

LATVIAN EXPERIENCE IN ASSIGNMENT, IMPLEMENTATION AND VALUATION OF WINTER MAINTENANCE WORKS

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ABSTRACT

Time period from 2006 to 2008 may be considered as the years of economical boom in Latvia. In these years the financing for road construction and maintenance increased greatly (Chart 1).

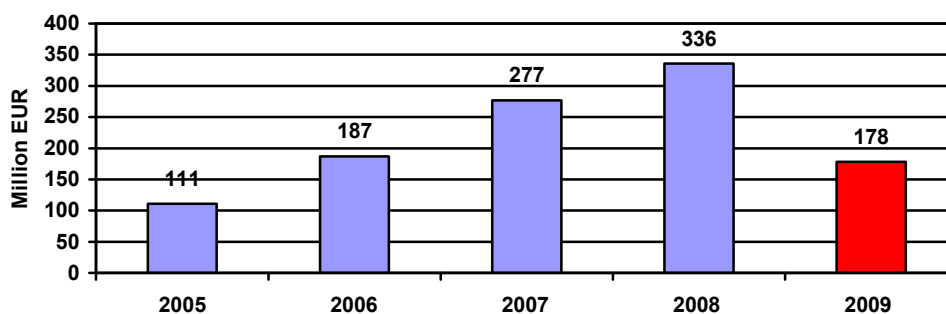


Chart 1 - Road financing 2005 -2009

Unfortunately this wonderful period of development had certain side-effects – rapid increase of work costs (Chart 2), lack of competition and qualified human resources.

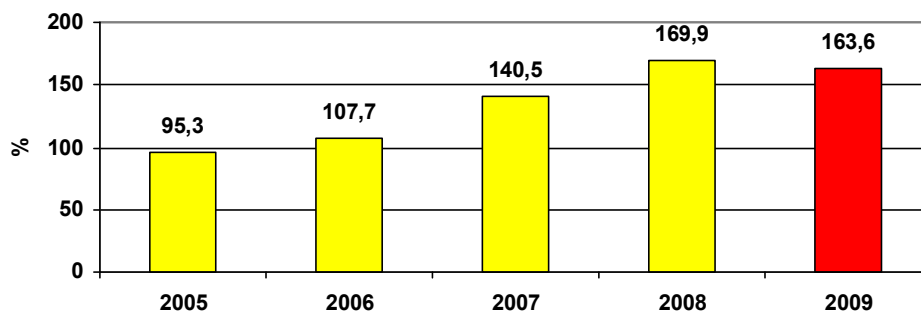


Chart 2 – Construction price index 2005-2009

In these years of development in order to increase the efficiency of state road maintenance, the Ministry of Transport decided to unite its 4 maintenance companies into one and launch a tender in 2007 on the rights to perform state road maintenance works. Both the term of contract from 5 to 7 years, as well as, the number of bids from 4 to 12 were increased.

KEYWORDS

WINTER / MAINTENANCE / LATVIA

1. INTRODUCTION

Latvia is located in the northeast part of Europe on the eastern shore of the Baltic Sea. It borders on Estonia, Lithuania, Russia and Byelorussia. The biggest part of the territory of Latvia is located slightly higher than 100 m above the sea level. The highest point is 312 m. Latvia has hundreds of rivers and lakes. Data about Latvia are summarized in Table 1.

Table 1 – Background data about Latvia

Area	64589 km ²	
Population	2.3 million	
Population density	35.8 /km ²	
Road and street length	State	20 180km
	Municipal	39 013km
	Forest	6995 km
	Private	3500 km
	Total	69 688 km

Average temperature in January on the coastline is -2°C, in the east -7°C. At times sharp drop of temperature of -40°C may be observed in relation to the inflow of anticyclonic air masses from the north or east.

Steady layer of snow stands from middle of December until the middle of March. In the west it lasts approximately 80-90 days, in the east – 100-120 days. Due to many thaws the layer of snow is not thick, usually 30-50 cm and 15 – 20 cm on the sea coast. In years with many rainfalls and cold winters its thickness may reach 1 m but in warm winters layer of snow is unsteady. The average number of days with thaws is <60 per year.

2. REQUIREMENTS FOR WINTER ROAD MAINTENANCE.

Requirements for state and municipal road maintenance are defined by the Regulations of the Cabinet of Ministers of Latvia. In these Regulations the level of road maintenance is defined which is divided into five maintenance classes according to traffic intensity (Table 2).

Table 2 - Maintenance classes and traffic intensity

AADT (vehicles per day)	Main roads	Regional roads	Local roads
> 5000	A	-	-
1000 - 5000	A1	A1	A1
500 - 1000	A1	B	B
100 - 500	-	C	C
< 100	-	-	D

The requirements for every class define surface evenness, thickness of snow layer and time of work performance. Qualitative indices acceptable for each class change according to weather conditions. In the Regulations it is defined that road administrator is responsible for ensuring these requirements. For municipal roads it is the respective municipality but for state roads – State Joint Stock Company “Latvian State Roads” (LSR). Class requirements are showed in Table 3.

