ANALYSIS OF EMERGENCY EVENTS IN THE REGIONS (NUTS 3) OF THE SLOVAK REPUBLIC

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Abstract: The Slovak Republic is threatened by many risks, mainly of natural or social nature. Their existence constantly affects Slovak's security environment. Consequences of emergency events negatively threaten life, health, and the property of citizens, and also the environment and cultural heritage of the country. This article provides an overview of emergency events in the Slovak Republic. The main purpose of the paper is to identify the foremost kind of emergency events threatening regions of the Slovak Republic. Findings and conclusions are based mainly on historical data and statistics.

JEL Classification Numbers: H12, R14 **DOI:** <http://dx.doi.org/10.12955/cbup.v4.793>

Keywords: security, emergency event, flood, landslide, accident.

Introduction

We see worldwide, a growing trend of undesirable emergency events, with numerous negative consequences for sustainable development of a society. Each crisis affects territorial units, thereby endangering the safety of the people within these territories. The term territorial unit is defined as a region about the size of a state, district, county, or village. Security of each territorial unit can be threatened from inside or outside the unit. External threats, which include military threats and migration waves, cannot be completely eliminated by territorial unit resources alone. On the contrary, internal security can be influenced from within the territorial unit. We understand that, as far as possible, inside threats are eliminated by the territorial unit and its interests, and when effectively equipped, the territorial unit willing carries out this elimination (Adamec, Řehák, & Černá, 2012). Internal threats and risks that could threaten the territorial unit are identified in a base document, the Area Analysis. The analysis is undertaken by government bodies, under Act No. 42/1994 (Act of the National Council of the Slovak Republic, 1994), as follows:

- District offices at local level (Nomenclature of Territorial Units for Statistics 4; NUTS 4);
- District offices at the region at regional level (NUTS 3); and
- The Ministry of Interior of the Slovak Republic at national level (NUTS 1).

The conditions for the effective protection of life, health, and property against the consequences of emergency events, as well as the responsibilities of the various governing bodies is defined under Act No. 42 on the civil protections of the inhabitants (Act of the National Council of the Slovak Republic, 1994). This Act defines the emergency events as non-military crisis events, which are divided into:

- Natural disasters;
- An accident;
- Catastrophes;
- Public Health Threats; and
- Terrorists attack.

Based on the Risk Assessment document of the Slovak Republic, in accordance with Article 6 of the Decision No. 1313/2013/EU of European Parliament and of the Council about Civil Protection (2015), emergency events are divided into three basic groups:

- Events caused by natural origin;
- Events caused by human activity; and
- Disruption of critical infrastructure.

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The territorial units' security is mainly threatened by emergency events that occur inside the territory. Assessment of individual threats must be examined, primarily on a retrospective statistical basis (Maléřová, 2014). The main purpose of this article is to analyze the emergency events that have occurred in the regions of the Slovak Republic, based on statistical information.

Analysis of emergency events in the Slovak Republic regions

In 2014, the Ministry of Interior of Slovak Republic registered, through a central monitoring and control center, a total of 372 emergency events. Table 1 provides an overview of emergency events for the different regions of the Slovak Republic.

Table 1: Emergency events (EE) in 2014, divided by regions of the Slovak Republic									
Regions	BA	BB	KE	NR	PO	TN	TT	ZA	Σ
Total amount of EE	36	23	39	11	156	28	29	50	372
Amount of EE [%]	9.7%	6.2%	10.5%	3%	41.9%	7.5%	7.8%	13.4%	100%
BA: Bratislava; BB: Banská Bystrica; KE: Košice; NR: Nitra; PO: Prešov; TN: Trenčín; TT: Trnava; ZA: Žilina									
Source: Ministry of Interior of Slovak Republic (2015)									

The most affected region was Prešov, which had three times more emergency events than the second most affected (Žilina). This extreme was due to a large number of floods in the region. In comparing the previous years, an increasing trend in the number of emergency events is observed. An overview is shown in Figure 1.

