

# Risks And The Importance Of Workplace Accident Prevention: A Case Study In The Telecommunications Industry

Eduardo de Sousa Gaspar<sup>1</sup>; Leopoldo Pedro Guimarães Filho<sup>2</sup>;  
Wilson Menegon Bristot<sup>2</sup>

<sup>1</sup> Production Engineering - University of the Extreme South of Santa Catarina – UNESC

<sup>2</sup> University of the Extreme South of Santa Catarina – UNESC; Associated Graduate Program in Productive Systems (PPGSP) among Uniplac, Unesc, Univille and UnC; Brazil.

---

## Abstract:

**Background:** Workplace safety is a matter of great importance, not only for telecommunications services but also for various other occupational activities. Therefore, it is essential that safety in telecommunications companies becomes increasingly subject to stringent regulations and requirements, surrounded by various inspections and demands regarding compliance with regulations that preserve the lives of employees. These requirements come from both the company itself, its customers, and the energy regulator.

**Materials and Methods:** The objective of this study was to assess measures for preventing workplace accidents in the deployment and maintenance of optical fiber networks within a branch of a large Brazilian company located in the state of Santa Catarina. The study was conducted through a theoretical framework and a case study.

**Results:** Results showed that 100% of the respondents stated that the company provides EPI (Personal Protective Equipment); 98.3% receive safety training for their specific job tasks; 75.9% have not been involved in any type of height or electrical accident; 70.7% consider the provided EPI suitable for their profession; 58.6% consider the EPI to be of good quality; 20.7% find them comfortable, while 17.2% find them uncomfortable. Furthermore, 91.4% always use the EPI provided by the company, and 98.3% believe that the correct use of all EPI directly influences the reduction of workplace accidents in the company. Additionally, 93.1% understand that EPI use is indispensable and always use the EPI suggested by the company, with their own safety being the primary factor to consider.

**Conclusion:** The research revealed a strong sense of responsibility among the interviewed employees, highlighting a culture of using the personal protective equipment provided by the company. This demonstrates a clear understanding of the significant importance of correctly using safety equipment and, most importantly, caring for their own lives and the lives of their coworkers involved in the activities.

**Key Word:** Security; Personal Protective Equipment (EPI); Optical Fiber.

---

Date of Submission: 27-09-2023

Date of Acceptance: 07-10-2023

---

## I. Introduction

Telecommunication services must increasingly provide agility to their customers, especially in the corporate sector, where fast and efficient access to information transmission is essential. Currently, optical fiber is the medium that meets this demand.

In the implementation and maintenance of optical fiber networks, activities are carried out on utility poles where there is a close proximity to the electrical network, posing a set of risks, including electrical shock and the risk of falling for employees (VALPECOVSKI, 2014).

Optical fibers are increasingly being used because they offer much higher transmission capacity than metallic conductors. Some advantages of optical fiber include reduced electromagnetic interference in high-voltage electrical installations or those caused by lightning strikes, interference from radio stations, radar, and electromagnetic pulses caused by nuclear explosions. Additionally, it provides significant protection against external noise on the network (VALPECOVSKI, 2014).

In this context, it is evident that institutions, in respect of the dignity of their workers, have a duty to ensure a healthier and safer work environment to prevent employees from being exposed to occupational risks. The best way to provide greater protection to employees is to follow the recommendations of current health, hygiene, and safety standards (BASILE, 2019).

In addition to the risks associated with their profession, workers have the complex task of providing customers with quality access, delivering the signal with the desired power and without failures or attenuations (VALPECOVSKI, 2014).

In general, environmental risks are encountered in the daily work of employees in both public and private companies. It is the responsibility of their respective managers to provide the necessary means to control these environmental risks, thereby avoiding health and ergonomic problems for their employees, whether they are in the public or private sector (PONTES, 2005).

