CAPACITY OF PUBLIC SECTOR OPERATORS FOR MOTORWAY MAINTENANCE IN AZERBAIJAN

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***Summary**: Current practice in road maintenance was examined with the aim to build a strategy to conduct operation and maintenance activities on the motorway network. Interviews were made with key stakeholders, including maintenance managers at the state road administration and in the road maintenance units, assessing capacity and identifying potential partners both within the administration and in the private sector. Status and capacity of the existing road maintenance units were reviewed with the aim to improve management and maintenance practices of motorways.*

***Key words**: public sector operators, maintenance, motorways, capacity*

1. INTRODUCTION

Azerbaijan has a central administration, i.e. the AzerYolServis (AYS), responsible for Main (M), Regional (R) and Local (Y) roads, totaling 17.504 km. All of the design, construction and supervision activities are outsourced, while planning and maintenance are still performed in-house.

Road maintenance (routine and winter) works are performed by state established Road Maintenance Units (RMUs) on a geographic basis. In commercial terms, RMUs are semi-independent. Maintenance contracts are traditional method-based contracts in which the road agency as a client specifies techniques, technologies, materials and quantities of materials to be used, and time period during which maintenance works should be executed, while the payments are made on the basis of quantities actually done.

Current practice in road maintenance was examined with the aim to build a strategy to conduct Operation and Maintenance (O&M) activities on the motorway network. Assessment of the existing road maintenance capacity consisted of:

- detail examination of current arrangements for primary road and motorway maintenance in Azerbaijan;
- determination whether the regional RMUs have resources and capacity for undertaking O&M tasks for motorways in future, including proposals of cost-effective recommendations if deficiencies are identified;
- survey and assessment of the RMUs.

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2. ORGANIZATION AND RESPONSIBILITY

The country is divided into 63 geographically based areas, each of them being covered by one RMU. This division is not based on any kind of administrative or similar organization. Data was collected for 28 RMUs involved in maintenance of M roads.
The current status of the RMUs is to carry out routine and winter maintenance of the state roads (M, R and Y). Landscaping and middle repairs (a form of periodic maintenance) of roads, bridges and other ancillary structures are also performed from the budget. Most of the RMUs' activities are based on the annual maintenance program of the AYS, directly implemented through the RMUs. Some of the RMUs also perform works on a contract basis (usually as sub-contractors) to private organizations in road rehabilitation/ reconstruction or new investment projects, as their schedules permit and funding is available. Certain RMUs also bid for rehabilitation and reconstruction works (typically successful in winning around 5 % of the work). Middle repair works are apparently outsourced to the private sector in some RMUs.
The general process is a monthly cycle:

- RMU supervisors conduct field inspections, from time to time accompanied by the traffic police and a representative of the AYS, to identify problem situations and discuss works priorities;
- proposal from the RMU is being prepared for the approval of the AYS Road Maintenance Department (RMD);
- volume of work to be performed is determined by the monthly budget allocation, which may be substantially different (usually less) than what was proposed;
- RMD assigns the type and volume of work to be performed to the RMUs;
- work assignments consist of simply the type of work to do and the amount of money the RMU can spend;
- payment is being done from the central AYS office on the basis of remuneration for performed quantity;
- emergency work is performed as needed or at the moment when problems arise.

