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COMPARISON OF WINTER MAINTENANCE REQUIREMENTS (ESTONIA, LATVIA, LITHUANIA)

Jānis Kastanovskis

Head of Maintenance Supervision Department
State Limited Liability Company "Latvian State Roads"
Janis.Kastanovskis@lvceli.lv

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Abstract.

Three Baltic states are located next to each other on the coast of the Baltic Sea. Similarly, to Finland, density of population in these countries is low. All three countries have large amount of state roads with low traffic intensity.

Climatic differences are minimal. Milder climate is in coastal area but inland the weather conditions are more severe. The average air temperature in January in Estonia is from -2 to -7 degrees Celsius but in Lithuania from -1 to -5 degrees Celsius. The number of snowy days fluctuates from 50 to 120.

All three countries have common contracts for summer and winter maintenance where the responsibility for maintenance activities lays on the contractors. Despite common history the methods of the assignment of road maintenance contracts are different in every country. Estonia awards contracts in open tenders and has performance-based contracts. Latvia has the contract awarded to the State Joint Stock Company «Latvijas autoceļu uzturētājs» ("Latvian Road Maintainer") by law and the contract is unit price based. Lithuania has the contract awarded to the state-owned company «Kelių priežiūra» the contract is performance-based.

The requirements for road conditions are quite similar in all three countries. They have three levels of maintenance.

High service level means snow and ice-free surface of the road pavement during winter in constant weather conditions and quick response in case of worsening road conditions.

Medium service level means that snow and ice is allowed on the surface, but activities must be undertaken to improve skid resistance.

The lowest service level means that snow and ice is allowed on the surface and activities to improve skid resistance (mostly only snow cleaning) may be undertaken in some spots only.

In Estonia the expenses for winter maintenance are lower than in the neighbouring countries but it does not have impact on traffic safety during winter.

Keywords: Snow, ice, winter maintenance, weather, the Baltic states, maintenance level

Introduction

More than 20 years within the Baltic Road Association a special Technical Committee on Road Maintenance is working actively. The Committee improves information exchange between road maintenance experts in three Baltic countries and below the names of involved experts who have contributed to this report are listed:

Mr Aldis Lācis,

Mr Jānis Kastanovskis,

Mr Meelis Saat,

Mr Taavi Umal,

Mr Modestas Lukošius,

Mr Tomas Ratkevičius

1. Background

Three Baltic states are located next to each other on the coast of the Baltic Sea. Similarly, to Finland, density of population in these countries is low; All three countries have large share of state roads with low traffic intensity.



Climate

Long term average climate data from 1981 to 2010 are shown in Figure 1. The climatic differences are minimal. Milder climate is on the coastal area but inland the conditions are more severe. The climate in Estonia is a little colder than Latvia and Lithuania. Precipitation is a little more severe in Latvia and Lithuania. The number of snowy days fluctuates from 50 to 120. The Meteorological offices in the Baltic states have admitted that the average temperature and amount of precipitation are increasing and we will have less snow in the future.

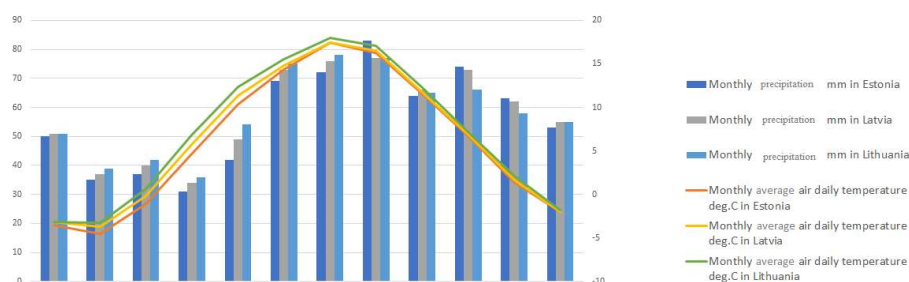


Figure 1. Average amount of precipitation and average temperature in the Baltic states

Maintenance Organization

All three countries have common contracts for summer and winter maintenance where the responsibility for the activities lays on the contractors. Despite common history the assignment of road maintenance contracts is different in every country. One of such differences is the determination of winter maintenance period. Estonia does not determine a special winter maintenance period but pays for 5 months. Latvia has winter maintenance season from November 1 until March 31. Lithuania has winter maintenance season from October 15 to April 15.

