Report No: ACS12157

Ukraine

Road Sector Quality Assurance, Management and Development – Key Policy Options

January 2015

GTIDR

EUROPE AND CENTRAL ASIA

CURRENCY AND EQUIVALENT UNITS

(as of December 18, 2014)

Currency Unit	=	Ukrainian Hryvnia
US$	=	15.8

ABBREVIATIONS AND ACRONYMS

BMS	Bridge Management System
CoST	Construction Sector Transparency Initiative
DAK	Ukrainian acronym for the State Joint Stock Company “Roads of Ukraine”
DED	Dorozhno- Eksplutatsiyina Dilyanka: Raion Level Contracting Unit
Doryakist	Road Quality Institute
EBRD	European Bank for Reconstruction and Development
EIB	European Investment Bank
FIDIC	International Federation of Consulting Engineers
GDP	Gross Domestic Product
IFI	International Financial Institution
MIS	Management Information System
MoI	Ministry of Infrastructure
MoRD	Ministry of Regional Development
OPBC	Output and Performance Based Contract
ORS	Oblast Road Services
PIU	Project Implementation Unit
PMS	Pavement Management System
QA	Quality Assurance
QAC	Independent Quality Assurance Consultant
QC	Quality Control
RSIP2	Road Safety Improvement Project 2
UAD	Common abbreviation of ‘Ukravtodor’
UAH	International designation for Hryvna (Ukrainian Currency Unit)
Ukravtodor	State Road Agency of Ukraine
Ukrdiprodor	State Road Design Institute

Vice President	:	Laura Tuck
Country Director	:	Qimiao Fan
Practice Director	:	Pierre Guislain
Practice Manager	:	Juan Gaviria
Task Leader	:	Simon Ellis

ACKNOWLEDGEMENTS

This report was prepared by a World Bank team comprising Hatim Hajj (Consultant and Principal Author), Simon Ellis (Task Team Leader), Eric Lancelot, Maria Claudia Pachon, Rakesh Tripathi, and Yevhen Bulakh. The report also benefited from comments and suggestions received from Christopher Bennett and Gregoire Gauthier. The team benefited from the guidance of Qimiao Fan (ECCU2 Country Director), Juan Gaviria (GTIDR Practice Manager), and Tamara Sulukhia (Program Team Leader).

The team is grateful to Government officials from the Ministry of Infrastructure, Ukravtodor, Ukrdiprodor, Dortsentr and DerzhdorNDI for their cooperation in conducting the analysis and for their comments and suggestions on earlier drafts of the work.

Table of Contents

Executive Summary

1. Road transport is a key sector of the Ukraine economy. However, insufficient budget allocations have resulted in a significant deterioration in the network over the past decade, affecting the competitiveness of the country. In 2010 the **Transport strategy of Ukraine to 2020** was approved to address these issues with a broad objective to foster sustainability and efficiency by improving infrastructure capacity and quality, improving governance, fostering private sector involvement, and improving transport safety. This report was initiated by request from the government following concern with the overall quality of outcomes in the road sector in Ukraine. The report started as a "quality control audit" of Ukravtodor but was later broadened to an assessment of "Quality Assurance" to encompass delivery of quality roads and quality transport services. Within this context Quality Assurance covers all parts of the project cycle including planning, design, development of plans and specifications, advertising and award of contracts, construction, and maintenance. The report also makes a clear link between quality assurance and the on-going reform of the sector. Without changes in the way the sector is managed it will be very difficult to deliver better quality road services.

2. Improving Quality Assurance, through the prism of project cycle requires first improving ***planning capacity***. Planning functions are diffuse in Ukraine, with no clear transport planning policy. The preparation of a multimodal transport master plan under the Ministry of Infrastructure (MoI) involving the key stakeholders of the sector and other bodies in charge of land use planning and territorial development as well as civil society, is essential. Structuring a capacity within the Ministry of Infrastructure to conduct and follow up such exercise is also important. At the road subsector level, current planning tools including the Pavement Management System (PMS) and the Bridge Management System (BMS), while robust, could still be improved and would need to be updated with regular inventory, condition and traffic information to support the preparation of multi-year programs of intervention.

3. Related to ***design*****,** while the market is open to consulting firms, both public and private, "Ukridiprodor" does most of the engineering designs and preparation of bid documents for the road sector including for International Financial Institutions (IFIs). Splitting the public and commercial functions of the Institute and fostering competition with intervention of the private sector should be considered. Similarly, the independent design reviews which are currently being done by the "Expertise and Organization Sector" could be opened up to the private sector to foster value engineering.

4. ***Plans and specifications*** are mostly based on the former Soviet Union norms. The introduction of European norms for construction, already started since 2011, should be accelerated and amplified to progressively align with European Union. There should also be increased promotion of performance specifications, particularly in rehabilitation works, where there is a greater focus on the specifications of the final output rather than on specifying the inputs to the process.

5. A good ***procurement system*** is key to promote competition and the emergence of a vibrant private contracting industry. Clear and sound recognized rules should be used to procure works and services, such as the ones introduced under the main IFI's financing. The recent draft amendments to the public procurement law go in the right direction and further improvement could be introduced with, e.g.

use of affordable bid securities, the practice of registration for contractors, and the introduction of multi-year contracts for maintenance. Procurement is also key to mitigate fraud and corruption. More transparency and accountability should be promoted, giving civil society greater oversight of the sector and systematically disclosing non confidential information, following the recommendations of the Construction Sector Transparency Initiative (CoST).

6. As regards ***construction***, IFI financed projects allowed the introduction of International Federation of Consulting Engineers (FIDIC) contracts in the sector, a practice that should be broadly adopted to increase the focus on quality and extend to domestically funded projects the best international practice. Contract management should rely on improved supervision, which may be achieved through the use of independent consultants. At the contract management stage Ukravtodor has to address late payments, price and quantity adjustments and impose liquidated damages where necessary. The introduction of independent technical audits, particularly early in the construction phase, could help identifying problems, allow early resolution and promote accountability.

7. Finally, ***maintenance*** is carried out predominantly by DAK companies, which enjoy a virtual monopoly for winter and routine maintenance activities. DAK companies are overstaffed and, as they lack flexibility to adapt to a more commercial environment, a technical assistance is required to assess the implementation steps to reform the DAK. It is also important that private contractors are actively encouraged to join the market both for new construction and maintenance works, and that there is close follow-up of the ongoing pilot of long-term performance-based rehabilitation and maintenance contracts with a view to customizing the model to the Ukraine context. Generally, there should be a move to widespread maintenance based on performance. Overloading is a major issue in Ukraine which could be mitigated through introduction of weight control policy and this would ultimately reduce the maintenance burden.

8. **Beyond project cycle, quality requires sound institutional organization and sustainable financing**. On governance, the sector embarked on a reform in 2011[1] aimed at substantially changing the management of the sector from being overly centralized and vertically integrated. Under this reform, the functions of policy making, program management and works execution would progressively be separated, with an aim at increasing reliance on commercialization in the interactions between managing and executing entities, including through increased reliance on participation of the private sector. As part of this process, the functions of policy development in the road sector should be separated from network management. Policy should be set by the MoI to which Ukravtodor reports and Ukravtodor should manage the road network within the policy framework set by the MoI.

9. Meanwhile, the management structure would be adapted to transfer to local authorities the responsibility of the management of local roads with relevant transfer of resources. Capacity at the Oblast level is an important consideration and any decentralization should only take place once sufficient capacity is available. This will require a comprehensive capacity building program and implementation

[1] Presidential Decree 456/2011, mainly based on a study by WSP Consultants under an European Bank for Reconstruction and Development (EBRD) funding initiated in 2005.

undertaken on a pilot basis at the beginning. This reform process needs to be re-energized, short- to medium-term implementation plans need to be designed, and strong commitment from senior management needs to be gained.

10. On ***sector finance***, ultimately, the overall condition of the road network can only be improved with sufficient resources. As for most countries, road maintenance is largely financed by fuel levies supplemented by vehicle import duty, fees for oversized and overloaded vehicles, and loans from different sources including IFIs. Although there has been a continuous increase in the revenues from excise duties on fuels (the latest being an 11% increase in April 2014), expenditures in maintenance of roads have been falling since 2011 and debt servicing has almost tripled since 2012. The shortfall in resources will continue to affect the sustainability of the network with the current level of funding for maintenance of the network at about half the minimum level. Given the current stressed economic environment in Ukraine, addressing the maintenance funding issues will be difficult. However, if not addressed the long-term costs will be much higher as the overall condition of the network continues to deteriorate. Addressing the funding shortages will require increasing charges on road users including through further increasing the fuel levy, increasing vehicle registration fees and by starting to toll (or use vignette) the main highways in the country. In the short term, it is also important that the authorities introduce systematic monitoring of existing maintenance expenditures.

11. **Feedback from international experience**. The report presents a variety of successful experiences from countries around the world. Evidence from new EU countries is that a master plan has been key to using both EC and IFI funds effectively: Poland, with a good master plan, now tops the EU funds absorption while Bulgaria and Romania, without effective master plans, are still struggling to plan, procure and implement new projects. Modern road agencies are increasingly using performance management with a focus on outcomes such as safety, reliability, maintainability and value for money. The road user ("customer") is central in the management of those agencies. Pavement management is part of the asset management culture where roads are treated as assets which can be depreciated at a financial cost and where maintenance is prioritized over new construction. However, there are different approaches to quality control and assurance in design. The USA and Germany for example undertake these functions in house, while other agencies contract out these functions.

12. **Recommendations**. The report highlights a wide range of recommendations which are provided in full in the recommendations section but summarized in the following table:

Action	Responsible	Short <1 yr	Medium <3 yrs	Long 3-5 yrs
Planning and Budgeting				
Start preparation of a multi-modal transport master plan to define long-term investment priorities	MoI	✓		
Progressively improve PMS and BMS functions and agree regular minimum data requirements	UAD		✓	
Design				
Support commercialization of Ukridiprodor and gradually increase participation of private firms in the preparation of designs, safety audits and design reviews	UAD	✓	✓	
Review role of State Expertise and Technical Council of Ukravtodor and make recommendations to enhance their focus on quality of design and road safety	MoRD/UAD		✓	
Plans and Specifications				
Bring standards in conformity with EU technical regulations in line with Association Agreement timetable (2017)	MoI/UAD	✓	✓	
Procurement/Transparency				
Establish a multi-stakeholder group to improve oversight and implement an "information portal" for improved disclosure	UAD	✓		
Construction				
Adopt FDIC contracts for domestically funded works	UAD		✓	
Increase independence between construction, supervision and acceptance functions through progressive separation of ownership	UAD			✓
Introduce the practice of technical audit for all projects	UAD			✓
Maintenance				
Develop a detailed implementation plan to improve efficiency and commercial orientation of DAKs	UAD	✓	✓	
Evaluate results of on-going long term performance based maintenance contractsand consider extending their use	UAD		✓	
Implement a national Weigh-in-Motion system to protect against overloaded trucks	UAD			✓
Sector Management				
Clarify roles and responsibility: MoI responsible for policy and UAD responsible for implementation of programs aligned with this policy; revise reporting arrangement such that UAD reports to MoI to increase accountability.	GoU	✓		
Identify pilot Oblast to test decentralization principles, and contract a TA to assess specific needs of the decentralization process (local capacity, M&E, financing, management etc.)	UAD	✓	✓	
Sector Finance				
Enact legislation to enable either tolling or the use of a vignette system on Ukraine's roads, and further increase duties on fuel	GoU		✓	
Identify opportunities for private sector finance in the road sector starting with smaller projects such as a concession for road tolling	UAD		✓	✓
Capacity Building				
Develop capacity building programs to ensure that personnel in the sector have updated skills	MoI		✓	

QUALITY ASSURANCE IN ROAD SECTOR IN UKRAINE

1. Introduction

1. This report was initiated following concern from the government on the overall quality of outcomes in the road sector in Ukraine. On this basis, Ukravtodor requested the Bank to undertake a "quality control audit" on the various functions of the agency to determine how to deliver quality roads and quality road services. To people who design or build the roads, quality relates to pavement smoothness and durability, and adherence to budget and schedules or issues of "Quality Control". Looking at the sector in a broader perspective though, the final objective of a road is less the construction and maintenance of the infrastructure per se than the service that the road is expected to bring to customers, road users and the affected communities. With this overall picture in mind this report has taken a broader notion of "Quality Assurance" and has evaluated the activities of planning, design, development of plans and specifications, advertising and awarding of contracts, construction, and maintenance, and the interactions of these activities. The report also makes a clear link between quality assurance and the on-going reform of the sector. Without changes in the way the sector is managed it will be very difficult to deliver better quality road services.

2. With a share of more than 11% of GDP and an important reliance of the economy on transport, the sector is key to Ukraine development. While transport in the country continues relying strongly on rail and pipeline for heavy freight and long haulage, road transport demand has been growing steadily for the past decades, a situation expected to prolong in the coming years. The road network comprises about 170,000 km of interurban roads, of which 52,000 km are national and regional roads and 118,000 km are considered of local importance, an overall relatively smaller size than comparable European countries in area or GDP/capita. The organization and management of the road sector is regulated by the Law on Motor Roads[2], which defines the functionality of the roads and structure of their management depending on their classification (state publicly owned, urban publicly owned, independently or privately owned).

3. Insufficient budget allocation to maintain and develop the roads for the past decade has resulted in significant deterioration of the network and the emergence of capacity bottleneck, affecting average speed[3] and increasing transport costs. As a result, by the end of the 2000's already more than half of the national road network had inadequate roughness and close to 40% presented structural problems, a situation which has undoubtedly worsened in the past 4 years. Besides the chronic underfunding of the road network, which has turned critical over the past months in the context of political unrest in the country, the road sector has been facing a number of organizational and governance issues affecting its ability to deliver a high quality road network which, in turn, has significant impact on the economy of the country.

[2]Law XX of October 7, 2005

[3] Average speed is one half to one third of Ukraine's western European neighbors

4. In this context, the sector embarked on a reform in 2011[4] aimed at substantially changing the management of a sector which thus far has been overly centralized and vertically integrated. Currently, the road agency Ukravtodor, a body under the Cabinet of Ministers, is in charge of policy formulation, strategy development, network management and administration and, through its subsidiary entities, the preparation of design and the execution of construction and maintenance works. With the reform, the functions of policy making, program management and work execution would progressively be separated, with an aim at increasing reliance on commercialization in the interactions between managing and executing entities, including through contracting to the private sector the undertaking of selected activities. Meanwhile, the management structure would be adapted to transfer to local authorities the responsibility of the management of local roads with relevant transfer of resources.

5. The reform is currently underway, albeit at a slower pace than initially planned. It is expected that the reform will substantially improve efficiency in the sector and to improve the quality and safety of service to the users. However, the level and reliability of the funding of the sector remains a key issue still to be addressed. Moreover, while the reform builds on a sound overall strategy, the detailed mechanisms for implementation still need to be elaborated based on a reasonable work schedule and action plan and its implementation closely accompanied. Remaining operational questions range from relatively simple ones to more intricate ones, e.g.: what is the exact definition of the roads to be transferred; what is the level of funding transfer to local authorities; what is the level of financing needed to recover appropriate road conditions and then ensure long term sustainable maintenance of the roads; what level of capacity building at the local authority level will be required so that transferred assets can be adequately managed in the future with the agreed fund transfer; what level of oversight from central Government will be required and what are the mechanisms for monitoring use of funds; what is the process for increasing the level of commercialization in the management and implementation of road sector interventions particularly related to reform of the DAK; what should be the involvement of road users in providing feedback etc.

6. Improving Quality Control is one of the key areas of work identified by the Government. While Ukraine does have a defined system of quality control and many of the institutions involved in its application have knowledgeable staff and modern equipment, there are some processes that will need to be adapted and strengthened to address the reforms of the sector. The recent signing of the association agreement with the EU in June 2014 has added a new impetus to addressing the issues of quality control as over the next few years Ukraine has to make itself ready for convergence with EU directives. In that context, the Prime Minister's office requested the World Bank to make an initial assessment of the current system of quality control and prepare recommendations. This preliminary assessment, object of the present report, will be supplemented with a more detailed and comprehensive study to be executed by a specialized consulting firm to support Ukravtodor in strengthening the capacity of the organization to improve road management and quality of roads based on the best international practice.

[4] Presidential Decree 456/2011, mainly based on a study by WSP Consultants under an European Bank for Reconstruction and Development (EBRD) funding initiated in 2005.

7. This report presents the results of the work of a short term Quality Assurance Consultant (QAC). Given the ramification of the quality control, which roots in the broader concept of quality assurance, and the tight link between quality assurance and the overall efficiency of the sector, the scope of the assessment goes beyond the mere Audit of the system of quality control. It also provides operational advice on key aspects of the reform to improve quality assurance and quality control, including on: orientations on how to improve reliability of funding of the sector and effectiveness of expenditures, orientations on how to improve governance and transparency, and orientations on how to foster "commercialization" of the management of the sector. A key recommendation to improve quality control and assurance is to foster a greater independence between the various stakeholders to foster better value for money and quality outcomes

8. The findings are based on desk study of past studies concerning the reform of Ukravtodor, material from the USA, Canada, Europe, South Africa, Indonesia, Australia, New Zealand, Australia as well as Bank's financed work on Quality Management in the Road Sector Projects in Azerbaijan. A visit was also organized in Ukraine during March 19-29, 2014 where the following institutions were met: Ukravtodor, Kiev Oblast Road Services, "Ukridiprodor" (leading Design Institute for designing roads, bridges and infrastructure objects), "DerzhdorNDI" (Road Research Institute), "Dortsentr" (Road Quality Institute - Technical organization in charge of monitoring the compliance of road construction and repair works with regulations and standards); "Expertise and Organization Sector" of the Ministry of Regional Development which reviews designs and recommends approval, two public contractors, one large private contractor, one private consulting firm, and one expatriate expert in the road sector in Ukraine. A rapid field visit of the road conditions in the vicinity of Kiev was organized on March 28. Annex 2 lists the agencies and persons met during this mission and Annex 3 lists the documents received or reviewed to help prepare this Report.