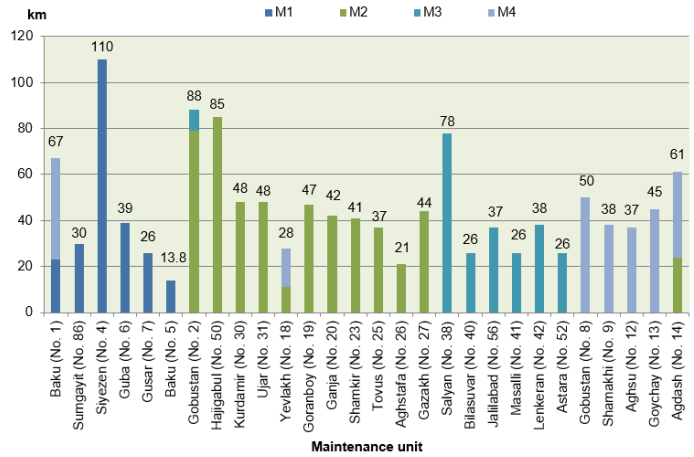

Figure 1. Distribution of main road network (M1-M2-M3-M4) between RMUs

Monitoring and supervision of works by the RMD is limited to few inspections per year. This is done in an ad hoc manner with the primary purpose to verify that the reported works have been completed. Presently, each surveyed RMU maintains a network of 150-200 km in total (M, R and Y roads), which is small given the organizational structure and equipment resources. Distribution of main road network within the RMUs is presented on Figure 1. Portion of M roads maintained in comparison to total amount of roads (including R and Y roads) under RMUs' jurisdiction ranges between 15 % and 50 %. There are some extreme differences between RMUs. For instance, Baku specialized unit /No. 5/ maintains only13 km of M roads, while Siyezen unit maintains 110 km. Average amount is 45 km per RMU, while majority of units maintain between 25 and 50 km of M roads. RMUs do not deal with traffic volume and axle load survey, as well as with traffic accident data and collection of road condition data. There is no formal requirement for quality control and management in maintenance activities, and no requirement to present tests for materials, results of preliminary or control testing, etc. Maintenance supervision is not regulated and formally established.

3. STAFFING

Staff mainly holds secondary or specialized school diploma, while there is a relatively small percent of university-educated personnel. These are mainly heads of units and staff managing the works at the head office or in the field. However, this is relatively common in such organizations that are oriented to a very narrow field of activities, although not justified. For instance, in Balkan states, there is even lower number of university-educated personnel in road maintenance companies, and these numbers are usually covering only for regulatory issues. Qualified staff (secondary or specialized school), as well as unqualified staff, is mainly involved in fieldwork, i.e. those who actually do the work. Some of the unqualified staff usually performs support duties in the head office or at depots (guard, hygiene, meals preparation, etc.). Based on interviews with managerial level staff, it is estimated that employees with university background are more than willing for further development and gaining practical experience. In addition, a certain amount of the secondary level staff (foremen) is also capable of receiving specialized training and applying it in the field.

Number of staff ranges between 60 and 218, which is a very high number comparing to maintained network length. While there is a big difference in staff education, age distribution is more equalized, and majority of employees are younger than 50 years. Within those, about 30-40 % is less than 35 years old, which makes a good opportunity to be involved in training activities and further development of skills. Staff aged over 50 are mainly field workers, with a certain percentage of heads of units and managers.

Network coverage by the employed staff is very high, and majority of RMUs can theoretically devote more than one person per km of network, or it can be said that 1 km of network is covered by at least one employee (Figure 2), which makes a very high employment rate and should be reflected in road condition. Even if the rest of the network (R and Y roads) for each RMU would be added, this would still make a very high coverage rate. However, road condition is not following such distribution or equipment availability, especially for the R and Y roads.

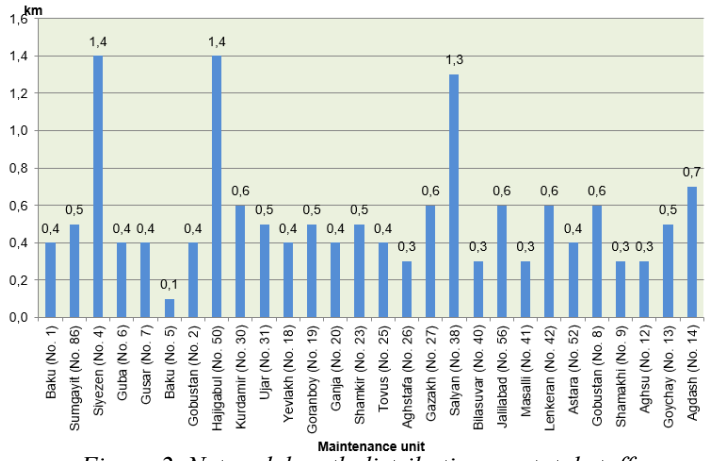

Figure 2. Network length distribution per total staff

Exception to the rest of the units is the Baku specialized unit /No. 5/ that also performs maintenance of local traffic infrastructure in Baku. This local infrastructure is spacious and vast in comparison to M roads maintained by this RMU.

