

Experiences of Winter Maintenance with Focus on Contract Maintenance

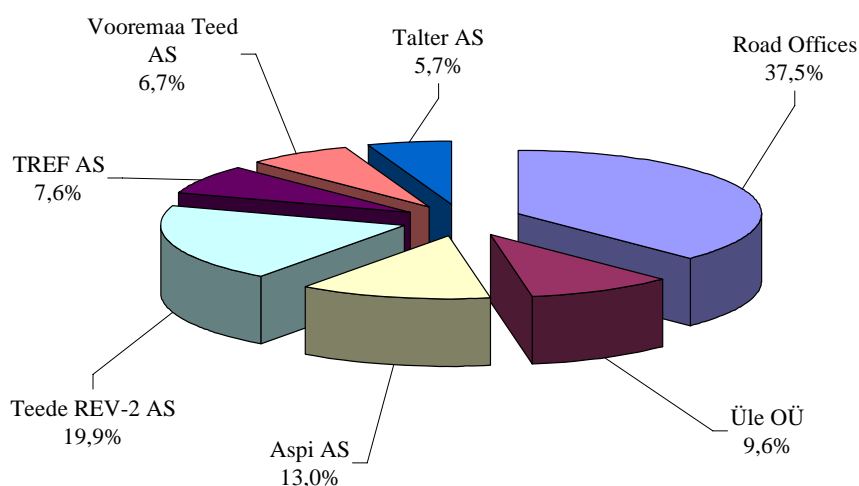
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There have been a lot of changes in road maintenance system in Estonia during last ten years, many reforms that are carried out have changed the market situation completely.

Maintenance of national roads

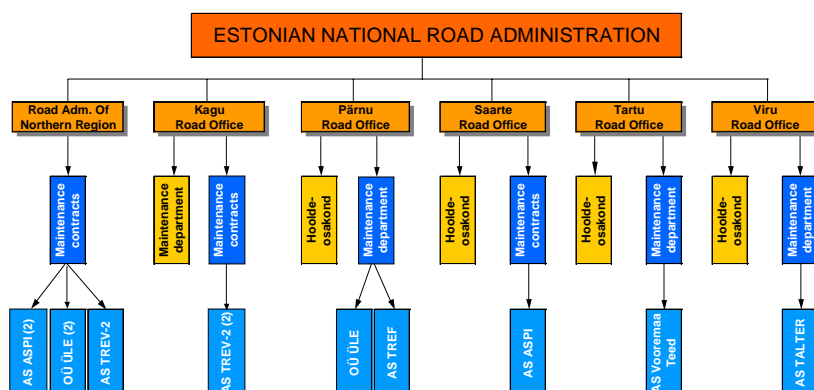
Maintenance is done by companies on 10292,5 kilometres of roads, it is 62,5% of total road network and Road Offices do the maintenance on 6166,9 kilometres of roads which forms 37,5% of total road network, as follows:

Maintenance of national roads



Market share of private entrepreneurs ranges from 5,7% to 19,9%.

Although there are 6 entrepreneurs that have maintenance contracts the situation is that actually their daughter-companies carry out the real works, in total there are 12 maintenance contracts signed today.



The general principles of maintenance contracts

In principle we have two different opportunities to set up a contract.

The first is like following – we can describe a certain amount of certain operations and works that have to be done when doing the maintenance of roads. What is actually done is checked here, but it is very difficult because of rapidly changing weather.

The second what we actually use, is like following – we can describe in high detail a needed condition of roads. What is the actual road condition and is it like it is required is checked here, what and how is done to achieve such a condition is not important. The second way is easier and suits Road Authority much better although the changing weather has a negative impact here as well.

Both ways are strongly affected by rapidly changing weather conditions which make it very difficult either to plan to do certain amount of a certain work or to guarantee a certain condition of roads.

First maintenance contracts reveal decisions made in a hurry and lack of experience. Later the drawbacks were taken into consideration and maintenance contracts were improved, therefore the content of contracts is different – contracts that have been signed later are more thorough.

