

INSTITUTIONAL CAPACITY ASSESSMENT FOR ROAD MANAGEMENT IN MOLDOVA

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Summary: The road sector in Moldova is experiencing the same forces that are driving change in road organizations around the world, such as: globalization and increasingly open trade among nations, rapidly advancing technology, increasing need for infrastructure to meet growing demands, and policy and regulatory reforms. Road organizations throughout the world are addressing these challenges in different ways. The paper presents results of the institutional assessment conducted with the main purpose to evaluate the adequacy of the public sector to manage and perform maintenance activities, and introduce performance based maintenance contracts into practice, and to suggest improvements where it is established that they are needed.

Keywords: road management, capacity assessment, monitoring, regulation, operation

1. INTRODUCTION

Road sector generally represents the only available mode of transport that is capable of sharing the traffic load from all other sectors in Moldova. Low volume of maintenance and rehabilitation for the existing road network over long period has made the road network condition fragile. This was further aggravated by weak control over axle load and vehicle weights and led to deteriorating pavement and weakened bridges over large part of the network. This imposed an enormous challenge to upkeep and augment the network to a healthy state to boost the country's development and overall economy.

The road sector in Moldova is experiencing the same forces that are driving change in road organizations around the world. In this context, most road organizations are confronting several institutional challenges, including: (i) high level of political involvement and interference in decision-making (ii) road sector maintenance and

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improvements severely underfunded, (iii) unclear roles and responsibilities of personnel, (iv) insufficient project management capacity or experience to efficiently handle externally financed projects, (v) lack of clear project management systems which link project identification to implementation performance targets, (vi) lack of familiarity with international and European Union procurement, monitoring, implementation, and reporting practices, and (vii) lack of capable contracting and consulting industry.

Road organizations throughout the world are addressing these challenges in different ways. Those successfully doing it and managing change greatly share the following five characteristics: (i) a clear vision and direction, (ii) an understanding of stakeholder needs, (iii) transforming needs into organizational activities, (iv) prioritization and optimization of tools and techniques and (v) setting key performance indicators.

Moldova has a central administration responsible for Main and Republican (national) roads, while Local roads should be managed by the local authorities. Although defined as such in the relevant legislation, the reality shows that the State Road Administration (SRA) is responsible for both national and local roads due to fact that local authorities do not have capacity (physical and financial) to manage and maintain road network under their jurisdiction. Central administration is subordinated to the governmental policy and regulatory body, i.e. the Ministry of Transport and Road Infrastructure (MTRI).

Current practice in road management and maintenance was examined through the technical assistance project [1] provided to the SRA in order to establish capability of management structures to enter into new set-up of road maintenance practice, i.e. Performance Based Maintenance Contract (PBMC).

This paper provides a review of the management and maintenance institutional set-up for the road sector, and makes observations and recommendations for changes to improve its efficiency and role in modernizing the system.

2. MINISTRY OF TRANSPORT AND ROAD INFRASTRUCTURE

The MTRI is the central organ of public control, which develops and realizes the policy of the state in the sphere of all transport modes and road infrastructure. It is subordinated to the Government of Moldova (GoM) and is based in Chisinau.

The MTRI structure is a familiar one, being applied in many countries where the sector has not been privatized or liberalized and depends on the central government for budgets, subsidies and policy. It tends to be “heavy”, bureaucratic structure, may employ a lot of people and can be expensive to operate. In countries where transport has been liberalized, a process of privatization or corporatization has evolved over time where one by one, the different modal entities have ceased to come under direct government control. This usually starts with land freight, then the state airline, and ports which become private operators. Public transport comes next, then finally railways. In those cases, the ministry becomes very “slim” organization acting only as regulator and enabler, and setting policy and targets. The roads authority becomes a separate agency or roads administration, generally contracting out design, construction and maintenance.

MTRI has embarked on a reform process of its transport system, and started a process of liberalization, giving the modal authorities more autonomy, but at the same time reinforcing its role as a regulator. This is very clear from its main functions defined through the Decree on approval of regulation on structure and organization of MTRI [2].

