

OPTIMIZATION OF THE ROAD MAINTENANCE COSTS IN POLAND

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ABSTRACT

Road maintenance in Poland has been evolving since 1991. It was then that the administrative-governance process was separated from the executive process by outsourcing the maintenance works of the national roads by fragmented commissions. Due to the structure of General Directorate of National Roads and Motorways, decentralisation model as well as the market environment and the specifics of the terrain, various models for managing the commissions for road maintenance were used, which were based on uniform guidelines and standards only as regards winter road maintenance. The main problem the Manager had to face was the blurring of responsibility for the degradation of the assets and for failing to meet the standards, lengthy process of working towards certain standards as well as the fact that it was not possible to settle accounts with the Contractor as regards the realized tasks.

Therefore, in 2010, the General Directorate of National Roads and Motorways introduced the first PBC contract, entitled "Maintain the standards" in Poland, encompassing both summer and winter road maintenance. Under this contract, the Manager outsourced the management of maintenance works, including the responses during the "winter action", to one Contractor and transferred the responsibility for the maintenance standard and the road appearance to that Contractor. This contract featured a different settlement method for the Contractor under the same obligations. It was based on certain indicators the Contractor was held accountable for. The duration of the contract was four years and it is now coming to its end. General Directorate of National Roads and Motorways has drawn some conclusions and lessons from the contract and implemented them in the case of new contracts. These changes concerned standardisation of tender provisions as well as indicators, i.e. the standards for summer and winter road maintenance in the whole country as well as the guidelines for controlling the realization of the indicators. The changes introduced, generating savings at about 30% for the state budget, allowed to implement further facilitations, as well as made it possible to increase the satisfaction of road users as regards the quality and safety of the most important roads in Poland.

Due to the fact that Poland is now intensively developing the road network, in particular highways and motorways and spends a significant part of the state budget on these activities, the changes introduced allowed both the Road Manager and the Government to standardize and stabilize the expenses connected with maintaining the most important roads in Poland.

1. Introduction

The general directorate for national roads and motorways is the administrator of about 18 000 km of the major roads in Poland. They include top class roads - about 900 km of motorways and approximately 1 100 km of expressways. Although the national roads constitute only about 5% of all the roads in Poland, they manage about 40% of all traffic in the country. Therefore, for GDDKiA, as for the whole Polish government, road safety is important. Bearing safety in mind, GDDKiA equips the roads with most effective safety features, innovative solutions, including the design, and provides an adequate standard of roads and bridges maintenance.

2. Situation

The mere maintenance of roads includes not only the determination of the standard to be met, but also organizational changes and search for newer and more effective methods of management. Until 1991 GDDKiA (then the manager of most of the public roads in Poland) performed all the work related to the lifecycle of the road with its own resources, beginning with design, through construction of roads, to their maintenance. Then, the time came for the first major organizational revolution and separation of administrative and managerial processes from the executive ones, i.e., the manager and the contractor function were specified and an internal division of GDDKiA into headquarters, branches (according to the Polish administrative division) and field offices, subject to the branches was performed. Over the next 20 years, each of the branches maintained roads using different management models. Some performed most of the work themselves, others commissioned the works. Among those who commissioned there were different beliefs regarding the most effective way of outsourcing the tasks. These discrepancies were

caused not only by the area specificity (e.g., a severe winter conditions), but also the market environment, which were diverse across the country.

3. Tasks

In 2010, a revolution in thinking inside GDDKiA was accomplished. The primary objective, which GDDKiA must realize was identified - functional and secure national roads network and strategic areas of management were diagnosed. Among them, an important place is taken by the management of the built assets. One of the most important tasks in this area is the routine road maintenance, which is different in summer and winter. In this area, GDDKiA looked for savings not only in technology of surface renewal or the safety elements and standards of maintenance, but also in the method of road management. And that is where savings deposits were discovered.

4. Actions

It was diagnosed that within the framework of a routine maintenance, there is a great diversity and chaos in the work management system. This area was organized step by step.

At the beginning, management methods of the maintenance works used in GDDKiA were determined. Then the management method that would be most effective and that would be able to generate savings was contemplated. It was found that a major problem in the management was the blurring of responsibility for the performed maintenance works, failure to meet standards, prolonged process of achieving certain standards and the lack of specific rules of settlement of the contractor's tasks. Then the rules of the "maintain the standard" model based on performance based contract (PBC) implemented since 2010 were laid down.

5. Mechanisms

This model is characterized by a specific, yet simple accounting of the contractor through the use of indicators, which the contractor has to achieve. These indicators are the standards concerning the elements of the road, specified in the contract. Every element of the road, that is the pavement, safety equipment, and the lane has a description of the appearance, functionality and parameters that is required and which will be checked. Additionally, the possible exemptions from these standards and the time to remove them have also been defined. Exceeding this time will incur certain penalties. The way of checking the indicators is also described in the contract, so the contractor has the clarity concerning the way he will be accounted for under the contract.