However, the same general principles have been followed.

1. The period of a maintenance contract is 5 years.

In the future we have planned the period of a maintenance contract to be longer than 5 years, it will be 7 or even more years. It is very important because it is easier for entrepreneurs to pay for machinery during a longer time period and on the other side entrepreneurs will be more interested in good state of roads.

2. Both winter and summer maintenance consists of two parts - routine maintenance and periodic maintenance.
3. During routine maintenance the prescribed operations must ensure the required condition of road, it is not important what works are actually done the end result is.

Requirements for state of winter roads are valid for typical winter weather conditions like snow, ice and slipperiness, blizzard etc.

For better visualisation how a winter road must look like in case of different levels of maintenance some pictures are added.

3rd level of maintenance



Wheel tracks must be clear. There may be dry and light snow up to 3 cm or wet thaw snow, sleet or salt-snow mix up to 2 cm between wheel tracks

2nd level of maintenance



Surface is allowed to be covered with snow or ice, anti-skid treatment is required. There may be dry and light snow up to 5 cm or wet thaw snow, sleet or salt-snow mix up to 3 cm.

1st level of maintenance



Road surface is allowed to be covered with snow or ice anti-skid treatment only in dangerous places. There may be dry and light snow up to 10 cm or wet thaw snow, sleet or salt-snow mix up to 6 cm.

4. *During periodic maintenance prescribed amount of described works must be carried out.* It was sensible to add periodic maintenance to a maintenance contract as the overall condition of roads was not very good and it was not possible to improve the situation with only routine maintenance. The main reason for that kind of condition of roads was the lack of rehabilitation works over a longer period of time. The amount of periodic maintenance does not depend on total cost of a contract, the amount of work has been estimated by experts.

We have also discussed about a version of a maintenance contract which would include all works that are done throughout a year including works like surface dressing and repairing of gravel roads.

The only winter maintenance work that is a part of periodic maintenance is de-icing of roads that have the 1st (lowest) level of maintenance, during extreme weather conditions like overall slipperiness (glaze) that can happen when the temperatures change rapidly, during heavy rain etc.

5. *Deductions from maintenance prices are made due to a low quality maintenance works discovered during supervision.* If the quality requirements are not fulfilled a bonus will not be paid.
6. *Maintenance prices change every year in accordance with the Construction Price Index.*

Winter maintenance consists of the following important works:

1. *weather conditions monitoring, information collection and exchange system, supervision of roads;*

Weather condition monitoring and information collection include following operations like:

- ✓ reading and using weather-reports from meteorological centre;
- ✓ observing information of road weather stations;
- ✓ collecting information from road information centre, from other road entrepreneurs, from road users etc.;
- ✓ additionally - checking the information which has arrived from road users to road information centre.

Supervision of roads includes following operations:

- ✓ evaluating condition of roads by entrepreneur;
- ✓ evaluating condition of roads together with road authority;
- ✓ checking complaints that have arrived from road users.

2. *de-icing using sand, salt-sand and chlorides;*

- ✓ which material will be used is decided by the entrepreneur;

3. *snow removal using plows, graders etc mechanisms;*

- ✓ road authority does not make a decision which mechanisms or technology entrepreneurs can use in a certain case;

4. *scraping of snow-covered road for antisleet treatment;*

5. *other snow removal related works like cleaning of bus-stops and traffic signs.*

Aforementioned works must be carried out to ensure the required condition of road, the amount or order of different works is not important, the end result is.

Supervision of maintenance roads

There is no special guide for inspection of roads for winter period, we have a Guide for Inspection of Roads that covers all seasons.

According to Guide all inspections are grouped in two groups: ones that are done every day and ones that are done every month.

The main idea behind every day inspection is to do a selective check if the actual road conditions fulfil the requirements stated in Requirements for State of Roads and maintenance contracts - where maintenance is done by a private company - and to check if the works done on the road are in accordance with the Technological Requirements for Road Managing Works. The route to be inspected is chosen according to the principle of importance by the specialist doing the inspection, the idea is to try to look over the roads where the biggest shortcomings in level of maintenance may occur.

