Level crossing – Current situation in the Western Balkan Region

Statistics, classification and comparison on LCs within Western Balkan

There are quite many level-crossings (LCs) present on the West Balkans Region (WBR) rail networks.

Table 1 shows only those LCs present on the Core & Comprehensive Network, as registered through the recent CONNECTA project, while the total number of LCs is higher as shown in Table 2.

Around 35% of all LCs are located on the Core&Comprehensive network.

Table 1: Total number of level crossings - Core&Comprehensive network

Regional Participant (RP)	**Number of level-crossings on Core&Comprehensive network**
Albania	
BiH	
Montenegro	23
North Macedonia	138
Serbia	897
Kosovo*	108
TOTAL:	1153

Table 2: Total number of level crossings with "Passive" or "Active" signaling

Regional Participant (RP)	Total number of LCs on the whole network	Number of level-crossings with		
		Road horizontal/vertical signalization (without barriers)	Manual barriers	Signal-safety equipment (automatic barriers, light/sound signals)
Albania	125	86	39	0
Bosnia and Herzegovina	493	434	0	59
Montenegro	23	4	0	19
North Macedonia	248	142	11	95
Serbia	2131	1591	221	319
Kosovo*	267	241	2	24
TOTAL:	**3287**	**2498**	**273**	**516**

*This designation is without prejudice to positions on status and is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo declaration of independence.

The safety level of a majority of LCs is at best questionable, and in many cases very low. Namely, all these LCs are protected with different safety systems and are thus at varying safety levels. For example, at the lowest level of protection are those containing only road signaling, i.e. "*St. Andrew's cross*" ("*Crossbuck*") and the sign "*Stop*", and according to the records of Serbian railway infrastructure provider, Infrastructure of Serbian Railways, they constitute amazing **74,6%** of the above total of 2,131 LCs.

According to the EU legal classification (CSIs in Anne I to RSD), LCs are divided into "*Active*" and "*Passive*" (where "*Passive*" are those where roads cross the railway without any form of warning system or protection activated when it is unsafe for the user to use the crossing, whereas "*Active*" are those where the crossing users are protected from or warned of the approaching train by the devices activated when it is unsafe for user to traverse the crossing), In **EU MSs, 45% of LCs are "Passive", i.e. 55% "Active**", while the related averages in the WBR are much worse, i.e. in favor of the less safe "*Passive*" LCs, Table 3, as well as Figure 1 & Figure 2:

Table 3: Total percentage of "active" and "passive" level crossings

	ALB	BIH	KOS	MNE	NMKD	SER	EU
Passive	**68,8**	**88,3**	**90,2**	**17,4***	**57,3**	**74,6**	**45**
Active	**31,2**	**11,7**	**9,8**	**82,6**	**42,7**	**25,4**	**55**

