

# WINTER MAINTENANCE POLICY IN SLOVENIA

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## ABSTRACT

*Slovenia, country with 24.000 km<sup>2</sup>, lies in central Europe, between the Alps, the Dinaric mountain range, the Pannonian plain and the Adriatic Sea. It is mostly a hilly country, with a various climate, Mediterranean by the sea, Alpine in the central part and Continental in the northeastern part. Therefore we have quite a lot of difficulties with the winter maintenance. The winter road maintenance is performed according to the rules of the Act on Public Roads, Road Safety Act and the Rulebook for the Routine Maintenance. Slovenia has a specific system of the assurance of the needed staff for a specific weather situation and the adequate system of payment of the winter maintenance works. The winter maintenance in Slovenia is part of the routine maintenance. Nine Road Companies perform Snow removal and ice control service on about 6.000 km of state roads. The motorways (about 360 km) are maintained by the Public Company for Motorway Maintenance which is 100% owned by the state. In the paper the relationship between the Road Directorate, as the representative of the State, and the contractors is presented.*

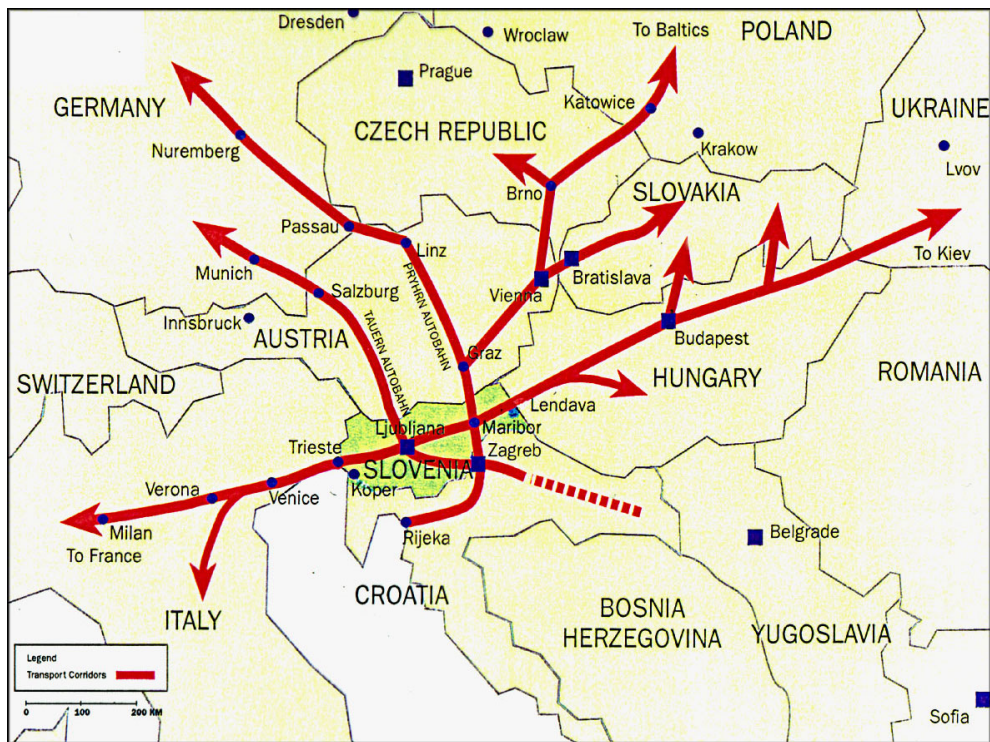
*With the intention to improve the routine maintenance quality and to attract private funds Directorate of the Republic of Slovenia for Roads decided to prepare legal environment, which will attract private firms to participating in open tendering on the grounds of a proven economic feasibility, for acquiring long - term (up to 20 years lasting) concession for road maintenance. The grantor of such concessions will have to ensure adequate long – term sources of funds for the performance of these and transfer them in an adequate manner to concessionaires. The idea of granting concessions for these types of works in Slovenia is new. By the financial help of the European Bank for Reconstruction and Development the Republic of Slovenia obtained a contractor in international tendering for the preparation of the project on the implementation of concession maintenance of state roads. The firm chosen is FINNRA – Finnish Road Directorate, which will prepare in two years all the necessary documents for a gradual introduction of concession in this field.*