For all territories of the Slovak Republic, a total of 45 emergency events occurred in 2003. In comparison, 2014 had 372 in total (Figure 1), a large increase in emergency events overall. Notably,

the total amount of emergency events is not indicative of the destructive power of individual events. Nevertheless, the Slovak Republic needs to adopt preventive measures for changing negative developments. The most common causes of emergency events occurring in Slovakia are natural disasters and accidents (Ministry of Interior of Slovak Republic, 2015), and thus, these are included in the scope of this article.

Emergency events caused by natural origin

Natural disasters occur as a result of ‘negative’ nature forces, which can threaten life, health, and property, and the most common emergency events are of natural origin. Natural disasters are, in particular, floods, hailstorm, windstorms, landslides, heavy snowfalls, avalanches, ice storms, and earthquakes (Poledňák & Orinčák, 2010). The most frequently occurring emergencies in the Slovak Republic currently are natural disasters of landslides and floods. Landslides represent a major problem for building and planning infrastructure (Land Use Plans, 2015). Increasing urbanization of territories directly increases building of infrastructure in areas potentially affected by slope deformation. The consequence of global climate change and extreme precipitation significantly increases the risk of landslides. Recently, the usually stable conditions of the Slovak Republic substantially deteriorated during the period 2010–2013. Over this period, more than 550 slope deformations were registered. At present, according to “The program of prevention and management of landslide risks” (2015), the risk of landslide affects:

- 98.8 km of highway and 1st class roads (international importance);
- 571 km of 2nd and 3rd class roads (regional importance);
- 62 km of railways;
- 101 km of pipelines;
- 291 km of water conduit; and
- 30 000 of civil engineering buildings.

Table 2: Overview of flooded areas in years 2012 to 2014 and for six months of 2015

Region	Flooded areas (ha)				Σ (ha)
	2012	2013	2014	6/2015	
Bratislava region	4.00	983.46	16.00	0.00	1003.46
Trnava region	24.50	5558.26	4.65	0.00	5587.41
Trenčín region	0.10	398.61	241.00	405.00	1044.71
Nitra region	0.00	6163.57	232.00	190.39	6585.96
Žilina region	0.70	125.50	1605.87	56.00	1788.07
Banská Bystrica region	225.70	1965.49	59.40	26.49	2277.08
Prešov region	72.20	844.73	1601.76	679.28	3197.97
Košice region	0.00	743.40	765.44	0.00	1508.84
Σ (ha)	327.20	16783.02	4526.12	1357.15	22993.5

Source: Ministry of Interior of Slovak Republic (2015)

Based on available information, we assumed that floods have been the most commonly occurring emergency event in Slovakia. Under special regulations, namely Act no. 7 on flood protection (Act of the National Council of the Slovak Republic, 2010), flood is defined as a temporary covering, by water, of territory that is not normally covered by water. An overview of flooded areas in regions of the Slovak Republic for the years 2012 to 2014 and six months to June, 2015 is shown in Table 2.

Table 2 shows that in the Slovak Republic, from January 2012 to June 2015, the total area flooded was nearly 23 000 ha. The largest part of this flooded area was located in Nitra (6586 ha). Notably, while the number of emergency events in Prešov region was three times that of Žilina (Table 1), there was a lesser degree of difference between these in the total area flooded (Table 2). This suggests that rather than limiting the scope of the risk assessment to the probability of emergency events, it is necessary to include evaluation of such negative effects. For the abovementioned territories, preventive measures aimed at flood minimization are necessary. Flood risk management is one of these instruments. Through this instrument, there are plans for individual catchment areas of rivers in the Slovak Republic. These plans are strategic documents and include measures for flood protection throughout the flood risk management cycle. Flood plans are reviewed annually and updated as necessary. In the context of emergency events, particularly natural disasters, there is ambiguity as to whether fires are considered natural disasters. For the purposes of this article, we assume that fires are natural disasters if they occur as a result of negative natural impacts. The following table reflects the number of fires in different regions of the Slovak Republic from 2009 to 2013 (Table 3).

