

LEGAL ACTS OF WINTER MAINTENANCE ACCORDING TO ESTONIAN ROAD ACT.

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1. Scope of Application of Roads Act

The Roads Act provides the requirements for roads, the rights and obligations of road owners and road users and the liability thereof for violations of traffic safety requirements, and regulates the organisation and financing of road management, road use and road protection and the protection of humans and the environment against hazards arising from traffic.

The state of a road shall enable safe traffic and shall conform to environmental protection requirements and the technical requirements established for the corresponding class of road. The owner of a road or the person appointed as the person responsible for the organisation of road management is required to maintain the road in a state which conforms to the requirements provided for in this Act and legislation established on the basis thereof.

Information on state of road and organisation of use

The Road Administration shall provide information on the state of national roads and general requirements for the use and protection. The Road Administration shall provide on national radio immediate information concerning traffic conditions on national roads.

In the event of a heavy snowstorm or black ice and in other cases which significantly affect traffic control or traffic safety, the Road Administration is required to give immediate notification on national radio of the state of national roads and to provide immediate information on any changes in traffic control caused by natural disasters or traffic accidents.

The owner of a road shall provide information on the state of the road and on the organisation of use thereof if a corresponding inquiry is made.

Rights and obligations of owner of road

The owner of a road is required to monitor the state of the road, to maintain the road, and to organise the use and protection of the road.

The owner of a road is required to compensate road users for damage caused due to the road being unusable or due to the violation of this Act or legislation issued on the basis thereof.

According to Road Act there are three documents concerning the winter maintenance:

- 1) The requirements for the state of a road at winter conditions.
- 2) Technology requirements of winter maintenance works.
- 3) Requirements for construction, state and use of winter roads.

2. The requirements for the State of a Road at Winter Conditions.

The requirements for the state of road determine the conditions of road, which enable safe traffic. The requirements for the state of road are in force any time then weather conditions are typical to winter (snow, ice, glazed frost, snow storm, etc.) and are not associated with any date.

TABLE 1. Classes of Roads and Corresponding Requirements for the State of Road:

Classes of road and traffic volumes (cars per 24 hours)	Required state of road			
	Main roads	Basic roads	Secondary roads	Local roads
Motorway (over 8000)	4	–	–	–
I (6000 – 8000)	3	3	3	–
II (3000 – 6000)	3	3	2	–
III (1000 – 3000)	3	2	2	2
IV (200–1000)	3	1	1	1
V (up to 200)*	–	1	1	1

TABLE 2. States of Road at Winter Conditions are Described With Slipperiness, Amount of Snow and Evenness and are given in the Following Table.

Indicators	States of road and their description			
	1	2	3	4
SLIPPERINESS State of road surface	Road surface is allowed to be covered with snow or ice, anti-skid treatment only in dangerous places	Surface is allowed to be covered with snow or ice, anti-skid treatment is required	Wheel tracks must be clear	Whole road surface must be clear from snow and ice
SNOWINESS				
Dry and light snow up to	10 cm	5 cm	3 cm between wheel tracks	-
Wet thaw snow, sleet, salt-snow mix up to	6 cm	3 cm	2 cm between wheel tracks	-
Space between road side snow-drifts at least	6 m or at least width of road	8m or at least width of road	9 m	10 m
EVENNESS Ruts or unevenness on snowy road surface up to	4 cm	3 cm	There can be squeezed snow between wheel tracks up to 2 cm	Road surface must be clear, at temperature lower than –12°C squeezed snow between wheel tracks up to 1 cm is allowed

Table 1 shows that established requirements for the states roads depend on the class of road and on the traffic volume. Change of the state of one road can be allowed only on crossings, on the border of settled areas or on the change of pavement type.

The required state of intersection, bridge, footpath, bus stop, parking area, square must conform to the state of road where it is located.

There are additional requirements for constructions mentioned above:

- Intersection must be clean from snow
- The pavement widening at bus stop and platform must be cleaned from snow and deicing treatment must be done
- Bridge must be clean from snow and there must not be any icicles above the road
- At the parking areas, the depth of loose snow can not exceed 5 cm
- Footpaths must be clean from loose snow and deicing treatment must be done
- Tramways and surrounding area must be clean from snow and ice
- Railway crossing must be clean from snow and ice
- Manhole covers and inlets must be clean from snow and ice

TABLE 3. Maintenance Cycle – Time Interval Then Required State of Road Must Be Restored (Hours):

State of road	Removal of snow and sleet from road surface	Anti-skid treatment	Removal of salt-snow mix from road surface	Cleaning of footpaths and anti-skid treatment	Fulfilling of additional requirements for intersections, bridges, footpaths, bus stops, parking areas, squares
4	2	2	4	6	8
3	5	4	8	8	12
2	12	8	–	12	24
1	36	24	–	–	36

Counting the time of maintenance cycle starts then slipperiness originates or from the end of snowfall or then snow thickness between wheel tracks exceeds the critical limit.

