

Vierendeels et al. (2018) describe the evolution of the safety culture models by describing the evolution in research of the elements that influence safety. They initially describe the three E's model developed by the National Safety Council (1974). In this model, engineering and enforcement would intersect in the education and be the main dimensions to the prevention of accidents (**Erro! A origem da referência não foi encontrada.**). The engineering dimension refers to technical aspects and to safety rules and enforcement both receiving a significant grow during XX century.

Figure 2 - The three E's model by the Nation Safety Council (1974) (in Vierendeels et al. (2018))



This model shows the importance of training in the prevention of accidents. With courses on the job, or in classrooms, as well as posters and other information to increase workers knowledge (Vierendeels et al., 2018).

According to Hale and Howden (1998) and Vierendeels et al. (2018), human factors started being introduced to improve occupational safety when engineering/technical factors as risk assessments and preventive measures could not be deemed as the solution for all safety problems.

After significant accidents as Chernobyl, Bhopal or Challenger happened, safety culture models started to change. This has led to the safety models of Geller (1994) – "Total Safety Culture model", Cooper (2000) – "Reciprocal Safety Culture Model" and Renniers et al. (2011) – "P2T model".

Geller (1994) explains that to achieve a "Total Safety Culture" (TSC) it is necessary to apply several safety processes engrained in engineering disciplines and in psychology disciplines (as behavioural and social disciplines). He states that

it is necessary a continual consideration of three domains: environmental factors, personal factors and behavioural factors (

Figure 3 - "Total Safety Culture" model by Geller (1994)

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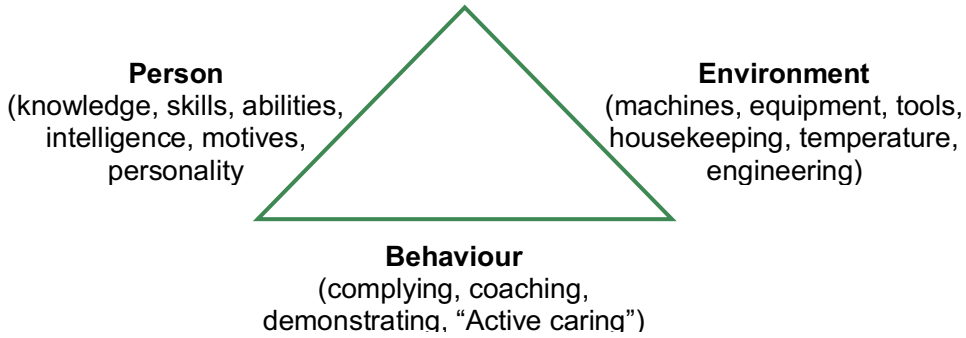
Figure 3 - "Total Safety Culture" model by Geller (1994)

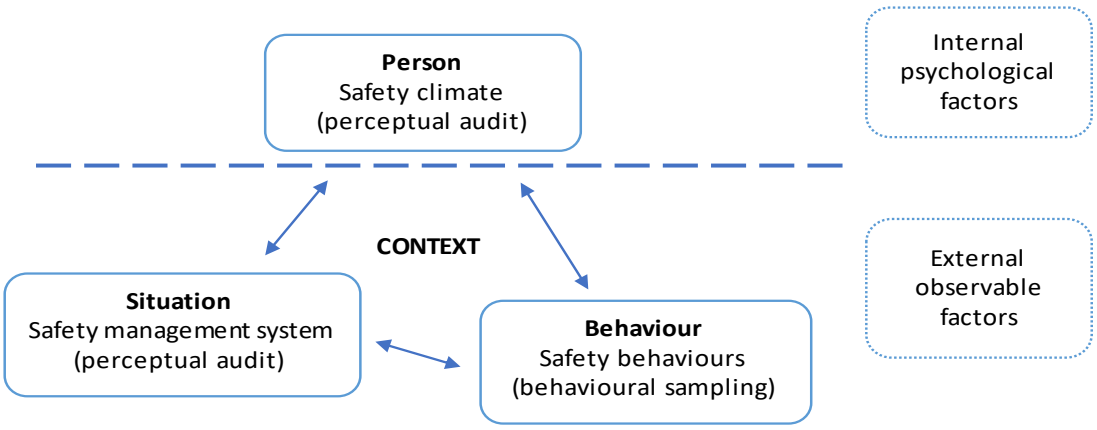


Cooper (1998, 2000) with his Reciprocal Safety Culture (

Figure 4 - Reciprocal Safety Culture model by Cooper (1998)

) also addresses the person (safety climate), behaviour (safety behaviour) and situation (management system). According to Vierendeels et al. (2018), the Reciprocal Safety Culture adds the procedural (management systems) to the technical aspect of the situation of the Geller (1994) “Total Safety Culture” (TSC) model.

Figure 4 - Reciprocal Safety Culture model by Cooper (1998)



Cooper (1998, 2000) also describes how the different elements can be measured: Person with a safety climate survey (perceptual audit); Situation as an audit to the safety management system; and Behaviour with checklists of behavioural safety initiatives.

Reniers et al. (2011) developed the P2T model, see

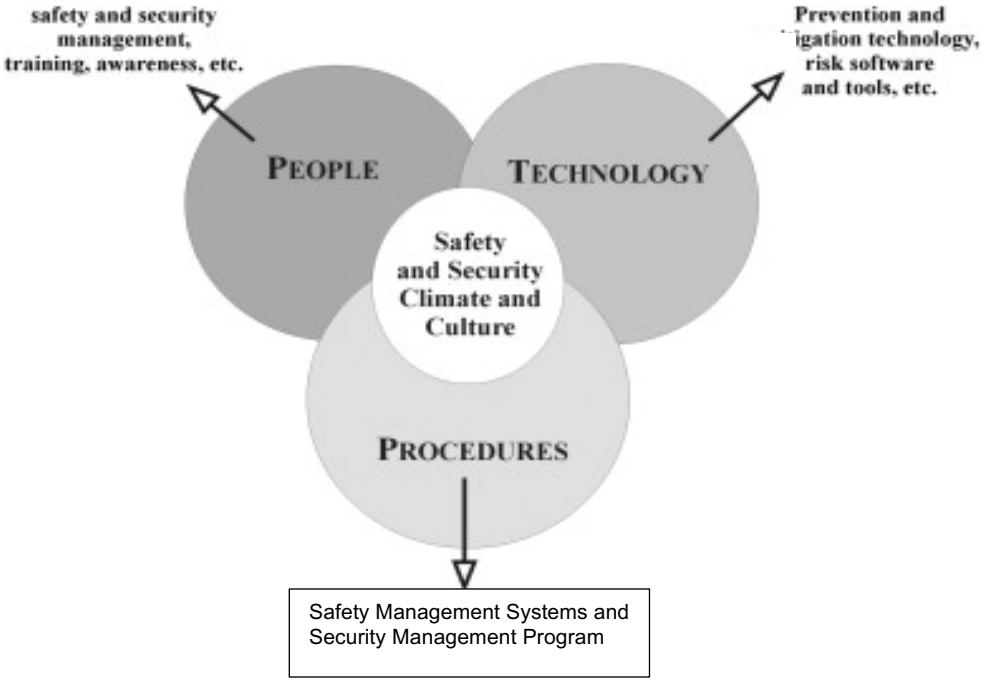
Figure 5 - P2T (Reniers et al., 2011)

model

. This model comprises of three dimensions: People, Procedures and Technology (P2T model) and it is an integrative safety and security model where all integrated safety and security culture and climate aspects can be covered and placed in one of the three dimensions. The relationship between the three dimensions describes the current safety and security culture and climate in an organisation.

Figure 5 - P2T model (Reniers et al., 2011)

Safety and security management, training, awareness, etc.	Safety and security management, Prevention and mitigation technology, risk software and tools, etc.

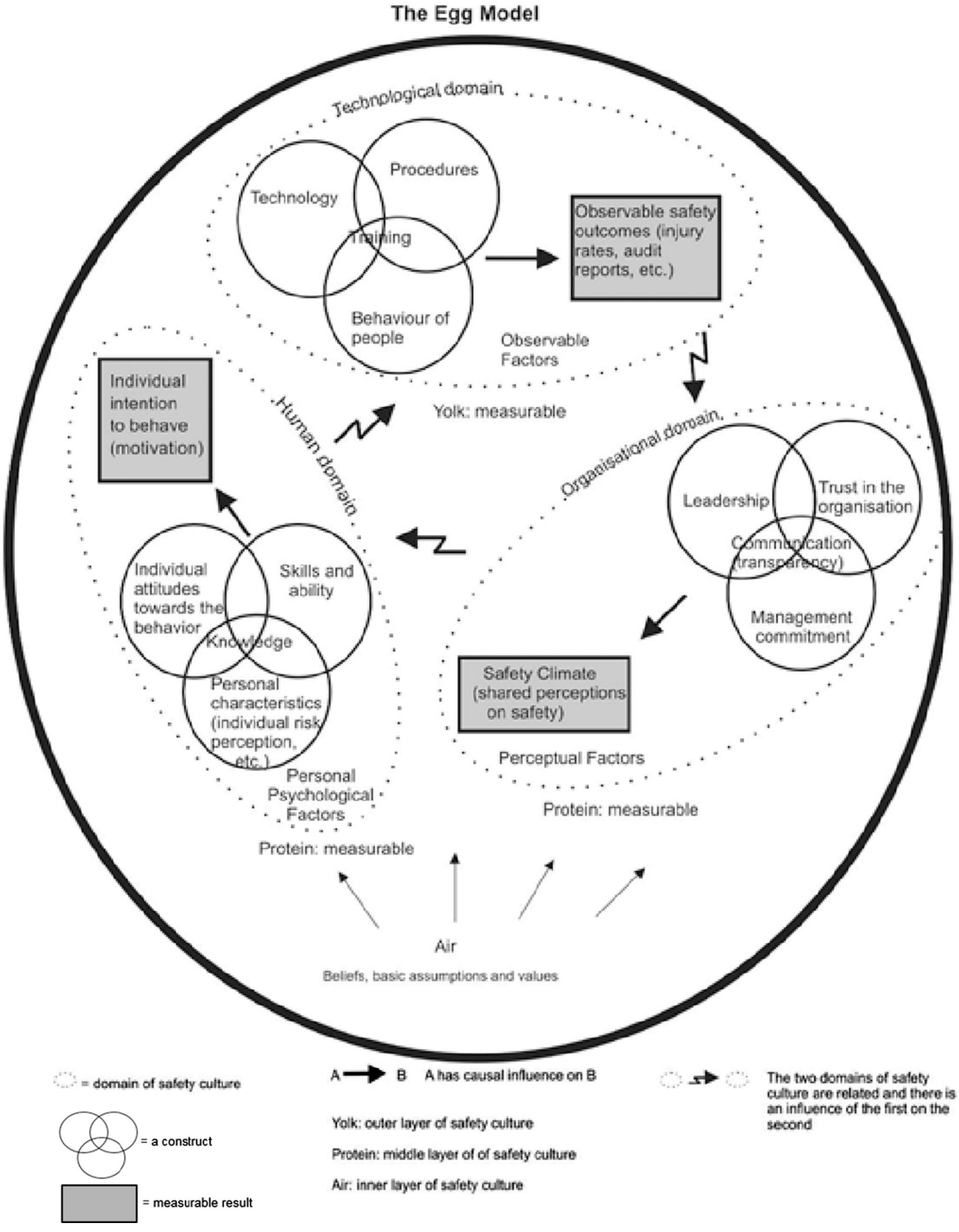


Vierendeels et al. (2018) developed their own conceptual safety culture model based on extensive literature review of existent theories and models. This model represents a holistic approach to safety culture where different safety factors and dimensions are related in a cyclic way. On this model the three domains - technological, human, and organisational - influence each other and cannot been seen as separate.

Figure 6 - The Egg Aggregated (in Vierendeels et al., 2018) Model of safety culture

represents the Egg-Aggregated Model (TEAM) described by Vierendeels et al. (2018).

Figure 6 - The Egg Aggregated Model of safety culture (in Vierendeels et al., 2018)



The egg analogy is characterised by:

- Yolk representing the outer layer of safety culture comprising the technological domain that represents the observable factors such as technology, training, procedures, and employee behaviours. The measurable results are the observable

safety outcomes as accident rates, audit reports, etc. This domain will be influenced by the human domain and will influence the organisational domain.

- Protein is the middle layer of safety culture, and includes:
    - Human domain that refers to personal psychological factors: individual attributes (skills and abilities); personal characteristics (individual risk perception); individual attitudes towards the behaviour; and knowledge, intercepting all three constructs. It can be measured by the individual intention to behave – motivation. This domain will influence the technological domain and be influenced by the organisational domain.
    - Organisational domain refers to perceptual factors as leadership, trust in the organisation and management commitment and these constructs are intercepted by communication. It can be measured by safety climate (shared perceptions on safety). This domain will influence the human domain and be influenced by the technological domain.
- Air is represented by the beliefs, basic assumptions and values that will influence all the other parts of the "egg". However, this is the part that is not visible.

The researchers have only created a theoretical model but haven't put it into practice. According to them, it is necessary to elaborate all three domains of safety culture into reliable measurable outcomes.

As safety culture definition is complicated and difficult to accomplish, and there isn't agreement on it, some companies and professionals simplify it as "the way we do things around here" (Wakefield et al., 2010). However, this implies that safety culture is related to behaviours excluding the values, motivations attitudes, beliefs and assumptions that exist behind the behaviour. Nevertheless, organisational culture (as doing things around here is not just related to safety) should be defined as a cause of behaviour and not the observed behaviour (Schulman, 2020). This simplified definition of safety culture as led to a growth of behaviour change programs used by organisations by focusing changing the behaviour of workers as aim to improve safety culture. These programmes use measures such as reward/punishment, training and attitude campaigns because they consider safety culture as a result of compliance with rules and procedures (Antonsen, 2009). These programs jeopardise to consider that behaviours are the

only cause of accidents when these are often the last link in a chain of causes to an accident (Hopkins, 2006).