Table 3: Number of fires in the Slovak Republic						
Region	Number of fires in regions of the Slovak Republic					Σ
	2009	2010	2011	2012	2013	
Bratislava region	1 358	1 288	1 364	1 635	1 100	6 745
Trnava region	1 099	941	1 335	1 556	1 113	6 044
Trenčín region	1 106	883	1 134	1 172	869	5 164
Nitra region	1 247	900	1 272	1 473	916	5 808
Žilina region	1 463	1 377	1 793	1 395	1 206	7 234
Banská Bystrica region	1 552	1 197	1 688	2 087	1 084	7 608
Prešov region	1 830	1 711	2 308	2 168	1 632	9 649
Košice region	2 336	1 554	2 783	2 927	1 978	11 578
Σ	11 991	9 851	13 677	14 413	9 898	59 830

Source: Statistical Office of the Slovak Republic (2014)

Based on the above, it is concluded, that the largest number of fires during the period 2009 –2013 occurred in Košice and the smallest number in Trenčin (Table 3). In addition to the landslides, floods, and fires, previously mentioned, there were other emergency events, namely avalanches, earthquakes, droughts, storms, and other similar climatic episodes. Because of the limited scope of this paper, we were not able to assess all.

Emergency events caused by human activity

The most common emergency events caused by human activities were road accidents, namely road accidents with leakage of dangerous substances, and major industrial accidents. According to Decision No. 1313/2013/EU of European Parliament and of the Council (2015), accidents are caused by traffic accidents in the transport of dangerous substances. This is a very specific area, with specific regulations adopted for every kind of transport. Because of the limited scope of this paper, we do not assess these. The major industrial accident was reported as fire or explosion involving one or more dangerous substances. Principles of prevention, preparedness, and response for these types of accidents are subject of the Seveso Directives, named after the Seveso disaster (Zánická, Ristvej, & Šimák, 2010). In the Slovak Republic, these directives are developed into laws. Current law is Act no. 128 about the prevention of major industrial accidents (Act of the National Council of the Slovak Republic, 2015). Based on the above legal norms, controlling enterprises with hazardous substances

are categorized into groups A and B. The categorization is carried out according to the amount of hazardous substances in these enterprises. Table 4 contains the numbers of Seveso enterprises in different regions of the Slovak Republic in relation to their categories, which reflect the potential hazards associated with the activity and the existence of such enterprises (Zánická et al., 2010).

Table 4: Number of Seveso enterprises in the Slovak Republic

Region	Number of Seveso enterprises	
	Category A	Category B
Bratislava region	8	5
Trnava region	5	5
Trenčín region	5	4
Nitra region	5	3
Žilina region	3	4
Banská Bystrica region	5	8
Prešov region	2	2
Košice region	7	11

Source: Enviportal (2016)

Data shown in Table 4 indicate the largest number of category A enterprises were located in Bratislava and the largest number of category B in Košice. The number of Seveso enterprises handling hazardous materials was high, given the relatively small area of the Slovak Republic with the number of enterprises in category B higher than those of category A. The category B enterprises carry large amounts of hazardous substances and their location is often near rivers, as shown in the diagram (Figure 2).

Figure 2: Location of Seveso enterprises in the Slovak Republic

Source: Enviportal (2016)

Disruption of critical infrastructure

Disruption of critical infrastructure from the point of view of damage to its elements may result in reduction or complete failure of an infrastructure, and eventually more services from entities in the system managed by government. Failure and unavailability of services can disrupt the performance of tasks by government as well as other organizations and entities. Because of the extent of the issue, the scope of this article does not include protection of critical infrastructure.

Measures implemented because of security increase in Slovak regions

Legal standards that specify activities of state administration also deal with regional security issues. Crisis events threatening the security of regions are, according to the Decision No. 1313/2013/EU about Civil Protection (European Parliament and of the Council, 2015), divided into emergency events caused by nature, human activity, and disruption of critical infrastructure. Appropriate measures can increase the level of security. Spatial planning of territorial development is one area suitable for adoption of such measures. Spatial planning documentation, as an appropriate instrument, can include spatial projection of all activities in territorial units (Betáková, Havierníková, & Dvorský, 2014a). Hence, why such instruments are characterized by the necessity to apply preventive measures. According to Act. no. 50 on territorial planning and building regulations (Act of the National Council of the Slovak Republic, 1976), spatial planning documentation involves the conception of spatial development of the Slovak Republic, the regional territorial plan, the territorial plan of the municipality, and the zoning plan. The Land Use Plan deals with the spatial arrangement and functional use of land (Land Use Plans, 2015) with emphasis on environmental care, achievement of an ecological balance, and sustainable development. Attention is also given to effective natural resource use, social values, and cultural heritage (Betáková, Lorko, & Dvorský, 2014b). The main aim of the Land Use Plan is to set limits of land use, focus on functional and spatial territorial arrangement, and reconstruct interventions (Land Use Plans, 2015). The Land Use Plan includes the specification of protected areas or subjects, changes made, and spatial and technical results of their implications (Land Use Plans, 2015).

