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## RESEARCH ON ENSURING ROAD TRAFFIC SAFETY ON ROAD SECTIONS CROSSING SIBIU COUNTY ACCORDING TO EUROPEAN UNION STANDARDS

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**Abstract:** *The automotive transport development and the rapid growth of the automobile fleet have led in an objective way to the concerns intensification and multi-level efforts to ensure road safety and security. This research aim is to analyze the road accidents produced on certain national road sectors, this being a very topical issue in our country. An analysis on the produced road accident, on 7 road sections that pass-through Sibiu County on the 2014-2016 period, was carried out. The most important road accidents cause was scientifically identified and argued based on a pertinent analysis and substantial support of the Romanian Police. It was found that the lack of adaptation to the road conditions, the irregularity overcoming, the priority lack, falling asleep, are the most important causes for which a serious argumentation and a real correlation with what happened in the rest of the European Union, was made. Various ways to mitigate the accidents main cause have been identified: the inadequate speed to road conditions with the most negative consequences. The final conclusion of this original research is argued by the authors and leads to an increased road education among the population as well as to the legislation improvement to adopt more stringent measures than existing ones.*

**Key words:** *Road traffic, accident, safety, accident cause, road education, legislation*

### 1. INTRODUCTION

The road traffic safety and its assurance supposed to carrying out the maximum safe transport activities [1], and the factors that influence this field form very dynamic links.

Ensuring traffic safety depends on the institutions with attributions in this field, on the human factor, on the technical factor, the road factor, as well as the legislation [2].

Road accident means any event involving at least one moving vehicle that has occurred or originated in a public road and has resulted in the death or injury of one or more persons or at least one vehicle has been damaged or has caused material damage [3].

It has been found that the automotive transport development, the rapid growth of the automobile fleet, have objectively determined the concerns intensification, multi-level efforts to ensure the road safety and security. These concerns were all the most necessary as the

increase in the number of road accidents is relatively direct proportional to the increase in the motoring index, to the performance improvement of the vehicles, first of all, and especially to the movement speed, a constituent that has priority in the accident road occurrence [4].

At European level, the legislative measures adopted in the early 1970s by most of European countries focused mainly on four elements that seemed to have the most important and immediate impact on the number and severity of traffic accidents: alcohol, speed, seat belt port and helmet harness for motorcyclists. The adopted measures were aimed to reduce the negative effects of the speed and alcohol, through clear legal instruments, setting the alcoholism limits of the driver and setting speed limits on various road sectors, and on the other hand reducing the serious consequences of accidents in the case of a seatbelt lake or a helmet for motorcyclists [5].

At the same time, the international community, particularly Western European countries, has intensified their research and has advanced and set up special road-traffic prevention programs, taking greater account of the ongoing development of the road phenomenon, the road accidents number and their adverse consequences.

Thus, it was insisted that the elements related to the driver behavior at the vehicle wheel, where programs to improve the road infrastructure have been developed, and among them, the establishment of motorway networks, representing the most spectacular aspect [6].

To a different extent, the car manufacturers have been constantly concerned with the introduction of increasingly secure and faster vehicles, with a special focus on both passive and in-flight security components active security [4].

The research was carried out to ensure the road traffic safety on the 7 national road sections that cross the Sibiu county as well as identifying the causes generating the road accidents [4]. The paper objective consists of the road accidents analysis produced on certain road sectors, as it is a topical and evolving theme.

## 2. ANALYSIS OF ROAD ACCIDENT PRODUCED ON THE NATIONAL ROAD THAT TRANSIT THE SIBIU COUNTY

The operational situation was recorded during the 2014, 2015, 2016 period, on the national road sections passing through Sibiu County.

As a result of this study, in Figure 1 on the national road section BV - PC Veştem (Figure 4) there were 57 road accidents during the three analyzed years, 27 were serious injuries, with 12 deaths people and 37 seriously injured.

The remaining 30 accidents were mild accidents, causing injuries to 68 people. As can

be seen in the graph, most accidents, occurred in 2016.