According to the current regulations of the Ministry of Labor and Employment, hazardous activities are those that, by their nature or working methods, involve a significant risk due to the worker's permanent exposure to explosives, electrical energy services, personal or property security professions, and others. For any occupational exposure of employees to hazardous activities, employees are entitled to a 30% additional payment on their respective base salary (BASILE, 2019).

In this perspective, when thinking about business management, it is essential to take into account the issues related to worker safety and health.

Therefore, a thorough monitoring of an organization's processes and procedures, whether private or public, is of fundamental importance to predict, minimize, and correct the risks generated by these activities (BARROS, 1996).

In general, in telecommunications services, electricity and height are significant risk factors, leading to various types of occupational accidents with irreparable damage to employees in the sector. Workplace safety is a matter of utmost importance for companies, not only in telecommunications but also in various types of work activities. The company must prioritize a well-structured safety management in accordance with regulations and follow the requirements meticulously to prevent any type of accidents with its employees, whether they are mild, moderate, or even fatal.

There is no doubt that training in accident prevention, related to the continuous improvement of the work environment and organization, will yield excellent results. According to item 35.3.1 of the regulation, the employer must develop a training plan for employees to perform work at heights. Height training programs should be conducted initially, regularly, and occasionally. Periodic height training should be conducted every two years and as needed on specific dates (BRASIL, 2013). The regulation specifies that training must be led by instructors with proven proficiency in the subject, under the supervision of a qualified occupational safety expert.

In addition to training on equipment and job activities, it is essential to conduct training related to the correct use of Personal Protective Equipment (EPI) for better understanding by employees of the proper functionality of the equipment. These training programs should be ongoing because, in addition to employee turnover, the level of education is often low. Therefore, when a company invests in training programs, it values its employees and, as a result, encourages them to take measures to prevent workplace accidents (CHIAVENETO, 2008).

For optical fiber operations, cables are usually installed on the poles of the power utility companies in cities, thus posing a significant risk of electrical shock due to their proximity to low-voltage network cables (127 V for phase and neutral and 220 V for two-phase voltage). In most situations, the medium-voltage network (13.8 kV) is further away, usually located at the top of the pole, above the crossarm, far from the point where the optical fiber installation is carried out. This consequently reduces the chance of electrical shock at medium voltage but does not completely eliminate it. Therefore, the highest probability of electrical shock accidents is in the low-voltage network due to its proximity to the fibers (VALPECOVSKI, 2014).

Therefore, some routine situations are of great importance, such as verifying whether the choice of protective equipment that employees are using is best suited for the job being performed and whether they are compatible to provide full protection. According to the NR 6 regulatory standard, EPIs that should always be available according to the risk to which the worker is exposed during work execution and in good condition. The supply should be on an individual basis (OCUPACIONAL MEDICINA E ENGENHARIA DE SEGURANÇA NO TRABALHO, 2008).

In general, risks related to accident-causing agents (mechanical) can occur due to a lack of appropriate physical structure in the workplace provided by the company for the respective worker. In this sense, in addition to the physical structure, inadequate technological infrastructure also has the potential to pose a significant danger to the physical integrity of the respective worker (DRACENA, 2013).

Furthermore, according to Dracena (2013), potential risks to workers' health posed by certain accident-causing agents occur due to various factors, including inappropriate or deficient physical layouts. Similarly, the author comments that the existence of machines without proper protection or with inappropriate electrical installations also presents certain risks.

According to the regulatory standard, any bodily injury and/or functional disturbance, whether temporary, permanent, or even leading to the death of the employee, is considered a workplace accident if it occurs while the employee is performing work for the company (OCUPACIONAL MEDICINA E ENGENHARIA DE SEGURANÇA NO TRABALHO, 2008).

Employees who have suffered some type of workplace accident and have had to be absent from the company for a period exceeding 15 days are entitled to job stability for a minimum of 12 (twelve) months. Job stability occurs after the discontinuation of accident-related sick leave (BASILE, 2019).

