

THE SOCIAL ASPECTS AND THE POPULATION PROTECTION IN CITY PUBLIC TRANSPORT

Rudolf HORÁK, Ladislav NOVÁK, Tomáš SALIGER, Jan WIEDERLECHNER

Rudolf.horak@unob.cz, Ladislav.Novak@fsi.uniza.sk,

University of Defence Brno, Kounicova 65, 612 00 Brno,

CZECH REPUBLIC

Faculty of Special Engineering, University of Žilina in Žilina,

SLOVAK REPUBLIC

Abstract: *The authors deal with the solving of emergency (crisis situation), that can occur in city public transport after leakage of dangerous matter. They are thinking about the influence of such a situation on urban population and at the end they suggest possible precautionary measure.*

Key words: *emergency, crisis situation, city public transport, transport security, behavior in the load*

I INTRODUCTION

The experience from the civilization development points to the emergencies (crisis situation) that are the inseparable part of all world communities. This is also typical nowadays. Some kind of uncertainty comes up and in some specific periods the tension comes up too. This phenomenon is caused neither by in ordinance of political situation nor ideological contradiction. This phenomenon is not bounded only by one or several states. It is a global phenomenon. A crisis seems to be a part of everyday life. It is connected with the thing that we come to know about every event – from media – almost immediately. The distances in the world are minimizing. The things, that had been solved locally before the news even came to the metropolis, are nowadays the discussion topic in a few hours. The emergencies (the crisis situations) are more difficult and often with very traumatizing consequences. The main reasons are the unusual world complexity, the size of forces, which are set in motion, the output of used energy (from the power stations to atomic

bomb), and the weight of materials, that are manipulated and transported by unbelievable speed to before unsuspected distances (except of solar system), information flood (the important and unimportant) and also the number of people, hundred millions and milliards of individuals, who take part in the social life, that in a close future are increasing into outrageous sub continental , continental and global dimensions.

1. TRAFFIC SECURITY

We have to take these factors into consideration as well if there is a serious nuisance in the traffic system during an emergency (or crisis) situation. Traffic is one of the subjects of the crucial infrastructure and a phenomenon of the today's society. It is becoming optimal, quicker, and cheaper; there are more connecting bus lines, etc. Traffic itself has been defined as a movement of people and goods of any kind, by one's own means or with the help of mediated power [1]. It is also possible to look at traffic from the economic point of view. In favor of the rising security in road traffic

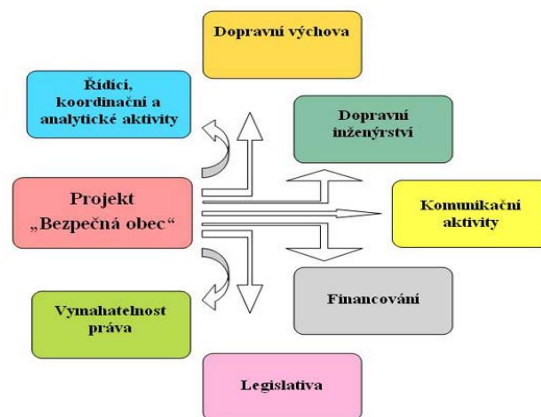
there is a project to be launched called „Secure Municipality“¹ in the Czech Republic, whose objective is to summarize examples of the existing good practice and experience, to create methodology for the municipality's activities, and to promote municipality's involvement in solving the security of the road traffic. This project should cover a complex area of the road traffic security in municipalities starting with traffic awareness and education, traffic calming down etc. reaching up to information about possibilities in financing of infrastructure repair work in favor of security in road traffic. To create the project proposal there are going to cooperate representatives of the police, public administration, and non-governmental not-profit making companies. The project is a part of “The National Strategy of Road Traffic Security” and a long-term program of improving the state of health of the inhabitants in the Czech Republic “Health for all in the 21st century”. It is mainly about influencing the negative state in accident rate. The accident rate in municipalities is specific. There are often many spatial particularities to influence it. The consequences of accidents in the towns and villages are very serious. It is a challenge to create suitable conditions for solving the phenomenon of the security of the road traffic for the citizens and public administration.

The Objectives of the Project “Secure Municipality” are as follows:

- To increase the security of the road traffic in municipalities,
- To reduce number of the injured and the dead,
- To inform people in charge within municipalities about the security state of the road transport in towns and villages and to inform about the possibilities of advancing it,
- To provide municipalities with approach towards information about possible solutions in the field of road traffic security (further only RTS),
- To arouse interest among municipalities about the issue of road traffic security,
- To promote, enhance and help to coordinate cooperation among municipalities in the field of RTS.

