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SUSTAINABILITY STRATEGY OF THE FINANCING OF REPAIRS AND MAINTENANCE ON II. CLASS AND III. CLASS ROADS IN KOŠICE REGION

SUMMARY OF THE RESULTS

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Director General:	Ing. Ľubomír Palčák
Leading Researcher:	Ing. Ľubomír Palčák

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Director General:	Ing. Ľubomír Palčák
Project Guarantee:	Ing. Dana Alezárová
Division Director:	Ing. Roman Ondrejka, PhD.
Project Manager:	Ing. Štefan Machciník, PhD.
Leading Researcher:	Ing. Ľubomír Palčák
Researchers:	Ing. Peter Hronský, Ing. Pavol Kajánek, PhD., Ing. Peter Vonš, Ing. Katarína Kilianová, PhD., Ing. Miloš Zuziak
Cooperating organisations:	VÚD, a. s., DAQE Slovakia, s. r. o.

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Leaging Researcher:

ANNOTATION MAINTAINING

The road infrastructure has big transport - economic meaning in regions that connects economic, cultural and administrative centers with regions. The road infrastructure also connects regions with infrastructure of higher traffic importance and with infrastructure of surrounding states. The foregoing facts are ensured mainly with II. class and III. class roads that are in worse condition compare to motorways, expressways and I. class roads.

In terms of maintaining of mobility, accessibility, competitiveness, growth potential and economic development of regions it is necessary to flexibly react to the current needs and wisely invest into the development of road infrastructure and reconstruction of existing roads.

Development of industry and economics is strongly dependent from road infrastructure condition whose task is to ensure transport service in considered area. Due to the fact that the area of industry and agriculture has prospects to continue in development it is necessary to keep the road infrastructure in good technical condition. Modernization of regional roads and completion of missing infrastructure will allow connection at national and international level.

CONTENTS

REPORT IDENTIFICATION	I
ANNOTATION MAINTAINING	II
CONTENTS	III
LIST OF TABLES	IV
LIST OF ABBREVIATIONS	V
1. ANALYTICAL PART	6
1.1 Road infrastructure analysis in KSGR	6
1.1.1 Road infrastructure condition in KSGR - quantity	6
1.1.2 Construction - technical condition of road infrastructure in KSGR.....	7
1.1.2.1 Objects on roads owned by KSGR	8
1.1.3 Current traffic volume of road infrastructure in KSGR	8
1.1.4 Accidents on roads in administration of KSGR.....	9
1.1.5 Results analysis of measurement bearing capacity on selected roads.....	9
1.1.6 Analysis of climatic and geodynamic impacts	10
1.2 Analysis of current situation of administration and maintenance of II. class roads and III. class roads.....	10
2. PREPARATION OF STRATEGY - TRANSPORT INFRASTRUCTURE.....	11
2.1 Framework for determination of projects prioritization	11
2.1.1 Project selection and description of individual projects.....	11
2.1.2 Selection of criteria for the evaluation and determination of weights	12
2.1.3 Prioritization of projects according to RESULTS of MCA.....	13
3. PREPARATION OF STRATEGY - FINANCIAL PART AND PLAN OF UPDATE	14
3.1 Financial needs.....	14
3.1.1 Minimalist scenario of Funds Allocation	14
3.1.2 Maximalist scenario of Funds Allocation	14
3.1.3 Optimal scenario of funds allocation	15
3.1.4 Summary of financial needs in road infrastructure for each scenario.....	15

LIST OF TABLES

Tab. 1-1	Summary of transport infrastructure condition in KR divided into districts	7
Tab. 1-2	The condition of II. class and III. class roads based on inspections in 2014	7
Tab. 1-3	The distribution of bridges by owner and roads	8
Tab. 1-4	The condition of bridges in administration of KSGR.....	8
Tab. 1-5	Important roads in KSGR in terms of maximum intensity - II. class roads	8
Tab. 1-6	Important roads in KSGR in terms of maximum intensity - III. class roads	9
Tab. 1-7	Information about II. class and III. class roads in KSGR	10
Tab. 3-1	Total financing needs of projects in each area	14

LIST OF ABBREVIATIONS

EIB	European Investment Bank
EU	European union
HTU	Higher territorial unit
KR	Košice Region
KSGR	Košice Self-governing region
MC	Maintenance center
MCA	Multi-criteria analysis
NTC	National traffic census
RA	Road Administration
SGR	Self-governing region
SR	Slovak republic
SRA	Slovak Road Administration
TR	Technical regulation

1. ANALYTICAL PART

The road infrastructure issue is solved in national transport policy and with regard to economic, safe and smooth traffic. The road infrastructure has impact on economic, social and cultural development not only in national level but also in regions. Because of this, the comfort and safety of transport should not decrease.

The road infrastructure is composed mainly from roads of lower traffic importance - II. class and III. class and regional roads at level of regions and self-governing regions. These roads ensure connection of places, villages and traffic connection with roads with higher traffic importance.

The II. class roads are important for transport between regions and self-governing regions because they connect cities in self-governing regions. The III. class roads are local roads and connect villages with I. class or II. class roads.