The first contract "maintain the standard" was used on the 54 km section of the newly constructed expressway. The contract was performed by the division in Szczecin. This is a specific division, due to the limited contractor market in the field of road maintenance, dominated by a single company. An important element that distinguishes this division are also specific winter conditions - more common than in the other areas of Poland, the occurrence of crossing the zero threshold ($^{\circ}$ C). The contract included comprehensive summer and winter maintenance of the road. GDDKiA, as the administrator, prepared a detailed description of the standards of maintenance (indicators) of all elements of this road both in summer and winter. The administrator of the road allowed one of the contractors maintenance work management, including undertaking activities during the "winter action". In the case of the winter period, it is particularly important not to allow very bad road conditions to occur. The awarding entity assists the contractors in this regard by providing procedure guidelines in specific weather conditions at tender stage that were developed by research units and which are currently used by the road administrator. At the same time, the contractor was given freedom in the management of the maintenance works, so the contractor now decided when and what work should be done to maintain the standard. As a result it was clearly defined that the responsibility for the standard of the maintenance and appearance of the road is the responsibility of the contractor. The contractor has the ability to support and improve guidelines on the implementation of maintenance works in cooperation with the employer in this regard.

The contract was characterized by a different way of accounting for the contractor within the framework of the responsibilities set out above. It was based on monthly

accounting of specific indicators (appearance and function of the road and its components). The contract lasted for four years and presently is coming to an end. In October 2014, another, already second contract for the maintenance of this road will be launched.

6. Results

GDDKiA, as early as during the term of the contract in Szczecin, acquired new experiences and the conclusions are included in the following contracts. However, before distributing the "maintain the standard" model on all national roads in Poland, the economic advisers were asked to perform an analysis concerning the possibility of further changes and the effects of these changes. This study shows that giving a greater freedom in managing the maintenance works to the contractor and determining transparent accounting rules may result in savings of approximately 10% of the budget allocated to road maintenance, while providing a good standard of living. GDDKiA was also basing on the knowledge and experience of the world bank in the implementation of changes in management. The world bank, presenting the results of savings achieved by other countries implementing PBC contracts, speaks of the savings reaching as much as 40%. Through this institution in the united states all the documents used in PBC contracts were unified.

Therefore, GDDKiA gave the contractor greater freedom in the selection of resources by specifying only the minimum that is necessary to maintain each ordered section (individually determined by the department and adapted to the specificity of the terrain and length of the segment). This allowed Contractors for a more suitable selection and use of resources. A suitable example is the equipment, in this case Contractors - by using a single carrier - can use it in different areas by using replaceable parts for mowing, snow removal and cleaning. It pays off for Contractor to develop equipment, apply new technologies, since this saves money. In the quoted pilot contract at the Szczecin Branch, the Contractor applied modern ploughshare allowing him to remove snow from a larger part of a road lane with a single run. As a result, he paid for the single run removing the snow from the entire roadway. Contractors may also use modern methods of work and resources management to save the money. He has more flexibility than the administration, as well as motivation to search for ways to save him time, money and resources.

Additionally, GDDKiA consolidated the records of tender documents, as well as the standards of road maintenance in the summer and winter across the country, and the guidelines for the control of these indicators.

Extending the "maintain the standard" model contributed to the development of the contractor market. In 2013, the growth of companies involved in road maintenance and the migration of these companies to other areas of Poland can be observed. Currently, the tenders attract an average of 10 offers by companies, while for the first contract only one company took part in the tender. Additionally, the changes have generated savings of about 30% with respect to the estimated amounts for the execution of tasks. The implementation of further improvements and the improvement of road users' satisfaction with the quality and safety of roads were also enabled.

Given the fact that Poland is at the stage of intensive development of the road network, particularly the highways and expressways and allocates an important part of the budget to these activities, the introduced changes allowed both the road managers and the government to unify and stabilize the expenditure related to the maintenance of the main roads in Poland.

7. Recommendations

The "Maintain the standard" model was introduced only linearly, and only on new roads that are guaranteed by the general contractor of the project. This enabled the exclusion of the maintenance of technical indicators of the road structure on a designated section from the "Maintain the standard" model. In 2013 GDDKiA attempted to encompass the section not covered by the guarantee with the "Maintain the standard" model. At the end of 2013, the area for which the "Maintain the standard" model will be introduced was designated. It will be a pilot program of the area maintenance of the old road network (about 140 km). The roads designated for the pilot program are not covered by the guarantee and are diversified in terms of class, which has an impact on the standard of maintenance (indicators). The effects of the pilot program will be visible in 2014.

Additional changes that await the Administrator include the retraining of staff, which has so far managed, supervised, and even performed maintenance works. Where the "Maintain

the standard" model is introduced, GDDKiA employees will conduct the inspection and maintenance of indicators and account for Contractors on the implementation of the assigned tasks. This change will not only cause the stabilization of relations between the Employer and the Contractor, but also systematization of tasks of GDDKiA on the road. Further work on the model will be based on standard documents that need to evolve along with the experience from consecutive contracts. Additionally, we constantly monitor the indicators in terms of meeting the requirements of road users and because of the new trends in the maintenance, generating savings. GDDKiA has previously applied modern technologies to improve the efficiency of work, such as locating the winter maintenance equipment on the road and fleet management by controlling the use of vehicles. In 2013 it began the collaboration with the European Space Agency (ESA), which promotes the use of satellite technologies in everyday tasks. The first competition that was announced after the start of the cooperation between Poland and ESA is the development of a feasibility study "Space based services for winter road maintenance."