

## RISK MAP AND FIRE FIGHTING PROJECT OF VIA SATELLITE COMMUNICATIONS LTDA

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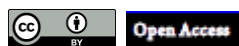
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### ABSTRACT

This article will evaluate in the context of occupational safety. The disposition of risks within the company Via Sat elite communications LTDA. To perform the work at first, a technical visit was made to the company, a photographic report was generated and a questionnaire was answered by the workers. Afterwards, with these data, a floor plan of the site was generated and the risks were identified according to the environments, generating the risk map, taking advantage of the information and based on specific laws and regulations, was prepared the fire-fighting project. It was observed that the company has fire-fighting equipment with proper use conditions and correctly quantified and leased, also noted a greater predominance of ergonomic risk in return for the company's great concern with employee safety.

**Keywords:** Risk map; Firefighting project; Safety.



### I. INTRODUCTION

The risk map is a graphical representation of factors that make up the work environment, being able to cause damage to the workers' health. These elements can be related to the process as: facilities, machines, supplies or the form of organization as: arrangement. physical, work rate, work method, work shifts and others.

The risk map is regulated in NR 5 Annex IV by Ordinance No. 25 of December 29, 1994 and originated in Italy through trade union movements in the late 1960s and early 1970s.

The purpose of the map is to gather information necessary to enable safety and health to workers. Its elaboration as suggested by NR 5 is attributed to the Internal Accident Preservation Commission (CIPA), thus influencing the exchange of information between workers and making them participatory agents in the prevention activity.

As for its elaboration, it consists of circular indications overlapping the floor plan of the analyzed place, and larger circles indicate more intense dangers and lesser dangers of less intensity. The circles are divided into colors to discriminate the risk, being the division: Physical Risk represented by the green color;

Chemical Risk by the color red; Biological Risk by brown; Ergonomic Risk by Yellow and Mechanical or Accident Risk by Blue, these relationships are defined according to NR 32 as well as their respective definitions.

The firefighting project is also an indicative graphic of safety measures, its execution consists of inserting in the floor plan firefighting elements at its inception, fire protection elements and quick withdrawals as foreseen by NR 23. Also highlighted is the need for people with equipment handling skills. The equipment is quantified in relation to a specific decree that must be used according to the state to be executed the project, in the insertion in the project it is necessary a study of work safety norms along with fireman's manuals and several others. bibliographic bases, therefore the need for qualified professional to perform the work.

This work consists of preparing a risk map and a fire project of the company Via Satélite de Comunicações LTDA. It aims to identify the risks and map them also quantify the safety equipment and map them thus assist in the safety of the company object of study.

## II. BIBLIOGRAPHIC REFERENCE

### II.1 BASIC RULES FOR IMPLEMENTATION OF RISK MAP

All risks are normative based and have influence on the elaboration of several programs such as PPRA, PCMSO and others [1]. The NR 17 refers to ergonomics, risk distinguished by the yellow color, aims to establish parameters that allow the adaptation of working conditions to the workers' psychological characteristics. Other risks, with the exception of accident risk, are defined by NR 9 [2]. The Physical Agent is described as the various forms of energy to which workers may be exposed, such as: noise, vibration, normal pressures, external temperature, and others, the Biological as: bacteria, fungi, bacilli, parasites, protozoa, viruses, and others, Chemicals such as: substances, compounds or products that may enter the body through the air, in the form of dust, fumes, mists, haze and Accident is defined as all factors that endanger the worker or affect their physical or moral integrity, this definition is bibliographic has no norm-specific definition but is widely addressed.

Having as baseline parameters the risks it is possible to elaborate the risk map, observed in figure 3, it is necessary in all companies but, according to the Ordinance No. 5 of 17/08/92 of the National Department of Safety and Health of the Worker of the Ministry of Labor, it is mandatory only for those who have CIPA - Internal Accident Prevention Commission which in turn its obligation is regulated by NR 5 [3].

The risk map must be prepared by CIPA in order to encourage employee participation with the work safety planning in the company and for this participation to take place the following questionnaire was prepared.

Table 1: Questionnaire conducted with workers.

Do you feel any discomfort when performing daily work activities such as handling the keyboard and keyboard or affecting material transportation?
Do you feel the need for some personal or collective protective equipment such as gloves, belts, glasses or helmets?
Do you feel exposed to discomfort, noise, heat, pressure, humidity, cold, radiation or other such agents?
Do you feel exposed to dust, mist, mist, gases, vapors, chemicals and the like?
Do you suggest any improvements in work structure or work habits that could prevent workers?
Do you feel exposed to various bacteria, fungi or other agents that may be harmful to health?
Do you consider improper physical arrangement, improper storage and lighting or other agents in this regard?

Source: Authors, (2019).

