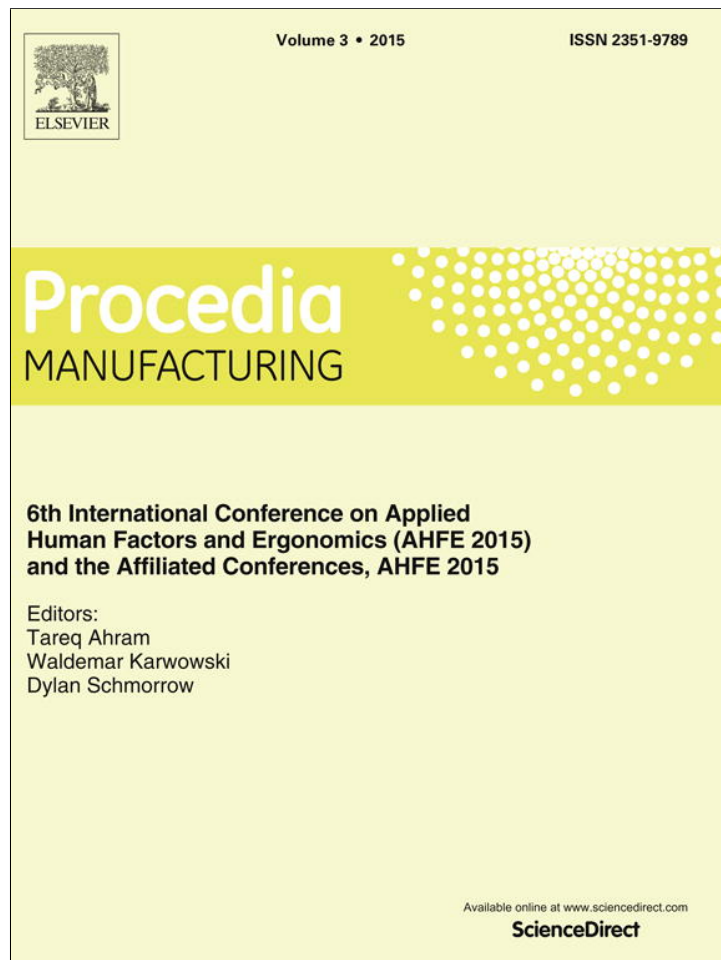


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## Occupational Safety and Health During Rescue Activities.

Linda Makovicka Osvaldova<sup>a,\*</sup>, Martin Petho<sup>b,†</sup>

<sup>a</sup>University of Zilina, ul. Imaja 32, Zilina 01026, Slovakia

<sup>b</sup>Safirs, s.r.o., E.Bohuna 12, Ruzomberok 03401, Slovakia

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### Abstract

In everyday life, play important role rescue services such as fire-fighters, paramedics and police. Rescuers at their work often forgot on their own security. Overall, this problematic is neglected in these services, whether it's a matter of law but in practice, especially in the intervention itself. This issue is important for the protections of life rescue themselves, but also rescued. In many cases, the imperfect process of each rescue activity or the use respectively not use of personal protective equipment. The actual legislation in the Slovak republic does not specify procedures for each activity respectively to the general definitions of each activity. In this article, we specify a group of fire-fighter and respect the basic rules of OSH in their activities such as fire, traffic accident, natural disaster, and many others.

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\* Corresponding author. Tel.: +421 903245231.

*E-mail address:* [linda.osvaldova@fbi.uniza.sk](mailto:linda.osvaldova@fbi.uniza.sk)

† Corresponding author. Tel.: +421 918 126004.

*E-mail address:* [mpetho@safirs.sk](mailto:mpetho@safirs.sk)

## 1. Introduction

The work safety of fire-fighter paramedics is an important element of rescue activity when helping people in need. Accident rate statistics and the development of work injuries by clearing work inform us about the problems and drawbacks which can occur mainly by operating. First comes the work safety of fire-fighters on duty even though very often the operational conditions of work make the activity more complicated. Fire-fighters training must be aimed at correct methodical procedures by fulfilling the safety rules. The injuries statistics is described in table no 1. [2]

Table 1. Accident rate in Rescue services during the period 2009 – 2013.