** MNE is only one with more "Active" then "Passive" LCs.*

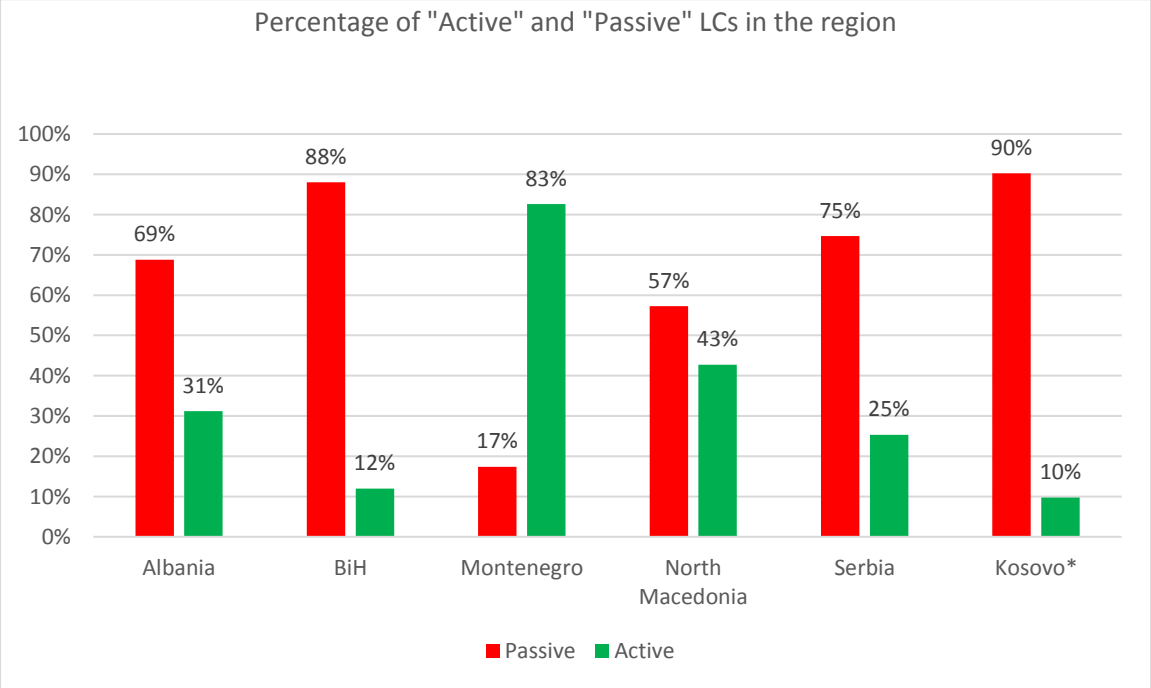

Figure 1: Percentage of "Active" and "Passive" LCs per South East European party

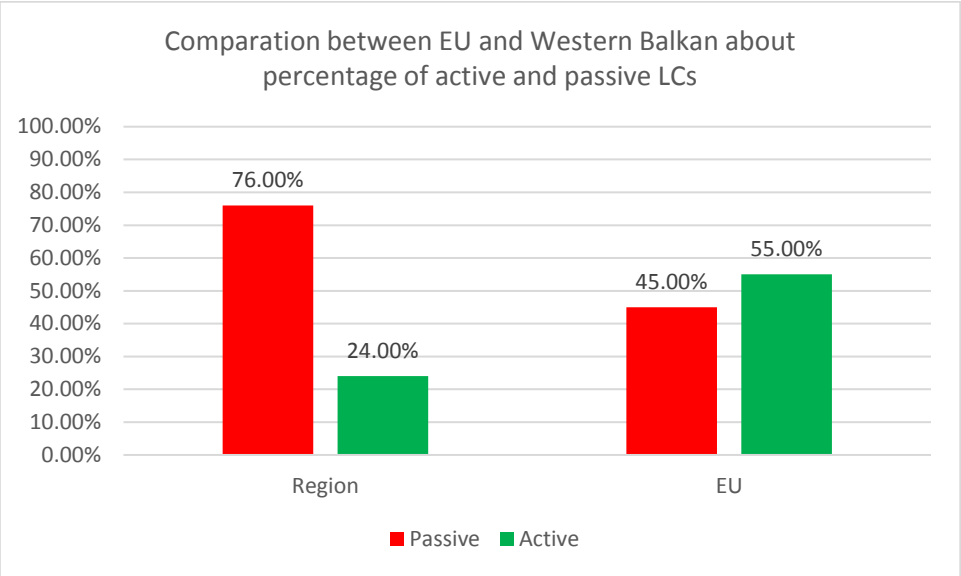

Figure 2: Comparison between EU and Western Balkans in terms of percentage of "Active" and "Passive" LCs

However, what is most important and even alarming, and which thus constitutes the main motivation for this mini survey, are the statistics of road/rail traffic accidents on LCs (Table 4-Table 18 and Figure 3-Figure 11).

To better illustrate and underscore the importance of the severity of the extremely low safety level at LCs in the WB Region and the consequential level of hazard prompting the utmost urgency of appropriate measures to be taken, it would be prudent to demonstrate the comparison of the number of accidents and casualties on LCs in each of the individual WBR RPs, in comparison to the EU countries in 2016 per 1,000 LCs, provided in the paragraphs below.

Table 4: Number of significant accidents and resulting casualties on LCs in Serbia, in comparison to the EU countries in 2016 (per 1,000 LCs) – (source ERA Report for 2018)

	Serbia (per 1,000 LCs)	**EU average (per 1,000 LCs)**
No. of **accidents** with casualties (fatalities & injured)	14.5	5.2
No. of casualties (fatalities & injured)	19.6	6.4
No. of **fatalities**	4.2	2.9

Table 5: The consequences of rail/road traffic accidents on LCs in Serbia, 2014-2018

Year	**No. of traffic accidents**	**No. of fatalities**	**No. of severely injured**	**Traffic interruption (hours)**	**Damage to property (€)**
2014	53	9	12	52	40.000
2015	49	3	15	67	50.000
2016	55	10	17	62	100.000
2017	57	8	25	95	250.000
2018	55	14	18	115	300.000

Table 6: Total number of accidents and incidents in Serbia for the period 2014-2018

