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FIRE AND RESCUE SERVICE INTERVENTION IN RAILWAY INCIDENTS

Abstract

The paper addresses to activities of the fire brigades intervention in traffic accidents at level crossings. It refers to the number of interventions made in detail and define the model of activity with emphasis on the risks that are the source of the threat of fire brigades. The article presents the most significant incidents at level crossings in the Slovak Republic. As a result the paper attract the attention of the railway incidents worldwide.

Keywords: level crossings, rescue work, fire brigades, incident.

VASÚTI BALESETEKNÉL TÖRTÉNŐ T ZOLTÁSI ÉS MENTÉSI BEAVATKOZÁSOK

Absztrakt

A cikk a vasúti átjáróknál történő közlekedési baleseteket követő t zoltói beavatkozásokat mutatja be a szerzők szakmai tapasztalata és a legfontosabb nemzetközi szakirodalmak alapján. A cikkben részletesen ismertetésre kerülnek a beavatkozások számai, valamint a beavatkozási tevékenységek menete, különös tekintettel a t zoltókat fenyegető veszélyforrásokra. A cikk ezen felül kitér a vasúti átjáróknál megtörtént főbb balesetekre Szlovákia területén. A cikk eredményeként megismerésre kerülnek a legjellemzőbb vasúti balesetek, melyek felhívják a figyelmet a probléma aktualitására és annak megoldási lehetőségeire.

Kulcsszavak: vasúti átjárók, mentési munkálatok, t zoltóság, baleset

1. INTRODUCTION

The issue of traffic accidents is a serious social problem in all areas of human activity. Therefore it requires a comprehensive approach to its prevention as well as to its solution. It can be stated, that although a traffic accidents at the railway crossings are according to the statistical numbers not most often accidents within the transport accidents statistics, but they are nearly always much more serious in sense of killed or seriously harmed people involved to them. In case of existence this kind of crisis situation, there is needed an efficiency cooperation among all units involved to the crisis intervention activities.

2. ASSESSMENT OF INTERVENTION ACTIVITIES OF FIRE AND RESCUE CORPS

Fire and Rescue Corps is the core of the integrated rescue system. Their activities are focused on the firefighting, on the elimination of consequences of emergencies and on other tasks related to the protection of people. Statistically in 2014 fire service carried out a total of 30,144 interventions, of which 9,781 were for fires, 18,492 were about the technical requirements or the nature of emergency exits, and 657 were defined as false alarms. Apart from the direct intervention activity 1214 exercises were done. Table 1 shows the number of intervention in 2007 - 2014. [1]

Year/Departure	Fires	Technical Assistance	Accidents	Hazardous substances	Workout	Schedule alarms
2010	9979	23089	6741	*	*	1050
2011	13891	15743	6656	938	1624	919
2012	14846	15316	6539	1100	1031	1227
2013	9939	9648	6752	820	1099	652
2014	9781	10439	7069	984	1214	657

* Data is not known

Table 1: Number of interventions of HaZZ for the period 2010-2014

An increase in the total number of technical interventions, including road accidents were observed. Comparing to 2013, the number of intervention for traffic accidents increased about 317. Also number of technical interventions is increasing - 791. Figure 1 shows the number of hits for accidents at level crossings in the total number of technical interventions.



Figure 1: The proportion of the number of interventions in traffic accidents FRC in the years 2007-2014

Successful rescues from entrapments involve a marriage between *medical rescue* and *physical rescue*. It is essential that all extrications are viewed in this context. The *golden hour* philosophy, which was introduced by Dr. R. Adams Cowley in 1961, recognizes that casualties will have a much poorer chance of survival if they are not delivered to definitive care within one hour from the time of the accident. (Definitive care being a hospital operating table 2.) The golden hour includes the time taken for call-out, travel to the incident, extrication and transport to hospital. This time-scale does not allow for a lengthy extrication time at the accident scene if lives are to be saved and healthy recoveries promoted. For the majority of road traffic accidents the time taken for extrication should not exceed 15 minutes. This figure is realistic and can be met if crews are adequately trained and work as a team at the scene. [2]

Table 2: Schedule, Golden Hour "[2]

Cumulative Time	Action	Time Taken
0 minutes	Accident Occurs	<i>0 minutes</i>
5 minutes	Call to Emergence Services	<i>5 minutes</i>
15 minutes	Turnout a Travel to incident	<i>10 minutes</i>
30 minutes	Extrication	<i>15 minutes</i>
35 minutes	Package and transfer to Ambulance	<i>5 minutes</i>
60 minutes	Transport to Hospital	<i>25 minutes</i>

The Fire Service has no control over most of the actions shown in the table, the time taken for extrication is really the only one where the Brigade can have an influence. For this reason, quick decision is required at the scene which has special processes. [3] It is essential that the extrication is carried out as efficiently as possible.

Any technical intervention in a traffic accident is unique in its environment and it is possible to provide a clear definition of the situation, particularly at level crossings. Level of risk to the environment entails a traffic accident, is the fact that the overwhelming majority of situations, it is considered that the overall risk of a number of possible foreseeable threatening. In road accidents at level crossings it is important to consider the following points:

- **Roles:** The Incident Commander should have a clear understanding of the roles and responsibilities of all the agencies responding to situation.
- **Liaison;** There should be good communications between all services at the scene. The Incident Commander should keep his own crew fully briefed throughout the operation.
- **Positioning:** Effective command and control comes with good positioning – far enough away to have an overview of the whole incident scene around the vehicle, whilst close enough to step in and have a close up look should the need arise.
- **Anticipation:** The Incident Commander should constantly be thinking ahead and should anticipate equipment and manpower needs. An alternative plan should be drawn up - in case it is needed.

