

PROTECTING THE ROAD NETWORK IS A PRIORITY



Every spring, the Ministère des Transports establishes the dates for the thaw period for the three zones that comprise the territory of Québec. During this period, heavy vehicles that travel on the road network must reduce their loads in accordance with the limits imposed by *the Vehicle Load and Size Limits Regulation* that applies to road vehicles and combinations of road vehicles.

The coming into effect of load limits because of the thaw invariably raises a number of questions concerning the load limits applied to heavy vehicles, pavements, and structures, along with the effects of climate on roads, the procedure used to establish the thaw period, traffic control, etc. In order to answer some of these questions, we have created a series of fact sheets that contain the essential information related these topics, as well as maps and answers to recurring questions concerning pavements and vehicle loads.

It is only logical to submit heavy transport operators to more restrictive regulations during the thaw period, especially considering the fact that, by 2013, the Government of Québec will have invested 17.8 billion dollars since 2007 to modernize the road system.

For information concerning authorized load limits during the thaw period, or concerning any other topic, choose one of the options listed below.

- Visit the ministère des Transports du Québec website:
www.mtq.gouv.qc.ca
- Call **511** (in Québec)
1-888-355-0511 (from anywhere in North America)
- Contact the ministère des Transports du Québec by e-mail:
communications@mtq.gouv.qc.ca
- Write to the following address:
Direction des communications
ministère des Transports
700, boul. René-Lévesque Est, 27^e étage
Québec (Québec) G1R 5H1

If you require information concerning road transport control, contact the information centres of the Société de l'assurance automobile du Québec.

Monday to Friday, 8:00 a.m. to 5:00 p.m.

Québec City region: **418-643-7620**

Montréal Region: **514-873-7620**

Elsewhere: **1-800-361-7620** (Québec, Canada, United States)

These numbers also give you access to the automated information system, which includes a variety of services and allows you to carry out certain transactions outside of office hours.

Happy reading!

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- Protecting the road network is a priority
- Fact sheet 1 – Québec roads: background information
- Fact sheet 2 – Bridges: an essential component of the road network
- Fact sheet 3 – Road design
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- Fact sheet 5 – Regulations governing loads
- Fact sheet 6 – Establishing the thaw period in Québec
- Fact sheet 7 – Load limits during the thaw period
- Fact sheet 8 – Road checks
- Frequently asked questions: pavements
- Frequently asked questions: vehicle loads
- Thaw zones in Québec (map)
- Location of frost probes (map)
- Thaw history: 1977- 2008
- Visual of the "En période de dégel – Roulez léger" (During the thaw period – Travel light) road sign



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ROADS IN QUÉBEC:
BACKGROUND INFORMATION

In post-industrial economies, social interaction and economic activity are closely related to the functionality of the road network. Québec is no exception to this rule.

The mission of the ministère des Transports du Québec (MTQ) is to ensure the mobility of people and goods throughout Québec on safe, efficient transportation systems that contribute to the sustainable social and economic development of Québec. The road network is one of these systems.

Thanks to the prevalence of a number of factors, it is crucial to understand the phenomena that modify the behaviour of road structures, in order to ensure the efficient and proactive management of these structures. These factors include demography, the increase in the vehicle fleet, the increase in the number of kilometres driven, especially over the past twenty years, and weather conditions that are unique to Québec.

The MTQ is responsible for maintaining approximately 29,000 km of road infrastructures, including autoroutes, national highways, regional highways, and collector roads. This road network, which is valued at several billion dollars, interconnects all of the regions of Québec, providing access to markets and resources. This network is vitally important in terms of supporting the Québec economy.

In fact, road travel is the preferred mode of travel for a significant percentage of the population, and for many shippers who transport goods to Québec, to other parts of Canada, and to the US market. The increased car population and the number of driving permits testify to the need of Québécois for mobility. Trips are higher in number, and are distributed differently across the territory, depending on the weather and the seasons.

Increase in demand

In Québec, the following increases have been observed between 1987 and 2007:

- the population has increased by 13%;
- the number of vehicles has increased by 52%;
- the number of driving permits has increased by 30%;
- the number of kilometres driven has increased by 61%;
- the number of kilometres driven involving heavy loads has increased by 79%.

During this same period, the length of the road network has changed very little. Some noteworthy improvements have been made to the existing network, particularly in terms the design of slow lanes, the redesign of intersections, and the widening of certain lanes.

Methods involving design, materials, construction techniques, quality control, and infrastructure management are all areas where knowledge has increased significantly. The understanding of phenomena that alter the behaviour of structures is essential in order to be able to face the demand that we are experiencing today.



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ROADS IN QUÉBEC:
BACKGROUND INFORMATION**A harsh climate**

In addition to the traffic volumes involving light vehicles and the loading methods for heavy cargo, a number of factors influence road design, the choice of materials, and pavement management. Some of these criteria are dictated by characteristics that are unique to Québec, where the road network is subject to particularly harsh weather conditions, with temperatures that are very cold in the winter and very hot in the summer. This creates variations of approximately 60°C during the year. In winter, when the ground freezes to depths varying from 1.2 to 3.0 metres for a period of more than four months, the temperature can change by as much as 25°C in only a few hours. This situation is obviously not good for the roads. In fact, a flash freeze in the winter or spring can cause premature deterioration of the pavement and the driving surfaces.

After resisting the effects of deformation caused by a deep freeze, the roadway must continue to support significant loads during the thaw period, when it is weakened by between 30% and 70% as a result water absorption. The immensity of the Québec territory, the low density of the population, the extremely harsh climate, and the intensity of traffic make Québec one of the places in the world where ensuring the quality of public travel through the effective conservation and management of a reliable road network remains a constant challenge!

Specific soil mechanics

The majority of the inhabited land in Québec is made up of clay materials that were deposited in ancient lakes and glacier seas during the last episode of Wisconsin glaciation. The design and construction of road infrastructures on this sensitive clay requires that geotechnical studies be conducted in order to verify the stability and bearing capacity of the soil, which is sometimes inadequate to support the presence of fill that is no more than two metres thick.

Geotechnical studies are also necessary in order to devise technical solutions to structural problems that affect the behaviour of pavements. Phenomena such as packing, lack of capacity, and support, especially in bogs, require road structure designs to be well adapted. The presence of numerous bogs in several regions of Québec is at the root of the expertise that the MTQ has developed with respect to construction on organic soil.

In fact, several research projects that were subsidized by the MTQ and carried out by Québec universities have made it possible to achieve significant progress in terms of improving the bearing capacity of clay. Experts from the MTQ's Laboratoire des chaussées (pavement laboratory) are also participating in the design and implementation of new techniques for consolidating clay soils. This work is even more important in light of the damage caused to the properties of the materials used for pavements and the supporting soil during the spring.



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STRUCTURES: AN ESSENTIAL COMPONENT OF THE ROAD NETWORK



The ministère des Transports is responsible for managing more than 9000 structures valued at approximately \$12 billion.

For the MTQ, any construction that is required in order to make way for a traffic lane, whether it involves a road or a railway, is considered to be a structure that is part of the MTQ's inventory, which includes overpasses, bridges over waterways, tunnels, retaining walls, and many culverts.

With respect to these structures, the MTQ strives to ensure the safety of users, to optimize the return on invested amounts, and to offer a level of service that satisfies the needs of users. In order to accomplish this, all transportation-related obligations involve the completion of six main activities: design, execution of the work, inventory, inspection, maintenance, and evaluation of bearing capacity.

The construction of bridges and viaducts as part of the Québec road network has been going on for many years. These structures have always been designed to support anticipated loads at the time of their design, but the number and weight of vehicles has increased over time, and therefore, bearing capacities vary from one structure to another.

Bridges and viaducts are subjected to systematic inspections and evaluations of load bearing capacity in order to ensure the safety of road network users and the protection of the structures. When necessary, repair, reinforcement, or reconstruction work is carried out.

In order to ensure public safety, and to preserve the integrity of the structures, sign panels are used to indicate the bearing capacity of structures that cannot support current loads with an adequate level of safety.

In fact, subsequent to the evaluation of the bearing capacity and the work being carried out, the situation in the field is constantly evolving. Signage panels may be removed, modified, or added.

The directory of bridges and overpasses that are subject to weight limits is available through the ministère des Transports du Québec website, under the heading "Companies – Trucking – Bridges". It contains information concerning structures that may constitute an obstacle to the free flow of heavy vehicle traffic as a result of their limited weight-bearing capacity.