Year	Registered injuries in the line of duty and work injuries
2009	73
2010	55
2011	58
2012	59
2013	57
2014	60

## 2. Work safety regulations

This article briefly mentions generally legally binding regulations that deal with the mentioned problems in Slovak Republic. Health and work safety protection as well as appraisal of products equality and technical equipment safety are mentioned. Internal regulations for this area are mentioned in terms of Fire and Rescue Committee of Ministry of Interior are presented. Work safety in emergency services 68 Act. 124/2006 Coll., on occupational safety and health (OSH) and amending certain acts. This act sets general prevention principles and basic conditions to secure safety and health protection at work. The act tries to eliminate the risks and factors contributing to work injury [1]. Decree of the Occupational Safety Office no. 74/1996, security and occupational health, safety pressure, lifting, electrical and gas appliances, and technical proficiency. This regulation divides reserved technical equipment and sets the scale and the conditions to assure safety and health protection at work. It deals with planning, production, assembly, operation etc. It also sets which technical equipment is considered as reserved technical equipment [2].

President instructed the Ministry of Interior No FRC. 62/2002 concerning the classification of firefighting equipment and material means of personal protective equipment to use in the Fire and Rescue Service

In this directive the basic principle is given – the introduction of means, fire fighting equipment and personal work safety measures into the fulfilment of the activity of FRC of Ministry of Interior of SR [3].

The statistics of work injuries using hoisting apparatus. The statistics of work injuries was dealt within one region of Slovakia. We focused on common work with the use of hoisting apparatus. It is a selection of work injuries where the cause of the injury are:

- cranes and other hoisting gears for transportation (motor-assisted, motor-less)
- hoisting gear and traffic equipment and needed tools

The data in the table is from the period 1995-2011. Details were not taken into consideration due to privacy of some cases.

Under the Act no. 124/2006, Z.z. OSH occupational accidents are divided as follows [1]:

- serious occupational accidents resulting in death
- serious occupational accidents with severe personal injury (§ 3 paragraph. L)
- serious occupational accidents with sick leave of 42 days
- occupational injuries

Data acquired from the work inspectorate:

- Registered work injuries
- Serious work injuries
- Fatal work injuries

### 2.1. Fire

The ground and only task of fire-fighters was to extinguish fires. Later on the tasks were added and their work became more complicated and tough. Though not only for direct action but also the training, and their physical and mental ability. That is connected to education, the amount of information not only about possible situations but also about equipment that must be used. From „relatively“ easy equipment for fire extinguishing (even though they say that in the fire brigade truck is more electronics than in the lunar module that landed in 1969 on the moon) they must know how to use equipment needed for ecological disasters, car accidents, by slides etc.

Composite authors [3, 4] put together an interesting statistics, during the period 2009 – 2014 where there is comparison of total calls to fire (see picture no 1). Similar statistics is in the table no 2. From picture no 1 it is clear that the number of calls to fire has a decreasing tendency but in comparison to other years it has a stable level above 10 000 calls a year, that means that we cannot omit them.

Extreme levels are in the years 2007, 2011 and 2012. The rate between calls to fire and to other, e.g. technical calls has increased. The human factors are in the forefront where the threat to the personnel creates new risks. It is necessary to accept new and emerging risks with regard to the work of fire-fighter paramedic, in the exercise of their activity in the framework of technical and ecological calls.