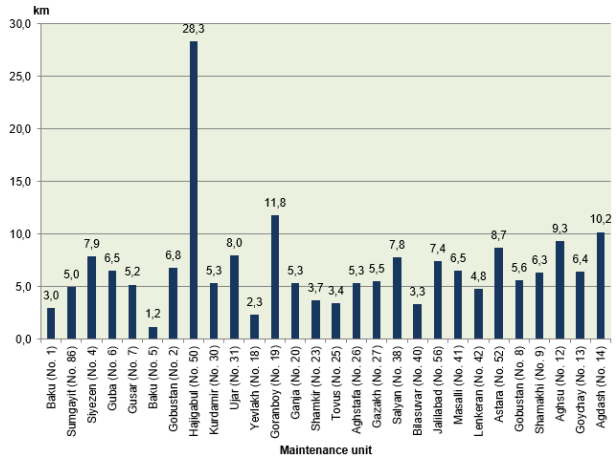

Figure 3. Network length distribution per technical staff

When coming down to only technical related staff (civil, electrical, mechanical and material (technology) engineers), data is more representative (Figure 3), as practically these employees are directly involved in road maintenance activities. Coverage of network ranges between 1,2 and 11,8 km/person, while there is less than one technically related employee per km of network. Baku specialized unit is exceptional again. Still, this is very high rate in comparison to some high/medium developed countries where one employee covers between 10 and 20 km of maintained network. However, what is important to emphasize is the fact that management capacity within the RMUs is small

and not ready for competition on the market. This comes mainly from the fact that modern business management principles are not applied and units are accustomed to direct contracting/getting of job for maintenance works.

4. EQUIPMENT

Equipment numbers are said to be insufficient and outdated and has reduced capacity. Majority of equipment dates from early 1990's (some pieces are even more than 40 years old) and needs major overhaul or to be replaced. In the recent years, the AYS purchased a number of equipment pieces that has lessen the overall age of the equipment fleet. This makes a mix of rather old (more than 20 years) and new equipment (less than 10 years). However, this positive impact is limited to certain types (trucks, bulldozers, graders) and may not be of such significance as the characteristics and performance are not of high standard, especially considering specialized road maintenance equipment. Survey showed that practically all units have problems with equipment repairs. Due to variable age of broken equipment, it is not possible to connect age of equipment and its status (for instance, one unit can have higher number of broken new equipment than the old one). The same is also valid when trying to compare size of the RMUs, i.e. for the network covered. Status of equipment operation cannot be associated to length of covered network. Thus, the main reason probably lies in the fact that there are no resources for repairs, either financial or human (skills).

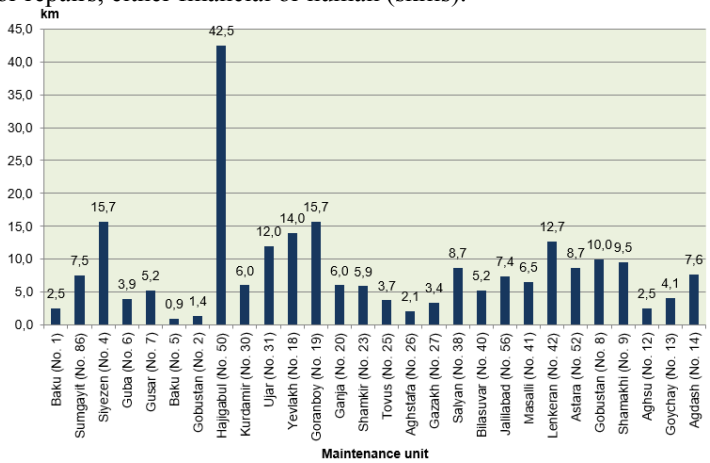

Figure 4. Network length distribution per operative truck

Number of trucks ranges between 3 and 65, the biggest number being at Gobustan. Such high number comes from the fact that this unit usually acts as sub-contractor for major road works contracts, beside its involvement in maintenance activities. Most of the RMUs have less than 10 trucks available, while several units (Baku 1, Kurdamir, Shamkir, Aghstafa, Gazakh) have about 30 % or even more of broken trucks in comparison to total number. In terms of coverage (Figure 4), one truck operates on approximately 8 km of maintained network in average. Asphalt plants are usually of

