SAN: A Comprehensive Statistical Analysis of Traffic Accidents in Slovakia

Adrian Filcík, Adam Hrabovský, Zuzana Világiová, Matej Vojtek

December 2023

1 Introduction

This study focuses on comparing various statistical datasets from the Statistical Office of the Slovak Republic to gain a clearer understanding of road safety in the country. By analyzing different sets of data, we aim to identify trends and patterns, shedding light on how these statistics vary across regions. This comparative approach allows us to uncover insights that might not be evident when looking at the data in isolation.

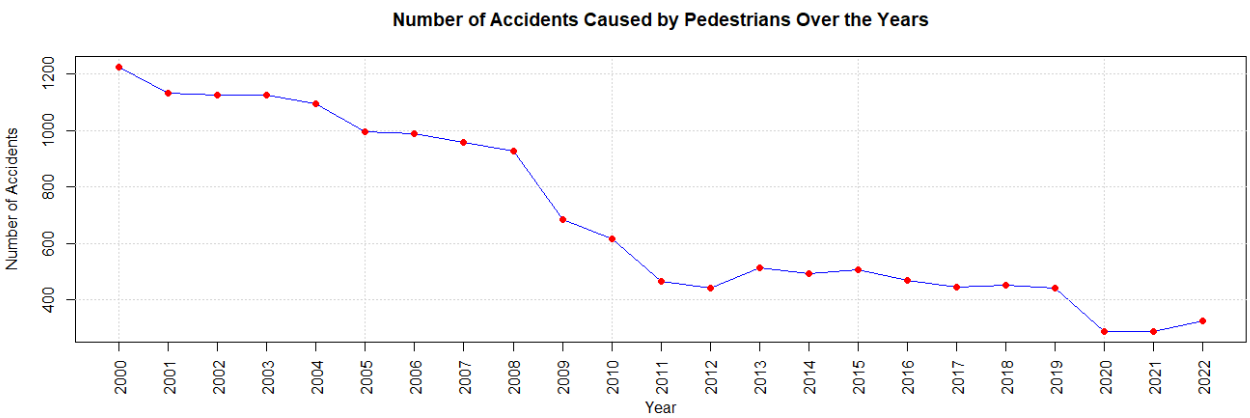

Figure 1: Example of Dataset Number of Accidents Caused by Pedestrians Over the Years

2 Data

For the analysis of accident rates, we will use publicly available data from the Statistical Office of the Slovak Republic: DataCube

3 Data analysis

3.1 Impact of a Major Legislative Change on Traffic Injuries: A Comparative Analysis Before and After 2009

The year 2009 marked a significant turning point in traffic regulations, introducing a major legislative change[1] that aimed to reshape and enhance safety measures on the roads, as well a reclassification of what constitutes a traffic incident. This pivotal moment necessitates a comprehensive examination of its effects on the frequency of traffic incidents. In this section, we delve into the dynamics of traffic-related incidents, comparing the patterns and trends before and after the implementation of the 2009 law.

Motivation for Using Mann-Whitney test:
Given the nature of our data and the observed violation of the assumption of equal variances tested by Leven's

[1] Vyhláška č. 9/2009 Z. z. - Vyhláška Ministerstva vnútra Slovenskej republiky, ktorou sa vykonáva zákon o cestnej premávke a o zmene a doplnení niektorých zákonov

test and normality tested by Shapiro-Wilk test, traditional parametric tests, such as the t-test, may not be appropriate. To robustly analyse the potential differences in traffic incidents, we turn to non-parametric methods, specifically the Mann-Whitney U test. This statistical approach allows us to assess whether there is a significant shift in the distribution of incidents between the two periods, offering valuable insights into the impact of the legislative change. Through the application of the Mann-Whitney U test, we aim to discern any substantial variations in traffic incidents patterns while accounting for the unique characteristics of our dataset.

