



PROGRAM OF SOLVING LEVEL CROSSINGS IN THE REPUBLIC OF CROATIA

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Abstract

Level crossings (LC) are the intersections of rail and road traffic in the same level. Therefore they represent a point of high risk on which often comes to accidents with the worst consequences.

Number of killed and injured people, significant material damage due to vehicles damages (road and rail), and significant losses (economic and time) because of the traffic stop indicate the seriousness of the problems of security and regularity of traffic on the LC. This situation requires continued actions, both in the field of technical – technological solutions and in the field of culture of drivers, in order to reduce the threat to security in traffic over a LC significantly.

For all these reasons the Department of railway traffic of Ministry of the Sea, Transport and Infrastructure has launched an initiative to create the measures and activities related to systematic and continuous solution to the traffic safety on the LC, which is in cooperation with the working group from HZ-infrastructure resulting in the document entitled “Program of solving LC in the Republic of Croatia” (Program).

The paper presented this Program, which was conceived as a national program, and makes segment of the entire “National rail infrastructure program”, which was approved by the Croatian Parliament in year 2008.

Keywords: level crossing, program, solving, railroad, coordinated

1 Introduction

Level crossings (LC) are the intersections of rail and road traffic in the same level. Therefore they represent a point of high risk on which often comes to accidents with the worst consequences.

Participants of road traffic often suffer on LC, although in accidents of heavy road vehicles and rail passenger trains can also cause serious injury to passengers and railway workers, and major damage to vehicles in railway transport. Number of killed and injured people, significant material damage due to vehicles damages (road and rail), and significant losses (economic and time) because of the traffic stop indicate the seriousness of the problems of security and regularity of traffic on the LC. This situation requires continued taking systematic measures and actions as on the area of technical-technological solutions as on the field of traffic discipline and culture of drivers in order to significantly reduce the threat to security in traffic over the LC.

For all these reasons the Department of railway traffic of Ministry of the Sea, Transport and Infrastructure has launched an initiative to create the measures and activities related to systematic and continuous solution to the traffic safety on the LC, which is in cooperation with the

working group from HŽ-Infrastructure resulting in the document entitled “Program of solving level crossings in the Republic of Croatia” (Program).

Program was conceived as a national program, which is one of the preconditions for a systematic solving problem on LC in big traffic system (HZ, HC, ŽUC), all administrative, organizational and technological levels of local communities, and makes segment of the entire “National rail infrastructure program” which was approved by the Croatian Parliament in year 2008.

The Program has processed the range of solutions on the LC by years, i.e. the dynamics and the necessary financial investment for all types of solutions; ensuring with light/audible ringing signals and half barriers, the removal of crossings with or without reduce roads constriction, visibility triangle setup and two-level constructions.

It is also developed a system of authority and responsibility for the implementation of the Program

2 Framework indicators of Program

2.1 Scope of solutions

From the total number of LC on HZ-Infrastructure network (1540) third of them can be considered definitively settled in accordance with applicable regulations, from which it follows that at the two thirds requires the engagement in order to achieve a definitive solution. This is also the number of LC whose solving is the subject of the Program.

In the solving analysis is included the total number of LC together with pedestrian crossings, and for each crossing is methodological presented the following information:

- mark and name of railroad
- kilometric position on railroad (chainage)
- local name
- the type and number of road
- County
- city or local community
- existing insurance
- visibility triangle
- temporary technical solution
- final technical solution
- priority
- dynamics of temporary solution
- dynamics of final solution
- costs estimate of temporary solution
- costs estimate of final solution

Scope of solutions by type, dynamics and priority is shown in Table 1.

The data in Table 1 shows that for a complete solution LC on the HŽ-Infrastructure network need to be done; 335 removal of crossings with reduce roads construction (RWR), 53 visibility triangle setup (VTS), 30 removal of crossings without reduce roads (RWOR), 29 supplement ensuring with half barriers (SHB), 278 ensuring with light/audible ringing signals (LAR), 134 ensuring with light/audible ringing signals and half barriers (LARHB) and 68 two-level constructions (TL) (these data will be partially changed by adjusting the solutions of Program to new by-law regulations).

Table 1

| Dyna-mics | Technical solutions: | | | | | | | | Priority | | |
|---------------|----------------------|-----|------|-----|-----|-------|----|-------|----------|-----|-----|
| | RWR | VTS | RWOR | SHB | LAR | LARHB | TL | Total | I | II | III |
| | 2009. | 9 | - | 3 | 5 | 30 | 38 | 3 | 88 | 88 | |
| 2010. | 6 | 14 | 24 | 9 | 26 | 21 | - | 100 | 100 | | |
| 2011. | 31 | 18 | 1 | 7 | 20 | 22 | 2 | 101 | 101 | | |
| 2012. | 64 | 8 | - | 6 | 26 | 9 | - | 113 | | 113 | |
| 2013. | 45 | - | 1 | 1 | 75 | 15 | - | 137 | | 137 | |
| 2014. | 103 | 2 | - | - | 42 | 15 | - | 162 | | 162 | |
| 2015. | 77 | 11 | 1 | 1 | 59 | 14 | - | 163 | | | 163 |
| 2016-20. | | | | | | | 63 | 63 | | | 63 |
| TOTAL: | 335 | 53 | 30 | 29 | 278 | 134 | 68 | 927 | 289 | 412 | 226 |

The two-level constructions are divided into 3 categories, depending on the location of the crossings; city area, populated area and inhabited area. Accordingly approximate costs of running these constructions are proposed.

The program gives the possibility of appropriate solutions over established standards and the dynamics of solutions in case when the local community or other organizations are willing to finance the cost difference.