# 1. INTRODUCTION

Slovenia is a young country, independent since 1991. Since then, big changes have been made to improve the winter maintenance efficiency. Slovenia, country with 24.000 km<sup>2</sup>, lies in central Europe, between the Alps, the Dinaric mountain range, the Pannonian plain and the Adriatic Sea. It is mostly a hilly country, with a various climate, Mediterranean by the sea, Alpine in the central part and Continental in the northeastern part. Therefore Slovenia has quite a lot of difficulties with the winter maintenance.

Two trans - European corridors, namely the Vth and Xth corridor, cross Slovenian territory. As Slovenia is in the phase of becoming a member of the European Union it pays a lot of attention to construction of motorways in the corridors. The fact that the 5th and the 10th trans – European corridors passes Slovenia increases the importance of the winter maintenance in those two directions.

**Figure 1: Corridors in Slovenia**



With regard to their importance for traffic and connecting functions in the space the state roads are categorized as motorways, expressways, major roads of Class I in II and regional roads of Class I, II and III and municipal roads (divided into local roads and public paths). With the categorization of state roads, the Government of the Republic of Slovenia determines, which kind of traffic they are intended for and what level of maintenance applies for certain road category.

Beside the regulation public expectations also play important role. User satisfaction depends on parameters such as road safety, mobility a whole year through and efficient information system.

## **2. ORGANIZATIONAL SET-UP OF MAINTENANCE**

Snow removal and ice control service on about 6.100 km of state roads lies within the responsibilities of DRSC, while the motorways (in length of about 360 km) are within the responsibilities of publicly owned Company for motorways in republic of Slovenia (DARS). There are also some 31.000 km of municipal roads, which are within the responsibility of municipalities. In this paper we deal only with winter maintenance of roads that lie within the responsibility of DRSC – state roads.

When discussing the maintenance of state roads, one needs to look first at the institutional arrangements. The existing institutional arrangement for maintenance of state roads is tripartite and includes following actors:

- The Directorate of the Republic of Slovenia for roads (DRSC) as the policy-making and budgetary agency;
- The state-owned Engineering company for public roads (DDC, with other private consultants), who act as term managing consultant, including maintaining the asset information database; and
- The Road companies (CP stands for Cestno podjetje, Eng. Road Company), which are private companies with a small element of the equity (about 16%) owned by the State, and private construction contractors execute the routine maintenance and construction works, respectively. Routine maintenance contracts were awarded on basis of regional distribution to formerly publicly owned Road companies, without competitive procedures.

This arrangement can be characterized as command-and-control system, with top-down granting of roles:

- The DRSC decides what can be done (drawing on the DDC's advice);
- The DDC instructs and audits the CPs on what to do and what was done, respectively; and
- The CPs (and other contractors) carry out what needs doing.

### 3. MAINTENANCE REGULATION

The winter maintenance in Slovenia is part of the routine maintenance and therefore regulated according to the rules of the Act on Public Roads, Road Safety Act and the Rulebook for the Routine Maintenance.

#### 3.1 RESPONSE TIMES

For the winter maintenance certain response times are obligatory. Discrimination between road categories is taken into account (see Table 1).