Among the various standards contained in the NR, those that complement the study in-depth include NR 6, which covers Personal Protective Equipment, NR 10, which provides administrative guidelines and establishes planning, implementation of control measures, and preventive safety systems in processes, conditions, and the work environment in electrical services. Additionally, NR 35, which, in addition to specifying the responsibilities of employers and employees, includes factors such as planning, organization, and implementation of work at height to prevent accidents (OCUPACIONAL MEDICINA E ENGENHARIA DE SEGURANÇA NO TRABALHO, 2008).

Therefore, the objective of this work was to verify measures to prevent workplace accidents in the implementation and maintenance of optical fiber network in a company in the southern state of Santa Catarina. The specific objectives are as follows: To assess and evaluate potential risks to the activity; To monitor with employees the safety equipment being provided to them; To verify if the equipment used complies with current legislation and technical standards.

Therefore, the development of this work is justified by the importance regarding the health and safety of workers, and it is necessary, whenever possible, to emphasize how beneficial accident prevention is for organizations:

- a) Occupational safety management tools;
- b) Implementation of prevention programs such as PPRA - Environmental Risk Prevention Program, PCMSO - Occupational Health Medical Control Program, and LTCAT - Technical Report on Environmental Conditions at Work;
- c) Mandatory courses for the performed activity such as NR 10 and NR 35;
- d) Routine safety inspections;
- e) Record of Personal Protective Equipment (EPI) delivery;
- f) Periodic training for employees;
- g) Conducting Preliminary Risk Analysis (APR);
- h) Monitoring the use of EPI during work activities;
- i) Keeping occupational health exams up to date;
- j) Internal Accident Prevention Committee (CIPA);
- k) Occupational Safety Signs.

These measures, among others, aim to eliminate or reduce the number of workplace accidents among employees in the organization (OCUPACIONAL MEDICINA E ENGENHARIA DE SEGURANÇA NO TRABALHO, 2008).

Furthermore, it is of utmost importance to emphasize and discuss the importance of implementing preventive measures in the workplace. Companies have the primary duty to ensure the health, safety, and well-being of their employees, providing them with a higher quality of life.

## **II. Methodology**

The conducted research was descriptive in nature with a qualitative approach. According to Rauen (1999), descriptive research aims to understand and interpret reality without interfering in order to change it, being interested in discovering, observing respective phenomena, seeking to describe, classify, and interpret them.

This research also has an explanatory aspect because, according to Gil (2002, p. 36), in explanatory research, "the researcher seeks to explain the causes and consequences of the phenomenon's occurrence, deepening the understanding of reality."

The research method used was theoretical framework research, which is similar to a survey, with the difference being that "the theoretical framework seeks a much deeper exploration of the proposed questions" (GIL, 2002, p. 36).

Through this research, we aim to understand the relevant concepts of behavior management in the field of health and safety in the fiber optic industry.

This research follows a classification based on four important criteria, considering the methodology, which allows its categorization within scientific research. According to Barros and Leheld (2007), these criteria are presented in Table 1, and as per the author's guidance, they provide possibilities for the research's classification within scientific research.

**Table 1: Methodological Framework**

In terms of the Problem Approach	Qualitative
Regarding Nature	Applied
Concerning Objectives	Explanatory

Regarding Procedures	Bibliographic Research
	Case Study
Research Techniques (Instruments) - Data Collection Technique	Documentary Data

Source: The authors (2023), based on Gil (2002) and Barros and Lehfeld (2007).

In accordance with this model, the present study aimed to compile the necessary theoretical framework to conduct an integrative analysis, documenting a historical overview of the studied topic, integrating the findings from other research works with the proposed objectives, and ultimately making the obtained data available to other interested parties.

The methodological procedure applied to construct the theoretical framework involved conducting bibliographic searches that supported the respective discussions on the topic. These searches were carried out by reading articles from scientific journals available on the internet, as well as researching books, newspapers, and various magazines. Google Scholar and Scielo were used as the primary databases. This study was conducted between May and June 2023. The searches were conducted using the following keywords: occupational health and safety, electrical and height-related risks, workplace accidents, and incidents.