The main idea behind every month inspection is to check if the actual road conditions fulfil the requirements stated in Requirements for State of Roads and maintenance contracts in a the whole area. Every month inspection gives an overview of an overall situation concerning road maintenance and its quality in the area. The route to be inspected is chosen according to the principle of chance. The inspection is done by a commission that consists of the representatives of the company or road district doing

the maintenance and representatives of supervision. During every month inspection a 100% of all main roads and 10% of all remaining roads are checked.

Inspection is mainly done visually, if some kind of conflict of opinions occurs different measurements are done additionally. Some of the measurable parameters are: height of snow, space between roadside snow drifts, depth of ruts, if timeframes for maintenance cycles are not exceeded etc.

Noticed shortcomings are written down and deadlines for correcting things up are given. A difference based on the amount of shortcomings written down is calculated using different tables and formulas and if that difference is bigger than allowed then it is a ground for using different sanctions against the company or road district doing the maintenance.

Distributions maintenance work among entrepreneurs


Advantages

- ✓ More efficient usage of maintenance machinery and staff.
- ✓ Establishment of competition and free market in road maintenance.
- ✓ Achievement of lower prices due to promotion of competition and more efficient administration.
- ✓ Separation of the roles of the customer and contractor.

Disadvantages

- ✓ Inflexibility in extraordinary weather conditions and unforeseeable circumstances.
- ✓ Uncertainty concerning emerging problems not covered by the maintenance contract.
- ✓ Increasing importance of supervision. Supervision done both by entrepreneur and by state is important here.
- ✓ Greater need for more precise regulation by legislation. It is very important to clearly state requirements special for winter maintenance. According to that principle a road surface friction measurement system has been developed in Estonia during last 3 years to minimize the subjective part in evaluating winter road conditions and the number of discussions whether the road surface is slippery or not.
- ✓ While indifferences between the three levels of road maintenance, that are used in Estonia, are being made smaller over time, it is possible to see that there have been some drawbacks in the actual maintenance level of roads that have the 1st (lowest) level of maintenance. The reason behind this is that when the state was the only one doing the maintenance works on roads the works were sort of overdone - the actual level of maintenance was higher than the required level was.

2005-09-01

A photograph of a car driving through a snowy field, kicking up a large cloud of snow. The car is in the center, moving away from the viewer. The background shows a line of trees under a cloudy sky.

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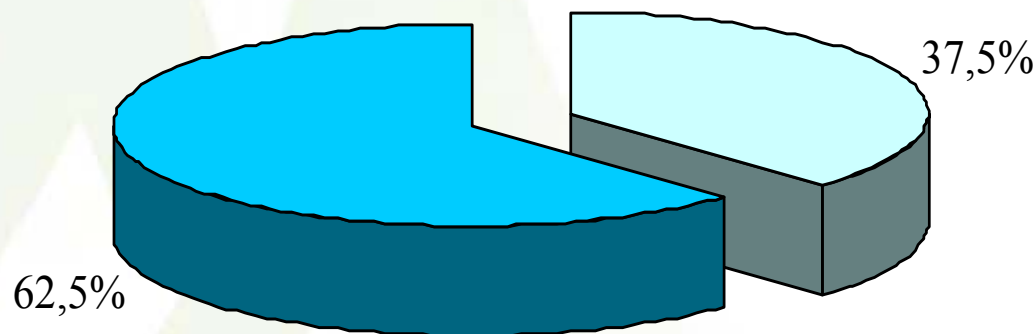




A yellow rectangular road sign with black text is mounted on two green metal poles. The sign is positioned on the right side of a snow-covered road. The road has dark tire tracks in the snow. In the background, there are snow-covered evergreen trees and a hazy sky.