Table 3 - Maintenance class requirements

Requirements	Maintenance class				
	A	A1	B	C	D
	Acceptable indices				
Snow thickness	Without snow	Without snow	4 cm	10 cm	-
Ruts	-	Occasionally	Up to 20 mm	Up to 40mm	-
Time for clearing	3 h	4 h	6 h	18 h	-
Time for de-icing	3 h	4 h	6 h	-	-

LSR has developed specifications for winter maintenance works. In these specifications there are requirements for equipment, materials, work performance and results. Snow clearing on state roads is mainly performed with trucks equipped with front and side plough. Roads of rural municipalities and private roads are mainly cleared with tractors or graders. Wet salt is used for de-icing roads of classes A and A1. It is defined that maximum size of salt particles may not exceed 5 mm and different additions may not exceed 4 %.

On class B roads both wet salt, mix of salt and sand, sand and creasing is applied. 1 m³ of salt and sand mix has to contain 130 – 160 kg of salt, maximum particle size may not exceed 5 mm. On class C antiskid activities are performed only in separate sections – in intersections, steep slopes and sharp turns – by spreading of salt or creasing. In the case of freezing rain class C roads are spread in all their length. In the streets of bigger cities wet salt is applied for melting snow and ice. Sometimes, if there is a lot of snow, streets are cleared by forming walls on street sides and organizing snow removal afterwards. Rural municipalities mainly clear the snow only from their roads and streets.

3 . ORGANISATION OF ROAD MAINTENANCE

In 2007 the last tender took place about the rights to perform state road routine maintenance works for time period from 2007 to 2014. 20.2 thousand km of state roads were divided into 12 contracts (Figure 1). Length of allocated road network in the contract varied between 1000 and 3000 km. Although documents were bought by 7 possible tenderers, the bid was submitted only by the state road maintenance company – State Joint Stock Company „Latvijas autoceļu uzturētājs” (LAU), therefore it gained rights to perform these works for 7 years. Total costs of 12 maintenance contracts for 7 years are 470 million EUR, from which approximately 45 % are used for winter road maintenance. LAU is a business company independent from LSR and in addition to state road maintenance it performs maintenance of roads of other owners, as well as, construction works. In 2008 the turnover of LAU was 87 million EUR, from which 59 million EUR came from state road maintenance.

