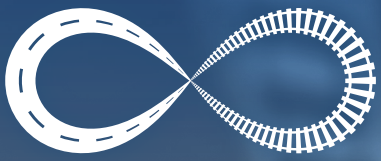

CETRA 2018

5th International Conference on Road and Rail Infrastructure
17–19 May 2018, Zadar, Croatia

Road and Rail Infrastructure V

Stjepan Lakušić – EDITOR

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TEN-T ROAD AND RAIL NETWORK DEVELOPMENT IN WESTERN BALKANS AND ITS FUTURE SUSTAINABILITY

Nerejda Hoxha, Nedim Begović
South East Europe Transport Observatory, Serbia

Abstract

The regional cooperation, established within the framework of the Memorandum of Understanding (MoU) is based in two main pillars: development of the Indicative Extension of TEN-T Core and Comprehensive Networks in the Western Balkans and establishing efficient transport systems. Since 2004 until 2016, total amount of € 13.5 billion has been invested in Comprehensive and Core Networks. The region efforts to build the network is clearly shown with an increase of almost € 1 billion from 2015 to 2016. Investment in road sector prevails accounting for almost 81 % of the total investment in the transport sector while investment in rail sector follow with 15 % of total investments. Two key issues pressing today's development of the road and rail network in the region are: a) Lack of funding in order to build the network to the required standards, b) Proper maintenance of the already build network and finding efficient ways to maintain the new infrastructure. As the region is committed to join the EU and have focused their efforts to achieve the TEN-T guidelines objective, completion of the Core Network by 2030 and Comprehensive by 2050. The trend of investments in the road sector will continue to prevail in comparison with other modes of transport. Only 38 % of the Core network has been built to motorway standards, the remaining of 62 % remains to be upgraded as the needs arise. Rail infrastructure network is not compliant to the TEN-T criteria, the regional railways are especially lagging behind to comply with operational speed of 100km/h, ERTMS and 740m train length. The issue of maintaining the network in order to cope with increased demand in transport of goods and people, has proved to be a challenge and will continue unless serious commitments are taken and systems for the maintenance are put in place.

Keywords: TEN-T Comprehensive and Core Network, road maintenance, rail maintenance, infrastructure development, Western Balkans

1 Background

The regional cooperation, established within the framework of the Memorandum of Understanding (MoU) is based in two main pillars: development of the Indicative Extension of TEN-T Core and Comprehensive Networks in the Western Balkans and establishing efficient transport systems. The Regional Transport Network in the South East Europe was firstly defined by the Memorandum of Understanding (MoU), signed on 11th June 2004. An important milestone is the inclusion of the SEETO Comprehensive Network maps in the TEN-T Guidelines in 2013 as indicative extension of the TEN-T Comprehensive Network into the neighbouring countries. This has been undoubtedly the greatest achievement as has provided a clear sign that the Comprehensive Network in Western Balkans is inseparable part of the wider European transport network. Based on the two layer approach used in the Trans-European Transport

network (TEN-T) methodology was defined the Core Network and included in the EC Delegated Act of February 2016.
After nearly a decade of negotiations and stalls in the process, at the Western Balkans Summit in Trieste, on July 12th 2017, the Treaty establishing Transport Community was signed between five Western Balkans partner and the European Union and on 18th of September by Bosnia and Herzegovina.
The SEETO Comprehensive/Core Network is a multimodal network which includes road, rail and inland waterway links in the six SEETO Regional Participants, together with a number of designated seaport, river port and airport nodes and terminals. Core Network is a subset of Comprehensive Network, comprised of respectively 71 % of road network and 67 % of railway network, as shown in the map below.

Comprehensive Road Network:	
Total Length:	**5,462 km**
Corridors:	2,198 km
Routes:	3,264 km
Core Road Network:	
Total Length:	**3,522 km**
Corridors:	1,970 km
Routes:	1,552 km

Comprehensive Rail Network:	
Total Length:	**3,857 km**
Corridors:	1,984 km
Routes:	1,873 km
Core Rail Network:	
Total Length:	**2,602 km**
Corridors:	2,602 km
Routes:	1,116 km

Figure 1 Indicative Extension of TEN-T Road and Rail Core/Comprehensive Network to Western Balkans

2 Infrastructure Performance

Transport networks main purpose is to serve the economic and social development of the region, so the key issues to be discussed in this paper referring to the performance of road and rail network will focus in current infrastructure conditions and the compliance with required TEN-T standards.