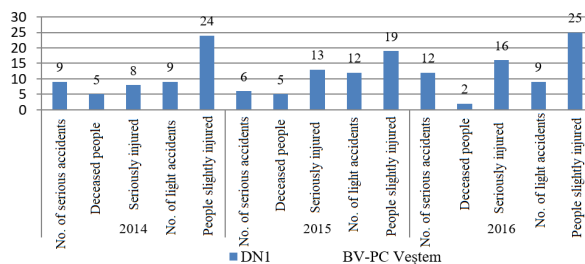


Fig. 1. Analysis of road accidents produced on the national road 1 BV - PC Veştem.

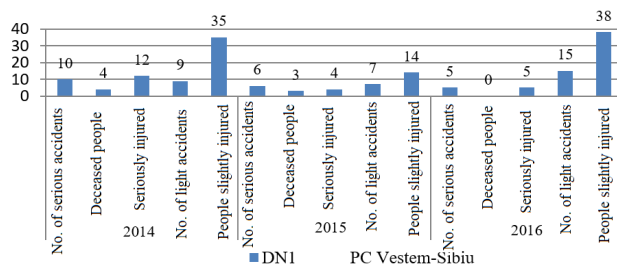


Fig. 2. Analysis of road accidents produced on the national road 1 Veştem - Sibiu.

On the national road segment Veştem - Sibiu - Figure 2, Figure 4, it was found 10 serious accidents in 2014, with 4 people’s death and 12 persons with serious injury.

In 2015, there was a decrease in both serious and light accidents and in 2016, serious accidents did not result in deceased persons, but the registration of slightly injured persons increased to 38.

The chart shows, in 2015 the least road accidents occurred.

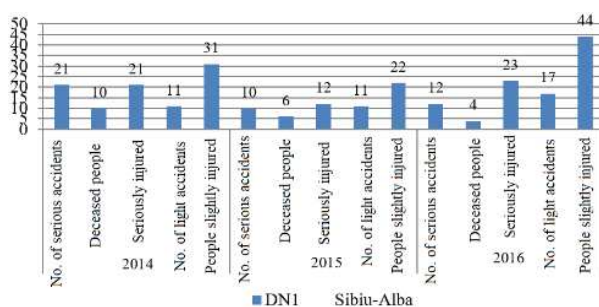


Fig. 3. Analysis of road accidents produced on the national road 1 Sibiu-Alba.