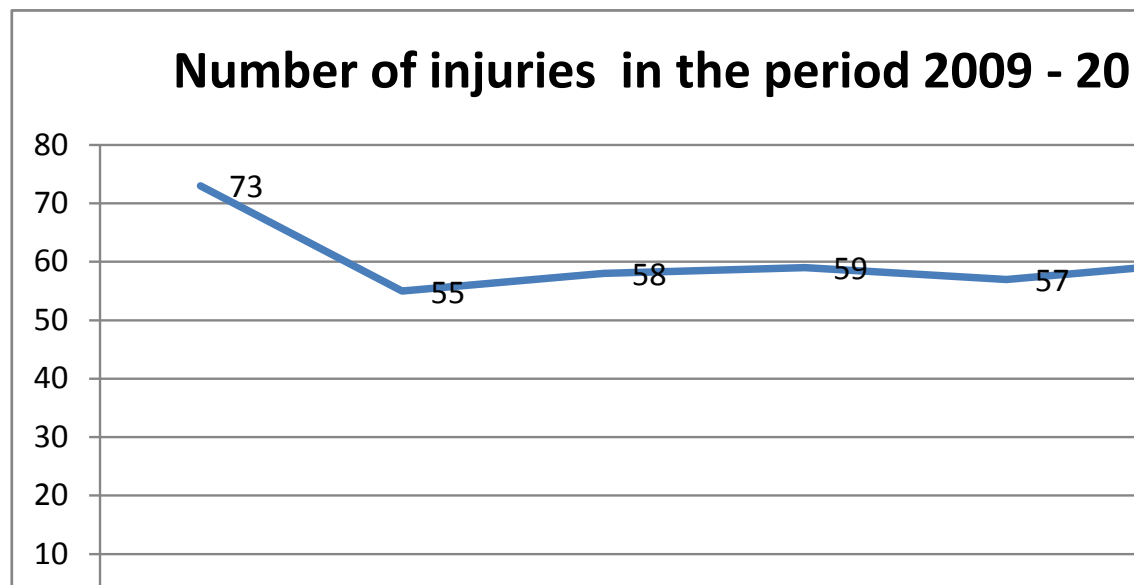


Fig. 1. The number of injuries in the Rescue services in the period 2009-2014[7].