1.1 ROAD INFRASTRUCTURE ANALYSIS IN KSGR

The Košice region is the fourth biggest (6 755km²) self-governing region in Slovakia and it takes 13,8% of Slovakia area. According to inhabitants the Košice region is at second place. On the south side, the region has state border with Hungary, on the east side has state border with Ukraine, on the north side has border with Prešov self-governing region and on the west side has border with Banská Bystrica self-governing region.

Košice region is divided into 11 district (4 of them are in Košice town). In the region are 440 villages and 17 cities. Territorial - administrative distribution of the region creates a space for a sufficiently dense network of roads that are not only for the inhabitants of the area but they are also important at national and international level.

The road infrastructure condition is checked and evaluated based on quantitative and qualitative indicators of road network. The evaluation is the source material for maintenance planning, reparation of II. class and III. class roads but also for proposal of infrastructure development.

1.1.1 ROAD INFRASTRUCTURE CONDITION IN KSGR - QUANTITY

The total density of roads network according to central data bank of SRA was 0,353 km / km (3,04 km/ 1000 inhabitants) on the day 1/1/2014 in Košice region. Road network density of the Košice region is approximately the same as for the whole territory of Slovakia.

In Košice region was built 2 382,464 km of roads on the date 1/1/2014 and in terms of length of roads, the region is at the second place in SR. The road infrastructure distribution according to traffic importance and length are summarized in the following table.

Tab. 1-1 Summary of transport infrastructure condition in KR divided into districts

SGR	Motorways (km)	Expressways (km)	Feeder of Expressway (km)	I.class roads (km)	II.class roads (km)	III.class roads (km)	Total (km)	Area (km ²)	Population	Density of road network	
										km/km ²	km/1000 inhabitants
GL					89,897	41,394	131,29	584	31440	0,225	4,176
KE I			8,056	0,344	16,544	9,415	34,359	85	67185	0,402	0,511
KE II		9,605		1,675	2,62	21,587	35,487	74	80838	0,48	0,439
KE III				5,438		1,356	6,794	17	29602	0,402	0,23
KE IV		2,62	4,258	5,031	6,272	4,475	22,656	61	56264	0,372	0,403
KS	5,395	14,245	0,387	64,168	105,511	399,372	589,08	1541	116322	0,382	5,064
MI				48,484	114,683	223,425	386,59	1019	110166	0,379	3,509
RV				94,853	89,686	138,63	323,17	1173	61827	0,275	5,227
SO				21,353	29,406	128,757	179,52	538	23213	0,334	7,733
SN					90,199	118,524	208,72	587	97784	0,355	2,135
TV				98,515	38,697	327,587	464,8	1074	105362	0,433	4,411
KR total	5,395	26,47	12,701	339,861	583,515	1414,522	2382,5	6755	780000	0,353	3,054

From 1/1/2014, KSGR became owner of II. and III. class in this region but except of roads in Košice city.

On the day 1/1/2014, the KSGR was owner of following infrastructure according to central data bank of SRA:

- II. Class roads in total length: 558,032 km, which is 15,43% length of all II. class roads in SR,
- III. Class roads in total length: 1377,323 km, which is 13,27% length of all III. class roads in SR.

1.1.2 CONSTRUCTION - TECHNICAL CONDITION OF ROAD INFRASTRUCTURE IN KSGR

The construction - technical condition of road infrastructure influences the quality of roads. The condition of roads is defined based on main inspections, which owner of roads must done every year after winter time according to TR 8/2013 inspection, maintenance and repair of roads. The construction - technical condition evaluation of roads is based on fair length of roads.

Some of roads are not in good condition in KSGR according to construction and technical condition. The roads have to be always in operating condition and safe in term of drivers. The roads must meet technical parameters set by a relevant regulation.

Based on main inspections that were made in 2014, the II. class and III. class roads are in following technical condition.

Tab. 1-2 The condition of II. class and III. class roads based on inspections in 2014

Category of roads	Very good VG (%)	Good G (%)	Satisfactory S (%)	Unsatisfactory U (%)	Disrepair D (%)
II. class roads	80,89	1,22	1,51	10,72	5,66
III. class roads	67,52	3,43	5,11	21,71	2,23

1.1.2.1 OBJECTS ON ROADS OWNED BY KSGR

In Košice region was registered 25 636 objects in total at the day 1/1/2014 on the II. class and III. class roads. From the standpoint of quantity and quality of the road infrastructure, the bridges are the most important objects. Košice region has in his ownership 655 bridges.

Tab. 1-3 The distribution of bridges by owner and roads

Owner/Administrator	II. class roads	III. class roads	Total
KSGR /RA KSGR	208	447	655

Many different factors have impact on condition of bridges. The biggest impact has age of bridges, traffic volume, natural disasters, weather and climate impacts. Some of bridges were built in the period after World War II. so they were not designed for current traffic volume and they have lower load capacity.

Tab. 1-4 The condition of bridges in administration of KSGR

Road	Perfect	Very good	Good	Satisfactory	Bad	Very bad	Disrepair	Indefinite
II. class roads	12	34	75	73	11	3	0	0
III. class roads	15	48	207	153	22	2	0	1
Total	27	82	282	226	33	5	0	1

Poznámka: Neurčitý stav reprezentuje neúplné údaje o mostnom objekte v centrálnej evidencii cestných komunikácií.

