COMPARISON OF ANALYSIS OF ROAD TRAFFIC SAFETY IN THE CITY OF ZAGREB AND REPUBLIC OF CROATIA

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Abstract: The current approach to improving the level of safety in road traffic systems, which applies different approaches for improving the safety of road traffic, has been inspired by many theories of traffic management system. The national program of road safety in the Republic of Croatia is a national strategic document which indicates all quantitative targets and guidance toward achieving the planned level of safety in traffic. Recognizing and respecting the importance of developing strategic documents of road safety, comparing its stated objectives with the actual situation at the national and local level (for example the City of Zagreb), and by analysing developments and trends in the rate of basic indicators of road traffic safety, the paper will indicate its main advantages and limitations. The paper also carefully analyses the status of road safety in the city, and compares it to the state of road safety at national level. Conclusions about the guidelines for the improvement of road traffic safety in the City are derived from the analysis made.

Keywords: road safety, national program of road safety, City of Zagreb,

1. INTRODUCTION

The main objective of all road traffic system managers in the world is to ensure a satisfactory level of safety and flow of traffic entities, so as to achieve shifts toward the reduction of severe forms of road traffic accidents RTAs (dead and injured), improve the quality of life and achieve safe and sustainable mobility. Given that the factor of safety has taken precedence over other attributes of the traffic system (flow, ecology, etc.) the ability to monitor, implement and upgrade the existing safety measures and activities to increase the level of road traffic safety have become imperative.

The level of traffic safety is affected by three elements (in a qualitative sense) which form the road traffic system: humans, vehicles or roads and regulations (through control and sanctions) as well as the quality of their interaction. The desired results can only be achieved by implementing the planned, coordinated and long-term activities simultaneously directed to the improvement of road traffic system elements, and raising the quality of their interactions.

In the first place, this refers to decentralisation of work for the improvement of traffic safety, i.e. transfer of obligations, rights and liabilities from the national to the regional and local level. The fact is that foreign experiences should not be literally and non-critically copied,
but rather adopted and applied to local specifics based on the analysis of local conditions and the analyses or applicability to local conditions [1].

The current approach toward improving the road traffic systems is inspired by various theories of road traffic system management. By adopting them, a quick understanding of problems is achieved which eases decision-making for the officials at national, regional and local levels as well as setting quality objectives in line with the examples of good practices from other countries.

Recognizing and respecting the importance of developing strategic documents of road safety, comparing its stated objectives with the actual situation at the national and local level (for example the City of Zagreb), and by analysing developments and trends in the rate of basic indicators of road traffic safety, the paper will indicate its main advantages and limitations. It will also analyse in detail the state of road traffic safety in the City of Zagreb and compare the results with the state of road traffic safety at the national level.

2. NATIONAL ROAD TRAFFIC SAFETY PROGRAM OF THE REPUBLIC OF CROATIA

Plans and actions directed at reducing the negative trends of injuries in the road traffic system of the Republic of Croatia in the early 90s were primarily based on individual attempts and activities of individual state and local institutions, i.e. subjects competent for road traffic safety, which led to partial solutions and unsatisfactory short-term results.

A systematic and coordinated approach to suggesting a set of preventive, educational and repressive measures, based on scientific data and best practices available at the time, was implemented in Croatia in 1994 where the First National Road Safety Program was adopted. The Program recorded certain positive effects and results from the very beginning, and the reason for this is that the first interdisciplinary team of renowned scientists and professionals worked on it, divided in sectorial working groups by the relevant organizations and institutions.

The document was focused on improving the road traffic safety system and through the following programs it tried to sublime the basic traffic indicators of the road traffic system in Croatia while also systematically defining the most significant elements and long-term national ideas and objectives.

Through continuous adoption of the following programs with significant improvements compared to the preceding versions, the current V. National Road Traffic Safety Program of the Republic of Croatia [4] for the period 2011-2020 is based on provisions and guidelines contained in: the Moscow Declaration from 2009, the UN Declaration 62/244 from March 2010 and the 4. Action plan of the European Commission. The holder of the program is, as in all previous cases, the Ministry of Internal Affairs (MUP). According to the Program [4], at the end of a ten year period (in line with the common objectives accepted at EU level) a decrease of 50 percent in traffic accident fatalities should be achieved.

The current Program is characterized by a cooperation between local and regional communities with the competent state institutions in the area of road traffic safety.