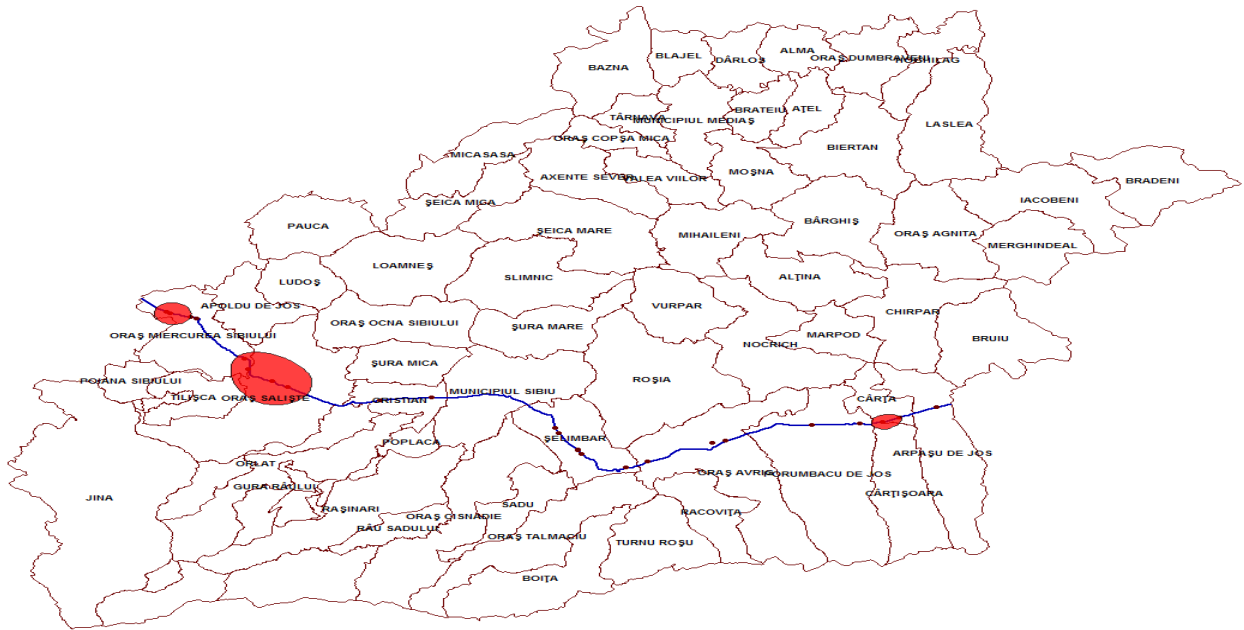


Fig. 4. Map of Sibiu County with serious accidents on the national road 1.

After the 3 years analysis, it can be noticed that on the Sibiu - Alba Iulia route - Figure 3, Figure 4, the number of serious accidents fell from 21, and 10 road accidents were recorded in 2015.

Also, in 2016 there is a gradual decrease in the number of deceased persons, which is 4, and the number of mild injuries has increased, with 44 people slightly injured.

From the road accidents analysis on the section of the national road 14 (Figure 8) Sibiu - Copșa Mică - Figure 5, in the 3 consecutive years, resulted 40 serious accidents with 14 deceased persons, respectively 49 seriously injured persons.

The rest of the accidents were recorded as 53 light mishaps, resulting 109 people with slight injury.

By this chart it can be seen that the most serious but also light accidents were recorded in 2016 and their consequences resulted in more injured than deceased or slightly injured persons.

Analyzing the occurred road accidents on the national road segment 14 (Figure 8) Copșa Mică - MS - Figure 6, it was found that in 2014, the number of serious road accidents was 11, with the death of two people, and in 2015 an accident increases resulting 4 people deaths.

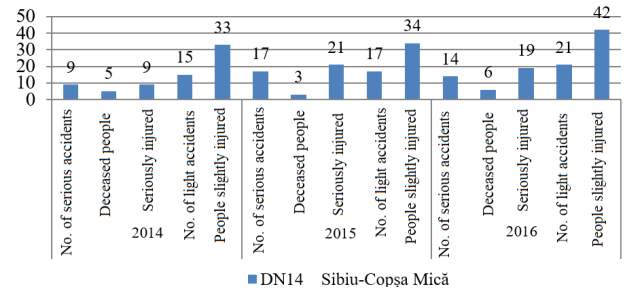


Fig. 5. Analysis of road accidents produced on the national road Sibiu - Copșa Mică.

In 2016, the number of serious accidents increased, with 20 people seriously injured but the dyed people number decrease. Considering the chart, it can be noted that the most serious but also light accidents were registered in 2016.

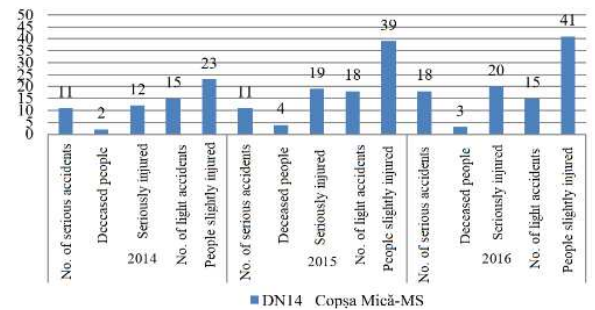


Fig. 6. Analysis of road accidents produced on the Copșa Mică - Mureș national road.

By analyzing the road accidents occurred on the national road section 14 (Figure 8) Mediaș -

MS - Figure 7, in the course of the three years analyzed, there have been recorded 3 serious accidents and as a result only the serious injury of the persons. It can be highlighted that in these years there were no serious accidents with death peoples.