Additionally, a case study was conducted at a branch in Santa Catarina, Brazil, of a large-scale company operating in the deployment and maintenance of fiber optic networks. The company has been active in the industry for over sixty-five years, serving approximately 1.4 million customers across Brazil, operating in sixteen Brazilian states, the federal district, and 354 cities. It boasts more than 77.9 thousand kilometers of optical networks, and according to the Expertise Institute (2018), it has a customer satisfaction rate of over 94%.

For this case study, interviews were conducted with the employees of the Santa Catarina branch, without gender distinction, on an individual basis, with the aim of maintaining the anonymity of the interviewees to ensure more reliable responses. These interviews were conducted over a period of three days, in a digital format, using the Google Forms tool, through a questionnaire titled "Telecommunications Safety," with a total of 58 participants from the fiber optic department of the branch.

The reason for choosing this case study was the need to evaluate the measures for preventing workplace accidents in the deployment and maintenance of fiber optic networks in a branch of a large-scale company in Brazil.

### III. Results

Within the institution, a survey was conducted regarding the personal protective equipment (EPI) and collective protective equipment provided by the company to its employees for performing fiber optic-related activities.

The first question inquired whether the company provides EPI to the respective interviewee. In this regard, it was found that all interviewees (100%) responded affirmatively. Subsequently, they were asked whether they received safety training for the activities they perform. It was found that 98.3% responded positively.

Regarding the question of whether the employee had ever been a victim of any type of height or electrical accident, the aim was to assess the potential risks associated with the field technicians' activities and the effectiveness of safety measures. In this case, the majority of respondents (75.9%) reported that they had not been victims of any height or electrical accidents. However, even though the number of victims is lower, when adding mild cases (17.2%) and moderate cases (6.9%), it becomes evident that the numbers are quite significant and concerning, indicating that the activity carries a real risk of workplace accidents.

Responses related to the quality of EPI available in the market were connected to the use of safety equipment by employees. It was observed that 70.7% considered the equipment suitable for their profession, with 58.6% also considering them to be of good quality. Additionally, 20.7% found the equipment comfortable, while 17.2% considered them uncomfortable. This shows that the majority views the equipment as of good quality and suitable for their profession, though not necessarily comfortable, but rather vital for their work.

Regarding whether employees frequently use EPI, it was noted that the vast majority, approximately 91.4%, always use EPI, and 6.9% use them almost always when provided by the company. This demonstrates that employees are aware of the risks and the importance of taking care of their safety.

Concerning the use of EPI and its impact on reducing accidents, reinforcing the direct relationship between EPI usage and the reduction of workplace accidents, it was found that 98.3% of respondents believed that the correct use of all EPI does indeed influence and directly contribute to reducing workplace accidents in the company. Only 1.7% believed otherwise, further emphasizing that the majority firmly believes in the importance of EPI and accident prevention.

Regarding the existence of any determining factor for not using a particular EPI provided by the company, it was observed that the vast majority (93.1%) understood that the use of EPI is indispensable and always used the EPI provided by the company for their own safety, which is the primary factor considered from the employees' perspective.

As for whether employees were aware of the primary function of the EPI they use and whether they understood the purpose of the training they had participated in, it was noted that 79.3% of respondents believed that the primary function of EPI is accident prevention, and 65.5% also understood it to be personal protection for the worker. This demonstrates a collective awareness among employees regarding the benefits of individual protective equipment.

#### **IV. Final considerations**

Fiber optics has driven advancements in telecommunications, offering advantages over conventional transmission media and improving the transmission of data, voice, and image signals between devices. However, due to the significant growth in the demand for telecommunications services, there has been a corresponding increase in workplace accidents involving employees. These accidents often occur due to the nature of the work, which involves working near electrical networks and at heights.

Workplace accidents pose a significant public health problem because they can be potentially fatal or disabling. They particularly affect young and economically active individuals, resulting in significant consequences for workers, society, and the economy of the country.