Estonian Maintenance Organization

The contracts are awarded in open tender and there are 18 contract areas and 9 contractors. All contractors are private contractors. The contracts are performance-based. The customer is the Estonian Transport Administration which has four Road Maintenance Divisions.

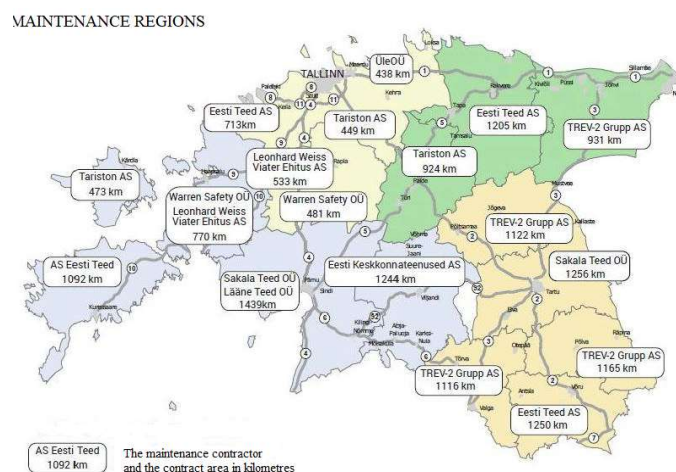


Figure 2. Estonian Maintenance organization.

Latvian Maintenance Organization until May 1, 2022

Latvia has the contract awarded to the State Joint Stock Company “Latvijas autoceļu uzturētājs” by law. The contract is unit price based and there are three parties involved in the contract. The customer is the Ministry of Transport, road network manager is State Limited Liability Company “Latvian State Roads”. LSR supervises the state-owned contractor according to the contract with the Ministry.

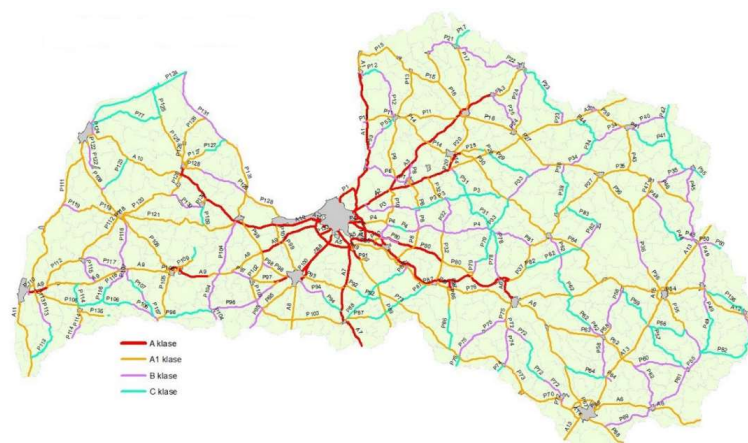


Figure 3. Latvian maintenance classes in the winter 2020 /2021.

Latvian Maintenance Organization after May 1, 2022

Customer for the road maintenance works will be State Limited Liability Company “Latvian State Roads”. The execution of road maintenance works will be awarded in open tender in 19 contract areas. There will be more than one contractor. But the share of works performed by state owned company will still be large. Contracts will still be unit price based except one which will have fixed payment for maintenance performance on main roads. Will the maintenance be in same quality as before and cheaper? We will see.

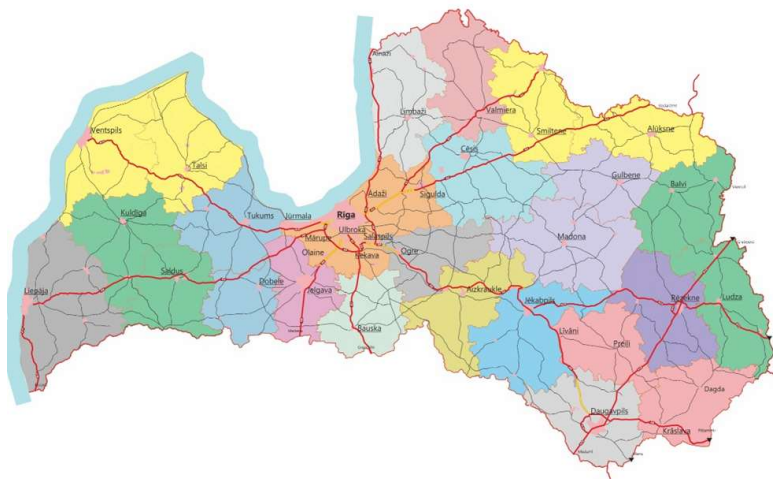


Figure 4. Maintenance contracts after May 1, 2022

Lithuanian Maintenance Organisation

Lithuanian contractual arrangements are like Latvian, although with few important differences. Lithuania has the contract awarded to the state-owned company Public limited liability company «Kelių priežiūra». The contract is performance based with some works with unit prices. Instead of the Ministry the Customer is the State Enterprise “Lithuanian Road Administration”. The supervision is carried out by independent Supervisors according to the Contract with the Lithuanian Road Administration.