Following the chart, it can be seen that in 2016 the most accidents occurred.

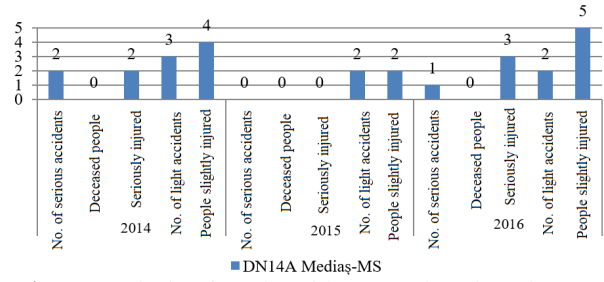


Fig. 7. Analysis of road accidents produced on the national road Mediaș - Mureș.

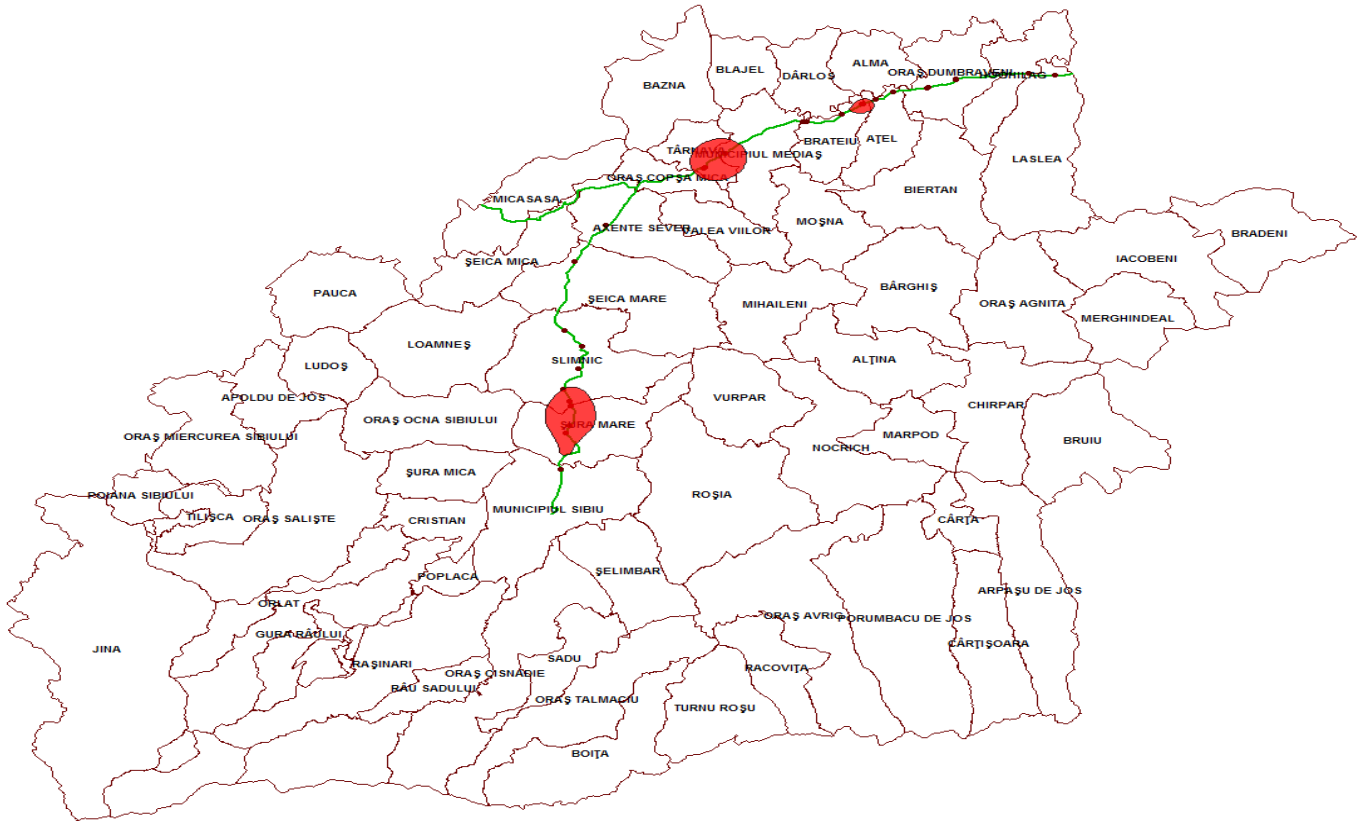


Fig. 8. Map of Sibiu County with serious accidents on the national road 14

Analyzing the Figure 9 graph, on the national segment 7 (Figure 10) VL - Veștem, it can be noticed that in 2014 were 9 serious accidents, which resulted 8 deceased persons and 12 seriously injured persons.

In the same year there was also a slight injury of 20 people. In 2015, there were as many serious injuries, but the number of deceased and seriously injured people dropped by almost 60% over the previous year.

At the same time, the number of light accidents increased, which resulted a slight injury of 24 people.

In the 2016 year, the most serious accidents occurred, but the number of light accidents decreased compared to the previous year.

As can be seen, most of the accidents, light and serious, occurred in 2016.

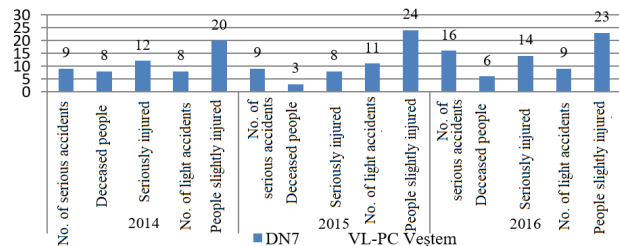


Fig. 9. Analysis of road accidents produced on the national road Vâlcea - PC Veștem.



Fig. 10. County Map of Sibiu with serious accidents on the national road 7.