**Table 1: Response times for winter service**

<b>1</b>	<b>Motorways and fast roads</b>	24-hour passability of at least one lane and access to at least the larger parking areas must be ensured
<b>2</b>	<b>Roads with AIDT (average idle daily traffic) above 4,000 vehicles</b>	Passability of at least one lane must be ensured between 5 am and 10 pm. Traffic interruption may be possible for up to 2 hours, mainly between 10 pm and 5 am.
<b>3</b>	<b>Regional roads, important local roads, main town and village roads</b>	Passability must be ensured between 5 am and 8 pm. Interruptions may be possible for up to 2 hours, mainly between 8 pm and 5 am.
<b>4</b>	<b>Other local roads, town and village roads</b>	Depending on needs, passability must be ensured between 7 am and 8 pm. Interruptions may be possible for up to one day.
<b>5</b>	<b>Public paths, parking areas, cycle paths</b>	Depending on local needs. Interruptions lasting several days may be possible.
<b>6</b>	<b>Roads and other traffic areas which are closed in winter conditions</b>	

#### 3.2 WINTER MAINTENANCE IMPLEMENTATION PROGRAMME

The winter road maintenance service implementation programme is made in accordance with the provisions of the Law on Public Roads, the Regulations on types of maintenance works performed on public roads and the level of normal maintenance of public roads and the Decree on Categorization of National Roads.

The winter road maintenance service depends on the geographic situation, relief, height above sea level, climatic characteristics, population, volume and structure of traffic, road elements, laws and regulations, which determine regular maintenance of roads and traffic on them.

With winter maintenance implementation programme following topics are defined:

- Organizational scheme (management, responsibilities, competence),
- Plan of preliminary activities,
- Road network, prioritization of road sections and locations of depots,
- Plan of equipment, materials and labour,
- Duty service and work organization,
- Gritting and snow-removal plan,
- Arrangement of parking lots for temporary elimination of heavy vehicles from traffic,
- Data collection and plan of information dissemination on road condition and trafficability.

The plan is prepared by maintenance contractors and approved by Road Directorate.

### **3.3 WINTER ROAD MAINTENANCE SERVICE DURATION**

The winter service is divided into several periods:

1. The period of preliminary activities (preparatory works);
2. The period of the winter service performance;
3. The period of later activities (works after the conclusion of the winter service).

#### The period of preliminary activities

This period lasts from 1 October to 15 November. The preparatory works include:

- Elaboration of the winter service implementation programmes;
- Erection of winter traffic signaling devices and snow fences;
- Erection of winter posts;
- Preparation of depots for gritting materials;
- Preparation of winter depots for personnel lodgement;
- Preparation of machines and equipment.

#### The period of the winter service performance

The winter service lasts from 15 November to 15 March. During this time all winter service activities are performed:

- Stand-by (readiness for duty);
- Duty service;
- Winter road inspection;
- Preventive gritting;
- Machine gritting of black ice;
- Removing of snow from the pavement – machine and manual methods.

### The period of later activities

The later activities are performed after the conclusion of the winter service, i.e. from 15 March to 15 April, namely:

- Removing of winter signaling devices and equipment;
- Cleaning and putting in order of depots;
- Cleaning, repair and storage of winter mechanical equipment.

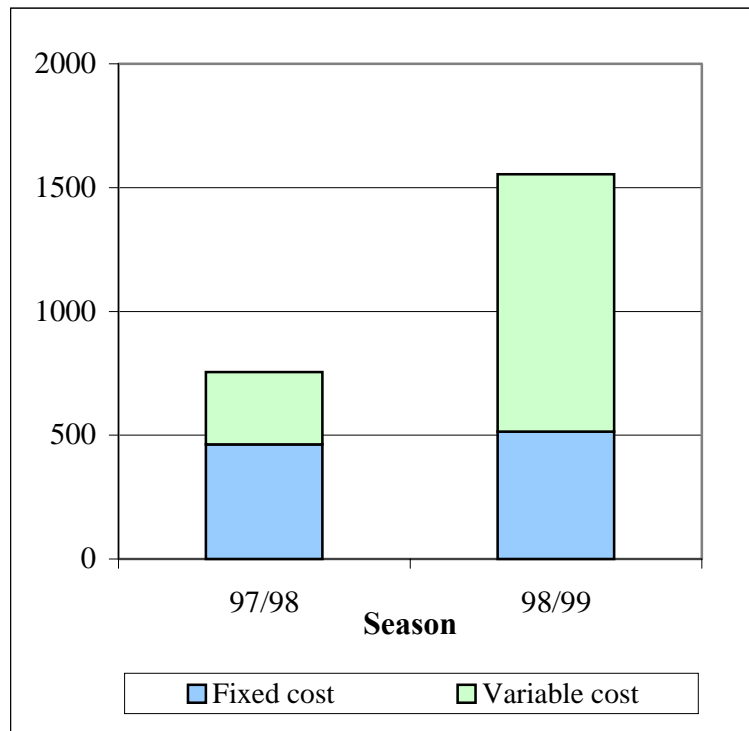
In times during the winter service period, when no actions are necessary, other regular maintenance works shall be performed, such as cleaning of troughs and pits, lopping-off, chopping-up, pruning, cleaning of drainage systems, patching of pot-holes etc.