With a broad definition of what culture (including safety culture) encompasses, it is attractive for the idea of having a global view of an organisation or as something that is important for the performance of the organisation. However, these abstract and global concepts risk of meaning nothing and making impossible to measure it (Guldenmund, 2000; Hollnagel, 2018).

I.3 Safety climate/Organisational climate

Safety climate initially came as a sub climate of organisational climate. It was initially described by Zohar (1980) as “summary of molar perceptions that employees share about safety”.

To define safety climate, Zohar (1980) based his interpretation of organisational climate as aspects of the organisational environment perceived by its employees, summarised over each individual, taken from James & Jones (1974) review of previous organisational climate theories research. They concluded that there were three categories of definitions and measurements approach of organisational climate: multiple measurement organisational attributes; perceptual measurement organisational attributes; perceptual measurement individual attributes approach. The last two approaches consider organisational climate as a combination of perceptions that culminate from the interaction between the individual and his environment. The main difference lays on the fact that the later considers organisational climate as an individual attribute where the former as an organisational attribute.

The combination of perceptions may provide the base for the behaviour toward the organisation and within the level of data collected it is possible to predict the behaviour of several individuals (Schneider, 1973).

Organisational climate initially had a broader integrated concept, including most organisational processes and events, that however changed with the introduction of the concept of organisational culture. Organisational climate is how

culture expresses itself. Organisational culture is more stable in time and climate dependent of the current perceptions (Guldenmund, 2000).

Zohar (1980) defined safety climate as a sub type of organisational climate and he defined, through the literature review, what organisational factors will distinguish between companies with high accidents rates from the ones with low accidents rates. For him, these factors would influence workers perception of the safety level of the company and would their behaviour.

With the Chernobyl accident and the conclusions from INSAG's Summary Report (INSAG, 1986, cited in IAEA, 1991), the need to develop research in safety culture and safety climate increased. However, not only the consensus of the definition hasn't been reached but also the difference between concepts of safety culture and safety climate have been blur (Guldenmund, 2000).

Despite safety climate and safety culture being two different concepts, there is an overlap on the facilitating and enacting factors that influence safety culture over time and climate scale dimensions (Bisbey at al., 2019).

Guldenmund (2000) considers that the approach to organisational climate and organisational culture applies to safety climate and safety culture. However, the current research hadn't been developed to explore the relationship between organisational climate and safety climate. Neal et al. (2000) examined the impact in organisations of organisational climate on safety climate and the impact of the later on knowledge, motivation and performance of individuals. They concluded that organisational climate influence safety climate and safety climate influences safety performance because of its independent influence on motivation and knowledge that are important factors of safety behaviours.

With lack of research into the relationship between organisational climate and safety climate Silva et al. (2004) developed the Organisational and Safety Climate Inventory (OSCI). In their study they developed an instrument to allow the categorisation of organisational and safety climate and the relationship between them. This instrument was driven by already existent theories and starting from organisational climate model – competing value model - to allow the identification of various dimensions to define safety climate (Silva et al., 2004). The competing value

model assumes that there are two dimensions to characterise organisational climate, which represent the inherent tensions that organisations have to deal with in order to survive: one accentuates the internal versus external focus and the other the flexibility versus control (Silva et al., 2004).

The authors considered the definition of both climates as “shared perceptions about organisational values, norms, practices and procedures that can be observed at general or specific levels” (Silva et al., 2004, p. 208), where organisation climate is for perception of organisational dimensions and safety climate for safety dimensions in the organisation. They defined as climate dimensions: support, innovation, goals and rules.

The HSE defines safety climate as “the tangible outputs or indicators of an organisation’s health and safety culture, as perceived by individuals or work groups at a point in time” (HSE & Keil Centre, 2002, p.1). Therefore, safety climate will help companies determine the important aspects of their safety climate to be improved and to promote employees’ involvement (HSE & Keil Centre, 2002).

The HSE have developed the Climate Survey Tool (CTS) that has been widely use in UK by companies of different sectors. The CTS was initially developed for the oil and gas industry and then adapted to be use by any industry and it was first published in 1997 (HSE & Keil Centre, 2002).

Safety climate research has been mainly focusing on measuring safety climate without considering the organisational aspect. However, work environment’ factors have an impact on workers’ perception on safety (Murphy et al., 2018).

The Construction industry has several characteristics that differ from other industries as organisations, depending on their size, can be complex and are decentralised. Departments can be in different locations and not understanding work of other departments (office work teams versus site teams), sites are in constant change, work undertaken is usually non-routine, there is a significant number of subcontractors, work groups are semi-autonomous, culturally diverse workforce is involved and significant workforce turnover is observed. These characteristics might have an impact on safety climate (Schwatka et al., 2016; Zhang et al., 2015).

Most safety climate studies in construction industry use questionnaires developed for other industries or make adaptions from ones that are not specifically developed for construction (Schwatka et al., 2016).

Workers' perception of safety can vary significantly depending on different subgroups as well depending on their organisational level. Therefore, climate measurement should be multilevel (Zhang et al., 2015; Zohar, 2010). Top management is concerned with the creation of the policies, where supervisors will be concerned with the implementation of formal procedures but also with carrying the work. Therefore, workers from different levels will perceive supervisors differently depending on their organisational level. Due to the characteristics of construction companies, this is more evident (Zhang et al., 2015).

On their research, Alruqi et al. (2018) concluded that some dimensions are important factors to assess safety climate in construction: management commitment to safety; safety role of the supervisor; safety rules and procedures; training; and health and safety individual responsibility. This indicates that middle management has an important role on the workers perceptions in safety. In smaller companies, this middle management can be the same as top management, if they have frequent presence in site work.

One problem with self-administrated questionnaires, as the ones used on climate assessments, is the socially desirable responding (SDR), where a person will answer what he perceives as the acceptable answer and not what he thinks (Paulhus, 1989).

Most of the research and practice of organisations in improving safety had and still has as aim the reduction and even elimination of accidents. There has been an assumption that accidents were due to human error, as humans are considered the unreliable part of the system (they are seen as a hazard). Humans can be the element of the system that can adapt and compensate and allow the system to recover from a verge of disaster (Reason, 2008). However, as highlighted by Reason (2008), the research on this field (recover and compensation from humans) is not as developed as it is in the failings (human error).

Safety performance is sometimes used to describe two different concepts. One is the metrics of incidents and accidents but can also be to describe safety related behaviours. However, it is important to distinguish behaviours from the outcome (accidents) as these have different relationship with antecedents (personal and situational). According to Christian et al. (2009), safety motivation and safety knowledge (personal antecedents) are strongly related safety performance behaviours. On the other hand, safety climate is strongly associated with accidents. This means that safety related behaviours (as unsafe acts) are not a good metric for predicting undesirable outcomes (accidents) as safety climate is (Christian et al., 2009).

Murphy et al. (2018) on their study on trucking companies found 19 themes that affect safety. Of those, there were some that were similar to the ones in safety climate theory (e.g., practice vs. police). However, there were others that for the researchers need extra attention as they were unexpected, as personal time or balancing work and family. This means that safety behaviours are influenced by internal organisational related aspects but also external related aspects.

Moreover, existent research on safety culture and safety climate implies that culture is related to harmony and consensus. However, in organisations there are issues of power and conflicting interests, and these have an impact on organisation performance and safety outcomes (Antonsen, 2009). When studying safety culture, it is necessary to consider the perspective of power and conflict to better understand the organisational dynamics and be able to improve safety culture. By understanding the existence of conflict view, it can enable learning and be a safety resource (Antonsen, 2009).

Akselsson et al. (2009) suggested to look for weaknesses when working with safety culture to improve safety in an organisation. They identify some of the “holes” that are important to address when working with safety culture as low-score groups or characteristics and items, problems with the questionnaire, management commitment, resilience aspects not considered, situations when pressures move toward acceptable performance boundary (Rasmussen model) and difference between work as planned and work as done.

According to Pillay et al. (2010) the overall safety culture of an organisation is heavily influenced by the collective perceptions and attitudes towards safety at all levels. When there is a significant difference between the perception of management and workers it can lead to a fragmented safety culture where different levels of the organisation have inconsistent views on safety priorities and practices.

Safety culture and resilience engineering can be both used to identify opportunities to improve safety performance (Pillay et al., 2010). On the resilience side they propose to use the reality gradient of safety, where there is a comparison between the views of management and the views of workers. This will allow to have an indication of the difference between the perceptions of the people that plan the work (Top Management) and the people that execute the work (Workers).

II Methodology

II.1 Introduction

This study falls in the domain of both paradigms: quantitative and qualitative. For that reason it can be classified as a mix method approach type of study (Kumar, 2019). On the quantitative side, this study can be classified as a cross-sectional study. On this type of studies, the aim is to find the prevalence of a situation with only one contact with the population and taking a cross-section of the population once in time (Kumar, 2019). As one of the objectives of the study is to assess the safety climate of a company this would mean that the study concentrates on a point in time and not in the evolution of the phenomenon.

However, as this study will concentrate on single company, it will mean that this study will also be a case study. According to Kuma (2019:196), in a case study the situation selected ”becomes the basis of a through, holistic and in-depth exploration of the aspect that you want to find about”. According with the same author, the entire population of the study needs to be treated as one entity.

On the first part of this study a questionnaire was administered to assess the organisational and safety climate of a construction sector company. On the second part there was an assessment of the reality gradient of safety by comparing the results from top management with the workers to get an idea of the difference between work as planned and work as done.

For the literature review the data bases used were the ones that were available to the University of Lisbon students: The b-on.pt, the Ebsco Elsevier and also the Google Scholar. The following key words were used: Organisational Climate; Safety Climate; Reality Gradient of Safety, Safety culture. The Boolean operator used was “and”. It was also used the cross references of other research projects from the documents already searched.

II.2 Setting

This study was done in a small family run construction company dedicated to manufacturing and installation of stone and ceramics. This company exists for 5 years.

The company main work is to fabricate and install stone or ceramic (but majority of work is with stone) in floors of different houses or apartment divisions, floors and walls of bathrooms or bath tops, kitchen worktops, staircases. The company also works with installation of stone floors and walls of hotels.

This company office and factory is located in west London, and the installation process is done through construction sites in London and Surrey area. These sites are usually of a medium or small size.

Three family members are equally shareholders of the company, all of them directors but one is the managing director. There are also another two family members that are the commercial and financial director and office manager but do not own the company.

The company with 34 employees is divided by office, factory and site personnel. The factory personnel (10 workers) is composed by cutters, polishers and labourers. Site personnel (16 workers) is constituted by fixers and labourers and office staff (3) by project managers and CAD designer.

The company usually has stone slabs (2mx3m) arriving by truck and unloaded with a forklift or a crane. Stone material usually weights 50 kg/m^2, with a 20 mm thickness. The slabs are stored on the yard. When it is necessary to cut them, a labourer or cutter collects them from the yard with the forklift and places it on the cutting machine. The stone is cut in accordance with the drawing supplied by the client's drawing or a template done by site team, where they take the measurements of the area to fix the stone.

Polishers usually do the final touches to the final pieces. They usually receive the cut stone and polish it or if it is necessary, they will assemble parts of a bigger piece using resin, as it is the case of a bath top.

Labourers usually help in the duties of the factory using the forklift to carry the slabs from the yard to the factory to be placed on the cutting machine bed.

Site personnel work is to install the manufactured stone on houses, apartments (individual or apartment block construction) or hotels. If the material to install is ceramics, the material is already cut and does not need to be manufactured or needs small cuts.

Fixers are specialists in installation of stone or ceramics and labourers help fixers with the transportation of material to the working area or mix the adhesive for the fixer to install the pieces and other work necessary to support the fixers. Work on site can also include cutting and polishing the material with the use of hand-held tools.

The stone pieces are install in the area with adhesive. After the adhesive has dried, grout is poured on the stone to fill the joints. On bathrooms floors, showers floors and walls a waterproofing is necessary to be installed before the stone. In rooms a underfloor heating is also installed before the stone.

Fixers are also responsible to do templates of the fixing area to assess the size of the pieces to be installed. These templates are then given to the factory to manufacture the necessary pieces to be installed.

The material around site is transported by pallet truck, A-frames trolleys, small trolleys or by manual handling, depending of the access available. On new built buildings usually there is a working lift during construction but on refurbished Victorian houses access is done by stairs. On new build of one floor houses, lifts usually are not available.

On site this company always works as a sub-contractor. The client can be the principal contractor or a sub-contractor. The principal contractor is usually a medium size company. This company does not work with big principal contractors due to top management decision based on financial criteria.

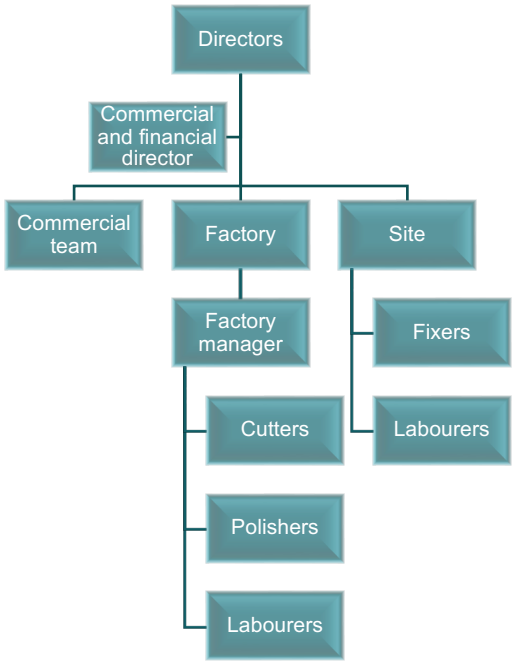
There are also smaller jobs working to private clients.

