



A Charlevoix County Road Commission Publication

FROST LAW RESTRICTIONS and the Road Weather Information System

By Ina Heaton

- ◆ **How Frost Laws help preserve roads.**
- ◆ **RWIS is on the horizon, But what is it?**

Every winter and early spring for nearly 20 years Charlevoix County Road Commission personnel have maintained a system that provides information such as temperature, depth of frost and depth of thaw under the pavement surface on one of our State Highways. The information is used to determine where and when in Charlevoix County to apply weight or "Frost Law" restrictions. Spring weight limits begin with the first thawing and continue until ground below the pavement is completely dried and firm enough to support the pavement.

Michigan Law provides that restrictions can be applied during March, April, May or any other time when conditions of the roads require. But by the end of April, the restrictions have typically been lifted statewide.

During the last 20 years the deepest frost depth recorded in Charlevoix County was 68 inches in 2009. Average depth is about 52 inches.

The technology to measure frost depth has improved significantly during the last 20 years. Back in the 1980's, the method used to determine frost depth was the simple expedient of using a pick and hand shovel to dig a hole in the shoulder of the road to visually inspect frost activity. Today, we use a permanently installed frost tube.

The following diagram and sidebar pictures show the frost tube in more detail. The actual tube, which is protected by an enclosure, is filled with a special solution that changes color when it freezes. The color changes do not have to be uniform. When they are not, it signifies that there are different strata of frozen and unfrozen ground.



The following paragraphs basically outline the physics involved when "freeze" becomes "thaw". (Remember, that when the ground under a road is frozen solid, there isn't

much of a problem. It's only when that solid becomes liquid, or partially liquid, that the problems show up).

As frost in the subbase melts, water saturates the road's base and subgrade. These layers lose strength, like squeezing a handful of mud compared to dry soil. Paved roads with thin overlays on top of frost-susceptible soils may lose more than 50 percent of their bearing capacity in spring, and gravel roads may have only 30 percent of their original strength during the thaw period. Without adequate support, a pavement or gravel surface deflects too much under heavy loaded trucks, developing cracks and failures. These failures let more moisture penetrate, worsening the condition of the road.

If the road is exposed to heavy traffic, the dynamic forces will pump up the saturated subsoil, and mix with the structural layers. Eventually the whole road structure will be damaged. The amount of damage a road sustains is directly related to the weight of the load and how often it is applied. Passenger and light duty vehicles generally are not a problem, but heavily loaded trucks are.

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Foreman Randy Thompson inspects the "Frost Tube", February 2011

CHARLEVOIX COUNTY 2010 ROAD PROJECTS

ROAD NAME	TOWNSHIP	LENGTH (Miles)	Actual Cost	STATUS & CONTRACTOR
Horton Bay North Rd. Wedge & Overlay	Bay	1.00	\$ 132,908.82	Completed (Rieth-Riley Construction Inc.)
Camp Sherwood Rd. End Drainage Improvements	Bay	0.033	\$ 1,758.75	Completed (Team Elmers)
Curtis Lane Afton Stone Placement	Bay	0.27	\$ 10,281.77	Completed (Rieth-Riley Construction Inc.)
Boyne City –Charlevoix Rd. Rehabilitation	Bay/Evangeline	2.85	\$ 851,417.79	Completed (Payne & Dolan)
Kuzmik Rd. Afton Stone Placement	Boyne Valley/Hudson	1.72	\$ 71,302.01	Completed (Poquette Leasing)
Beechwoods Dr. & Mercer Rd. Wedge & Overlay	Charlevoix	0.22	\$ 31,758.35	Completed (Payne & Dolan)
Sanderson Rd. Wedge & Overlay	Eveline	0.25	\$ 45,326.34	Completed (Payne & Dolan)
Snyder Rd. Wedge & Overlay	Eveline	0.55	\$ 68,253.35	Completed (Rieth-Riley Construction Inc.)
Loomis Rd. Wedge & Overlay	Eveline	1.00	\$ 199,704.14	Completed (MDC Contracting)
Burgess Rd. Subgrade Undercut	Hayes	0.59	\$ 109,432.56	Completed (Tri-County Excavating)
Townline Rd. Reconstruction	Hayes	0.61	\$ 111,711.97	Completed (Rieth-Riley Construction Inc.)
Maple Grove Rd. Afton Stone Placement	Hayes	0.29	\$ 8,575.43	Completed (Poquette Leasing)
Klooster Rd. Wedge & Overlay	Marion	1.34	\$ 136,831.87	Completed (Rieth-Riley Construction Inc.)
North Shore Dr. Paving Project	Melrose	0.64	\$ 152,144.97	Completed (Rieth-Riley Construction Inc.)
Iron Ore Creek Culvert Replacement	Peaine	N/A	\$ 27,136.80	Completed (Gillespie Enterprises.)
Indian Point Rd.	St. James	0.119	\$ 19,540.08	Completed (Gillespie Enterprises.)
Peninsula Rd. Wedge & Overlay	South Arm	2.51	\$ 540,958.79	Completed (Payne & Dolan)
Peninsula Rd. Culvert Rehabilitation	South Arm	N/A	\$ 42,058.00	Completed (Tri-County Excavating)
Dutchman's Bay Rd. Wedge & Overlay	South Arm	1.00	\$ 110,624.78	Completed (Rieth-Riley Construction Inc.)
Miles Rd. Subgrade Undercut	South Arm	0.15	\$ 32,154.40	Completed (MDC Contracting)
Cosier Rd. 23A Gravel Placement	Wilson	0.44	\$ 16,468.61	Completed (Poquette Leasing)
Hull Street Afton Stone Placement	Wilson	0.41	\$ 31,012.25	Completed (Poquette Leasing)
TOTAL		15.99	\$2,751,361.83	<ul style="list-style-type: none"> • townships funded over \$ 1,1 million for the above reconstruction projects. • 2010 "Stimulus Fund" (American Reinvestment & Recovery Act) funded \$ 340,911.00 of the Peninsula Rd. Project.