### **3.4 WINTER ROAD MAINTENANCE COST**

Because of its geographic position winter weather pattern (snow fall and frost) in Slovenia is very unpredictable and indeed varies a lot from season to season. The cost for winter maintenance change accordingly to the certain extent. Some cost act as fixed (first of all equipment, duty service and winter road inspection) while the greater part is variable (labour and material cost for stand-by, gritting, snow removal and ploughing).

Gritting materials are procured by DRSC, who carries the greatest risk of changing winters and related costs (cost of carrying the stock of materials). In some years winter maintenance consumes up to 60 % of budget allocated for routine maintenance.

**Figure 2: Winter maintenance costs**



## 4. INTRODUCTION OF CONCESSIONS

### 4.1 THE PROBLEM

Slovenia has two major problems in road sector:

- First, the poor road network quality and its accelerated decay because public budget cannot provide enough funds for large scale up-front rehabilitation;
- Second, inefficient maintenance, caused by lacking competition for maintenance contracts.

Data on state roads shows following distribution of road sections by **quality** (expressed with MSI – Modified Swiss Index): (1) very bad or bad condition: 40 % of network, (2) fair or good condition: 21 % of network and (3) very good condition: 39 % of network. State roads are, generally speaking, in poor condition. Hence they are in need of substantial refurbishment. There is insufficient funding available in annual budget allocations to the DRSC for the national road network to be speedily brought up to a suitable standard and sovereign loans are not available to the DRSC for this purpose. The DRSC is, as a consequence, prevented from implementing an appropriate programme of capital maintenance to prevent further deterioration of the network.

The problem with current organizational set-up is in CP's acting as local **monopolies**. A boost in competition would most probably improve their performance substantially. With the intention to improve the routine maintenance quality (value for money) and to attract private funds Directorate of the Republic of Slovenia for Roads decided to prepare legal environment, which will attract private firms to participation in open tendering on the grounds of a proven economic feasibility, for acquiring long term (up to 20 years lasting) concession for road maintenance.

Since both problems lie within the DRSC responsibility the idea for simultaneous solution emerged, namely the introduction of concessions, which would cover both problems.

### 4.2 PROJECT LAUNCH

The Ministry of transport and EBRD launched a project, which is to give answers about feasibility of concessions for rehabilitation and maintenance of state road network. Under these concessions, private sector entities would undertake and finance the initial refurbishment, and manage and maintain the road network over a pre-agreed period. The Ministry would pay a fee for these services, which would cover the cost of financing the initial refurbishment and the ongoing maintenance costs.

It is anticipated that Slovenian resident concession companies would be established by winning bidders. These companies would contract with the Ministry to undertake the

initial refurbishment and subsequent operation and maintenance under concession contracts, which would define the requirements and the terms for the works and services rendered. The concession companies would in turn contract for the construction, operation and maintenance services that they need in order to fulfill their obligations under the concession contracts.

Financing would be made available to each of the concession companies by EBRD and co-financiers in the forms of debt and by the shareholders in the concession companies in the form of equity.