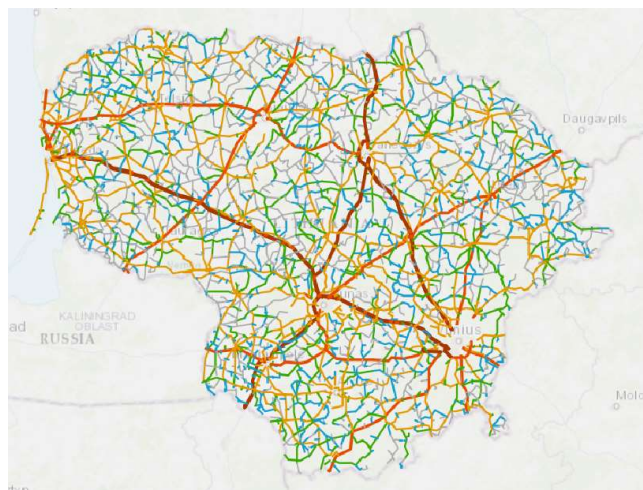


Figure 5. Lithuanian state road network with different classes.

Service standards for road winter maintenance

The requirements for road conditions are quite similar in all three countries, namely, all three countries have three standards of maintenance. The high standard means that the pavement surface is free from snow and ice during winter in constant weather and quick response is expected in worsening road conditions. The medium standard means that snow and ice may be on the surface, but activities have to be done to improve friction. The lowest standard is that snow and ice may be on the surface and the activities to improve friction have to be done in some spots only. And this means only snow cleaning mostly.

Country	High Standard	Medium Standard	Low Standard
Estonia	Level 3 and 3+	Level 2	Level 1
Latvia	Level A	Level B	Level C, D and E
Lithuania	Level 1 and 2	Level 3 and 4	Level 5
Carriageway	Ice and Snow free	Partly snowy and icy	Snowy and icy
Anti-skidding	As soon as possible	Long reaction time	Only spots

Table 1. Maintenance service standards in the Baltic.

Lowest Service Standard

The lowest service standard in Estonia is Level 1 and it is applied on roads with average traffic intensity less than 250 vehicles per day.

Latvia has 3 levels: Class D on roads with traffic less than 100 vehicles per day and class C on roads with traffic from 100 to 499 vehicles per day, and Class E for collapsed roads. Class D and E means no requirements and activities are done occasionally.

In Lithuania the lowest service level 5 is applied only for unpaved roads and paved roads with traffic intensity less than 500 vehicles per day.

Country	Estonia	Latvia from April 2021	Lithuania
Service level (traffic volume)	Level 1 (<250)	Class C (100 -499) Class D (<100) Class E collapsed road	Service level 5 and 5g on gravel roads (0 - 500)
Time for snow removal	24 hours after snowfall	Class C 24 hours after snowfall Class D snow removal at least 2 times per season Class E snow removal at least once per season	Service level 5: 9 hours after snowfall; Service level 5g: 18 hours after snowfall.
Permitted snow depth	10 cm (loose snow), 5 cm (slush)	Class C 10 cm (20 cm in snow drift places) Classes D, E no requirements	Service level 5: snow removal is done when snow thickness exceeds 15cm; Service level 5 on gravel road: snow removal is done when snow thickness exceeds 20 cm.
Skid - resistance coefficient	0.20 (0.25 on unsafe spots)	No requirements, spreading and grading of unsafe spots	No requirements, spreading and grading of unsafe spots
Time for de-icing	12 hours	No requirements	Service level 5: de-icing* with sand in 9 hours; Service level 5g: de-icing* with sand in 18 hours. *only in case of extremely slippery road surfaces (e.g., freezing rain, wet ice, etc.)
Hours when requirements are applied	Round the clock	6:00-20:00 no requirements in other time	9:00-18:00 no requirements in other time

Table 2. Requirements for the lowest service standard.