For further information, please:

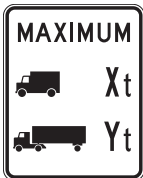
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STRUCTURES: AN ESSENTIAL COMPONENT OF THE ROAD NETWORK



The following signs are located along bridges and viaducts that have weight limitations.



The "Weight limit" sign informs truck drivers whose total weight load exceeds the maximum weight that is indicated on the sign that they are prohibited from travelling on a bridge. These signs also target buses, special mobile equipment, and equipment transport vehicles. The "X" indicates the total maximum load of a road vehicle, and the "Y" indicates the total maximum load for a variety of road vehicles.



The "Weight limit" sign informs truck drivers whose total weight load exceeds the maximum weight that is indicated on the sign that they are prohibited from travelling on a bridge. These signs also target buses, special mobile equipment, and equipment transport vehicles. The "X" indicates the total maximum load of a road vehicle, the "Y" indicates the total maximum load for a variety of road vehicles consisting of two units, and the "Z" indicates the total maximum load for a variety of road vehicles consisting of more than two units.



The "Weight limit" sign informs drivers of all road vehicles whose total weight load exceeds the maximum weight that is indicated on the sign that they are prohibited from travelling on a bridge. The "X" indicates the total maximum load of a road vehicle or all road vehicles.



The "Legal load weight limit" sign informs truck drivers whose total weight load exceeds the maximum weight limits stipulated in the *"Vehicle Load and Size Limits Regulation"* that is applicable to road vehicles and to all road vehicles that it is against the law for them to travel on certain bridges. This sign also targets special mobile equipment, and equipment transport vehicles.



The "Truck access prohibited" sign indicates no access for trucks. The shape of the truck also targets special mobile equipment, and equipment transport vehicles.



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PAVEMENT
DESIGN

The structure of pavement is simple in appearance only, with only a few layers visible above the ground. In reality, the design of pavement is dependent upon many variables, which makes it one of the most complex civil engineering structures in existence.

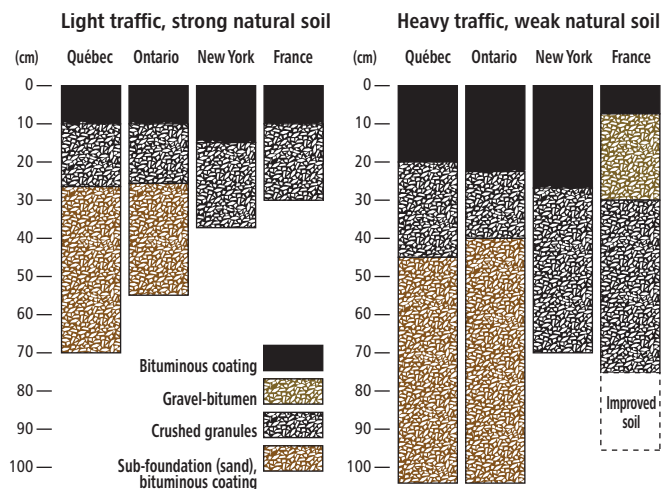
There are two main categories of pavements, which are divided according to their mechanical behaviour and the type of material used. Rigid pavement is characterized by a concrete cement driving surface. It reacts as a solid block, and experiences very little distortion under load. Flexible pavement, which is used more frequently in Québec, is covered with a coating or bituminous concrete, more commonly known as asphalt. This type of roadway experiences only slight distortion under the flow of traffic, and for all practical purposes, fully resumes its original shape after being run over by traffic.

Rigid pavement is generally well adapted to intense traffic, which is characterized by a high volume of intense weight. Flexible pavement adapts well to most traffic conditions.

The coating of the pavement contributes to increasing the structural capacity by reducing the impact of the weight that is transmitted to the underlying layers (foundation, sub-foundation, and ground). It also limits water penetration. Layering variable thicknesses of different materials, such as sand, gravel, and crushed stone, also counters the effect of freezing on the ground. The useful life of flexible pavement prior to major renovations is generally between 15 and 20 years. The thicknesses and types of materials used are determined based on the type of road that is being constructed, the traffic, the ground, and the specific weather conditions.

The design method provides for the use of a series of equations, with factors that are adapted to the Québec context, taking into consideration the following elements:

- Climatic conditions (temperature, humidity). The thaw period is critical: the same truck axle can cause 5 to 8 times more damage in spring than in summer.
- The characteristics of the soil at the site.



Once the calculations have been carried out, the loads and deformation that are liable to be transmitted to each layer are compared to the bearing capacity of each layer.

Higher loads on thin layers or poorly resistant materials can cause cracks in the surface or permanent deformations in the pavement. For example, a 20% increase in load translates into a more than 100% increase in damage, which is why it is important to design the roadway properly to and accurately anticipate the evolution of the traffic.

The effect of freezing on the pavement can cause swelling, which directly affects the quality of driving. An adequate thickness of materials that is insensitive to the effects of freezing may be effective under such circumstances. The use of other pavement insulation techniques is sometimes necessary when the bearing soil deforms under the effect of freezing. Finally, the process is completed by analyzing the cost of the various options.

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PAVEMENT
DESIGN**Changing practices**

There are significant differences between roadway structures in different countries, which may seem surprising. However, these differences are inevitable, because the soil, the climate, the traffic, the materials used, and the costs are often very different. In light of this, comparison can be dangerous, as can importing technologies without conducting an in-depth analysis.

In Québec, the structure of pavement that is designed using proven design methods and parameters compare advantageously to those that are often cited as examples. Considering its unique context and traffic flow, Québec clearly ranks first in terms of the total thickness of the materials that make up its road structures.

Design methods and knowledge of pavement design are rapidly evolving, and new technologies and new products are emerging. In order to optimize the use of these new processes, and to reduce the risk of failure, in the 1990's the MTQ launched a meticulous monitoring program with respect to the performance of pavements, in order to document the evolution of the behaviour of pavements in the Québec context. This innovative approach has made it possible to establish a knowledge base for optimizing design methods and interventions on the road network. A number of pilot projects conducted by the MTQ, in collaboration with specialized companies, have made it possible to define the usage potential of various pavement construction and repair techniques. The development and increasingly common use of techniques including the recycling of roadway materials, and thermal insulation techniques for reducing the negative effects of freezing on the behaviour of pavements are examples of these projects.



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THE EFFECTS OF
CLIMATE ON PAVEMENT

Although they may seem simple at first glance, roads represent structures that cover extensive expanses of land and exhibit complex behaviour. Understanding and analyzing this behaviour is one of the greatest challenges in civil engineering.

The personality of pavement

There are two main families of pavement, divided according to the type of coating used: bitumen-coated flexible pavement (asphalt), which makes up more than 90% of the road network; and rigid pavement with a concrete cement surface, which covers 4% of the network. Figure 1 illustrates a cross-section of a roadway that can accommodate both types of structures. The choice of the most appropriate type and design of the pavement depends on a number of factors, including the anticipated intensity of traffic, the types of soil, the climate, the cost, and the local availability of construction materials.

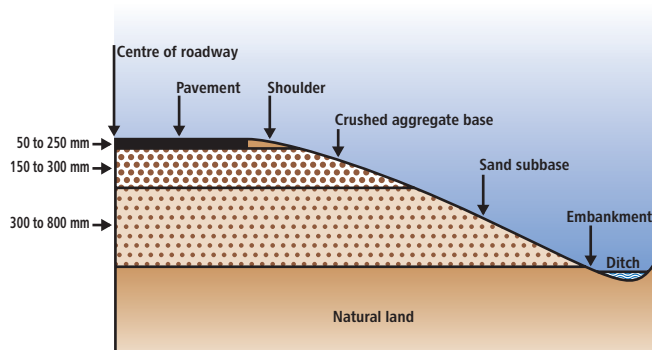


Figure 1: Example of a typical pavement section

Working structures

The state of a pavement is evaluated according to certain defects that evolve over time and with wear. The following elements are often referred to in order to describe these defects:

1. Evenness, which is used to define the comfort of the ride, comprises defects that are perceived as waves due to their inherent peaks and valleys;



2. Ruts form, and the surface in the tire tracks weakens;



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THE EFFECTS OF
CLIMATE ON PAVEMENT

3. Cracking worsens, and other breaks appear on the surface.



Every pavement behaves differently, according to the nature of the underlying soil, the position of the water table, the thickness of the layers, the climate, the type and shape of the pavement, the characteristics of the construction materials, and traffic, among other factors. It is essential that all of these parameters be taken into considerations in order to adequately diagnose the causes of deterioration.