1.1.3 CURRENT TRAFFIC VOLUME OF ROAD INFRASTRUCTURE IN KSGR

Average daily intensity of vehicles according to NTC from 2010 was at level 3557 vehicles per 24 hour on II. class roads in SR. Average daily intensity of all vehicles according to NTC from 2010 was at level 3625 vehicles per 24 hour on II. class roads in administration of KSGR. It can be seen that intensity of KSGR is higher by 1,9% than average intensity on II. class roads in SR. It can be said that traffic in KSGR is easily above average.

Average daily intensity of vehicles according to NTC from 2010 was at level 1896 per day on III. class roads in SR. Average daily intensity of vehicles according to NTC from 2010 was at level 2072 per day on III. class roads in KSGR. It can be seen that intensity of KSGR is higher by 9,28% than average intensity on III. class roads in SR.

The following table shows the most important II. class and III. class roads in administration of KSGR from point of daily intensity of vehicles.

Tab. 1-5 Important roads in KSGR in terms of maximum intensity - II. class roads

No. of road	Max. intensity (vehicle/24 h)	Min. intensity (vehicle/24 h)	Road length /section (km)
II/533	14079	511	52,5
II/536	13290	4382	28,2
II/582	11075	910	44,7
II/526	10401	1476	24,4

Tab. 1-6 Important roads in KSGR in terms of maximum intensity - III. class roads

No. of road	Max. intensity (vehicle/24 h)	Min. intensity (vehicle/24 h)	Number of count sites of NTC 2010
III/3244 (III/536005)	15067	1984	6
III/3695 (III/553034)	6320	3824	2
III/3248 (III/536010)	6097	2844	2
III/3655 (III/050212)	5409	5409	1

1.1.4 ACCIDENTS ON ROADS IN ADMINISTRATION OF KSGR

Accidents on road network is serious problem of society. The effectiveness of its solutions is based on the ability of coordination between all stakeholders, including the support of the general public.

In terms of safety on regional roads owned by SGR it can be spoken about the accident rate on roads II. and III. class.

Thanks to information system of traffic accidents of the Police Force in SR, it is possible to exactly locate places and sections of frequent accidents in 2014.

The following locations can be marked as sections with frequent accidents on II. class roads that are in administration of KSGR:

- Road II/582 – kilometer 0,500
- Road II/582 – kilometer 1,500
- Road II/582 – kilometer 6,000
- Road II/555 – kilometer 1,000
- Road II/555 – kilometer 36,500
- Road II/552 – kilometer 26,000
- Road II/548 – kilometer 7,500
- Road II/547 – kilometer 37,790
- Road II/526 – kilometer 15,700
- Road II/526 – kilometer 16,110
- Road II/536 – kilometer 13,500
- Road II/536 – kilometer 21,800

1.1.5 RESULTS ANALYSIS OF MEASUREMENT BEARING CAPACITY ON SELECTED ROADS

From the analysis of the measurement results that were provided by SRA can be said the following conclusions. The measuring of bearing capacity was carried out on 450,715 kilometers of II. class roads in KSGR. The bearing capacity of the road network shall be based on annual average transit of heavy goods vehicles and calculated equivalent modulus of elasticity in the five point scale. At the fifth point of the scale are 111,664 kilometers of II. class roads, which mean that almost 24,8% from measured kilometers

have inadequate bearing capacity. The results confirm the fact that many of II. and III. class roads are not appropriate for current traffic bearing capacity.

The same measurement was made on 38,38 kilometers of selected II. class roads in KSGR. At the fifth point of the scale are 7,55 kilometers, which means that almost 19,70% from measured kilometers have inadequate bearing capacity.

1.1.6 ANALYSIS OF CLIMATIC AND GEODYNAMIC IMPACTS

The bearing capacity is not the only one indicator that has bad impact on roads. In combination with other impacts such as climatic and geodynamic impacts, it can happen catastrophic scenarios. These scenarios are significantly reflected in the schedule of maintenance and repairs of individual administrators.

From the analysis of climatic and geodynamic impacts was found out that there are many areas with flood risk and unstable areas in KSGR. In 378 geographical areas exist real flood risk and damage of II. class and III. class roads (26,6 km of II. class roads and 50,70 km of III. class roads are in risk).

1.2 ANALYSIS OF CURRENT SITUATION OF ADMINISTRATION AND MAINTENANCE OF II. CLASS ROADS AND III. CLASS ROADS

Since 2004, KSGR is owner of II. class and III. class roads after concluding the agreement for transition property and related rights and obligations from ownership of SRA. KSGR has set up the road administration of KSGR because of administration, maintenance, modernization, reconstruction and construction of roads.

Since 2011, RA of KSGR changed its organization from budget organization to allowance organization, the funding was changed.

Since 1/1/2014, KSGR is owner of following II. class and III. class roads, table 1-7.