9. Besides the present introduction, which provides background information and the rational for the assignment, the report comprises the following sections: Section 2 presents the concepts of quality control and quality assurance and sets out the need for an institutional response to address quality assurance issues and the various elements of the quality assurance cycle and recommendations for change. This includes the areas of planning, design, plans and specifications, advertising and award of contractors (procurement), construction and maintenance of roads in Ukraine; Section 3 sets out the main institutional issues that drive quality including an assessment of the management in the sector, the on-going reform agenda and issues of sustainable finance; Section 4 summarizes the recommendations of the report and presents a roadmap of actions. The annexes presents practice from other countries which have systems for quality control that might be interesting for the Ukrainian context.

2. Quality Control in the Broader Picture of Quality Assurance

2.1 From Quality to Quality Assurance

9. Like beauty, quality is in the eye of the beholder. The definitions of quality depend on the perspective of each respondent. The Merriam-Webster Online Dictionary defines quality as "degree of excellence". ISO 9000's definition of quality is the degree to which a set of inherent characteristics fulfills

requirements". To people who design or build the roads, excellence relates to pavement smoothness and durability, and adherence to budget and schedules (the said "Quality Control").

10. Looking at the sector in a broader perspective however, the final objective of a road is less the construction and maintenance of the infrastructure per se (the "object") than the service (or "function") that the road is expected to bring to customers, road users and the affected communities. With this overall picture in mind embedded in the broader notion of "Quality Assurance", quality should include reliability, availability, maintainability, safety, security, health, environment, economic and politics.

11. Eight quality management principles are defined in ISO 9000:2005, Quality management systems-Fundamentals and vocabulary and in ISO 9004:2009, managing for sustained success of an organization-A quality management approach. These are:

- Principle 1: Customer focus
- Principle 2: Leadership
- Principle 3: Involvement of people
- Principle 4: Process approach
- Principle 5: System approach to management
- Principle 6: Continual improvement
- Principle 7: Factual approach to decision making
- Principle 8: Mutually beneficial supplier relationships

12. The American Association of State Highway and Transportation Officials (AASHTO) defines quality assurance (QA) as all those planned and systematic actions necessary to provide confidence that a product or facility will perform satisfactorily in service or making the quality of a product what it should be (Table 1 and Figure 1). Historically, agencies used the terms quality assurance and quality control (QC) with QC referring to the contractor role and QA to the Agency role. In fact, quality control is one element of quality assurance.

Table 1: QA versus QC

Quality Assurance	**Quality Control**
Making sure the quality of a product is what it should be	Making the quality of a product what it should be.
A highway agency responsibility.	A producer/contractor responsibility.
Includes QC.	A part of QA.
Doing the right things.	Doing things right.
Motivates good QC practices.	Motivated by QA and acceptance procedures.

Source: Transportation Research Board, Transportation Research Circular, Number E-C074, Glossary of Highway Assurance Terms Third Update, May 2005.

13. QA addresses the overall problem of obtaining the quality of a service, product, or facility in the most efficient, economical, and satisfactory manner possible. Within this broad context, QA involves continued evaluation of the activities of planning, design, development of plans and specifications,

advertising and awarding of contracts, construction, and maintenance, and the interactions of these activities (Figure 1).

14. Quality control needs to be assessed in the broader picture of quality assurance to achieve outcome and improve the quality of service to customers. Moreover, quality can't be envisaged through the narrow perspective of processes. It is in fact affected by the institutions, the organizations (inter- and intra-institutional), the individuals and the competences.

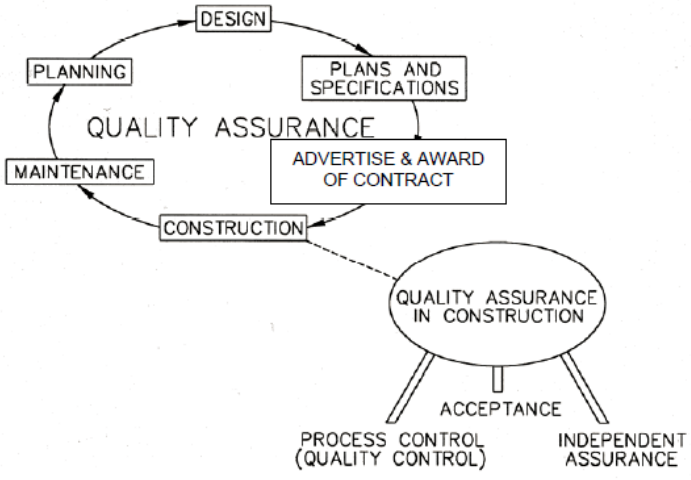


Figure 1: QA System Elements

Source: Transportation Research Board, Transportation Research Circular, Number E-C074, Glossary of Highway Assurance Terms Third Update, May 2005.

2.2. Quality Assurance by Stage of Project Cycle

15. The following sections of this report assess how each of the activities in above Figure 1 is being addressed in Ukraine, the main problems and present suggestions for making changes to improve quality of roads. As stated above it is important to address quality through the whole project cycle. For example, there is no point in building the perfect road if it is in the wrong place, built to wrong standards or there are insufficient resources to maintain it once built. Similarly, once the perfect design has been agreed, if there is a procurement process that delivers a high price or inexperienced contractor this will also lead to poor quality outcomes. The recommendations take into consideration international experience, especially in developed countries in Europe, North America and Oceania (Section 4 of this Report).

A. Planning, Programming, and Budgeting

16. Planning is key to establish a clear vision of the needs and how best to meet them, build a strong rational and defensible basis for setting priorities, and design an implementable work program. In most advanced countries, planning is an integrated process that seeks to pull together all the contributing factors to increase the effectiveness of the delivered plans or solutions. It helps ensure proper

coordination between the transport network and land use. Also, planning in those countries involves all stakeholders and the public. Public engagement involves not only information to the public, but also consultation and involvement in the planning process. OECD/EU/USA countries have in general an orderly, legally based process, which is broadly coordinated with land use planning and taking environmental and social (such as land acquisition) factors into consideration. These countries have an acceptance and appeals process that gives rights for affected interests to appeal. Conversely, some countries have suffered from too much political involvement in the planning process leading to sub-optimal investment decisions.

17. **Institutional organization**. The responsibility for planning in the road sector in Ukraine is diffuse at the present time and improvements could be made to planning processes to make them more integrated, transparent, and inclusive. Overall planning in the transport sector should rest with the Ministry of Infrastructure (MoI) but it is important that Ukravtodor in the new paradigm of the road sector should also have the capacity to plan both in terms of short term priorities but also to feed into the longer term priorities being developed at the MoI level. As such, it would be important that Ukravtodor create a proper planning function/capability in its organization and staffed with qualified personnel. An ideal scenario would be the creation of a Planning Department/Unit to demonstrate the importance given to planning activities. A lower profile solution could consist in setting planning functions as part of an existing entity of Ukravtodor, such as roads development or economic planning units. This planning entity would be in charge of preparation of the road master plans (long term), medium term programs of investments (4 to 5 year programs) and annual works and services programs. The same unit would also be in charge of the preparation of techno-economic feasibility studies of individual projects (specific rehabilitation, paving, upgrading etc.). In addition to adequate staff, key instruments of planning activities should include a functioning and updated pavement management system (PMS) and bridge management system (BMS). Full access rights to the information in these systems should be given to staff of the dedicated planning unit.

18. **Master Plans:** At present Ukraine does not have a road or transport master-plan. Building a transport master plan for the country is essential to improve efficiency of the sector. Such master-plan should be multimodal, ideally under MoI leadership, and involve the key stakeholders of the sector including bodies in charge of land use planning and territorial development and civil society. This plan should be based on observed traffic, recent trends, the observed linkage between transport and the economy, territorial development plans and neighboring countries own master-plans. It would provide a medium to long term scenario of development based on up to date traffic forecasting and modeling. Overall, the master-plan should be the basis for the design of medium and long term multimodal transport policies complemented by specific investment plans to support the country's growth strategy

19. The road sector should be a major contributor to the master plan identifying needs for new roads infrastructure and roads capacity expansion in the medium to long term. In addition to identifying priorities for road transport policy and investment needs, the master-plan could identify roads which could be financially viable and of potential interest to the private sector and roads which are economically viable but of marginal financial viability which are suitable for public private participation. Overall, this planning exercise would provide a more rational basis for investment decisions in the short, medium and

long term and signal to the private sector where their support is required in financing and managing the roads in Ukraine. This recommendation is a key short term priority if Ukraine is to maximize its opportunities to attract and utilize international investment. It is also essential in the longer term to comply with EU regulations on developing investment priorities. The Box below shows the importance of this topic for Romania.

Romania's General Transport Master Plan

As one of the more recent entrants to the EU, Romania has had access to significant EU funds to improve and modernize its transport infrastructure. However, Romania has not been able to fully utilize these funds and as a result the country has one of the lowest absorption rates of EU funds. A key problem has been continuously shifting priorities and lack of a long term focus in the implementation of particularly large infrastructure projects. Without this focus there is an inadequate pipeline of prioritized and well prepared projects.

To address this issue the Ministry of Transport has embarked on the preparation of a General Transport Master Plan which will provide a short, medium and long term outlook, and will contain infrastructure priorities and policy instruments for all transport modes, including road, rail, air, waterways and maritime. Indeed, this is also a requirement to access EU funds and is an ex-ante conditionality for all EU countries as follows:

"*The existence of a comprehensive plan(s) or framework(s) for transport investment in accordance with the Member States' institutional set-up (including public transport at regional and local level) which supports infrastructure development and improves connectivity to the TEN-T comprehensive and core networks*."

20. **Medium Term Plans/Development Programs/Annual Programs**: Under the current context, Ukravtodor prepares a 5 year program of works and services. The current program covers the period 2013-2018. The program is mainly based on proposals by the oblasts, some of which seem to take the PMS and BMS results into account. It also takes into consideration economic and social policies, political factors as well as technical criteria such as, traffic, types of improvement/treatments proposed as well as their cost. The Technical Council at Ukravtodor decides on the maintenance portion of the program, however, proposals for new construction and capital construction (reconstruction and capital repairs) have to be reviewed and related budget approved by the Council of Ministers. Overall, the programing of works and services needs to be better integrated and the decision process built on more objective and verified elements. More often than not, budgets are reproduced from previous years and scarce resources distributed without thinking of budget constraints or of maximizing efficiency in resource use. This opens up the system to favoritism and suboptimal decision making.

21. **Budgeting:** The document entitled "Methodology to determine the scope of financing for construction, reconstruction, repairs and maintenance of motorways" summarizes the principles and methodology used by Ukraine for budgeting for roads by oblast and type of works. Generally, the methodology makes sense and is logical. It starts with the total funds available, then allocates them among

national and local roads. It then divides the funds for national roads among the following categories of works: (1) minor running/emergency repairs and operational maintenance (routine and emergency maintenance), (2) medium running repairs (periodic maintenance), (3) reconstruction and capital repairs, and (4) construction of new roads and major widening of existing roads and bridges. The funds for local roads are distributed among oblasts and then among the following categories of works: (1) minor running/emergency repairs and operational maintenance, (2) medium running repairs, (3) capital repairs, (4) reconstruction, and (5) construction.

22. The order of priority for allocation of funds for both national and local roads is reasonable, with apparently higher priority given to routine maintenance rather than construction. However, the criteria of allocation are pretty unclear and in many instances, priority is given first to requests from the President and the Government and political interference becomes a major factor in allocation of road funds. The major shortcoming of the actual budgeting process is that it does not generally rely on an objective assessment of transport condition (road and traffic conditions)[5] which opens up the process to sub-optimal decision. Both issues should be addressed by operationalizing the existing PMS and BMS, and by revisiting the criteria for allocation of budget resources to ensure they are optimal and also to take account of the proposed reforms in the sector. This is particularly the case for distribution of funds between national and local level roads.

23. **PMS and BMS:** The PMS and BMS should be the fundamental tool to prepare the five year and annual year programs for capital expenditures (where geometry of road is not changed) and current expenditures (routine maintenance, seal coats/periodic maintenance) for roads and for bridges. These systems use the following main inputs of road and bridge data bases: inventory data of the asset, road/structure condition data and traffic characteristics. Based on a deterioration model of the infrastructure and an economic evaluation[6], the systems provide for economically optimized short to medium term programs of works by road link, proposed improvements, costs and economic rate of return depending on expected level of service and, if possible, eventual budgetary constraints. Those systems are key to an appropriate programming exercise as they provide the logic, reasoning and context behind how a road agency proposes to maintain and improve the road network over a period of years (often 3-5 years).

24. The PMS in Ukraine was developed by the National Transport University, Kiev. The Design Institute "Ukrdiprodor" operates the system. The State Road Research Institute "DerzhdorNDI" has developed the BMS and operates it. "Ukrdiprodor" claims that the PMS has been improved since it was evaluated by HPR (High-Point Rendel Limited) Consultants in 2010 (Task 2: Close Out Report Consultancy Services for Reform of Road Management System in Ukraine, Component 3: Institutional Capacity Building Project ID No. P100580, Draft October 2010). The system now allows for budget constraints, but in first analysis, the

[5] Example of dysfunction: given the lack of measured data, traffic volumes on road links are estimated as average traffic volume for each category of roads

[6] The evaluation tests scenarios with specific programs of works against a referent situation, computing both the works program's costs and the saving in vehicle operating costs

system does not seem able to select and optimize treatments across a network on the basis of minimizing total transport cost. It has improved the referencing system and can handle routine maintenance.

25. To turn the system fully operational, however, while capabilities for automatic collection of inventory and condition data (including bridges) have been improved through the recent acquisition of specialized equipment (Europe 2012 Program), the system still lacks field data to be operational. The PMS and BMS systems can handle both State, Regional and Local Roads. In their actual configurations, the data (inventory, condition, and traffic data) are available only for State Roads, and even those scarce data have not been updated regularly since 2008, the last time when these data concerning State Roads were collected for all oblasts (additional data was collected from 7 oblasts in 2013 and from one oblast in 2012[7]). Overall, this is clearly insufficient to turn the systems operational and it is highly recommended that data collection campaigns be launched as soon as possible. Not only the State roads should be covered, but also the regional and local roads, an exercise considered critical to define the budget needs and allocation in the decentralization process. While it is understood that the sector faces severe budget constraints, data collection for all roads could be made under a rolling program aimed at gathering progressively all the needed data over a 3 to 5 years period. In the short run, the PMS and BMS could be run on data collected on a sample of roads and bridges in representative oblasts.

26. Future revisions to the PMS and BMS systems should take into consideration experience from countries such as New Zealand and Australia who have adopted a holistic "asset management" approach that embodies quality as one of a set of valued outcomes, together with whole life cycle cost, value for money, supply chain management, user satisfaction, etc. In this regard, the International Infrastructure Management Manual (IIMM) 2011, Quick Guide: Meeting ISO 55001 Requirements for Asset Management", February 2014- v1.0 should provide good guidance.

27. Overall there are a number of issues that the HRP Consultant just selected can address in more detail. These include whether it is practicable/desirable to include an economic analysis module to the PMS/BMS to allow greater optimization of expenditures; where the PMS/BMS should be housed i.e. is there a case for them to be managed by the same entity; and finally how the collection of data can be institutionalized both at Ukravtodor but also at the Oblast level where access to data should be more readily available.

Bridges management in Ukraine

[7] Since 2012 the State Roads have increased from about 21,000 km to about 52,000 km, basically through reclassification. However, there is no data in the PMS concerning the additional 31,000 km.

It is estimated that Ukraine has 16,156 bridges of which 6,497 are on the roads of national significance and 9,659 are on the Local Roads. The BMS does not contain data for all bridges. At present it covers 3,806 bridges on roads of national significance (59% of the total) and 1,105 bridges on Local Roads (11% of the total). According to the State Road Research Institute "DerzhdorNDI" as of January 1, 2014 about 1,623 bridges were in need of repair and 43 bridges were closed to traffic. 9,405 bridges require some work to be done: 3,556 are undersized, 2,801 bridges do not have sufficient strength for the loading they bear, and 3,048 bridges have insufficient size and lack strength. According to the recent data from the BMS, "DerzhdorNDI" estimates the expenditures for eliminating defects and replacement of bridges amount to UAH 12.0 billion for bridges on National roads and UAH 2.0 billion for bridges on Local Roads entered into the BMS system. Expanding this to cover all the bridges would entail expenditures of about UAH 25 billion for bridges on National Roads and UAH 21 billion for bridges on Local Roads, a total of about UAH 46 billion (about $4 billion) for all bridges.

B. Design

28. The design of road works in Ukraine is open to Consulting firms, both public and private. However, Ukravtodor's owned Design Institute "Ukridiprodor" does most of the engineering designs and preparation of bid documents for the road sector. It's areas of specialization also cover road safety, traffic control devices, automated systems, environmental impact assessments, acquisition and resettlement studies and economic feasibility studies. Further, the Institute operates the PMS while the State Enterprise "DerzhdorNDI" operates the BMS. Main clients of the Institute are Ukravtodor and the Oblast Road Services (ORSs), which are 100% subsidiaries of Ukravtodor. The design of most works financed by IFI's (including those of the World Bank) has actually been done by the Design Institute, which is certified by TUV NORD CERT. It has many qualified staff (holding required certificates) as well as laboratories, modern mapping and geological equipment, computers and software and printing facilities, archives and historical data on roads, experience with FIDIC documents and procedures through the IFI financed road projects. The Institute receives subsidies in the form of equipment, most recently automatic data collection vans under Europe 2012 Program and projection room at headquarters, which overall however, constitutes a small part of the total equipment owned by the Institute. It has branches in all oblasts in Ukraine. Ukravtodor appoints the Design Institute's director and approves the deputy directors appointed by the director of the Institute.