The responsibilities of the MTRI involve organizing all means and modes of transport, fixed and movable equipment, personnel and associated services, as well as the tasks of drawing up the necessary plans and studies for determining the country's medium- and long-term needs of the transport modes. It also includes the responsibility of drafting and updating the sector's laws, by-laws and instructions that regulate all matters related to transport, in a way that is congruent with domestic and foreign transport.

Good governance can only be seriously pursued by separating responsibilities in a hierarchical structure in which the institutions setting policies and drafting laws are not involved in their implementation. In the roads context, the ministerial level delegates certain functions to the implementation body (in this case the SRA) that applies these regulations to enterprises and businesses providing services and works. The ministry retains monitoring responsibility and provides a higher level of appeal by the public and businesses. The implementation body could be an independent governmental authority or an agency, or a private enterprise with delegated duties. It however must be able to take day-to-day decisions autonomously within the set framework.

As a conclusion, it may be said that basic functions of policy, regulation and operation in Moldova are segregated, although not completely, but the transformation is ongoing, particularly in view of objectives and actions set up through the Transport and Logistics Strategy 2013-2022 [3]. The main role in the following process of road maintenance reform for the MTRI would be to define and monitor policy and regulatory issues.

3. STATE ROAD ADMINISTRATION

SRA is the corporative road agency, in the form of a registered state enterprise, responsible for day-to-day management and maintenance of the national road network, and additionally of the local network as well. It holds the title of manager for roads and their right-of-way with the primary objective to reduce road transport costs in Moldova, by improving the condition and quality of the road network and the way it is managed.

SRA is in charge of all road construction, maintenance and rehabilitation, and of road safety. All design, construction, periodic maintenance and construction supervision activities are outsourced, while planning and maintenance supervision are still performed in-house. SRA is also responsible for all decisions concerning the use of funds for roads, both from the state budget and from the Road Fund. Directly subordinated to the MTRI, SRA is the agency responsible for implementing the key maintenance system reforms.

SRA is supposed to enjoy a judicial (as legal entity), financial and administrative independence and complete aptitude, however this is not fully practiced in reality due to lack of full financial and political independence from the MTRI and Ministry of Finance (MF). All funding requires the approval of the MF and the Parliament, and all improvements, including both rehabilitation and periodic maintenance are listed by name and section in these decisions. Capital and recurrent expenditures are financed from the national budget. Investment needs are estimated based on annual plans developed by the SRA. The plans are then consolidated at the national level and submitted, along with MTRI's other departmental needs, to the MF for consideration. The MF approves funding for capital investments and recurrent expenditures (road and bridge maintenance, including winter service) based on available resources, and authorizes annual allocations for their implementation. This is all part of the annual general budget.

The SRA's organization is reviewed in the context of traditional to modern operating modes. Management organizations are usually characterized according to the degree to which they employ practices that are considered as state-of-the-art from management point of view. The organization is analyzed based on global understanding and identified common characteristics at each stage of development as shown in the following matrix (Table 1). SRA set-up and function, at its present, mostly satisfy the requirements of a traditional road organization. Mixed characteristics are seen in recent times, mainly in the areas of core services and information/management systems.

Table 1. Characteristics of road organization

	traditional	mixed (transitional)	Modern
regulatory context	regulation of multiple processes and units	performance impeded by conflicting roles and responsibilities	coordinated regulations which promote high degree of transparency and management of key outcomes
structural characteristics	large size with operations performed by public works forces having centralized control and minimal delegation	smaller size with increased outsourcing of functions	focus on results by small work force which leverages competitive forces for cost and quality control
core services (planning, design, construction, maintenance)	focus on technical and functional areas rather than long term strategy and effectiveness	expected performance not clearly defined or highly valued	focus on management of service providers with effective supervision and defined performance targets
information/management systems	cumbersome manual systems with limited access to computers	Information Technology (IT) based contract administration and financial control systems in place	electronic reporting and communications with integrated systems and extensive use of Internet
financing mechanisms	dependence on annual allocation of government assigned funds	budgetary allocations are partially supported by performance based evidence	adequate and stable funding from dedicated source of government and road user funds

Regulatory context-Traditional: The SRA is governed by the Law on roads [4] with clear regulations for undertaking of works. Jurisdiction and authority of the works are also defined. However, it works as an executive organization under the MTRI and does not have the required independence and autonomy of a modern road agency for its own administration, policies, structuring and financing.