Office workers are mainly project managers and supporting staff (financial department). Project managers deal directly with clients and prepare tenders,

arrange samples for the client to choose the material and deal with the buying of the materials (stone/ceramics). Other type of material is dealt with the commercial and financial director.

Figure 8 depicts the organigram of the company.

Figure 7 - Company's organigram



Two of the directors work mainly with site teams as their manager, as there is no middle management on site teams. Usually there are not more than 4 teams on site (a team is formed by a fixer and a labourer). They frequently work independently with visits from directors (managers).

In the factory, however, there are two factory managers that have the managing director as their manager.

Office and factory personnel are mainly employees, where site personnel are mostly self-employed.

The accident rate in this company has been zero since its foundation (5 years ago). The company also has a “light” global management system that is mainly based on verbal rules and procedures rather than written procedures. It does have

a health & safety policy, as demanded by law. Site work does have RAMS (Risk Assessment and Method statement) for each project, as it is common in the construction industry in the UK. Factory has a risk assessment available. Checks as site inspections are also not registered by site directors.

II.3 Data collection instrument

To measure the safety climate of a company it is necessary to apply a safety climate inventory. The instrument used to measure the safety climate in this company is the one developed by Silva et al. (2004) – Organisational and Safety Climate Inventory (OSCI) (Annex). This instrument was driven by already existent theories and starting from organisational climate model – competing value model.

This instrument is divided in two parts, one that measures the organisational climate and the other that measures the safety climate. The authors defined as climate main dimensions: support, innovation, goals and rules, that applies to both organisational and safety climate.

The authors also defined other scales within the main organisational climate and safety climate. For the organisational climate there are other scales: organisational climate – values perception scale (also with the main dimensions: support, innovation, goals and rules), organisational climate – norms perceptions (with two dimensions: perception of Top Management (TM) declared values and perception of norms of expected behaviours), organisational climate – values and norms perception scale. For safety climate there is another scale: safety climate organisational practice scale (with seven dimensions).

The application of the OSCI to assess safety climate was due to the fact that this instrument was already validated in Portuguese language and the vast majority of the company workers have Portuguese as their mother language.

The fact that this instrument is not construction specific was not considered as a problem as this company is a sub-contractor that does not work with sub-contractor companies and therefore this study will not have most of the typical

construction industry conditions that involve the use of an industry specific questionnaire.

The other reason for applying OSCI is because this instrument assesses safety climate but also organisational climate allowing to broad the picture of the performance of the company as several aspects (safety, productivity, quality and safety) will influence the performance of the company that will consequently affect safety.

II.3.1 Organisational and safety climate inventory (OSCI)

The OSCI is composed by 70 items for measuring organisational and safety climate and 11 for sample characterisation purposes. For the 70 items a Likert scale ranging from 1 to 7 was used (see Annex A).

From the original questionnaire, the following items, from the group 5, needed to be changed, as it wasn´t applicable to the company being studied:

- “O departamento de segurança é muito influente dentro da empresa” and “A gestão não dá atenção ao que o departamento de segurança diz”.

This was necessary because the company does not have a safety department but an external safety consultant. For that reason, the sentences were change to:

- “O técnico de segurança é muito influente dentro da empresa” and “A gestão não dá atenção ao que o técnico de segurança diz” respectively.

For the last section – questions about professional experience and the company where they work – there were also changes to accommodate the information necessary in relation to this specific company.

The sociodemographic questions education were maintained, namely those concerning education, age, how long the person works and how long do they work in this company. The age question has the age already in groups instead of typing the exact age. This was to respect the original questionnaire and for people to feel comfortable that the questionnaire is anonymous, and it is not possible to identify them through their age (Cooper, 1998).

However, some other questions were included (e.g. how long they work in the stone sector; type of employment; working department within the company) or changed (e.g. role in the company categories). It was also included questions about place of birth, mother language and domain of Portuguese. This is because some workers might be dual nationals or be born in UK, as second generation of Portuguese and speak Portuguese but having difficulties in reading Portuguese.

Information regarding the sector was removed as the company is from the construction sector and the hierarchy position and gender questions were also removed as all employees from site and factory and directors are all male and their hierarchy position is known through their role.

II.4 Data collection procedures

The OSCI was in written in Portuguese, the mother language of all of site and factory staff and the directors of the company.

The questionnaire was given to most of the site and factory staff and also the directors. The rest of the office staff was excluded because they do not speak Portuguese.

The questionnaire was given to the site staff in a day that most of them were at the factory to attend a training session. The factory staff filled the questionnaire the day after.

The questionnaire was applied personally, and an explanation of the research objectives was given as well as the instructions on how to fill it. It was also explained that the questionnaire was anonymous and if anyone wanted to quit, they could do it at any moment. The researcher was available to help in any question that workers might have.

At the end the workers signed a form where they allowed the information on the questionnaire to be used for this research purposes.

II.5 Data analysis techniques

From the questionnaires given only one person refused to answer. This means that 31 workers agreed to participate in this study. However, some of these, left a few questions with no answer or with double answers. There were 2 questionnaires with blank answers on the items that were going to be used, for that reason these questionnaires were removed and the total sample is of 29 individuals.

For the data analysis of the questionnaires, the SPSS software (version 28.0.0.0) was used. The data analysis type used to obtain the data for evaluation was the descriptive analysis as mean, maximum and minimum value. As suggested by Silva et al. (2004), the Cronbach's alpha was also obtained for the questionnaire items to assess the reliability of the questionnaire. This will allow to compare the amount of shared variance among the instrument items and the overall variance of the instrument.

The information of questionnaires was introduced into SPSS to build a data base. The questions that were on the negative had their score inversed. All of the socio-demographic questions were coded, and the information of each code was them introduced on SPSS on the information of the variable. A descriptive analysis as mean, maximum and minimum values were done to better understand the sample of this study.

The different dimensions for the organisational climate and the safety climate were created on SPSS and introduced to the data base. The descriptive analysis as mean, maximum and minimum values was obtained for each dimension.

The dimensions were created in accordance with the rules set by Silva et al. (2004), including which items needed to be used for the creation of each dimension.

Each of the following scales were created to obtain the results of each dimension as the sum of each item mean and the result of each scale as the sum of the mean of all items of the dimensions of the corresponded scale.

For the Organisational Climate scale there were the following dimensions:

- Support – 6 items
- Objectives – 6 items

- Innovation – 6 items
- Rules – 4 items
- Organisational Climate (sum of the four dimensions) – 22 items

For the Organisational Climate – values perceptions scale, the following dimensions:

- Support – 3 items
- Objectives – 3 items
- Innovation – 3 items
- Rules – 2 items
- Perception of values (sum of the four dimensions) – 11 items

For the Organisational Climate – norms perceptions scale, the following dimensions:

- Perception of Top Management (TM) declared values (declared norms) – 6 items
- Perception of norms of expected behaviour (descriptive norms) – 4 items
- Norms perception (sum of the two dimensions) – 10 items

For the Values and Norms perception (sum of the perception of values and norms perception) – 21 items

For the Safety Climate scale there are the following dimensions:

- Support – 4 items
- Objectives – 2 items
- Innovation – 2 items
- Rules – 3 items
- Organisational Climate (sum of the four dimensions) – 11 items

For the Safety Climate organisational practices scale, there are the following dimensions:

- Management actions to safety – 3 items
- Safety training – 3 items
- Efficiency in Safety – 4 items
- Communication quality in Safety – 4 items
- Effects of Work rhythms – 4 items
- Organisational learning in safety – 4 items

- Safety practices (sum of the 6 dimensions) – 22 items

There are a total of 26 dimensions and scales for the two climates: 10 dimensions and 4 scales for Organisational Climate (identified as OC); and 10 dimensions and 2 scales for Safety Climate (identified as SC).

As stated by Silva et al. (2004) high values of the quality of each scale will indicate a strong and positive climate whereas low values will comprise a negative climate. Each dimensions result will allow to understand what areas influence the results of the climate scale and need to be improved, with high scores as positive and low scores as negative indicators.

Whenever possible, taking in consideration the small sample dimension, there was a comparison between different organisational levels as workers' perception on safety can vary significantly depending on different subgroups as well depending on their organisational level (Zhang et al., 2015; Zohar, 2010).

To consider the weaknesses when working with safety culture, as addressed by Akselsson et al. (2009), not only the subgroups were checked but also the situations when pressures move toward acceptable performance boundary (Rasmussen model) and difference between work as planned and work as done. This was done by checking the reality gradient of safety. This comparison was done between top management and workers, with also two subgroups of workers – factory and site.

Because of the small size of each subgroup the Independent-Samples Kruskal-Wallis Test was applied to the categories of "Hierarchy" (TM, Factory and Site).

On the second part of the study, to have an idea of the difference between the perception by the people that plan the work (Top Management) and the people that do the work (workers), the suggestion of Pillay et al (2010) was applied, where the answers from management were compared with the answers of workers.

For the calculations of the reality gradient of safety it was necessary to create other variables: "Hierarchy" and "TMvsWorkers", the first one divides into Top Management (TM), Factory and Site; the second one into Top management and

Workers. The existent items, from the questionnaire would not allow this aggregation as the division was between roles or sector. Some directors were in different sectors (office and site) and the number of persons in each role was not significant to compare between groups. Therefore, the calculations for the reality gradient of safety were done for each scale and dimension, for Top Management versus Workers and for Top Management, Factory and Site.

The reality gradient of safety highlights the perceptual differences between various organisational levels. This perceptual disconnect can lead to misunderstandings about the effectiveness of safety measures and the actual safety culture experienced by employees. It was pertinent to compare the results of the organisational and safety climate scale and dimensions of each of the groups to find if there were differences between them.

For this calculation it was considered that the maximum discrepancy would be the difference between the opposites of the Likert scale (7-1=6) and the minimum would be equal to zero (same results for both groups). Therefore 100% of difference between work as done and work as planned would correspond to 6 points and no difference to 0 points (0%). The value obtained would correspond to the reality gradient of safety. The higher the percentage of difference, the higher discrepancy of work as done, and work as planned and therefore a high reality gradient of safety.

III Results

III.1 Characterisation of the workforce

The characterisation of the workforce part of the OSCI was built to understand if there was any element that despite being able to speak Portuguese wouldn't be born in Portugal but in the UK and wouldn't have full understanding of Portuguese language, as reading.

However, this was not the case, and all respondents answered that they have full domain of Portuguese. Besides being Portuguese nationals, they all were born in Portugal with the exception of the Brazilian national that was born in Brazil. Therefore, they are all expatriates in the UK. There was not any question to find if any of the participants came to UK as an adult or as a child.

III.1.1 Birthplace

The 29 people that responded to the questionnaire are all Portuguese nationals, except for one person that is Brazilian, see Table 1.

Table 1 - Birthplace of the participants.

BIRTHPLACE	FREQUENCY	%
Portugal	28	96,6
Brazil	1	3,45
Total	29	100,0

III.1.2 Education

The education levels used on the OSCI correspond to the Portuguese education system. From Table 2 it is possible to see that the vast majority of the workers in this company hold a 9th year certificate at the most and only 2 people completed a university degree.

Table 2 - Education level of the sample.

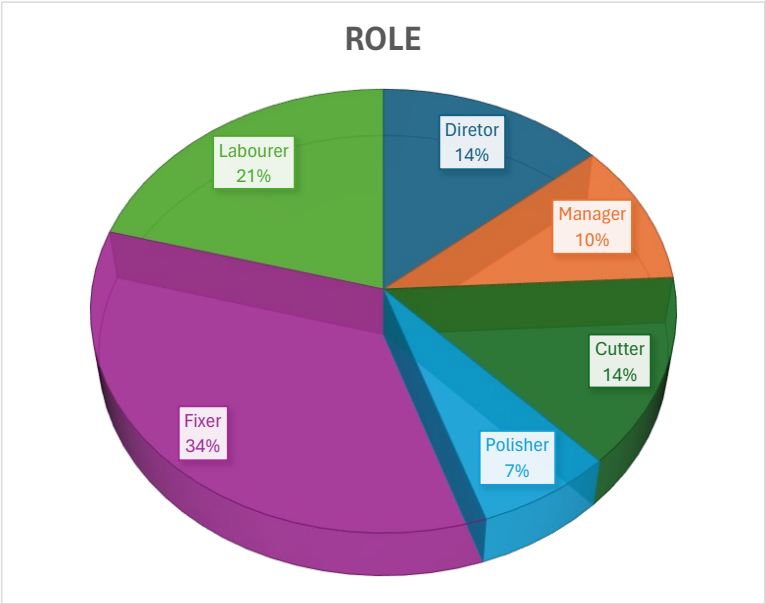
EDUCATION LEVEL	FREQUENCY	%
4th Year	3	10,3
6th Year	7	24,1
9th Year	10	34,5
11th Year	3	10,3
12th Year	4	13.8
Degree	2	6,9
Total	29	100

III.1.3 Role

The roles in this company are divided in: Directors, Managers, Cutter and Polisher for the Factory and Fixer for the Site. Labourers work in the factory and on site. The distribution of the different roles is described in Graphic 1.

There is a significant number of workers that are fixer (34%), which is the majority of the site personnel.

Graphic 1- Distribution of the roles in the sample.