small capacity, but still capable to cover the maintenance needs. RMUs that do not have their own asphalt production capacity (7 out of 28 RMUs) buy asphalt mass at commercial plants or acquire it from nearby RMUs. This is also the case for units that have old and broken plants. In addition, two units, namely Gobustan and Aghsu, participate as sub-contractors in major road works and provide asphalt and paving equipment to main contractors. In terms of other construction equipment, it can be concluded that there is a variety of it present at the RMUs. Network coverage (Figure 5) depends on the number of equipment and length of maintained network. However, it can be seen that some of these pieces of equipment are of much higher capacity than is necessary for road maintenance, which leads to opinion that equipment is mainly provided without consideration of the activity to be performed and volume of work. This, on the other hand, drives up to high operation and maintenance costs, as well as to equipment inefficiency and uneconomic operation, but makes a good opportunity to participate in construction works of higher volumes.

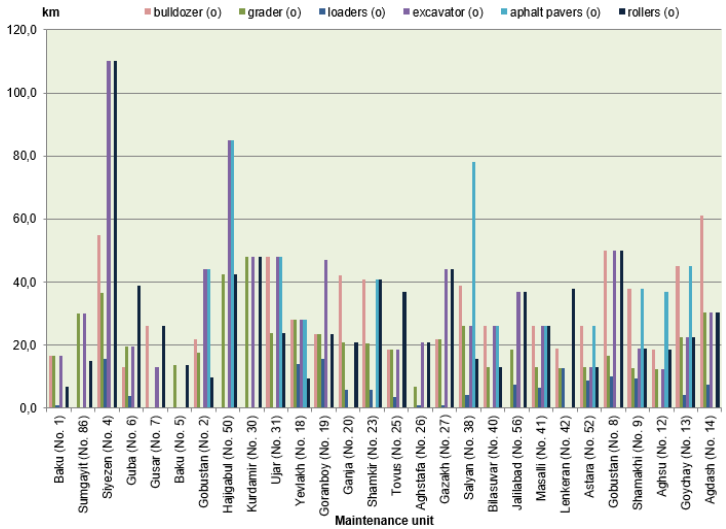

Figure 5. Network length distribution per piece of operative road construction equipment

Specialized equipment for road maintenance or repairs is very scarce. For instance, 6 units reported possession of special road repair vehicles, while only one unit reported availability of salt spreaders (Baku specialized unit /No. 5/). No single unit reported possession of snow ploughs and crack filling units, while only five have asphalt saws. Unavailability of winter maintenance equipment is understandable for units closer to Caspian Sea, but it cannot be accepted for units at the far west or mountainous regions of the country where snowfalls can be extensive. Equipment mix and number sighted during the RMUs survey appeared more than adequate for their present limited operation (excluding high capacity construction equipment). Especially so, as the RMUs are able to additionally rent equipment from one of a number of AYS operated equipment organizations (Transport Unit) which rent their equipment (including operator) at rates

which appear to be approximately 75 % of those charged by private sector companies in Azerbaijan. The renting is on a need basis. It has to be pointed out that all the equipment, being regularly used by the RMUs, is also property of the AYS, but delivered to the RMUs without any fee. AYS practically bears all associated costs. Besides equipment for road works, RMUs are not in possession of laboratory or any device for survey of road condition, while IT (Information Technology) equipment is primarily used for preparation of letters and reports. No single unit has a road database and engineering staff usually retain data in their working notes.