Snow Removal Tips for Residents

In the Newsletter "Winter 2008-2009" we informed our readers how to travel safely around snowplows and also provided readers with winter driving safety tips.

MDOT Michigan Department of Transportation reminds residents and businesses to not pile snow at the ends of driveways or push snow across the road. Doing so contributes to slippery conditions on the road-

way surface.

The Michigan Vehicle Code also prohibits vision obstruction by depositing snow, ice, or slush." This includes the end of driveways, where banked snow can reduce visibility for vehicles trying to enter the roadway. "When the snow banks get higher than your average car, it makes it difficult for motorists to see other vehicles", said

State Transportation Director Kirk T. Steudle.

Leaving a trail of snow on the pavement while plowing across the road also can cause problems. The snow can become packed and create ridges on the road, and, as temperatures change, the area becomes icy.

"Careless plowing creates an added hazard to unsuspecting motorists and to road maintenance personnel", Steudle said.

Road Commission Board Welcomes New Member

Russell MaGee was appointed to complete the final two years of the term left vacant when road commissioner Wayne Saunders retired after 22 years of service.

Russell was born and raised in Boyne Valley Township and still lives in the old family home. He holds a bachelors degree from Northern Michigan University in Marquette and taught school for 30 years, as well as working as a park ranger for 19 years.

His appointment reflects a growing concern, starting with the State Legislature, that road commissioners should represent the county by districts, equally divided. In other words, two road commissioners should not live in the same area. Additionally, each road Commissioner should have intimate knowledge of the road system in his district, gained

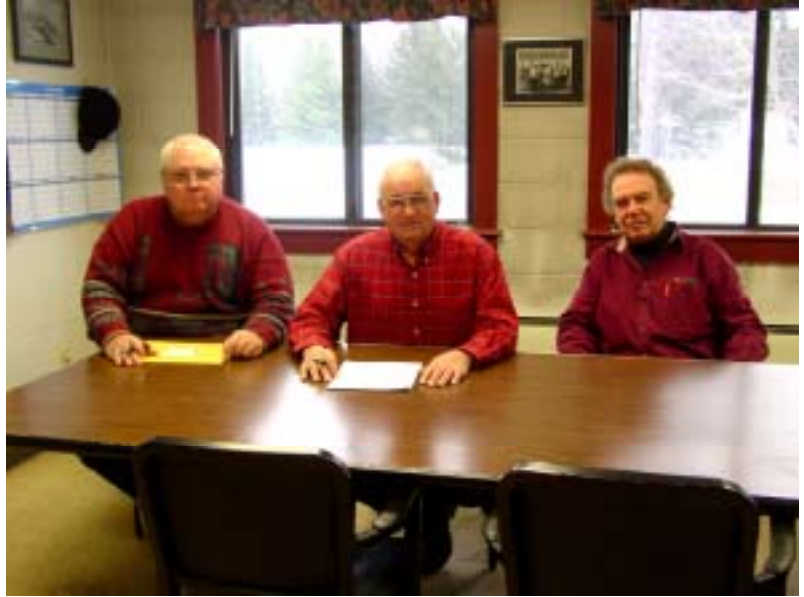
over a long period of time, so that the concerns and well being of the people living in the district can best be served.

At the same time Russell MaGee was appointed to fulfill the balance of a two year term, Doug Way was reappointed to a six year term. Doug has been on the Board fourteen years, and he hopes his experience will allow him to serve the people through discovering new ways to pay for county roads. "We need to seek some different and creative kinds of financing to pay for our roads in the future," he said in his interview in the *Petoskey News-Review* November 2010.

As it now stands, the county is about equally represented by area: Doug in Charlevoix, Russell on the east side which includes Boyne City, and

Keith who represents the south end of the county including East Jordan. But as each commissioner will quickly point out, their special concerns and knowledge

of their district must be combined with the other areas so that the whole county benefits from working together.