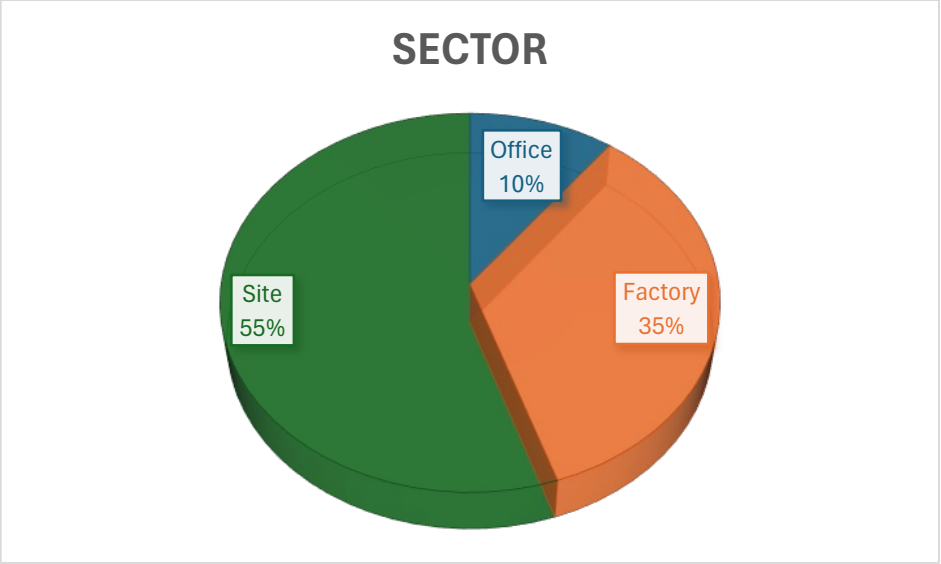


III.1.4 Sector

In relation to the different sectors in the company there are office, factory and site. The distribution is described in Graphic 2.

The sector with the biggest percentage of workers is the site, with 55%. Factory has 35% of the workers and the remaining elements are from the office.

Graphic 2 – Distribution of the sample on the sectors of the company.



In this sample the people from the office are related to the Top Management as the other elements do not understand Portuguese and therefore were not able to participate in this study.

Not all elements of Top Management are included in the office as two of the directors are considered to be part of the site, because this is the area where they work the most.

III.1.5 Type of employment

There are two different types of employment in the company: employees (working for an employer) and self-employed or contractor.

Table 3 shows the distribution of type of employment in the company.

Table 3 – Type of employment distribution in the sample.

EMPLOYMENT	Frequency	%
Employee	13	44,8
Self employed	16	55.2
Total	29	100,0

The majority of the self-employed are in the Site sector. Most of the employees are in the factory or in the office.

III.1.6 Age

In relation to the age of the participants, the question was divided into groups to avoid any fear from the participants that it would be possible to be identified, as it was on the original version from Silva et al. (2004) and suggested by Cooper (1998). The distribution is presented on Table 4.

Table 4 - Age distribution of participants.

Age	Frequency	%
To 20 year old	1	3.4%
21-25 years old	0	0.0%
26-30 years old	5	17.2%
31-35 years old	7	24.1%
36-40 years old	5	17.2%
41-45 years old	1	3.4%
46-50 years old	2	6.9%
51-55 years old	3	10.3%
56-60 years old	5	17.2%
more than 61 years old	0	0.0%
Total	29	100.0%

The majority of the working population in this company is in their 30's or in their 50's, with 5 workers also between 26 and 30 years old.

However, it is also possible to see from the Table 4 that 27% of the population is over 50 years old.

III.1.7 Working experience

There were three questions related to how long the participants have been working for in relation to the total time of work, time working in the stone sector and time in the company. The results are described in Table 5 to Table 7.

For the total working experience, regardless of working for this organisation or on the stone sector, Table 5 shows the years of working experience that workers and top management have.

Table 5 – Total working experience.

Working experience	Frequency	%
1-5 years	1	3.4%
6-10 years	4	13.8%
11-15 years	4	13.8%
16-20 years	5	17.2%
21-25 years	6	20.7%
26-30 years	1	3.4%
30-40 years	1	3.4%
>36 years	7	24.1%
Total	29	100.0%

From Table 5 it is possible to see that around 50% of the company workers have less than 20 years of working experience. On the other hand, more than 24% has more than 36 years of working experience. Having in consideration that more

than 60% is less than 40 years old of age, a significant number of workers started working really early in life.

The work done in this organisation – work in stone and ceramics – needs a particular level of experience, as most of this work is learned through experience and apprenticeship and very rarely through classes. Therefore, it was important to have a notion of the level of working experience these workers had.

In relation to working experience in the stone sector see Table 6.

Table 6 – Working experience in stone sector.

Working experience in Stone	Frequency	%
1-5 years	7	24.1%
6-10 years	7	24.1%
11-15 years	3	10.3%
16-20 years	4	13.8%
21-25 years	5	17.2%
26-30 years	1	3.4%
31-35 years	1	3.4%
> 36 years	1	3.4%
Total	29	100.0%

The groups with the higher percentage of workers are the ones from 1-5 years (7) and 6-10 years (7), both accounting for almost 50% of the sample, and there is also a significant value from 21-25 years (5). This shows a mixture between low experience levels and high experience levels in this field.

In relation to the time working in the company, the values are low because the company is in operation only for 5 years. The distribution is on Table 7.

Table 7 – Time working in the company.

Experience working in company	Frequency	%
to 1 year	4	13,8
to 2 years	5	17,2
to 3 years	5	17,2
to 4 years	5	17,2
to 5 years	10	34,5
Total	29	100,0

The largest group is the one that is in the company since the beginning, however, top management is on this group because they were the ones creating the company.

For the descriptive statistic of these items related to working experience see Table 8.

Table 8 – Descriptive statistics of working experience (in years).

	Working experience	Working experience in Stone	Working experience in the company
MEAN	24	14	3
ST. Dev.	12.8	11.1	1.6
Max	48	48	5
Min	4	1	0.2

It is possible to conclude that the workers have a significant working experience, with a minimum of 4 years. The maximum experience is from someone that as only worked in stone. The range, however, is significant in the working experience and working experience in the stone sector, but the mean is significantly high for both parameters.

It was expected that the experience within the company would be small having in consideration that the company is only 5 years old.

There is also a fact that is not on the data obtained from the questionnaire: there are workers that although not in the company from the start, they have worked previously with most of the workers and top management on another company, before this one was formed.

III.2 Results of the organisational and safety climate scales and dimensions

After the creation of the dimensions and the scales on the SPSS, the mean was obtained for each one. The results were obtained for the entire organisation and for the existent subgroups: Top management, factory, and site and also workers (factory and site).

As stated by Silva et al. (2004), it is necessary to get the Cronbach alpha for each dimension to assess the reliability of the study. The results should be above 0.60. For the current study the Cronbach alpha is 0.961 as shown in table Table 9. This proves the study has an excellent internal consistency.

Table 9 – Reliability statistics.

Cronbach alpha	Cronbach alpha based on standardised items	Nr of items
,961	,969	26

III.2.1 Organisational Climate

For the Organisational Climate scales and dimensions the results of the descriptive statistics are described on Table 10 – Descriptive statistics from the Organisational climate scales and dimensions. These results are for the full sample of 29 individuals.

Table 10 – Descriptive statistics from the Organisational climate scales and dimensions.

Scales & Dimensions	N	Minimum	Maximum	Mean
Support (OC)	29	3,67	7,00	5.68
Objectives (OC)	29	3,67	7,00	5.74
Innovation (OC)	29	3,50	6,83	5.19
Rules (OC)	29	3,25	7,00	5.64
Organisational Climate	29	3,50	6,77	**5.56**
Values perception - Support (OC)	29	3,33	7,00	5.81
Values perception - Objectives (OC)	29	3,67	7,00	5.64
Values perception - Innovation (OC)	29	3,33	7,00	5.42
Values perception - Rules (OC)	29	2,00	7,00	5.37
Values Perception (OC)	29	3,73	7,00	**5.58**
Perception of TM declared values (OC) (Declared norms)	29	3,80	6,83	5.49
Perception of norms of expected behaviour (OC) (Descriptive norms)	29	1,00	7,00	5.45
Norms Perception (OC)	29	3,22	6,80	**5.47**
Values and Norms perception (OC)	29	3,52	6,76	**5.53**

The Organisational Climate scale obtained a result of 5.56. Its dimensions, in a descending score order, are 1) objectives (5.74), 2) support (5.68), 3) rules (5.64), and 4) innovation (5.19).

For the Values Perception scale the value is 5.58. Its dimensions, in a descending order, are 1) support (5.81), 2) objectives (5.64), 3) innovation (5.42), and 4) rules (5.37).

The norms perception scale score is 5.47. Its dimensions present similar results, declared norms (5.49) and descriptive norms (5.45).

The values and norms perception scale has a score of 5.53.

For all the scales of the organisational climate the results vary between 5.47 and 5.58.

It is also possible to see from Table 10 that there is a wide range of score values for all dimensions and scales. This is most significant for the Perception of norms of expected behaviour (OC) (Descriptive norms) dimension that has the lowest and the highest scores.

III.2.2 Safety Climate

The results of the descriptive statistics related to the Safety Climate scales and dimensions are shown in Table 11. These results comprise the full sample of 29 elements.

Table 11 – Descriptive statistics for the Safety climate scales and dimensions.

Scales & Dimensions	N	Minimum	Maximum	Mean
Support (SC)	29	3,25	6,75	5.15
Objectives (SC)	29	1,00	7,00	5.24
Innovation (SC)	29	1,00	6,50	4.71
Rules (SC)	29	1,67	7,00	5.22
Safety Climate	29	2,55	6,64	**5.11**
Management actions to safety (SC)	29	2,00	7,00	4.45
Safety training (SC)	29	1,33	6,67	4.99
Efficiency in Safety (SC)	29	2,75	6,75	5.32
Communication quality in Safety (SC)	29	3,00	5,75	4.24
Effects of Work rhythms (SC)	29	1,25	7,00	4.33
Organisational learning in safety (SC)	29	2,50	7,00	5.22
Safety practices (Total) (SC)	29	3,41	6,55	4.75

The Safety Climate scale presents a score of 5.11. Its dimensions, in descending order, are 1) objective (5.24), 2) rules (5.22), 3) support (5.14) and 4) innovation (4.71).

The Safety Practices (total) scale achieved a score of 4.74 and its dimensions, in descending order of the score are: 1) efficiency in safety (5.32), 2) organisational learning in safety (5.22), 3) safety training (4.99), 4) management

actions to safety (4.45), 5) effects of work rhythms (4.33), and with the lowest score, 6) communication quality in safety (4.24).

It is possible to see that there are a few dimensions exhibiting a significant difference between the minimum and the maximum score values, i.e. objectives, innovation, safety training and effects of work rhythms.

III.2.3 Organisational Climate (subgroups)

The results of the scores found for the Organisational Climate scales and dimensions of the subgroups of Top Management and Total Workers are described in Table 12.

Table 12 – Mean values of the scores obtained for Organisational Climate scales and dimensions of the subgroups Top Management (5) and Workers (24).

Dimensions	**Top Management (N=5)**	**Workers (N=24)**
Support (OC)	6.73	5.48
Objectives (OC)	6.43	5.61
Innovation (OC)	6.10	5.01
Rules (OC)	6.75	5.43
Organisational Climate	**6.49**	**5.38**
Values perception - Support (OC)	6.87	5.61
Values perception - Objectives (OC)	6.47	5.48
Values perception - Innovation (OC)	6.40	5.23
Values perception - Rules (OC)	6.70	5.12
Values Perception (OC)	**6.60**	**5.39**
Perception of TM declared values (OC) (Declared norms)	6.47	5.30
Perception of norms of expected behaviour (OC) (Descriptive norms)	6.35	5.28
Norms Perception (OC)	**6.42**	**5.29**
Values and Norms perception (OC)	**6.51**	**5.34**

The results from Top Management are higher than the ones from the total Workers in the company. All values from Top Management are above 6, with the maximum result for Values perception - Support (6.87) and the lower value for Innovation (6.1). The scales have score of 6.49 for Organisational Climate, 6.6 for Values perception, 6.42 for Norms perception and 6.51 for Values and Norms perception.

On the other hand, Workers had scores above 5 but below 6. With the highest score for Objectives (5.61) and the lowest for Innovation (5.01). The lowest score is the same as for Top Management. The scales have score of 5.38 for Organisational Climate, 5.39 for Values Perception, 5.29 for Norms Perception and 5.34 for Values and Norms Perception.

Introducing the subgroups Factory and Site to the Top Management, the results are described on Table 13. The subgroup of Workers with a total of 24 was divided into Factory (10) and Site (14).

The results show that score values for site are, in all dimensions and scales, lower than those of the factory. Some of the values show significant differences as it is the case for: Descriptive Norms (4.86 and 5.95, respectively) and Values Perception – Rules (4.63 and 5.9, respectively).

Organisational climate scale score is 5.71 to factory and 5.17 to site. Values perception scale score is 5.79 to factory and 5.14 to site. Norms perception score scale is 5.57 and 5.11 to factory and site, respectively, and Values and Norms perception value is 5.69 and 5.13 to factory and site respectively. Scores from Site are lower than the ones from factory

Table 13 - Mean values of the scores found for the Organisational climate scales and dimensions of subgroups Top Management (5), Factory (10) and Site (14).