Understanding the phenomena of pavement deterioration makes it possible to find better solutions to counteract it.

In a Nordic land

Québec experiences temperature variances of 60° to 70° C. In fact, the temperature can drop as low as -30° C in winter, and rise above 30° C in summer. In winter, the ground freezes to a depth of between 1.2 and 3.0 metres, which is much thicker than roadway structures, which average 90-cm in thickness.

The following table compares the Québec context with that of Ontario, New York State, and France. Two important features emerge from this comparison: the harshness of the climate; and the extensiveness of the Québec road network compared with the number of inhabitants.

State-managed road network: comparison between administrations

	Québec	Ontario	New York	France
Length of the road network (km)	29 000	19 600	24 200	38 300
Number of inhabitants (millions)	7,5	12,7	19,3	63,4
Average annual precipitation (mm)	1000	850	750	800
Frost duration (days/year)	147 to 218	100 to 200	10 to 100	0 to 90
Frost depth (m)	1,2 to 3	1 to 2,6	Less than 1,4	0 to 0,5



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THE EFFECTS OF
CLIMATE ON PAVEMENT**Solutions adapted to the climate**

Bitumen that is adapted to the climate must be used to prevent the coating from becoming too brittle in the winter and to allow it to remain sturdy enough in summer.

Drainage ditches along roads and the elevation of pavement represent means that are widely used to reduce the risk of the water table rising up to the road level. In some cases, it is necessary to install specific drainage devices, including gravel, synthetic membranes, or underground drains that allow water to be expelled outside of the structure.

It is also often necessary to protect soil that is susceptible to freezing by sheltering it from the cold. Accordingly, the thickness of the layers of sand and gravel on the northern roads is greater than on roads in warmer regions.

On occasion, deeper excavation is required in order to remove the problematic soil and replace it with soil that is less susceptible to frost. The soil is sometimes stabilized by means of a chemical product, such as lime. In certain cases, an insulated layer is inserted into the pavement in order to deter the penetration of frost. The insulating layers may be composed of high-density polystyrene, insulating concrete, or other insulating products.

The use of certain devices or special products incurs additional costs, but they make it possible to generate substantial long-term savings. Therefore, these methods are only used if the financial gain that is attributable to the extended useful life of the pavement is beneficial in comparison with the initial investment.

Advantages and disadvantages of flexible pavements

With the effects of the cold, frost penetration occurs gradually from top to bottom in the soil (see Figure 2), and damages the structure. Under certain unfavourable conditions, the water in the unfrozen soil may be sucked into the frozen zone. This pumping of water from the water table results in the formation of ice lenses, which cause the pavement to heave.



Ice lenses in this soil sample appear as white areas

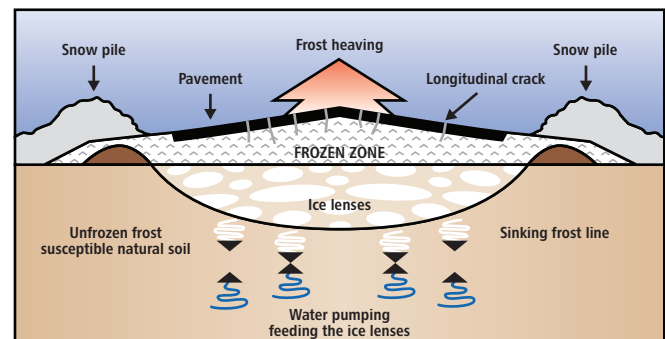


Figure 2: Effects of freeze and thaw cycles on a road

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4

THE EFFECTS OF
CLIMATE ON PAVEMENT

A) Frost heaving

Because of their size, these lenses can lift the pavement by as much as 20 cm. These frost heaves are often unequal, which explains the peaks and valleys that are more pronounced at the end of winter, when the frost depth is at its maximum.



This pavement is lifted by as much as 20 cm.

These lenses also have the effect of folding the pavement, which resulting in the appearance of frost cracks that are more or less longitudinal. Furthermore, like with any other material, the coating hardens, becomes brittle, and contracts under the effects of the cold. By shrinking over extended lengths, the coating is subjected to tension strains that cause it to break, which produces transversal cracks.

The pavement must endure even more after this point, because this is followed by the spring thaw, which also occurs from top to bottom. Large quantities of water from the melting snow on the surface and the melting ice lenses inside the roadway are found in the layer of thawed soil. This water is then trapped in the ground as a result of the frozen bottom layer, which is sealed (see Figure 3).



Longitudinal cracking, as depicted in Figure 2

B) Weakening caused by thawing

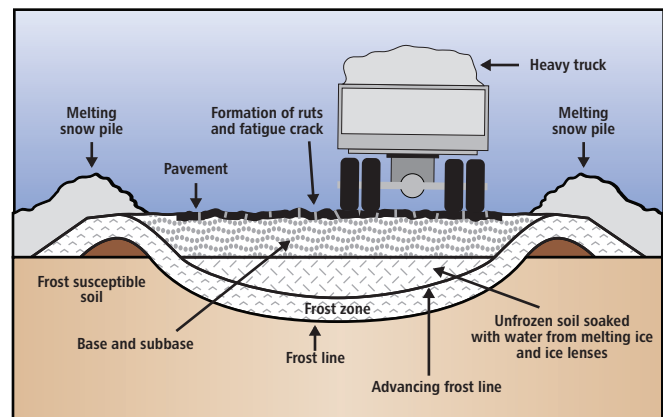


Figure 3: Effect of traffic during the thaw

As a result, the roadway retains only 30% to 70% of its normal summer resistance. Therefore, load restrictions must be imposed on heavy vehicles in order to limit damage during the thaw.

The roadway drains during the summer, and the cycle repeats itself every year, causing further deterioration. The damage accelerates over time, because the appearance of small defects creates additional zones of weakness, which allows more water to penetrate. These zones worsen and propagate more quickly over time. As a result, life in the north is far from relaxing, even for pavement.

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5

REGULATIONS
GOVERNING LOADS

The Vehicle Load and Size Limits Regulation specifies the various load limits based on axle category (weight per axle) and vehicle category (total load mass), among other things. The main purpose of this Regulation is to prevent the premature deterioration of road infrastructures that can be caused by vehicles carrying excessive loads.

Regulations governing vehicle loads and sizes must take into consideration not only the costs and economic benefits, but also constraints related to road safety and the environment. We must not ignore the fact that load limits directly affect the number of vehicles on the road and the choice of transportation mode.

The economic importance of transportation

With the globalization of markets, Québec industries must become increasingly competitive. Transportation costs represent a significant portion of the total production cost of a manufactured product. Furthermore, in order to enable Québec to remain competitive, the ministère des Transports must provide infrastructures that facilitate the transport of goods at the lowest possible cost. Among all of the available modes, road transport remains the uncontested preference among a significant number of shippers, primarily because of its flexibility, speed, and competitive costs. However, shippers and carriers who opt for trucking must deal with constraints in terms of authorized weight limits.

It has been demonstrated that higher weight limits would result in more rapid deterioration of the road network, but would boost the economy. On the other hand, lower weight limits make it possible to decrease the costs associated with maintaining the road network, but are harmful to several economic sectors. In light of this, it is essential to find a balance between the two positions.

Major trade corridors



Maritimes – Québec – Ontario – Midwest



Québec – New England



Québec – New York

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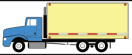
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REGULATIONS
GOVERNING LOADS

TABLE 1 : Axle Load Limit

Class and description			Period		Reduction
			Normal	Thaw	
B.10	Single axle		10 000 kg	8 000 kg	20 %
B.21	Tandem axle	 $d \geq 1,2 \text{ m}$	18 000 kg	15 500 kg	14 %
B.32	Triple axle or equivalent group of axles	 $3,0 \text{ m} \leq d < 3,6 \text{ m}$	24 000 kg	21 000 kg	13 %
B.44	Self-Steering axle in front of a triple axle	 $b \geq 2,4 \text{ m}$ $3,0 \text{ m} \leq c < 3,6 \text{ m}$	32 000 kg	27 500 kg	14 %

TABLE 2 : Gross Vehicle Weight Limit

Type of Vehicle	Period		Reduction
	Normal	Thaw	
	25 250 kg	22 750 kg	10 %
	41 500 kg	36 500 kg	12 %
	49 500 kg	43 000 kg	12 %
	55 500 kg	48 500 kg	13 %
	62 500 kg	57 500 kg	8 %



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REGULATIONS
GOVERNING LOADS**Method for establishing the *axle load***

The maximum load authorized for each axle category is the smallest of the following three values:

- The sum of the capacity of all tires (indicated on the side of the tire by the manufacturer);
- The load capacity of the front axle;
- The load limit stipulated in the Regulation according to the axle category. This limit varies depending on the season (normal or thaw).