¹ www.mvcr.cz/ibesip.cz/bezpecna-obec. 20.7.2007

The scheme of how to solve the issue is illustrated there in picture Nr. 1.



Picture 1. The scheme of project division: „Secure municipality

The major part of the project is the creation of methodology for the municipality's activities in villages, towns, regions in the field of road traffic security. This methodology should contribute towards a better orientation of those subjects involved in the issue of the security of the road traffic, mainly it should point out the opportunities of how to make the labor more effective and should suggest other possible activities in this field. Methodology fully corresponds with the demands set by the government specified in “The National Strategy of the Road Traffic Security”. Activities will be further divided according to positions and coherence towards single subjects.

Transport as an important part of the human activity carries with itself a lot of social aspects as well as those positive and negative ones that cannot be neglected. It enables people to get in touch and it also isolates them, it integrates them into society and separates them; it helps people get to know one another, it promotes their own growth, their mutual meetings and destruction. From the objective point of view transport is in its values neutral and it owns a pure purpose character. In a specific realization of traffic it is always possible to reveal both positive and negative social features. On one hand traffic can help to combine different cultures and people but on the other hand it can also help to create barriers in a successful communication and prosperous co-existence and can sometimes harm it or even completely destroy it. Special position in the whole traffic system has been devoted to

urban mass transport (further only UMT) which is a part of The Region's Integrated Transport System (further only RITS). The term RITS represents such a way of reinforcing the urban traffic within a region in which single kinds of traffic cooperate in between and create a simple and transparent system of connecting lines with the same fares tariffs, transport conditions and regular intervals among lines in cooperation with train, trolleybus and bus transport connections.

In our contribution we have tried to create a suitable environment for a hypothetical model crisis situation that is not dealt in the project mentioned above, but that can in reality happen. In such a situation it is going to be vital not only to eliminate the consequences in the whole traffic system (within a municipality) but also to solve some social aspects. These aspects have been described as those having certain influence on the individual human being and the society as a whole, or its vital parts.

Emergency situation (crisis situation) is being characterized as a failure of those now-existing managing mechanisms. During emergency contingencies (crisis contingencies) human acting is being influenced above all by the fear of endangering one's own property, health, life or lives of the others. **People on principle and always consider the degree of distress, the risk, not according to reality (which they sometimes cannot judge, mainly because of shortage of time or opportunities), but according to the feeling of being endangered which is created in them subjectively.**

From this point of view people compare their position to that of handicapped and are under pressure. A huge communication about the range and character of torture occurs. People tend to accept the torture. The crises bring with them increased coherence among our population, in its leadership team, in the executive committee and in other parts of the society. During the emergency situation (crisis situation) it leads to the leveling of social life because danger, loss, torture have become shared phenomena. The consequence of this is that before existing social differences inside the endangered group become eliminated.

Following the above mentioned we can judge that during emergency situation (crisis situation) not only individual human beings, but also the

organization and the society change. Further we have to understand that each of us has a different resistance against effects of the emergency contingencies (crisis contingencies). The faced (shared, watched) reality affects us in a different way, with different intensity of an experience, different way of managing it and different way of coping with emergency situation. The individual after having faced the emergency situation will always behave in a unique way and it is not possible to approach him/her with the help of any of the working methods, but he/she needs to be handled as an individual human being with his/her own attitudes, individual resistance, psyche, etc. Without taking this fact into consideration we cannot solve any natural, economic, traffic, etc. emergency situation (crisis situation). In consistence with what we have mentioned before, human reaction during emergency situation (crisis situation)² can be divided into:

- **Initial period**, or crisis, when the catastrophe is being prepared (from the mentioned point of view of human factor, worries and the increasing feeling of fear arouse),
- **The moment of the own catastrophe** – when it happens, persons affected start to panic (they act and behave in a irrational, instinct way) – catastrophe has two forms – a depressive form, leading to a shock (Totstellreflex), and a hyperactive form up to an aggressive form (Bewegungssturm), always followed by a later different long memory disorder (retrograde amnesia). But there is not a single catastrophe that can cause a lasting mental disorder to a healthy person,
- **Period of stabilization**, when the crisis or catastrophe is being reduced, starts with a feeling of delight when one have managed to escape from the danger, euphoria (catharsis), and it moves into a reasonable period, when people gradually start to realize a up-to-date state of things. This can be attended by the feeling of fear (of the relatives, future) and sorrow which can lead to depression (mainly when watching the number of the dead). Very interesting fact is that such a feeling can be observed not only among those affected by the catastrophe but also among their rescuers, those who have helped them and