Dimensions	Top Management (N=5)	Factory (N=10)	Site (N=14)
Support (OC)	6.73	5.77	5.30
Objectives (OC)	6.43	5.95	5.40
Innovation (OC)	6.10	5.23	4.88
Rules (OC)	6.75	5.90	5.13
Organisational Climate	**6.49**	**5.71**	**5.17**
Values perception - Support (OC)	6.87	5.93	5.41
Values perception - Objectives (OC)	6.47	5.87	5.24
Values perception - Innovation (OC)	6.40	5.50	5.06
Values perception - Rules (OC)	6.70	5.90	4.63
Values Perception (OC)	**6.60**	**5.79**	**5.14**
Perception of TM declared values (OC) (Declared norms)	6.47	5.32	5.29
Perception of norms of expected behaviour (OC) (Descriptive norms)	6.35	5.95	4.86
Norms Perception (OC)	**6.42**	**5.57**	**5.11**
Values and Norms perception (OC)	**6.51**	**5.69**	**5.13**

III.2.4 Safety Climate (subgroups)

The results of the scores for Safety Climate scales and dimensions of the subgroups of Top Management and Total Workers are shown in

Table 14.

The Safety Climate scales and dimensions scores are lower than the ones of the Organisational Climate. The range of scores for Top Management is between 6.8 (Effects of Work rhythms) and 4.95 (Communication quality in Safety), with most of the scores above 6, except for 4 scales and dimensions.

Table 14 – Mean values of the score of Safety climate scales and dimensions for subgroups Top Management (5) and Workers (24).

Dimensions	Top Management (N=5)	Workers (N=24)
Support (SC)	6.25	4.94
Objectives (SC)	6.30	5.04
Innovation (SC)	5.50	4.56
Rules (SC)	6.47	4.98
Safety Climate	**6.18**	**4.90**
Management actions to safety (SC)	6.60	4.04
Safety training (SC)	5.87	4.82
Efficiency in Safety (SC)	6.30	5.13
Communication quality in Safety (SC)	4.95	4.11
Effects of Work rhythms (SC)	6.80	3.86
Organisational learning in safety (SC)	5.90	5.10
Safety practices (Total) (SC)	**6.14**	**4.48**

For Top Management, Safety Climate scale score is 6.18 and for Safety Practices (Total) is 6.14.

For the Workers the range of scores is between 3.86 for Effects of Work rhythms and 5.13 for Efficiency in Safety, with most scores around 4, except for 3 scales and dimensions that are near 5 and another one that is below 4.

Dividing the subgroup of Workers into the subgroups Factory (10) and Site (14) the results for the scales and dimensions of the safety climate are described on Table 15.

Table 15 – Mean values of the scores of Safety climate scales and dimensions of subgroups Top Management (5) and Factory (10) and Site (14).

Dimensions	Top Management (N=5)	Factory (N=10)	Site (N=14)
Support (SC)	6.25	5.08	4.85
Objectives (SC)	6.30	5.15	4.97
Innovation (SC)	5.50	4.55	4.56
Rules (SC)	6.47	4.83	5.07
Safety Climate	**6.18**	**4.93**	**4.88**
Management actions to safety (SC)	6.60	5.00	3.44
Safety training (SC)	5.87	4.50	5.02
Efficiency in Safety (SC)	6.30	5.23	5.07
Communication quality in Safety (SC)	4.95	4.10	4.11
Effects of Work rhythms (SC)	6.80	3.88	3.84
Organisational learning in safety (SC)	5.90	5.25	4.99
Safety practices (Total) (SC)	**6.14**	**4.68**	**4.35**

As it happened with the Organisational climate, the results from the Factory and Site are different. Safety climate scale and Safety Practices scale with values for Factory (4.93 and 4.68 respectively) above the ones for Site (4.88 and 4.35 respectively). However, in this case not all dimensions have higher scores for Factory compared to Site. This happens for Innovation (difference of 0.24), Rules (difference of 0.24) and more significantly for Safety Training (difference of 0.52). The reason for this is probably related to the fact that Site personnel have to work in sites run by other companies (Client) that have specific rules. It is also the case that Construction sector is more regulated and has more requirements than other areas, and this is cascade from companies to their subcontractors. One good example is the requirement of specific training to work in their sites and that justifies the fact that Safety Training dimension has such a significant difference (0.52).

For a small company the subgroups are significantly small making the statistical treatment more complicated. The Independent-Samples Kruskal-Wallis

Test was applied on SPSS to test the independence of the subgroups. For the variable “Hierarchy” (Top management, Factory and Site) was tested. For a significant level of 0,05, the p-value between 0,003 and 0,048 for 18 scales and dimensions for which the distribution is not the same across the different categories of Hierarchy and between 0,053 and 0,408 for 8 dimensions where the distribution is the same across the different categories of hierarchy (TM, Factory and Site).

III.3 Reality Gradient of Safety

As the authors of the instrument used in this study consider climate as “shared perceptions about organisational values, norms, practices and procedures that can be observed at general or specific levels” (Silva et al., 2004, p. 208), it would be interesting to compare these perceptions between Top Management and the workers. This could give an idea of the difference between the perception of people that plan the work and people that do the work. This was proposed by Pillay et al (2010) as the reality gradient of safety. This comparison can also give an idea of the areas where there is a discrepancy between the views of Top Management and Workers and allow more specific recommendations for intervention.

To assess the reality gradient of safety, a comparison for each scale and dimension was made, firstly between Top Management (TM) and the rest of the workforce (Workers) and secondly between TM and Factory and Site. This would allow Top Management to have an idea of how different the perception of workers is from theirs. This can also be considered the difference between work as planned (work as TM as envisage) and work as done (work as workers do it). This difference is important to know which workers perceive as company’s objectives when they have to make a decision once a challenge emerges. These perceived objectives should be as close as the ones envisage by TM, to avoid discrepancies between what is done and what was expected to be done.

For this study the difference between the scores from TM and Workers is resumed in Table 16 by descending order of reality gradient of safety.

Table 16 - Descending order of the reality gradient of safety for TM (5) and the Workers (24).

Dimensions	Mean values		Difference	Difference (%)
	Top Management (N=5))	Workers (N=24)		
Effects of Work rhythms (SC)	6.80	3.86	2.94	49%
Management actions to safety (SC)	6.60	4.04	2.56	43%
Safety practices (Total) (SC)	**6.14**	**4.48**	**1.66**	**28%**
Values perception - Rules (OC)	6.70	5.12	1.58	26%
Rules (SC)	6.47	4.98	1.49	25%
Rules (OC)	6.75	5.43	1.32	22%
Support (SC)	6.25	4.94	1.31	22%
Safety Climate	**6.18**	**4.90**	**1.28**	**21%**
Objectives (SC)	6.30	5.04	1.26	21%
Values perception - Support (OC)	6.87	5.61	1.26	21%
Support (OC)	6.73	5.48	1.25	21%
Values Perception (OC)	6.60	5.39	1.21	20%
Values and Norms perception (OC)	**6.51**	**5.34**	**1.17**	**20%**
Perception of TM declared values (OC) (Declared norms)	6.47	5.30	1.17	19%
Values perception - Innovation (OC)	6.40	5.23	1.17	19%
Efficiency in Safety (SC)	6.30	5.13	1.17	19%
Norms Perception (OC)	6.42	5.29	1.14	19%
Organisational Climate	**6.49**	**5.38**	**1.11**	**19%**
Innovation (OC)	6.10	5.01	1.09	18%
Perception of norms of expected behaviour (OC) (Descriptive norms)	6.35	5.28	1.08	18%
Safety training (SC)	5.87	4.82	1.05	17%
Values perception - Objectives (OC)	6.47	5.48	0.99	16%
Innovation (SC)	5.50	4.56	0.94	16%
Communication quality in Safety (SC)	4.95	4.11	0.84	14%
Objectives (OC)	6.43	5.61	0.82	14%
Organisational learning in safety (SC)	5.90	5.10	0.81	13%

Effects of Work rhythms (SC) and Management actions to safety (SC) are the dimensions with the highest reality gradient of safety, 49% and 43%, values close to 50%. This shows that there is a significant discrepancy of perceptions between

TM and Workers. The interventions in these areas should be more significant. The Total of safety practices scale has a significant value of 28%, and the previous dimensions are part of it.

The reality gradient of safety despite being intend for safety, can be applied to organisational climate as this climate will also have an impact on safety.

Values perception - Rules (OC) (26%), Rules (SC) (25%) and Rules (OC) (22%) are very similar in description and have similar values of reality gradient of safety.

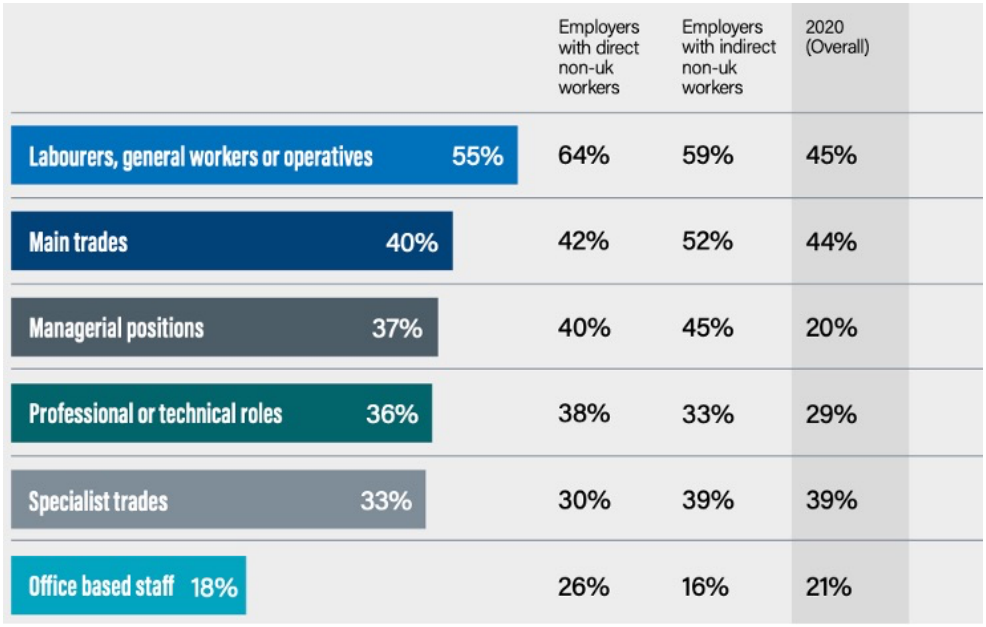
IV Discussion of Results

IV.1 Characterisation of the workforce

The sample, that correspond to the workforce of the company with the exception of the office staff, is all Portuguese except for one Brazilian element. And all of them were born outside of the UK and have Portuguese as their mother language, with no one being born in the UK to Portuguese parents, as sometimes is the case in this type of companies. It was not possible to know how many moved to the UK as an adult or as a child.

According to CITB (2023) on their Migration and Construction Report (migrant workers are more concentrated in London. Construction workers born outside of the UK represent almost half (46.1%) of construction workers in London. Following Brexit, even with a decrease in migration from the EU, nearly half (49.3%) of migrant workers are still from the EU, and an additional 10% come from other regions of Europe. Figure 8 shows the distribution of non-UK workers in the construction industry.

Figure 8 - Roles undertaken by non-UK workers in the previous 12 months of 2022 (in CITB, 2023)



The company has a unique distribution of nationalities because of the way it was formed. The directors are Portuguese and hired people that knew from previous

company that was set also by Portuguese nationals. However, if this distributions is seen on a larger scale (a construction site), with other trades, the percentage of non-UK born workers would probably be similar to the study of CITB.

The vast majority of the workers in this company have less than the 9th year of school certificate and only 2 people completed a university degree. This implies that the education level is low.

The level of education among construction workers in the UK varies significantly. CITB (2023) indicates that a substantial portion of the construction workforce lacks formal higher education qualifications. Specifically, about 34% of construction workers have no qualifications beyond compulsory education, while another 20% hold a Level 2 qualification, 12% possess a Level 3 qualification, and only a small percentage have higher education degrees.

In relation to the roles distribution in the company, the reason for the high number of fixers is justified by the fact that Site work is scattered by several site locations with small groups of workers. Whereas workers from the factory work in a single space. Cutters are also dependent of the number of cutting machines available, not being possible to have more cutters than the existing cutting machines.

The distribution of the study population on the different sectors is not the same as the one for the subgroups in the climate calculation. This happens because two of the directors consider themselves as part of the site, as their work is to manage and coordinate site work.

The company has a significant number of workers that are self-employed, and most of them are part of the site personnel. This is usually because of financial advantages; however, it might bring some instability to the availability of the workforce as self-employed workers can leave and work in another site whenever they want.

As self-employed, the company does not have to provide training, personal protective equipment (PPE) and other equipment as it does to employees. However, in terms of training, the company has recently provided training in Abrasive Wheels and Manual Handling to the Site personnel.

In terms of age, it is possible to say that the company has a young workforce but at the same time a considerable number of workers is close to the retirement age – in their 50's (25.8%). This is because the majority of the working population are in their 30's (42%) and also between 26 and 30 years old (16.1%). The population between 26 and 39 is 58.1%.

The age distribution among workers in this company reveals a significant trend towards an aging workforce, reflecting broader patterns seen in the construction industry across the UK. According to recent data (Zhao, 2023), in the UK about 10% of construction workers are under the age of 25. The majority, around 67.7%, fall within the prime working age of 25 to 54. Notably, workers aged 55 and older represent approximately 22.3% of the construction workforce

In relation to working experience, the workforce of this company has a significant work experience with a mean of 24 years, but also experience in the stone sector, with a mean of 14 years. It was however, expected that the experience in the company would be low as the company is a young company with only 5 years old. Nevertheless, the mean of experience in the company is of 3 years.

With high levels of experience with a young workforce, it is easy to assume that some workers started working at a really young age, and therefore have a low education level because they left school early.