Method for establishing the *total loaded mass*

The total loaded mass that is established for road vehicles and combinations of road vehicles is the smaller of the following two values:

- The sum of the maximum loads authorized for each axle category. This limit varies depending on the season (normal or thaw);
- The total loaded mass limit for the category of road vehicles or combinations of road vehicles, as stipulated in the Regulation.

Decreasing load limits

Over the past 15 years, load limits for heavy vehicles have been reduced by an average of 2,000 kg for vehicles with three or more axles. These decreases, which were born of a desire to harmonize standards, to promote top-performing vehicles in terms of road safety, and to protect the road network, were introduced gradually in 1991, 1995, 1998, 2002, and 2006. Several types of vehicles have been targeted by these major weight reductions, and the limits are now lower than they have ever been. For example, the total loaded mass for a vehicle with a dumping mechanism and 10 wheels dropped from 28,500 kg to 25 250 kg, which represents a decrease of 3,250 kg, or 11.4%.

Data from trucking surveys indicates that only 20% of vehicles drive with the authorized maximum load. In other cases, vehicles drive with either no load, a partial load, or a load that is restricted by volume.

A road vehicle or combination of road vehicles that does not respect the limits that are stipulated in this Regulation is not permitted to drive on the roads unless the owner, lessee, or operator obtains a special permit to drive under these circumstances. However, it is important to note that the vast majority of special permits that are issued in connection with loads are suspended during the thaw. Special permits that are valid during the thaw are mainly for vehicle configurations that are not covered by the law (e.g.: cranes) and permits that are issued under the terms of experimental programs (e.g.: vehicles with wide tires).

Other administrations

As a general rule, the standards that are applied by neighbouring administrations tend to influence each other. In fact, the load limits in Québec are either comparable to or more severe than those that apply in other Canadian administrations.

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AN OVERVIEW OF
THE THAW PERIOD IN QUÉBEC

In Québec, the freeze period generally extends from the end of November to mid-March, at which time the temperature begins to warm up considerably, rising above the freezing point. The longer periods of sunlight allow the thawing process to begin, starting with the surface layer of the pavement.

During this spring thaw period, the load limits that are permitted for heavy vehicles are reduced in order to protect the road network at the time when its bearing capacity is at its weakest. *The Vehicle Load and Size Limits Regulation* specifies the applicable restrictions. These decreases in load limits range from 12% to 20%, depending on the axle category.

Some milestones in the history of the thaw

The first provisions respecting load restrictions during the thaw period date back to 1955. The laws governing heavy traffic on certain roads in the province originated at that time, with the adoption of the Motor Vehicles Act. This law conferred upon the Roads Minister the authority to establish load reductions of 50% during the thaw or rainy period.

Starting in 1968, the ministère des Transports decided to follow the progress of the thaw period more methodically by placing frost probes in the pavement.

The starting and ending dates of the thaw period have been systematically recorded since 1977, as indicated on the table entitled "History of the thaw – 1977-2009".

Determination of thaw zones and dates

In order to follow the progress of the thaw and to accurately determine the starting and ending dates of the thaw period, the MTQ uses more than ninety (90) frost probes throughout the territory of Québec.

Since 1991, there have been three thaw zones in Québec, where the starting and ending dates of the load restrictions are slightly different. This division of the Québec territory into three zones was established by taking into consideration geographic realities, including the normal frost depth and the progress of the thaw in the various regions, spring weather conditions, and the circulation of heavy vehicles in the east-west corridor.

The determination of the restricted load period relates to the results of the frost probes and the analysis of weather forecasts. This information is carefully evaluated in accordance with the roadway freeze and thaw monitoring procedure that the MTQ has adopted in order to determine the thaw period.

Pursuant to Section 419 of the Highway Safety Code, the Québec Minister of Transport establishes the dates and zones where restrictions are applicable, by virtue of an order published in the *Gazette officielle du Québec*.



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AN OVERVIEW OF
THE THAW PERIOD IN QUÉBEC**The frost probe**

A frost probe is a simple instrument that is used to measure the depth of the frost and the thaw within the pavement structure. It consists of two concentric tubes that are placed vertically in the roadway.



The outer tube, which is made from hard PVC, is closed at the bottom, and the top end is equipped with a surface plate, a cap, and anchor stems.

The "inner tube", which is commonly known as the "frost tube", is made from clear vinyl, and is closed at both ends. It contains a solution of water and xylene cyanol, which reacts to frost.

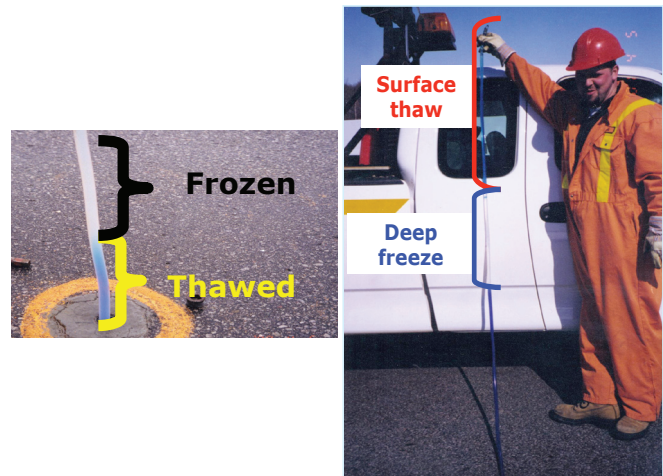


Installing a frost probe in the pavement

How the frost probe works

When frost penetrates the pavement, the low-concentration solution separates and remains in the liquid section of the tube.

Therefore, by pulling out the tube, the colour contrast makes it possible to distinguish the colourless portion (pure water), which is frozen, from the blue portion (concentrated solution), which is not frozen. The phenomenon is reversible, which means that the progress of the freeze and the thaw can be monitored over time.

**"Reading" the frost probe**

The start of the thaw period is established when 30% of the frost probes indicate that the depth of the thaw in a given zone has reached more than 30 cm. The end of the thaw period is determined five weeks after the depth of the thaw in a given zone has reached an average of 90 cm. This procedure was established using the measurements of bearing capacity that are conducted by the MTQ on various sections of the road network. These measurements make it possible to establish a link between the depth of thaw on a pavement and the reduction in its bearing capacity.



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AN OVERVIEW OF
THE THAW PERIOD IN QUÉBEC**Progress of the thaw in the pavement**

The load restriction period is divided into two phases:

- The first phase relates to the thawing of the soil from the surface to the lower stratum. During this phase, the bearing capacity of the road is reduced significantly. In fact, the water that is produced in the soil during the thaw is held captive by the underlying layers of soil, which are still frozen.
- The second phase involves the recovery of resistance by the pavement, which continues once the ground has thawed completely. This recovery requires the expulsion of the quantities of water that were produced during the thaw period.

The ambient temperature has a considerable impact on the first phase of the thaw, which essentially corresponds to the first weeks of the weight restrictions. Therefore, the temperature has a lesser effect during the second phase, which is the recovery period.

Comparison with other administrations

Most Canadian administrations apply weight restrictions on their networks during the thaw period. Similarly, nineteen of the northern states in the US apply the same types of restrictions. Most administrations that enforce weight restrictions during the thaw period do not enforce restrictions on their main network, with the exception of loads for non-standard vehicles. Only Québec imposes such restrictions on all of its public roads.

Québec justifies its position in light of the following factors:

- The significant depth of the frost;
- The aging of its road network;
- The difficulties that are encountered in terms of controlling load limits on the secondary and municipal road network.