2.1 Road Infrastructure Performance

2.1.1 Road Core and Comprehensive Networks Conditions

The majority of the investments in the road infrastructure in the region took place during the last decade. Nevertheless, a new road section after 5 years of use without maintenance will be downgraded from very good to good and will tend to downgrade further. If maintenance works are carried out regularly, it will preserve good condition through its entire lifespan.

The main challege in assessing road conditions remains the condition surveys that are not carried out on timely intervals. Despite it, the data presented below represent a mixture between accurate data from the surveys and subjective data based on the assessment of road administrations. The current trend regarding road condition (Condition assessment is based on IRI values) per Corridors and routes is provided below.

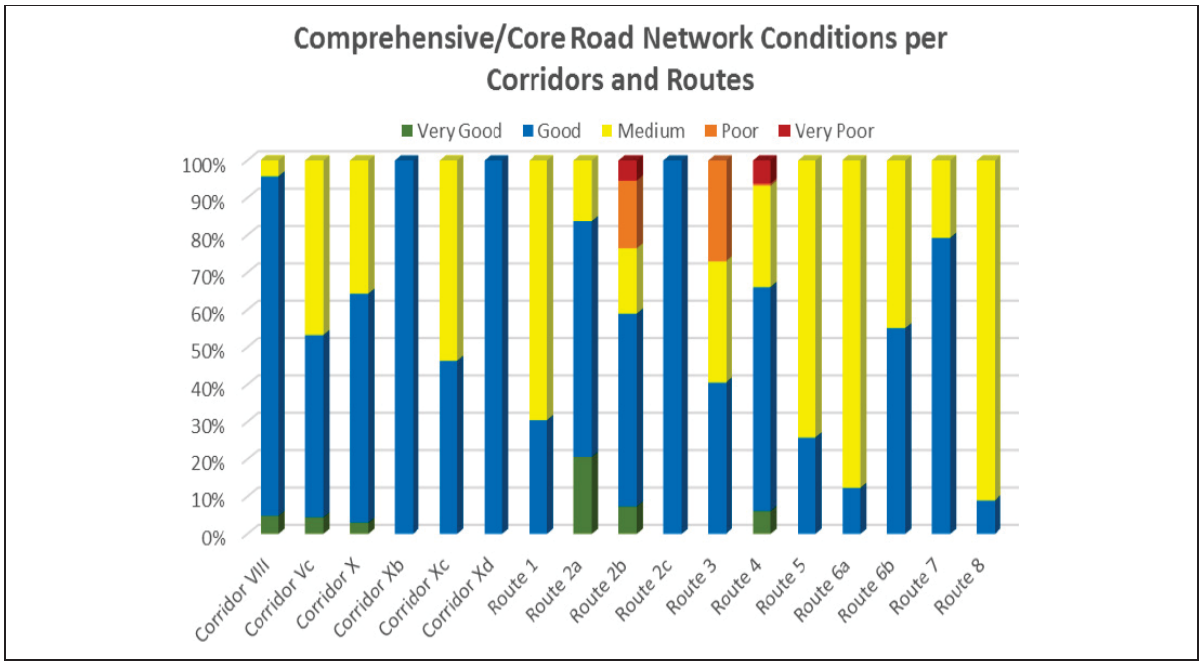

Figure 2 Comprehensive/Core Network Conditions per Corridors and Routes

Due to focus on improvement of the road infrastructure in the region, the share of roads in very good condition increased from 6 % in 2010 to 17 % in 2014, the percentage of roads in good condition decreased from 41 % in 2010 to 34 % in 2014, while the roads in poor and very poor condition have been reduced by 50 %.Furthermore, the shift from roads in good to medium conditions has been noticed. This can be explained by the fact that the roads are up to 10 years old and the lack of appropriate maintenance once the road construction/rehabilitation has been completed is leading to the deterioration of road conditions from good to medium.

2.1.2 Compliance with TEN-T standards

"Core network corridors" were introduced to facilitate the coordinated implementation of the core network. Nine core network corridors are identified of which OEM and MED Corridor are proposed to be extended to Western Balkans . The compliance check exercise focused on the these extensions, rather than the entire network. It should be noted that based on the TEN-T standards, as identified in the TEN-T regulation No. 1315/2013, the TEN-T requirements for the road network are:

- Roads have to be either an express road or a motorway by 2030
- Roads must have sufficient parking areas, at least every 100 km, by 2030
- Availability of alternative clean fuels by 2030
- Use of tolling systems/ITS and their interoperability with other systems

Based on the compliance exercise which was performed, it seems that only 27 % of the OEM Corridor is compliant, whereas regarding the MED Corridor, the compliance percentage for the road network is approximately 35 %. Furthermore, for the compliant motorway sections, it is assumed that there are available parking areas, while the criteria referring to the availability of alternative fuels and ITS/tolling systems were not examined, as they are not directly related to primary infrastructure characteristics.