(Left– right)
Russell MaGee, Member
Doug Way, Chairperson
Keith Ogden, Vice Chairperson

FROST LAW RESTRICTIONS and the Road Weather Information System

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When weight restrictions are not in place (for example, during summer) the Michigan Vehicle code declares that maximum loads shall not exceed the number of pounds as follows:

- 18,000 lbs. on an axle with at least 9 feet of spacing from any other axle. NOTE: weight cannot exceed 700 lbs. per inch of the width of the tire ("width means as published by manufacturer")
- 13,000 lbs. per axle when axle spacing is less than 9 feet between two axles but more than 3.5 feet .
- Axles less than 3.5 feet apart shall not exceed 9,000 lbs. per axle.
- The maximum legal load per inch of tire width is 700 lbs.

When spring weight restrictions are in effect , axle loadings are reduced by 35 percent and speed limits are reduced to 35 mph for vehicles over 10,000 lbs. gross weight.

Allowable axle weights on local roads must be consistent with state law, but final weight determinations are the responsibility of the local jurisdictions, which also retain authority to issue or deny special permits.

All Extended Transportation permits are invalid during Frost Laws.

Some roads are exempt from Frost Laws. These roads are called All Season Routes which have a deeper gravel base and a thicker layer of asphalt to support heavier loads when the ground is soft. The Road Commission manager reviews the list of weight restricted roads every spring, and the clerk posts this list along with date and time on the CCRC Web page when these restrictions will be implemented. The restrictions usually are applied in March countywide. Here is the link to the web:

www.Charlevoixcounty.org/ccrc.asp

We publish this information in the *Petoskey News-Review* and install Weight Restriction signs on the roads affected by law. CRAM (County Road Association of Michigan) also maintains a Seasonal Weight Restrictions page. You can find this page following the link

www.micountyroads.org/weight.htm

The new Environmental Sensor Station (which can be thought of as a very sophisticated weather system) near Charlevoix on US-

31 and Burgess Road became the part of RWIS or Road/Runway Weather Information System during the winter 2010-2011. RWIS is an entire system of collecting information, transferring the information to a central site, processing the information, and disseminating the information to agencies that need the information.

A system installed on the Charlevoix Environmental Sensor Station provides weather information, such as air temperature, precipitation, wind speed, hu-

midity, visibility; pavement conditions (wet, dry, icy, frost depth, etc.).

Much of the data collected on these "high tech" stations is available to the public on line, through following the links:

www.michigan.gov/drive

<http://www.clarus-system.com/>

RWIS is somewhat new, but there is a good possibility that with some technological upgrades, it could replace the "Frost Tube".



Randy Thompson shows depth of frost as measured on the "Frost Tube".

Employee Anniversaries

These employees celebrate their anniversaries with CCRC this year.

Randy Thompson 36 years
 Tom Webb 34 years
 Pat Harmon 25 years
 Floyd Wisniewski 25 years
 Bernard Kondrat 25 years
 Richard Wells 17 years
 Shelley Kondrat 16 years
 Michael Luchenbill 16 years
 Michael Lickfeldt 16 years
 Darcy Phelps 16 years

Ken Howard 15 years
 John Lashmit 15 years
 Bruce McGeorge 14 years
 John Fratrack 14 years
 William Carson 14 years
 Vern Kassuba 13 years
 Jim Vanek 13 years
 Kelly Kleinschrodt 13 years
 Ed Nachazel 13 years
 Joe Smith 13 years

Aron Williams 10 years
 Leroy Potter 10 years
 Doug Scott 9 years
 Doug Gillespie 8 years
 Ken Glazier 8 years
 Jeromy Loper 7 years
 Joshua Lacombe 6 years
 Sam Strong 4 years
 Ina Heaton 4 years



In December 2010 Richard Hall and Debra Taylor joined the CCRC Crew!



Organization

CHARLEVOIX COUNTY ROAD COMMISSION

Main Office ~ Boyne City Garage

P.O. Box 39
 1251 Boyne Avenue,
 Boyne City, MI 49712-0039
 Phone: (231) 582-7330
 Fax: (231) 582-3110

Ironton Garage

11705 Shaw Road
 Charlevoix, MI 49720
 Phone: (231) 547-2551

Beaver Island Garage

38310 Bay Avenue
 Beaver Island, MI 49782
 Phone: (231) 448-2285
 Fax: (231) 448-2193

Visit our page on the Charlevoix County Website for information such as meeting schedules, Board minutes, permit applications, CCRC NEWS, etc. :



How to Contact Us

Office Hours

7:00 AM - 3:30 PM Weekdays
 (Excluding Holidays)

Contact Information

Main Office Phone: (231) 582-7330
 Main Office Fax: (231) 582-3110
 E-mail: ccrclerk@utmi.net

The Charlevoix County Road Commission Main Office and Boyne City maintenance garage is located on M-75 just east of the Boyne City Public School football field.