Re-evaluating load restrictions

Québec carried out a complete re-evaluation of the thaw issue at the request of the Québec industry (carriers and shippers) and other Canadian administrations. This re-evaluation process revealed the following facts:

- The costs that are incurred by industry as a result of load restrictions during the thaw period are comparable to the additional maintenance costs that would be incurred for the road network if the load restrictions were lifted;
- Therefore, the imposition of load restrictions during the thaw period is fully justified, and a partial lifting of the restrictions, applicable only to the main network, is difficult to envision;
- The MTQ is aware of the inconvenience that is caused by load restrictions during the thaw period, but it must ensure optimal protection of pavements, which become more fragile during the thaw period, in order to maintain the quality of this public good at the highest level possible.



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LOAD RESTRICTIONS
DURING THE THAW PERIOD

In winter, climatic conditions in Québec are particularly harsh. Depending on the region, the ground freezes to a depth of between 1.2 and 3 metres for more than 4 months. Combined with sudden changes in temperature and humidity, this freezing has a significant impact on the behaviour of pavements. The freeze and thaw cycles also contribute to making pavements more vulnerable.

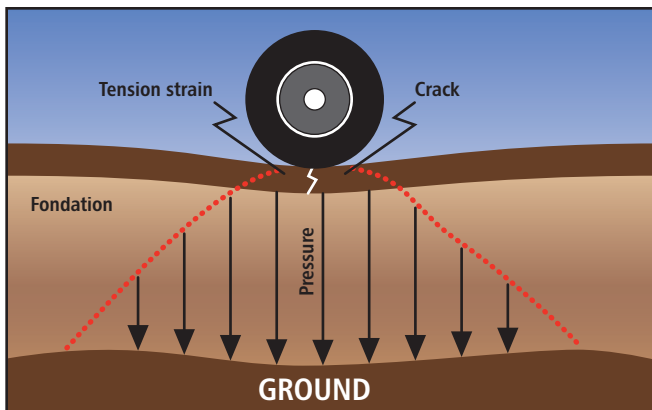


Figure 4: Reaction of pavement under the load

In spring, the layers of materials that make up the pavement are weakened by the accumulation of water caused by melting ice. Studies conducted by the MTQ pertaining to the bearing capacity of roads have demonstrated that the reactions of the pavement under a load at this time are 50% to 70% more pronounced than those recorded during the summer.

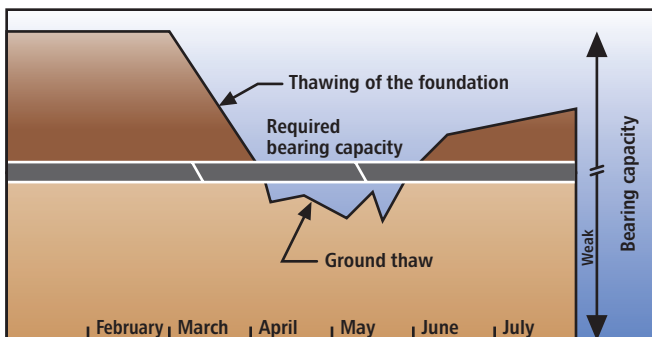


Figure 5: Evolution of the bearing capacity of pavements

At any time during the year, a vehicle that is overloaded by 25% will cause a corresponding increase in damage on the order of 150%. During the thaw period, this phenomenon is intensified, and the same load on an axle can cause a tension strain that is 5 to 8 times higher than during normal periods.

Therefore, the impact of heavy transport during the thaw period is greater, due to the fact that the number of commercial vehicles has increased significantly over the years. For this reason, *the Vehicle Load and Size Limits Regulation* requires carriers to lighten their loads.

These restrictions are not necessarily meant to slow the appearance of surface damage such as potholes, but rather to prevent the deterioration of the structure of the pavement, which often causes lifting and a decrease in the quality of the evenness.

During the thaw period, roads are 30% to 70% more fragile than during normal periods, and a single overloaded truck can cause major damage.

In order to minimize the deterioration of pavement during this period, the ministère des Transports subjects road carriers to more restrictive regulations with respect to the weight of their vehicles.



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ROAD CHECKS



The compliance of loads carried by heavy vehicles is verified by traffic controllers from the agence Contrôleur routier Québec, which reports to the Société de l'assurance automobile du Québec. For these 320 controllers, who are distributed throughout the province, the thaw period represents an intensive period of weighing operations. In order to carry out their work, the controllers rely on 32 traffic control stations and 550 portable weighing devices.

In an effort to prevent the risk of accidents and to adequately protect the road network, the controllers apply a strict compliance policy. Therefore, in keeping with this approach, any vehicle that is non-compliant or overweight, or that poses a risk, is not permitted to resume its journey until it complies with the regulations. If a truck is overweight, the operator must distribute the weight over the axles more evenly or unload the excess weight before the truck can resume its journey.

An overweight truck not only damages the road network, but also contributes to modifying the behaviour of the truck on the road, which makes it less safe. It is essential to respect the vehicle load limit in order to ensure the safety of all road users, and to protect the road network.

In the context of their mandate, which entails improving the safety of road users, overseeing the protection of the road network, and promoting competitive equity among transportation companies, traffic controllers apply the 9 laws and 27 regulations that govern the road transportation of people and goods, including the following:

- All of the provisions of the Highway Safety Code;
- The Act respecting owners, operators and drivers of heavy vehicles;
- The various laws governing road transportation;
- The Fuel Tax Act;
- The Environment Quality Act;
- The Criminal Code.

ROAD CHECK STATIONS AND LOCATIONS

Amos	111 North
Baie Saint-Paul	138 East
Boucherville	20 West
Brossard	10 West
Cabano	185 North
Candiac	15 North
Chambord	169 South
Laval	13 South
Laval	25 South
Les Cèdres	20 East
Lévis (Saint-Étienne-de-Lauzon)	73 North
Lévis (Saint-Nicolas)	20 West
L'Islet	20 East
Litchfield	148 East
Lochaber	148 West
New Richmond	132 East
Pointe-Lebel	138 East
Québec (Charlesbourg)	73 South
Rouyn-Noranda	117 South
Saguenay (Chicoutimi)	175 North
Saint-Augustin-de-Desmaures	40 East
Saint-Augustin-de-Desmaures	40 West
Saint-Bernard-de-Lacolle	15 North
Saint-Célestin	55 North
Saint-Étienne-des-Grès	55 South
Saint-Mathieu-de-Beloeil	20 East
Sherbrooke (Ascot)	108 West
Sherbrooke (Deauville)	10 East
Trois-Pistoles	132 West
Trois-Rivières	40 East
Val-d'Or (Louvicourt)	117 South
Vaudreuil-Dorion	40 East

Traffic controllers also use approximately twenty traffic control areas, which are secure sites where heavy vehicles are inspected. These traffic control areas are located throughout Québec.

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ROAD CHECKS



Some statistics

- Between 1990 and 2007, the number of heavy trucks (over 3,000 kg) increased by 16.7% in Québec, from 98,748 to 115,236.
- In addition to heavy vehicles that are registered in Québec, traffic controllers inspect approximately 8,000 vehicles that are used to transport people and goods that are registered in another province or state every year.
- Over the past three years, Contrôle routier Québec has verified the weight of approximately 1.7 million heavy vehicles and 296,000 combinations of heavy vehicles. Statistical data indicate an overall truck compliance rate of approximately 98% in terms of authorized mass. During the thaw period, this percentage drops to 72%.
- This drop in the compliance rate during the thaw period can be explained by the application of additional load restrictions. This situation has resulted in a certain number of truckers adopting the habit of transporting a partial load or a volume-restricted load, thereby ensuring that their loads are within the authorized limit. As a result, the percentage of trucks carrying the maximum authorized load increases from 20% under normal circumstances to 33% during the thaw period.
- In 2007, 11,230 heavy trucks were weighed in the context of "Opération dégel". During this period, a total of 3,497 violation notices pertaining to overloaded axles or excess total mass were issued. The majority of violations that were cited involved overloaded axles, which accounted for 76% of all overload violations issued.



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FREQUENTLY ASKED QUESTIONS: PAVEMENTS



1. What types of bituminous coatings (asphalt) are used on Québec roads?

Bituminous coatings are generally composed of several layers that contain different types of asphalt. There are many combinations of bituminous mixtures, but there are approximately ten that are more commonly used, depending on the purpose of the layer. The “base” normally consists of a more granular mixture that has excellent structural qualities. The mixtures that are used for the surface must provide characteristics that ensure adequate skid resistance, driving comfort, and increased resistance to wear.