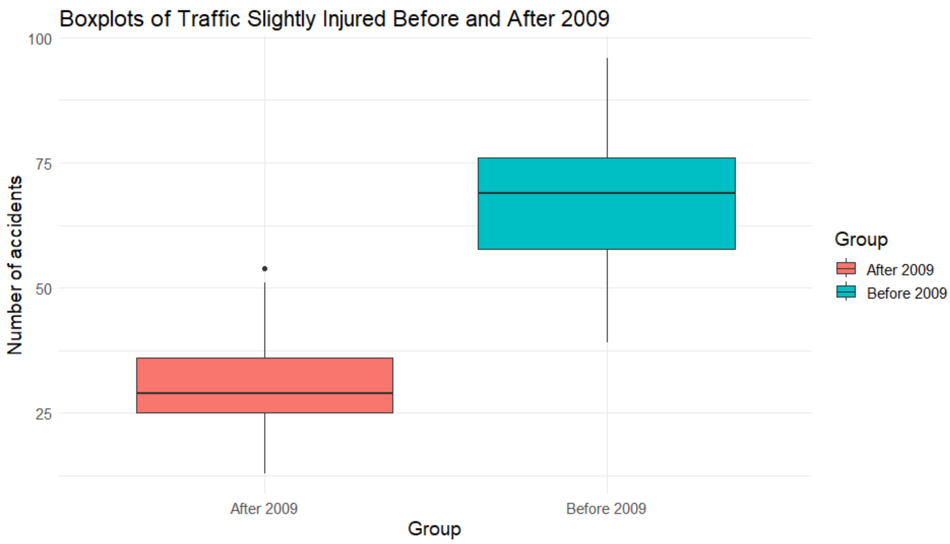

Figure 2: Example of boxplots comparing the incidents of slightly injured traffic participants before and after the year 2009

The results obtained from the statistical analyses demonstrate highly significant differences in various datasets related to traffic incidents before and after the major legislative change in 2009. The table below presents p-values associated with Mann-Whitney U tests for each dataset, indicating the level of significance in the observed differences:

Dataset	**p-value**
Traffic accidents with severely injured	$< 2 \times 10^{-16}$
Traffic accidents with slightly injured	$< 2 \times 10^{-16}$
Severely injured persons	$< 2 \times 10^{-16}$
Slightly Injured persons	$< 2 \times 10^{-16}$
Road accidents with material losses only	$< 2 \times 10^{-16}$
Road accidents with killed and injured	$< 2 \times 10^{-16}$
Material losses (Thous. EUR)	$< 2 \times 10^{-16}$
Killed persons	$< 2 \times 10^{-16}$
Caused pedestrian	$< 2 \times 10^{-16}$
Caused drivers of non-motor vehicles	$< 2 \times 10^{-16}$
Caused drivers of motor vehicles	$< 2 \times 10^{-16}$

Table 1: Mann-Whitney U test results for traffic incident datasets before and after 2009.

All p-values observed in Table 1 are considerably smaller than the conventional significance level of 0.05, providing strong evidence to reject the null hypothesis that there is no difference between the groups. These findings support the conclusion that the legislative change in 2009 had a profound impact on various aspects of traffic incidents, as indicated by significant shifts in different datasets. The consistently low p-values across all categories underscore the robustness of these observed differences.

3.2 Regional Analysis of Traffic Incidents

In this section, we showcase the outcomes of our investigation aimed at examining regional disparities in traffic incidents, encompassing injuries, material losses, and fatalities. Instead of employing traditional ANOVA tests, we opted for a pairwise nonparametric ANOVA approach, specifically utilizing the Kruskal-Wallis test. Subsequent post-hoc tests were then applied to pinpoint noteworthy distinctions among various regions. This alternative methodology allows for a robust assessment of regional variations while accommodating the non-parametric nature of the data.

The following table 2 presents the results of the Kruskal-Wallis test for various categories of traffic incidents across different regions.