Such coordinated program is in accordance with legal, financial, design and safety criteria, including aspects of interoperability of railway lines in Croatia, and the allowable and acceptable level of risk.

2.2 Dynamics of solutions

Dynamics of solution on LC is foreseen for the period 2009 - 2015. year, and for two-level constructions from 2009 to 2020.

Dynamics is made accordingly to the legislation, which means depending of the category of the railroad and category of road and classified in three priority (I priority from 2009-11, II priority from 2011-14 and III priority from 2014-20).

Determining the order of solving, priorities and standards solutions in this program is based primarily on;

- harmonizing existing solutions on LC with applicable laws and by-laws, evaluate existing solutions with regard to local specificities, number and seriousness of accidents, the impact of planned major projects, objective requirements of local communities.

Speeding up of determined dynamics of solutions or by established standards of solutions is possible only if the subject who wants better solutions provide adequate additional financial resources.

Considering relatively long period of solving the overall Program, and the objective circumstances which can affect it, the dynamics will be necessary periodically synchronize with the consent of all relevant entities.

2.3 Financial indicators

The program foreseen approximate costs of solving LC, based on current costs reduced for planned rationalization. Rationalization is possible in the choice of production, purchase and installation of equipment and organization of work.

Starting from the current approximate prices, based on rationalization, financial costs for the overall technical solutions for crossing and two-level constructions on the HŽ-Infrastructure network are 726.8 million Kuna.

Total investments by type of technical solutions are (in millions of kuna):

| | |
|---|--------|
| · removal crossings with reduce roads construction | 132,52 |
| · visibility triangle setup | 6,92 |
| · removal without reduce roads | 2,00 |
| · supplement ensuring with half barriers | 4,68 |
| · ensuring with light/audible ringing signals | 254,40 |
| · ensuring with light/audible ringing signals and half barriers | 204,00 |

Basic and permanent financial resources intended for financing the Program according to the basic standard solutions, priorities and dynamics are provided from the state budget (HŽ-Infrastructure assets, national fund of road safety programs, credit funds and pre-accession funds).

Continuity financing by range, structure, dynamics and the standard solutions through the entire duration of the Program implementation is based on the status of document entitled “Program of solving LC in the Republic of Croatia” (Program) as a national program, which is segment of the entire “National rail infrastructure program”, which was approved by the Croatian Parliament in the year 2008.

3 Jurisdiction and obligation in the implementation of Program

Subjects who are competent and responsible for the implementation of the Program are; Ministry of the Sea, Transport and Infrastructure (Department of railway traffic, Department of road traffic), HŽ-Infrastructure, Croatian Roads, County Road Administration, and the local authorities. All these subjects are obliged to participate in the implementation of this program organizationally and technologically.

They are also obligated to show all required parameters of the Program related to the priority, dynamic, technical solution and financial costs, by the methodology requested in their mid-term and annual plans for development (investment) defined according to financial sources.

Deviations from the Program provided solutions (higher standard solutions, dynamics speeding up etc.) shall be previously, agreed with the Ministry of the Sea, Transport and Infrastructure, through the HŽ-Infrastructure.

For the realization of the dynamics should be ensure requirements at all the levels and take actions to increase efficiency, quality, economy and security such as:

- update low and by-low legislation and regulations in the field of LC
- better coordination between the major complex projects, rail and road infrastructure
- the possibility of domestic production of equipment with the better solution of appropriate certification issues
- rationalization of work through standard solutions
- establishing interoperability of railway lines in Croatia, including aspect of the device security level and also specificities related to permitted and acceptable risk according to a new railway lines division.

Considering the facts mentioned above, the HŽ-infrastructure established the “Project Team for LC” responsible for coordination of implementation of the Program in all its phases:

- planning and commencement of activities on the LC in accordance with the Program
- harmonization of the special requirements of local communities or other entities as well as ways to solve such specificity

- coordination activities on the systematic arrangement of laws and by-law regulations regarding LC in order to encourage the realization of the Program (in the final stage is work on the standardized project for ensuring with light/audible ringing signals and half barriers - for easier and faster way to obtain building permits)

4 Conclusion

The “Program of solving LC in Croatia” is the basic document for improving safety on level crossings.

The implementation of the solutions foreseen in Program can achieve many positive effects that can be evaluated by the following factors;

- security (in railway, road transport and movement of pedestrians)
- mutual arrangement of relationships between the railway and road traffic
- interoperability with the European rail and road network
- technological conditions of railway systems (high speed, safety, fewer restrictions, the possibilities of modern traffic management, etc.)
- economic and financial (economy in rail and road traffic, smaller losses through delays in traffic, a smaller number of workers to ensure the level crossings, minor damage from the accidents, etc.)
- life and work conditions in local communities and the general safety of local people in traffic
- possibility of better planning and traffic organization of cities and villages
- systematic and efficient education of participants in road traffic
- positive impact on the development of domestic industries and the employment of local business resources

Level crossings or rail-road crossing, in security terms are the critical point of rail and road transport network, and for the quality of solution should be definitely interested both branches of traffic. They are the main entities that are responsible for implementation of this program together with the local authorities interested for the general security of the local population. This document should be continuously monitored and updated, respecting the changes in legal regulations that cover this area. It is also necessary to increase efforts to create the preconditions for its implementation.

Only coordinated and continuous action of all these entities can assure progress in the traffic safety on level crossings, and realize the planned solutions and the dynamics of the “Program of solving level crossings in Republic of Croatia”.

References

- [1] Program of solving level crossings in the Republic of Croatia