² Horák, Rudolf at-al. *Krizové plánování*. Brno: Univerzita obrany, 2007. ISBN 80-7231-178-6, p. 242

have faced the emergency of their own will (post-traumatic syndrome).

typical smell of chlorine could be smelt still in the distance 2km from the place of escape. In that

2. MODEL SITUATION

In the area of administrative town of the region (picture 3), there was an outflow of liquid chlorine from the bottles transported by the crashed vehicle, as the consequence of the traffic accident. There was the outflow from the output slot of the main damaged valve with a diameter: 1cm and the content of chlorine: 50 kg. Thanks to extreme temperatures (34°C) the gas immediately evaporated and the cloud with a dangerous substance was created. Everything happened in the morning hours, when there are a lot of people waiting for the lines in the town centre.

For modeling of the situation a software device ALOHA 5.4.1. (Areal Locations of Hazardous Atmospheres) was chosen. It is a part of Computer-Aided management of Emergency Operations (CAMEO®) [3].

Selected input data:

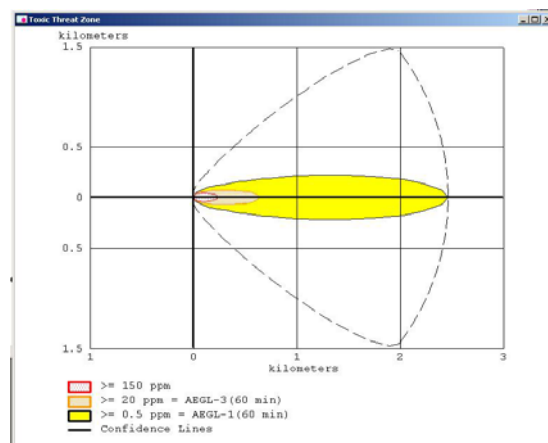
Air temperature: 34°C
 Wind strength: 2m/s
 Terrain segmentation: a town or a mountain
 Cloud amount: zero
 Relative atmospheric humidity: 5%
 For the modeling in the stated SW it was essential to enter other data for the calculation of the mortal and hurting zone.

Output

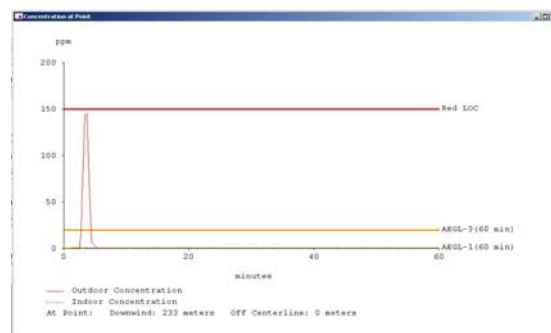
A text output (it recaps the stated data) as well as a graphic output can be made from the stated SW. The graphic output shows the progress of the highest concentration and a period during which they are occurring in the given area. The program makes it possible to plot on calculated zones (ortophotomap from www.seznam.cz was used). For illustration of the output graphs were selected, see picture 2, 3, 4.

The results of modeling

With the help of the stated software two zones- mortal and hurting zone-were determined. The mortal zone (red color), in which all present people would die with an excellent probability, is 100 meters in the direction of the wind from the source of escape(stripe 107x50 meters). It has been calculated, that the concentration which is badly harmful to health and in which the death of people will probably occur, is 233 meters. The



Picture 2. The attacked area of a cloud



Picture 3. The concentration in the cloud at the distance of 233m from the source



Picture 4. The contamination extent by mortal and injuring chlorine concentration

space sensitive people would smell an unpleasant smell. As far as people in the surrounding buildings and in raised points, this attack should not directly endanger their life. However it is

possible that the people could be hit by the chlorine in small concentrations but it would not cause a permanent damage of their organisms. Probably irritation of eyes and airways would occur.

At the same time a panic would probably arise and it could cause additional injuries, eventually victims (trampling, running down people by means of transport, etc.)

When the stated situation springs up, it would be appropriate for the workers of MHD to be prepared to realize evacuation of people to the safe distance by MHD means of transport.