It is anticipated that the fees payable to the concessionaires would cover:

- Debt servicing cost arising from the initial refurbishment;
- Costs of on-going operation and maintenance; and
- Return on equity.

The strategy adopted will need to take account of the agreed level of risk transfer to the private sector, and appropriateness for the resources available and performance standards.

#### **4.3 PROJECT PLAN**

At the beginning the project plan was established.

First step was to produce a strategic document, which would then need to get government approval and needed following commitment. With that commitment the implementation becomes possible. It comprehends carrying-out of the tendering procedures, evaluation of bids, negotiations with the bidders and financial close of the contracts.

#### **4.4 PROJECT OBJECTIVES**

The objectives of the project are following:

##### 1. Preparation of strategy:

- Scope of the concessions;
- Technical and performance standards;
- Costing;
- Risk transfer and payment mechanism;
- Financial analysis;
- Legal analysis;
- Environmental analysis;
- Heads of terms for standard form concession contracts;



- Proposed phasing of introduction of concessions; and
- Technical and institutional framework for a monitoring regime to facilitate Ministry decision-making.

## 2. Implementation:

- Preparation of standard tender documentation for all concessions;
- Concession specific information for the first and second concessions;
- Managing the tender process for these concessions;
- Evaluation of the tenders received;
- Supporting negotiation to achieve financial closing; and
- Advising on the institutional changes and detailed requirements for the monitoring regime.

## **5. PROJECT INTERIM RESULTS**

Thus far project team produced strategic report, which covers the first phase of the project, but the implementation hasn't been decided upon. From this report we draw the parts, which are relevant for winter maintenance.

### **5.1 SCOPE OF CONCESSION**

Winter maintenance is included in the scope of concession. It includes ice control, snow removal (with leveling) and other winter maintenance works (placing/removing snow markers, cleaning etc.).

### **5.2 RISK TRANSFER**

The basic philosophy of a concession contract is that the concessionaire shall deliver turnkey services against a fixed annual payment. Routine maintenance services are a part of the total scope of the concession and the concessionaire shall provide the same required level of turnkey services irrespective of the difference in winters. Thus the concessionaire will benefit from mild winters and suffer from severe winters. In practice the risk is not a significant one as the concession period is 15-20 years and the mild and severe winters should statistically eliminate each other during that period. A couple of consecutive severe winters are considered to be rather a cash flow problem than a risk to the concessionaire. Consequently it is proposed that this risk should be allocated with the concessionaire.

### **5.3 COSTING**

The costs for routine maintenance depend on the required level of service of the roads and road furniture. The demanded year around characteristics of the carriageways have a considerable impact on the costs. The probable future routine maintenance costs were calculated by dimensioning the resources (equipment, labour and materials) according to the roads, topography and climatic data using the winter activities as the main dimensioning factor.

The equipment costs were calculated assuming that the concessionaire will use available auxiliary equipment. The number of staff was dimensioned according to the number of needed machinery, two persons for each main piece of equipment (lorry, motor grader, tractor). For other machines smaller factors were used. It was assumed that the fleet of machinery is used for rehabilitation and periodic maintenance or other work, whenever not needed for the routine maintenance works. Actually only a small number of machinery is needed for the routine maintenance activities year round.

The calculation ended up in about 20 % lower routine maintenance costs compared with the actual costs today. The annual routine maintenance costs in the 2000 budget is 39,3 million euros whereas our cost estimate ended up in 30,8 million euros.

### **5.4 MAINTENANCE STANDARDS**

The project produced a proposition of maintenance standards. The proposed standards set the measurable parameters in most of the cases. In other cases the parameters are applicable for visual observation and inspection. Each work item has been divided into the following sub-items:

- Description of work,
- Quality requirements,
- Quality verification procedure,
- Penalties and
- Hand-back requirements.

Maintaining of serviceability of winter roads is carried out according to the priorities set by the maintenance classification. This classification is a combination of traffic volumes and functional classification of roads. Geographic and climatic conditions must be taken into account in the degree of readiness for winter maintenance measures. The distribution of roads into maintenance classes is determined by the technical service in such a way that a coordinated serviceability of the road network is ensured. Integral part of the standard are the tables describing the maintenance classification, LOS requirements and allowed response times for wintry road conditions.