Tab. 1-7 Information about II. class and III. class roads in KSGR

Owner	Administrator	District	Centre	II. class roads	III. class roads	Total
KSGR	RA of KSGR	Košice-surroundings	MC Moldava nad Bodvou	96,646	391,029	487,675
KSGR	RA of KSGR	Michalovce	MC Michalovce	114,683	223,425	338,108
KSGR	RA of KSGR	Sobrance		29,406	128,757	158,163
KSGR	RA of KSGR	Rožňava	MC Rožňava	89,639	138,630	228,269
KSGR	RA of KSGR	Gelnica	MC Spišská Nová Ves	89,897	41,394	131,291
KSGR	RA of KSGR	Košice-surroundings		8,865	8,280	17,145
KSGR	RA of KSGR	Spišská Nová Ves		90,199	118,524	208,723
KSGR	RA of KSGR	Trebišov	MC Trebišov	38,697	327,587	366,284
			Total	558,032	1377,626	1935,658

Zdroj: http://www.cdb.sk/files/documents/cestna-databanka/vystupy-cdb/2014/prehľad_ck_vl-spravca_k_01-01-2014.pdf

2. PREPARATION OF STRATEGY - TRANSPORT INFRASTRUCTURE

The part of the second part of strategy is to determine priorities for development, transport infrastructure needs and define indicative projects.

2.1 FRAMEWORK FOR DETERMINATION OF PROJECTS PRIORITIZATION

The framework of projects prioritization can be determined by multi-criteria analysis. Multi-criteria analysis is one of the quantitative evaluation methods, where results of the analysis are overall evaluation of the state and comparison between several variants of the projects.

One of the most important step of the analysis is to identify criteria that have impact on the project. These criteria are modified and according to importance of criteria are added weights of importance. Criteria can be at the same level of importance or can be hierarchically structured. Proportionately – index method is used, when all criteria are concentrated into one decision or indicator. AHP method is used in hierarchical structure. In this case criteria are divided into groups according to field of activity.

Steps of multi-criteria analysis:

1. Step: Project selection and description of individual projects
2. Step: Selection of criteria for evaluation
3. Step: Determination weights of criteria
4. Step: Projects evaluation
5. Step: The arrangement of the projects according to the results of multi-criteria analysis (prioritization)

2.1.1 PROJECT SELECTION AND DESCRIPTION OF INDIVIDUAL PROJECTS

There were defined measures in the form of specific projects according to list of strategic and specific aims that are focused at development regional infrastructure

In KSGR was the list of key projects divided into four main groups:

- projects for construction of infrastructure (2 projects),
- projects for reconstruction of road infrastructure (23 projects),
- projects for maintenance and repairs of road infrastructure (44 projects),
- projects for repairs and maintenance of bridges (5 projects).

In strategic plan of development and maintenance of II. class and III. class roads were chosen projects that are prepared and have a significant impact on shaping the characteristics of the road network (green projects).

2.1.2 SELECTION OF CRITERIA FOR THE EVALUATION AND DETERMINATION OF WEIGHTS

The strategic plan for the development and maintenance of II. class and III. class roads at the regional level is the basic conceptual document that defines the needs of transport infrastructure and priorities of development in KSGR. On the base of the conceptual document and analytical part of the strategy was developed framework by expert team for evaluation of selected projects. For individual aspects of transport analysis have been determined criteria for the prioritization of projects with regard to extent of fulfillment of needs that reflect the needs of the road network in the context of repairs financing, maintenance and other investment activities related to II. class and III. class roads in ownership of KSGR.

The criteria were selected and designed to be able analyze and assess the requirements for transport and economic importance of regional infrastructure as well as to assess the technical characteristics of the infrastructure and also certain hazards due to forces of nature.

The evaluation of criteria for compiling the ranking of projects and measures are concentrated in five categories that represent specific areas of assessment of transport infrastructure development:

- A. Transport and economic importance,
- B. Traffic operation,
- C. Construction and technical condition,
- D. Safety,
- E. Climate and geodynamic impacts.

Vision of infrastructure development in regional level is to achieve such characteristics of the road network that will allow to generate economic growth, employment and will not limit the internal potential of the region.

Characteristics of the road network will be achieved through the objectives and measures that are divided into following areas: construction (1), reconstruction (2), maintenance and repair roads (3) and reconstruction, maintenance and repair of bridges (4). Projects are assessed by group of criteria that belong to the category related to area in which the project falls. Each analyzed area may have a different number of categories with different criteria. In this case, projects from reconstruction, maintenance and repair infrastructure will have the same categories and criteria of evaluation but the weight of criteria will be different.

As was already mentioned, for projects evaluation is necessary to determine weights of each criteria. The projects are divided into 4 basic groups and the weights are calculated for each group separately. The weights were calculated with Saaty method where all categories and criteria were evaluated between each other in matrix.

The weights of criteria and criteria for evaluation are included in attachment No. 1 of this document.

2.1.3 PRIORITIZATION OF PROJECTS ACCORDING TO RESULTS OF MCA

Projects evaluation were realized on based MCA by team of transport experts. The overall score of the project was directly dependent on meeting selected criteria and its weights. Each project was evaluated separately.