SRA is governed by the civil service rules and procedures for its human resource. Financing of its operations is solely dependent on budget allocations. Fuel levy is permitted and practiced, with a regulatory mechanism in place, but fully controlled by the governmental bodies. Similarly, traffic safety, weight regulations, environmental issues are under the control of MTRI or other relevant ministries. An appropriate

coordination framework is needed if SRA is not empowered with exclusive right to implement regulations for the roads sector.

Structural characteristics-Mixed: The organization is defined by required functional divisions/departments. SRA exhibits general characteristics and organizational culture of a mixed organization. SRA does not perform so well in the following areas: technical manpower, technical expertise and qualified and experienced personnel.

Employee numbers and structure show a very steep pyramidal hierarchy with a bulging number of junior technical and administrative staff, and very few managers. This is common in countries, especially those in transition, where the transport system has been traditionally under strong centralized state control and not liberalized or modernized.

Total number of technical staff closely related to maintenance of roads in the SRA is 61. This covers Roads and Bridges Maintenance Division, Network Management Administration Division, Testing Laboratory and Supervision Department. A comparison of present staffing to the national roads length shows an average assignment of approximately 55 km per technical staff-member/engineer in overall context for national road network, while this length is even higher when local roads are accounted (approximately 155 km). However, knowing that most of the Testing Laboratory and Supervision Department resources are providing their services and expertise to the remaining two technical divisions (i.e. Investment Division and Construction and Capital Repair Division), this figure is even higher and may fall in the category of intensive assignment (over 80 km per technical staff-member/engineer).

Appropriate number depends on size and complexity of a network besides its spatial distribution. In case of smaller networks and traditional organization, where almost all functions are done in-house except for major construction, share of average road length per engineer could be as low as 20 km. As network density increases, routine functions are repeated, standard norms and procedures applied and most importantly, major functions of design studies and implementation are outsourced, ratio can very well be targeted to a healthy figure of 100. Thus, overall technical staff strength of about 80 staff-members dealing only with maintenance of roads, including asset management, supervision and quality control, with approximately 45-50 km per technical staff-member/engineer will be adequate for the present level of network provided that activities are streamlined with a focus on outsourcing of resource-intensive functions.

Higher technical education share of engineers is low. This needs to be strengthened by promoting pursuing of higher qualifications. Higher qualification is a pre-requisite to develop the required understanding and competence. Ideally, one-third of the engineers should be post graduate or higher qualified.

There is experience gap in the organization of the SRA and reduced effective professional strength. Senior block remained technologically backdated, but is available with experience to guide the rest of engineers. To overcome this experience gap, best way would be skill transfer by hands-on training and working through projects executed by consultants. Involvement of international consultants is a must as the domestic industry is weak and yet to make over to the required quality and expertise. Emphasis should be given to recruit highly qualified engineers with good English proficiency. Besides, it is recommended that selected engineers should be sent to reputable institutes and laboratories abroad to attain further skill and qualification on regular basis. This particularly refers to modern maintenance management practice and asset management.

Tendering/procurement capacity in the SRA is concentrated within the Investment Division and Construction and Capital Repair Division, and it manages procurement processes for contracting construction works, reconstruction and periodic maintenance, as well as consulting services such as design and construction supervision. SRA has no experience in procurement of routine maintenance works and PBMC. Medium level of productivity is present when dealing with procurement and contract administration.