Conclusion

The security of the Slovak Republic can be disrupted by several threats. We divide these into internal and external matters. This article focuses primarily on internal threats and the emergency events caused by nature, human activities, and the disruption of critical infrastructure. There is an increasing trend of emergency events in the Slovak Republic that is noteworthy. In order to reverse this trend, it is necessary to take appropriate preventive measures. Not surprisingly, the occurrence of emergency events is disproportionate among the regions. This is because of several factors, including the diversity of natural conditions and the unequal distribution of enterprises handling hazardous substances. Critical infrastructure and the disruption of such were mentioned only partially because of the limited scope of this paper. However, this factor remains an area for future focus.

Acknowledgment

This paper was undertaken as part of the research project IGP201508.

References

- Act of the National Council of the Slovak Republic (1976). No. 50/1976 on Territorial Planning and Building Regulations.
- Act of the National Council of the Slovak Republic (1994). No. 42/1994 on Civil Protection of Population.
- Act of the National Council of the Slovak Republic (2010). No. 7/2010 on the Flood Protection.
- Act of the National Council of the Slovak Republic (2015). No. 128/2015 on the Prevention of Major Industrial Accidents.
- Adamec, V., Řehák, D., & Černá, L. (2012). Basics of safety organization and management in Czech Republic. Ostrava: SPBI. ISBN 978-80-7385-123-1.
- Betáková, J., Havierníková K., & Dvorský, J. (2014a). The issues of clusters potential assessing in the regions of Slovak Republic. 2nd International Conference on Management Innovation and Business Innovation, Bangkok, 2014. 122-127 s. ISBN 978-981-09-1685-5.
- Betáková, J., Lorko, M., & Dvorský J. (2014b). The impact of the potential risks of the implementation of instruments for environmental area management on the development of urban settlement. Environmental Impact II, Ancona, Italy, 2014. 91-101 s. ISBN 978-184564762-9, ISSN 1743-3541.
- Enviroportal (2016). Retrieved January 20, 2016 from <http://charon.sazp.sk/SevesoPublic/>

- European Parliament and of the Council (2015). Decision No. 1313/2013/EU about Civil Protection. Retrieved December 25, 2015 from <http://eur-lex.europa.eu/legal-content/SK/TXT/?uri=CELEX%3A32013D1313>
- Land Use Plans (2015). Retrieved January 8, 2016 from: <http://www.uzemneplany.sk/priprava-a-realizacia-upn>
- Maléřová, L. (2014). Risk analysis of territorial units. Dissertation thesis. Ostrava: VŠB – Technical university of Ostrava, Faculty of Safety Engineering. p. 127.
- Ministry of Interior of Slovak Republic (2015). Risk assessment in Slovak Republic. Retrieved from: http://www.minv.sk/?Bezpecnostne_rizika
- Poledňák, P., & Orinčák, M. (2010). Natural crisis situations solution. University of Žilina, Žilina. ISBN 978-80-554-0339-7, p.232.
- Statistical Office of the Slovak Republic (2014). [online]. 2016. [cit. 2016-01-08]. Available at: <http://www7.statistics.sk/wps/portal/ext/products/publikacie/>
- The program of prevention and management of landslide risks 2014-2020 (2015). Retrieved May 1, 2016 from: https://lt.justice.gov.sk/Attachment/vlastnymat_doc.pdf?instEID=1&attEID=61459&docEID=338280&matEID=6805&langEID=1&tStamp=20131206140557500
- Zánická, K., Ristvej, J., & Šimák, L. (2010). Industrial processes risk assessment, Bratislava: Iura Edition. ISBN 978-80-8078-344-0.