Despite this, with this workforce, it is possible to use the experience of the most senior workers to teach the less experienced ones in an apprenticeship type of learning. This would allow the company not to be so dependent of the expertise availability in the market, that in the current situation of the UK is low in the construction industry. However, with the high numbers of self-employed, especially in Site personnel, the investment made can be lost very easily or deter the company from making any investment in training from "classes" and "in work training".

IV.2 Organisational and Safety Climate

In this company the Organisational Climate score value is 5.56 and the Safety Climate score is lower, 5.11. This implies that the "shared perceptions about

organisational values, norms, practices and procedures that can be observed at general or specific levels" (Silva et al., 2004, p. 208) are more positive at the organisational level than at the safety level.

According to Silva et al. (2004) high scores of organisational climate implies a strong and positive climate. The scale of the score range from 1 to 7, from the Likert scale of the questions on the OSCI. With a score of 5.56 it can be considered that the organisational climate is positive and strong but with plenty of space to improve.

Safety climate is also positive but has a lower value (5.11), therefore it has more space to grow. In comparison with other studies, using the same instrument (OSCI), the values obtain in this company are significant higher than Alves, P. (2011) of 4.23, in a car manufacturing company or Monteiro et al. (2007) with 3.13 on a services company.

As Zohar (1980) defined safety climate as a sub type of organisational climate, employees may perceive their organisation as generally positive (high organisational climate) while identifying specific safety concerns (lower safety climate) within that positive context.

Higher values observed in organisational climate compared to safety climate typically reflect the broader scope and positive perception employees have of their overall work environment, which includes safety as one component among others.

IV.2.1 Organisational Climate

In relation to the organisational climate scales and dimensions and according to Table 10 that summarises the scores of the organisational climate, it is important to understand which ones are more in need of intervention. The priority level will depend of other factors as the availability of resources in the company.

The lower scores are for Innovation (5.19), Values perception – Rules (5.37) and Values perception – Innovation (5.42), Perception of norms of expected behaviour (OC) (Descriptive norms) also has one of the lower scores (5.45).

Innovation

Checking the questions concerning the Innovation dimension, it is related to innovation of products/services, technological development, encouragement to new ideas to improve company's products, promotion related to being creative, top management requesting innovative suggestions to do the work and giving importance to technological innovation. The problem can be related to the use of old procedures and machinery, lack of use of more new technologies or for example in the communication between site and factory (templates[1]). It also shows lack of commitment from top management to innovation. Nevertheless, it shows that consultation with workforce is also lacking. Values perception – Innovation is similar to Innovation being part of the latter.

Values perception – Rules

Values perception – Rules dimension is related to the importance of written instructions to perform the work and implementation of clear procedures to perform the task. With a lower score, comparing to other dimensions, in this company written instructions and implementation of clear procedures are not as important to perform the work. This might be good to allow flexibility in a challenging situation, but it also implies that rules and procedures are not important.

According to Colley et al. (2013) it is necessary to adhere to rules and procedures to some extent, however, their findings indicate that placing too much emphasis on them, at the expense of other important values, can be counterproductive.

With these results in this company, it is important the implementation of clear written procedures but allowing some level flexibility.

Perception of norms of expected behaviour (Descriptive norms)

On Perception of norms of expected behaviour (Descriptive norms) dimension, workers were asked in terms of what was necessary to be promoted or

[1] Templates are physical material or drawings that are made on site where exact measures are taken to send to factory to cut the stone.

rewarded: teamwork, meeting objectives, being innovative and creative and comply with company's rules.

However, on the Perception of TM declared values (declared norms) dimension that had slightly better score, they were asked about the same points but asking if Top Management says that is necessary to do: contribute with innovative suggestions, account with workers wellbeing, technological innovation, complying with establish working rules, following the company's policies and procedures.

Norms Perception dimension is the sum of the previous two and therefore was ranked between the two.

To improve these two (or three) dimensions it is suggested to improve written documentation with policies and procedures, share with the workforce and consult them, but also to improve promotion and rewarding with introduction of other values beside just doing the work. And have this process also documented to clarify the criteria.

IV.2.2 Safety Climate

In relation to the safety climate scales and dimensions from Table 11 is easy to understand that Communication Quality in Safety (4.24) has the lowest score of all dimensions and scales. Effects of Work rhythms (4.33) and Management actions to safety (4.45) scores are also very low. These are the areas that are in more need for intervention, although there are 6 dimensions with scores below 5. In relation to the dimensions of safety climate (Support, Innovation, Objectives and Rules) Innovation has the lowest score (4.71), similar to the results of organisational climate. The one with the highest score from the four is Objectives (5.24) similar to what happens with Organisation climate dimensions. Dimensions with the higher scores are Efficiency in Safety (5.32), Objectives (5.24) and Organisational learning in safety (5.22).

According to Monteiro et al (2007) when dimension "Rules", in safety climate, is the highest dimension this will lead to a reduction of workers awareness of

professional risks as the internal regulation is considerable high because it is the most important in the company regarding safety.

In this study the dimension rules is not the highest but the fourth highest, this and the fact the highest values are in dimensions “Efficiency in safety”, “Objectives” and “Organisational learning in Safety” implies that there is a high awareness of professional risks in the company and a higher value of safety climate than obtain by Monteiro et al (2007) in their study.

Communication Quality in Safety

In relation to the items associated with Communication quality in Safety, they are linked to supplying information about what happens in safety, studying and discussing safety statistics, knowing who to contact in relation to safety, top management allowing workers to feel comfortable talking about safety. In this company there aren´t safety statistics or any other reactive or proactive indicators measurements. To improve this dimension it is necessary to create a safety monitoring programme with active and reactive performance indicators and measure them against defined objectives and inform workers. Consultation with workforce about safety should also be implemented. There should exist open conversation about safety so workers can expose their concerns and doubts.

Effects of Work rhythms

The Effects of Work rhythms dimension is related to work pressure negatively influencing safety by not following safety rules when there is too much work, short deadlines, working faster or not worrying to much about safety to finish work. To improve this dimension it is necessary to analyse work planning, including time allocation during tender stage, and certify that workers have all resources to do the work, including time. It is also a good opportunity to analyse where waste happens and consequently improve productivity.

Management actions to safety

Management Actions to Safety is related to the fact that Top Management does not care to what the safety manager says. They don't demonstrate concern about safety until an accident happens and consider that people that take decisions about safety do not know what is happening at the workers level.

This dimension gives an idea of what workers think about Top Management's approach to safety. It is necessary to provide information to workers about safety, but also demonstrate Top Management's commitment to safety by improving safety equipment available as fire equipment, signs, posters, and also rules and procedures. Consultation with workforce is also necessary to understand what workers think that is necessary to do to improve safety.

Innovation

Innovation dimension associated with Safety climate is related to valuing expression of new safety ideas and the introduction of new safety norms in line to what is done in other countries. This dimension (Innovation) achieved a low score for both climates (organisational and safety). So, for improvement of this dimension, it would be important to get new ideas from workers through consultation. In relation to new norms in line with other countries the low score might be because UK is regarded as having good safety performance so there is the assumption that is not necessary to get information from other countries but that does not mean that this innovation cannot come from other companies in the country.

IV.2.3 Organisational Climate and Safety Climate of Subgroups

Akselsson et al. (2009) suggested to look for weaknesses when working with safety culture (or safety climate) to improve safety in an organisation. They identified some of the "holes" that are important to address when working with safety culture as low-score groups.

As there are two different sectors in the company (a third if counting with office), with different type of work and working conditions, it would be interesting to compare the less favourable dimensions.

The fact that there are few people in one group – Top Management – makes statistical results extremely influenced by few elements views. However, in reality the dynamics of organisations are not linear where “quantity” would be the only factor for decisions. The existence of a vertical hierarchy implies that the few in the top will have more influence than the crowed bottom.

As stated by Antonsen (2009) culture in a company is not a consensus environment because of the existence of issues of power and conflicting interests between different groups within the company. Therefore, and considering that safety climate is part of the safety culture, it was considered pertinent to evaluate the scores of the scales and dimensions of the existent subgroups, even though the sample is small. Because the perceptions of the few (or even one) in the Top Management will have a significant impact on how the organisation behaves.

From Table 17 is possible to see the dimensions in descending order (both safety and organisational climate) for the two groups. Where is possible to see that the order of scales and dimensions is different for each group.

It is interesting to see that despite safety climate having a score above 5, there are some dimensions with scores lower than 5. As it is the case for Effects of Work Rhythms for Factory and Management Actions to Safety and Effects of Work Rhythms for Site, all with score below 4.

For the factory the dimensions with lower scores are Effects of Work Rhythms (3.88), Communication Quality in Safety (4.1), Safety Training (4.5), and Innovation (SC) (4.55) is also close. Whereas for the site the lower scores were obtained for Management Actions to Safety (3.44), Effects of Work Rhythms (3.84) and Communication Quality in Safety (4.11).

Table 17 – Scores of Organisational and Safety Climate scales and dimensions in descending order for subgroups Factory and Site.

Dimensions	Factory	Dimensions	Site
Objectives (OC)	5.95	Values perception - Support (OC)	5.41
Perception of norms of expected behaviour (OC) (Descriptive norms)	5.95	Objectives (OC)	5.40
Values perception - Support (OC)	5.93	Support (OC)	5.30
Rules (OC)	5.90	Perception of TM declared values (OC) (Declared norms)	5.29
Values perception - Rules (OC)	5.90	Values perception - Objectives (OC)	5.24
Values perception - Objectives (OC)	5.87	**Organisational Climate**	**5.17**
Values Perception (OC)	**5.79**	**Values Perception (OC)**	**5.14**
Support (OC)	5.77	Rules (OC)	5.13
Organisational Climate	**5.71**	**Values and Norms perception (OC)**	**5.13**
Values and Norms perception (OC)	**5.69**	**Norms Perception (OC)**	**5.11**
Norms Perception (OC)	**5.57**	Rules (SC)	5.07
Values perception - Innovation (OC)	5.50	Efficiency in Safety (SC)	5.07
Perception of TM declared values (OC) (Declared norms)	5.32	Values perception - Innovation (OC)	5.06
Organisational learning in safety (SC)	5.25	Safety training (SC)	5.02
Innovation (OC)	5.23	Organisational learning in safety (SC)	4.99
Efficiency in Safety (SC)	5.23	Objectives (SC)	4.97
Objectives (SC)	5.15	**Safety Climate**	4.88
Support (SC)	5.08	Innovation (OC)	4.88
Management actions to safety (SC)	5.00	Perception of norms of expected behaviour (OC) (Descriptive norms)	4.86
Safety Climate	4.93	Support (SC)	4.85
Rules (SC)	4.83	Values perception - Rules (OC)	4.63
Safety practices (Total) (SC)	4.68	Innovation (SC)	4.56
Innovation (SC)	4.55	**Safety practices (Total) (SC)**	4.35
Safety training (SC)	4.50	Communication quality in Safety (SC)	4.11
Communication quality in Safety (SC)	4.10	Effects of Work rhythms (SC)	3.84
Effects of Work rhythms (SC)	3.88	Management actions to safety (SC)	3.44

It is interesting that Safety Training has a low score for Factory but not for Site. This is probably because Site recently attended training whereas Factory hasn't had yet.

Measures for Effects of Work Rhythms need to be improved for factory but also for site. This is because factory has been having to do overtime to manage the workload and give material for site. On the other hand measures for Management actions to Safety are more urgent for site. This is because on site safety measures are usually decided by client (principal contractor) and not by management.

Communications Quality in Safety is important for both sectors with low scores in both departments.

For Organisational climate, Innovation (5.23), Perception of TM declared values (OC) (Declared norms) (5.32) and Values perception - Innovation (OC) (5.50) have the lowest scores for factory. Whereas Perception of norms of expected behaviour (OC) (Descriptive norms) (4.85), Innovation (OC) (4.88) and Values perception - Innovation (OC) (5.06) have the lowest scores for Site.

In terms of Organisational Climate, Innovation is the area that are in more need of intervention, including Values perception - Innovation (OC).

The differences between the two groups is understandable because of the existent difference workplace dynamics. Although there are some common dimensions that can be justified by the fact that it is the same company and therefore there are similar challenges faced by all workers.

IV.3 Reality Gradient of Safety

According to Schwatka et al (2016) there were very few research studies contrasting safety climate scores between management and workers. Unlike workers, management's responses to safety climate surveys might show an idealised safety climate. Analysing safety climate indicators across different job levels could uncover how effectively health and safety communication is maintained within the organisation, highlighting any disparities between specified and practiced policies and procedures.

On this study the dimensions with the higher values of reality gradient of safety are Effects of Work rhythms (SC) and Management actions to safety (SC) with 49% and 43% respectively. This shows that there is a significant discrepancy of perceptions between TM and Workers. This shows that there is a need for Top Management to assess the work rhythms with consultation with the workforce to see were improvements can be made.

The Total of safety practices scale has a significant value of 28%, and the previous dimensions are part of it. However, other two dimensions of this scale have some of the lowest values of reality gradient of safety.

It interesting to see that Values perception - Rules (OC) (26%), Rules (SC) (25%) and Rules (OC) (22%) are very similar in description and have similar values of reality gradient of safety. This indicates that the implementation and enforcement of rules need to be clearer. Although, on site, there are the RAMS as documentation, the enforcement of these are not being done. Inspections of the workplace need to be more comprehensive.

Support (SC) also has a reality gradient of safety of 22%, meaning that the organisational emphasis on workers, teamwork and participation is less perceived among workers than it is by TM. This reinforces the need for improvement in workforce consultation.