The questionnaires seen in table 1 were answered by eight store employees, who were discursive. It is worth mentioning that the questions were limited to the activities that take place within the analyzed company and that they were all asked for each analyzed environment, thus gathering an amount of 24 (twenty four) answers from each employee.

The choice of the risk map was based on: 1) the legal basis for using the risk map as a risk identification method; 2) the apparent simplicity of the method; 3) the possibility of active involvement of workers.

## II.2 RISK MAP RELATED WORKS

Some studies have already researched about the risk map [4] presented a reflection on the experience of building the risk map in a public hospital, was analyzed from the workers' awareness stage until the discussion about preventive measures. The elaboration of the Serbian map as an educational process and generated practical consequences regarding the intervention in the work environment.

Similarly [5] the objective was to bring questions regarding environmental risk to an Intensive Care Unit, a methodology was elaborated in which workers described the existing environmental risks and it was proved the existence of biological, physical, chemical, ergonomic and accident-like map was drawn up.

### II.3 BASIC RULES FOR DESIGNING A FIRE PROJECT

Regarding the fire-fighting project, DECREE N °. 24.054 of March 1, 2004 where with Table 2, reproduced from the Decree, it was possible to dimension the necessary compaction devices.

Table 2: Analyzed Location Group Definition.

Group	Occupation / Use	Division	Description	Examples
B	Hosting Service	B-1	Hotel and similar	Hotels, motels, guesthouses, inns, rooms and rooms with more than 16 beds. And similar
		B-2	Residential Hotel	Hotels and similar with own kitchen in the apartments (including apart hotels, residential hotels) and similar
C	Commercial	C-1	Fire-Low Trade	Haberdashery, tobacconists, grocery stores, fruit trees, boutiques and others
		C-2	Commerce medium and high fire load	Shop buildings departments, magazines, department stores, general supermarkets, markets and other
		C-3	Malls Centers	General Shopping Center (Shopping Malls)

Source: Authors, (2019).

The object of study falls into category C-3. And to determine the height, which is also relevant to the dimensioning, is used the table 3, also reproduced from the Decree no. 24,054.

Table 3: Set height of the analyzed site.

Type I	Denomination	Height
I	Ground Building	A floor
II	Low building	$H < 6,00m$
III	Low-Medium Height Building	$6,00m < H \leq 12,00m$
IV	High medium building	$12,00m < H \leq 30,00m$
V	Medium High Building	$21,00m < H \leq 30,00m$
VI	High building	Above 30,00 m

Source: Authors, (2019).

The object of study fits in type I, called Terrea Building, after these times was used the table 4 partially shown below to measure the necessary security measures.

Table 1: To define project components.

Fire Safety Measures	C	
Finishing Material Control		
Emergency Exit	X	
Emergency lights	X	Only for buildings higher than 5m
Emergency Signaling	X	
Fire extinguishers	X	

Source: Authors, (2019).

The object of study will require Emergency Exit, emergency signaling and extinguishers, Emergency Lighting will not be required. It was also used as theoretical base the Technical Standard 14 for signaling and the NR 23 to execute the project.

#### II.4 FIRE PROJECT RELATED WORKS

Some work has already addressed the subject of Fire Design, [6] has addressed fire safety as an objective that must be pursued during all phases of the construction process and demonstrates for each architectural design provision considerations to be met.

Similarly [7] and [8] aimed to establish safety design guidelines involving practical and conceptual aspects, concepts were clarified so that designers could discuss and contribute to improving safety measures.

#### III. MATERIAL AND METHODS

The methodological procedures applied to this research start from a bibliographical review that are mainly NR 32 [9] and NR 5 [10], which standardize the execution of the risk map and the identification of risks respectively and empirical knowledge acquired with the experience of. I work at the company studied. The research was initially developed with a technical visit to the company Via Satellite. The objective of this research was to verify the structure of the company, as well as its physical dimension, the materials that made up its structure as ceiling and divisions, the internal furniture that involves the evaluation of dimensioning and level, the type of product stored in stock, the type of waste disposal, the type of waste generated, the work tools of the staff, the electrical and hydraulic installations, air cooler arrangement, internal temperature, sanitation, personal protection used by employees, the trajectory of these products internally and the form of storage. After this step a photographic record of the environments analyzed during the visit was requested and in possession of all requested information together with the photographic report, it was possible, through the Autocad software, to carry out the risk map and the fire-fighting project of the studied company.

#### IV. STUDY APPLICATION

Based on DECREE N °. 24.054 of March 1, 2004, the company Via Satélite, object of study, was classified as group "C", which refers to the type of occupation and division C-1 which refers to activity performed at the site. According to Table 1 partially reproduced in the bibliographic reference. After this, the height was classified as "land building" taking into account table 2 of the decree also set out in the bibliographic reference. With this

information is possible relationalas and determine the items that must have the fire project. After gathering such information it was determined that for the object studied will be necessary Emergency Exits, Emergency Signs and Fire Extinguishers, Emergency Lighting will not be necessary because the building is only 3 meters high.