Removal of the snow from road surface must be started immediately then the thickness of snow exceeds the critical limit.

In extreme situation (heavy snowfall, snow storm, icing, etc.) the maintenance cycle time can be increased by 12 to 24 hours.

The road owner must guarantee required state of the road in following times:

- Motorway – 24 hours 7 days of the week
- Class I road – 7 days of the week from 6.00 – 22.00
- Class II road – 7 days of the week from 7.00 – 21.00
- Class III road – 7 days of the week from 7.00 – 21.00
- Class IV and V roads – time interval then required states of roads are in force are established by Road Administration or by local governments.

The performer of maintenance works is required to record executed maintenance works and condition of the roads in the diary of winter maintenance works.

3. Technology Requirements of Winter Maintenance Works.

This document gives requirements for preparing the roads for winter maintenance, general goals and methods of snow control, anti-skid treatment, requirements for machinery and materials as well as critical thickness of snow during the snowfall.

Preparing the road for winter involves cleaning the shoulders, slopes of embankment, profiling the gravel roads, installing in the necessary places sign posts for winter maintenance.

Critical Thickness of Snow On The Road Surface

State of road	Critical thickness of loose snow between wheel tracks	Critical thickness of wet snow (sleet) between wheel tracks
4	3 cm	2 cm
3	5 cm	3 cm
2	10 cm	6 cm
1	-	-

Then the thickness of snow exceeds the critical limit snow removal should be started immediately.

There are given requirements for the salts used for anti-skid treatment.

Salts (NaCl, MgCl₂, CaCl₂) used for anti skid treatment shall meet following requirements:

- 1) Fraction of salt must be between 0,25 – 4,0 mm. There cannot be finer particles than 0,25 mm and greater particles than 4,0 mm more than 10 %.
- 2) Moisture content in the stockpile can be up to 1,5 %.
- 3) Salt can contain up to 0,7 % of indissoluble particles.
- 4) Content of chlorides must be at least 97 %.

4. Requirements for Construction, State and Use of Winter Roads.

A winter road is a road, which is constructed over frozen land, or a frozen body of water (**ice road**) and which is prescribed for traffic between the mainland and islands or between different locations on the mainland. The period of use of a winter road is restricted.

The owner of land or a body of water, which is necessary for the construction of a winter road, has the right to demand payment of a fee from the constructor of the road for use of the land or the body of water.

The location of a winter road, the term for and conditions of use of the road and the size of the fee charged for use of the land or body of water necessary for construction of the road are prescribed by a contract entered into by the owner of the land or body of water and the person interested in construction of the winter road.

Construction of ice roads

Before construction of ice road thorough investigation of conditions of ice should be conducted. Results of investigation should be recorded and following data must be put on the scheme of the ice road:

- 1) Thickness of ice at least in every 100 metres
- 2) Bearing capacity of ice in the place there thickness of ice is minimum
- 3) Appropriate approach roads to the ice road
- 4) Boundaries of corridor of ice road
- 5) Possible places of reinforcement of ice
- 6) Traffic control devices and their location
- 7) Other necessary information

Requirements for the state of winter road:

The state of winter road, which is constructed over the frozen land, must conform to the requirements of the class V road.

Ice Road Must Conform the Following Requirements:

Quality indicator	Description of the state
SNOWINESS Thickness of dense snow Thickness of loose or thaw snow Drifting snow	Up to 15 cm Up to 10 cm Snowdrifts must not reach over the road
EVENESS Ruts Frozen cracks Opened cracks	Up to 4 cm Up to 50 cm Up to 7 cm
WIDTH OF THE ROAD	The width of the two lane road must be 40-50 m, the width of the one lane road must be at least 10 m and the distance between two lanes 50 m.

Requirements for the use of ice roads regulate the organization of maintenance works, traffic, etc.

In Estonia there are four ice roads, which are responsibility of state. These roads link three bigger islands with mainland and with each other. The total length of state ice roads is approximately 56 km.

5. Conclusion.

The most significant from these three documents is definitely (from point of view both of road users and of performer of maintenance works) “The requirements for the state of road at winter conditions”. This document gives clear rules for performer of maintenance works and it serves also as tool of control both for road owners and road users.

The major problem here is that weather conditions in winter in Estonian climate are much more versatile than described in this document. For this reason improvement and further development of these documents is very essential.