Dataset	**p-value**
Traffic accidents with severely injured	2.29×10^{-15}
Traffic accidents with slightly injured	3.77×10^{-08}
Severely injured persons	5.08×10^{-15}
Slightly Injured persons	7.70×10^{-08}
Road accidents with material losses only	1.67×10^{-11}
Road accidents with killed and injured	4.16×10^{-05}
Material losses (Thous. EUR)	1.38×10^{-08}
Killed persons	2.07×10^{-05}
Caused by pedestrian	7.22×10^{-11}
Caused by drivers of non-motor vehicles	2.06×10^{-10}
Caused by drivers of motor vehicles	1.04×10^{-10}

Table 2: Results of Kruskal-Wallis Test

After the application of the Kruskal-Wallis test to analyze the dataset, we proceeded to visually explore the data distribution. Following this exploration, paired post hoc tests were conducted to delve deeper into the specific pairwise comparisons, providing a more detailed understanding of the relationships between the variables under investigation.

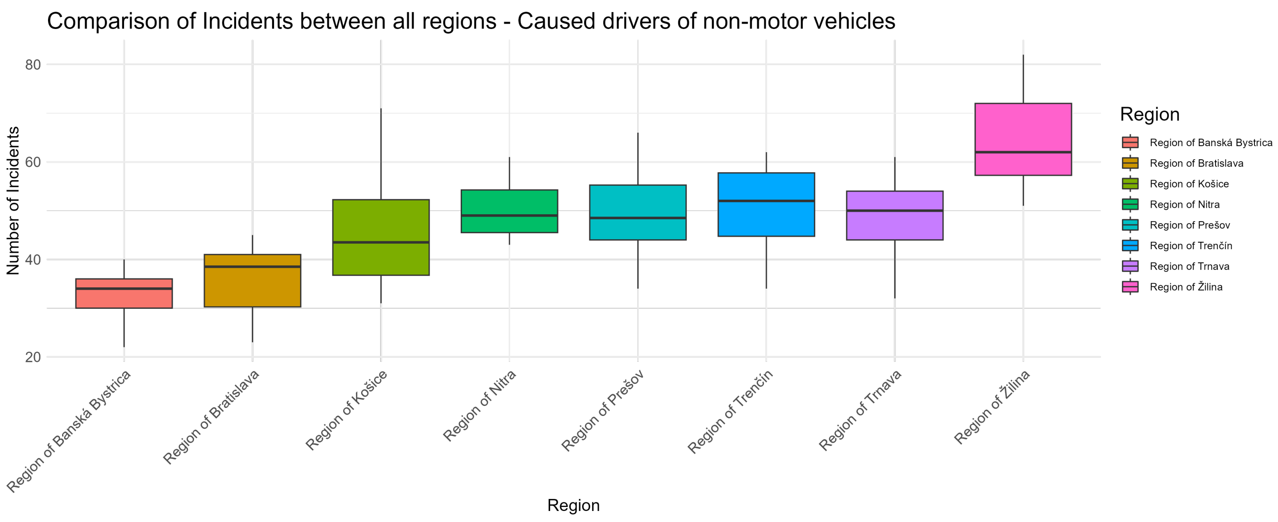

Figure 3: Example of boxplots comparing the incidents caused by drivers of non-motor vehicles

Region of	Banská Bystrica	Bratislava	Košice	Nitra	Prešov	Trenčín	Trnava
Bratislava	1.000	-	-	-	-	-	-
Košice	0.038	1.000	-	-	-	-	-
Nitra	2×10^{-4}	4×10^{-4}	1.000	-	-	-	-
Prešov	0.001	0.016	1.000	1.000	-	-	-
Trenčín	0.001	0.011	1.000	1.000	1.000	-	-
Trnava	0.002	0.012	1.000	1.000	1.000	1.000	-
Žilina	2×10^{-4}	2×10^{-4}	0.046	0.007	0.022	0.067	0.014

Table 3: Pairwise comparisons using Dunn's test for dataset Caused drivers of non-motor vehicles

P value adjustment method: Bonferroni

Figure 3 presents a visual representation of the data, using boxplots to compare incidents caused by drivers of non-motor vehicles. Additionally, a Dunn's test was conducted, and the results are provided in Table 2 for a detailed comparison.