	2014	***2015***	***2016***	***2017***	***2018.***	***Total***
Total number of accidents in Serbia	564	602	439	598	548	2751
number of accidents on LCs	53	49	55	57	55	269

In Serbia, there were 2751 accidents/incidents in the last 5 years, 589 accidents of which occurred on LCs, represents about **10 %.**

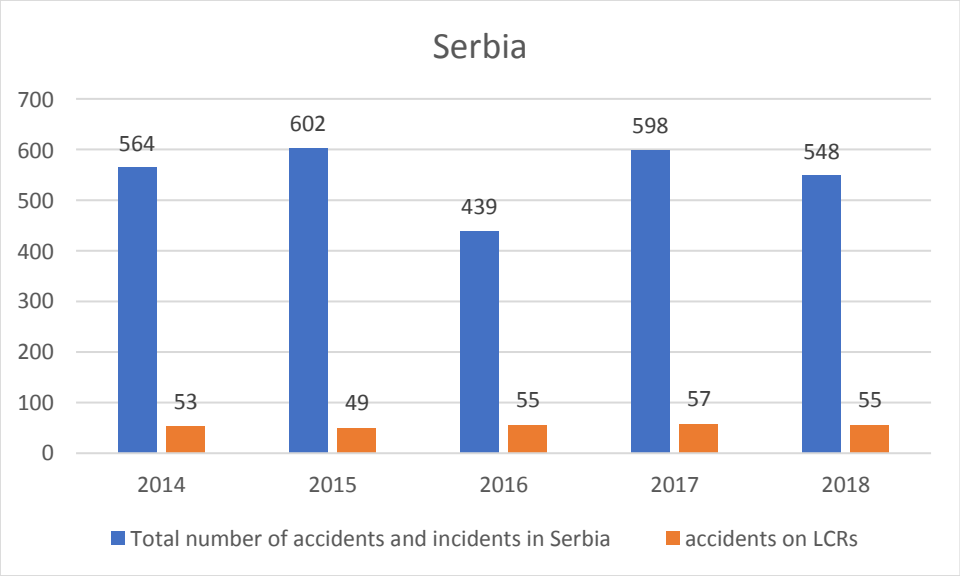

Figure 3: Comparison between the total number of accidents and those happening on LCs in Serbia for the period 2014-2018

Table 7: The structure of rail/road traffic accidents on LCs in Montenegro, 2009-2019

Year	**No. of LC accidents**	**No. of fatalities**	**No. of severely injured**	Traffic interruption (hours)	Damage to property (€)
2009	3	0	2	6,5	3.323,44
2010	8	2	1	13,5	84.943,44
2011	0	0	0	0	0,00 €
2012	2	0	1	14	466.669,10
2013	6	0	2	18	10.145,00
2014	4	1	1	6	202.150,00
2015	3	0	0	5	1.500,00

2016	5	1	1	12	24.209,00
2017	5	1	1	9	56.425,85
2018	4	0	0	4,5	5.500,00
2019*	1	0	0	1,5	6.115,08
Total	**41**	**5**	**9**	**90**	**860.980,91**

** Data for 2019 are for the first five months*

Of the total number LC accidents (41) in the observed period, 37 occurred due to **disrespect road traffic signalization**, while railway workers (drivers and TMD drivers) were responsible for 4 emergency crossings.

Table 8: Total number of accidents and incidents in Montenegro for the period 2014-2018

	2014	***2015***	***2016***	***2017***	***2018.***	***Total***
Total number of accidents and incidents in MNE	40	31	43	43	47	204
number of accidents on LCs	4	3	5	5	4	21

In Montenegro, there were 204 accidents/incidents in the last 5 years, with 21 accidents happening on LCs, i.e. about **10 %.**