5. FACILITIES

Most of the surveyed RMUs (17 out of 28) are based at one location in the respective region. These are mainly located at the same facility where head of the unit is located, while four of the RMUs (Guba, Shamkir, Masalli and Astara) dislocated their facilities from the headquarters. From those, all basic activities are organized and performed (routine maintenance, winter maintenance, material storage, equipment maintenance and repair, etc.). However, several of them have additional locations (Siyezen) or separate depots (Shamakhi, Aghsu, Goranboy, Tovus, Kurdamir, Salyan and Bilesuvar) for material storage. RMUs Ganja, Aghstafa and Sumqayit established one winter maintenance depot each, in addition to the one at the main facility location, to cover necessary interventions within regions where snowing occurs. Material is bought by AYS and handed over to RMUs or remunerated, with second option being usual only in emergencies. Material for road works is usually being supplied from local sources, state or private. When supplied from such locations, RMUs typically use their own trucks to transport the material. Only two of the RMUs have their own quarry (Aghsu) or borrow area (Ganja).

6. CAPACITY QUALIFICATION/CONCLUSION

Generally, RMUs are medium to small organizations using an aging equipment fleet and a mediocre staff. Units are generally getting weaker in terms of equipment and staff capacity travelling from Baku to outskirts of the country. Currently, RMUs have unique experience in routine and winter maintenance in the country. This is also doubled with the network of winter depots, where necessary due to climate conditions, and availability of head office facilities and equipment maintenance depots. Given the capacity in organizational structure and equipment number, existing RMUs are capable of taking care for motorways. However, current staffing as well as age and type of equipment, prevent them from dealing with special requirements for motorway maintenance. Financial resources could also provoke unfavorable position if and when entering the free market. Consideration should be given to downgrading the present RMUs by excluding M roads from their responsibility, and combining them to make separate bigger entities for maintenance of motorways, and, on the other side, for remaining roads in the area. These combined RMUs should be fully equipped for performance of routine

and winter maintenance (where necessary) works, with some specialized equipment for typical pavement repairs, urgent and preventive maintenance works. They should also have a laboratory and an equipment workshop, and several technical specialists to deal with day-to-day road inspection, road condition assessment, road management, traffic safety issues, quality control, cost estimating, equipment operation/management, database, etc. It would be also good to consider establishment of a traffic signalization service within each of these combined RMUs or as a single one for the entire motorway network, to produce and install signalization (signs, lines, etc.). As a state owned entities, RMUs could face difficulties regarding its business development, mainly for the following reasons:

- insufficient business management skills in the top management;
- excessive centralization of responsibilities at the AYS head office, and lack of motivation and implication of middle management, as a result of the previous;
- constraints to operate as an efficient contractor and lack of flexibility due to obligation to follow established rules for provision of resources, and/or public procurement rules for purchasing of materials and other required resources to carry out the activity.

The maintenance market in the coming years will still benefit from various international loans dedicated to maintenance on M and R roads, which will constitute real opportunity for current RMUs, especially those working on M roads to transform into modern companies, no matter they will remain state owned or be privatized. Important aspect is absolutely necessary establishment of maintenance works supervision service, either in-house or outsourced with some of the consulting companies at the market. In addition, improvement of work quality by requiring contractors/RMUs to have "method statements" and "standard quality control procedures", employing crews that can understand and follow them is necessary to establish quality and reliable system.

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KAPACITET PREDUZEĆA IZ JAVNOG SEKTORA ZA ODRŽAVANJE AUTOPUTEVA U AZERBEJDŽANU

***Rezime**: Istražena je postojeća praksa u održavanju puteva sa ciljem da se izgradi strategija za obavljanje aktivnosti eksploatacije i održavanja na mreži autoputeva. Obavljeni su intervjui sa ključnim akterima, uključujući rukovodioce održavanja u državnoj upravi za puteve i u jedinicama za održavanje puteva, uz procenu kapaciteta i identifikaciju potencijalnih partnera kako unutar administracije, tako i u privatnom sektoru. Stanje i kapacitet postojećih jedinica za održavanje puteva su razmatrani sa ciljem poboljšanja prakse upravljanja i održavanja autoputeva.*

***Ključne reči**: preduzeća iz javnog sektora, održavanje, autoputevi, kapacitet*