2. Where do potholes come from, and how are they formed?

Potholes represent the final step in a series of surface deterioration phenomena on a pavement.

Events occur in the following sequence:

- The appearance of cracks, which may have been caused by a number of factors, including intense traffic, the freeze/thaw cycle, production defects, etc.;
- Deterioration of the cracks due to a concentration of constraints under the effect of traffic, and the appearance of multiple cracks;
- Infiltration of water and brine, which contributes to a reduction in the bearing capacity of the foundation and the acceleration of the deterioration process;
- The freeze/thaw cycle accelerates the deterioration;
- The effects of traffic: dynamic impacts, the number of vehicles, and the severity of the phenomena described above are all factors that determine the rate at which potholes appear.

A computer simulation on the MTQ website site clearly illustrates the phenomena that lead to the formation of a pothole.

3. Given the climatic conditions in Québec, is it possible to avoid the appearance of potholes?

Generally speaking, the formation of a pothole is closely related to the state of the pavement. Therefore, the risk of a pothole appearing is related to the degree of cracking of the coating, traffic use, and the amount of water that is liable to penetrate beneath the coating. Maintenance work to keep the pavement in good condition is the best way to prevent the formation of potholes.

In light of this, it is possible to prevent the appearance of potholes if pavements are adapted to local weather conditions, if they are not subjected to a more intense traffic condition than they were designed for, and if it is possible to maintain them adequately within the necessary timelines.

It is important to remember that the restrictions that are placed on the loads carried by heavy vehicles during the thaw period are not intended to ensure the protection of the driving surface, which is affected by all vehicles (for example, a road in a residential district where heavy trucks do not drive may be covered in potholes), but rather to preserve the actual structure of the road.

4. What is the life expectancy of a “cold asphalt” repair compared with a “hot asphalt” repair?

Repairs made using cold asphalt are generally carried out as an emergency measure. The primary purpose of these repairs is to ensure user safety. The lifespan of this work is generally less than one year, and it is often necessary to implement corrective measures during the summer. This is why the use of hot asphalt is strongly recommended during the winter.

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FREQUENTLY ASKED QUESTIONS: PAVEMENTS



No matter what the season, it is important to follow good repair practices, which entails drying the crack or hole and installing an anchoring binding. By following this procedure, it is possible to ensure that the repair will enjoy a maximum life span of between 2 and 5 years. Repair work that is carried out during the summer generally lasts the longest.

A technical newsletter that is published by the Direction du laboratoire des chaussées (pavement laboratory division) deals specifically with this topic. It can be consulted online on the MTQ Website.

5. How long is a repair to the top layer of the coating (driving surface) expected to last?

The useful life of a 40 to 50 mm thick asphalt coating for pavement that actually support the traffic that it was designed for, and for high traffic roads (national highways and autoroutes), varies between 9 and 14 years. For roads that are used less, or on which the maximum speed limit is lower, the expected lifespan of the surface is approximately 15 years. For the most part, these data correspond to the generally accepted standard for a road surface repair.

Furthermore, considering the fact that traffic flow has a direct impact on the useful life of pavement, the service demand on the MTQ-administered road network is evaluated every year. Traffic data are collected, processed, analyzed, and validated. Updating the databank makes it possible to anticipate the evolution of the condition of the road network.

6. Given the climatic conditions in Québec, how is it possible to improve the condition of highways and roads?

It is essential to establish intervention strategies throughout the network, and to set specific objectives, in order to be able to effectively improve the quality of roads.

Nevertheless, the optimization of interventions throughout the network requires a prior knowledge of the specific condition of the roads, in order to determine what work is most appropriate. Once it is compiled in a road management system, all of this information makes it possible to establish the performance of the various maintenance scenarios in accordance with the allocated budgets, and to make short-, medium-, and long-term projections for the attainment of upgrading objectives.

Improving the quality of interventions also involves the use of materials that are adapted to traffic wear and weather conditions. The steps involved in the design and a meticulous approach to the achievement of the work also represent determining factors that promote the longevity of repair and maintenance interventions.

7. Why does the quality of roads vary so much within a region?

Each level of administration, from municipalities to the MTQ, is responsible for maintaining its road network. As such, each administration determines its objectives and manages its budgets according to these objectives. In general, the need for maintenance work relates to the age and level of use of the network, which sometimes varies considerably from one location to another.



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FREQUENTLY ASKED QUESTIONS: PAVEMENTS



A significant portion of the extensive road network, which is the responsibility of the MTQ, was built in the 1960s and 1970s. Several segments, which are also more heavily used than the municipal network, are currently in need of major repairs. In the current context, where maintenance needs for the aging superior network are significant, the primary objective of the MTQ is to ensure and improve safety for road users. Therefore, an intervention to fix ruts that may cause aquaplaning will be favoured over an intervention aimed at improving comfort.

The MTQ closely monitors the evolution of the conditions of the road network in accordance with the amounts allocated for its preservation. By acting in this manner, Quebec taxpayers are ensured that their investments will be optimized.

8. Does the ministère des Transports du Québec conduct research in the areas of technologies or innovation of components?

The MTQ is very active in research and development as it pertains to new ways of contributing to improving its activities involving the road network. For example, since the early 1990s, the MTQ has been monitoring the performance of specific work carried out on segments that are deemed to be representative of its road network. This approach will enable it to evaluate the potential for using various techniques and products, or to validate their application. The following is a list of research projects that were conducted by the MTQ that made it possible to improve the quality of work pertaining to pavements:

- Research pertaining to bitumen and asphalt, which made it possible to establish the criteria for choosing asphalt according to the climatic conditions that are found in Québec. This work leads to the maximized performance of bituminous asphalt;
- Reusing materials from the demolition of roadways. This practice is used in major projects, especially in the Greater Montréal Area. Concrete elements such as slabs, curbs, bases for light standards, etc... are crushed and reused as aggregates. These aggregates are used to manufacture sub-layers for the reconstruction of pavements. Several thousand tonnes of materials have been reused since 1998. This approach is in keeping with the objectives of the Ministère du Développement durable, de l'Environnement et des Parcs, and those of the MTQ, in terms of recycled materials and reducing the impact of work on the environment;
- The use of a thermal insulator on sections of the road network where major problems have been reported in connection with thawing. The use of insulators, which was done on an experimental basis only a few years ago, has now become a proven, reliable, and economical technique for providing definitive solutions to some specific contexts, and has even been adopted as a standard;
- The recycling of bituminous coatings during pavement repairs, which began in the 1990s, is now a common practice in both urban and rural settings. Accordingly, more than 1,000 km of roads in the MTQ network have been repaired using this technique. This work, which is carried out in a variety of contexts, has clearly demonstrated the performance and profitability of this approach.



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FREQUENTLY ASKED QUESTIONS: PAVEMENTS



9. How is it possible that a Nordic land like Québec has not yet refined a recipe for “high performance” asphalt?

In the first place, it is important to mention that “indestructible asphalt” does not exist anywhere in the world. Nevertheless, Québec has recorded significant gains in the field of asphalt over the past 15 years. In fact, the MTQ has participated in major North-American research projects that have made it possible to refine new methods for designing bituminous mixtures that are better adapted to our climatic context.

Work that has been carried out by the MTQ, in collaboration with various research organizations, including universities, has also made it possible to significantly improve roadway design methods. Better designed roads offer better resistance to the onset of heavy traffic, and are less vulnerable to the effects of freezing and thawing.

The MTQ has also contributed to the development of roadway assessment methods. This research has made it possible to develop new equipment for evaluating the bearing capacity of roads, and to automatically measure the cracking and evenness of roads. These methods, which are more reliable and more productive, allow for more precise results and diagnoses, which in turn lead to better adapted intervention choices.

10. What steps does the ministère des Transports take during the construction of a new road?

The execution of a road project by the MTQ represents the culmination of several months of sustained study, collaboration, and discussion among numerous participating stakeholders. From the moment when the opportunity study is tabled until the request for proposals documents are accepted, the project manager must plan and organize consultations, and request studies, surveys, authorizations, acquisitions, and the relocation of obstacles that are located inside the rights-of-way.