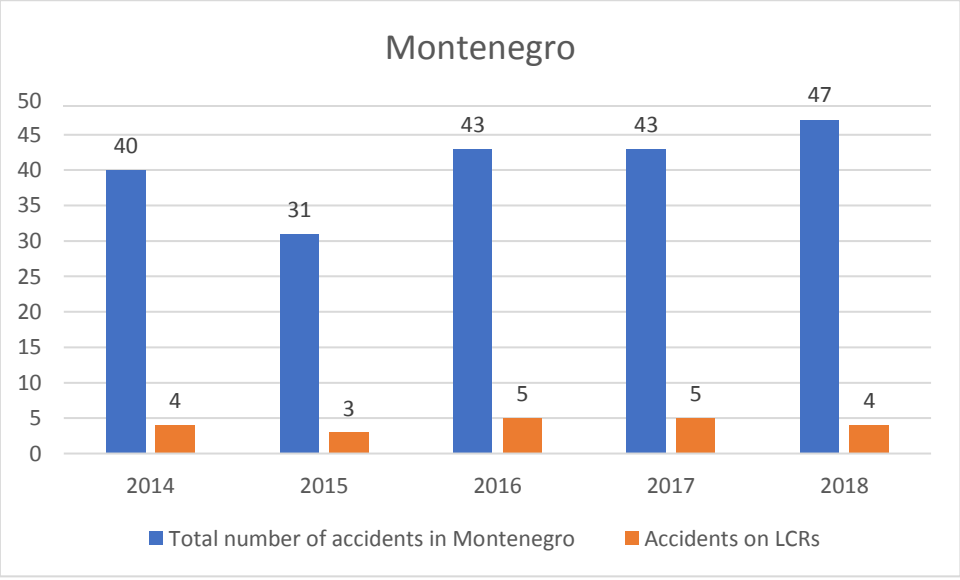

Figure 4: Comparison between the total number of accidents and those happening on LCs in Montenegro in the period 2014-2018

Table 9: The structure of rail/road traffic accidents on LCs in Bosnia and Herzegovina, 2015-2018

Year	**No. of traffic accidents**	**No. of fatalities**	**No. of severely injured**	Traffic interruption (hour)	Damage to property (€)
2015	11	1	0		250.000
2016	11	5	0		590.000
2017	28	10	5		560.000
2018	24	5	3		700.000
Total	**74**	**21**	**8**		

Table 10: Total number of accidents/incidents in BIH for the period 2015-2018

	2015	**2016**	**2017**	**2018.**	**Total**
Total number of accidents in BIH	48	25	60	53	186
Accidents on LCs	11	11	28	24	74

In BIH, there were 186 accidents in the last 5 years, with 74 accidents happening on LCs, i.e. about **40 %.**

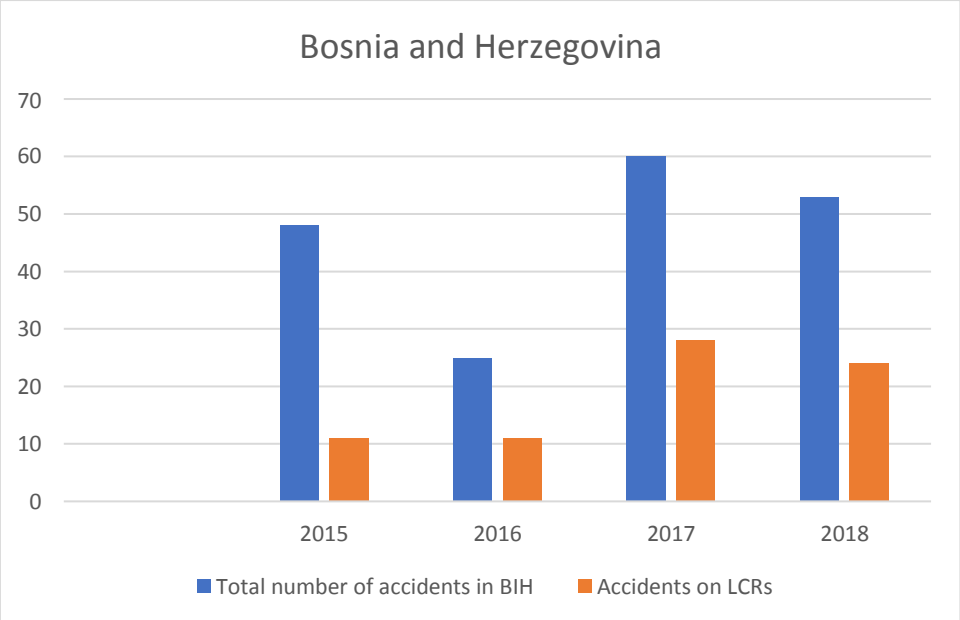

Figure 5: Comparison between the total number of accidents and those on LCs in BiH, for the period 2015-2018

Table 11: Total numbers of fatalities and injuries in all accidents for the last 4 years in BIH

BIH	**2018**		**2017**		**2016**		**2015**		**Total**	
	fatalities	**injuries**	**fatalities**	**injuries**	**fatalities**	**injuries**	**fatalities**	**injuries**	**fatalities**	**injuries**
BIH	**16**	**6**	**13**	**7**	**9**	**7**	**5**	**8**	**43**	**28**

BIH is the only country with more fatalities than severity injuries in the last 5 years!