SRA lacks capacity for dispute resolution, and it should be established and gradually strengthened. The existing mechanism has three steps of reconciliation, arbitration and reference to court, but can be very cumbersome with many legalities and procedural hassles. A straight mechanism comprised of independent jury in the form of engineer from supervision consultant and dispute adjudication board would be appropriate. All dispute resolution mechanisms are well documented in FIDIC (Fédération Internationale Des Ingénieurs-Conseils) documents, widely accepted in civil engineering practice and these can be directly adjusted for use in routine maintenance contracts. This will enable a simple and quick setting or remedy. Whilst this is generally accepted practice for internationally financed contracts at SRA, there is no such provision for local contracts.

Core services-Traditional: The SRA program is mainly focused on the routine technical and functional areas with a long-term strategy. The programs are carried out on needs-basis rather than on the basis of planning and development of the road network as a whole. Delivery mode for each core service is discussed below:

- **Planning:** SRA identifies roads in need for development and maintenance work. There are no clear medium- or long-term plans. SRA prepares plans for road development, but not comprehensively. No consideration is given to economic criteria or to the condition of the through road to which connectivity is provided. Planning is primarily a process of preparing an annual program with the resultant plan being a consolidation of “bottom up” inputs;
- **Design:** Consultants are engaged for design works and need to be stream-lined for effective execution. Very often designers are found in conflict of interest by offering their design services to prepare contractor’s construction drawings and by proposing variations to the already signed contract. In accordance with Moldovan legislation, designers’ instructions must be respected regardless of contractual consequences;
- **Construction:** External contractors are engaged to perform all road works. Construction supervision is also outsourced. Systematic approach to quality control is in place, and Testing Laboratory acts as a control facility while the contractors’ obligation is to present all necessary proofs for quality of materials and products. Quantum of resources in terms of equipment and tools has been generally sufficient;
- **Maintenance:** SRA engages external contractors for maintenance works, but routine maintenance contractors receive contracts for part of the routine maintenance activities, mostly on a direct award basis. This mostly covers simple maintenance works like vegetation control, drainage system cleaning, pavement cleaning, and similar low valued and labour extensive works, as well as winter service. Emergency maintenance works are carried out through routine maintenance contractors. All maintenance equipment is owned by contractors. It has to be noted that various periodic maintenance works and maintenance activities that normally fall into category of routine maintenance (such as markings, signs, guardrails, bituminous surface treatments, pothole patching) are contracted through competitive tendering. There is no maintenance plan; maintenance specifications and all maintenance are drawn on

as-needed basis. The centralized road database and condition surveys are not regularly used for maintenance planning. At present stage it would be difficult to continue with such practice since the data is not updated regularly. Regulation (i.e. rulebook, manuals, guidelines, etc.) on maintenance is not available. Maintenance supervision operates on regional basis with one staff member covering certain portion of the road network. This member of the Supervision Department prepares and delivers proposals for works in close cooperation with the companies' staff. Limited supervision staff operates under rules that do not promote accountability or reward performance. Testing Laboratory performs quality check for component materials and built products, however with a very limited involvement compared to construction (bitumen, aggregates, asphalt, traffic signalization retro reflectivity, etc.). Periodic maintenance activities are outsourced to contractors.

Organizational performance is measured in terms of maintenance and construction works expenditures instead of benefits provided or services delivered to road users and stakeholders. Plans do not specifically propose any measurable goals, indicators, or targets focused on stakeholder benefits (e.g. mobility, safety and environmental impact). The Supervision Department is a valuable asset with a very good knowledge of local conditions, and through this organization the SRA today can influence priorities and work scheduling.

Information systems-Traditional: SRA's use of information systems is limited as they mainly use software like MS Office and basic financial applications. The administrative and financial systems are mostly based on manual routines. There is no department responsible for IT development and maintenance. Software and Geographic Information System applications for planning, survey, investigation and design are also very limited. SRA possesses road survey system and database, but the full information system for effective planning (definition and prioritization) and monitoring (full tracking of executed works and link with budgeting and expenditure control) of works has never been completely established.

Engineers in SRA have modern desktop/laptop computers with Internet and e-mail services, and this should be improved in future to follow technological advance. Individual systems should preferably be connected through local server, which in-turn can be networked to central server at the SRA headquarters in Chisinau. Monitoring software and applications can be server based with end-user license provision.