Health damage and possible mortality could be also caused by the outflow of the gas to the underground spaces (subways). Consequences would be similar to those which occur in the case of endangering people on the surface of the street.

3. PREDICTION OF THE BEHAVIOR OF INHABITANTS

The transport is halted due to the built-up cloud. Passengers are disturbed because they have not got enough relevant information about the situation. In this situation mass behavior can occur. Mass behavior is accidental, plan metrically determined behavior of the set of people who have found themselves in the emotionally exposed situation of mass character. As a result of an incurred and developing mass psychical infection the force of shareable emotional experience prevails an independent rational behavior. Mass behavior is understood as a specific type of a social behavior being developed under the emotional pressure of situation contexts. This type of behavior is developed in several stages which are stated in point 1. In situation like this, tensions are induced on the principles of suggestiveness, emotional infection and succession in the direction shown by the inciter (in the direction of escape, aggression, or hysteria). [4]

A person is exposed to the feeling of uncertainty during coping with the stated events (situations). Its main cause is a lack of information. And so the prognosis of development is difficult. People get themselves to the state of stress and subsequently to negative, aversive (up to aggressive) reactions to the crisis

social situation. If the emergency (crisis situation) is not managed, chaos and panic are created. Measure of panic is directly proportional to measure of the lack of information. We have to take into the consideration also the limitations of the human nervous system. They are:

- reduction of attention (with the increasing level of stress, the person is more and more influenced by the idea that important things will be entirely out of attention),
- distortion of perception (obtained information is adapted by individuals according to their expectations).

The cause of this phenomenon usually is:

- when the information is late and unclear (not concrete enough),
- when the information requires clarification (then this is influenced by previous experience and wishes),
- mental rigidity (cognitive processes become rigid under the strong emotional pressure, i.e. the ability to accept new information is limited),
- fluctuation of awakedness (mental awakedness is connected with circadian – 24-hour biorhythm which characterizes the majority of biological processes, and this increases the risk of mistakes),
- decision-making process of individuals in complicated situations is often characterized as a decision to gain everything by the technique "either - or", and in crisis situations it can be so intensive that anything will be done also in that case when its consequences are evidently harmful.

To sum up- for the managing of emergency (crisis situation) it is necessary to give information to the affected people. Information has to be true, given in time, and with the recommendation for the activity of affected people.

4. SUGGESTIONS AND RECOMMENDATIONS

On the result basis from the model situation it is recommended to build up places to monitor dangerous matters at exposed traffic junctions. It would be monitoring mostly of chlorine, ammonia, phosgene, hydrogen cyanide, hydrogen sulphide, possibly radioactivity and so on.

In the case of warning, the travelers and people located in the adjacent places of a city centre; use external radio apparatus in urban means of transport.

To learn the public transport drivers how to cope with the emergencies (crisis situations) and to inform people necessary information. To acquire the habits of solving situations, mentioned above, in the workaday duty of public transport. To include this points at issue into the topics for training the drivers.

To record the warning report to the PC unit of public transport. In the case of solving the emergency (crisis situation) the driver can use the record to inform the passengers by internal and external apparatus.

To release the information bulletin of how to behave in the emergency (crisis situation) for the public transport passengers.

At least once a year to organize, for the urban dwellers, the training for acquiring the self-protection habits in the emergency (crisis

situation). The training would serve for dwellers to learn the first aid and other techniques of saving affected people, for showing some demonstrations of rescue techniques and needed materials.

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СОЦИАЛНИ АСПЕКТИ НА ЗАЩИТАТА НА НАСЕЛЕНИЕТО В ГРАДСКИЯ ОБЩЕСТВЕН ТРАНСПОРТ

Рудолф Хорак, Ладислав Новак, Томаш Салигер, Ян Виедерлечнер

*Институт за отбрана, Бърно, Коупцова 65, 612 00 Бърно,
ЧЕХИЯ*

*Факултет за специално инженерство, Университет в Жилина,
СЛОВАКИЯ*

Резюме: Авторите разглеждат решаването на спешни случаи (кризисни ситуации), които могат да възникнат в градския транспорт при изтичане на опасни вещества. Те размишляват върху влиянието на такава ситуация върху градското население и накрая предлагат евентуални предпазни мерки.

Ключови думи: спешен случай, критична ситуация, градски транспорт, транспортна сигурност, поведение при натоварване.