29. Overall, dominant position of the design institute in the market raises questions on the overall quality and efficiency of the system, as well as its flexibility to adapt and openness to new technologies. While the Design Institute is likely to continue to play an important role in the short to medium term, the possibility in the long run to split the normative functions of the Institute, if any, that could remain public, from the commercial functions, that could be progressively commercialized, should be discussed. In that perspective, the experience of the Transport Research Laboratory (TRL) in the United Kingdom could be an interesting case study (see box below). Besides, there should be a conscious effort to open up the design works to the private sector in the short/medium term and their deepening involvement should be encouraged both by the Government and the IFIs. Implementation of the proposals under the section of this report on Procurement should help in this regard. Further, joint ventures between foreign consulting firms (mostly involved on IFI financed projects) and local consulting firms should be encouraged, such as by giving appropriate weight to this factor in evaluation of proposals by consultants.

The privatization of TRL

TRL was the sole state owned research arm of the Department of Transport (DoT) in the UK. It provided most of the research services to the DoT and there was very little work that was bid out to private consultancy companies, research institutes and universities. The government decided that by opening up the market for research it could increase innovation and timeliness of research in the sector. It decided to open up the market by gradually moving TRL to private status and having competitive tenders for all research work. It also realized that TRL provided a key service with unique skills so for four years TRL was moved to "agency" status where work was guaranteed from DoT but TRL started to operate commercially. After the "agency" period TRL was privatized but in the first few years also given gradually declining guarantees of work. This is a possible model that Ukravtodor can gradually explore for the commercialization of the various entities under their control. It is recommended that the HRP Consultant delve deeply into this issue and recommend options, evaluate the options and propose recommended setup and how to get there.

30. **Design Review**: By law, designs (not bid documents) are being reviewed by an organization named "Expertise and Organization Sector" of the Ministry of Regional Development, which is responsible for national construction standards. This organization reviews the designs of civil works in all sectors, including roads. It ensures that designs conform to laws and regulations as well as standards and norms. The design is evaluated under strength and longevity, sanitary and epidemiological considerations, health, environmental safety, fire safety, needs of disabled people, cost estimate and budget. Projects of higher complexity, categories 4 and 5 (the higher the number the more complex, 5 being the most complex ones), are subject to technical and financial reviews. In the road sector, this would concern mainly the national roads. Projects of lower complexity categories 1-3 are subject to financial review only. In the road sector, this would include mainly the local roads.

31. If the estimated cost of the project exceeds UAH 100 million (irrespective of the degree of complexity), it is subject both to technical and financial reviews by "Expertise". In the road sector, Designs for projects costing more than UAH 100 million also require Council of Ministers approval and allocation of budget. Major design changes during construction have to be approved by this organization. Designs for projects costing less than UAH 100 million are reviewed by "Expertise" and approved by Ukravtodor through its Technical Council.

32. The Technical Council is currently focused on the economic and technical parts of the design for example methods, materials and production technology. However, there is scope for increasing the role of the Technical Council to provide additional design input particularly related to road safety matters.

33. Existing requirements for design reviews seem reasonable, whilst cumbersome by some aspects, and "Expertise" seems to give decision makers some confidence and information to support designs, although anecdotal information seems to suggest too much focus on cost. While a more thorough analysis of "Expertise"'s reports and more detailed meetings with "Expertise", Ukravtodor, Employers, and Design Institutes than was allowed in the time of the present study would be needed to provide a sound judgment on the system, it seems that design review should be recentered within the sector, for specific expertise concern. Moreover, while in the near to medium term, it seems that the current arrangements for design reviews will continue to prevail, there should be a conscious effort to open up design reviews to qualified

independent private consulting firms or expert practitioners. These may offer another source of independent feedback and observations that could lead to improved schemes especially concerning constructability and value for money (value engineering). A good design reviewer should be independent, accountable, expert, advisory, accessible, proportionate, timely, objective, focused on outcomes to road users and public at large, and focused on improving quality. The focus of the design review would be on safety, functional, cost effectiveness, aesthetics, constructability, maintainability, environmental, legal/statutory and government and departmental policy.

C. Plans and Specifications

33. Plans and specifications are prepared by the entity which prepares the design. On projects financed by the Government, the Ukrainian specifications and bid documents, which are based primarily on the former Soviet Union standards and specifications, are followed. The Scientific Road Research Institute "DerzhdorNDI" plays a major role in the development of specifications, standards, and norms. For IFI financed projects, FIDIC documents with some modifications to reflect conditions in Ukraine are used. It is recommended that the technical specifications and standards for road works are revised to progressively align with standardized set of bidding documents used by Ukravtador in projects funded by IFIs. These are based around the Multi-Donor Harmonized Version of the FIDIC Contract comprising: (a) Instructions to Tenderers and tender forms; (b) Conditions of Contract with Particular Conditions adapted for Ukravtador; (c) Specifications which, while adapted to each work case, could also benefit from standardization, depending on the type of works (rehabilitation, maintenance, construction, PBC etc.); (d) Model of Bill of Quantities with amendments to CESMM3 for UKravtador; and (e) Model of drawing index and notes for guidance on drawing preparation.

34. A first set of such standard bidding documents were prepared by High-Point Rendel Consultants in 2013 and are being revised based on comments received from Ukravtodor. More work remains to be done to standardize drawings and specifications (depending on the nature of the works/services, if needed through the establishment of norms) and improve bill of quantities preparation as well as quality review processes. It is recommended that this work be completed in the near future and take into consideration that in June 2013 the Ukrainian government officially signed up to the use of EuroCodes. This will require a gradual move to conformity with EU technical regulations and standardization which should take place by November 2017. It will also require the removal of existing national legislation which is in conflict with the European standards.

35. In the specifications, particular attention should be paid to the quality of bitumen and aggregates, which are key ingredients of flexible (asphalt) pavements. Part of the bitumen is produced locally, but its quality lack consistency, a serious issue when constructing high class roads. In relation to imported bitumen, which constitutes the bulk of the volume use, quality varies depending on countries of origin and sometimes on shipment. Tight specifications for bitumen should be established and "Dortsentr" should be required to set up a certification system to ensure that the bitumen used in construction follows appropriate norms. Tests should also be made on site, to ensure adequacy of the mix with the design. Similar caution should be applied with regard to aggregates for sub-base, base, and wearing course. The quarries and crushers which supply the aggregates should be inspected and material tested before delivering it to the construction site. Indeed, it is generally difficult to reject material once delivered to

site, especially when the Employer and Contractor as well as the Supervision Engineers are parts of the same organization (Ukravtodor).

36. Specifying products by commercial name should not be allowed in bidding documents, and where this is unavoidable, the specifications should allow similar products. Otherwise costs would be unnecessarily higher than they should be and the room for corruption increases.

37. **Customer-focused Performance Specifications:** Ukraine currently uses method or input based specifications but it is recommended that Ukraine makes more use of performance specifications in bidding documents. In a first step, the approach aims at focusing on what results the product should achieve rather than how it should be made (as it is under the traditional approach). More recently, this approach has evolved to encompass customer-focused performance standards. Under this approach, typically, a road rehabilitation specification should not be based on the quantities and specificities of the intrans (not being prescriptive about how it is built), but rather its expected characteristics when implanted (e.g. roughness, structural capacity). The second step of the approach focuses on the ultimate objective, providing quality of service measured through characteristics such as smoothness, level of ride (noise), longevity/durability, safety, minimal traffic disruption, speed of completion etc. These standards appear to drive quality up and have the potential to be a key driver of innovation in the road construction business. Under this approach, the Contractor and the Employer become a team aimed at satisfying the needs of the customer, rather than simply getting a road built. For example, many State Highway Departments in the USA include incentives and disincentives to encourage achievement of the high levels of smoothness (low IRIs) that result in reduced operating costs for the road users and reduced maintenance costs for the owner agencies. Overall, examples of success using this type of approach are found around the world, notably through Performance based and PPP contracts.

D. Procurement (Advertising and Awarding Contract)

38. **Need for Transparency and Accountability:** According to the Construction Sector Transparency Initiative (CoST), global construction accounts for about 13.5% of the GDP worldwide and public-funded construction for about 30% of public budgets, with even higher tendencies in low income countries. Roads account for a significant part of these expenditures. Mismanagement, inefficiency, and corruption account for about 10-30% of construction project's value. Ukraine is not an exception to these observations. According to Transparency International and based on the Corruption Perception Index, Ukraine ranked 144 out of 177 countries in 2013. The problem in the country seems exacerbated by the low payroll of the staff who manages the road sector in the public. Overall, fraud and corruption may have huge costs to the society whether directly, when funds are embezzled, or indirectly, when quality is impacted. While addressing this issue is a long run and complex challenge, more transparency and accountability are key to improve the efficiency of the sector.

39. Civil society in general and road users in particular should be given the opportunity to be involved at different stage of contract management, notably procurement. Non confidential information should be systematically disclosed. The recently completed Bank financed document entitled "Third Party Monitoring of Procurement: A Practical Guide" (in Ukrainian) concerning third party monitoring of procurement provides excellent suggestions in this regard. It is imperative that future operations of IFIs

including the World Bank in the road sector contain strong and realistic anti-corruption action plans. This should gradually be extended to government financed projects.

40. **CoST (Construction Sector Transparency Initiative):** Ukraine has recently joined the CoST initiative and is one of 12 participants of this program. CoST is an international, multi-stakeholder initiative. It aims at: (a) promoting transparency, accountability in public infrastructure, (b) developing systems, procedures to collect, verify, interpret and disclose key project information into public domain, and (c) reducing mismanagement, inefficiency and corruption and improve value for money on public investment in construction projects. Under this initiative, Government procurement entities are responsible for disclosing information and if there is no formal/legal requirement to do so, interim disclosure requirement is established. Eventually the government should establish a formal disclosure requirement. Information is disclosed proactively (i.e. on a routine basis) and reactively (i.e. on request by stakeholders mechanism for request and reply to be established). Moreover, procurement entities should respond to questions from stakeholders. In summary participation in CoST and implementation of its disclosure requirements will lead to an improved culture of transparency and accountability in Ukraine. It will contribute to reduced corruption in the sector but just as importantly will help to open up a dialogue with road users which will improve the quality of service delivery. A recent scoping report into the introduction of CoST in Ukraine has identified two key areas to increase the level of citizen engagement in the roads sector. The first is to more systematically and consistently disclose key information in the sector in such a way that the general public can easily access it. The second is to create a multi-stakeholder group consisting of departments in Ukravtodor and various external civil society groups to improve general oversight in the sector.

41. **True Competitive Procurement**: Generally, competition is required in Ukraine for the procurement of road works (capital and current expenditures), consulting services, and goods. However, because Ukravtodor, through its subsidiaries and institutes and its control of DAK, is both the Employer and contractor/consultant, most contracts are won by the public-owned consultants and contractors. For example the Design Institute (Ukrdiprodor) wins 90% of the contracts it bids for, and all routine maintenance and winter maintenance are won by DAK and its subsidiaries. Procurement should be reformed to allow more genuine competition and speed up the rise of privately owned contractors and consultants. Currently, a Public Procurement Law (PPL) to reform procurement is under consideration by the Council of Ministers.

42. ***Contract Documents and Their Application***: The practice of contract management does not encourage participation by private consultants and contractors. The main identified shortcomings include:

i. Payment terms: under the current regulation, advance payments of up to 30% of the annual volume are authorized. Upon preliminary assessment based on interviews with public and private contractors and consultants, it seems however that payment by Employers generally comes late without compensation for consultants and contractors;

ii. Design cost estimates allocate funds to cover additional costs associated with future price increases. However, contracts with contractors have to stipulate this in order for the contractors to be compensated.

But, in practice it is understood that there is no allowance for price adjustments, even for contracts which span several years.

iii. Adjustment of design cost estimates is foreseen in case of errors found in the scope of the works and if the investment cost of the project is exhausted. However, in practice it is understood that there is no allowance for quantity variations.

iv. Claims by contractors and consultants are practically nonexistent. On the other hand, contractors are generally not subjected to "liquidated damages" in case of delays in completion.

43. As already highlighted in the previous section a key recommendation of this report is to move to the FIDIC forms of contract for domestically funded projects as is already the case for internationally funded projects. The FIDIC contract will address many of the issues highlighted above and gradually increase the professionalism in contract management. It will bring local contract management regulations in-line with international best practice, build institutional capacity of local engineers, create a market for local consultancy firms to design and supervise works, and increase the level of site supervision.

44. ***Government Actions to Promote Competition*****:** Government can take some actions to promote genuine competition and encourage the development of private contractors and consultants. These could include:

i. Contracts often require guarantees (bid security, performance guarantee etc.). Fostering the emergence of reasonable and affordable mechanisms of insurance of works in Ukraine for national contractors would ease their participation to bidding processes and improve the competitiveness of Ukrainian contractors versus foreign contractors. This could be achieved by encouraging commercial banks to provide contractors and consultants with reasonable terms for: (a) borrowing for working capital (especially in the current circumstances of long delays in payments), and (b) guarantees for advance payments, bid guarantees and performance guarantees. It is worth noting that Ukravtodor contends that contractors are already able to obtain loans from commercial banks for works in case of delay or lack of State funding;

ii. Formalizing and structuring a sound registration system of contractors by specialty and standardizing the technical and financial criteria for works would guide the contractors and increase the probability that only qualified firms bid while reducing the risk of low bids;

iii. Introducing innovative approaches (which have worked in other countries) in procurement such as design-build and long term outcome based contracts;

iv. Allowing multi-year contracts for periodic maintenance and repairs. This in turn would help contractors (i) getting some comfort by envisioning medium term turnover, (ii) spreading needed investments for capital intensive works over several years, (iii) help attenuating the consequences of eventual budget freeze. Current regulations necessitate that these be procured, implemented and completed in same fiscal years;

v. In the case of seasonal works, tightening the planning and timing of implementation of procurement of consulting services and contractors so that works can be finished within the fiscal year.

45. ***Consulting Services*:** In a broader perspective of fostering the emergence of a national consulting service capacity in the road sector. The following recommendations should be taken into account:

i. Realistic budgets should be allocated to consulting services to reflect the cost of carrying out the services. Currently, the budget for consulting services for design of works is generally low, about 1% of the cost of the road works, while it could easily raise up to 3%.

ii. Competition is open and there is no short list of consultants to be invited. Selection is largely based on price. It is recommended to adopt short lists based on prequalification for each assignment. Another option, applicable for specific services (e.g. simple and small) would be based on a general prequalification exercise, where ORS would prepare long lists of prequalified firms in each field in the road sector, based on a general request for expression of interest. Such lists would be updated periodically (every 1-2 years) to give chance for new firms to qualify, provide opportunity for already qualified firms to become qualified in new fields, and to take performance on actual assignments into consideration. Submitting proposals is expensive and ultimately results in higher costs for services because they increase the overhead of firms. Also, the time, effort, and cost by the Employer to evaluate proposals increases with number of proposals received. As a result, shortlist should be limited to about 6 companies

iii. Need for greater clarity in the terms of reference for consulting services. Often during the execution of the services, the consultants are required to do additional work which is not defined in the TOR and for which they are generally not compensated.

iv. Generally, price is the main factor for selection of the successful consulting firm. Quality should be the major factor in selection of consultants. It is proposed to adopt selection procedures similar to those in the World Bank procurement guidelines: primarily quality-cost based selection (QCBS), but also other methods of selection as recommended by the Bank procurement guidelines.

v. Delay in Payments to Consultants: Consultants (whether state owned or private) are often not paid on time because the Oblast Road Services do not have the money and when payments are made, there are no interests on delayed payments. Contracts with consulting firms (and contractors) should include fair clauses on handling delayed payments.

E. Construction

46. Generally, competition is required for procurement of road works in Ukraine. All works which cost more than UAH 1,000,000 (about $100,000) are procured through competition by contractors. Construction quality assurance consists of the following core elements: (a) contractors' quality control program; (b) agency acceptance; (c) independent assurance; (d) dispute resolution; (e) personnel qualification; and (f) laboratory accreditation/qualification.

47. In Ukraine, the contractor is required to have an approved quality management system including provision of site/field laboratories staffed with qualified staff. But, in practice, in many cases this does not materialize. With the exception of works financed by IFIs, construction works are de facto supervised by

the Employer, which generally has an accredited and well-staffed laboratory[8]. "Dortsentr" can be called upon for control of quality of road and bridge works during construction, rehabilitation and repair of highways and motorways; inspection of road construction materials, troubleshooting, and certification of road construction materials and evaluation of contractor's production processes, including laboratories. Often, the Employer (Oblast Road Services) signs a contract with "Dortsentr" specifying their role during construction. Also, the designer of the works is involved during construction supervision through what is called author's supervision, which involves visual inspection to ensure that the approved design is being followed and to carry out any required changes in design.