### 3. THE IDENTIFIED CAUSES

The generating causes of the road accidents have been identified on the national road sectors analyzed as: speed not adapted to road conditions; overrun; non-giving the vehicle priority; sleeping at the wheel; non-observance

of the distance between vehicles; driving without attention.

For the national road section 1 Sibiu - Alba Iulia, the identified as the most dangerous in terms of road accidents, the following were registered as the main causes:

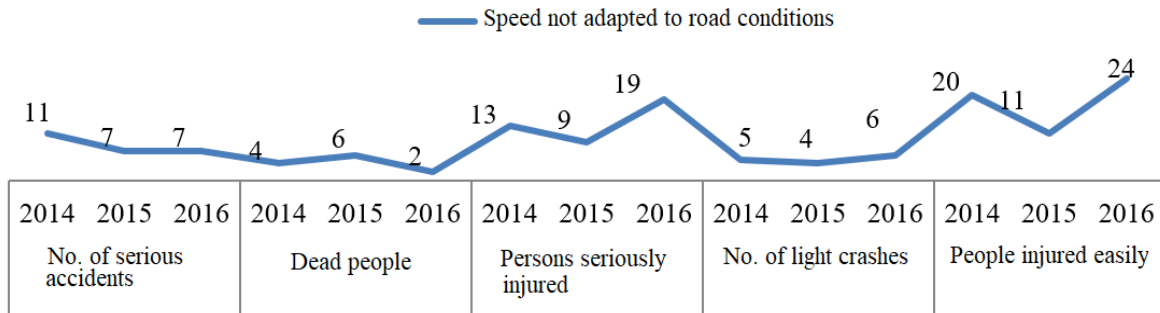


Fig. 11. The main cause of road accidents.

On the national road 1 section Sibiu-Alba Iulia, the speed not adapted to the road conditions was registered as a first cause – Figure 11.

Given the graph, it can be determined that the speed which is not adapted to the road conditions was a very dangerous cause on the analyzed road segment.

For this purpose, the related consequences of traffic accidents have been identified.

Another cause encountered on the national road 1 section Sibiu-Alba, was the illegal overrun - Figure 12.

During the analyzed period, it can be noticed that 25 of serious accidents resulted as 12 fatalities and 41 seriously injured persons.

