



UNECE

**TRANS-EUROPEAN NORTH-SOUTH
MOTORWAY (TEM)**

Workshop: MAINTENANCE SERVICE LEVELS

**Ministry of the Sea, Transport and Infrastructure
Croatia**

May 2018, Prague

MAINTENANCE REGULATORY FRAMEWORK

- *Road maintenance works are defined in Road act (NN 84/11, 22/13, 54/13, 148/13, 92/14) as:*
 - *Routine maintenance - continuous works during the year to keep road ready to accept traffic*
 - *Periodic maintenance - periodical works to improve some element of road according detail design*
 - *Road act is defining general obligations of road operators and relations between main stakeholders*
- *According Road act minister bring:*
 - *Regulation on maintenance*
 - *Regulation on road patrol*
- *According Road act and regulations road authorities are preparing internal documents - General technical conditions for road works (OTU)*

ROUTINE MAINTENANCE STANDARDS

Road act:

- *State road operator and counties road operators are not allowed to do patrolling and maintenance (have to be outsourced)*
- *Road authorities is always responsible for maintenance*



ROUTINE MAINTENANCE STANDARDS

Routine maintenance standard defines the quantities and frequency of works and standards for materials, work hours for vehicles, machines, equipment and labor that are required for routine maintenance. When routine maintenance standard levels are met fully, this enables to preserve structural, transport and economic value of an asset.

OWNERSHIP OF MAINTENANCE

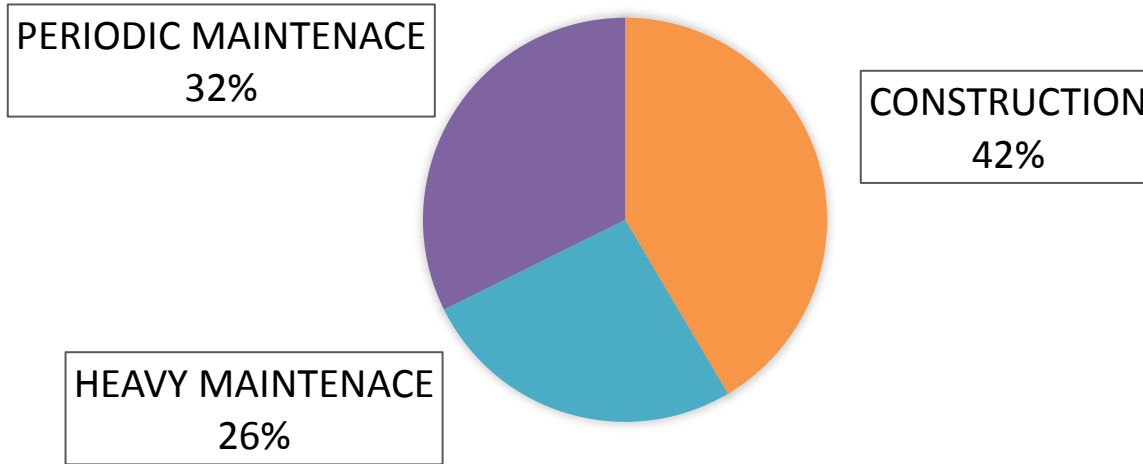
<i>Structure of public roads authorities:</i>	<i>Maintenance</i>
<i>HAC - highway national operator</i>	<i>on its own</i>
<i>ARZ - highway concessionary road operator – 100 % state owned</i>	by HAC
<i>BINA – ISTRRA - highway road operator (Bina-Istra) 1995.g. – 56% private owned concessionary</i>	daughter company for patrolling tooling and maintenance
<i>AZM - highway road operator (AZM) – 51 % private owned concessionary</i>	EGIS - market oriented company for patrolling tooling and maintenance
<i>state road national operator (HC)</i>	14 market oriented companies for patrolling tooling and maintenance (5 year contract)
<i>county road operator (21 ŽUCs)</i>	14 market oriented companies for patrolling tooling and maintenance (5 year contract)

Expenditure of public roads sector:

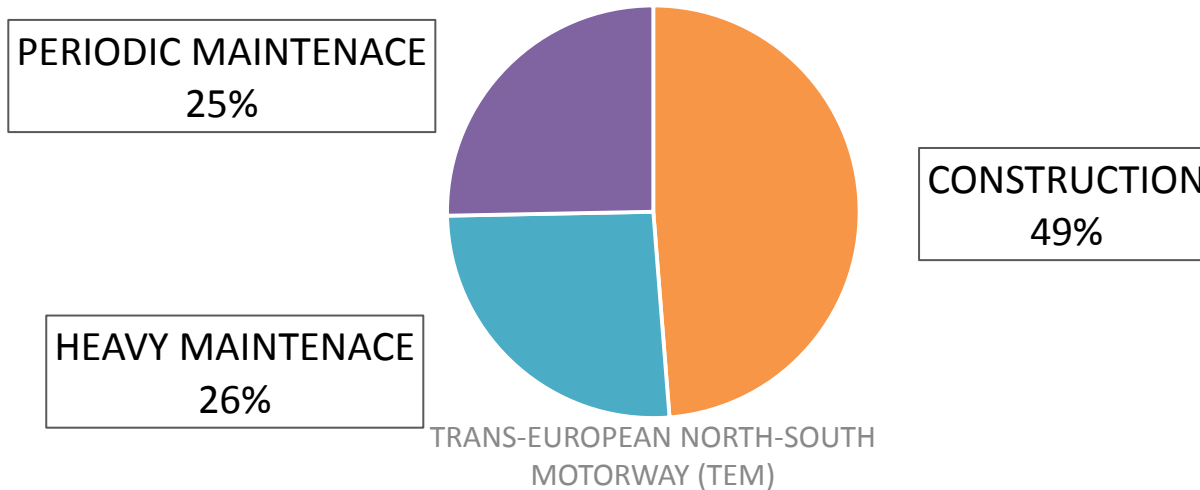
ROAD / Expenditure	2013. – 2016.	2017.-2020.	2017.	2018.	2019.	2020.
HIGHWAYS	€ 592.935	€ 636.233	€ 140.947	€ 172.151	€ 182.331	€ 140.803
Construction (CAPEX)	€ 403.347	€ 340.248	€ 69.962	€ 91.180	€ 104.517	€ 74.589
Heavy maintenance (CAPEX)	€ 54.584	€ 158.761	€ 36.450	€ 46.911	€ 43.585	€ 31.815
Periodic maintenance (OPEX)	€ 135.003	€ 137.225	€ 34.536	€ 34.061	€ 34.228	€ 34.400
STATE ROADS	€ 872.514	€ 1.251.483	€ 229.708	€ 295.260	€ 362.791	€ 363.723
Construction (CAPEX)	€ 352.443	€ 761.507	€ 105.575	€ 175.719	€ 240.859	€ 239.353
Heavy maintenance (CAPEX)	€ 302.915	€ 286.871	€ 74.800	€ 69.295	€ 70.681	€ 72.095
Periodic maintenance (OPEX)	€ 217.155	€ 203.105	€ 49.333	€ 50.246	€ 51.251	€ 52.276
COUNTY AND LOCAL ROADS	€ 373.285	€ 377.976	€ 99.763	€ 90.605	€ 93.363	€ 94.244
Construction (CAPEX)	€ 7.294	€ 13.055	€ 4.205	€ 2.814	€ 2.857	€ 3.179
Heavy maintenance (CAPEX)	€ 123.997	€ 132.019	€ 38.828	€ 29.208	€ 31.618	€ 32.364
Periodic maintenance (OPEX)	€ 241.994	€ 232.902	€ 56.729	€ 58.583	€ 58.888	€ 58.701
CAPEX	€ 1.244.580	€ 1.692.460	€ 329.820	€ 415.128	€ 494.118	€ 453.394
OPEX	€ 594.153	€ 573.232	€ 140.599	€ 142.889	€ 144.367	€ 145.377
TOTAL	€ 1.838.733	€ 2.265.692	€ 470.419	€ 558.017	€ 638.485	€ 598.771

Structure of expenditures

2013. - 2016.