Table 12: The structure of rail/road traffic accidents on LCs in Albania

Year	**No. of traffic accidents**	**No. of fatalities**	**No. of severely injured**	Traffic interruption (hour)	Damage to property (€)
2014	9	1	8		
2015	9	3	6		
2016	15	2	13		
2017	4	2	2		
2018	8	3	5		
Total	45	11	34		

In all cases of accidents, more than 80% of the cases have occurred due to non-enforcement of the rules by drivers. There is a lack of emphasized culture of vehicle drivers in terms of road traffic regulations and vehicle speed. (Source – Albanian report)

In Albania, there were 89 accidents reported in the last 5 years, 45 occurred on LCs, i.e. about **51 %.**

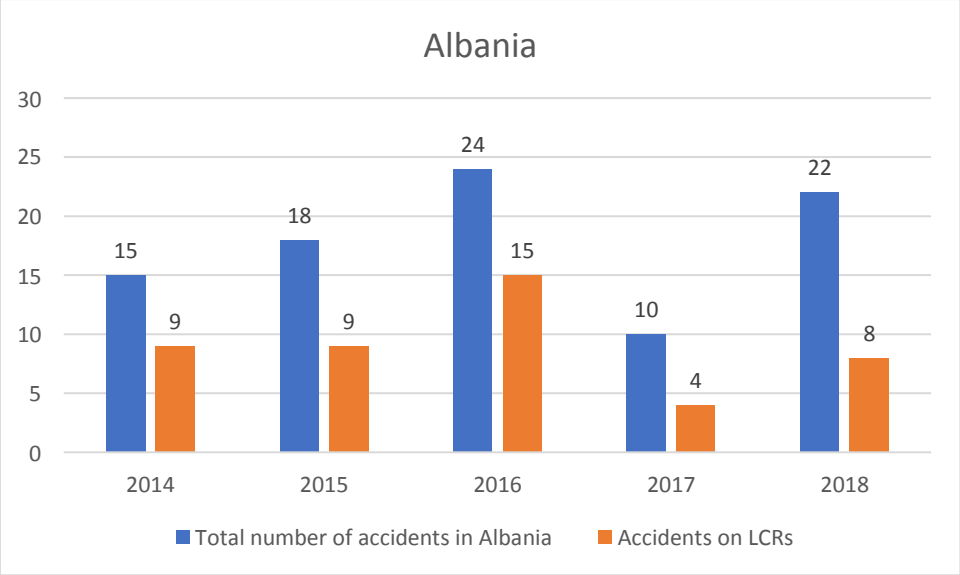

Figure 6: Comparison between the total number of accidents and those on LCs in Albania, for the period 2014-2018

Table 13: Total number of accidents/incidents in Albania

	2014	**2015**	**2016**	**2017**	**2018.**	**Total**
Total number of accidents in Albania	15	18	24	10	22	89
Accidents on LCs	9	9	15	4	8	45

In Albania, there were 89 accidents/incidents in the last 5 years, 45 of which happened on LCs, i.e. about **50 %.**

What is important to notice and emphasize is the fact that out of a total of **217 crossings** only **125** are authorized by IM, i.e. opened with the explicit approval of the Albanian Railways. The reason why this is so important is that according to informal communication with the rest of the WBR railways, the situation is very similar and quite valid for all of them. In that sense, the so-called "*illegal*" LCs represent one of the major issues and causes of incidents

Table 14: The structure of rail/road traffic accidents on LCs in Kosovo

Year	**No. of traffic accidents**	**No. of fatalities**	**No. of severely injured**	Traffic interruption (hour)	Damage to property (€)
2014	13	3	11		
2015	13	2	8		
2016	14	1	15		
2017	14	3	16		
2018	15	3	13		
Total	69	12	63		

Table 15: Total number of accidents/incidents in Kosovo

	2014	**2015**	**2016**	**2017**	**2018.**	**Total**
Total number of railway accidents in Kosovo	13	17	14	17	19	80
Accidents on LCs	13	13	14	14	15	69

In Kosovo, there were 80 accidents in the last 5 years, 69 of which occurred on LCs, i.e. about **86%.**