48. Supervision of Construction: Supervision of works is essential to ensure that the works are being constructed in accordance with the specifications and the quality of the finished product is good. Supervision by the Employer's staff seems to work as long as the number of ongoing projects is small and works are not complicated. However, based on quick discussions in this regard, the Employer's supervision staff is not always present on site and there are not enough of them. The supervision effort should be increased, especially when work is going on at several projects at the same time. Further, there is a significant potential for corruption that could be potentially managed by (i) regularly rotating the supervisors on different works sites and (ii) creating a central technical audit function that would intervene in a sporadic and unadvised fashion to countercheck on the quality of the supervision. Independent laboratories for supervisors could be tested and identified, if successful, as a good practice.

49. Quality of works can also be improved by using qualified independent supervisors. This is important in Ukraine since the contractor is most often a public contractor (DAK subsidiary), although private contractors serve as subcontractors. Independent supervision consultants are currently required on all projects financed by IFIs and it seems that the quality of the finished works under these contracts is significantly higher than under works financed completely by the Government. This practice should be extended to Government financed projects.

50. **Acceptance of Works:** Any intermediary work must be systematically accepted before starting construction of follow up works. Thus, the sub-base must be accepted before starting construction of the base course. Following the acceptance of quantities by the supervision of construction officer, the General Contractor should submit to the Employer a **Certificate of Acceptance of civil works** (form # KB-2c, # CB-3) for review. It should then be countersigned by the officer in charge of the supervision of the construction to confirm the quality and reliability of the volume of work performed and checked and countersigned by the construction estimator for the accuracy of calculations and also by the designated manager for the conformity of prices of materials. Overall, the existing procedures for acceptance of works are considered reasonable.

51. **Commissioning:** After completion of the full scope of works, works with category of difficulty 1 to 3 are commissioned through registration by the State Architectural and Construction Authority of a declaration of readiness for commissioning. Completed construction facilities of category of difficulty 4 and 5 are commissioned on the basis of an act of readiness of the facility for commissioning (signed by a

[8] Key Employer supervision staff is certified and are proud to display their certificates.

committee) through the issuance of a certificate by the State Architectural and Construction Authority. However, before registration of the declaration of readiness for facilities of category 1 to 3, the Inspectorate of the State Architectural and Construction Authority together with the Employer and the Contractor should review the facility (check board jointing, board lowering, the absence of settlement of the surface, the availability of diaries, certificates for materials, etc.). For facilities of category of difficulty 4 and 5, the review should be conducted in the presence of the designer and subcontractors, who also sign the act of readiness of the facility for commissioning. The existing procedures (for commissioning of works) are considered reasonable.

52. **Warranties:** The warranty period is stated in the contract with the contractor. Generally, the contractor guarantees the works for 3 years in case of capital expenditures and one year in case of current expenditures. These procedures are reasonable and equal or exceed the FIDIC contracts requirement of a one year defects liability period. However, they could have the effect of driving up prices as contractors have to build in the additional risk from the increased defects liability period.

53. Overall, there are existing procedures for supervision, acceptance of works, commissioning and warranties which are likely to prevail in the short to medium term. However, some of the main shortcomings that would need to be addressed include: there is no real independence between the various actors involved (construction, supervision, acceptance and commissioning of the works) and (i) a progressive separation of the ownership relationship should be conducted and (ii) an increased opening to the private sector of most of those activities is recommended; supervision effort should generally be increased in quality and quantity; the practice of technical audit should be established and widespread (see below).

Quality insurance in design and built contracts

In the case of design-build contracts, good practice requires that all acceptance activities must be carried out by the Agency (Ukravtodor/Oblast Road Services) or its designated agent (such as consultant under contract with Agency). Independent assurance consists of activities that are an unbiased and independent evaluation of all the sampling and testing procedures used in the acceptance program. Responsibility for independent assurance lies with the Agency. Independent Assurance personnel, whether employed by the Agency or a designated agent, cannot perform both independent assurance and acceptance activities.

54. **Dispute Resolution Process:** Presently, this is not a serious problem in Ukraine because most of the contractors, consultants are publicly owned or controlled and the overall business environment is not litigious. Contractors are not claims oriented but also they are not generally penalized for delays in completing works.

55. With the emergence of contracting to the private sector, it is recommended that the contract contain a clear dispute resolution process which is unbiased and timely to resolve possible discrepancies between the contractor's quality control data and the Road Agency's acceptance data. Further, all personnel performing sampling and testing for quality control used in the acceptance decision, verification, or independent assurance are required to be qualified. Minimum qualification requirements

should be specified in the contract documents. Any laboratory used by the Agency (or its designated agent) to perform verification testing and all contractor laboratories that perform quality control testing included in the acceptance decision shall be qualified and certified. Often contract documents specify the minimum standard to be met by laboratories that conduct quality control testing. Further, the Agency's role in approving the disposition of non-conforming work should be clearly identified in the contract. The warranty period and the enforcement process should also be specified in the contract.

56. **Audits**: Presently, no audits of works are carried out. It is recommended that Employers (ORS) make use of technical audits, both during construction activities and at completion of the works. The main objective of the audit is a systematic and independent examination of the road works and supervision quality with an aim at determining whether the organizational, technical, contractual and financial activities and related results comply with the requirements of the contracts and technical specifications, and whether these activities are implemented effectively and are suitable to achieve the objectives of the project. Audits are all the more needed in Ukraine because of relative lack of independence of Employer, contractor, supervision and the corruption in the sector.

57. Technical audits are an integral part of quality management systems to enhance the quality of works. The goal is to find practical solutions to problems, not to affix blame. They are most effective early in a project's implementation phase so that corrective action may be taken before the project has been completed.

58. **Road works and site safety**. Road works must be completed to a predetermined level of quality to ensure long lasting performance and reduce impacts on traffic congestion and the environment. Safety is improved by minimizing the frequency, duration, and extent of work zones. Special attention should be paid to good communications with road users and affected communities by providing information about lane closures and other restrictions. The work should be well coordinated in one continuous flow. The Employer and supervision consultants must ensure that contractors have the proper materials available and the work zones are marked off properly. Safety of the traveling public and work zone personnel is critical. This is especially important in Ukraine, where most of the major construction consists of upgrading existing major roads and corridors.

59. **Durability of Road Works:** Besides meeting specifications, quality of construction considers cost-effective completion, enhanced safety during and after construction, long-life durability, visual appearance, noise reduction, and improved mobility. Quality is not about providing a usable road today, not if 3 to 5 years from now the pavement starts breaking down. Part of the problem is that roads are designed to last 20 years or longer and the level of tear and wear is considerably higher than traffic volume estimates at the planning and design stages. Ukraine suffers from the familiar problem of overloading of trucks and the problem is primarily restricted to Ukrainian trucks because truck loads and axle loads of international traffic are well checked and controlled at the border crossings. It is highly recommended to review and improve, as the case may be, the regulation on road load and strengthen enforcement.

F. Maintenance

60. Previous sections of this Report have dealt with the issues of planning, budgeting, prioritization, design, plans and specifications, procurement, and supervision of works. Some specific issues for maintenance will be highlighted in the present section.

61. **Maintenance planning and management in the administration**. The main tools for planning and prioritizing maintenance works are PMS and BMS as discussed earlier. Besides a sound basis to define programs and an optimization of the work programs, these systems are a great opportunity to demonstrate to budget departments the level of funding required to have an appropriate maintenance and the risks (in terms of future conditions of the roads) and costs of underfunding the sector. This would in turn help Ukravtodor make a strong case to the Government to increase financial resources to maintenance and preservation of the road network.

62. Ukravtodor needs to introduce management by performance and results for its own activities and those of organizations owned or controlled, evaluated through a sound monitoring system based on objective indicators and assessed through annual reports focusing initially on expenditures and activities, and later expanded to emphasize performance monitoring. Ukravtodor should disclose those results and inform and consult the public and stakeholders in the preparation of programs. The resulting citizen oversight is expected to lead to more accountability for results.

63. **Maintenance contracting (DAKs)**. Virtually all road maintenance and much road construction is undertaken by the State Joint Stock Company "Roads of Ukraine", known as DAK (based on the Ukrainian acronym). On behalf of the government, Ukravtodor controls 100% of the share capital of DAK and so is also involved in service delivery. Much of the road construction is also carried out by affiliates of DAK without genuine competition for domestically funded projects. For planning, programming, procurement and execution of works, the regional offices of Ukravtodor, the Oblast Road Services are the prime movers. They monitor the condition of the road network, develop programs of repair and maintenance and submit them for budgetary approval. After settlement of the budget and any revisions of program, which are negotiated at a collegiate level, the Oblast Road Services act as client for the procurement of the programmed works. In general, routine and winter maintenance of public roads is undertaken by subsidiaries of DAK.

64. A key factor for improving quality during construction and maintenance is stability and predictability of the contracting market, which in turn depends on funding from Government (which is the main employer in the road sector). Contractors are more likely to invest in equipment and staff if they have confidence that the market for their services is at least stable and preferably growing. Recently, this has not been the case in Ukraine. The funds for road construction and maintenance have generally decreased with impact on investment of oblavtodor and rayavtodor, which in turn have not renewed their equipment or invested in modern equipment (much of their equipment is old with low productivity or broken down). Preliminary assessment based on interviews with two public contractors indicates that DAK companies are overstaffed and seem to lack flexibility to adapt to the changing market. But, above all their managers behave more as public employees and generally lack private sector mentality (with emphasis on risk taking, efficiency and profitability). The first step in the commercialization of the DAKs

would be to develop business plans and start to set various companies targets in terms of their expected profitability.

65. It is expected that public contractors will continue to be important in the near to medium term for maintenance services, but steps should be taken to encourage the entrance and growth of more private contractors. Eventually in the long term most of the road works could be carried out by the private contractors or at least be awarded following a full and fair competitive process. This would contribute to improve efficiency of the system, including by turning the public bodies in charge of works and services more efficient. To achieve this, DAK needs to be reformed and a detailed study of the main features of this reform and how best to achieve it is needed (See section 5).

66. Quality assurance during maintenance is similar to that in construction. However, since maintenance work has to be carried out while keeping the roads open to traffic, it is important that maintenance jobs are finished quickly and effectively. Extended construction and maintenance activities increase travel time and costs for highway users, affect the flow of commerce, and prolong safety risks to motorists and highway workers. Work zones are a source of frustration to road users and it is critical to keep traffic flowing safely through them. Although weekend and nighttime road work is more expensive, it pales in comparison to costs involved with crashes and congestion caused by road work during times of heavy traffic volume.

67. High quality of pavements with long life at the design and construction stages as well as using preservation techniques that help extend the life of existing pavements help reduce the need for maintenance. More than often, low cost preventive maintenance allow avoiding costly rehabilitation down the road. Further, it is essential to establish the right schedules for maintenance and stay with them. Deferred maintenance is more costly and disruptive to traffic than regular maintenance. In this regard, based on the WSP Consultants study of 2006 concerning “Road Reform Plan” and its updates in 2010, Ukraine has a huge volume of backlog of maintenance works and it is getting worse due to insufficient fund. Above all, it is important that adequate funds are provided for timely maintenance.

68. **Output Performance Based Contracts (OPBC):** Procurement of maintenance services is expected to mostly follow the traditional input based approach in the short run. However, there is need for alternative delivery methods which progressively transfer the responsibility of the management of the infrastructure to the private sector. In addition to traditional contracts, New Zealand uses four contract types to procure maintenance and operations: alliances, performance-specified contracts, hybrid contracts, and network outcomes contracts (these are defined in Section V.B.3 and Annex 7 of this Report).

69. Ukravtodor has recently prepared and awarded the first Output and Performance Based Contract (OPBC). It used bid documents and specifications prepared by international consultants. These contracts differ from the traditional input-based contracts in that the Employer specifies performance indicators or levels of service that the contractor is required to meet when delivering repair and maintenance services. OPBC approach is expected to result in: (a) cost savings in managing and maintaining road assets; (b) greater expenditure certainty for road agencies; (c) ability to manage the road network with fewer agency

staff; (d) better customer satisfaction with road service and conditions; and (e) stable multi-year financing of maintenance. It is recommended that increased use be made of OPBCs in the future depending on the results of the ongoing current operation financed by EBRD.

G. Capacity Building

70. **Trainings.** With the introduction of some of the recommendations in this report specifically related to new forms of contracting and supervision arrangements, Ukravtodor should consider developing a training program for technical staff of Ukravtodor, ORSs, "DerzhdorNDI", "Dortsentr". Such program should include sessions dedicated on briefing key specialists on the main principals of FIDIC contracts together with the list of standards that will be included as a part of technical specifications of the contracts. Additionally, it would be necessary to prepare special courses for each enterprise under Ukravtodor in order to introduce aspects of: (i) technical supervision ("Dortsentr"); (ii) preparation of payment certificates (Ukravtodor, "DerzhdorNDI"); and (iii) review/approval of changes in the design ("Ukrgiprodor", "DerzhdorNDI").

71. **Academic education.** In order to build institutional capacity in the sector, government should consider revisiting the curriculum in universities and colleges around the country to ensure the teaching is keeping pace with developments in the sector. This would also require trainings for teaching personnel, modernization of university laboratories and practical field trips to construction sites. The last activity could be supported by all subordinate organizational units of Ukravtodor. The curriculum should cover all the technical aspects of road construction but also be extended to cover project management issues and planning.

3. Institutional Organization to Foster Quality in the Sector

3.1 Management and Reform of the Road Sector

72. As previously mentioned, improving quality control and quality assurance requires more than just process changes, it also requires a fundamental change in the management structure of the sector.

73. At present the road sector in Ukraine is dominated by the State Road Services of Ukraine "Ukravtodor" which has overall management of State and Local Roads, carried out at the oblast level by the Oblast Road Services (ORS) which report to Ukravtodor. Although policy formulation and regulation are administered solely at the level of the Ministry of Infrastructure and the Cabinet of Ministers, in practice Ukravtodor has a high degree of responsibility for developing policy. Most work related to construction and maintenance of State and Local roads is carried out by subsidiaries of the State Joint Stock Company "Roads of Ukraine", known as the DAK. Works are delivered at oblast level by DAK subsidiaries, the oblavtodors (one in each of the regions, operating and maintaining national and local roads), under contract to the ORS. Work is carried out at the rayon level by the oblavtodors' rayon-level branches- the rayavtodors (for local roads) and the DEDs (for national and regional roads). A group of specialist institutions provide design and research services to both Ukravtodor and OBS. These institutions consist of State Road Design Institute "Ukridiprodor", State Road Research Institute "DerzhdorNDI" and

Road Quality Institute "Dortsentr". These professional institutes as well as DAK are 100% owned or controlled by Ukravtodor.

74. Since 2005 there have been various proposals by international consulting firms[9] to reform the road sector. According to the above studies, the key elements of reform of the road sector are:

- Restructuring of road network management for state and local roads.
- Changes to the institutional framework under which road sector services are provided, to increase competition and reduce costs.
- Restructuring of road sector financing in line with sector recovery principles (to be covered in section 5).

Restructuring of Road Network Management

75. Previous studies have recommended, and supported by this study, is that the functions of policy development in the road sector should be separated from network management. Policy should be set by the Ministry to which Ukravtodor reports (currently, the Ministry of Infrastructure) and Ukravtodor should manage the road network within the policy framework set by the Ministry of Infrastructure. This would increase the accountability of Ukravtodor activities and ensure that road policy is aligned with overall transport policy. As part of this process it would enable Ukravtodor to operate more effectively as the network developer and manager, ideally with a more commercial focus in line with agreed performance criteria from the MoI.

76. **Decentralization of Management of Local Roads:** Instruction No. 759 dated 2 October 2013 by the Cabinet of Ministers was approved but not enacted because of the need for change in the law on the transfer of responsibility to manage local roads by local authorities as well as the recent events in Ukraine. It seems there is agreement concerning the principle of decentralization but there is new discussion concerning the level of decentralization: Oblast or Rayon. Success of decentralization will depend on decentralizing road budget to the appropriate level of government and capacity and capability at that level. At the present time, it is recommended that Local roads become the responsibility of the Oblasts because they generally have more capacity and capability than the Rayons. In the longer term it might become feasible to decentralize to the Rayon level. The Oblasts do not have great capacity either and some staff would need to be shifted from the Oblast Road Services to Oblast Governments. Further, a large training program would be needed to train personnel at the oblast level. Ukravtodor can play a major role in this training and manpower development.

[9] WSP Consultants in 2005 and 2006 (Assistance with Developing a Road Reform Plan); ARUP, WSP, and Naco in 2010 (Support to the Integration of Ukraine in the Trans-European Transport Network TEN-T, WP 3.2: Organization and Financing of Road Infrastructure Draft Final Report 2010); and High-Point-Rendel Limited in 2010 (Task 2: Close Out Report Consultancy Services for Reform of Road Management System in Ukraine; Component 3: Institutional Capacity Building Draft Report October 2010).

77. To reduce the risks in implementation of the above-mentioned decentralization, the Government might want to start with two pilot oblasts and progress to remaining oblasts on the basis of the pilot implementation. But, this would lengthen the time period for decentralization.

Institutional Framework Under Which Road Sector Services Are Provided

78. **Professional Institutes**. The Design, Quality, and the Scientific Research Institutes are strong institutes with good staff and equipment. These institutes provide vital services to the road sector. However, because of low wages they are not attracting the best college graduates and in view of shrinking budgets to the road sector have been reducing their staffs. There is no budget assigned to them by Ukravtodor. Instead they have to earn their income by competing for work.

79. The Design Institute "Ukridiprodor" competes with the private consultants. But, it wins 90% of the work it competes for. The Design Institute operates the Pavement Management System (PMS) and the State Enterprise Research Institute "DerzhdorNDI" is the developer and operator of the bridge management system (BMS or AESUM in Ukrainian). The Research Institute competes primarily with universities for research work. But, it prepares design standards and norms also, which is an essential function to be carried out at least initially by a government agency. The Quality Institute "Dortsentr" undertakes tasks which probably should not (at least initially) be privatized such as certification of road construction products. However, there is room for more privatization of the design function of the Design Institute.