The Kruskal-Wallis test emphasise the presence of statistically significant differences in both the occurrence and severity of accidents across diverse categories of traffic incidents, as observed in various regions. The comprehensive examination of specific pairwise comparisons in the appendix A, through post hoc tests, provides nuanced insights into the intricate relationships between variables identified by the Kruskal-Wallis test.

4 Accident frequency and demographic data

We investigated possible linear relationships between the following demographic factors and accident frequency:

- Population
- Population density
- Household income
- Unemployment
- Risk of poverty

To investigate the relationship between these factors and the various accident categories, we fit a linear model for each region for each category with the demographic factors as features. First, we took a look at the F-tests of the resulting models. Tables 4-14 show the resulting p-values of the F-statistics. In total, only twelve models showed a significance level below 0.05 (in bold), and those models were scattered across different categories.

Therefore, we concluded that this data will not yield any useful insights into the causes of various traffic accidents. Even if a significant relationship was found for a certain factor within the significant models, the occurrence is too small to infer any relevant conclusions.

Region	p-value
Banská Bystrica	0.30509
Bratislava	0.08459
Košice	0.08954
Nitra	0.12436
Prešov	0.23418
Trenčín	0.11352
Trnava	0.37787
Žilina	0.44009

Table 4: F-test results for traffic accidents with slightly injured

Region	p-value
Banská Bystrica	0.39200
Bratislava	0.05583
Košice	0.63462
Nitra	0.46176
Prešov	0.59955
Trenčín	0.37567
Trnava	0.09160
Žilina	0.17381

Table 5: F-test results for traffic accidents with severely injured

Region	p-value
Banská Bystrica	0.38934
Bratislava	0.12336
Košice	**0.04315**
Nitra	0.15243
Prešov	0.68188
Trenčín	0.11633
Trnava	0.21089
Žilina	0.63417

Table 6: F-test results for slightly injured persons

Region	p-value
Banská Bystrica	0.33165
Bratislava	0.06811
Košice	0.73807
Nitra	0.61529
Prešov	0.31066
Trenčín	0.39304
Trnava	0.05997
Žilina	0.26431

Table 7: F-test results for severely injured persons

Region	p-value
Banská Bystrica	0.32481
Bratislava	**0.00243**
Košice	0.23457
Nitra	**0.02972**
Prešov	0.06396
Trenčín	**0.00587**
Trnava	0.20373
Žilina	**0.02344**

Table 8: F-test results for road accidents with material losses only

Region	p-value
Banská Bystrica	**0.03688**
Bratislava	**0.04105**
Košice	0.32772
Nitra	0.85618
Prešov	0.27394
Trenčín	0.49726
Trnava	0.06938
Žilina	0.05720

Table 9: F-test results for road accidents with killed and injured

Region	p-value
Banská Bystrica	0.13781
Bratislava	0.30373
Košice	0.61201
Nitra	0.15797
Prešov	0.09748
Trenčín	0.57697
Trnava	0.12375
Žilina	0.16978

Table 10: F-test results for material losses (Thous. EUR)

Region	p-value
Banská Bystrica	0.05559
Bratislava	0.09463
Košice	0.27849
Nitra	0.92001
Prešov	0.25551
Trenčín	0.49039
Trnava	**0.02159**
Žilina	**0.02706**

Table 11: F-test results for killed persons

Region	p-value
Banská Bystrica	0.08720
Bratislava	0.08283
Košice	0.47746
Nitra	0.25721
Prešov	0.75743
Trenčín	0.70044
Trnava	0.38954
Žilina	0.10436

Table 12: F-test results for accidents caused by pedestrians

Region	p-value
Banská Bystrica	0.96896
Bratislava	0.30662
Košice	0.20860
Nitra	0.28193
Prešov	0.16449
Trenčín	0.08492
Trnava	0.65939
Žilina	0.10465