Based on the results of the case study presented in this work, it is evident that 100% of the interviewees confirmed that the company provides EPI to its employees. Of these, 98.3% stated that they receive safety training for their tasks. Additionally, 75.9% reported that they have not been victims of height or electrical accidents, while 17.2% experienced mild cases, and 6.9% experienced moderate cases. Regarding the types of EPI available, 70.7% considered them suitable for their profession, with 58.6% also deeming them of good quality. Furthermore, 20.7% found them comfortable, and 17.2% considered them uncomfortable.

Similarly, 91.4% always use the EPI provided by the company, and 98.3% affirmed that the correct use of all EPI directly influences the reduction of workplace accidents. Furthermore, 93.1% understood that the use of EPI is indispensable and always use the equipment provided by the company, primarily for their own safety.

The research revealed a strong sense of responsibility among the interviewed employees, demonstrating a culture of using the EPI provided by the company. This reflects their awareness of the importance of correctly using safety equipment, not only for their own well-being but also for the safety of their colleagues involved in the activities.

Therefore, it is believed that in the telecommunications industry, through various preventive measures implemented by the institution, such as ongoing prevention programs like PPRA (Environmental Risk Prevention Program), PCMSO (Occupational Health Medical Control Program), and LTCAT (Technical Report on Occupational Environmental Conditions), mandatory and updated training for activities such as NR 10 and NR 35, documentation of EPI issuance, routine safety inspections, periodic safety training, conducting Preliminary Risk Assessments before commencing activities, supervision of EPI usage by safety personnel, regular occupational health examinations, safety signage, and, most importantly, employee compliance with all EPI usage, these measures aim to eliminate or significantly mitigate potential workplace accidents and their consequences related to height and electrical hazards, thereby providing greater safety and quality of life for the institution's workers.

In conclusion, the success of the studied company, with its low number of minor and moderate accidents and no serious or fatal accidents among its employees since the inception of the Santa Catarina branch, can be attributed to the various safety policies implemented within the institution.

#### **References**

- [1]. Barros, A. J. Da S.; Leheld, N. A. De S. Fundamentos De Metodologia Científica. 3. Ed. São Paulo: Pearson Prentice Hall, 2007.
- [2]. Barros, I. F. Do R. Fatores Antropométricos E Biomecânicos Da Segurança Do Trabalho. Manaus: Editora Da Universidade Do Amazonas, 1996.
- [3]. Chiavenato, I. Treinamento E Desenvolvimento De Recursos Humanos. 7. Ed. São Paulo: Manole, 2008.
- [4]. Basile, C. R.O. Teoria Geral, Contrato De Trabalho E Segurança E Saúde No Trabalho. – 9. Ed. – São Paulo: Saraiva Educação, 2019.
- [5]. Brasil. Segurança E Medicina Do Trabalho. 62. Ed. São Paulo: Atlas, 2008.
- [6]. Brasil. Ministério Do Trabalho E Emprego. Nr° 35: Trabalho Em Altura. Comentada. 2013.
- [7]. Gil, A. C. Como Elaborar Projetos De Pesquisa. São Paulo: Atlas, 2002.
- [8]. Ostrovski, T. L. F. Análise De Riscos Em Uma Fábrica De Artefatos De Cimento. Monografia. 2014. Universidade Tecnológica Federal Do Paraná. Curitiba-Pr, 2014. 60f.
- [9]. Valpecovski, M. Avaliação De Riscos Na Implantação E Na Manutenção De Redes De Fibra Óptica Na Região De Curitiba. 2014.
- [10]. Pontes, B. R. Avaliação De Desempenho: Nova Abordagem. São Paulo: Ltr, 2005.
- [11]. Chiavenato, Idalberto. Treinamento E Desenvolvimento De Recursos Humanos: Como Incrementar Talentos Na Empresa. 7.Ed. São Paulo: Atlas, 2008.