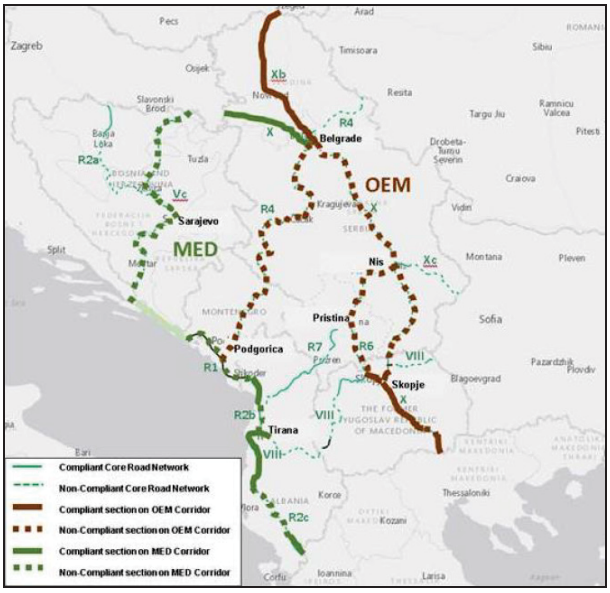

Figure 3 The Compliance Gaps for the Core Corridors – Road Network (2014)

2.2 Rail Infrastructure Performance

2.2.1 Rail Core and Comprehensive Networks Conditions

In 2016, as a part of the connectivity reform measure exercise, SEETO analysed the maintenance system in Western Balkans (Report on rail maintenance on TEN-T Core Network in Western Balkans,July 2016, https://goo.gl/coEJZY). Harmonized assessment of the condition has not yet been introduced for railways on the regional level; the current condition of the network was assessed based on subjective judgment of railway companies on the current condition of their tracks. To this purpose, current maximum allowed speed (as a % of designed speed) was introduced to better describe the current condition of railways.

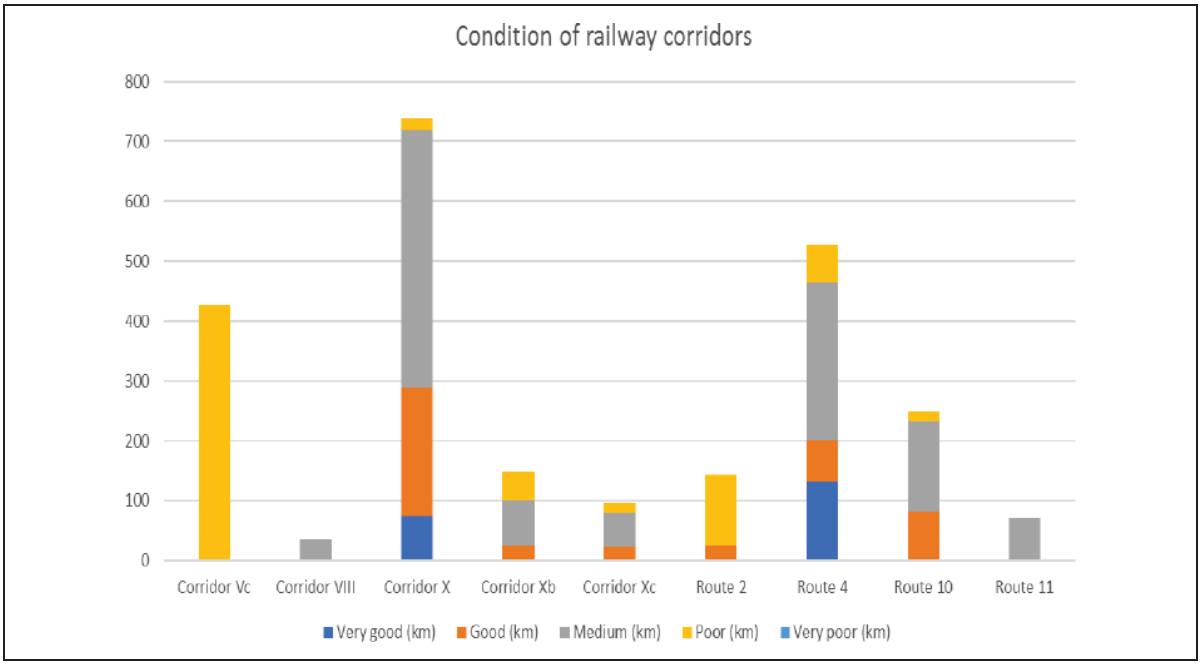

Figure 4 Condition on the rail TEN-T Corridors in Western Balkans

As for the condition, 26 % of the core rail network has been reported to be in very good and good condition, where approximately 70 %-100 % of designed speed can be achieved. The