Although SRA now has an Internet domain, it has not yet fully networked all employees, but data is generally shared via e-mail, discs or hard copies. All official information is in hard copies. Financial management and payroll have separate systems for their own use. It seems like there is long way for SRA to integrate corporate management system through the Intranet.

However, it has to be noted that the Road Asset Management Department has a very clear vision about its development and utilization of inventory and condition data in the planning and programming of routine and periodic maintenance works, as well as in network development planning. SRA holds in its possession modern vehicle for survey of road assets and their condition. Vehicle is equipped with three panorama cameras, odometer, gyroscope, Global Positioning System device, distress camera, geometry registration system, roughness registration system, and rutting registration device. Traffic intensity survey and its classification can be performed from panorama videos, but this is an intensive manual job. SRA also has geo-radar for general survey of

pavement structure which is not being used as the training is necessary. In addition, there are plans for procurement of skid resistance device and Falling Weight Deflectometer. On the other side, the data originally collected at the time of establishing the database is not being updated on a regular basis, except for the roughness parameters, i.e. International Roughness Index, that are surveyed twice a year (spring and autumn).

Financing mechanisms-Mixed: Funding is dependent on the GoM budgetary allocations, but with dedicated source of government and road user funds (through the Road Fund). International Financing Institutions also participate in financing of periodic maintenance and investment projects. Sources of alternative funding for SRA programs need to be identified. Sources should provide adequate and stable funding for routine road maintenance, but due to accumulated back-log it needs significant amount of money for major repairs and rehabilitation. The level has historically been far below the sustainability limit and has only in 2010 reached a level which allows more than emergency works.

Although the Law on roads [4] gives SRA the responsibility for overall road management, the GoM still retains many of the controls of SRA as before initial reform, such as:

- SRA has to get GoM (in fact, from several Ministries) and Parliament approval for its annual plan which gives the Ministries de facto power to direct SRA funding to certain projects/budget line items;
- a large part of SRA funding comes from the excise tax on fuel which is governed by the MoF (acting as a through gate for collected revenues towards SRA, however MoF should not be involved in this process according to regulatory rules);
- the salary schemes of SRA are part of government salary agreements.

The Government controls SRA directly through the usual management board, but additional controls make long term corporate planning significantly more challenging.

3.1. Capacity Qualification and Recommendations

SRA demonstrates that it has a clear understanding of its functions and structure, and the division of responsibilities within the organization which will pave the way for implementing future changes. SRA already has in place a good administrative set-up consisting of administrative, finance and legal departments, alongside engineering departments. It can be summarized as a well-functioning authority with a clear organizational structure and a good horizontal coordination, including vision of the future and its list of priorities, though these are not documented.

SRA today is very much a technical body where the work is carried out by competent engineers and technicians. Although SRA staff effectively carries out their functions, comparably low power of the Moldovan economy has prevented them from keeping pace with technological advances, and the migration of qualified staff to private sector or to other countries reduces their capacity.

Staff capacity in planning and programming activities, modern practice and techniques for road maintenance and rehabilitation and network planning appear to be weak. It is important to introduce the discipline of network planning, and to prepare master plans and feasibility studies for future network development and maintenance. SRA should be empowered to carry out these activities, and equipped with the tools needed to fully

assess the condition of roads, identify network bottlenecks and deficiencies, and survey traffic volumes.

The staff in SRA should be professionals of high caliber, with high academic qualifications and having recently undergone refresher courses in their respective fields. With the average efficiency target (approximately at 45-50 km/engineer), high level of professional skill and competence is required. Staff development will be very important to meet such target. Bulk of staff has to be recruited early to develop them professionally, while a margin should be added to compensate loss against retirement and attrition to private sector. Staff should be assigned to specialized fields, such as: road maintenance, bridge maintenance, asset management, traffic engineering, etc., according to their technical qualifications and competence, and engineers' capability. Management functions should be strengthened by providing training to improve existing capacity.

Technical specifications should be developed to incorporate international trends, with PBMC manuals/guidelines/specifications having the priority in view of the foreseen reform.