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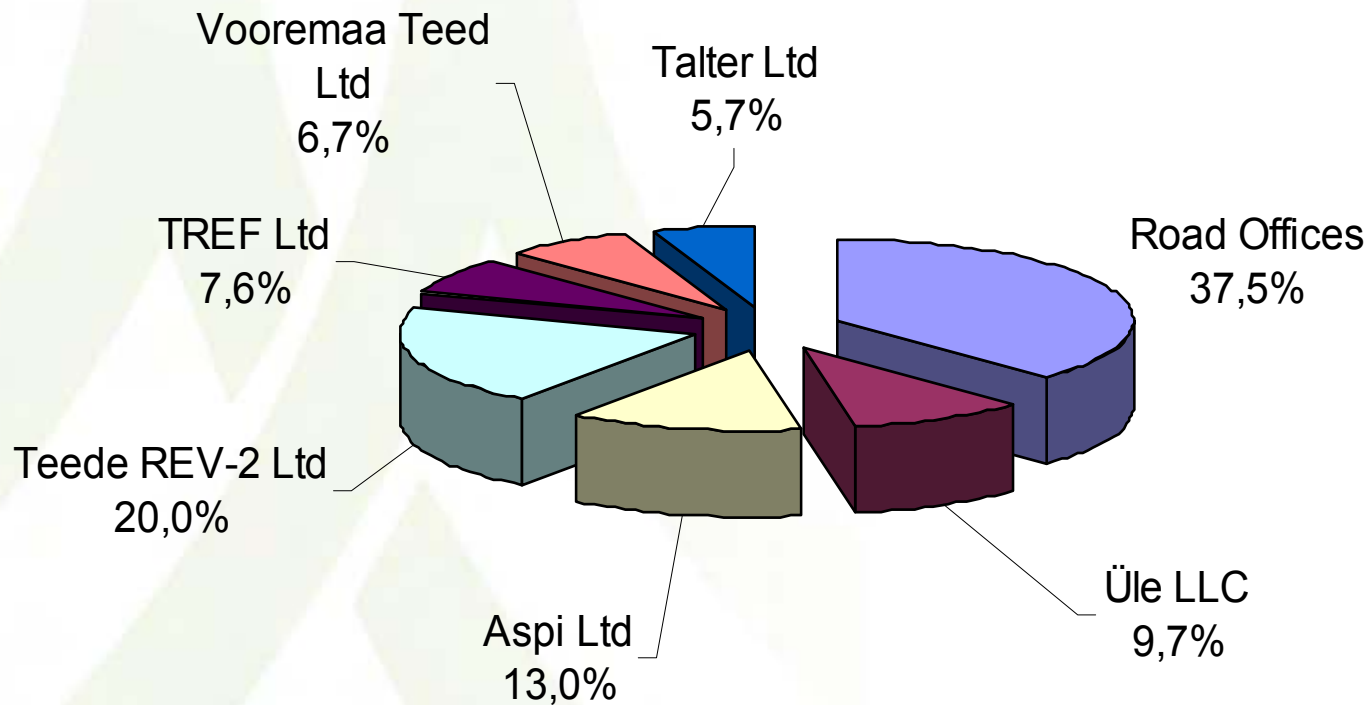
Winter maintenance work performed by Road Offices and by contractors in Estonia (%)