80. Ultimately, there should be divesture of professional service enterprises (such as the Design Institute, State Road Quality Institute, etc.) for which Ukravtodor presently stands as owner's representative, the initial step may be the formation of a state owned joint stock holding company. Ukravtodor has no definitive plans for this divesture but it is recommended that this issue be subjected to more in depth study to determine which functions of each institute should be commercialized and secure support of Ukravtodor for the change, and concrete steps and time frame for implementation.

81. **DAK**. Ukravtodor and OBS are Employers of DAK and its subsidiaries. DAK performs works and also provides services to other enterprises and organizations. But, Ukravtodor controls 100% of the shares of DAK. There should be a separation of the customer and supplier roles in the implementation of road construction, periodic maintenance and routine maintenance, which entails separation of the ownership representation, direction and operation of DAK including offices, materiel, directors and personnel.

82. The original reform plans stated that the DAK "and its 26 subsidiaries will be split into 25 separate JSC, each to be managed by an oblast and 1 JSC under management of Ukravtodor". However, recent meetings for this study suggest that Ukravtodor is thinking of gradually commercializing these subsidiaries, region by region and believes that the cost of works by private contractors will be initially higher because of their lack of production bases. Ultimately, DAK should operate in a more commercial manner and all construction works should be through appropriate competitive bidding procedures. It is recommended that reform of DAK should be subjected to an in-depth study to devise the most efficient but politically acceptable course of action.

User perspective

83. Involvement of users and stakeholders is essential to provide a customer focus to operations. It improves focus of the road agency to provide acceptable levels of service and the users can also generate political pressure for better performance and increased funding.

3.2. Financing of the Road Sector

84. The road network in Ukraine is composed of close to 170,000 kilometers of roads of which 8,600 km are international state roads, 4,800 are national state roads, 10,000 are regional state roads, 28,300 are territorial state roads, 50,000 are regional local roads, and 67,900 are district local roads. Repairs for the networks have been backlogged and close to 80% of them have not been repaired in over 30 years[10]. The exact condition of the whole network is not known because of a backlog in data collection but the evidence suggests that some of the major corridors have been improved considerably but much of the rest of the network has not been sufficiently maintained and the overall network is deteriorating.

85. As is the case for most countries, road maintenance is largely financed by fuel levies. In the Ukraine the main sources of revenues for the road sector are: excise duty (fuel), vehicle import duty, fees for oversized vehicles and over-weight, and loans from different sources including IFIs. Expenditures include maintenance, investment projects, debt commitments, transfers to local governments, and road sector reforms. The table below summarizes revenues and expenditure for the past three years and the planned levels for 2014.

Table 3: State Budget Revenues and Expenditure for Road Sector

(in Millions of UAH)	2011	2012	2013	2014*
Total Revenues	**16,827.3**	**14,887.5**	**18,085.5**	**26,027.0**
Balance from Previous Years	643.8	997.3	1,629.0	
Excise Duty: National	2,507.0	2,883.8	2,147.6	4,139.0
Imported	4,898.0	5,626.9	6,405.3	10,216.0
Import duty	1,412.5	1,401.4	2,033.2	2,572.2
Fee for Weight and Size parameters	11.2	5.6	10.9	20.8
Loans for Network Development	3,785.0	1,427.1	3,197.1	6,787.8
Borrowing from International Financial	2,504.3	2,545.4	2,661.5	2,291.2
State Budget	1,065.4			
Total Expenditures	**13,042.3**	**13,460.3**	**18,085.5**	**26,027.0**
Maintenance	4,289.7	5,548.4	4,260.6	3,248.1
Investment Projects	3,785.0	*1,427.1*	*3,197.1*	*6,787.8*
Debt Commitments	4,162.0	3,153.4	6,199.9	11,157.7
Transfer to Local Budgets (15%)	2,086.3	2,213.2	1,766.4	2,542.2
Road Sector Reform	2,504.3	2,545.4	2,661.5	2,291.2

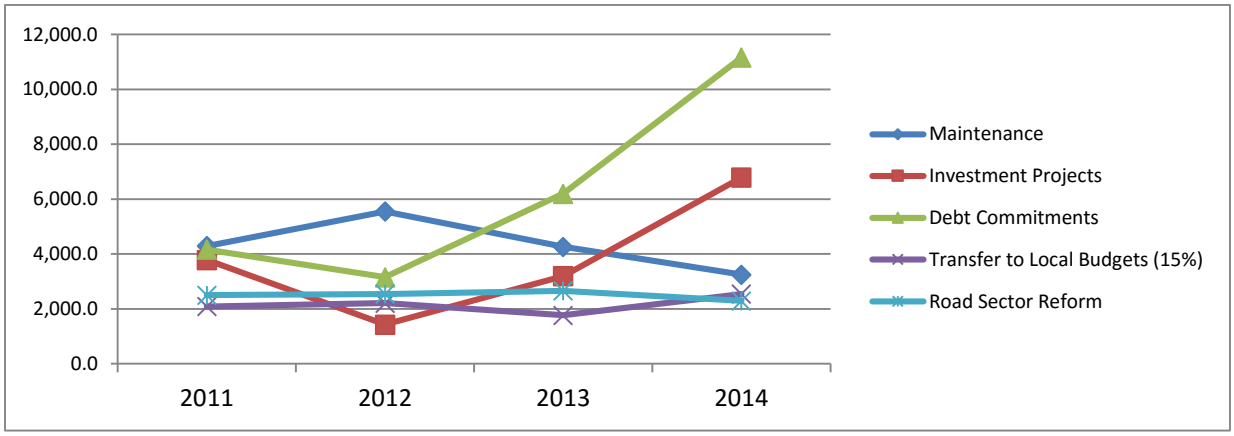
[10] Data from Ukravtador.

*Planned

86. In April of 2014, a law to avoid a new financial crisis was passed and included changes in the funding levels for the road sector. Excise duties for fuel where increased to a flat rate of 98 euros per ton. Up until April, the rate varied between 48 and 98 euros per ton depending in the quality of fuel. Levies on new imported vehicles doubled. With these changes, revenues to the sector increased from 15.2 billion UAH approved in January to 16.9 billion UAH effective April 1st.

87. Although there has continuous increase in the revenues from excise duties on fuels, expenditures in maintenance of roads have been falling since 2011 and debt servicing has almost tripled since 2012. The development of the network is being funded 100% from loans.

Graph 1: Road Sector Expenditures 2011-2014



88. In 2013, the Government set targets for the development of the road sector 2013-2018. For 2013, the actual values were below between 10 and 20 percent below the targets.

Table 3: Implementation of the 2013 Government Economic Program for Roads

	2013	
	Target	**Actual**
Operational Maintenance and routine minor repairs	4,119.0	3,683.4
Providing innovative development in the Road Sector	202.5	49.1
Repayment of obligations under sovereign guarantees	7,501.2	6,203.1

Source: http://www.ukravtodor.gov.ua/

89. The targets set by the Government strategy have not been met in 2013. Fewer resources have been available for funding the road sector. For 2014, the government strategy calls for resources close to 32,000 million (local currency) to meet the targets set forth in the strategy. However, the current approved budget for 2014 only envisions 26,000 million. The gap in financing of 6, 000 million is about

twice the resources planned for maintenance of the network, and about three times the budget for 2014 investments. The shortfalls in resources will continue to affect the sustainability of the network.

90. The Ministry of Finance and the Ministry of Infrastructure have developed a formula to allocate maintenance funding. Using this methodology, the minimum maintenance needs are estimated at 6.8 billion. This level of funding will maintain the road network at minimum standards. As suggested by the expenditures in the sector, road maintenance funding has not reached that level. The current level of funding for maintenance of the network under Ukravtodor is about half that minimum level. It is clear that the sustainability of the sector is threatened at the current levels of financing.

91. In general, a budget for the roads sector is approved during the regular budget cycle, and is usually amended during the year. This makes the process less reliable with an impact on the management of the network, and the ability to plan and prioritize investments, specifically on maintenance.

Revenues

92. A Special Purpose Fund that includes a number of duties on vehicles, imported and manufactured oil products is part of the revenue stream for the road sector. The specific duties are:

- Excise duty on excisable goods (products) manufactured in Ukraine as regards oil products and vehicles (Special Fund)
- Excise duty on excisable goods (products) manufactured in Ukraine as regards oil products and vehicles (Special Fund)
- Import duty on oil products, vehicles and tires thereto (Special Fund)
- Fee for use of motorways by vehicles and other self-propelled machines and vehicles which weight and size parameters are in excess of the standard ones (Special Fund)

93. Excise on Gasoline is 198 euros per ton, and excise duty on diesel is 98 euros per ton (flat rate adjusted in April 2014). Previously, diesel excise duty varied between 48 and 98 depending on the quality. Vehicle registration grew almost 40% in 2011 and again over 100% in 2013. Diesel and gasoline consumption are still in low levels compared to its neighboring countries. As vehicle ownership increases, and consumption of diesel and gasoline, there is room for a continuous increase in revenues for excise duties.

94. State Guaranteed Loans particularly from IFIs fund 100% of investment projects. In addition, loans for development of the network of public motorways which are granted against a guarantee of the Cabinet of Ministers of Ukraine.

95. When a funding gap is identified, there is a contribution from the General Fund of the State Budget.

96. A draft law is being considered which creates a Road Fund. In addition, a new axle fee is being considered for heavy duty vehicle to compensate for the damage these types of vehicles have on the network. The Ministry of Infrastructure estimates that between 1 and 4 billion UAH can be expected as additional revenue collected for the sector.

Expenditures

97. Expenditure in the road sector can be summarized as follows:

- For the development of the network and maintenance of public motorways including expenditure on investment projects in the motorway sector to be financed out of borrowed funds with a guarantee of the Cabinet of Ministers of Ukraine
- For the fulfillment of debt commitments on loans for development of the network of public motorways which are received against a guarantee of the Cabinet of Ministers of Ukraine
- For a Subvention (transfer) from the State Budget to local budget for construction, reconstruction, repair and maintenance of municipally-owned streets and motorways in inhabited localities
- For the development of highways and the motorway sector reform

Towards more sustainable road sector finance

98. In order to improve the finance of the sector, there needs to be a comprehensive review of both the revenues and the expenditures and improvements can be made on both sides of the equation.

99. **Quality of public expenditures**. On the expenditure side of the equation more can be done with the existing resources. Priority in use of funds should be given to: (a) routine road maintenance, (b) removal of current maintenance backlog, and (c) periodic maintenance. Reconstruction, capacity expansion or new construction should be implemented only where this can be economically justified. As stated previously priorities should be developed through use of the PMS and BMS systems.

100. There is also scope for improving the efficiency in the execution of works. This would include reformed and more efficiency DAKs, use of private contractors and the move to expand performance based contracts. By adopting certain forms of performance based contracts, Ukravtodor could also equalize payments over time so that contractors take the up-front costs of reconstruction but spread payments over time.

101. Finally on the expenditure side is the issue of debt commitments. Debt commitments in 2014 are close to half of the resources allocated to the road sector in the national budget. The amount is close to what is collected from excise duties on fuel. As a result, resources are dedicated to servicing this debt which leads to a vicious circle of underinvestment in maintenance, adding to the backlog, and the rapid deterioration of the network, particularly of local roads.

102. **Increasing revenues**. By Law funds of the State Road Fund of Ukraine should be used primarily for the financing of construction, reconstruction, repair and maintenance of roads of state significance.

However, this has not always been followed. Consequently, to ensure that the collected funds are used for roads, the current legislation to this effect should be amended.

103. In terms of direct revenues there are a number of areas where levies can be increased including (a) fuel taxes (both gasoline and diesel); (b) vehicle ownership taxes structured so that heavy, multi-axle vehicles pay proportionately more and cover the costs of damage that they impose on the road pavement; and (c) increased use of local revenues for the maintenance of local roads.

104. Finally the national and international road network should be fully funded from Road User Charges. Part of this can be covered from the fuel and vehicle ownership taxes but in most countries in Europe there is also the use of either tolls or the vignette system. This may be difficult to implement at this time but consultations should start with the intention of passing legislation that would allow tolling and/or the introduction of the vignette system. Initial discussions have already taken place to include this in the next World Bank loan.

4. Recommendations

125. The key recommendation from this report is that Ukravtodor needs to address the "Quality Assurance" process and not just look at the "Quality Control" process. This is the policy that all major road agencies around the world have adopted. It is also clear that improving the quality of outcomes will also require a change in the overall management of the sector. The philosophy needs to change to provide for a greater focus on performance management and taking account of the user perspective. Within this context the detailed recommendations are as follows:

1. Planning

a. It is important that Ukravtodor creates a proper planning function/capability within its organizational structure. An ideal scenario would be the creation of a Planning Department/unit demonstrating the importance given to planning activities. A lower profile solution could consist in setting planning functions as part of an existing entity of Ukravtodor, such as roads development or economic planning units.
b. Planning must be an integrated process that seeks to pull together all the contributing factors (such as land use) to increase the effectiveness of the delivered plans or solutions. Also, planning must involve all stakeholders and the public. Public engagement involves informing the public as well as consulting and involving them. Further, there must be an acceptance and appeals process that gives rights to affected interests to appeal.
c. Ukraine does not have a long term or medium term transport plan. It is recommended that the Ministry of infrastructure hire a qualified consultant to help design an integrated multimodal transport master-plan and Ukravtodor hire a qualified and experienced consultant to help prepare these plans and strategy for the road sector. The preparation of a master-plan is a long term

exercise but it is a short term priority to make the decision to prepare one and agree on how it will be implemented.

d. Although Ukraine has a functioning Pavement Management System (PMS) and a Bridge Management System (BMS), their outputs are not given the required consideration in the development of road and bridge works and maintenance programs. Ukravtodor needs to become more committed to these planning tools in terms of budget and staffing to improve both systems and keep them up to date, especially the collection of timely data (missing data to be collected initially on a sample basis) and according their outputs proper weight in developing five year and annual programs.

2. Design

a. Presently, the majority of design work is done by the State owned Design Institute "Ukridiprodor". While the Design Institute is likely to continue to play an important role in the short to medium term, the possibility in the long run to split the normative functions of the Institute, if any, that could remain public, from the commercial functions, that could be progressively commercialized, then, if deemed relevant, privatized, should be discussed.

b. There should be a conscious effort to open up the design works to the private sector in the short/medium term and their deepening involvement should be encouraged both by the Government and the IFIs. Further, joint ventures between foreign consulting firms (mostly involved on IFI financed projects) and local consulting firms should be encouraged, such as by giving appropriate weight to this factor in evaluation of proposals by consultants.

c. Designs are presently being reviewed by "Expertise and Organization Sector" of the Ministry of Regional Development mainly to check for standards compliance. In the medium to longer term, design review should be enhanced through technical council within the sector and there should be a conscious effort to open up design reviews to qualified independent private consulting firms or expert practitioners.

3. Plans and Specifications

a. Ukrainian specifications and bid documents still largely follow the former Soviet standards and specifications and there is a need to modernize the system. This has already started under the IFI financed projects, where FIDIC documents have been used with some modifications to reflect conditions in Ukraine. This should be widespread for all works in Ukraine. More use should be made of pertinent excellent technical standards and specifications available around the world and particular focus should be given to harmonizing Ukrainian standards with EU standards as Eurocodes has now been formally adopted.

b. More use should also be made of performance specifications in bidding documents, changing the paradigm from compliance to a set of designs and standards to the paradigm of delivery of output and outcome, with customer-focused performance standards. These standards appear to drive quality up and have the potential to be a key driver of innovation in the road construction business.

c. For the essential components of road works such as bitumen and aggregates the quality standards and verification processes should be improved.
d. Increased use should be made of the recently prepared Output and Performance Based Contracting (OPBC) in the future depending on the results of the ongoing current operation financed by EBRD.

4. Procurement

a. There is need for more transparency and accountability in the procurement process in Ukraine. Ukraine which has recently joined the Construction Sector Transparency Initiative (CoST) should take CoST seriously and implement its recommendations. These include the formation of a multi-stakeholder group (MSG) consisting of key Ukravtodor departments and representatives of civil society groups to provide public oversight and the improved public disclosure of Ukravtodor activities through a more user friendly website. The creation of the MSG will require a council of ministers decree and the website can be addressed through the on-going HPR consultancy services. Both are priorities and can be achieved in the short term. The recently completed Bank financed document entitled "Third Party Monitoring of Procurement: A Practical Guide" (in Ukrainian) also provides excellent suggestions in this regard.
b. Procurement should be reformed to allow more genuine competition and speed up the rise of privately owned contractors and consultants. Currently, a Public Procurement Law (PPL) to reform procurement is under consideration by the Council of Ministers. Through the approval of these reforms Government can take some actions to promote genuine competition and encourage development of private contractors and consultants.
c. The procedures for selection of consultants and contractors and management of the contracts should be improved. This includes to professionalize the market for contractors and consultants; to foster improved quality by giving it additional weight in proposals; to strictly apply contractual clauses including on delays, fines and compensations; to promote multiyear contracts and Design and Build contracts; and to foster the national capacity to provide guarantees and set clear dispute resolution systems.