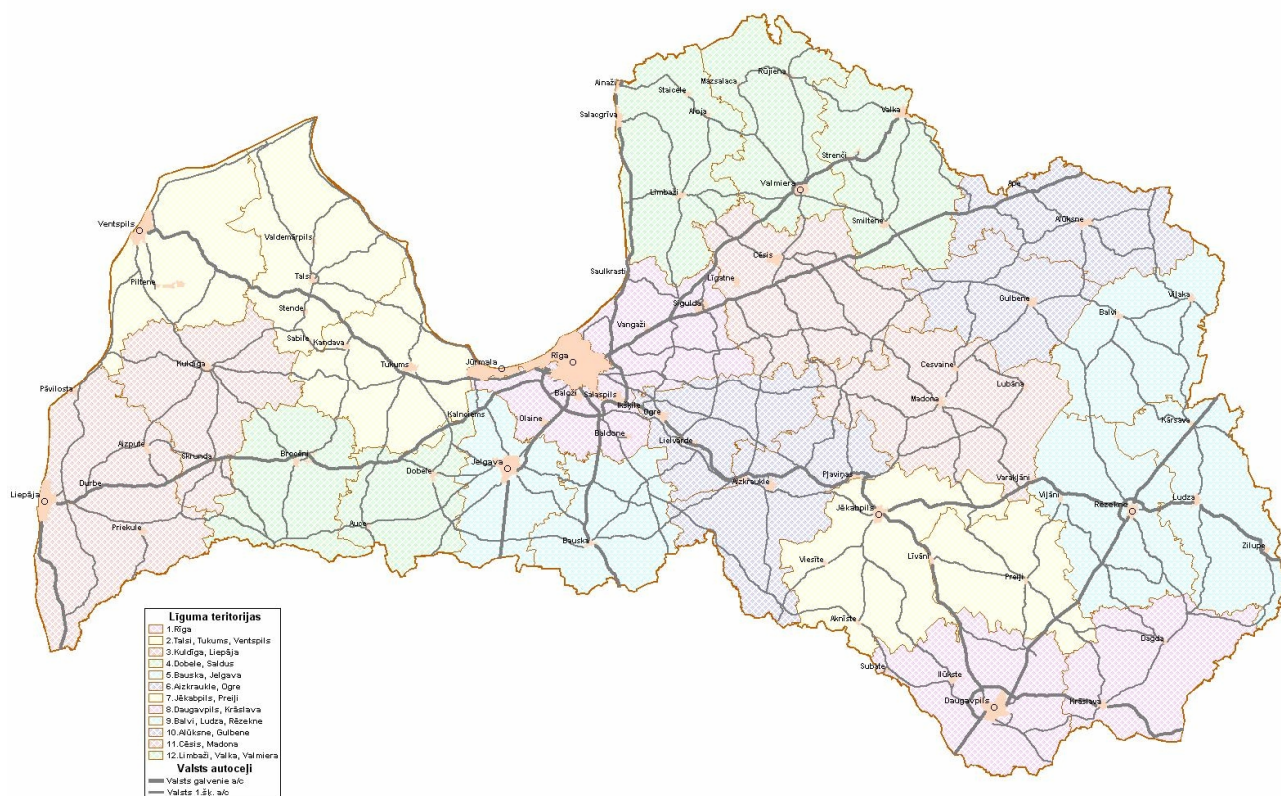


Figure 1 – Division of maintenance contracts

The contractor is fully responsible for road conformity to maintenance class, it constantly follows road conditions and makes decisions on necessary activities according to visual inspection, weather forecast, road weather station data and experience. In winter the person on duty of winter road maintenance service works in every district.

Personnel of LSR controls the conformity to requirements of maintenance class and the amount of works performed on roads, as well as, accepts performed work for payment.

If significant deviations from quality requirements are discovered, every case is investigated and, if it is confirmed that deviations occurred due to inactivity of the contractor, penalty is inflicted on the contractor.

To ensure evident tracking system of work amounts, from 2007 the work of vehicles equipped with spreaders and snow ploughs on roads of classes A and A1 has to be registered and they have to be equipped with GPS for automatic registration of location. Unfortunately due to technical reasons there is a problem to register automatically snow clearing but spreading is being registered quite precisely.

4. PROBLEMS IN WINTER ROAD MAINTENANCE

In 2007 the tender on rights to perform works of state road routine maintenance took place in the period when the supply in Latvian road construction market was extremely big and existing construction companies could hardly master it. Therefore private companies were not interested to win state road maintenance contracts because construction works provided much bigger profit. As a result the only applicant (LAU) could easily raise work unit price from 10 % to 30 %.

During the last years the level of winter road maintenance, especially around the capital city Riga, has grown considerably (Chart 3) due to both increased financing (Chart 4), and the rise of technical possibilities of the contractor. Every year LAU invests in the renewal of technological equipment and machinery. 18 million EUR were invested in 2008 only. In addition to that traffic intensity near the cities has grown since in the years of development the number of inhabitants in suburbs highly increased.

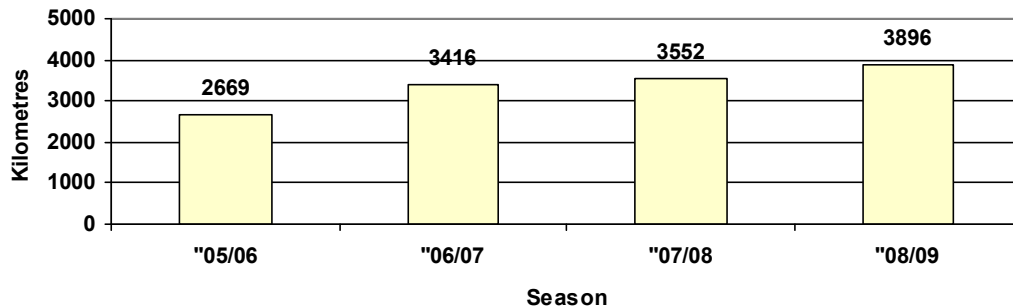


Chart 3 - Changes of road length in A and A1 classes in the last 4 winter seasons

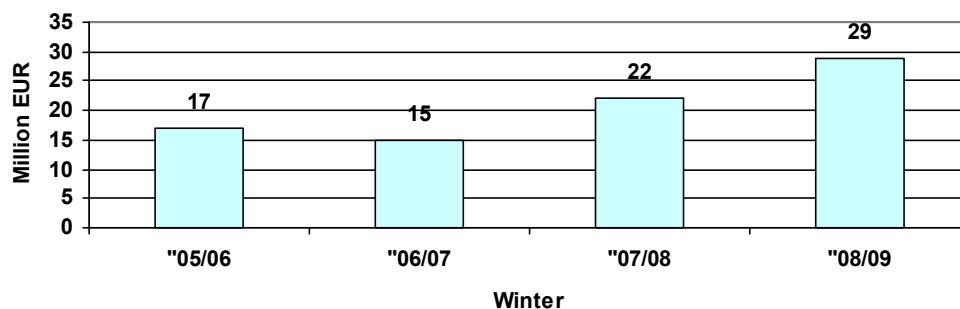


Chart 4 - Costs of winter road maintenance works from winter of 2005/2006 to winter of 2008/2009

As a result the road users think that driving conditions in winter have to be similar to driving conditions in summer and, if they are not, pressure on politicians has to be made. In their turn politicians request LSR to invest funds and ensure high level of winter road maintenance regardless of costs.