Table 13: F-test results for accidents caused by drivers of non-motor vehicles

Region	p-value
Banská Bystrica	0.43747
Bratislava	**0.00591**
Košice	0.30267
Nitra	**0.02558**
Prešov	0.08847
Trenčín	0.06618
Trnava	0.30335
Žilina	**0.02069**

Table 14: F-test results for accidents caused by drivers of motor vehicles

5 The influence of the type of railway crossing on the accident rate

One of the more interesting statistics we obtained was the number of secured and unsecured railway crossings (utilizing barriers and warning lights) in various regions of Slovakia. In this section, our focus was on assessing their potential impact on accident rates. To explore this, we utilized a specific dataset related to material damage (in thousands of Euros) caused by traffic accidents. This dataset was chosen due to its comprehensive coverage of accident information in Slovakia. Unfortunately, we did not have access to a dataset specifically related to accidents at railway crossings or those resulting from collisions with railway traffic.

Within this segment, our emphasis was on conducting a correlation analysis between the numbers of secured and unsecured railway crossings and the amount of material damage caused by traffic accidents in individual regions of Slovakia. The next step involved the creation of a multiple linear regression model, aiming to provide a more profound understanding of the potential influence of the type of railroad crossings on accident rates.

A minor limitation in this section may be the fact that the statistical office did not publish data on the number of raiway crossings in the year 2006. Consequently, we excluded this year from our analysis in this chapter, which might have a slight impact on the precision of our findings.

5.1 Correlation Analysis

In the initial segment, we assessed the correlation between the extent of material damage resulting from traffic accidents and the classification of railway crossings. To conduct this evaluation, the Pearson correlation coefficient was computed for each region under investigation. Tables 15 and 16 present the corresponding correlation coefficient values, accompanied by information regarding their achieved significance.

Table 15 illustrates that the correlation coefficient values between the quantity of unsecured railroad crossings and the extent of material damage reached at least 0.67 in all regions. Simultaneously, the p-values derived from the significance test of the correlation coefficient indicate its high level of significance.

Region of	**Correlation coefficient**	**p-value**
Bratislava	0.78	1.43×10^{-05}
Trenčín	0.72	1.30×10^{-04}
Trnava	0.67	6.45×10^{-04}
Nitra	0.79	8.23×10^{-06}
Žilina	0.72	1.41×10^{-04}
Banská Bystrica	0.83	1.61×10^{-06}
Prešov	0.71	2.11×10^{-04}
Košice	0.81	3.46×10^{-06}

Table 15: Correlation coefficient and its p-value of the number of unsecured railway crossings and the amount of material damage caused by traffic accidents in individual regions in Slovakia

Table 16 presents the outcomes of the correlation analysis concerning the number of secured railway crossings and the extent of material damage. As presented, in six out of eight regions, the correlation coefficient reaches a negative value, and in five instances, its value is significant.

Region of	**Correlation coefficient**	**p-value**
Bratislava	-0.26	0.22
Trenčín	0.69	3.79×10^{-04}
Trnava	0.55	7.50×10^{-03}
Nitra	-0.62	1.90×10^{-03}
Žilina	-0.73	1.04×10^{-04}
Banská Bystrica	-0.50	0.01
Prešov	-0.72	1.28×10^{-04}
Košice	-0.79	9.31×10^{-06}

Table 16: Correlation coefficient and its p-value of the number of secured railway crossings and the amount of material damage caused by traffic accidents in individual regions in Slovakia

5.2 Multiple linear regression

The second phase involved the construction of a multiple linear regression model. Within this model, we investigated the impact of the quantity of secured and unsecured railroad crossings, serving as predictors, on the amount of material damage resulting from traffic accidents, acting as the dependent variable. Like the last time, eight distinct models were established, each corresponding to a specific region.