5. Construction

a. Supervision effort should be increased in quality and quantity, especially when work is going on at several projects at the same time. Further, there is a significant potential for corruption that could be potentially managed by (i) regularly rotating the supervisors on different works sites and (ii) creating a central technical audit function that would intervene in a sporadic and unadvised fashion to countercheck on the quality of the supervision. Independent laboratories for supervisors could be tested and identified, if successful, as a good practice. Quality of works can also be improved by using qualified independent supervisors.
b. Increase independence between the various actors involved (construction, supervision, acceptance and commissioning of the works) and (i) a progressive separation of the ownership relationship should be conducted and (ii) an increased opening to the private sector of most of

those activities is recommended; supervision effort should generally be increased in quality and quantity; the practice of technical audit should be established and widespread (see below).

c. While advancing the above, increase the use of technical audits, both during construction activities and at completion of the works. These audits are an integral part of quality management systems to enhance the quality of works. The goal is to find practical solutions to problems, not to affix blame.
d. Ukraine should experiment with alternative methods of project delivery and evaluate the results before adoption as standard procedures. In addition to the classical design-bid-build method, Ukravtodor should experiment with design-build and OPRC arrangements
e. Improve road safety management during works periods

6. Maintenance

a. Use PMS and BMS to define priorities, optimize work programs and demonstrate to budget departments the level of funding required to have an appropriate level of maintenance. The PMS and BMS can also demonstrate the impacts of under-funding on the condition of the road network.
b. Introduce management by performance and results for those organizations owned or controlled by Ukravtodor. Their performance should be evaluated through a sound monitoring system based on objective indicators and assessed through annual reports focusing initially on expenditures and activities, and later expanded to emphasize performance monitoring. Ukravtodor should disclose those results and inform and consult the public and stakeholders in the preparation of programs. The resulting citizen oversight is expected to lead to more accountability for results.
c. Reform the DAKs through commercialization, promote competitive contracting for maintenance activities and encourage the entrance and growth of more private contractors.
d. Evaluate the results of the ongoing OPBC to help decide whether to expand its usage in the future.
f. Improve legislation and enforcement of vehicle overloading. Ukravtodor should build the inclusion of axle load control system into the design of new projects such that newly improved roads are protected from overloading.

7. Monitoring and Audits

a. Ukravtodor should monitor its own activities and those of organizations owned or controlled by it by preparing annual reports and acting on their recommendations.
b. Ukravtodor should audit its own activities and those of organizations owned or controlled by it every 2- 5 years, depending on a risk assessment. Audits could be procedural, technical, post implementation reviews, road safety assessments, or thematic.

8. Management and Finance of the Road Sector

a. The road sector in Ukraine needs to be restructured to transfer management of Local roads to local governments (oblast or rayon). This process, which has been decided but has been delayed, would be in line with the ongoing trend towards bringing the government closer to the people.
b. The institutional framework under which road sector services are provided should be changed to open up the sector to the private sector to increase competition and reduce costs. However, the issues involved are complex and more in depth studies are required to devise the most efficient but politically acceptable course of action.
c. Road sector financing should be restructured in line with sector recovery principles. This involves amending the current legislation to prohibit the use of funds, allocated for development and maintenance of roads, to cover the budget deficit; ring fencing the funding through a "Road Fund" if the legislation cannot be amended; and increasing financial resources such as by increasing fuel taxes and increasing vehicle ownership taxes, and/or through the introduction of a tolling or vignette system.
d. There is a need for Ukravtodor and the Ministry of Infrastructure to take stock of the status of the current reform plans, agree on the need for further studies, develop detailed plans for the implementation of the reforms and provide technical assistance to support implementation of those plans. It will be important that capable consulting firm(s) are selected to carry out this work and that the findings are realistic and implementable within the political context of Ukraine. The reform process is a long term process but developing the detailed road map for the reforms is an urgent short term priority.
e. Road safety is also an area where a more comprehensive approach is required and one which takes a multi-sectoral approach. Much work has already been done on road safety and in the short term there are a number of key recommendations including the formation of a coordinating body that represents the main stakeholders and the rolling out of automatic enforcement methods at least on a pilot basis.
f. The sector needs a strong and continuing Technical Assistance to help address the key operational questions which need resolving before the various reforms can be implemented.

9. Capacity building

a. To achieve the objectives set out above it is important that Ukravtodor has a cadre of highly qualified staff. The competence of staff can be improved through selection and regular capacity building activities. Specific trainings and study tours for key managers of Ukravtodor and representatives of relevant stakeholders with a focus on performance management, transparency and accountability, and public involvement in addition to quality control systems of roads and road contracting practices.

The recommendations can be summarized and prioritized as follows:

Action	Responsible	Short <1 yr	Medium <3 yrs	Long 3-5 yrs
Planning and Budgeting				

Start preparation of a multi-modal transport master plan to define long term investment priorities	GoI	✓		
Agree minimum data requirements for PMS and BMS and start first round of data collection	UAD	✓		
Progressively improve PMS and BMS functions, easing access and promoting dissemination	UAD		✓	
Design				
Provide technical assistance to Ukridiprodor to i. assess sovereign and commercial functions, ii. propose a new organization separating both functions, iii. support commercialization of Ukridiprodor commercial function	UAD	✓	✓	
Review role of state expertise and make recommendations to enhance their focus on quality of design and road safety.	MoRD/UAD		✓	
Expand review of Technical Council of Ukravtodor to focus more on road safety measures implemented in the design.	UAD	✓		
Gradually increase participation of private firms in the preparation of designs, safety audits and design reviews	UAD		✓	
Plans and Specifications				
Bring standards in conformity with EU technical regulations in line with association agreement timetable (2017)	MoI/UAD	✓	✓	
Promote performance specifications	UAD		✓	
Standardize technical solutions for road rehabilitation works	UAD		✓	
Procurement/Transparency				
Systematic use of clear and fair procurement process for all works and services	MoI/UAD		✓	
Establish a multi-stakeholder group to improve oversight of the sector (CoST recommendation)	UAD	✓		
Implement an “information portal” for improved disclosure of road sector activities including maintenance	UAD		✓	
Construction				
Adopt FDIC contracts for all works including domestically funded works	UAD		✓	
Systematize independent supervision	UAD		✓	
Increase independence between construction, supervision and acceptance functions through progressive separation of ownership (UAD - ORS – DAK)	UAD			✓
Introduce the practice of technical audit for all projects	UAD			✓
Systematize strict application of the contract as a means to professionalize the sector, notably in terms of payment and delays	UAD		✓	
Maintenance				
Develop a detailed implementation plan to improve efficiency and commercial orientation of DAKs	UAD	✓	✓	
Evaluate results of on-going PBC and consider extending concept	UAD		✓	

Promote competitive contracting for maintenance in parallel with the commercialization of DAKs	UAD			✓
Use PMS and BMS to define priorities, work programs and budgets	UAD		✓	
Implement a national Weigh-in-Motion system to protect against overloaded trucks	UAD			✓
Sector management				
Clarify roles and responsibility: MOI responsible for policy and UAD responsible for implementation of programs aligned with this policy; revise reporting arrangement such that UAD reports to MOI to increase accountability.	GoU	✓		
Identify pilot Oblast to test decentralization principles, contract a TA to assess specific needs of the decentralization process (local capacity, M&E, financing, management etc.)	UAD	✓	✓	
Sector finance				
Enact legislation to enable either tolling or the use of a vignette system on Ukraine's roads, further increase duties on fuel	GoU		✓	
Identify opportunities for private sector finance in the road sector starting with smaller projects such as a concession for road tolling	UAD		✓	✓
Capacity Building				
Develop capacity building programs to ensure that personnel in the sector have the skills to implement the various recommendations in this report	MoI		✓	

Annex 1: International Experience

SCANS by USA

Similar to Ukraine, USA uses mostly the classical design-bid-build delivery in the road sector. This was the situation in most countries till recently. Often this resulted in cost overruns, slow delivery and delays, claims-oriented environments, adversarial relationships between contractors and employers, lack of innovation in addressing project needs, and user frustration. In fact, many countries have or are conducting reforms of their road sectors to respond to growing infrastructure needs, inadequate public funds, insufficient and diminishing staff, and the accepted wisdom that the private sector has a valid and valuable role to play in the delivery of projects because private contractors and consultants are generally more efficient than their public counterparts. Further and especially in Western countries, there is a growing trend to reform the business of government and bringing government closer to the people. This implies greater decentralization of decision making to local authorities with the associated autonomy and budgetary provision to do so.

The present section provides a number of case studies of other countries which have systems for quality control that might be interesting for the Ukrainian context. This includes legal framework for quality control of roads; system of coordination and decision making between the various governmental and non-governmental authorities responsible for quality control; review of the procedures and resources available for quality control activities; and the preparation of a number of case studies from countries which have systems for quality control that might be interesting for the Ukrainian context. The breadth of the topics under consideration ranging from planning, financing, design, delivery and procurement, construction and maintenance makes it difficult to have an exhaustive description of the cases.

The USA mounted a specific study (”scans”) to assess the experience of countries which have implemented reforms to gain experience from those countries. Four pertinent studies were carried out under the International Technology Scanning Program sponsored by the US Department of Transportation/ Federal Highway Administration in cooperation with the American Association of State Highway and Transportation Officials and the National Cooperative Highway Research Program. These scans relate to:

- Managing Pavements and Monitoring Performance: Best Practices in Australia, Europe, and New Zealand, August 2012. The European countries included Sweden, Finland, Denmark, Norway, Netherlands, Hungary, England, and Scotland.
- Linking Transportation Performance and Accountability: Australia, Great Britain, New Zealand, Sweden, January 2010.
- Construction Management Practices in Canada and Europe, May 2005. The European countries included Germany, England, Scotland, Netherlands, and Finland.
- Best Practices in Quality Control and Assurance in Design in USA (domestic scan), NCHRP Project 20-68A, Scan 09-01, July 2011.

In addition, a rather detailed investigation of practices in New Zealand was conducted based on advice from New Zealand experts and the excellent website for the New Zealand Transport Agency (NZTA): http://www.nzta.govt.nz/resources/results.html?catid=330.

The results of this work are summarized in Annex 6 for the US scans and Annex 7 for experience from NZTA. The following is a summary of key findings which are potentially of interest in the Ukrainian context.

1. Performance Management

Most of the agencies the US scan teams visited have moved to performance management (rather than the classical narrow short term targets) because it achieves steady, long term progress. They focus on outcomes and operate as service providers. They have articulated a limited number of high level transportation policy goals that are linked to a clear set of measures and targets (such as safety, reliability, availability, maintainability, security, health, environment, economics-value for money, etc.). Performance is evaluated by tracking the measures and reporting them in clear language appropriate for the audience. Technical jargon can be used for internal reporting but not to communicate with the public.

Another important benefit of their performance management systems was the transparency they created which improved understanding about transportation issues and led to greater degrees of trust. Also, it led to more collaboration among levels of government, not contention. The center-regional-local relationships are more akin to coach-player relationships than to umpire-player relationships. Seldom did one level of government mandate the performance of another.

The visited agencies improved the use of benefit-cost analysis and risk management practices to demonstrate value for money. Further, they carried out post construction evaluations to assess whether benefits included in the original benefit-cost assessments were realized.

Performance management in these agencies has a strong safety focus. Resources are provided to enable high-quality data tracking, analysis, and reporting capabilities that allow for the use of performance data in decision making. Annual reports on agency performance are produced to demonstrate accountability.

In summary, performance management is not a black box or simplistic solution; it is a culture to grow within the agency as an important consideration in the decision making and investment process.

The main lessons learned were:

1. Articulate a limited number of high-level national transportation policy goals that are linked to a clear set of measures and targets.
2. Negotiate intergovernmental agreements on how State, regional, and local agencies will achieve the national goals while translating them into State, regional, or local context and priorities.
3. Evaluate performance by tracking the measures and reporting them in clear language appropriate for the audience.
4. Collaborate with State, regional, and local agencies to achieve the targets by emphasizing incentives, training, and support—instead of penalties—as the preferred way to advance performance.
5. Perpetuate long-term improvement by understanding that the real value of performance management is the development of an improved decision making and investment process, not the achievement of many short-term targets.

6. Improve the use of benefit-cost analysis and risk management practices to demonstrate value for money. Consider major project post construction evaluations to assess whether benefits included in the original benefit-cost assessments were realized.
7. Recognize that major national visions, not achievement of narrow targets, tend to generate new investment.
8. Convert long-term deferred maintenance needs into a long-term future liability calculation. This clearly links the budget to long-term system sustainability.
9. Demonstrate accountability by producing annual performance reports on agency achievements.
10. Instead of using technical jargon, report results with language that is meaningful to the public, such as "the journey home" or "support for the journey." Detailed, technical terms should be used for internal reporting, but translated into understandable language for the public.
11. Collaborate frequently with other cabinet agencies, including conducting periodic meetings with top leadership on cross-cutting issues such as economic development, public health, highway safety, and climate change.
12. Have a strong safety focus and document the results of safety measures, in addition to the usual measures of infrastructure condition, internal operations, transit, and on-time rail performance.
13. Focus on desired outcomes for travel time reliability that lead to expanded strategies for highway operations.
14. Learn from international examples of addressing climate change that rely on improving vehicles, fuels, and modal choice, but do not mandate reductions in travel or mobility.
15. Provide resources to enable high-quality data tracking, analysis, and reporting capabilities that allow for the use of performance data in decision making.
16. Recognize that performance management is not a black box or simplistic solution; it is a culture to grow within the agency as an important consideration in the decision making and investment process.

2. Managing Pavements and Monitoring Performance

Management (in the agencies the US scan teams visited) is integrated into an asset management culture that supports agency business processes and long-term financial responsibilities. Whole life costs of preserving the value of road assets are assessed and documented in a long term financial plan. Agencies must either fund the depreciation in the road network each year or account for the unfunded liability. Project priorities for road maintenance and renewal are based primarily on economic indicators of viability and reducing agency risk and liability. Multi-year financial plans are adopted to provide flexibility to move funding from one year to another.

Agencies help elected and appointed officials become better stewards of transportation assets by informing them and collaborating with them in development of long term financial plans which outline the strategies that will be used to effectively manage the road network and communicate risk and deferred liabilities for any underfunded maintenance and renewal activities. Further, government officials are trained to better understand and honor their fiduciary responsibilities, which led to support of the transport agency programs at all levels of government. The transport agencies are then held accountable for the way public funds are used to preserve and improve the condition of infrastructure assets.

The agencies assign highest priority to maintaining and renewing the existing highway network rather than spending limited funds on capital enhancements. Many agencies have established methods for holding agency personnel and contractors responsible for their actions through audits and contractual agreements.

International agencies invest in workforce capacity development and succession planning. The agencies invest in asset management capabilities that result in well established, trained and assimilated units in the organizations that all stakeholders, including executives and legislators look to for information. In some cases internal capacity focused on regaining some of the internal capabilities lost when maintenance and renewal activities were contracted out.

The key findings were:

1. Pavement management is integrated into an asset management culture that supports agency business processes and long-term financial responsibilities. Assessment of the whole life costs of preserving the value of road assets and documenting the information in a long term financial plan. Agencies must either fund the depreciation in the road network each year or account for the unfunded liability. Project priorities for road maintenance and renewal are based primarily on reducing agency risk and liability. Multi-year financial plans to manage the road network that provide flexibility to move funding from one year to another and stability because the plans cannot easily be changed once they have been approved.
2. Agencies help elected and appointed officials become better stewards of transportation assets. The visited agencies develop long term financial plans which outline the strategies that will be used to effectively manage the road network and communicate risk and deferred liabilities for any underfunded maintenance and renewal activities. These plans are developed collaboratively with government officials, who are held accountable for the way public funds are used to preserve the condition of infrastructure assets. Further, government officials are trained to better understand and honor their fiduciary responsibilities, which led to support of the transport agency programs at all levels of government.
3. Agencies focus on outcomes and operate as service providers taking into consideration customer – driven priorities such as safety, reliability, availability, maintainability, security health, environment, economics, politics.
4. Investment priorities are known and stakeholders are held accountable for their actions. Highest priority is assigned to maintaining and renewing the existing highway network rather than spending limited funds on capital enhancements. Many agencies have established methods for holding agency personnel and contractors responsible for their actions through audits and contractual agreements.
5. Agencies invest in workforce capacity development and succession planning. The agencies invest in asset management capabilities that result in well established, trained and assimilated units in the organizations that all stakeholders, including executives and legislators look for information. In some cases internal capacity focused on regaining some of the internal capabilities lost when maintenance and renewal activities were contracted out.
6. Efficiency and value drive program delivery approaches. Most of the participating agencies contract out 100% of their pavement maintenance and renewal activities. These activities were privatized in response to pressures to reduce debt load or improve efficiency during times of limited funding with a focus on maximizing the value of the investment. Outsourcing has the advantage that the cost of the works is known with greater certainty. However, this led to loss of maintenance expertise. Further it led sometimes to rise of monopolies because of the need to find the right performing contractors.
7. It takes time to develop contracts that work as planned. The Finnish Transport Agency recommends that agencies considering privatized contracts do the following: (a) develop a good procurement strategy; (b) use objective road condition measurements; (c) allow a reasonable level of flexibility in contracts; (d) develop a cooperative relationship with the private sector; (e) do not expect immediate benefits; and (f) make improvements to the contracts based on experience.

3. Delivery of Road Works

Efficiency and value drive program delivery approaches in the agencies visited. Most of them contract out 100% of their pavement maintenance and renewal activities. The following are the key findings concerning construction management practices:

Construction Management Methods that Promote Alignment of Team Goals: In addition to the traditional design-bid-build methods of delivery, the international agencies use alternative management techniques which they claim are more efficient, more sustainable, and/or deliver better value to customers in the long run through the creation of partnerships with the industry that incentivize contractors and the supply chain to focus on outcomes of customer oriented goals.

Integrated Use of Risk Analysis Techniques: The international agencies have integrated the use of risk analysis techniques in their selection of delivery and contracting strategies that can best control and mitigate risks.