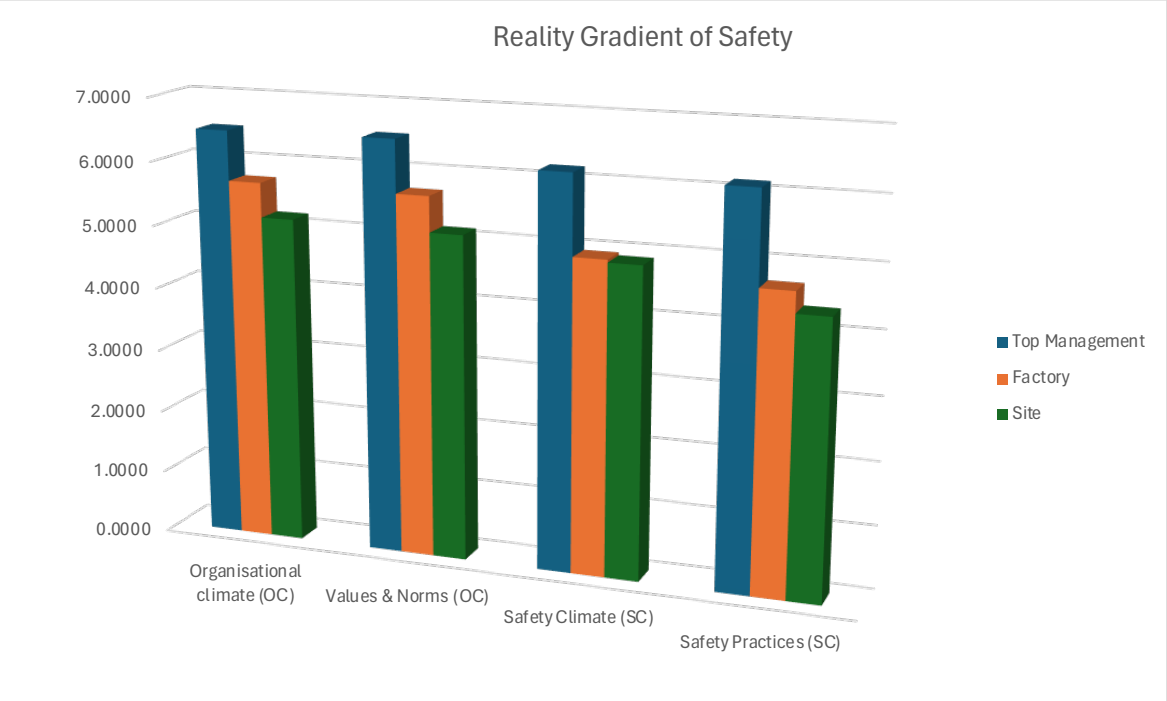
Safety Climate also has a significant value of 21%, meaning that management of safety is not a good as TM perceive it.

It is interesting to see that Communication quality in Safety (SC) has a low reality gradient of safety, justified by the fact that both groups perceive this dimension as weak and not so positive.

For the reality gradient of safety of the TM versus the two sectors of the company, it was made a comparison for the climates scales researched. The difference between Factory and Site exists but is significantly smaller than the difference between any of the sectors and TM.

The actual value of the reality gradient of safety was not obtained but the difference between each group can be seen in Graphic 3.

Graphic 3 - Reality Gradient of Safety for the Safety Climate scales and Organisational climate scales of Top Management, Factory and Site.



The scores of the Safety Climate and Safety practices are the ones with the highest difference between TM and Factory and Site. This indicates that the perception about safety of the Top Management is significantly higher than the one perceived by workers, in any of the sectors. On the other hand organisational climate does not have a difference between TM and the two sectors as significant as safety climate.

In conclusion, the higher values observed in organisational climate compared to safety climate typically reflect the broader scope and positive perception employees have of their overall work environment, which includes safety as one component among others. Therefore the difference between Top Management perception and workers perception will be lower on Organisational Climate compared to Safety Climate.

IV.4 Recommendations for intervention

The level of safety performance, through the lens of the organisational climate and the safety climate is good, however, improvements are necessary.

To improve both the organisational and the safety climate of the company it is important to implement some measures. The ones described below are the most significant ones:

- Consultation with the workforce regarding measures implementation, policies and procedures, monitoring programme, suggestions for innovation and contribution from workforce in project planning.
- Implementation of clear written safety procedures as safety company induction, risk assessment for factory work (cutting and polishing) and site (explanation of existent RAMS).
- Implementation of safety policies as general safety policy, incident reporting and investigation including near misses, emergency response and evacuation, safety training
- Improvement and clarification of the workforce promotion and rewarding policy, with clear definition of criteria.
- Creation of a safety monitoring programme with active (safety inspections, safety training completion) and reactive performance indicators (near miss reporting rate) and inform workers.
- Analysis of work planning, including time allocation during tender stage, and certify that workers have all resources to do the work, including time. It is also a good opportunity to analyse where waste happens and consequently improve productivity.
- Training programme implementation for the factory in abrasive wheels and manual handling as well in health risks as dust
- Clearer implementation and enforcement of rules with increase in safety inspections.

IV.5Limitations of the study

One of the problems that we came across during this study was the fact that the questionnaires should have been checked to understand if any answer was missing. Some of the inquiries didn't have all the answers and this implied that it was not possible to use the 31 results. However, when the situation was noted, the following questionnaires were checked for missing answers. The two questionnaires that were not complete were removed for the assessment.

Another difficulty was the fact that not all items were used to calculate the scales and dimensions created by Silva et al. (2004). The guidelines made available by the authors of OSCI for the creation of the scales and dimensions seemed to be incomplete. From the 70 items of the questionnaire, only 55 were used. This implied that the questionnaire in use took longer than necessary to be filled, and some participants complained of its length.

The most relevant limitation of this study was the dimension of the sample. This is because the company was also small, but almost all workers participates. The size of the sample might interfere with the results obtained, as the scales and dimensions of both organisational and safety climates are calculated by the mean of the answers of the items relevant to each scale or dimension. This limited the statistical tests that could be applied. One way of overcome this limitation is to make sure that all elements of the subgroups are represented. In this case unfortunately two questionnaires need to be removed. Nevertheless, the results obtained give a good idea of the interventions needed and the possibility to make different interventions in the sectors of the company.

Conclusion

The aim of the study was to understand the level of safety performance of a construction company without the use of lagging indicators such as accident rates in a small construction company in the UK with a significant Portuguese workforce.

To achieve this aim one of the objectives was to assess organisational climate and safety climate The other objective was to assess the reality gradient of safety to compare work as planned (by Top Management) from the work as done (by workers).

To assess the organisational and safety climate, the research instrument used to measure the safety climate in this company was the one developed by Silva et al. (2004) – Organisational and Safety Climate Inventory (OSCI). This instrument had the advantage of being already validated for the Portuguese language and allowing the measurement of organisational and safety climate.

The calculations for the reality gradient of safety were done for each scale and dimension, for Top Management versus Workers and for Top Management, Factory and Site.

The company has a workforce with a low level of education, with less than the 9th year of school. whereas only 2 people have a degree. The largest role group within the company are the fixers that are the main force on site and represent 39% of the total workforce. The company has a significant number of workers that are self-employed, the majority of them are part of the site personnel. It is possible to say that the company has a young workforce but at the same time a considerable number is close to the retirement age – in their 50's (25.8%). This is similar to the age distribution among workers in the construction industry in the UK.

In relation to working experience, the workforce of this company has a significant work experience with a mean of 24 years, but also experience in the stone sector, with a mean of 14 years. It was however, expected that the experience in the company would be low as the company is a young company with only 5 years old. Nevertheless, the mean of experience in the company is of 3 years.

The scales and dimensions had their scores obtained for the entire company. Organisational Climate scale had a result of 5.56.

The Safety Climate scale had a score of 5.11. The safety practices (total) scale has a score of 4.74.

For the safety climate, Communication Quality in Safety (4.24) was the lowest score of all dimensions and scales from both climates. Effects of Work rhythms (4.33) and Management actions to safety (4.45) were also very low. These are the areas that need more intervention, although there are 6 dimensions below score 5.

As the values of organisational climate and safety climate are above the average of the scale (1 to 7) it can be concluded that the climate is strong and positive. In comparison with other studies, safety climate has a high score.

Higher values observed in organisational climate compared to safety climate typically reflect the broader scope and positive perception employees have of their overall work environment, which includes safety as one component among others.

The scales and dimensions had their scores obtained for subgroups. The results from Top Management were higher than the ones from the total Workers in the company.

In relation to organisational climate all values from Top Management were above 6, with organisational climate value of 6.49. The maximum result from Values perception - Support (6.87) and the lower value from Innovation (6.1).

On the other hand, Workers had scores above 5 but below 6. The scales had score of 5.38 for Organisational climate. With the highest score for Objectives (5.61) and the lowest for Innovation (5.01). The lowest score was the same as for Top Management.

For the different sectors, Organisational climate scale was 5.71 to factory and 5.17 to site.

Safety climate scales and dimensions scores were lower in comparison with organisational climate. The range of scores for Top Management was between 6.8 (Effects of Work rhythms) and 4.95 (Communication quality in Safety), with most of the scores above 6, except for 4. With Safety climate being 6.18.

For Workers the range of scores was between 3.86 for (Effects of Work rhythms) and 5.13 (Efficiency in Safety), with most scores in the range of 4, except for 3 in the range of 5 and 1 below 4. And Safety climate with 4.90.

The results, as it happened with the Organisational climate, from the Factory and Site are different, with the Safety climate scale and Safety Practices scale with values for Factory (4.93 and 4.68 respectively) above the ones for Site (4.88 and 4.35 respectively).

For the subgroups organisational and safety climate scales and dimensions, it was interesting to see that despite both climates having a score above 5, there are some dimensions with lower scores. As it is the case for Effects of Work Rhythms for Factory and Management Actions to Safety and Effects of Work Rhythms for Site, all with score below 4.

For the factory the lower dimensions are Effects of Work Rhythms (3.88), Communication Quality in Safety (4.1) and Safety Training (4.5). Whereas for site the lower scores are Management Actions to Safety (3.44), Effects of Work Rhythms (3.84) and Communication Quality in Safety (4.11) that had the lowest scores.

The differences between the two groups is understandable because of the existent difference workplace dynamics. Although there are some common dimensions that can be justified by the fact that it is the same company and therefore there are similar challenges faced by all workers.

For the reality gradient of safety Effects of Work rhythms (SC) and Management actions to safety (SC) were the dimensions with the highest score 49% and 43%, values close to 50%. This shows that there was a significant discrepancy of perceptions between TM and Workers. The interventions in these areas should be more significant. The Total of safety practices had a significant percentage of 28%, and the previous dimensions are part of the scale.

It is also interesting to see that Values perception - Rules (OC) (26%), Rules (SC) (25%) and Rules (OC) (22%) were very similar in description and had similar values of reality gradient of safety. Therefore, the implementation and enforcement of rules need to be clearer.

Support (SC) also has a reality gradient of safety of 22%, meaning that the organisational emphasis on workers, teamwork and participation is lower on workers than it is perceived by TM. This reinforces the need for a better consultation with the workforce.

Safety Climate also has a significant value of 21%, meaning that management of safety is not a good as TM perceive it.

Comparing the results from TM with Factory and Site, the scores of the Safety Climate and Safety practices were the ones with the highest difference between TM and Factory and Site. This indicates that the perception about safety of the Top Management is significantly higher than the one perceived by workers, in any of the sectors.

As to improve organisational climate and safety climate of the company it was proposed some improvement measures as: consultation with the workforce, implementation of clear procedures, improvement and clarification of promotion and rewarding policy, creation of a safety monitoring programme, analysis of project management (resource allocation), training programme for factory and clear implementation and enforcement of rules.

With this we can conclude that the aims and objectives were achieved. As the assessment of the organisational and safety climate and assessment of the reality gradient of safety allowed to understand the level of safety performance and to recommend improvements of the safety performance.

This study had some challenges in relation to questionnaire being too long but some items were not use for the calculations. The main limitation of the study was the fact that the sample was small making the statistical treatment more challenging.

However, this type of study, where safety climate is measured, allows to assess the safety performance of a company and the recommendation of improvements in specific areas that have lower scores in the scales and dimensions assessed. This has the advantage of not limit the interventions for improvement only on lagging indicators as incidents and accidents.

The calculation of the reality gradient of safety on the other hand has the advantage of comparing the perceptions of Top management and workers and also subgroups that are significant in a company. This allows to compare the discrepancies between the group that make the decisions and plans the work (top management) from the ones that execute it (workers).

The reality gradient of safety helps the health and safety practitioner to explained to top management how their perception of safety performance shifts away from the perception of workers. A strong safety culture is one that bridges these gaps through effective communication, inclusive policy-making, and continuous engagement with employees at all levels. By doing so, organisations can ensure that safety practices are not only well-designed but also effectively implemented and embraced by everyone, thereby enhancing overall safety performance and culture.

In the future, it would be interesting to analyse the impact of the recommendations given in this study, repeating the Organisational and Safety Climate assessment and the reality gradient of safety computation to see improvements occurred.

There are few studies on the reality gradient of safety. More research about reality gradient of safety should exist. The comparison of different subgroups allows to have a more specific intervention and helps filling the gap between top management perceptions and workers perceptions and have a better idea of the existent power and conflicting interests (Antonsen, 2009). However, this type of research to assess the reality gradient of safety will only give an idea of the difference of perceptions between TM (who plans the work) and works or other subgroups (who execute the work).

This type of study that divides the company at a subgroup level to assess organisational and safety climate should have larger a sample to better assess the differences between the groups. On smaller organisations, the entire population of the subgroups to be compared should be assessed.