Before using the linear regression model, it was first necessary to verify that the assumptions of the model such as independence, homoscedasticity and normality of the residuals are fulfilled. These assumptions were examined through Q-Q plots and histograms of residuals. Upon visual inspection, they appeared to be relatively well met. Another critical condition, the linear dependence between predictors and the response, was assessed via residuals vs. fitted plot. While this condition was not evidently met, the individual points on the graphs were reasonably evenly distributed along zero and could be fitted with a straight line. Consequently, it was decided to proceed with the linear model. The corresponding results are detailed in the following table:

Region of	R-squared	p-value of secured railway crossings predictor	p-value of unsecured railway crossings predictor	p-value compared to constant model
Bratislava	0.69	7.02×10^{-06}	0.05	1.58×10^{-05}
Trenčín	0.56	0.07	0.24	3.98×10^{-04}
Trnava	0.49	0.01	0.23	1.00×10^{-03}
Nitra	0.78	9.41×10^{-07}	1.00×10^{-03}	4.01×10^{-07}
Žilina	0.53	0.94	0.45	6.00×10^{-04}
Banská Bystrica	0.70	3.38×10^{-05}	0.40	9.73×10^{-06}
Prešov	0.58	0.13	0.08	2.50×10^{-04}
Košice	0.67	0.15	0.63	2.54×10^{-05}

Table 17: R-squared and p-values from multiple linear regression models for individual areas

As evident from Table 17, the R-squared values attained a minimum of 0.49 in all instances. This suggests that each model was capable of explaining at least approximately half of the variance in the data. While the significance of the predictors for secured and unsecured crossings varied among individual models, the consistently small p-values, especially when compared to the constant model, indicate that in all cases, the model is statistically significant and effectively elucidates the variance in the amount of material damage caused by traffic accidents.

Based on these findings, it can be concluded that an increasing number of unsecured railway crossings correlates with an increase in the amount of material damage resulting from traffic accidents. Additionally, it is possible to observe that in certain regions, the amount of material damage caused by traffic accidents decreases with a higher number of secured railway crossings. It is encouraging to see that there is a positive trend in Slovakia where the number of unsecured railway crossings is decreasing over time. It is possible that this trend contributes to a reduction of the number of traffic accidents, thereby enhancing overall road safety.

6 Summary

In conclusion, this comprehensive study delved into various aspects of road safety in Slovakia, utilizing statistical datasets from the Statistical Office of the Slovak Republic. The research aimed to uncover patterns, trends, and factors influencing traffic incidents in the country. The analysis was structured around three main themes: the impact of a major legislative change in 2009, regional variations in traffic incidents, and the influence of railway crossings on accident rates.

The study's first focal point was the major legislative change in 2009, which was explored through Mann-Whitney U test. The results indicated highly significant differences in various datasets related to traffic incidents before and after the legislative change. The consistently low p-values across all categories underscored the robustness of the observed differences, providing strong evidence that the legislative change had a profound impact on various aspects of traffic incidents.

Furthermore, the study involved a regional analysis of traffic incidents using the Kruskall-Wallis test using post hoc Dunn's test. The results revealed statistically significant differences in both the occurrence and severity of accidents across diverse categories of traffic incidents in various regions. The comprehensive examination of specific pairwise comparisons provided nuanced insights into the intricate relationships between variables.

In the second part of the study, an attempt was made to investigate the relationship between demographic factors and accident frequency. However, the analysis revealed that the available demographic data did not yield useful insights into the causes of various traffic accidents.

The third aspect explored the influence of the type of railway crossing on accident rates. Correlation analyses and multiple linear regression models were employed to assess the relationship between the number of secured and unsecured railway crossings and the amount of material damage caused by traffic accidents. The findings suggested a positive correlation between the number of unsecured railway crossings and the extent of material damage, emphasising the importance of enhanced safety measures at these crossings.

In summary, this study provided a multifaceted exploration of road safety in Slovakia, shedding light on the impact of legislative changes, regional disparities, and the role of railway crossings. The findings contribute valuable insights that can inform future road safety policies and initiatives, emphasizing the importance of continuous monitoring and targeted interventions to improve road safety in the country.