Strategic Use of Alternative Delivery Methods: The agencies make strategic use of delivery methods which allocate more risk to the private sector and/or create more motivation for total life cycle maintenance and operation solutions from the private sector.

Procurement Systems that Set Framework for Success: The majority of the agencies use a best-value procurement system as standard procedure. An overriding objective of these procurement systems is to create trust and long term partnerships between the agencies and the industry.

Contract Payment Methods that Support Alignment and Trust: Payment methods are structured to create incentives to contractors to meet customers' needs. Lump-sum payments are being used to create milestone incentives for project completion.

Delegation of Traditional Highway Agency Functions to Promote Efficiency: Generally, more quality management is done by the contractors abroad than in the United States. Under these systems, a third party audits the contractors. All of the countries participating in the scan noted the use of International Organization for Standardization (ISO) certification as an important element of more dependence on contractor quality management.

A philosophy of Network Management: The contracting agency focus has shifted from contract compliance for individual services to management of the network by integrated service contracts.

Greater Partnership between Public and Private Entities: The above actions have contributed to a closer relationship between the public and private sectors in a sustainable manner.

Warranties: Involvement of the construction contractor with the maintenance and operation of facilities it constructed varies substantially with the project delivery method. Warranties of 5 years or longer are not uncommon in the countries studied in the scan. A retainage is used to ensure the correction of defects, but some contractors opt to submit a bond in lieu of having retainage held.

4. Quality Control and Assurance in Design

Similar to Germany, USA public transport agencies carry out most of the quality control and assurance in design in house. A key to the success achieved is the quality of staff and related training and well developed communication channels. They have developed good checklists, manuals and standards and use these tools for communication, training and regular re-evaluation of the processes. They have good selection processes and communication channels to select qualified and experienced consultants who carry out the design. Further, they use feedback from value engineering processes to analyze trends and make changes to their design processes. Moreover, they solicit feedback on design quality and plan quality. This information can show trends, such as the causes of most change orders, and outline changes to standard drawings and manuals. They look at improving quality in existing processes, not necessarily adding more processes.

Other agencies use independent consultants to review designs (prepared by other consultants) to help ensure their quality and constructability. The decisions about the amount, type and depth of review takes the importance of the facility and risk into consideration.

Findings

- Checklists, Manuals and Standards: Successful states use these tools for communication, training, and regular re-evaluation of the processes.
- Scoping and Environmental: Successful states include all parties involved in design and construction early on in the process, including environmental, right-of-way, utilities, designers, any other relevant agencies, and even construction in the scoping process.
- Value Engineering Feedback: Successful states use feedback from value engineering processes to analyze trends and make changes to their design processes.
- Consultant Selection and Communication: Successful states adopt thorough selection processes and good communication channels.
- Construction Reviews and Feedback: It is important to have early involvement to help ensure constructability, feedback during construction process and information provided during post-construction reviews. Successful states solicit feedback on design quality and plan quality. This information can show trends, such as the causes of most change orders, and outline changes to standard drawings and manuals.
- Quality in Existing Processes: Successful states look at improving quality in existing processes, not necessarily adding more processes.

Experience from New Zealand

New Zealand Transport Agency (NZTA), the main transport agency in NZ, was created in 2008 by merging the predecessor highway and transit agencies. Despite its small size (4.5 million people spread over two major islands with a land area of about 269,000 square kilometers, or about the size of Great Britain), the country has been cited frequently in international studies of best practices in asset management and safety. It has about 94,000 km of roads, of which NZTA manages about 11,000 km.

NZTA plans and invests in its land transport for outcomes with an emphasis on influencing planning, partnering for investment and enhancing investment performance. It works with stakeholders to deliver safe and optimum transport solutions that best meet the needs of communities both today and in the future. They tailor their involvement to reflect the level of risk associated with any particular investment program. The Government has articulated its expectations and priorities for the land transport sector in the Government Policy Statement on Land Transport Funding. Through planning and investing NZTA contributes to New Zealand's land transport system- it's a responsibility it shares with local governments.

I. Planning

NZTA follows integrated planning which considers integrating planning for land use, transport planning and urban design to ensure the best use of resources. It considers the drivers for economic growth, the wellbeing of communities, and the environment. NZTA works with local governments, regional councils, and the wider transport sector to deliver effective, efficient and enduring transport solutions, and extract the best performance from existing infrastructure. To achieve, this NZTA uses a **business case approach** to guide the planning, investment and project development processes. This approach links strategy to outcomes, and defines problems and their consequences thoroughly before solutions are considered.

A business case approach encourages early engagement with stakeholders to confirm: (1) fit with strategy and need to invest; (2) the way forward with short-listed options; and (3) that the best value option is affordable and deliverable and that risks are acceptable.

NZTA prepares strategic studies which have a medium-to-long term focus (10-30 years). These studies are different from the investigation phase of a project, which focuses on detailing the macro-scope packages and projects. Strategic studies are used to develop indicative packages of transport activities including indicative timing and funding plans needed to support planned growth and regional land, assess all the eligible activities proposed, prioritizing and programming them according to the available funding, growth strategies or regional policy statements. There are two types of these strategic studies: network-wide strategic studies and single approved organization strategic studies that involve only one approved organization (an example of the latter are the state highway strategic studies).

NZTA has developed detailed procedures for planning at state and local levels. It has an **integrated planning** tool kit and a planning policy manual. It emphasizes **road safety**. It contends that improving road safety starts with integrating safety into all aspects of planning. It stresses the need to **work with all stakeholders** and engages the public in two ways: informing and consulting and involving.

II. Programming

The National Land Transport Program (NLTP) contains all the transport activities that will be funded by NZTA over the next three years. Besides physical projects, it includes sector research, sector training, road policing. Deciding which activities get into the program is a process that begins with local communities and in which people have a say at the local, regional, and even national level.

To be included in the NLTP activities have to be:

- Included in a regional land transport program (including those concerning state highways) and proposed for funding from the National Land Transport Fund, or
- An activity that will be delivered nationally.

NZTA then assess all the eligible activities proposed, prioritizing and programming them according to the available funding.

III. Investing

Sources of Funds: New Zealand's road users primarily fund the country's land transport system through fuel excise duty **(petrol** tax), charges on diesel and heavy vehicles (road user charges) and vehicle registration and licensing fees. These funds are paid into the National Land Transport Fund (NLTF) for investment in maintaining and improving land transport networks and services. Other funding comes directly from the Crown (central government), from local authorities and other sources such as financial contributions for development.

Local transport networks and services are delivered and co-funded by local governments. NZTA is responsible for management and delivery of the state highway network and transport services including road policing program, sector training and research.

In assessing whether to invest in land transport activities NZTA rates strategies, programs, packages, projects and other activities across three factors:

- strategic fit of the problem, issue or opportunity that is being addressed,
- effectiveness of the proposed solution, and
- economic efficiency of the proposed solution.

Priorities among the activities that meet the above criteria are assigned taking into consideration:

- Funding available over time from each source;
- Tasks to be undertaken before can be implemented;
- Capacity of construction sector and what other construction works are also underway or proposed to start; and
- The timing of prerequisite projects or events.

NZTA has an **Economic Evaluation Manual (EEM)** to help in estimating the economic efficiency of a proposed activity. It reflects the industry's best practice

IV. New Zealand: State Highways- Management and Delivery Plans

Managing and running the state highway network, a large value ($25 billion) and complex asset requires planning, especially if NZTA has to respond to the needs of its stakeholders and customers. NZTA plans at both the longer term horizon (through the Asset Management Plan) and in more detail for the upcoming year (through the State Highway Plan).

The State Highway Asset Management Plan (SHAMP): SHAMP provides internal guidance on how the state highway network can be best developed and managed to achieve the government's objectives and meet customers' needs, while balancing the competing demands on available funding over the period. This provides the logic, reasoning and context behind how NZTA proposes to maintain, operate, and improve the state highways over the next 10 years.

State Highway Plan (SHP): The **National Land Transport Program (NLTP)** sets out NZTA's plans for New Zealand's state highways for **three years** (the latest Program is for 2012-15). It gives effect to the **Government Policy Statement on Land Transport Funding**, by allocating funds to land transport projects that increase productivity and stimulate economic growth for the ultimate benefit of all New Zealanders.

SHP communicates NZTA's state highway annual work program and how it fits within the context set out in the Asset Management Plan. It provides a greater level of certainty to NZTA's own staff, stakeholders and supply chain about immediate intentions. The latest SHP (2014/2015) includes:

- State highway improvements.
- State highway operations, maintenance and renewal
- Addressing traffic congestion.

V. Tenders and Contracts

NZTA outsources work on state highways (all state highway improvement, maintenance and operations works) to private sector suppliers, including consultants and contractors. This is done on a competitive basis as part of ensuring investment achieves best value for money.

Tender Process: The 11,000 km of state highway network is one of New Zealand's most valuable assets. NZTA provides the strategic direction and oversees all activities on the network. NZTA uses a range of delivery models. These models have been developed based on international best practice and adapted to the New Zealand context. This allows selecting the best model to deliver optimal value for money based on specific project and market characteristics. This process allows NZTA to:

- develop strong, collaborative supplier relationships;
- develop a strong skill base and understanding of the supplier market, including competitive rates, capabilities and commercial processes; and
- avoid the potential for supplier manipulation of a single process.

NZTA is in the process of changing maintenance and operations procurement practices to ensure efficiency and effectiveness through better asset management and service delivery. The new network outcomes contracts will be phased in over the next two and a half years (see section VII).

A procurement manual is available on line. It details the process and requirements and procedures required. Only contractors who are registered as "prequalified" may be eligible to tender for state highway contracts without having to go through the preliminary formalities every time. Also, only consultants who are accredited by NZTA may be eligible to deliver Highways and Network Operations (HNO) Group's capital and maintenance / operations contracts. NZTA maintains a National Register of

Consultants. Any consultant may apply for accreditation by emailing an electronic copy of the application form.

Contracts: NZTA uses an array of different contract types and the option that most closely matches the requirements is used. The different types of proforma contracts used on most tenders are:

- SM030 Professional Services Contract Proforma Manual
- SM031 Construction Contract Proforma Manual
- SM032 Maintenance Contract Proforma Manual

Transparency: NZTA lists: (a) all upcoming highway tenders and contracts, excluding those that may be procured by direct appointment excluding expedited procedures; (b) contracts awarded for capital projects and maintenance work with estimated cost, name of successful contractor, price and range of prices submitted; (c) information for Highways and Network Operations contracts are now advertised via the Government Electronic Tenders Service (GETS) and/or via National Consultants Register; and (d) the list of registered consultants will be updated monthly.

VI. Operations

Network management is about making the best use of New Zealand's road networks so that people and freight can move efficiently. This is done through efficient management of:

- Assets - the physical road itself and infrastructure such as bridges, tunnels, culverts, median barriers, signs, signals, etc.
- The different ways people use the network - through vehicles, public transport, walking and cycling activities.

This entails:

Operating efficiently by

- Managing the network safely (including the motorcycling safety guide)
- Managing public transport
- Managing walking and cycling networks
- Managing through standards, guidelines and rules: NZTA develops standards, guidelines and rules to ensure that all the country's road controlling authorities have the framework and guidance needed to manage the assets and activities on their transport networks consistently. This achieves a safe and seamless national network for road users. A cross-sector steering group - Register of Standards and Guidelines & Traffic Control Devices Steering Group - oversees this work.
- Managing procurement
- Managing assets
- Using technology and research to develop solutions that ensure the road network operates efficiently such as through toll roads, ramp signaling, travel time reliability, providing travel choice, traffic management, limited access roads.

Operating safely through

Safe road system, safety plans and safety-focused initiatives to help reduce death and serious injuries resulting from road crashes on state highways.

Environmental and social responsibility: This includes:

- Natural environment
- Culture and Heritage
- Urban design
- Human health
- Social Issues

Working with the community: by talking and listening to road users, communities, suppliers, consultants and contractors, and stakeholders.

VII. Maintenance

Maintaining and operating the road is done on basis of minimum criteria for condition and availability. Maintenance is contracted to consultants and contractors. Different types of contracts are used to ensure specified levels of service are met. ALSO, the cost of this work is monitored to determine the point at which more than maintenance is required to meet road users' expectations. NZTA uses five contract types to procure maintenance and operations:

- **Alliances** - special arrangements in which groups of organizations combine in partnership and work together.
- **Performance-specified contracts**, which are awarded for 10 years to single suppliers who are responsible for providing all services. Most resurfacing work is also done under performance-specified contracts.
- **Hybrid contracts**, which are awarded for five years and involve consultants and contractors working in a partnering arrangement to deliver services.
- **Traditional contracts**, which are awarded for varying terms and involve consultants managing suppliers who deliver physical works on the highway network, in a similar way to traditional road engineering construction contracts. Most pavement strengthening works and bridge repairs are managed through this type of contract.
- **Network outcomes contracts**, which are a new approach to maintenance and operations to ensure efficiency and effectiveness through better asset management and service delivery. These contracts are awarded to primary suppliers and are performance-based. This is a new contract model and the contracts are being phased in over the next two and a half years.

Specifying maintenance requirements: All contracts for state highway maintenance work specify 'levels of service' that must be achieved. These are expressed as either:

- response times to events, such as flooding or
- standards/ intervention levels, such as how easy it is to read or see signs and paint lines, the height of the grass and the amount of roadside litter.

Monitoring maintenance costs and asset data: Through maintenance contracts information is collected on the costs of maintenance per year and per kilometer. This is stored in the Roading Assessment and Maintenance Management **RAMM database**. The types of data held in RAMM include:

- condition data - how rough the road is, its **skid resistance** under wet conditions, the strength of the **pavement** and defects such as cracks, rutting and flushing
- a register of the assets on the state highways such as road structure (surfacing and pavement layers), signs, railings, retaining walls and drains
- records of routine maintenance activities
- a plan of work for future maintenance of the roads.

Working with consultants and contractors, NZTA uses this RAMM information to identify the sections of the state highway network where renewal and strengthening work might be needed. If it costs less to replace or strengthen the road than to continue maintaining it, the renewal work becomes a high priority. Local authorities also use RAMM to manage the inventory and maintenance of their networks. This has the advantage that a consistent national comparison and compilation of asset data and condition is possible.

Identifying maintenance locations: A distance-based reference station system is used to describe locations along the highway for maintenance work.

Meeting maintenance challenges

Geology and Topography: New Zealand's geologically young terrain and climate pose a number of challenges for the state highway network. Ranging from unstable hillsides to significant seasonal changes in surface temperature, such factors can result in damage to highways that can reduce the level of service they provide. An intensive monitoring and reporting regime helps ensure that problems such **as blocked or washed out roads and melting or frozen road surfaces are responded to as quickly as** possible. When emergencies occur, contractors have to respond quickly to deal with blockages and update road information for drivers. Also, Bailey bridges are provided for a variety of events, including emergencies when existing bridges or other structures are washed out.

Climate: New Zealand's climate can also cause problems on the state highways. In summer, surface temperatures can reach up 60 degrees Celsius, requiring grit on melting road surfaces to prevent the road surface from being picked up by vehicle tires. In winter, widespread ice and snow pose problems which generally require the use calcium magnesium acetate (CMA), sometimes mixed with grit. This substance lowers the temperature at which water on the road surface freezes. A sophisticated avalanche management program (using remote-reporting weather stations) keeps the roads subject to such an event open during most of the year.

The annual maintenance budget contains an allowance for emergency works.

VIII. Monitoring and Audits

A. Monitoring

An important part of the planning, programming and funding process is the monitoring of the Government's investment in the land transport system. NZTA monitors its own activities and those of organizations funded through the National Land Transport Fund. It's about ensuring New Zealanders benefit from effective and responsive solutions. It's about ensuring New Zealanders receive value for money.

1. **What gets monitored and why:** NZTA is accountable for how it invests public funds in transport services and infrastructure. Public funding provides for almost all land transport services and infrastructure in New Zealand - and NZTA is accountable to New Zealanders for how that funding is invested. This means closely monitoring costs and showing that services and infrastructure fulfil their intended purpose. Both central and local governments have a responsibility to contribute to economic, social and environmental outcomes. Monitoring allows NZTA to check that:
   - transport delivers the **results** intended, **activity by activity**,
   - organizations that receive **public funds** for investigating, planning, implementing, operating and maintaining transport infrastructure use **good practice** and are **accountable** for their use of public funds,
   - appropriate **procurement** (purchasing) procedures are used for infrastructure and services projects involving **public funds**, and
   - the **costs** associated with publicly funded activities are appropriate.
2. **How is monitoring done:** Monitoring involves collecting transport-related information, storing it securely, analyzing it and making it available to the planners, engineers, politicians and those who decide the future direction of transport in New Zealand. Monitoring activity involves:
   - monitoring and reporting on the **performance of the land transport system**,
   - **auditing** organizations that receive public funds for developing, operating and maintaining land transport infrastructure and services,
   - checking that appropriate **procurement** procedures are used for projects involving public funds,
   - checking that **good practice** is being used when activities are implemented,
   - monitoring the costs associated with publicly funded activities, through **procedural audits**,
   - carrying out **post implementation reviews** to check that the forecast **results** are being delivered.

B. Audits

NZTA has a legal obligation to audit organizations that are funded through the NLTP. Audits provide assurance that the NZTA's land transport investments have been well planned and managed by Approved Organizations. They also provide investment information to the NZTA to identify potential risks and help inform investment decisions. The audits typically take place on a cycle of 2 to 5 years. The current audit program includes technical, procedural, post-implementation, road infrastructure safety, and theme audits. NZTA's audit regime is currently under review, to support the NZTA's move towards a more outcomes focused approach.