It would be also interested to see this type of study in a company with middle management to assess their scores in comparison with upper and lower hierarchy levels.

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Annex

CENTRO DE INVESTIGAÇÃO E INTERVENÇÃO SOCIAL
INSTITUTO SUPERIOR DE CIÊNCIAS DO TRABALHO E DA EMPRESA
FUNDAÇÃO PARA A CIÊNCIA E TECNOLOGIA
(Projecto Praxis/P/PSI/13042/1998)

O Questionário que lhe apresentamos é constituído por duas partes principais: questões sobre o funcionamento da sua empresa em geral e questões sobre a segurança na sua empresa. Recordamos que **não há respostas certas nem erradas**, apenas se pretende a sua opinião sincera e as suas respostas são **confidenciais e anónimas**.

Para a maioria das perguntas pretende-se que responda utilizando **uma escala que varia entre 1 e 7 e que assinale a sua resposta marcando com um círculo o número que melhor traduz a sua opinião**.

Apresentamos em seguida alguns exemplos das perguntas que vai encontrar e da forma como deve assinalar a sua resposta.

Pergunta 1. Pretende-se que dê a sua opinião relativamente ao que é dado importância na sua empresa

Para responder a esta pergunta é necessário **assinalar com um círculo o valor que melhor corresponde à sua opinião utilizando a escala apresentada**

Escala:

Nada importante	Muito pouco Importante	Pouco importante	Algo Importante	Importante	Bastante importante	Muitíssimo importante
1	2	3	4	5	6	7

Exemplo

Assim, por exemplo, se considera que na sua empresa se dá pouca importância à competitividade com outras empresas, a resposta a assinalar será:

		Nada importante						Muitíssimo importante
a.	…a competitividade com as outras empresas	*1*	*2*	*(3)*	*4*	*5*	*6*	*7*

As perguntas que se seguem referem-se à empresa em que trabalha, e não apenas à Secção ou Departamento onde está actualmente a exercer funções. Por isso, **quando estiver a responder pense na empresa como um todo**.

1. Até que ponto na sua empresa é importante…
(coloque um círculo no número que corresponde melhor à sua opinião)

		Nada importante						Muitíssimo importante
a.	…a competitividade com as outras empresas	*1*	*2*	*3*	*4*	*5*	*6*	*7*
b.	…a inovação de produtos/serviços	*1*	*2*	*3*	*4*	*5*	*6*	*7*
c.	…a produtividade	*1*	*2*	*3*	*4*	*5*	*6*	*7*
d.	…a utilização de instruções escritas para a realização do trabalho	*1*	*2*	*3*	*4*	*5*	*6*	*7*
e.	…o bom ambiente entre as pessoas	*1*	*2*	*3*	*4*	*5*	*6*	*7*
f.	…o cumprimento dos objectivos definidos	*1*	*2*	*3*	*4*	*5*	*6*	*7*
g.	…o controlo do desempenho dos trabalhadores	*1*	*2*	*3*	*4*	*5*	*6*	*7*
h.	…o desenvolvimento tecnológico	*1*	*2*	*3*	*4*	*5*	*6*	*7*
i.	…o estabelecimento de procedimentos claros para a realização das tarefas	*1*	*2*	*3*	*4*	*5*	*6*	*7*
j.	…o incentivo a novas ideias para melhorar os produtos/serviços da empresa	*1*	*2*	*3*	*4*	*5*	*6*	*7*
k.	…o trabalho em equipa	*1*	*2*	*3*	*4*	*5*	*6*	*7*
l.	…ouvir a opinião das pessoas	*1*	*2*	*3*	*4*	*5*	*6*	*7*
m.	…cumprir escrupulosamente as regras existentes na empresa	*1*	*2*	*3*	*4*	*5*	*6*	*7*

A Direcção da empresa dá indicações acerca **do que é aprovado ou desaprovado dentro da empresa**. É sobre esse tema que lhe pedimos agora a sua opinião.

2. Nesta empresa, para se ser promovido ou recompensado é preciso…
(coloque um círculo no número que corresponde melhor à sua opinião)

		Nada						Muitíssimo
a.	… ser capaz de trabalhar em equipa	*1*	*2*	*3*	*4*	*5*	*6*	*7*
b.	… ser inovador e criativo	*1*	*2*	*3*	*4*	*5*	*6*	*7*
c.	… cumprir os objectivos de trabalho	*1*	*2*	*3*	*4*	*5*	*6*	*7*
d.	…cumprir as regras da empresa	*1*	*2*	*3*	*4*	*5*	*6*	*7*

3. A Direcção desta empresa diz que se deve…
(coloque um círculo no número que corresponde melhor à sua opinião)

		Nada						Muitíssimo
a.	… contribuir com sugestões inovadoras para a execução do trabalho	*1*	*2*	*3*	*4*	*5*	*6*	*7*
b.	… cumprir os objectivos de trabalho	*1*	*2*	*3*	*4*	*5*	*6*	*7*
c.	… dar atenção ao bem estar dos trabalhadores	*1*	*2*	*3*	*4*	*5*	*6*	*7*
d.	… inovar tecnologicamente	*1*	*2*	*3*	*4*	*5*	*6*	*7*
e.	… cumprir as regras definidas para a execução do trabalho	*1*	*2*	*3*	*4*	*5*	*6*	*7*
f.	… trabalhar em equipa	*1*	*2*	*3*	*4*	*5*	*6*	*7*
g.	… produzir muito	*1*	*2*	*3*	*4*	*5*	*6*	*7*

A próxima parte deste questionário refere-se a diversos aspectos da segurança. Por favor indique **até que ponto cada uma das frases descreve a forma como a sua empresa encara as questões da segurança.**

4. Nesta empresa…
(coloque um círculo no número que corresponde melhor à sua opinião)

		Discordo totalmente						Concor totalme
a.	… é habitual controlar o cumprimento das normas de segurança definidas pelo regulamento da empresa.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
b.	… é habitual explicitar os objectivos ao nível da segurança e da redução do número de acidentes	*1*	*2*	*3*	*4*	*5*	*6*	*7*
c.	… é habitual introduzir novas normas de segurança, actualizadas em função do que se faz noutros países.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
d.	… valoriza-se muito o cumprimento das regras de segurança	*1*	*2*	*3*	*4*	*5*	*6*	*7*
e.	… o equipamento de segurança está sempre disponível	*1*	*2*	*3*	*4*	*5*	*6*	*7*
f.	… evitamos participar pequenos acidentes de trabalho	*1*	*2*	*3*	*4*	*5*	*6*	*7*
g.	… deve-se cumprir mais os procedimentos de segurança	*1*	*2*	*3*	*4*	*5*	*6*	*7*
h.	… existe uma adequada formação de segurança	*1*	*2*	*3*	*4*	*5*	*6*	*7*
i.	… quando ocorre um acidente ele é discutido e aprende-se com ele.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
j.	… a formação em segurança é feita regularmente.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
k.	… é dada atenção à manutenção de boas condições de segurança nas nossas instalações.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
l.	… não nos é fornecida informação adequada sobre o que se passa em termos de segurança na empresa	*1*	*2*	*3*	*4*	*5*	*6*	*7*
m.	… deve-se dar oportunidade ao aparecimento de novas ideias para aumentar a segurança no trabalho	*1*	*2*	*3*	*4*	*5*	*6*	*7*
n.	… os acidentes têm servido para aumentar as condições de segurança da empresa	*1*	*2*	*3*	*4*	*5*	*6*	*7*
o.	… valoriza-se muito o bem-estar e a segurança dos trabalhadores	*1*	*2*	*3*	*4*	*5*	*6*	*7*
p.	… as estatísticas de segurança raramente são estudadas e discutidas	*1*	*2*	*3*	*4*	*5*	*6*	*7*
q.	… existe alguma confusão sobre quem devemos contactar quando se trata das questões de segurança.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
r.	… são solicitadas e usadas as ideias e opiniões que os trabalhadores têm relativamente à segurança	*1*	*2*	*3*	*4*	*5*	*6*	*7*
s.	… valoriza-se muito a expressão de novas ideias relativamente à segurança	*1*	*2*	*3*	*4*	*5*	*6*	*7*
t.	… quando ocorre um acidente reajustam-se as normas de segurança existentes.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
u.	… todos os indivíduos partilham a responsabilidade pela segurança	*1*	*2*	*3*	*4*	*5*	*6*	*7*
v.	… valoriza-se muito o cumprimento dos objectivos de segurança	*1*	*2*	*3*	*4*	*5*	*6*	*7*
w.	… deve-se manter os comportamentos de segurança mesmo quando se quer aumentar a produção	*1*	*2*	*3*	*4*	*5*	*6*	*7*

Pretendemos agora conhecer a sua opinião sobre a forma **como os responsáveis da sua empresa encaram as questões da segurança.**

5. Por favor indique até que ponto concorda com cada uma das seguintes descrições
(coloque um círculo no número que corresponde melhor à sua opinião)

		Discordo totalmente						Concor totalme
a.	O técnico de segurança é muito influente dentro da empresa	*1*	*2*	*3*	*4*	*5*	*6*	*7*
b.	A direcção faz com que os trabalhadores não se sintam à vontade para falar sobre as suas preocupações relativamente à segurança	*1*	*2*	*3*	*4*	*5*	*6*	*7*
c.	A gestão não dá atenção ao que o técnico de segurança diz	*1*	*2*	*3*	*4*	*5*	*6*	*7*
d.	Os meus chefes estão dispostos a aprender com os acidentes.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
e.	A direcção não demonstra grande preocupação com a segurança até existir um acidente	*1*	*2*	*3*	*4*	*5*	*6*	*7*
f.	As pessoas que tomam decisões sobre a segurança não sabem o que se passa ao nível dos trabalhadores	*1*	*2*	*3*	*4*	*5*	*6*	*7*

Por favor indique até que ponto concorda com cada uma das seguintes descrições da forma **como as pessoas da sua empresa encaram as questões da segurança.**

6. Nesta empresa, as pessoas…
(coloque um círculo no número que corresponde melhor à sua opinião)

		Discordo totalmente						Concor totalme
a.	… seguem cuidadosamente os procedimentos de segurança escritos	*1*	*2*	*3*	*4*	*5*	*6*	*7*
b.	… defendem o trabalho em segurança quando alguém o critica.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
c.	… estão dispostas a fazer um grande esforço para que o trabalho possa ser desempenhado de uma forma segura.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
d.	… pensam que a segurança não é da sua preocupação – é sim da direcção e de outros	*1*	*2*	*3*	*4*	*5*	*6*	*7*
e.	… trabalham de forma segura, mesmo quando o chefe não está a supervisionar.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
f.	… ajudam-se umas às outras a trabalhar de uma forma segura	*1*	*2*	*3*	*4*	*5*	*6*	*7*
g.	… estão bem preparadas para as emergências, e todos sabem como responder em caso de emergência.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
h.	… pedem ajuda em questões de segurança sempre que precisam	*1*	*2*	*3*	*4*	*5*	*6*	*7*
i.	… olham para o registo de segurança da empresa como se tratasse do seu próprio registo e têm orgulho nisso.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
j.	… têm orgulho por se trabalhar de uma forma segura.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
k.	… usam o equipamento de segurança mesmo quando sabem que não estão a ser observadas**.**	*1*	*2*	*3*	*4*	*5*	*6*	*7*
l.	… vêm a segurança como sendo da responsabilidade de cada um	*1*	*2*	*3*	*4*	*5*	*6*	*7*
m.	… devem ajudar os outros a trabalhar de uma forma mais segura.	*1*	*2*	*3*	*4*	*5*	*6*	*7*

As questões que se seguem referem-se aos riscos que você corre no seu local de trabalho. Por favor indique **até que ponto cada uma das frases descreve a segurança no seu posto de trabalho.**

7. Indique por favor o seu grau de concordância com cada uma das seguintes descrições.
(coloque um círculo no número que corresponde melhor à sua opinião)

		Discordo totalmente					
a.	Quando há muito trabalho não é possível seguir as normas de segurança.....	*1*	*2*	*3*	*4*	*5*	*6*
b.	Nas vezes que trabalhei sem segurança foi porque tinha de realizar rapidamente a tarefa	*1*	*2*	*3*	*4*	*5*	*6*
c.	Às vezes é preciso correr algum risco para acabar o trabalho mais depressa .	*1*	*2*	*3*	*4*	*5*	*6*
d.	Se eu me estivesse sempre a preocupar com a segurança, o meu trabalho não ficaria feito.	*1*	*2*	*3*	*4*	*5*	*6*

Por último responda às seguintes questões sobre a sua experiência profissional e sobre a empresa onde trabalha.

Página seguinte

Informação sobre a sua experiência profissional e sobre a empresa onde trabalha

Escolaridade:	4ª classe		**Há quanto tempo trabalha?**		_____anos
	6º ano		**Há quanto tempo trabalha nesta área (pedra)**		_____anos
	9º ano		**Há quanto tempo está nesta empresa?**		_____ anos
	11º ano				
	12º ano		**Tipo de vínculo**	Empregado (employee)	
	Bacharelato/ licenciatura			Trabalhador independente (Contractor/CIS)	
Cargo	Diretor		**Setor**	Escritório	
	Manager			Fábrica	
	Cortador			Obra	
	Polidor				
	Fixer				
	Labourer				

Idade	Até 20 anos		**Local de nascimento**	Portugal	
	21-25 anos			UK	
	26-30 anos			Brasil	
	31-35 anos			Outro (qual)	
	36-40 anos				
	41-45 anos		**Língua materna**	Português	
	46-50 anos			Inglês	
	51-55 anos			Outra (qual)	
	56-60 anos				
	Mais 60 anos		**Domina bem o português?**	Sim	Não