largest part of the core network is in medium condition (1082 km), with larger variations in the maximum allowed speed. Approximately, 29 % of sections have been reported to be in poor condition, where on average 55 % of the designed speed can be achieved. One important issue to mention is reliability of the system for assessing the condition. On several sections, there was a large discrepancy between the reported condition, designed and maximum allowed speed. Furthermore, there seem to exist several different systems for assessing the condition in different regional participants.

2.2.2 Compliance with TEN-T standards

The gap analysis for the transport networks carried out an inventory of the gaps for the entire SEETO core network. The compliance check exercise focused on the TEN-T Core Corridors extension in the Region, rather than the entire WB Core Rail Network. The gaps were identified in relation to the TEN-T standard required for the rail network. The requirements for the railway infrastructure that were examined during this exercise are:

- Electrification: rail network to be electrified by 2030 (including sidings where necessary);
- Axle load: Freight lines 22.5 t axle load by 2030;
- Line speed: Freight lines must allow 100 km/h by 2030;
- Train length: Freight lines to allow for 740m trains by 2030;
- Track gauge: Nominal track gauge for new railway lines 1435 mm;
- ERTMS / signalling system: Core network to be equipped with ERTMS by 2030.

Looking at each TEN-T standard separately, it seems that in terms of electrification, 78 % of the extension of OEM Corridor to Western Balkans and 74 % of the extension of MED Corridor to Western Balkansare compliant. Moreover, in terms of axle load, 87 % of the freight lines along the OEM Corridor and 77 % along the MED Corridor, allow for 22.5 tonnes. Currently no railway section in the region is compliant with ERTMS standard. However, only 45 % of the OEM Corridor and 12 % of the MED Corridor are compliant in terms of maximum operating speed. This is an interesting finding, if one takes into account the fact that the design speed in more than 85 % of the OEM Corridor and 74 % of the MED Corridor is more than 100 km/h, which is the threshold for compliance. These results clearly indicate that a large percentage of the problems that the railway network in the region faces, are due to lack of proper maintenance. For ERTMS, region is still in inceptio phase either preparing necesssary legal framework or project documentation.

Figure 5 Tentative Core Corridors alignment for Western Balkans

3 Maintenance Budget

3.1 Road Maintenance budget

Budget allocation for road maintenance in all regional participant was kept more or less stable in the last 5 years, with occasional fluctuations, but generally there is an increasing awareness of the necessity to allocate the budget for the maintenance of the road network. The chart below shows a slight decrease in the maintenance budgets in 2013 and 2014, followed by an increase of almost 20 % from 2014 to 2015. In the past years, the maintenance budget share in the total of investments in road infrastructure ranged between 20 and 30 %.