It can also be seen that 1 serious accident occurred in 2014, which resulted with 2 serious injuries, and in the following years no serious accident was identified.

The remaining 16 accidents were mild, which resulted with a mild injury of 55 people.

The rest of the accidents were mild and in 2014 were 5 accidents, resulting 20 injured people, in 2015 reduced, and in 2016 the number of injured people slightly increased.

After the analysis, it was concluded that serious accidents with dangerous consequences occurred in 2014, and in the year 2016 the number of light accidents increased.

Not giving priority to the vehicles - Figure 13, was found to be a dangerous cause on the route under consideration.

It caused 3 serious injuries, resulting a death person, and 2 people with serious injury.

They were 2 accidents, with 6 people slightly injured. In conclusion, the failure to prioritize vehicles was a cause on this section, where both serious and mild accidents resulted.

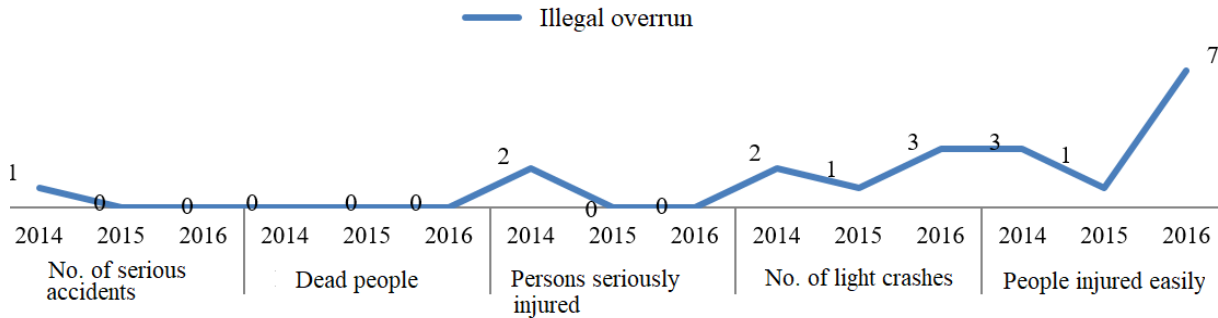


Fig. 12. The cause of road accidents.

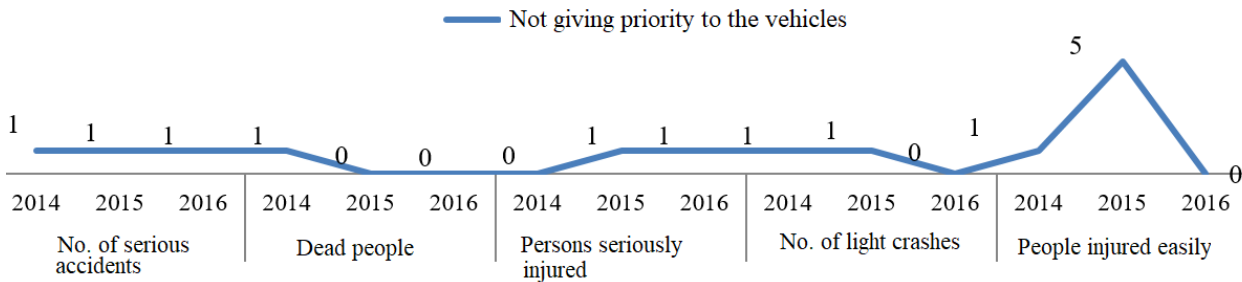


Fig. 13. The cause of road accidents

#### 4. DIMINISHING METHODS OF ROAD ACCIDENTS

Also, several methods have been identified to reduce the road accidents [4] due to the speed that is not adapted to the road conditions, namely: road education to change and improve the human factor behavior; radars implemented on the roadway side; road markings at legal speeds; noise-producing tapes for speed reducing; stricter legislation.

The road education, in terms of youth persons, the programs for psychological counseling and preventive driving are needed to change the attitudes of those who violate the legal norms.

These programs should be supported within Universities by specialized teachers in the field.