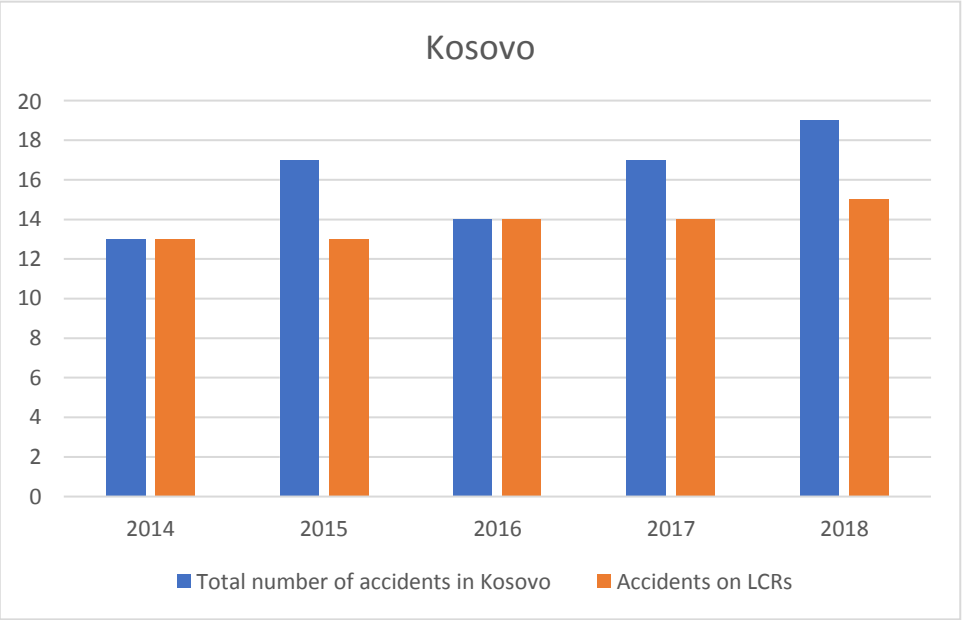

Figure 7: Comparison between the total number of accidents with those on LCs in Kosovo, for the period 2014-2018

Table 16: The structure of rail/road traffic accidents on LCs in North Macedonia, 2014-2018

Year	**No. of traffic accidents**	**No. of fatalities**	**No. of severely injured**	Traffic interruption (hour)	Damage to property (€)
2014	19	0	40	50	12.375
2015	6	1	4	27,5	14.961
2016	14	5	4	35,5	49.070
2017	6	0	2	8,5	0
2018	11	3	2	2	11.100
Total	56	9	52	123.5	87.506

Table 17: Total number of accidents/incidents in North Macedonia for the period 2014-2018

	2014	**2015**	**2016**	**2017**	**2018.**	**Total**
Total number of accidents in NMKD	90	115	88	96	97	486
Accidents on LCs	19	6	14	6	11	56

In North Macedonia, there were 486 accidents in the last 5 years, 56 of which happened on LCs, i.e. about **11.5 %.**

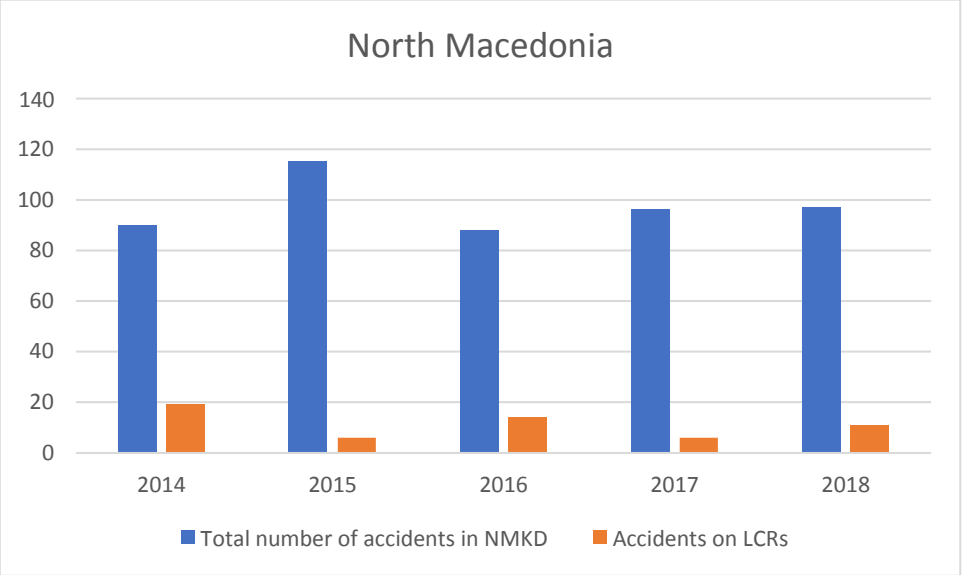

Figure 8: Comparison between the total number of accidents with those on LCs in the North Macedonia, for the period 2014-2018

Finally, the above statistics for the individual WBR RPs can be aggregated into an overall WBR statistics, which perhaps illustrates best the significant contribution LC accidents hold in the total number of accidents in WBR, clearly calling for urgent measures to be taken,

Figure 9-Figure 11 and Table 18.