Prioritization of projects was determined based on the final number of points in each area. **ID V002: Relocation of II/536 road, bypass Snižian** got full score in construction area. Reconstruction of bridge **549-003: Bridge through river Uhorná behind village Smolník** got 0,6917 points in the area of reconstruction, repair and maintenance of bridges where were assessed 5 projects. The project was assessed as the most advantageous. In the reconstruction area were assessed 23 projects on II. class and III. class roads. As the most suitable project was assessed **ID R003: II/526 Rožňava – Štítnik- district border KSGR/BBSGR** and **ID R009: II/555 Michalovce - Veľké Kapušany - Kráľovský Chlmec**, which got 0,8641 points. The most suitable project was **ID U0016: III/3302 Turňa – Žarnov, damaged old vaulted sluice**, which got 0,6263 points in repair and maintenance area.

Complete results of the prioritization of projects in each area on the basis of multi-criteria assessment are contained in annex No. 2 of this document.

3. PREPARATION OF STRATEGY - FINANCIAL PART AND PLAN OF UPDATE

The financial envelope for needs of regional infrastructure will be ensured by combination of funds coming from the European Union (EU funds), own resources of SGR (income and budget of higher territorial unit) and loans from the European Investment Bank.

3.1 FINANCIAL NEEDS

Total financing needs can be identified on the basis of different kinds of projects mentioned in the previous chapter. In the table 3-1 are defined financial needs based on the current definition of individual projects.

Tab. 3-1 Total financing needs of projects in each area

Area of operations	Financial needs (green projects) million €
Projects for the construction of road infrastructure	12,000
Projects for reconstruction of road infrastructure	74,500
Projects for maintenance and repairs of road infrastructure	9,000
Projects for reconstruction, repair and maintenance of bridges	1,735
Total on II. class and III. class roads in KSGR	95,50

3.1.1 MINIMALIST SCENARIO OF FUNDS ALLOCATION

Minimalist scenario represents basic operations and needs of road infrastructure that should carry out by administrator in order to maintain the primary assumptions of qualitative parameters of the existing road network at regional level. These operations represent the basic activities that are subject of regular summer and winter maintenance and implementation of projects for maintenance and repair of II. class and III. class roads and reconstruction of selected bridges, which could endanger road users as well as increase a negative impact on the environment.

3.1.2 MAXIMALIST SCENARIO OF FUNDS ALLOCATION

The maximalist scenario assumes to realize all the needs of road infrastructure (projects of the construction, reconstruction and maintenance and repair of road networks) in the regional level. In this scenario, KSGR must carry out two investment projects in road construction area on II. class roads (12 000 000 €), 23 investment projects in reconstruction area on II. class and III. class roads (74 500 000 €), 44 small projects in repair and maintenance area on III. class roads (9 000 000 €) and 5 projects in reconstruction area of bridges (1 735 000 €). In total it is 74 projects with estimated investment cost approximately 97 235 000 euros.

The analysis of financial sources for road infrastructure confirmed that maximalist scenario cannot be realized without credit loans and increased revenue through other gainful activities of KSGR.

3.1.3 OPTIMAL SCENARIO OF FUNDS ALLOCATION

The optimal scenario is a middle ground between maximalist and minimalist scenario, which should involve activities related to regular maintenance, investment shares and reconstruction operations. The HTU should be able to accomplish the tasks in given period, if the allocations of funds will be set up correctly.

In optimal scenario, the HTU must finance the realization of the basic measures and thanks to them HUT will keep the road network of regional significance in good operational and technical condition. This will be achieved by implementing projects of maintenance and repair in minimalist scenario. These activities shall be financed only from own funds.

The optimal scenario can be achieved by overpaying of minimalist scenario plus other appropriate projects from maximalist scenario.

3.1.4 SUMMARY OF FINANCIAL NEEDS IN ROAD INFRASTRUCTURE FOR EACH SCENARIO

The financial needs of the proposed measures with the funding sources of projects that are grouped under the various scenarios are contained in annex No. 3 of this document.

In the case that KSGR will not have enough of own finances or the financial needs of proposed projects will exceed the finances of Integrated Regional Operational Programme, it will be necessary to ask for loan or subsidy from the EIB. Currently, this option seems like inevitable and in comparison with other funding opportunities is the most advantageous.

APPENDIX

Appendix 1 – Evaluation criteria and weights of the projects criteria in various fields

Appendix 2 – Prioritization of projects according to the results of MCA in individual areas of investment

Appendix 3 – Summary of financial needs for road infrastructure in different scenarios

APPENDIX 1

Evaluation criteria and weights of the projects criteria in various fields

Criteria and weights of the criteria for projects in construction area

1	Category	Evaluation criterion	The absolute weight of criteria
A	Transport and economic importance	Connection with roads of higher traffic importance motorways, expressways, I. class roads, feeders on motorways, expressways, roads in area without superior road network, etc.	0,14
		The road provides daily mobility of persons and access to social and economic needs (employment, education, health services, culture and recreation), importance in terms of public transport (e.g. connection to terminals integrated transport, stations of urban public transport, etc.)	0,09
		Link or connection to important tourist centers	0,10
		Traffic connections of industrial sites and hubs of intermodal transport	0,21
		The road connects the centers of population defined in the Slovak Spatial Development Perspective 2011 (in principle these are cities that have in terms of economic development in the regions greatest development potential).	0,20
B	Traffic operation	Overshoot of average intensity on the alternating sections (comparing the intensity of existing roads, which the new section will replace / combine with average intensity in the region)	0,19
D	Road Safety	Traffic accidents on alternating road sections (comparison with the average traffic accident rate on existing roads, which the new section will replace / connect)	0,08