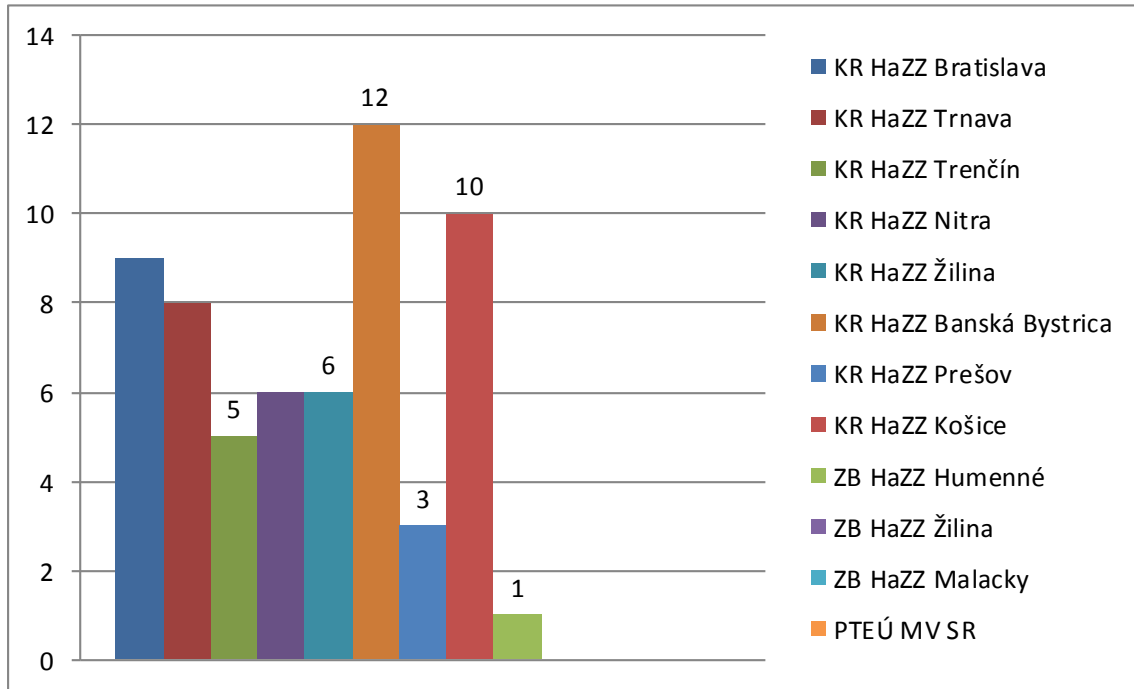


Fig. 2. Injuries in the line of duty and work injuries in Rescue services (divided by cantors) in the year 2014 [7].

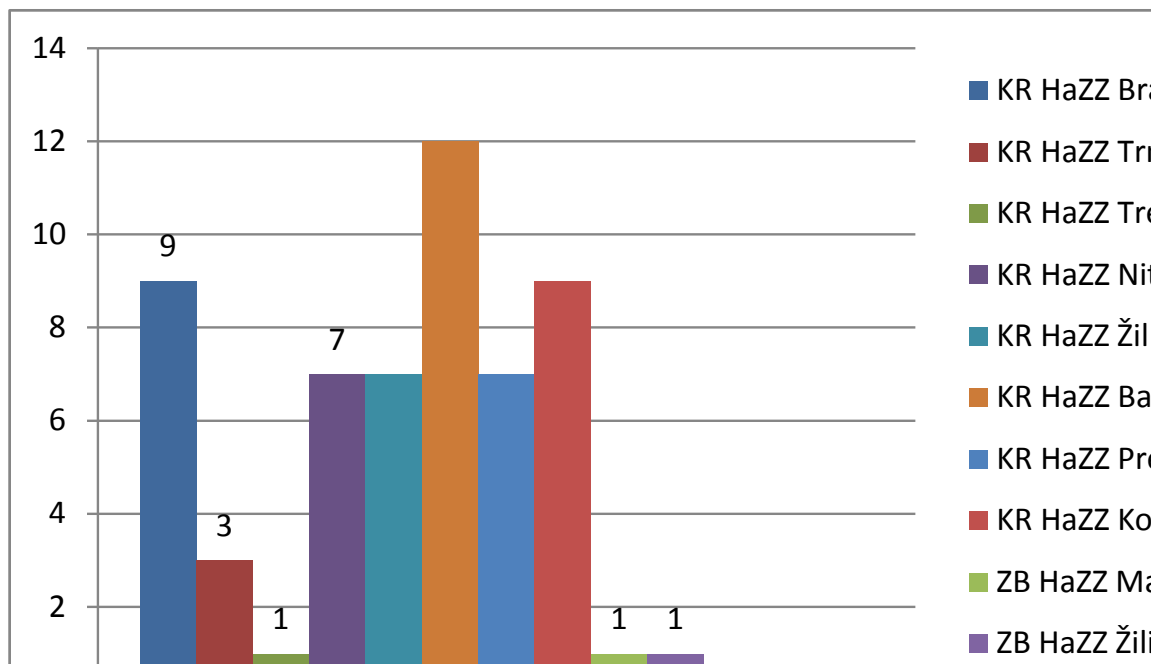


Fig. 3. Injuries in the line of duty and work injuries in Rescue services (divided by cantors) in the year 2013 [7].

The threat to fire-fighter is high temperature and inhalation of toxic combustion products. There are of course other risks, but they are the same as by other activities (e.g. fall from heights, injury caused by a tool or by falling building parts) that are however intensified by the fire conditions.

## 2.2. Car accidents interventions

The crucial criteria are the type of car accident. It can be car accident of one vehicle or crash of two or more vehicles, vehicle with higher number of injured (a bus), crash of a vehicle with toxic material transportation etc. In such cases the fire-fighter paramedic is threaten by physical conditions of the environment, there is higher demand for the equipment operation. Such conditions are also mentally difficult, when dealing with injured people and communicating with them.