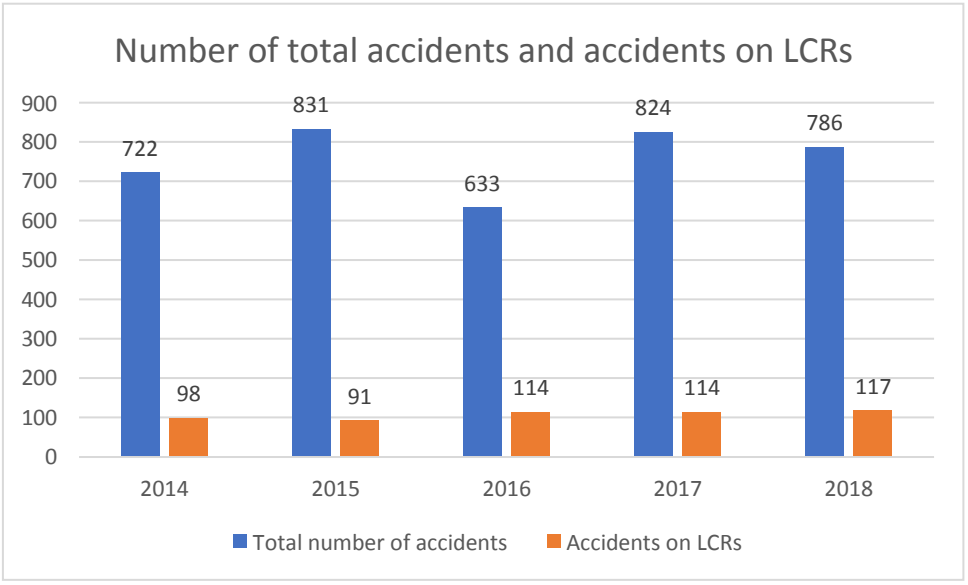

Figure 9: Comparison between the total number of accidents with those happening on LCs in the entire WB region, for the period 2014-2018

Table 18: Total numbers of accidents and the number of accidents on LCs in the entire WB region

Western Balkan - total	**2014**	**2015**	**2016**	**2017**	**2018**	**Total**
Total number of railway accidents	722	831	633	824	786	3796
Accidents on LCs	98	91	114	114	117	534
Percentage of LC accidents	13.6	11.0	18.0	13.8	14.9	14.1

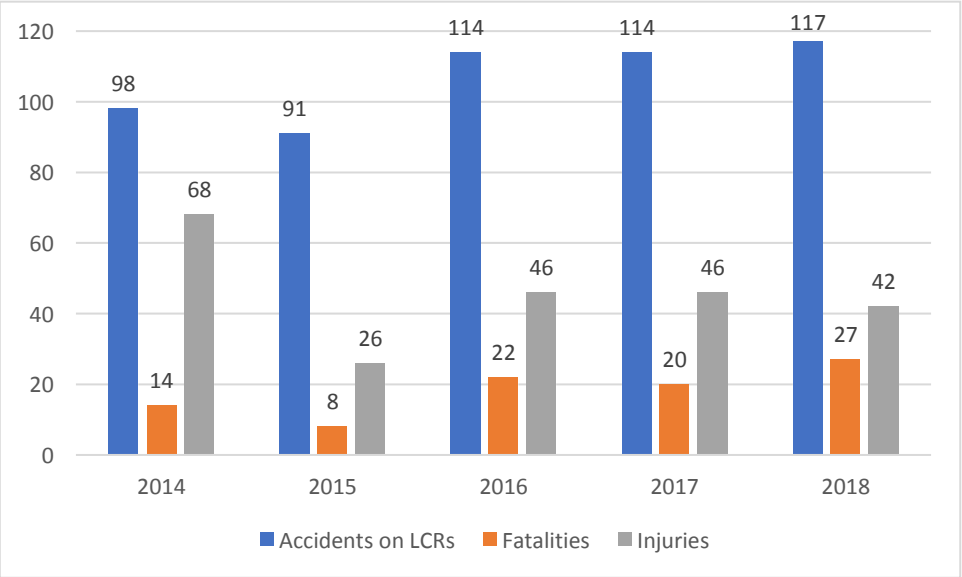

Figure 10: Number of accidents on LCs, fatalities and severity injuries in the entire WB Region for the last 5 years