The legislative framework in this area is particularly important according to the continuous

and increased interest in road traffic on public roads.

These actual normative acts are taking into account the legal basis of modern road traffic on the country territory, being harmonized with the European requirements in the field.

#### 5. CONCLUSIONS

Today's society is dependent on punctual and safe transport, which is in constant and continuous development and mobility as a part of society.

Road transport was and is a very important branch and also a factor to improve and influence the human activity, being one of the main technical ways of intensifying and accelerating the human communication.

In this paper the most important aspects regarding the road accidents produced on the road sections passing through Sibiu County, were presented, from which the following considerations emerged: on the national roads, in 2014, the number of accidents has an upward trend (+20.2%, from 129 to 155).

Serious accidents increase by a significant percentage + 33.3% (from 57 to 76) and the number of victims with + 53.9% as:

- ✓ deceased persons + 142.9% (from 14 to 34), seriously injured + 33.9% (from 62 to 83) compared to 2015 where there was a downward trend in the following indicators: the total number of accidents decreased by 3% (-5),
- ✓ the serious accidents by 13% (-10), the number of deceased persons by 26% (-9), the number of injured 7% slightly (-12).

The number of seriously injured grew by 6% (+5).

Recently, in 2016 on the same roads, there was an upward trend in road accidents, as follows:

- the total number of accidents increased significantly from 137 to 166 (+ 21%),
- the number of serious accidents from 59 to 78 (+ 32%),
- the number of deceased persons dropped this year from 24 to 21 (-13%),
- the number of seriously injured persons had a high percentage of + 30% (from 77 to 100),
- the number of accidents mild from 78 to 88 (+ 13%),
- the number of people slightly injured from 154 to 218 (+ 42%).

It was proved by the made analysis that the safest road in terms of road accidents is the 14A Mediaş - Mureş National Road, with the fewest road accidents recorded in the three analyzed years,

being the most dangerous road from the same point of view.

The National Road 1 Sibiu - Alba Iulia registered 43 serious accidents, resulted 20 deceased persons and serious injury of 56 persons.

The road accidents play an important role in the road traffic safety and security through their track record on the ground.

These are either material, result with deaths or injured persons, either severe or light, and all belong to a complex ensemble that shows the road traffic on public roads.

So, concluding, the road accidents are a problem both globally and nationally, given the particular danger they face.

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## CERCETARI ASUPRA ASIGURARII SECURITATII TRAFICULUI RUTIER PE DRUMURILE CE TRAVERSEAZA JUDETUL SIBIU IN CONCORDANTA CU STANDARDELE UNIUNII EUROPENE

**Rezumat:** Dezvoltarea transportului auto și creșterea rapidă a flotei automobilelor au condus într-un mod obiectiv la intensificarea preocupărilor și la eforturile pe mai multe niveluri pentru a asigura

securitatea și siguranța rutieră. Scopul cercetării este de a analiza accidentele rutiere produse pe anumite sectoare rutiere naționale, aceasta fiind o problemă foarte actuală în țara noastră. A fost efectuată o analiză a accidentelor rutiere produs pe 7 secțiuni rutiere care trec prin județul Sibiu în perioada 2014-2016. Cea mai importantă cauză a accidentelor rutiere a fost identificată științific și argumentată pe baza unei analize pertinente, cu sprijinul substanțial al Poliției Române. S-a constatat că lipsa adaptării la condițiile rutiere, depășirea neregulamentară, lipsa acordării de prioritate, adormirea la volan sunt cele mai importante cauze pentru care s-a realizat o argumentare serioasă și o corelație cu ceea ce se întâmplă în restul Uniunii Europene. S-au identificat diferite modalități de diminuare a cauzei principale a accidentelor rutiere, și anume viteza neadaptată la condițiilor rutiere, având cele mai negative consecințe. Concluzia finală a acestei cercetări inițiale este susținută de autori și conduce la creșterea educației rutiere în rândul populației, precum și la îmbunătățirea legislației pentru a adopta măsuri mai stricte decât cele existente.

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