Implementation of the stated objective is divided into five groups (Figure 1), where specific segments for the development of efficient measures for road traffic safety are listed.
Fig. 1. Areas of action listed in the Nationals Road Traffic Safety Program

Also, within the program there are five priorities such as:

- Improvement of the traffic culture of all participants in traffic,
- Protection of the most vulnerable groups of participants in traffic (pedestrians, cyclists, motorcyclists and children),
- Reduction of RTAs risks for young drivers,
- Improvement of existing regulations and their alignment with international standards,
- Improvement of methods of gathering and processing statistical data on RTAs, to make them compatible on an international level,
- Formation of the Road Traffic Safety Board within the Council for Prevention in cities, counties and municipalities

The most important quantitative objectives stated in the most current European and world national road traffic safety programs, which have in the meantime been implemented, are:

- Respect for speed limits of motor vehicles in optimal weather conditions for 90 percent of recorder cases,
- Rate of dispersion of all recorded speeds must not exceed the limit of 10 percent,
- Rate of safety belt use, including drivers, passengers and vehicles should be around 98 percent,
- Rate of safety helmet use (drivers and passengers of mopeds and motorcycles) of 98 percent,
- Reduction of persons to cause RTAs due to intoxication from the current 13.5 percent to 8 percent and also reduction of the share deaths in such cases from 30 percent to 15 percent,
- 30 percent reduction of the number of deaths during transport to a hospital or within 30 days of the RTA

It is important to note that the mentioned activities and research is exclusively conducted at the national level in accordance with MUP, while the stated objectives and priorities are not obligatory in any respect for the regional and city communities. This calls into question the mentioned document’s credibility and efficiency.
3. TENDENCIES AND TRENDS IN THE RATE OF BASIC ROAD TRAFFIC SAFETY INDICATORS IN THE REPUBLIC OF CROATIA AND THE CITY OF ZAGREB

3.1. Analysis of rate tendencies and basic road traffic safety indicators in Croatia

The safety of road traffic is a particularly significant feature of road traffic. Related to consequences on safety, the mid-term trends of certain safety indicators point to a continuous improvement of road traffic safety in Croatia, with a recorded reduction in all events.

According to available official data of MUP [3] [4], (Graph 1.) the tendencies in the number of traffic accidents and casualties in Croatia in the last 15 years, from 1999 to 2013, are shown. It is important to mention that during the research conducted for this paper semi-annual data for 2014 was not available, while the data in the table listed under casualties is divided in deaths and injuries (total amount of recorded severe and light injuries).

Looking at the total number of recorded road traffic accidents in Croatia, we can conclude that a ten year period of continuous reduction in the number of road traffic accidents has taken place (a decrease of 63.06 percent from 2003 to 2013), after the increase of 33.87 percent from 1999 to 2003.

This trend is noticeable in the number of deaths where a 47.5 percent reduction has been recorded from 2003 to 2013, which also applies to the number of injured persons.

Of the total number of RTAs for the monitored period, 570 persons died on average, while 21,136 sustained severe or light injuries.

The biggest percentage reduction for the given period was recorded in 2008 compared to 2009, 17.47 percent, for the most part thanks to the implementation of the new Law on Road Safety (NN 67/08).

Related to consequences on safety, recent trends in the mentioned safety indicators also point to the continuous improvement of road traffic in Croatia. By examining the absolute number of RTAs in Croatia in 2013, 34,021 RTAs have been recorded (-8.2 percent compared to 2012) in which 368 persons died (-1.88 percent compared to 2012), and 15,274 persons sustained severe or light injuries (-3.25 compared to 2012).

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Graph 1. Tendencies in the number of RTAs and injured persons from 1999 to 2013 in Croatia
The reasons for the reduction of RTAs and injuries despite rising volumes in road traffic are numerous. The most important of those are: work done on the road infrastructure (reconstruction of existing and construction of new relatively safe roads), continuous improvements to passive safety in motor vehicles, improvements in legislation (alignment with EU rules pertaining to alcohol consumption ban for young drivers, enhanced control of safety helmet use, safety belt use, mobile phone use during driving, more agile police monitoring etc.).

3.2. An analysis of road traffic safety in the City of Zagreb

The administrative area of the City of Zagreb covers 641.32 km² and is divided into 17 districts with a total of 218 local boards. According to the 2011 census, 790,017 residents live in the city (18.44 percent of Croatian population), which represents a density of 1.232 residents per square kilometre [5].

The number of registered motor vehicles in Zagreb was 342,405 in 2012, which constitutes a level of motorization (ratio of the number of residents and the number of vehicles) of 432 vehicles per 1000 residents. This is either equal to or more than the level in European cities and regions (= 1 : 2.5) [6].

The area of the City of Zagreb is operatively controlled by the I and II Traffic Police Precinct (excludes the parts of the highways that are administratively outside of the city) and the Sesvete Precinct.