We must not forget the trauma emerging from the contact with the deceased. When looking at the environment, this includes the difficulty resulting from the conditions of the accident itself (the access to the injured), from the terrain conditions (wreck in the ditch, under water surface), light conditions (accident during the night, during bad weather, rain, fog). Specific is a crash in the tunnel.

The safety measures by rescue operations have crucial influence on fast and adequate help to people in need. Injury statistics inform us about individual critical situations and the biggest negatives. The highest attention should be paid to equipment operation as well as work organisation, i.e. the correct methodology by rescue operations. [2]

Figure 4 shows the difficulty of rescue work. It is important to understand that an overturned vehicle is not a stable object to be lifted by two cranes. The risks are obvious. The authors of the work [2] put together a study where is a percentage share on the occurrence of a fatal and serious injury.



Fig. 4. Rescue work after car accident with the help of cranes [2].

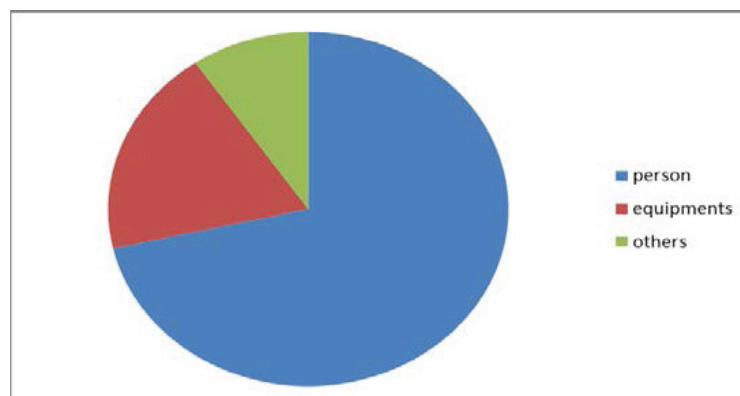


Fig. 5. The influence of the source on the occurrence of a fatal and serious injury.

### 3. Rescue operations by slides

It is an extremely difficult operation where more rescue units are required. The first problem can be their coordination and localisation of the injured – buried people. Such events happen very often. Just recently there was such case in Vratna valle. Torrential rain, snow, building fall, gas explosions or terrorist activity these are the main reasons that cause slides. The operation in collapsed buildings, slides is very demanding on the equipment, strength, means and material-technical equipment of the rescue units.

The first step by the rescue operation in this case (and not only in this one) is the reconnaissance. The reconnaissance is an important source of information for a successful rescue operation.

The commanding officer chooses an investigating team where each member has concrete tasks [1]. Here belong:

- in terms of paramedics safety
  - inspection of walls or constructions likely to fall in immediate vicinity
  - location of basement rooms which could fall through by rescue work
  - the instability of debris where the operation will take place
  - control of engineering networks
- in terms of workplace preparation
  - evaluation of the move to the fall and the preparation of appropriate tools
  - finding out whether the cooperation with other units and technical means is possible and necessary
  - possibility of machinery employment
- in terms of afflicted people
  - people search and marking of possible presence (estimated presence of people found out by careful listening, with the help of search dogs
  - communication with people in the debris
  - acoustical communication, the use of elements indicating sound direction (main beam, monolithic pillars, direct steel construction elements, cast-iron waste pipes, water riser pipes). It is necessary to keep in mind that there are some elements that do not indicate the sound direction (twisted heating pipes, gas pipes).

Important is to have a nonstop contact with the afflicted people during the whole time of the rescue operations – e.g. knocking or listening to responses [1].

### 4. Conclusion

To talk about classical work safety is quite difficult when dealing with rescue units and in the conditions of rescue operations. Situations where people run away to save their lives it becomes the work for the rescuers. The article does not want to solve this problem; we just wanted to point out on some situations the difficulty of rescue operations. When they can rescue it shows their professionalism that was achieved by study, it points at their skill which they achieved by training and about their personal bravery which is natural to them.

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