7 Contribution statement

Name	Contribution
Zuzana Világiová	30%
Matej Vojtek	30%
Adam Hrabovský	30%
Adrian Filcík	10%

A Results of Post Hoc Pairwise comparisons Using Dunn's test

Region of	Banská Bystrica	Bratislava	Košice	Nitra	Prešov	Trenčín	Trnava
Bratislava	1.000	-	-	-	-	-	-
Košice	0.024	0.569	-	-	-	-	-
Nitra	0.913	1.000	1.000	-	-	-	-
Prešov	0.009	0.282	1.000	0.344	-	-	-
Trenčín	1.000	0.043	8e-04	0.085	9e-04	-	-
Trnava	1.000	1.000	0.012	1.000	0.001	0.068	-
Žilina	0.390	1.000	0.301	1.000	0.535	0.010	1.000

Table 18: Pairwise comparisons using Dunn's test for dataset Traffic accidents with severely injured

Region of	Banská Bystrica	Bratislava	Košice	Nitra	Prešov	Trenčín	Trnava
Bratislava	0.001	-	-	-	-	-	-
Košice	0.602	2e-04	-	-	-	-	-
Nitra	0.002	1.000	2e-04	-	-	-	-
Prešov	1.000	3e-04	1.000	0.344	-	-	-
Trenčín	2e-04	1.000	2e-04	0.001	2e-04	-	-
Trnava	0.004	1.000	7e-04	1.000	0.001	0.907	-
Žilina	1.000	2e-04	1.000	2e-04	1.000	2e-04	3e-04

Table 19: Pairwise comparisons using Dunn's test for dataset Traffic accidents with slightly injured

Region of	Banská Bystrica	Bratislava	Košice	Nitra	Prešov	Trenčín	Trnava
Bratislava	1.000	-	-	-	-	-	-
Košice	0.098	0.058	-	-	-	-	-
Nitra	1.000	1.000	1.000	-	-	-	-
Prešov	0.013	0.012	1.000	0.444	-	-	-
Trenčín	1.000	0.813	0.001	0.175	9e-04	-	-
Trnava	1.000	1.000	0.073	1.000	0.003	0.085	-
Žilina	0.301	1.000	1.000	1.000	0.967	0.005	0.912

Table 20: Pairwise comparisons using Dunn's test for dataset Traffic accidents with severely injured for Slightly Injured persons

Region of	Banská Bystrica	Bratislava	Košice	Nitra	Prešov	Trenčín	Trnava
Bratislava	0.001	-	-	-	-	-	-
Košice	1.000	2e-04	-	-	-	-	-
Nitra	0.003	1.000	3e-04	-	-	-	-
Prešov	1.000	3e-04	1.000	4e-04	-	-	-
Trenčín	2e-04	1.000	2e-04	7e-04	2e-04	-	-
Trnava	0.010	1.000	7e-04	1.000	0.002	0.443	-
Žilina	1.000	2e-04	1.000	3e-04	1.000	2e-04	1.000

Table 21: Pairwise comparisons using Dunn's test for dataset Severely injured persons

Region of	Banská Bystrica	Bratislava	Košice	Nitra	Prešov	Trenčín	Trnava
Bratislava	0.007	-	-	-	-	-	-
Košice	0.099	0.642	-	-	-	-	-
Nitra	1.000	0.472	1.000	-	-	-	-
Prešov	0.015	1.000	0.021	0.009	-	-	-
Trenčín	0.231	0.001	0.024	0.046	5e-04	-	-
Trnava	1.000	0.001	0.034	0.264	2e-04	1.000	-
Žilina	0.017	1.000	0.039	0.024	1.000	0.001	5e-04

Table 22: Pairwise comparisons using Dunn's test dataset for Road accidents with material losses only