SRA must constantly update its capabilities to incorporate the latest trends in technology (materials, work methods, asset management, road surveys, IT, project monitoring, etc.). Comprehensive asset management system (preferably Commercial-Of-The-Shelf system) has to be completed. The use of software (such as Primavera, CPM/PERI Charts, MS Project) would facilitate contract monitoring and management, and must be made compulsory in SRA. It is desirable that every engineer, including those working in the field, has access to Internet and a computerized database. SRA should plan to move into fully computerized system within the following 2-3 years.

The current planning at SRA assumes that all road sections are of almost equal importance, while some technical parameters are being used through coefficients for road class, length, pavement type, condition, traffic safety and traffic volume. Economical evaluations are not used for prioritization between different set of road works to be carried out on different roads/sections. A set of appropriate indicators for prioritization of roads in need of works ought to be developed and become integral part of the SRA's future planning procedures.

In order to plan properly the network and its maintenance, a lot of accurate data is required. SRA has so far invested in the road database and survey equipment and will upgrade it in near future, but there is no regular, systematic process of road data collection. All future periodic maintenance works should be programmed using such a system. Using a Road Maintenance Management System offers a clear method for prioritizing works and justifying the use of funds. There is a substantial possibility for savings on periodic maintenance actions with application of an optimal strategy.

Planning in SRA seems to be very annual-plan oriented, which is natural considering the approval procedures and the relatively short-term goals. For a corporation, medium- and long-term financial plans, projections and scenarios are of utmost importance since the loan repayment liabilities are high. The organization does not yet have proper tools for making medium-term plans. For road maintenance, the typical tool would be HDM-4 complementing the established database. Using the system properly will require training and data updating, but HDM-4 will facilitate estimating costs with necessary reliability. Greater challenge is proper timing of the planning process. Late approval of the annual plan ruins all efficiency of contracting, especially for larger contracts which have a lead

time of 3 to 4 months from budget approval before a new contract can be effective. No new contract can be advertised before funds have been approved so the obvious remedy for the process is to create conditions which enable earlier approval for the annual plan. Beside the SRA, capacity at the local level for management and maintenance of the relevant road network should be created.

4. CONCLUSION

SRA currently acts as mostly traditional road organization, with aspirations to improve corporate governance of its core services and information/management systems. These aspirations are somewhat limited by de facto SRA's dependence on the MTRI in policy planning and by its total financial dependence on the MF.

Good governance has to be built on the creation of quality organizations and is based on a good legal framework. The sector's development should be based on these structures rather than relying on political will, the personal will of a strong leader or state power; factors which may not be stable over the longer term. The transport sector requires coherent organizational structures, consistent laws and regulations, and good professional staff. Coherence is a pre-condition which is necessary to enable professional staff to make good use of their skills as they seek to manage transport and communications services. Manageability can be maintained despite the delegation of responsibilities in several ways; through appointment and overruling power, but also via policies and performance objectives. A combination of management via objectives and delegation is the only way forward.

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PROCENA ISTITUCIONALNOG KAPACITETA ZA UPRAVLJANJE PUTEVIMA U MOLDAVIJI

Rezime: Putni sektor put u Moldaviji doživljava iste uticaje koji usmeravaju promene u putnim organizacijama širom sveta, kao što su: globalizacija i sve veći porast trgovinske

razmene među državama, tehnologije koje brzo napreduju, povećani zahtevi za infrastrukturom i zadovoljavanjem rastuće potražnje, kao i političke i regulatorne reforme. Putne organizacije širom sveta ovim izazovima odgovaraju na različite načine. Rad prikazuje rezultate institucionalne procene sprovedene sa glavnim ciljem da se utvrdi adekvatnost javnog sektora za upravljanje i obavljanje aktivnosti održavanja, i za uvođenje ugovora o održavanju zasnovanih na nivou usluge, te da predloži poboljšanja u oblastima za koje se utvrdi da je to potrebno.

Кljučне речи: *upravljanje putevima, ocena kapaciteta, monitoring, regulisanje, eksploatacija*