- **Risk Assessment:** The issue of safety should be constantly reviewed and the riskassessment should be updated. [2]

3. SPECIAL EVENTS IN RAILWAY CROSSING IN SLOVAKIA

The number of accidents in 2016 on the level crossings was increasing to 27, five people died and five suffered from serious injuries. As a one of the most difficult event can be called a collision of train with rolling vehicles REX 774 in the direction from Velky Medert to Komarno, which occurred on 09/16/2016 7:15 pm. 29 people were injured, two people were seriously injured and one person was killed. The precise cause of the incident has not yet known. Each accident on level crossings in Slovakia of the integrated rescue system involved and the department of safety and inspection of ZSR are in charge of the case.



Figure 2: Overview of the incident rainfall combination and a wagon [4]

Railroad crossing where the collision of the train and rail vehicle occurred is provided with signal lights without gates with visibility. Even though the security devices the driver didn't stop and the collision occurred.



Figure 3 clash of combination with rolling [4]

The Fire and Rescue Service consisted were recovering persons, assisting doctors in the treatment of injured persons, providing assistance in handling of injured persons in vehicles of ambulances and emergency medical assistance and in helicopters of emergency medical services. After that firemen were involved in the removing of accident consequences.



Figure 4: The distribution of firefighting equipment [5]

Crash of the passenger train No. 7353 of the Railway Company Slovakia (ŽSR) to the bus Karosa became on February 21st, 2009 at 9:04 a.m. in the interstation section Helpa - Polomka at the unsecured crossing (in the 17.938 km). The engine- driver of the train, running in the direction from Závadka nad Hronom to Polomka noticed that incoming bus was not stopping in front of the crossing and bus was coming to enter into the crossing. Engine driver immediately used the Rapid-braking system. It was at a distance of 72 meters before the crossing at a train speed of 70 km/h. Nevertheless, passenger train crashed into the left middle part of the bus. Bus fell over to the right side and railcar was derailed. The bus was thus pushed 26 meters until the train stopped. [6]



Figure 5: Accident nearby the Polomka village [7]

This was the most tragic accident in the history of ŽSR. There died 12 people, 6 accident participants suffered from serious injuries, and 19 of them were injured slightly. After this incident there were kept a long professional and political discussion how to increase the safety at this crossing. It resulted to the construction of traffic lights at this crossing. Investigation of this serious accident took place on the basis of the testimony of experts from the field of road transport. Investigators asked for the opinion of experts from the Institute of Forensic Engineering (IFE) in Zilina. According to IFE experts' opinion this accident was caused by the defendant-driver who drove the bus into the crossing when the train was passing through there.

Activities of the Fire and Rescue Corps consisted of dividing of intervention area into searching sector and rescuing one. This means that they set a danger zones with distinctive threat for movement of rescuers and other persons as well as the sector with medical assistance.



Figure 6: Site plan of accident site in Polomka [8]

Furthermore, fire and rescue units' activities consisted of the rescuing persons from the bus, assisting to physicians in the treatment of injured persons. They were helping with management of unloading of injured people into the ambulance vehicles, and emergency medical assistance vehicles as well as to the helicopter of emergency medical services. After successful transport of injured people, firefighters were involved in removing of the

consequences of this accident. Into the area of the accident, came a crane from the department of Fire and Rescue Service in Zlarnad Hronom, which lifted a wagon of the train engine.

In 2015 the Czech Republic the collision was of the vehicle and the train Euro City called Pendolino occurred on the secure level crossing. The driver was driving the vehicle full of plates transporting from Poland to Hungary. He came to railway crossing at the time when warning lights were already active. The gates closed the vehicle on the level crossing. The driver for unknown reasons did not try to break through the gates and escape, but he remained seating in the cabin. The train was moving at a speed 160 km / h. Later the train speed was reduced to 140 km / h. After the crash train was pushing the vehicle and remove his cab. The braking distance of the train was around 500 meters, the train stopped at the platform of the train station. It pushed the debris of the car ahead. Two passengers of trains were killed, the third man succumbed to injuries in the hospital and 18 people were injured. [9]



Figure 7: Scenario of traffic accident [10]

Six professional and volunteer firefighters were intervening. The first fire-fighting arrived from the station in Bílovec, only 10 minutes after the incident. The last person was rescued from the wreckage of the train in 1 hour and 8 minutes after the start of the rescue work. Firefighters also evacuated 107 passengers to the waiting room of the railway station. With the help of thermal camera and other specialized equipment, firefighters were reviewing the train to prevent the occurrence of another person in heavily damaged parts of the train. Overall, 65 firefighters, 27 medicals and 115 of police officers were involved in the intervention. The intervention lasted 15 hours and 20 minutes. [11]



Figure 8: A clash of combination and Eurocity in the Czech Republic [12]

From the perspective of the FRC, the procedure in emergencies is never identical. Every time it is difficult and intensive intervention. Therefore, the FRC commander must choose right intervention procedure and its tactics in order to cope with the situation in affected area and avoid thus possibility of occurring of secondary injuries or further worsening of health of injured people.

4. CONCLUSION

Based on the findings, it can be stated that although the number of accidents at railway level-crossings in last few years is declining, it is still high. It is therefore necessary to try to find really efficient solutions aimed to increasing of safety at railway level crossings. In the frame of intervention activities related to the large serious accidents, it can be stated, that there is really needed an efficient cooperation among all interested rescue units and subjects of IRS and correct application of their competences to do specific activities.

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