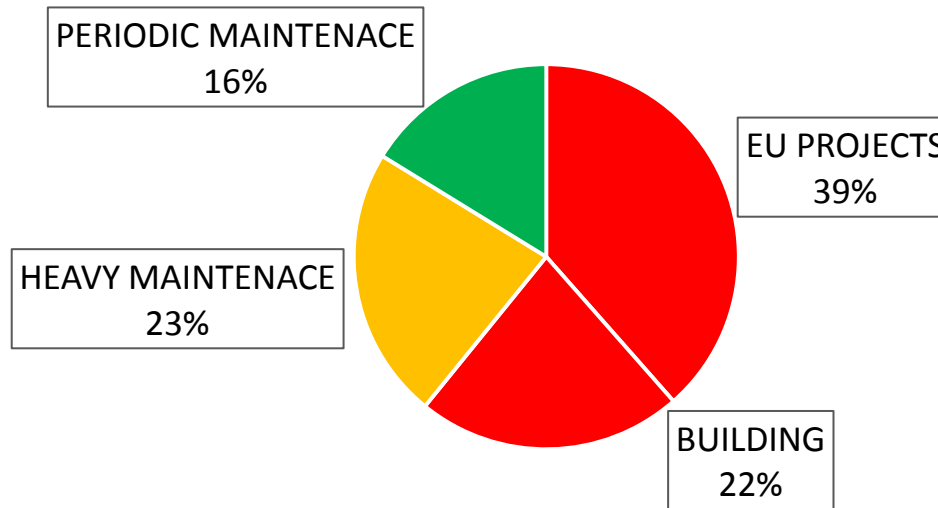
2017. - 2020.



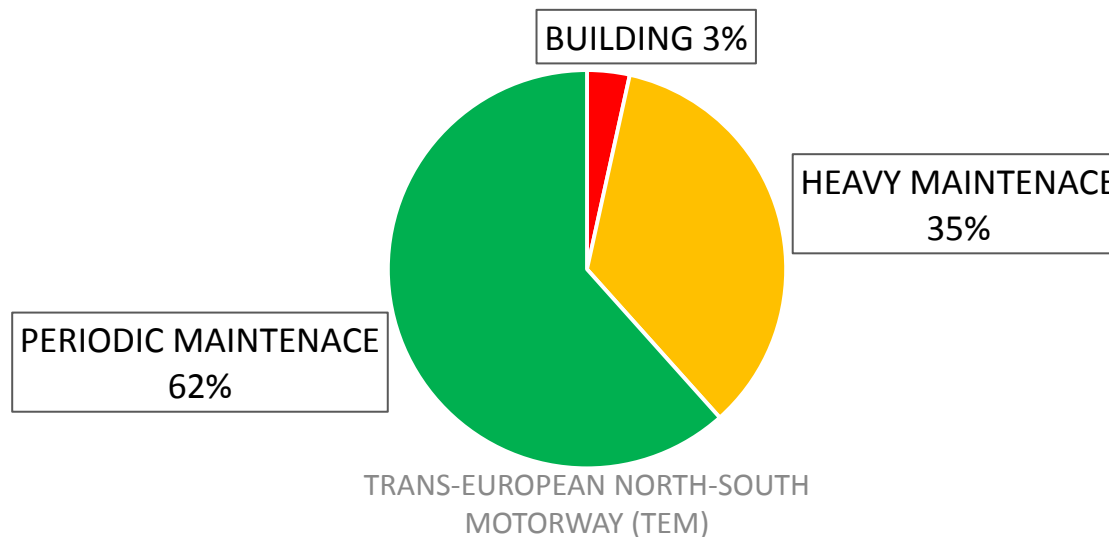
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Structure of expenditures 2017. - 2020.

STATE ROADS



COUNTY AND LOCAL ROADS



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M.A.R.S. - MODERNIZATION AND RESTRUCTURING OF THE ROAD SECTOR

- Financial restructuring:
 - Refinance 5 bil. € debt
 - Longer repayment
 - Lower interest rates
- Operational:
 - Optimisation of number of employees
 - Lower maintenance costs
 - Improvement of service (safety improvement)
- Organisational:
 - Better organisational structure
 - Long term planning

M.A.R.S. - OPERATIONAL RESTRUCTURING

- **road classification and standards:**
 - (i) implement a technical classification of the public road network;
 - (ii) develop consistent sets of maintenance related regulations and specifications for all classes of roads
- **road asset management system:**
 - (i) Design and implementation of a road asset management system (RAMS) for all Road Sector Companies to comprise a computerized database with inventory, condition and traffic data.
 - (ii) Development of a multi-year costed road maintenance program by each Road Sector Company.
- **rationalization of operations and business functions (motorways);**
- **road safety.**

M.A.R.S. – ROADS CLASSIFICATION

Decision has been enacted to implement technical classification of public roads, whereby all public roads shall be classified in the following six (6) categories:

- Motorways,
- Highways,
- 1st category roads,
- 2nd category roads,
- 3rd category roads,
- 4th category roads.