During the last years LSR pays more attention to traffic safety on state roads by investing in traffic safety improvements in addition to increased penalties for violation of road traffic regulations and especially for drunk driving. As a result the number of injured and killed in road traffic accidents has a tendency to decrease (Chart 5). Although there is no research how big is the role of increase of level of winter road maintenance in the improvement of traffic safety, we would like to believe that invested funds have their share in the decrease of traffic accidents.

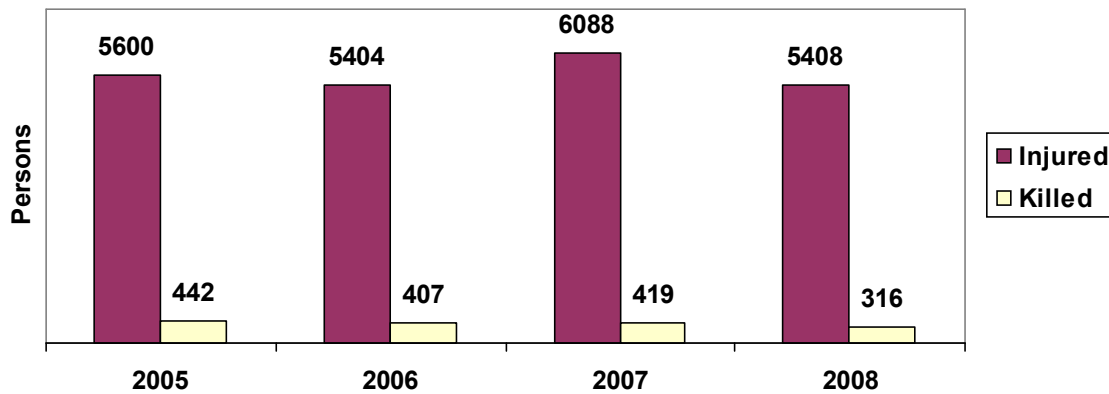


Chart 5 – Number of killed and injured from 2005 to 2008

Financing available to Latvian roads (Chart 1) has decreased from 336 million EUR to 178 million EUR. Financing allocated to winter road maintenance works forms considerable amount of state road funding. It is natural – the smaller amount of financing to roads, the bigger proportion of winter road maintenance costs. (Chart 6).

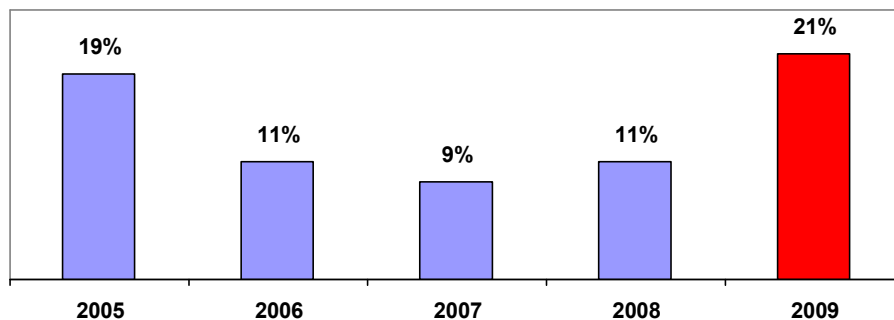


Chart 6 - Proportion of winter road maintenance works in state road financing

Initially 29 million EUR were planned in 2009 for winter road maintenance, but it is clear that LSR will not be able to afford such financing. Therefore in the autumn of 2009 decrease of level of winter road maintenance is expected and we may only guess how it will affect traffic safety.

It is clear to LSR specialists that improved efficiency of winter road maintenance is possible only when winter road maintenance service will be paid not for physical amount of performed works, but for ensuring compliance to maintenance class apart from the amount of work. At present this approach is reflected in 2 contracts on state main road maintenance but LSR keeps working in order to introduce the payment by road maintenance classes A and A1 in all 12 contracts.

To ensure that the contractor decently provides compliance with the maintenance class, it is necessary for LSR to intensify supervision over road quality and to increase penalties for non-compliance. Intensification of supervision has to be implemented by improving existing control procedures of LSR, extending the use of maintenance vehicles equipped with GPS and registration devices and installing video surveillance, as well as, improving work specifications and quality requirements.

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