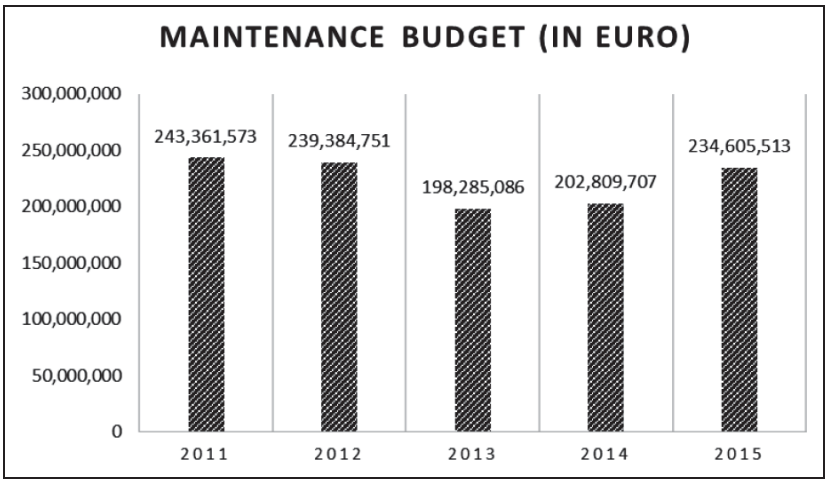

Figure 6 Maintenance Budget allocated – Road Network

Bosnia and Hercegovina, Serbia and Kosovo have their maintenance budget structured into budget lines such as routine, periodic, urgent and rehabilitation. The other regional participants have reported that the budget allocated from the central government comes as a total and then it is the responsibility of the road authorities/public enterprises to distribute it according to the needs. It would be useful to structure it accordingly as it would enable better needs assessment and monitoring of the maintenance budget.
Regarding the maintenance cost per km, it varies from 3,000 – 4,000 €/km, with the exception of Serbia where it is around 10,000 €/km. There is no difference in the cost/km in the participants regardless of who carries out the maintenance works, private contractors or state owned public enterprises. In the Final Study of "The Regional Balkans Infrastructure Study Update" (REBIS) annual unit cost of regular maintenance is estimated at 10,000 €/km and unit cost of rehabilitation at 300,000 €/km. Based on this data: Annual cost of regular road maintenance: €55 million; Annual cost of road rehabilitation (regular and backlog): €340 million. Altogether, for those regional participants that do not have yet toll roads the main source of funding for the road maintenance remains the central government through their tax regime system, as in case of Albania, Kosovo and Montenegro, while in the countries with road toll system already in place like Serbia, Bosnia and Hercegovina and the former Yugoslav Republic of Macedonia, the maintenance budget includes the income collected from toll roads.

3.2 Rail Maintenance budget

Routine maintenance expenditure does not match the maintenance needs assessed by the railway companies. The difference between the needs and funds allocated in some Regional Participants like Serbia and the former Yugoslav Republic of Macedonia is significant, while in Montenegro it is much less present (for 2015, 80 % of maintenance needs were covered).

When comparing 2015 to 2011, budget allocated for maintenance has decreased in most of the Regional Participants (except Kosovo). However, this is not a trend over the five-year period, rather large variations in budget from year to year. Most of the Regional Participants reported effective disbursement of yearly allocated funds: only anomaly was noticed in Serbia, where only 75 % (average between 2011 and 2014) of maintenance budget was spent.
As for the routine maintenance budget expenditure per categories, infrastructure maintenance accounts for the largest share of maintenance budget in most of the Regional Participants (the former Yugoslav Republic of Macedonia – 59 %, Montenegro – 48 %, Kosovo – 70 %-five-year average). Generally, Bosnia and Herzegovina has been allocating highest funds to routine maintenance, followed by Montenegro. Routine maintenance needs and maintenance expenditure do not match, i.e maintenance needs are never met on yearly basis, due to maintenance backlogs and deteriorated condition.
As for investment maintenance and rehabilitation projects, Serbia has been heavily investing in rehabilitation of its network, followed by Montenegro and the former Yugoslav Republic of Macedonia. Annual investment maintenance cost per kilometre shows similar pattern, with Serbia investing approximately €44,000 per kilometre in 2014 and the former Yugoslav Republic of Macedonia approximately €13,000 per kilometre in 2015. Similar to the routine maintenance, investment maintenance needs are being only partially met, with significant difference between estimated needs and investment maintenance. Disbursed investment maintenance budget is covering 10 %-50 % of needs (depending on RP and year).
As mentioned before, reliability of systems for assessing the conditions, remains an issue. One regionally harmonized system for assessing the condition, introduction of asset management systems and preventive maintenance, as well as setting a national conditions baseline should be introduced before developing regional maintenance plans, in order to ensure that the development of railways in the region is on equal footing.

4 Conclusions

As the region is committed to join the European Union and have focused their efforts to achieve the TEN-T guidelines objective, completion of the Core Network by 2030 and Comprehensive Network by 2050, the trend of high investments in the transport sector will prevail, with road counting for the biggest share compared to rail. Transport infrastructure comprise one of the biggest assets in the region, its maintenance is as crucial as funding new infrastructure projects.
The estimated needs (https://goo.gl/cWQL7R) for road infrastructure projects that already have prepared feasibility studies amounts to €3.6 billion for roads and €942 million for rail and estimate for projects that have a preliminary feasibility studies carried out is twice as much amounting to €6,3 billionfor roads and €2.6 billion for rail.
The time has come to establish efficient maintenance systems in place accross the region including setting up state of art Asset Managements system and respective surveys to feed updated information to the system, innovative fundings for maintenance and capacity building in terms of maintenance contractors and . Every Euro not spent on the maintenance is translated in thousands spent in operating costs (users pay more).

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