Equal level of maintenance standard for each category is expected, regardless of the network operator.

Maintenance standard in the form of service levels for the six road categories will be established.

M.A.R.S. - ROADS ASSET MANAGEMENT SYSTEM (RAMS)

Roads asset management system for motorways, state and county roads will be developed through a contract for services to be made by March 2018. RAMS will use all existing elements of the asset management systems at the road sector companies and Croatian Roads. RAMS will ensure availability of updated network condition data and will serve as a basis for continuous updating of estimates or periodic schedules for maintenance of motorways and state roads.

M.A.R.S. - ROADS ASSET MANAGEMENT SYSTEM (RAMS)

RAMS will have two main functions:

- (A) reliable, precise and user-friendly data inventory for pavements, structures and other elements of road infrastructure
- (B) tool to assess, prioritize and cost future periodic maintenance and rehabilitation needs, using international state-of-the-art practice

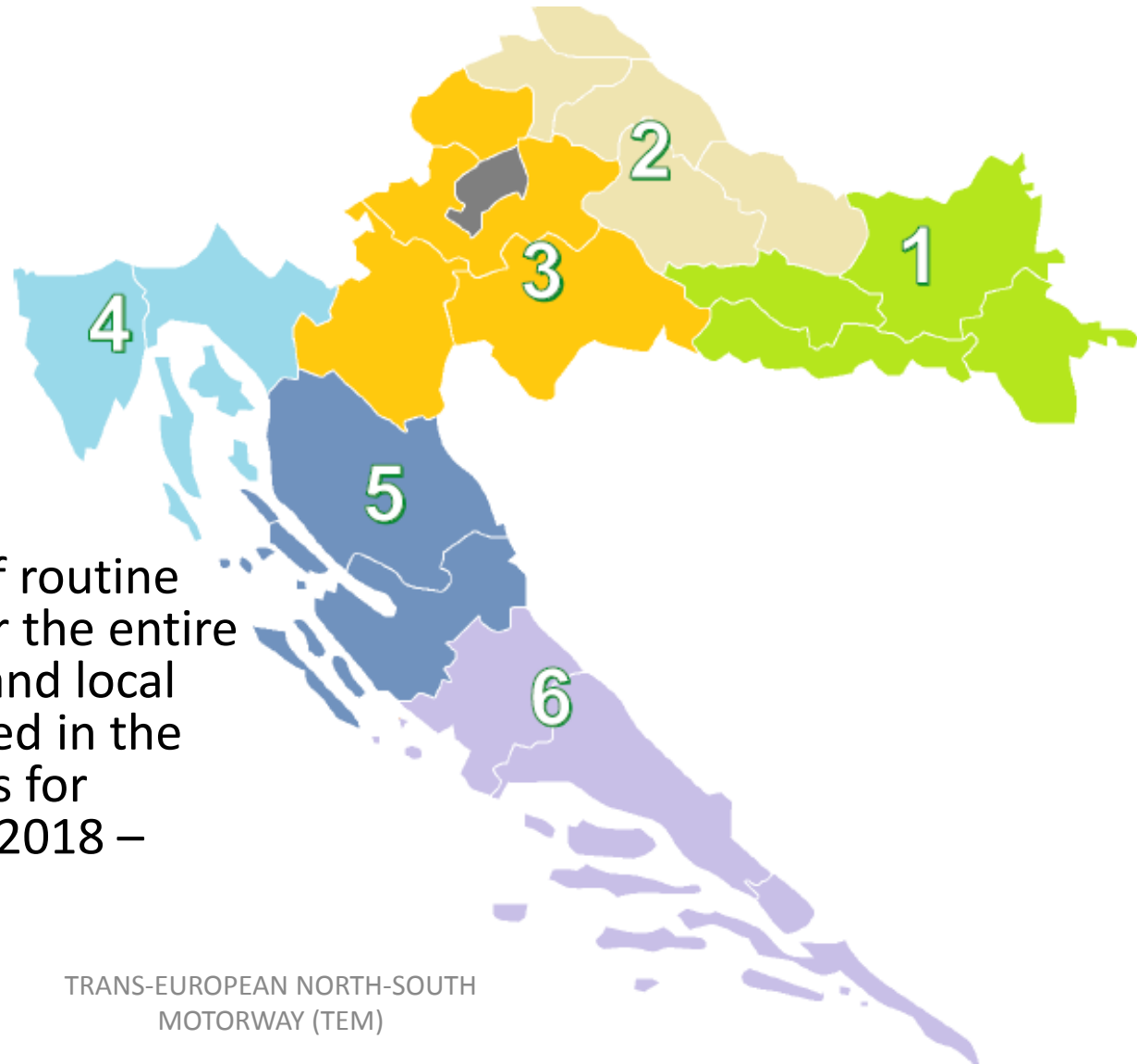
Main element of RAMS:

- Pavement Management Systems (PMS)
- Structure Management Systems (SMS)
- GIS based Road Database
- Traffic volume database

STATUS: Procurement for RAMS consultant for preparing RAMS Strategy is ongoing.

NEXT STEP: Establishment RAMS according prepared Strategy.

M.A.R.S. - ROUTINE MAINTENANCE PROCUREMENT



The unified procurement of routine works has been planned for the entire network of state, regional and local roads. It will be implemented in the upcoming period (Contracts for maintenance in the period 2018 – 2022).

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Thank you for attention!

Questions?

Jasna Divić

Ministry of the Sea, Transport
and Infrastructure

E: jasna.divic@mmpi.hr

Ivica Jujnović

Ministry of the Sea, Transport and
Infrastructure

E: ivica.jujnovic@mmpi.hr

What we expect from maintenance

- Road Asset Management Strategy
- Road Asset Management Systems (RAMS)
- Pavement Management Systems (PMS)
- Structure Management Systems (SMS)
- Accident Information System (AIS)
- Routine Maintenance Management System (RMMS)
- Road Information System (RIS) – central road database;
- Pavement Management System (PMS) – interfacing with HDM4 and RED analysis engines;
- Bridge Information System (BIS);
- Traffic Information System (TIS);
- Performance Based Maintenance Contracting (PBMC)
- LEAN concepts
- supervision of works
- Levels of Service
- Key Performance Indicators
- Engineering standards for maintenance

DATA-DRIVEN MAINTENANCE

- *Do you have Assets Inventory?*
- *What types of Assets do you have in your inventory?*
- *What types of data do you collect?*
- *How these data support maintenance?*

ASSETS CONDITION

- *How do you check assets condition?*
- *Which characteristics are measured? (i.e.: roughness)*
- *What indicators do you use for particular characteristics? (i.e.: IRI)*
- *What is the current technical condition of the network in your Member Country?*



MAINTENANCE SERVICE LEVELS

- *What is your maintenance strategy (preventive, corrective or reactive)?*
- *What are the maintenance service levels? (i.e. (a) roughness; (b) number of signal breakdowns and time to repair)*
- *What are the performance measures? (i.e. (a) IRI, very good = 3,5 m/km; (b) outages/year, maximum and average duration)*
- *Are performance measures based most on engineering or non-engineering considerations (or both)?*
- *Are performance indicators input-based, output-based or outcome-based?*
- *Do you have targets defined? (targets define quantitatively the performance that needs to be achieved in order to reach the required service levels) (i.e.: (a) roughness, 3,5 m/km, $\geq 80\%$)*



MAINTENANCE WORKS PLANNING

- *Do you carry out performance gaps analysis?*
- *How do you plan routine maintenance works?*
- *How do you plan periodic maintenance works?*
- *What data and information do you take into consideration when planning maintenance works – technical, non-technical, social, economical?*
- *What tools do you use to support maintenance planning?*



MAINTENANCE BUDGET

- *How do you split expenditures for capital investments and maintenance?*
- *What methodology do you use to plan maintenance budget?*
- *What data and tools do you use to plan maintenance budget?*
- *What sources of funding do you have for maintenance works?*
- *What is your current budget?*
 - *For routine maintenance*
 - *For periodic maintenance*
 - *% of your capital expenditures*

FINANCIAL GAP MANAGEMENT

- *What is the gap between network requirements and available budget?*
- *How do you manage this gap?*
 - *New technologies*
 - *New organizational forms (in-house, outsourcing of maintenance)*
 - *New business models (PPP)*
 - *Employees training*
 - *Decrease of maintenance service level*