Region of	Banská Bystrica	Bratislava	Košice	Nitra	Prešov	Trenčín	Trnava
Bratislava	1.000	-	-	-	-	-	-
Košice	1.000	0.066	-	-	-	-	-
Nitra	1.000	0.010	1.000	-	-	-	-
Prešov	1.000	0.035	1.000	1.000	-	-	-
Trenčín	1.000	1.000	0.806	0.104	0.671	-	-
Trnava	1.000	0.004	1.000	1.000	1.000	0.045	-
Žilina	1.000	0.002	1.000	1.000	1.000	0.016	1.000

Table 23: Pairwise comparisons using Dunn's test dataset for Road accidents with killed and injured

Region of	Banská Bystrica	Bratislava	Košice	Nitra	Prešov	Trenčín	Trnava
Bratislava	0.021	-	-	-	-	-	-
Košice	1.000	0.029	-	-	-	-	-
Nitra	1.000	0.021	1.000	-	-	-	-
Prešov	0.073	0.569	0.152	0.152	-	-	-
Trenčín	0.114	0.004	0.344	0.201	0.021	-	-
Trnava	1.000	0.073	0.444	1.000	1.000	0.034	-
Žilina	0.021	1.000	0.046	0.021	0.914	0.006	0.073

Table 24: Pairwise comparisons using Dunn's test dataset for Material losses (Thous. EUR)

Region of	Banská Bystrica	Bratislava	Košice	Nitra	Prešov	Trenčín	Trnava
Bratislava	0.466	-	-	-	-	-	-
Košice	1.000	0.049	-	-	-	-	-
Nitra	1.000	0.002	1.000	-	-	-	-
Prešov	1.000	0.024	1.000	1.000	-	-	-
Trenčín	1.000	1.000	1.000	0.056	1.000	-	-
Trnava	1.000	0.004	1.000	1.000	1.000	0.104	-
Žilina	1.000	0.002	1.000	1.000	1.000	0.024	1.000

Table 25: Pairwise comparisons using Dunn's test dataset for Killed persons

Region of	Banská Bystrica	Bratislava	Košice	Nitra	Prešov	Trenčín	Trnava
Bratislava	0.084	-	-	-	-	-	-
Košice	0.020	1.000	-	-	-	-	-
Nitra	1.000	0.009	6e-04	-	-	-	-
Prešov	0.009	1.000	1.000	0.001	-	-	-
Trenčín	1.000	0.005	6e-04	1.000	5e-04	-	-
Trnava	1.000	0.002	5e-04	1.000	5e-04	1.000	-
Žilina	1.000	1.000	0.078	0.262	0.049	0.122	0.050

Table 26: Pairwise comparisons using Dunn's test for dataset Caused pedestrian

Region of	Banská Bystrica	Bratislava	Košice	Nitra	Prešov	Trenčín	Trnava
Bratislava	1.000	-	-	-	-	-	-
Košice	0.038	1.000	-	-	-	-	-
Nitra	2e-04	4e-04	1.000	-	-	-	-
Prešov	0.001	0.016	1.000	1.000	-	-	-
Trenčín	0.001	0.011	1.000	1.000	1.000	-	-
Trnava	0.002	0.012	1.000	1.000	1.000	1.000	-
Žilina	2e-04	2e-04	0.046	0.007	0.022	0.067	0.014

Table 27: Pairwise comparisons using Dunn's test for dataset Caused drivers of non-motor vehicles

	Banská Bystrica	Bratislava	Košice	Nitra	Prešov	Trenčín	Trnava
Bratislava	0.015	-	-	-	-	-	-
Košice	0.163	0.813	-	-	-	-	-
Nitra	0.913	0.641	1.000	-	-	-	-
Prešov	0.020	1.000	0.024	0.020	-	-	-
Trenčín	0.073	0.002	0.021	0.033	0.002	-	-
Trnava	1.000	0.003	0.039	0.301	0.003	1.000	-
Žilina	0.021	1.000	0.054	0.039	1.000	0.003	0.004

Table 28: Pairwise comparisons using Dunn's test for dataset Caused drivers of motor vehicles