Roadway design requires that the following elements be taken into consideration, among others:

- The geological, hydric, and geotechnical context of the site that has been selected for the work;
- The anticipated level of traffic and the local climatic characteristics;
- The choice of materials. Economic analyses of the various options under consideration make it possible to make an informed choice in order to attain the targeted quality objectives;
- The insulation of pavements, the calculation of the reuse of fill, urban drainage (lane sizing, location of drainage grids), the relocation of public services as required, etc.

The MTQ's Guide de préparation des projets routiers, which is intended mainly for technical personnel, is the reference tool pertaining to this topic. The Guide reviews the activities that are most often carried out during the project preparation process.

The Guide can be consulted online on the MTQ Website



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FREQUENTLY ASKED QUESTIONS: VEHICLE LOADS



1. Are authorized load limits in Québec higher than elsewhere?

Authorized load limits in Québec are comparable to those of neighbouring authorities. In recent years, Québec has made considerable efforts to harmonize its load limits with those that are in effect among its commercial partners.

Over the past fifteen years, load restrictions have been reduced by an average of 2,000 kg for vehicles with three or more axles. This purpose of these significant reductions is to protect road infrastructures and to improve safety for all road users.

2. Considering the increase in heavy vehicle traffic in recent years, can the Québec road network adequately support this additional demand?

Road structures are designed to withstand a certain level of use. In other words, they must be able to support a foreseeable amount of vehicle traffic, including trucks, over a given period of time before the road requires total or partial reconstruction. Therefore, the useful life of a road depends on whether or not the anticipated number of trips has been attained.

A faster than anticipated increase in traffic will result in a faster than anticipated deterioration of the roadway, which will decrease its longevity. Lower than anticipated use may have the opposite effect.

Therefore, a level of use that differs from the scenarios that were considered at the outset will affect the evolution of the network. We are aware that not all Québec roadways are designed to respond to the traffic that we are experiencing today, and this influences the behaviour of these roads. In light of this, the MTQ has acquired road monitoring and management tools, and has implemented intervention strategies aimed at ensuring the longevity of existing structures.

3. Why are special permits issued?

If the size of a vehicle or the load exceeds those that are permitted pursuant to *the Vehicle Load and Size Limits Regulation*, a special traffic permit must be obtained. The Regulation respecting special permits establishes the conditions that must be respected by a vehicle that is oversized due to its manufacture or indivisible load. There are 7 classes and 2 categories of special permits.

When justified by exceptional circumstances, the MTQ may issue special traffic permits, in accordance with Section 633 of the Highway Safety Code. These permits authorize circulation by vehicles that are oversized in terms of load or size. They are issued primarily in order to enable the circulation of experimental vehicles, to harmonize Québec standards with those of other North-American administrations, or to give the industry time to adapt to a specific situation.

4. Why are allowances applied?

Allowances are only applied in a limited number of situations. In terms of applying certain provisions in the law, these allowances make it possible to take into consideration difficulties in evaluating certain loads by carriers, the margin of error for custom equipment, load variations during transport, and allowances granted to carriers by the courts (reasonable diligence).

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FREQUENTLY ASKED QUESTIONS: VEHICLE LOADS



For example, several factors can influence the total mass that is loaded onto a series of vehicles in the tree-length wood industry. The type of fuel used, the moisture level of the wood (which may vary between the time of loading and the time of the inspection), the cutting location, the type of soil, exposure to the sun, and the time that elapses between cutting and transport are all elements that may cause variations in the density of the materials being transported. The size of the trees, the way they are arranged on the vehicle, and the absence of a scale at the loading site are all factors that may directly impact the evaluation by the carrier of the wood load that is being transported. These allowances are applied at the discretion of Road Inspectors, who determine their relevance depending on the situation.

These allowances are imposed for technical, operational, and legal reasons. All North-American administrations apply such allowances. The allowances granted by Québec are comparable to those granted by neighbouring administrations.

5. Would decreasing load limits reduce the damage caused to the road network?

Decreasing load limits during normal periods and during the thaw period would certainly reduce the amount of damage caused to the road network. The cost of maintaining the network would likely decrease significantly. However, the economic impact of reducing load limits for the industry would be detrimental to the Québec economy.

Transport costs are directly related to authorized load limits. An increase in transport costs would make our exported products less attractive on foreign markets. For the most part, existing authorized load limits are harmonized with our main economic partners. Variances in this area would create additional trade constraints.

In addition, decreasing load limits would result in an increase in the number of vehicles, which would not necessarily be beneficial to the road network or to the environment. An increase in the number of heavy vehicles could also have an effect on road safety.

6. During the thaw period, roads are 30% to 70% more fragile than during normal periods, so why are load reduction only 12% to 20%?

Damage to the road network is caused by several factors. Among these factors, the load under the wheels of a heavy vehicle has a huge influence. The relationship between the load and the damage is not linear, but rather exponential, which means that a slight overload will have a significant effect on the damage that may be caused to a road network. For example, a 20% overload on a single axle causes twice as much damage to the road as a legal load on the same axle. Conversely, a slight decrease in the authorized load results in a significant decrease in its effect on the road network. Therefore, a 20% reduction corresponds to a reduction in damage of approximately 60% compared to an axle that bears a legal load. Load reductions that are applicable during the thaw period have been staggered in order to maximize the protection of the road network while ensuring that economic activity is sustained.



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FREQUENTLY ASKED QUESTIONS: VEHICLE LOADS



7. Why is Québec divided into three load restriction zones during the thaw period?

The thaw zones were established by taking into consideration differences in the depth of the freeze, which varies considerably from north to south, the progress of the thaw, the climatic conditions that are prevalent in the various regions of Québec during the spring, the geographic characteristics of the province, and heavy vehicle traffic in the east-west corridor.

Obviously, it would be possible to increase the number of zones in order to take into consideration the microclimate specific to a given area to a higher degree. By doing so, the duration of the period of load restrictions in each zone could be reduced. However, inter-zone truck transport would become very constricting, which would severely restrict mobility.

8. Why are higher load limits not applied during the freeze period, when the pavement is more resistant?

While it is true that the weight bearing capacity of roads is significantly higher when the ground is frozen to a sufficient depth, the Québec road network also comprises structures such as bridges, whose capacity does not increase during the winter. Therefore, it is not desirable to increase the authorized limits for safety reasons. In fact, an increase in the total loaded mass of vehicles would increase braking distances, modify the behaviour of vehicles, and reduce their reversal threshold. Furthermore, vehicles are normally designed with components whose capacities are equivalent to those permitted by law.

9. Why are the weigh stations that are located along the roads not open 24 hours per day all year long?

Inspection stations are operated based on a sporadic opening strategy in order to create a surprise effect, which means that heavy vehicle drivers are less likely to bypass inspection stations by taking other routes.

Depending on the traffic flow in the area where they are located, inspection stations operate between 4 and 8 hours per day, on average, and operate 365 days per year. During the thaw period, they are in operation 24 hours per day, based on a system of synchronism that takes into account nearby inspection stations. This operational method makes it possible to ensure optimal coverage of the main road corridors.

Contrôle routier Québec also relies on a mixed strategy that includes both stationary and mobile interventions, specifically by creating temporary inspection areas. Similarly, cordoning operations make it possible to inspect heavy vehicles that may otherwise seek to avoid inspection points.

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FREQUENTLY ASKED QUESTIONS: VEHICLE LOADS



10. Why are other transportation methods not favoured?

The Government of Québec favours the Assistance Program for Modal Integration, which is designed for shippers and aims to encourage the execution of intermodal projects allowing for the maintenance of railway and maritime infrastructures in conjunction with the road transport of goods sector. A budget of 21 million dollars is planned for the operation of this program for a period of five years (fiscal 2006-2007 to 2010-2011).

In addition to encouraging the execution of intermodal projects, the program includes a promotional component to encourage the corporate sector to take the best possible advantage of the railway, maritime, and road networks. Finally, the program supports maritime transportation upgrade schemes and the increased use of the St. Lawrence River.

However, there are many companies that rely on trucking in order to satisfy their needs for the transport of goods. They do this for a multitude of reasons, including such qualities as flexibility, speed, and the competitive prices that this mode of transport offers. A large number of companies also apply the "Just in time" method, which meticulously controls the logistics chain. This approach is well suited to the trucking industry.

Not all types of cargo can be handled by the maritime or rail industries. In fact, it is estimated that only 2.9% of domestic truck traffic could be handled by rail.

This explains why 82% of all truck traffic covers distances of less than 600 km.