Criteria and weights of the criteria for projects in reconstruction area

2	Category	Evaluation criterion	The absolute weight of criteria
A	Transport and economic importance	Connection with roads of higher traffic importance motorways, expressways, I. class roads, feeders on motorways, expressways, roads in area without superior road network, etc.	0,05
		The road provides daily mobility of persons and access to social and economic needs (employment, education, health services, culture and recreation), importance in terms of public transport (e.g. connection to terminals integrated transport, stations of urban public transport, etc.)	0,07
		Link or connection to important tourist centers	0,02
		Traffic connections of industrial sites and hubs of intermodal transport	0,04
		The road connects the centers of population defined in the Slovak Spatial Development Perspective 2011 (in principle these are cities that have in terms of economic development in the regions greatest development potential).	0,08
B	Traffic operation	Overrunning of traffic intensity average value in region (road capacity)	0,11
C	Construction and technical state	Construction and technical state of road (on the base of visual evaluation inspection – road surface bumps, ruts...)	0,18
		Bearing capacity (KUAB)	0,18
D	Road safety	Road accident in section of the road in the district (comparison of the traffic accidents density on the relevant road in district with an average density in region)	0,13
E	Climatic and geodynamic effects	Oblasť s významným povodňovým rizikom	0,07
		Náchylnosť územia na svahové deformácie	0,07

Criteria and weights of the criteria for projects in road maintenance area

3	Category	Evaluation criterion	Absolute weight of criterion
A	Transport and economic importance	Connection with roads of higher traffic importance motorways, expressways, I. class roads, feeders on motorways, expressways, roads in area without superior road network, etc.	0,05
		The road provides daily mobility of persons and access to social and economic needs (employment, education, health services, culture and recreation), importance in terms of public transport (e.g. connection to terminals integrated transport, stations of urban public transport, etc.)	0,07
		Link or connection to important tourist centers	0,02
		Traffic connections of industrial sites and hubs of intermodal transport	0,04
		The road connects the centers of population defined in the Slovak Spatial Development Perspective 2011 (in principle these are cities that have in terms of economic development in the regions greatest development potential).	0,08
B	Traffic operation	Overrunning of traffic intensity average value in region (road capacity)	0,12
C	Construction and technical state	Construction and technical state of road (on the base of visual evaluation inspection – road surface bumps, ruts...)	0,18
		Bearing capacity (KUAB)	0,18
D	Road safety	Road accident in section of the road in the district (comparison of the traffic accidents density on the relevant road in district with an average density in region)	0,14
E	Climatic and geodynamic effects	Area with a significant flood risk	0,05
		Liability of area to the landslip	0,05

Criteria and weights of the criteria for projects in bridge reconstruction and bridge maintenance

4	Category	Evaluation criterion	Absolute weight of criterion
A	Transport and economic importance	Connection with roads of higher traffic importance motorways, expressways, I. class roads, feeders on motorways, expressways, roads in area without superior road network, etc.	0,05
		The road provides daily mobility of persons and access to social and economic needs (employment, education, health services, culture and recreation), importance in terms of public transport (e.g. connection to terminals integrated transport, stations of urban public transport, etc.)	0,07
		Link or connection to important tourist centers	0,03
		Traffic connections of industrial sites and hubs of intermodal transport	0,04
		The road connects the centers of population defined in the Slovak Spatial Development Perspective 2011 (in principle these are cities that have in terms of economic development in the regions greatest development potential).	0,07
B	Traffic operation	Overrunning of traffic intensity average value in region (road capacity)	0,09
C	Construction and technical state	Construction and technical state of object	0,10
		Stressability	0,11
		Age of bridge (more than 50)	0,04
		Safety equipment (crush barrier, guide rail, bridge movement Jois...)	0,05
D	Road Safety	Road accident in section of the road in the district (comparison of the traffic accidents density on the relevant road in district with an average density in region)	0,10
E	Climatic and geodynamic effects	Area with a significant flood risk	0,12
		Liability of area to the landslip	0,12

APPENDIX 2

Prioritization of projects according to the results of MCA in individual areas of investment

Prioritization of road construction projects

Project ID	Road number	Section description	Evaluation	Budget mil. €	Ranking
ID V002	II/536	Shifting of road II/536 Smižany bypass	1,0000	10,0	1
ID V001	II/550	Shifting of road II/550	0,8116	2,0	2