According to the Zagreb Police Department (PUZ) reports, the safety situation in the observed area, for the period of 1999-2013 (Graph 2.), does not have a negative feature. The biggest number of accidents in the City of Zagreb was recorded in 2003 (21,011), and has been decreasing since. The lowest number was recorded in 2013 (7,362).

By comparing the RTAs injuries statistical data between Croatia and Zagreb it is evident that 8547 persons died in Croatia in 2013, of which 584 persons died in Zagreb (6.83 percent). Furthermore, 317,045 persons were injured of which 48,619 in Zagreb (15.34 percent). This points unambiguously to the scope of social harm suffered by the local communities in the city traffic system.
If we compare data from graphs 1. and 2. for the last observed year (2013) we can conclude that the share of road traffic accidents in Zagreb, compared to Croatia, was 21.64 percent of all traffic accidents, 7.34 percent of all deaths therein and 16.33 percent of injuries.

But, by comparing the safety situation in road traffic at the local and national level, versus the relative amount, the number of road traffic accidents per 100 000 residents, it is evident that the numbers pertaining to Zagreb (927 RTAs/100 000 residents) are 16.7 percent higher than those pertaining to Croatia (794 RTAs/100 000 residents). The reason for this is a significantly higher level of motorization in the City of Zagreb as compared to Croatia, as well as the categorization of roads (city road – roads in populated areas), which considerably contributes to the rise in the rate of road traffic accidents.

4. THE CITY ADMINISTRATION’S ACTIVITY IN THE IMPLEMENTATION OF THE SAFETY PROGRAM

4.1. Road traffic safety programs

As part of implementation of the National program, where it pertains to the City of Zagreb, a number of concepts or project implementations at locations deemed problematic from a safety perspective is foreseen every year in Zagreb, although there is as yet no formal Traffic Safety Council in the city.

Within the city administration’s competences a few programs related to road traffic safety improvement can be mentioned:

- Traffic prevention, technical regulation and safety program,
- Traffic light signalization program,
- Road construction and reconstruction program,
- Road infrastructure maintenance program,
- Traffic policing

The first program is the basic program aimed at increasing traffic safety and repairing critical locations in the traffic network from the perspective of traffic safety, whereas the activities in the technical area encompass all activities necessary within the existing traffic infrastructure.

Within its jurisdiction related to traffic problems and improvements in the functioning of the traffic system in its entirety, ex officio and on demand (residents, institutions, city neighbourhoods, schools, day-care centres, etc.), the city implements over 600 solutions and proposals pertaining to city traffic. Based on the allocated funds from the Office of Physical Planning, Urbanization, Construction, Municipal affairs and Traffic 12 million kunas per year are reserved for these activities [7].

The next important safety program pertains to the construction and reconstruction of city roads as well as the development of traffic activities. Its main purpose it to ensure the entirety of the traffic network in the city, increase the flow of traffic in critical intersections and parts of the network, resolve passive traffic and improve the quality of public transportation. The biggest impact in the area of traffic safety can probably be achieved through this program because it establishes or changes the technical elements of roads.

In 2014, the funds for this program (construction and reconstruction of unclassified roads, development of traffic activities) amounted to 286 million kunas.
4.2. Working Group for Monitoring and Proposing Safety Improvement Measures in the City of Zagreb

In order to implement priorities defined by the National Road Traffic Safety Program, through the work of the Office on improving the safety of city traffic, local plans and reports on the safety of traffic are continuously produced. Accordingly, the Traffic Department holds monthly coordination meetings of the Working Group for Monitoring and Proposing Safety Improvement Measures.

The Working Group began working in 2008 and comprises of representatives from different professional services whose competences encompass traffic safety and regulation, management and maintenance of unclassified roads and traffic monitoring and control: MUP, PUZ, Road Safety Service, Zagrebački holding, Traffic Policing Department, Department for Road Management, Conservation and Maintenance, but also other services as needed. The group’s competences and tasks include:

- Visits to critical location and proposing measures and activities that can be implemented,
- Active participation in the making of traffic solutions for future reconstructions and public-traffic surfaces constructions,
- Continuous monitoring of the safety situation on the city roads,
- Providing objections and proposals with solutions aimed at safety and traffic flow improvements.