## **5.5 PAYMENT MECHANISM**

In the proposed Slovenian road maintenance concession contract the key service consists of trafficable roads at agreed levels of service. As the concessionaire's primary obligation is to deliver trafficable roads, a lane availability payment mechanism would fit the requirement and should form the core of the payment system. With a lane availability payment mechanism if a road is not open for traffic or if it does not meet the set level of service then the concessionaire is not entitled to payment or his payment be reduced to reflect the lower service.

## **5.6 REGULATION**

Before the tender documents can be completed certain changes and amendments have to be made in the existing regulation:

### **Decree on the Method of Conducting Routine Maintenance and Organizing of the Repair of Public Roads:**

- The present time limitation of 5 years on non-motorway routine maintenance concession contracts has to be extended to 20-25 years;
- The present first priority of the CPs to a 3+2 years routine maintenance contract has to be deleted;
- The Decree should be amended or clarified to also allow for periodic maintenance, rehabilitation and new construction;
- The requirement that sub-contractors can only be selected by applying the bidding procedure in the Law on Public Procurements needs to be deleted;
- The requirement that sub-contracting is only allowed provided sub-contracting is permitted in the concession contract should also be deleted;
- Regulations on Types of Maintenance Works to be Performed on Public Roads and on the Level of Regular Public Maintenance

### **Regulations on Types of Maintenance Works to be performed on Public Roads and on the Level of Regular Public Maintenance**

- The minimum inspection requirement specified in the are considered unnecessary or inconsistent with the ideology of concession contracts and should be deleted;
- The proposed standards and the regulation should be harmonized.

## **5.7 ADMINISTRATION AND MONITORING**

It is proposed that a tripartite concession monitoring structure be adopted for each concession. The concession contract manager (CCM) will have the overall duties and responsibilities to the concessionaire and other interested third parties, e.g. the financial lender(s). He will also have overall responsibilities to monitor the performance of the Concessionaire. As the name implies the Rehabilitation Works Agent (RWA) will assist the CCM on all matters relating to the initial rehabilitation works only and once the works are completed the RWA will fade away. The Performance Monitor (PM) will

assist the CCM on matters relating to the day-to-day performance of the Concessionaire.

It is important that the individual concession monitoring teams are co-ordinated to ensure a seamless national roads network.

## **6. CONCLUSION**

The Ministry of Transport – Directorate of the Republic of Slovenia for Roads (DRSC) is responsible for keeping the state roads (motorways excluded) in a safe and efficient condition. Routine maintenance (winter maintenance included) of some 6.100 km of state roads is currently based on term contracts, awarded to Road companies without tendering procedure. All contracts have unified prices, which are renegotiated and agreed upon annually. Under the present legislation no competition is possible when awarding routine maintenance contracts. With deteriorating condition of road network this is a situation that calls for innovative resolution.

The Ministry of transport and EBRD launched a project, which is to give answers about feasibility of concessions for rehabilitation and maintenance of state road network. Under these concessions, private sector entities would undertake and finance the initial refurbishment, and manage and maintain the road network over a pre-agreed period.

Thus far project team produced strategic report, which covers the first phase of the project. The proposed system is (as expected) complex, long term and of substantial financial weight and is now being carefully studied so the implementation hasn't been decided upon yet. But regardless whether the concessions will be accepted or rejected, project yielded concepts, which could in near future help improve efficiency of routine and winter maintenance in Slovenia.

## **6. REFERENCE**

- Herga L., Fazarinc P., Pengal P.: Winter maintenance policy in Slovenia. Roanoke (Virginia): 5<sup>th</sup> International Symposium on Snow Removal and Ice Control Technology, 2000. Slovenia private road maintenance project – Strategy report. Helsinki: Finnish national road administration, 2001.