Prioritization of road reconstruction projects

Project ID	Road number	Section description	Evaluation	Budget mil. €	Ranking
ID R003	II/526	Rožňava - Štítnik – Border of region KSK/BBSK	0,8641	2	1
ID R009	II/555	Michalovce - V. Kapušany - Kráľovský Chlmec	0,8641	3,6	1
ID R008	II/550, II/548	Moldava nad Bodvou - Jasov - Košice	0,8189	3	2
ID R005	II/533	Gemerská Poloma - SNV- Harichovce - D1 (Jánovce - Jablonov)	0,8068	5,6	3
ID R007	II/552	Border of district KE/KS - Veľké Kapušany- border UA	0,7681	6	4
ID R002	II/576	Bohdanovce - Herľany	0,7632	6	5
ID R001	II/547	Border of district KE/KS - Spišské Vlachy	0,7551	10	6
ID R010	II/582	Michalovce - Sobrance	0,7551	2,4	6
ID R044	III/3244 (III/536005)	Through road of city Spišská Nová Ves, Markušovce - Rudňany - Poráč + landslide	0,7551	1,6	6 (1)
ID R014	II/549	Krásnohorské Podhradie - Úhorná - Mníšek nad Hnilcom	0,6937	8,4	7
ID R006	II/536	Spišské Vlachy - SNV - Border of district SNV/LE (I/18)	0,6871	4,8	8
ID R013	II/546	Jaklovce - Mníšek nad Hnilcom	0,6692	5,9	9
ID R055	III/3710 (III/553047)	Trebišov - Trebišov, Nový Majer part	0,5496	1	10 (2)
ID R004	II/587	Štítnik - Henckovce	0,5435	3,7	11
ID R012	II/554	Trhovište - Border of district MI/VT	0,5435	2,7	11
ID R015	II/535, III/3048 (III/535004), III/3047 (III/535001)	Dobšinský kopec - Palcmanská Maša - Dobšinská Maša	0,5000	1,2	12
ID R043	III/3201 (III/018165)	Border of district. PP/SNV - Iliašovce - Smižany	0,2921	1	13 (3)
ID R027	III/3410 (III/050196)	Oľšovany - Ďurkov	0,2648	0,5	14 (4)
ID R034	III/3440 (III/068002)	Kecеровce - Čížatice - Rozhanovce	0,2648	1,6	14 (4)
ID R036	III/3343 (III/068025)	Crossroad I/68 - Čaňa	0,2469	0,6	15 (5)
ID R061	III/3667 (III/552023)	Cejkov, crossroad with I/79 Borša	0,2139	1	16 (6)
ID R031	III/3295 (III/018230)	Bidovce - Kecеровce	0,1969	1,4	17 (7)
ID R018	III/3807 (III/552033)	Bežovce - Záhor	0,1395	0,5	18 (8)

Prioritization of road maintenance projects

Project ID	Road number	Section description	Evaluation	Budget mil. €	Ranking
ID UO016	III/3302 (III/050171)	Turňa – Žarnov – damaged old vault culvert	0,6263	0,1	1
ID UO018	III/3337 (III/068016) – križ. III/3390 (III/547002)	Town residential area of Družstevná p/H	0,6092	0,1	2
ID UO011	III/3754 (III/55232)	Crossroad with Ul. Tibavská , Sobrance – little roundabout	0,5826	0,3	3
ID UO012	Crosroad II/555 s III/3754 (III/55232)	Crossroad II/555 s III/55232 – rural zone – roundabout	0,5768	0,3	4
ID UO029	III/3005 (III/050150)	G. Hôrka, culvert	0,5525	0,1	5
ID UO003	III/3770 (III/555001)	Michalovce - Through road	0,5286	0,1	6
ID UO036	III/3279 (III/546022)	Nálepkovo - Peklisko	0,5272	0,2	7
ID UO026	III/3227 (III/53614)	Spišský Štvrtok - Stratená	0,5227	0,3	8
ID UO027	III/3010 (III/050155)	Brzotín Town resident area	0,5118	0,1	9
ID UO019	III/3460 (III/546001)	Obišovce-Bzenov	0,4985	0,1	10
ID UO033	III/3250 (III/536012)	Through road Spišské Tomášovce	0,4732	0,2	11
ID UO039	III/3250 (III/536012)	Railway overpass in Through road Spišské Tomášovce	0,4732	0,1	11
ID UO040	III/3250 (III/536012)	Behind Spišské Tomášovce - Čingov	0,4732	0,1	11
ID UO005	III/3754 (III/552032)	Lekárovce - Through road	0,4490	0,2	12
ID UO041	III/3690 (III/553024)	Veľký Horeš - Kráľovský Chlmec	0,4445	0,8	13
ID UO004	III/3753 (III/552030)	Krišovská Liesková	0,4381	0,1	14
ID UO008	III/3757 (III/552041)	Veľké Slemence - Ptrukša	0,4192	0,1	15
ID UO021	Malá Ida od križ. III/3405 (III/050 256) a III/3403 (III/050 192) Through road	Bukovec – Malá Ida from crosroad III/050 256 and III/050 192	0,4192	0,1	15
ID UO007	III/3757 (III/552041)	Ruská - V. Slemence	0,3950	0,1	16
ID UO030	III/3071 (III/018159)	Border of district .PP/SNV - Hrabušice	0,3847	0,4	17
ID UO017	III/3333 (III/050263)	Zádiel connector	0,3802	0,1	18
ID UO043	III/3680 (III/553014)	V. Trňa - Roundabout	0,3802	0,8	18
ID UO013	III/3359 (III/548003)	Jasov – Poproč	0,3738	0,1	19
ID UO015	III/3440 (III/068002)	Rozhanovce – Čižatice - 2 damaget culverts	0,3708	0,1	20
ID UO025	III/3036 (III/06715)	Dobšinská Ľadová Jaskyňa – estate road	0,3694	0,1	21
ID UO022	III/3336 (III/068 009)	Rural zone of Ortáše	0,3605	0,1	22
ID UO014	III/3359 (III/548003)	Intravilán obce Poproč – slip of road	0,3497	0,1	23
ID UO020	III/3293 (III/018228)	Herľany - Žírovce	0,3307	0,1	24
ID UO031	III/3244 (III/536005)	Rudňany - landslide	0,3307	0,9	24
ID UO024	III/3034 (III/06713)	Dobšiná – estate road	0,3263	0,1	25
ID UO034	III/3215 (III/018180)	Border of district LE/SN - Hodkovce - Žehra	0,3263	0,1	25
ID UO009	III/3732 (III/018240)	Rakovce n/O.	0,3066	0,1	26
ID UO044	III/3678 (III/553012)	Zemplínske Hradište - connector	0,3066	0,2	26
ID UO001	III/3735 (III/018251)	Pusté - Čemerné	0,3059	0,1	27
ID UO028	III/3038 (III/52619)	Roštár - Brdárka	0,2915	0,1	28
ID UO038	III/3281 (III/547014)	Kojšov - connector	0,2767	0,2	29
ID UO037	III/3270 (III/018187)	Hrišovce	0,2673	0,1	30
ID UO035	III/3280 (III/547013)	Štefanská Huta - connector	0,2526	0,1	31
ID UO023	III/3362 (III/548006)	Medzev - Vyšný Medzev	0,2375	0,3	32