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THAW ZONES IN QUÉBEC



2009 load restriction start and end dates for heavy vehicles



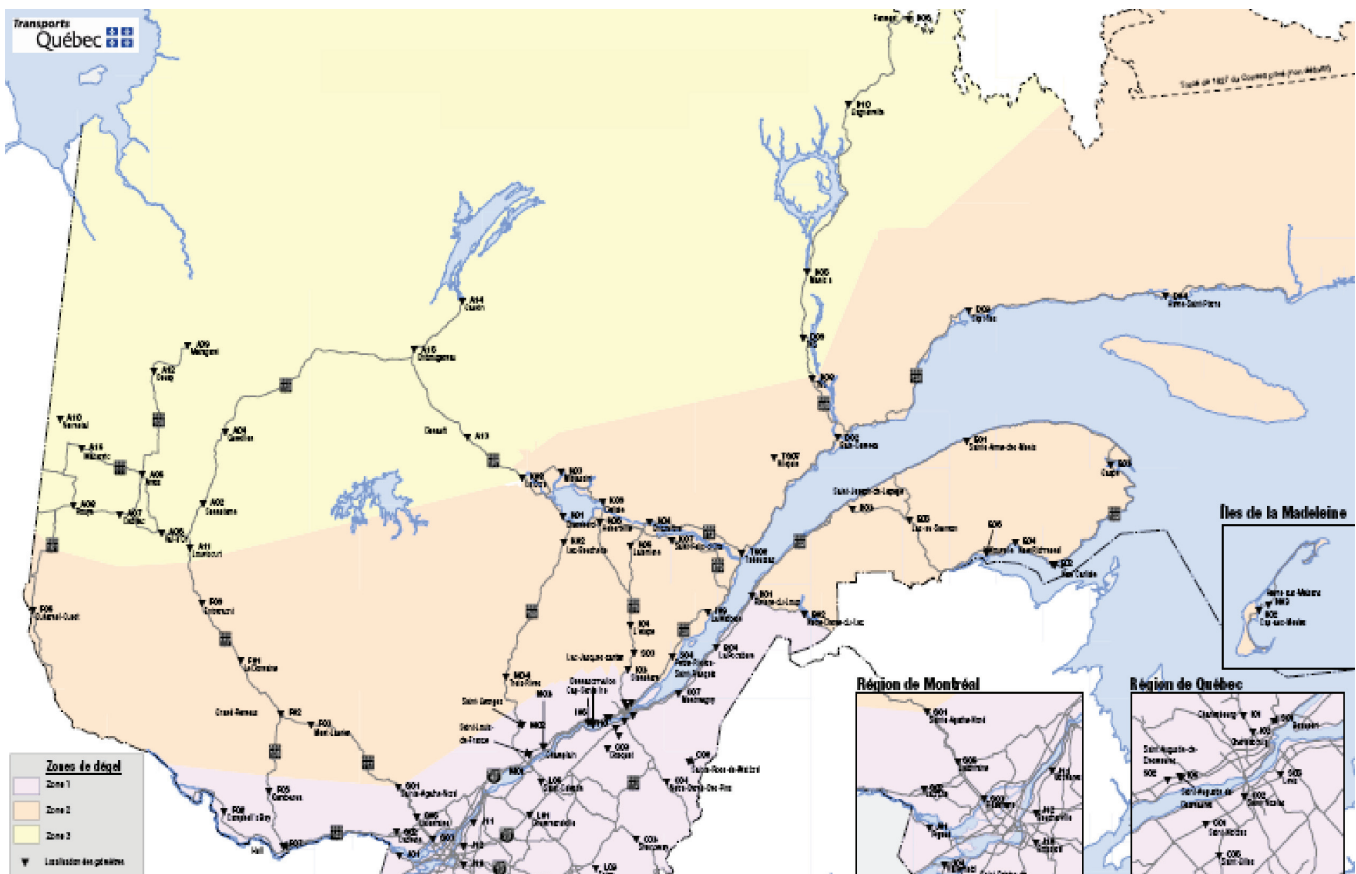
* The start and end dates of the load restrictions may be moved ahead or pushed back depending on changes in the weather conditions.



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LOCATION OF FROST PROBES



HISTORY OF THE THAW

1977 - 1990



YEAR	ZONE 1			ZONE 2		
	START	END	DURATION	START	END	DURATION
1977	27 march	15 may	49 days	3 april	15 may	42 days
1978	27 march	21 may	55 days	3 april	21 may	48 days
1979	26 march	21 may	56 days	2 april	21 may	49 days
1980	24 march	12 may	49 days	31 march	19 may	49 days
1981	25 february	4 may	68 days	25 february	19 march	64 days
	---	---	---	30 march	11 may	
1982	22 march	17 may	56 days	29 march	24 may	56 days
1983	14 march	2 may	49 days	21 march	16 may	56 days
1984	25 february	1 march	54 days	---	---	---
	26 march	14 may		2 april	21 may	49 days
1985	18 march	13 may	56 days	2 april	26 may	54 days
1986	14 march	9 may	56 days	1 april	19 may	48 days
1987	23 march	4 may	42 days	26 march	11 may	46 days
1988	20 march	9 may	50 days	31 march	16 may	46 days
1989	20 march	13 may	54 days	31 march	20 may	50 days
1990	13 march	12 may	60 days	19 march	24 may	66 days

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HISTORY OF THE THAW

1991 - 2009



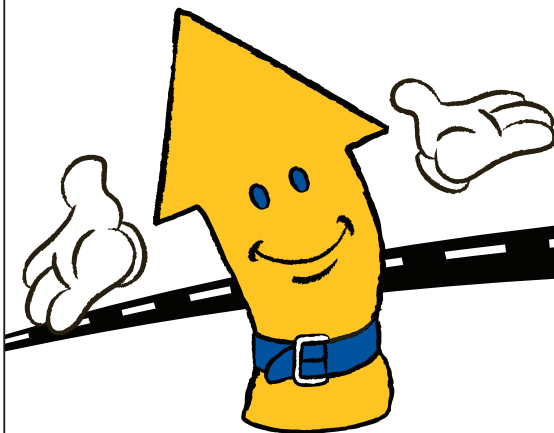
YEARS	ZONE 1			ZONE 2			ZONE 3		
	YEARS	END	DURATION	YEARS	END	DURATION	YEARS	END	DURATION
1991	13 march	10 may	58 days	20 march	17 may	58 days	28 march	25 may	58 days
1992	13 march	10 may	58 days	20 march	17 may	58 days	28 march	25 may	58 days
1993	13 march	10 may	58 days	20 march	17 may	58 days	28 march	25 may	58 days
1994	13 march	10 may	58 days	20 march	17 may	58 days	28 march	25 may	58 days
1995	13 march	10 may	58 days	20 march	17 may	58 days	22 march	29 may	68 days
1996	15 march	12 may	58 days	21 march	19 may	59 days	24 march	25 may	62 days
1997	15 march	12 may	58 days	21 march	19 may	59 days	24 march	25 may	62 days
1998	5 march	5 may	61 days	5 march	12 may	68 days	24 march	17 may	54 days
1999	21 march	6 may	46 days	21 march	15 may	55 days	24 march	25 may	62 days
2000	6 march	12 may	67 days	21 march	19 may	59 days	24 march	25 may	62 days
2001	12 march	16 may	65 days	19 march	16 may	58 days	26 march	21 may	56 days
2002	11 march	11 may	61 days	18 march	18 may	61 days	25 march	25 may	61 days
2003	21 march	17 may	57 days	24 march	24 may	61 days	31 march	31 may	61 days
2004	15 march	15 may	61 days	22 march	22 may	61 days	29 march	29 may	61 days
2005	21 march	15 may	55 days	28 march	21 may	54 days	4 april	21 may	47 days
2006	20 march	15 may	56 days	27 march	15 may	49 days	27 march	22 may	56 days
2007	15 march	15 may	61 days	19 march	19 may	61 days	26 march	26 may	61 days
2008	24 march	24 may	61 days	31 march	31 may	61 days	31 march	31 may	61 days
2009	16* march	16* may	61 days	23* march	23* may	61 days	30* march	30* may	61 days

* The starting and ending dates of the load restriction period may be adjusted depending on weather conditions.

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THE ROAD SIGN DISPLAY

**En période de dégel****ROULEZ LÉGER!**Québec 

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