Medium Service Standard

The medium service standard in Estonia is Level 2 with traffic intensity of 250 to 1000 vehicles per day. For Latvia it is Class B with traffic intensity of 500 to 999 vehicles per day. The medium standard in Lithuania is Level 3 and 4 with the average traffic of 500 -2000 vehicles per day.

Country	Estonia	Latvia from April 2021	Lithuania
Service level name (traffic volume)	Level 2 (250 -1000)	Class B (500 -1000)	Level 3 and 4 (500 -2000)
Time for snow removal	12 hours after snowfall	8 hours after snowfall	Service level 3: 4 hours after snowfall; Service level 4: 6 hours after snowfall.
Time for de-icing	8 hours	8 hours, 24 hours mechanical treatment (grooves)	Service level 3: 4 hours after snowfall Service level 4: 6 hours after snowfall

Permitted snow depth	8 cm (loose snow), 4 cm (slush)	4 cm loose snow, during snowfall (8 cm, 5 cm slush, 16 cm on snow drift places)	Service level 3: in normal conditions - 3cm (loose snow), 2cm (slush), during snowfall or sweep - 10 cm (loose snow), 5 cm (slush), allowed depth of unevenness - 2 cm;
			Service level 4: in normal conditions - 3cm (loose snow), during snowfall or sweep - 10 cm (loose snow), allowed depth of unevenness - 4 cm.
Skid - resistance coefficient	0.25	No requirements	No requirements
Hours when requirements are applied	7:00-21:00 in other time service level 1	6:00-20:00 In other time service class C	Service level 3: 4:00-19:00
			Service level 4: 6:00-18:00.

Table 3. Requirements for medium service standard.

Highest Service Standard

The highest service standard means no snow and ice on carriageway during normal weather. Estonia has level 3 and level 3+, Latvia - class A, Lithuania has level 1 and 2. The average traffic intensity is 1000 and more vehicles per day in Estonia and Latvia and more than 2000 vehicles per day in Lithuania.

Country	Estonia	Latvia from April 2021	Lithuania
Service level name (traffic volume)	Level 3+(>3000 on most important main roads)	Level A (>1000)	Service level 1 (≥10000)
	Level 3 (>1000)		Service level 2 (2000 - 10000)
Time for snow removal	5 hours after snowfall, for 3+ in 2 hours	3 hours after snowfall	Service level 1: 2 hours after snowfall
			Service level 2: 3 hours after snowfall
Pavement surface during normal weather	Snow and ice not allowed	1cm of snow and ice	Service level 1 and 2: snow or ice not allowed
Permitted snow depth during snowfall	4 cm (loose snow), 2 cm slush	6cm loose snow (12 cm on snow drift places) 3 cm slush	Service level 1: 4 cm (loose snow), 0 cm (compact);
			Service level 2: 7 cm (loose snow), 2 cm (compact).
Skid - resistance coefficient	0.3 in wheel tracks and 0.28 in other spots	No requirements	No requirements
Time for de-icing	Level L3+ 2 hours. Sidewalk and wheel tracks free of snow and ice. Preventive de-icing required	Slippery roads must be spread with de-icing or abrasive within 3 hours.	Service level 1: 2 hours
	Level L3 4 hours. Sidewalk and wheel tracks free of snow and ice. Preventive de-icing required		Service level 2: 3 hours
Hours when requirements are applied	Level L3+ 24 hours	Level A 5:00 - 23:00, level B required in other time	Service level 1: 24 hours
	Level L3 6:00 - 22:00 L2 required in other time		Service level 2: 04:00 - 22:00, no requirements in other time

Table 4. Requirements for the highest service standard.

Conclusions

Requirements for winter road maintenance in the Baltic states are not controversial, they are ideologically similar. Maintenance level depends on traffic intensity on roads. It seems that Latvia has less requirements for busy roads. There are no requirements for snow and ice-free carriageway during normal weather although this so far was provided by state owned maintenance company.

The table below shows maintenance requirements for the road E67 during night. During daytime difference is not significant. There is opportunity to harmonize the requirements for the maintenance of E roads in the future.

	Estonia	Latvia from April 2021	Lithuania
Allowed snow thickness	free	4 cm	free
Time for snow removal	2 hours	8 hours	2 hours
Time for de-icing	2 hours	8 hours	2 hours

Table 5. Requirements for the maintenance of E67 VIA BALTICA during nighttime.

Disclosure Statement

I have no competing financial, professional, or personal interests from other parties.

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