However, perhaps the most compelling insight from the above aggregated statistics for the entire WBR, and which is more than obvious, is that ***around 55% of all the accidents on LCs, have fatalities or severity injures as their direct consequences*****,** which is more than distressing and even alarming, and clearly demanding urgent reaction**.**

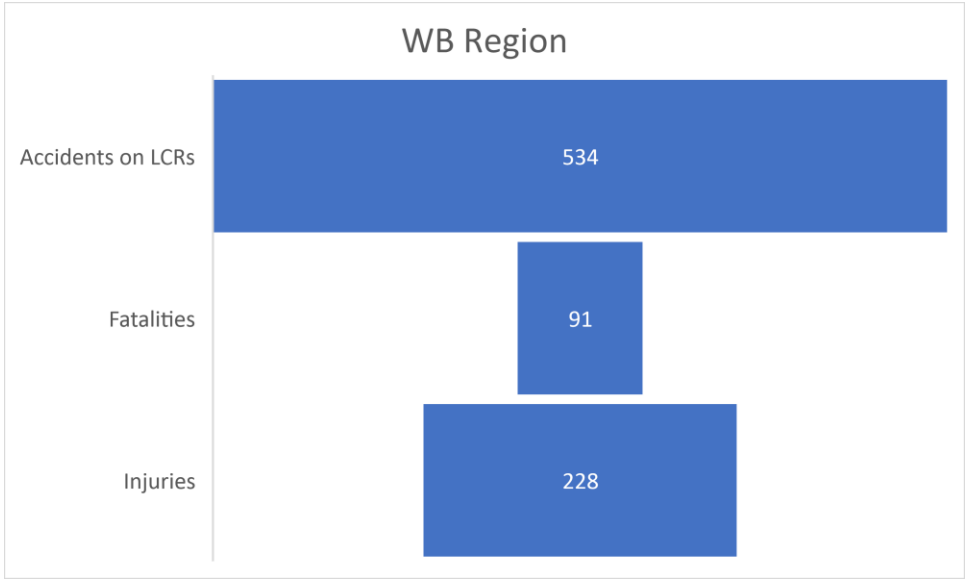

Figure 11: Cumulative number of accidents on LCs, fatalities and severity injuries in the entire WB Region for the last 5 years (2014-2018)

Conclusions:

General conclusion is safety on level crossings in the WBR is very far from the satisfactory. It deserves significant attention in all RPs.

Clearly, an ideal solution would be a physical separation between road and rail, but that is obviously very expensive (especially from the point of view of the economic standard of the RPs in the WBR), as well as time and effort consuming. The second-best option would thus be to **upgrade the safety level at LCs**, which can clearly be performed in many ways. However, in that sense, the first step would be to perform ***an objective prioritization of LCs*** to identify those whose upgrading would yield most benefits, both in terms of safety, primarily, but also from the point of view of cost-effectiveness. However, the sheer number of LCs, as indicated in the paragraphs above, makes any such prioritization effort quite complex, as it is clear that a great number of parameters needs to be taken into account.

The prioritization of LCs at minimum depends on the following groups of parameters (the below group being only indicative and certainly non final):

A. LCs' Road infrastructure characteristics (of concern for the road/rail safety)
B. LCs' Rail infrastructure characteristics (of concern for the road/rail safety)
C. LCs' Road traffic characteristics
D. LCs' Rail traffic characteristics
E. LCs' Road safety aspects
F. LCs' Rail safety aspects
G. Establish a ***dedicated LC database***, with all relevant characteristics and parameters mentioned above
H. Other aspects, e.g. Legal aspects (e.g. Laws, bylaws and regulations), consistency among various Laws concerning LCs, e.g. Road Safety Laws, Laws on Roads, Laws on Railways, Railway Safety Laws, Railway Interoperability Laws, etc.

This prioritization (as first phase) could proceed through CONNECTA as TA (if all stakeholders support this idea) or, alternatively, TC Secretariat together with RPs, DG Move and ERA could perform it without additional technical assistance.

In parallel with that, all RPS should make the transposition of the EU legislation related to the safety and interoperability issues (level crossings are part of that).

Second phase could represent common procurement of devices/equipment through WBIF or any other of the EU funds (based on results of the previous phase(s)).