1. **Audit Program:** An investment audit of each approved organization is carried out every two to five years, depending on a risk assessment. Factors that determine the frequency include the size of the NZTA's financial contribution, the complexity of each organization's program, network condition (pavement and safety), known issues/challenges facing particular approved organizations and the outcome of previous audits.

The audit program is published in May, for the upcoming NLTP fiscal year which starts in July. The program details the Approved Organizations to be audited, the type of audit to be completed, and the quarter of the year that the audit will be carried out. Each approved organization will be advised at least one month in advance of the audit commencing.

2. **Procedural Audits:** These audits focus on ensuring approved organizations comply with the NZTA's requirements in accordance with the Program and Funding Manual, procurement Manuals and various general circulars that have been issued to approved organizations. The audits include:
   - Reviewing documentation/ledgers supporting final claims submitted to the NZTA
   - Reviewing and validating a sample of transactions included in the general ledger
   - Checking a sample of contracts to ensure they have been let in accordance with approved procurement procedures
   - Looking at management of the contracts subsequent to them being let, including both financial and non-financial aspects
   - Validating annual achievement reports submitted to the NZTA.

1. **Technical Reviews:** These reviews focus on condition and performance of the road network assets. The technical reviews also specifically consider the Approved Organizations' planning and intervention logic for investing in their assets. Road networks that are funded through the NLTP, are subject to periodic technical reviews. The reviews involve examination of the network assets as well as an audit of the processes used by the approved organization that is responsible for managing the assets, to assess:

   - Value for money;
   - Achievement of agreed targets; and
   - Compliance with standards and guidelines

The technical review process looks at the management and condition of the network as a whole, including how that has changed over time. The components of the network include pavements, drainage, structures, traffic services, and environmental maintenance. The review:

   - Identifies any areas requiring technical, process or system improvement.
   - Encourages information exchange between the people involved in the review. Having an independent local authority engineer from a similar sized council provides a good opportunity for collegial exchange and brings balance to the technical review.
2. **Post Implementation Reviews:** These reviews promote the transparency of the review findings and aim to:
   - Assess and explain how well projects and packages have achieved their main expected transport benefits (such as improved safety, increased capacity to meet traffic volume growth, or improved journey time and reliability) to give an overall assessment of the value for money of completed projects or packages reviewed.
   - Assess any variation between actual results and expected benefits and costs, and
   - Identify lessons learned that can be made to make business improvements.

   Their scope is on reviewing improvement projects and packages from within the following NLTP activity classes:

   - New and improved state highway infrastructure
   - New and improved local road infrastructure
   - Public transport infrastructure, and
   - Walking and cycling.

A sample of completed projects is selected for post implementation reviews each year using a stratified sampling approach. The range of factors considered in selecting completed activities to review includes:

- The value of funding
- Activity type
- Regional spread
- Giving preference to reviewing a package of interrelated projects rather than the individual projects in isolation, and
- Selecting only projects or packages that have been substantially complete for at least two years. This is to give sufficient time after their completion for meaningful assessment of how well they have achieved their expected outcomes. Safety improvement projects may require at least five years before their effect on crash statistics can be properly assessed.

3. **Road Infrastructure Safety Assessments (RISA):** RISA is a safety-focused tool that identifies areas for improvement on a network. It is applied to sections of sealed rural road networks and identifies potential network-wide improvements - many relatively low-cost.

The RISA is based on international best practice guidelines. The audit is carried out in advance of a Technical Review and the results are included in the technical review report. The recommendations are typically used to prioritize safety improvements, which Councils can then include in their next Land Transport Program.

4. **Theme Audits:** These address a specific topic that is common to / affects many approved organizations. The topics may vary considerably. The choice of topic is made by limited survey involving NZTA auditors and other staff as well as representatives from approved organizations. Results of theme audits are used for the purpose of:
   - Informing approved organizations about issues that have been encountered, current good practice and future direction
   - Feeding into policy development by the NZTA or others in the sector such as Ministry of Transport or Local Government NZ.

Experience from Bulgaria

Bulgaria joined the EU in 2007. During its early transition years, Bulgaria implemented reforms in the institutions of the road sector, and over many years there have been multiple reforms (and change of leadership) at the road administration, and concern that these changes have not led to tangible quality improvements in policy administration nor in the efficiency and effectiveness of service delivery.

The implications of unfinished reforms and lack of efficiency are not negligible: poor prioritization leads to high fiscal costs, significant grant funds from the European Union (EU) are under or ill utilized, and transport infrastructure and services are far below the expectations of Bulgarian citizens and European quality standards, negatively impacting Bulgaria's competitiveness in the European market. These issues span the entire transport sector, and are rather acute in the road sector.

The Road Sector is currently organized around the Ministry of Transport (responsible for the transport sector policy), the Ministry of Regional Development (MRD), responsible inter alia for the implementation of the road sector policy, and the Road Infrastructure Agency (RIA), a second level budget agency at the MRD responsible for delivering investment and maintenance of roads.

The World Bank Bulgaria Road Infrastructure Policy Note (2009, the Note) concluded that to improve governance and management of road infrastructure institutions, and in particular RIA, was the main goal of the next phase of sector reforms in the road sector. It emphasized that no change would succeed without top management commitment to it and urged the government to have the right Management team in place and to ensure their stability, autonomy, and accountability.

The following briefly summarizes some of the Note's key findings and recommendations:

- ***Enhance RIA's Governance Structure*** by supporting efficient use of staff and assets, ensuring management decisions are not politically biased, enabling adequate supervision to measure management performance, and offering a system of incentives for managers who improve effectiveness and financial outcomes.

- ***Strengthen Management*** to effectively deliver on reforms. There is a need for radical cultural change, including payment incentives through a performance-based management system and training though an institutional management development program.

- ***Enhance road traffic safety*** by making it an explicit organizational objective of RIA. This should be supported by the provision of sufficient technical, human and budgetary resources.

- ***Develop a form of Performance Agreement*** between the State (Council of Ministers) and RIA including key performance indicators and their target values with which RIA's performance will be appraised annually. This can be used to define RIA's outputs and budget structure.

- ***Develop a Business Plan and Strategy*** for RIA with a clear mission statement to focus RIA's work and activities.

 Enhance Road Asset Management Systems and ensure data services to support decision-making and monitoring. This will also include a review of the functional classification of the road system.

The elements highlighted in the Note are for most part still relevant today, even if the sector has faced five management changes since the Note and a specific purpose vehicle (the National Company for Structural Infrastructure Projects or NCSIP) was created through an amendment to the Roads Act to oversee part of the Motorway construction.

Delayed or insufficient absorption of EU funds has also been one of the main preoccupations of the government for most of the funding program 2007-2013. Absorption of EU funds under the Operational Program for Transport is currently 41% through the current funding program but programs funded by other International Financial Institutions (IFIs) had been delayed for most of the programming period. However, the total value of declared projects under preparation or already contracted (indicative budgets) under Priority Axis 2 of OP-Transport (Road Infrastructure) is now 40% over the axis budget, which means that there will be a need to either find alternative financing or postpone these activities during the next funding program 2014-2020. Maintenance of the road network is insufficient and undermines the infrastructure sustainability.

The government has been discussing with IFIs since mid-2010 on support to the road sector. The European Investment Bank (EIB) has so far supported the setup of NCSIP, while it was agreed that the World Bank Group would support sector reinforcement in general and RIA in particular.

This support was to provide from:

(i) an institutional component under the Road Infrastructure Rehabilitation Project comprising a strategic advisor to the MRDPW and a consulting firm tackling general project management and institutional changes in RIA and

(ii) Advisory Services from the World Bank Group to the MRD in strategy and sector governance and to RIA in support to projects implementation and strengthening RIA's governance and operations.

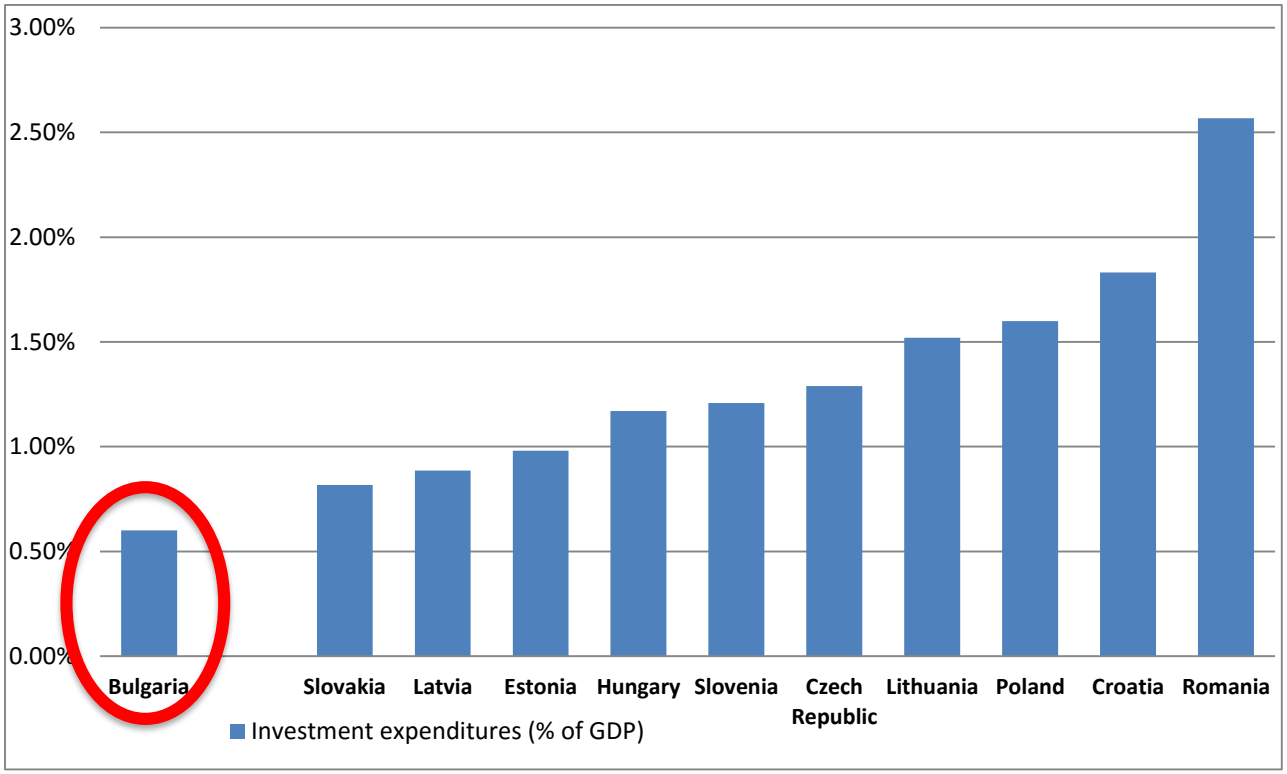
The content of such support were coordinated by the MRD and by the Council of Minister's office, which is coordinating support received from IFIs in the implementation of EU Funded programs especially to avoid overlaps between assignments.

As a substantial time was needed to finalize an implementation framework for IFI advisory services (about two years) both the government and RIA's needs evolved. As the period for implementation of the current EU Funds programming program is nearing its end, the direct need for project implementation support was not deemed critical by MRD and RIA, while MRD did not consider specific support necessary beyond the Highway Advisor. A new management team was appointed in RIA in October 2011 and the Advisory Services scope was finalized early in 2012 and focused on operational support to RIA's management, operations, strategy and business plan.

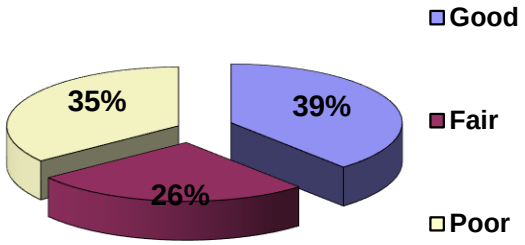
A Historic Failure at Macro level: Refocusing on Quality at the Strategic Policy levels

For 130 years RIA has been managing, designing, constructing and maintaining roads in Bulgaria. The high reputation of the civil engineering programs in Bulgarian academic institutions in the socialist times attracted students from all over the world to Bulgaria. The caliber and preparation of seasoned Engineers at RIA is no less than any department of transportation in a US state or any European country.

In this scenario, the quality of engineering at the micro level was not sufficient to overcome the lack of Quality at the macro level, where there was no strategic framework, no business plan, a remnant of a command and follow style of management, with predominant focus on the short term targets. The short term targets were also ever changing due to frequent changes in the government, and the RIA management. This has resulted in the fact that the long term investment in Roads in Bulgaria was the lowest among the EU 12 countries in 2010.



The greatest fallout of the lack of long term thinking and lack of long term quality in transport strategy and policy making is that only 39% of the Republican roads system is in a good condition. A very alarming statistics: for a country that is aiming to break the barrier of low growth.



When Bulgaria joined the EU in 2007 and became eligible for significant amount of EU funds, targeted to build and upgrade infrastructure, the inadequacy of the command and follow style of planning and lack of long term vision became even more obvious. The Regional development ministry developed the first formal Roads Strategy in 2013 with the World Bank assistance. The vision and major objectives being the following:

In order to implement this Strategy, the mission of RIA was prepared in collaboration with stakeholders.

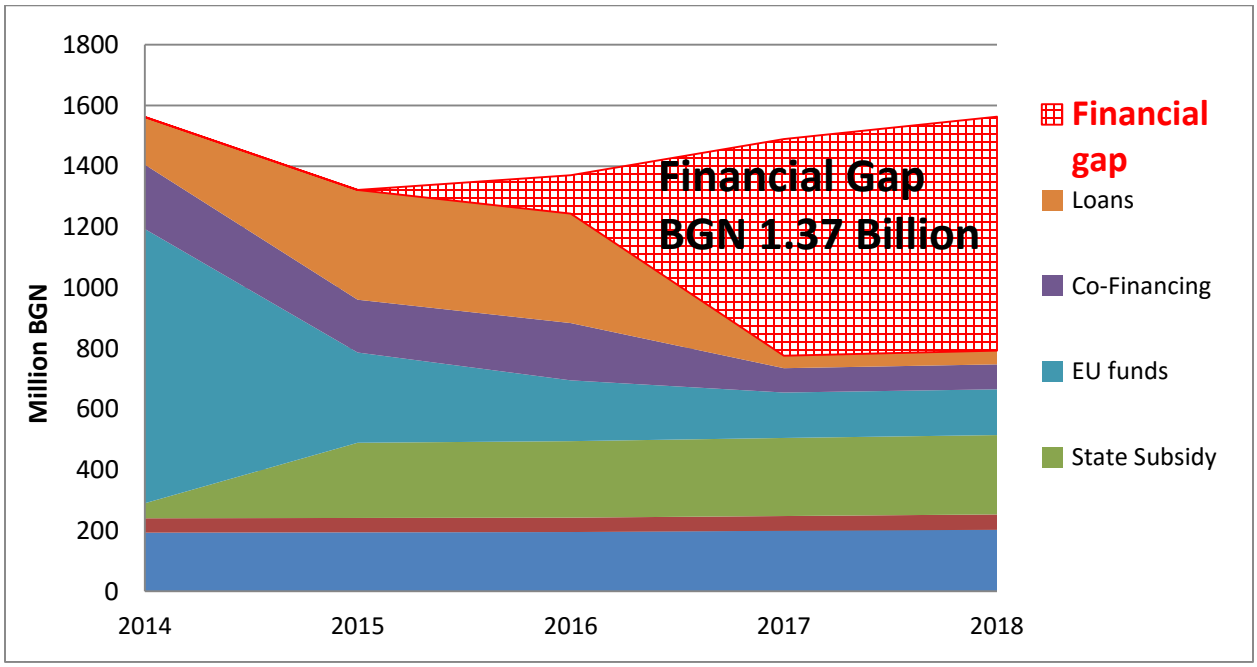
RIA will endeavor to be one of the best road agencies in the region and in Europe, which will successfully implement the Strategic Vision of the Bulgarian Road Sector Strategy

An exhaustive financial analysis was performed to find an accurate picture of the roads sector in Bulgaria. In addition, three scenarios for investment (High growth/ Sustainable, Low growth/ Current Status and Fiscally Constrained/minimum option) was prepared to guide the government to make a policy choice that would be the basis for RIA to perform long term planning, ascertain deficit and make plans for additional resources. This emphasis on macro level quality is very important to chart-out the future effectiveness of the agency, its work program, its Human Resource design, its overall strategic direction and its focus on measurement and performance in light of a macro benchmark set by the Strategy.

Policy Choices	Effect on the System	Budget 2014-2020

Sustainable Development	Improvements in Current condition with major development of the international transport corridors routes	BGN 20 Billion
Current Condition	Status Quo with development of the main international transport corridors routes	BGN 13 Billion
Fiscally Constrained	Status Quo with Limited development of international transport corridors	BGN 9 Billion

The government chose the second policy choice. Though unambitious, the choice gives a long term policy direction to RIA to ascertain it challenges, opportunities and choices. The financial analysis to address this strategic choice brought about the fact that RIA would face a massive financial shortfall of BGN 1.37 Billion over next 5 years, as seen below:



This fiscal reality forces the government and RIA to investigate all instruments/ options to close the fiscal gap. It also forces them to address organizational capacity, and critical HR and Technology (IT) issues that would be needed to deliver on a long term planning horizon to meet EU funds absorption targets as well as the critical infrastructure deficits. The Bulgarian experience has taught us that technically good staff, established and efficient procedures for procurement, etc are important but the ultimate determinant of the quality of the road system is at the Strategic policy level, through the Business Plan, where the vision and funding have to harmonize with the ground realities of capacity,

structural infrastructure needs, human and technological dimensions and ultimately the performance of the road network in the country.