In addition to this, in 2014 the Council for Prevention, acting on the proposal from PUZ, established a Working Group for Road Traffic Safety in the City of Zagreb. The reason behind this was the need to systematically monitor and analyse the safety situation and provide proposals for its improvements in cooperation with civil associations dealing with these issues. Apart from MUP and PUZ, the Group consists of members and representatives from the Department of Traffic and Department of Municipal and Traffic Policing. The Working Group was established according to the National Road Traffic Safety Program guidelines, and its competences include:

- Systematic traffic safety monitoring and analysis in the City of Zagreb,
- Providing the Council for Prevention with proposals for the improvement of road traffic safety (construction of walkways, cycling paths and lanes, bus stops, roundabouts, setting up protective bulkheads for pedestrians, installing traffic lights, changing the existing traffic light signalization or traffic regulation etc.),
- Proposals for directing police and Zagreb traffic policing actions,
- Initiatives related to the procurement of technical devices and other infrastructural support,
- Cooperation with civil associations (cycling, motor associations, ‘Roda’ etc.).

5. COMPARATIVE ANALYSIS OF SAFETY LEVELS VERSUS THE NATIONAL ROAD TRAFFIC SAFETY PROGRAM

Local authorities often set identical objectives in the area of road traffic safety management as the ones defined at the national level. Their implementation is monitored accordingly.

This approach, although limited in certain aspects (different typology of space, representation of road categories, number of motor vehicle users, travel patterns etc.), facilitates a comparison of tendencies and trends in the rate of basic traffic indicators.
By observing the basic safety indicator (graph 3.), the number of deaths, to get a more realistic safety situation description and a quality comparison of safety levels, through a standardized relative amount (risk indicators), of the number of deaths per 100 000 residents, in relation with set quantitate objectives in the National programs, it is evident that Zagreb’s result fall significantly below the data at national level.

Graph 3. The number of deaths per 100 000 residents from 1996 to 2012 in Croatia and PUZ

According to the data for 2012 pertaining to Zagreb, 4.3 deaths per 100 000 residents is considerably below the national average (53 percent less), which is very indicative, especially bearing in mind that the administrative borders of the City of Zagreb represent a fully urbanized area.

Although the City of Zagreb has better statistics when it comes to the number of deaths per 100 000 residents compared to the national level, it is important to stress that European cities have even better statistics, and that certain cities such as Berlin or Vienna have a yearly average of 1.6 deaths per 100 000 residents. The City of Zagreb, therefore, needs to intensify efforts in the field of road traffic safety, despite having indicators better than the national level.

6. INSTEAD OF THE CONCLUSION

The National Road Traffic Safety Program 2011-2020 is a good platform on which to base work on road traffic safety. Croatia’s results and achievements in the given period are considerable, but insufficient. The European surrounding has significantly better results in this respect.

The City of Zagreb and its road traffic safety is notably better compared to the national level. These results stem from the city administrations and other stakeholder’s pro-active approach in the field of traffic safety. Despite good results, certain European cities have better indicators in the area of road safety. This, combined with the ambitious objective set in the National Program for the period 2011-2020, to reduce traffic accidents by 50 percent, requires additional efforts and means that will result with the desired effect. It is therefore, necessary to implement European guidelines and experiences and, besides the national level, create specific programs of activities for the improvement of traffic safety in bigger city areas (this pertains to Zagreb, Split, Rijeka, Osijek and Zadar).

To rationally manage the safety situation, in alignment with the UN resolution, it is necessary to establish time defined quantified objectives. Besides legislation, great attention needs to be given to the most vulnerable groups of traffic participants (pedestrians, cyclists,
motorcyclists) where, within the suggested strategic document, it is necessary to introduce specific traffic solutions and protection measures for these groups.

One of the solutions is to introduce compulsory traffic safety education to educational institutions, to train staff and ensure funds to this end, especially for forming the biggest possible number of traffic youth units and school patrols. Improving the quality of driving schools it also warranted.

The final objective of the proposed measures and activities should result in raised awareness of citizens about traffic safety and the equality of all participants, especially those most vulnerable.

The Government of Croatia should seriously consider forming an Agency for Road Traffic Safety, as seen in other European countries which have better road traffic safety indicators [8]. The Ministry of Internal Affairs is an important, but not the only active participant in the improvement of road traffic safety. It is therefore necessary to transfer the National Program from the competence of the Ministry to a new agency whose sole purpose would be to proactively work on road traffic safety.

It is also necessary to make authorities in charge of road traffic safety more transparent, in its programs and plans as well as financially.

It is important to stress that good road traffic safety work should be delegated to regional and local communities so as to allow them to actively work on their own, specific problems and objectives [9].

Unified means for road traffic safety at national level, in order to support regional and local programs and plans for raising road traffic safety awareness are particularly important.

7. REFERENCES


[6] EU-27 Regions with the highest/lowest number of passenger cars per inhabitant, 2010., Eurostat