Project ID	Road number	Section description	Evaluation	Budget mil. €	Ranking
ID UO042	III/3715 (III/554001)	Boľ - Vojka	0,2375	0,5	32
ID UO006	III/3755 (III/552037)	Čičarovce - Through road	0,2133	0,2	33
ID UO032	III/3245 (III/536007)	Matejovce - connector	0,1490	0,3	34
ID UO010	III/3796 (III/050235)	Fekišovce - Through road	0,1445	0,1	35
ID UO002	III/3797 (III/050236)	Bunkovce - Blatné Remety	0,1248	0,2	36

Prioritization of reconstruction and bridges maintenance projects

Project ID	Road number	Bridge description	Evaluation	Budget mil. €	Ranking
	II/549	549-003 Bridge over river Uhorná behind village Smolník	0,6917	0,104	1
	II/533	533-013 Bridge over vodný watercourse (SNV)	0,6797	0,061	2
ID OM016	III/3368	552004-001; Bridge over railway Košice - Čierna nad Tisou before village Nižná Myšľa	0,6132	1,20	3
ID OM010	III/3308	050177-001; Bridge over standing water behind Peder	0,4960	0,08	4
ID OM034	III/3711	553048-003 Bridge behind railway junction Onča	0,3363	0,29	5

APPENDIX 3

Summary of financial needs for road infrastructure in different scenarios

Summary of financial needs in minimalist scenario

MINIM. SC	Financing of activities from own sources (2016 -2020)			
s. n.	Area of activity	number of projects	final costs (mil. €)	
1	Administration, Standart summer and winter road and bridges maintenance	-	51,440	61,640
2	Road maintenance projects	44	9,000	
3	Reconstruction and bridges maintenance	1	1,200	
MINIM. SC	Financing of activities from EU sources (2016 -2020)			
s. n.	Area of activity	number of projects	final costs (mil. €)	
1	Reconstruction and bridges maintenance	2	0,165	0,165

Summary of financial needs in maximalist scenario

MAXIM. SC	Financing of activities from own sources (2016 -2020)			
s. n.	Area of activity	number of projects	final costs (mil. €)	
1	Administration, Standart summer and winter road and bridges maintenance	-	51,440	66,010
2	Road maintenance projects	44	9,000	
3	Reconstruction and bridges maintenance	3	1,570	
4	Reconstruction of II. and III. class roads	4	4,000	
MAXIM. SC	Financing of activities from EU sources (2016 -2020)			
s. n.	Area of activity	number of projects	final costs (mil. €)	
1	Projects of road-traffic infrastructure construction	2	12,000	82,665
2	Reconstruction of II. and III. class roads	19	70,500	
3	Reconstruction and bridges maintenance	2	0,165	

Summary of financial needs in optimal scenario

OPTIM. SC	Financing of activities from own sources (2016 -2020)			
s. n.	Area of activity	number of projects	final costs (mil. €)	
1	Administration, Standart summer and winter road and bridges maintenance	-	51,440	81,110
2	Road maintenance projects	44	9,000	
3	Reconstruction and bridges maintenance	3	1,570	
4	Reconstruction of II. and III. class roads	3	19,100	
OPTIM. SC	Financing of activities from EU sources (2016 -2020)			
s. n.	Area of activity	number of projects	final costs (mil. €)	
1	Projects of road-traffic infrastructure construction	2	12,000	46,365
2	Reconstruction of II. and III. class roads	8	34,200	
3	Reconstruction and bridges maintenance	2	0,165	