Thus, the project presented in figure 1 was elaborated.

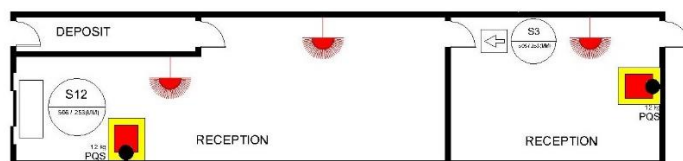


Figure 1: Fire Fighting Project.

Source: Authors, (2019).

Although the standard does not determine the need for emergency lamp, it was chosen to add them due to the amount of furniture and the presence of perforating materials, which may cause accidents. Regarding emergency exit and signaling, the symbols were based on Technical Standard 20 of 2014. As for the fire extinguisher NR 23 establishes the need for one every 25 meters radius which would result in the need for only one fire extinguisher. The plant analyzed, however as the site has two entrances and also two different environments in search of greater safety was opted for two extinguishers.

Below is shown the risk map produced by the company via Satellite reproduced in figure 2.

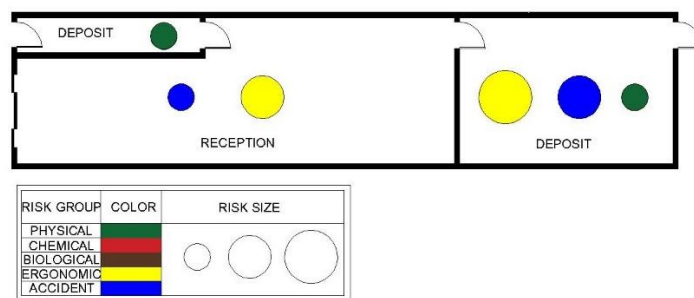


Figure 1: Risk map.

Source: Authors, (2019).

For the elaboration of the map it was observed the items listed in the methodology reaching the conclusion exposed in the map. At the reception was identified a small risk of accident, with the blue circle, because there is a transition of material from the store to the exit of the store, which is the sliding door, so that client and furniture employees end up occupying at the same time a common environment, Such material is sometimes large as antennas and electric fence rollers or small but heavy as cable boxes. The risk was classified as small because this transition is infrequent and when it occurs, the movement of people is low, usually at the beginning or end of work and the size of the reception is considerably large, 6 meters wide by 15 meters long. decreases the likelihood of an accident.

Also at the reception was indicated a high ergonomic risk since at least 2 workers spend full time sitting, being 4 hours before lunch from 7 to 12 and 4 hours after 14 to 18, these times are within the norm but if chairs are not If they are in the proper position, the computer is not at eye level, the mouse has no wrist support, employees who do not perform elaborate gymnastics can lead to occupational illness.

Regarding the deposit, three risks were identified, the ergonomic was classified as high because it is in the deposit that is stored the materials, being often heavy, the storage place is not always adequate, as when the stock is full and has to support the antenna on the floor, and employees who are not craft carriers do not wear ergonomic protective gear that would be a strap. As for the risk of accident classified as medium is related to the weight of the materials, the deposit also contains perforating materials such as screwdrivers, pliers, saws, drills, drills and others where their location is not identified. As for the small physical risk is related to temperature, it is not possible to see on the map but there is an air cooler in the reception and it releases hot air to the deposit, it also drips water bringing moisture to the environment, because it is a deposit, there is dust and although it is often clean it is not a healthy environment, but it was classified as small because there is little traffic of people on site and as there are two doors and frequent cleaning reduces the risk.

As for the front tank it is located under a ladder where cleaning materials and others are located, the low intensity physical risk is in relation to the temperature justified by the environment being small and not having ventilation.

## V. RESULTS AND DISCUSSION

The Risk Map made it possible for employees to be aware of the agents that cause occupational accidents and illnesses, as their answers were the basis for the map's execution. SIPA, and is not even required to have, so the safety of work in such cases is often overlooked. It is also useful for alerting visitors and staff alike of the possible risks they face, thus facilitating prevention.

Regarding the fire project, even though it was carried out after the necessary appliances were already installed, it was important to check if their sizing and quantification were adequate, if they were properly indicated and also in good use.

## VI. FINAL CONSIDERATIONS

Therefore, there was a considerable concern with safety in the company studied, there were personal protective equipment such as boots, gloves, uniforms, belts (for work at height) and others, the tables, chairs and computers are adjusted and have accessories suitable for workers. Regarding fire fighting the company has valid fire extinguishers, positioned and identified according to the standard, also has emergency lamps and qualified personnel for fire fighting if necessary.

As improvements can be cited the identification of the materials of the deposit, the suitability of the location of the deposit of material, which is not large enough and not suitable height for loading and unloading.

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