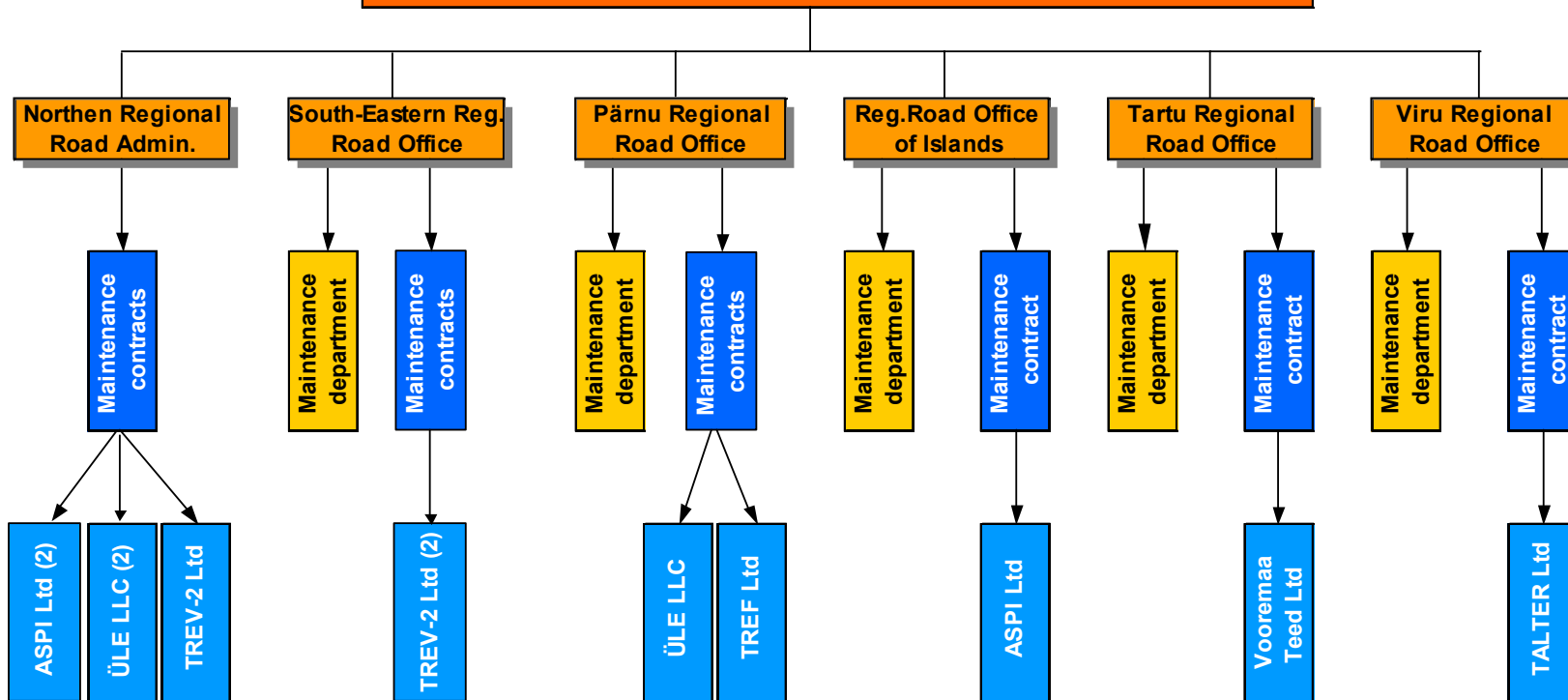
□ By Road Offices - 10 292,5 km

■ By Contractors - 6166,9 km

Maintenance of national roads by performer (%)



ESTONIAN NATIONAL ROAD ADMINISTRATION



General principles of maintenance contract (1):

- *the period of a contract is 5 years;*
- *consists of two parts - routine and periodic maintenance;*
- *routine maintenance - the prescribed operations must ensure the required condition of roads;*
- *periodic maintenance – the prescribed amount of the determined work must be carried out;*

General principles of maintenance contract (2):

- *deductions from maintenance prices are made due to a low quality of maintenance work discovered during supervision;*
- *maintenance prices change every year in accordance with the Construction Price Index.*



Requirements for national winter roads

Level 3

Removal of snow within 5 hours

De-icing within 4 hours



Level 2

Removal of snow within 12 hours

De-icing within 8 hours



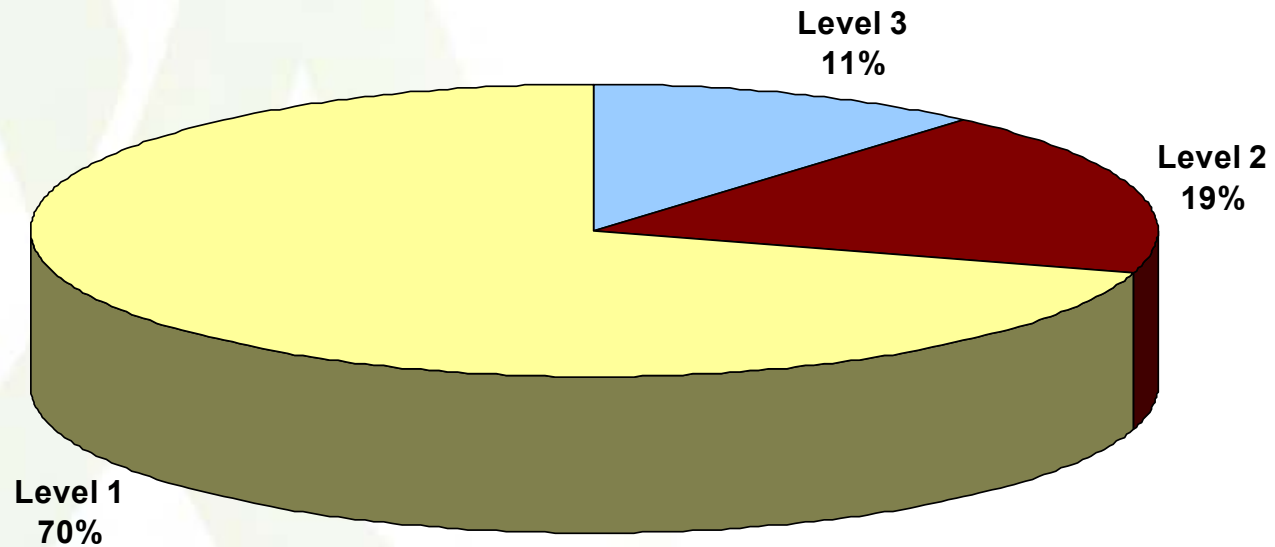
A photograph of a snow-covered road winding through a forest of evergreen trees. The road is covered in a thick layer of snow, with visible tire tracks. The trees are dark green and heavily laden with snow. The sky is overcast and grey.

Level 1

Removal of snow within 36 hours

De-icing (on dangerous stretches of roads) within 24 hours

State roads divided by level of maintenance



Winter maintenance consists of the following important work:

- *weather conditions monitoring, information collection and exchange system, supervision of roads;*
- *de-icing using sand, salt-sand and chlorides;*
- *snow removal using snowplows, graders etc mechanisms;*
- *scraping of snow-covered road for antiskid treatment;*
- *other snow removal related work like cleaning of bus-stops and traffic signs.*

Supervision of road maintenance

- *The Guide for Inspection of Roads;*
- *Two kind of inspection:*
 - *every day – selective checking if the actual road conditions fulfil the requirements;*
 - *every month – checking if the actual road conditions fulfil the stated requirements and maintenance contracts in the whole area;*
- *inspection is mainly done visually, if some kind of conflict of opinions occurs different measurements are done additionally;*
- *if that difference is bigger than allowed then it is a ground for using different sanctions against the company or road district doing the maintenance.*

Advantages:

- *more efficient usage of maintenance machinery and staff;*
- *establishment of competition and free market in road maintenance;*
- *achievement of lower prices due to promotion of competition and more efficient administration;*
- *separation of the roles of the customer and the contractor.*

Disadvantages:

- *inflexibility in extraordinary weather conditions and unforeseeable circumstances;*
- *uncertainty concerning emerging problems not covered by the maintenance contract;*
- *increasing importance of supervision;*
- *greater need for more precise regulation by legislation.*

Perspectives

The priority in the nearest future will be specifying existing legal acts and normative documents, as well as preparation of new specified maintenance contracts which take into account the acquired experience, as the term of the first maintenance contracts will soon expire

A scenic landscape photograph featuring a bright sun in a clear blue sky with some light clouds. Below the sky is a dense line of evergreen trees. The foreground consists of a rocky, uneven field with sparse, dry-looking vegetation and small shrubs. The text "Thank you!" is overlaid in the center of the image.

Thank you!