



Technical Backgrounder - Spring and Summer Maintenance

Spring and summer road conditions in Saskatchewan

Every spring, as a result of our harsh climate, potholes and surface breaks are a reality on Saskatchewan highways, municipal roads and city streets. Above average spring runoff and high water tables can exacerbate these conditions. Dry weather helps to stabilize road beds and allow crews to make repairs in a timely fashion.

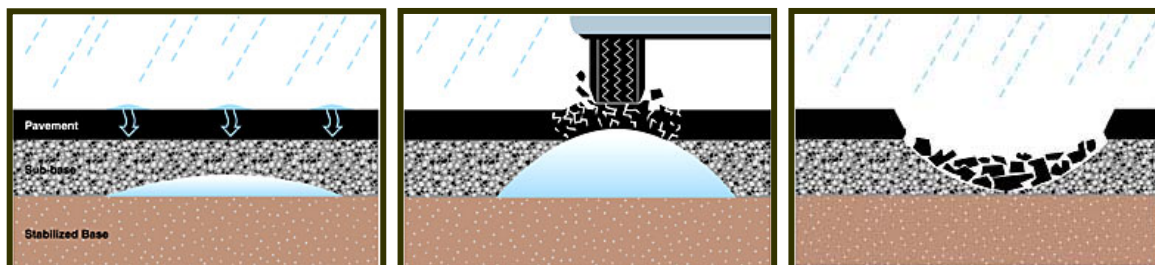
Are We Ready?

A record \$224 million has been budgeted for 2009-10 for the maintenance, repair and repaving of our highway network. This is the largest preservation budget in Saskatchewan history - a 10% increase over last year – and provides for:

- Repaving (resurfacing) 300 km of highways
- Micro-surfacing 200 km of highways
- Routine patching, spot sealing, crack sealing, etc.

How do potholes and surface breaks form?

Potholes are formed by the expansion and contraction of water that has entered into the subsurface of the road through cracks in the pavement. When water freezes it expands. This causes the pavement to expand, bend or crack weakening the road. When the ice melts the pavement contracts leaving voids in the subsurface where water can get in. If the water freezes and thaws over and over the road can become very weak. Potholes form when the surface of the road collapses into the subsurface void. Sometimes potholes do not appear until the weight of traffic, especially loaded commercial trucks, have passed over the weak spot in the road.



Potholes form when water gets trapped below the surface of the road. Water seeps in through cracks in the road and collects in the subgrade.

When the pavement freezes the water expands as it turns to ice. This pushes the pavement up and traffic stresses it.

When the ice thaws it collapses into the void left by the ice.

Traffic crumbles away at the edges of the pothole and it gets larger.

Why do some roads have more potholes than others?

Some paved highways are more vulnerable to potholes and break ups in the spring than others. Aged and cracked roads will allow more water into the subgrade. Roads with lower grades will stay saturated longer until melt water has dried up and the road has had a chance to dry out.

Thin Membrane Surface (TMS) roads can be very sensitive to break up in the spring. These highways do not have a granular structure under the surface. The surface of the road is a dust free wearing surface. It is not a structural asphalt concrete capable of handling heavy traffic loading. The performance of these roads in the spring is dependant on the way the spring thaw occurs. If there are numerous freeze thaw cycles more surface breaks are expected. If there are large volumes of melt water and the water takes a long time to recede, then numerous surface break ups are expected. If loaded commercial trucks travel over TMS roads with a saturated subgrade, surface breaks are expected. The more trucks that travel the road when the subsurface is weak, the more damage will occur.

What kind of repairs will be made?

When surface breaks occur in the spring Ministry road crews flag the hazard and do an assessment of what kind of repair is needed. The crew may apply gravel material or blade on some asphalt patching material as a temporary repair. Small potholes will be filled with patching material. These are short-term repairs to make the road surface safe for motorists until long-term repairs are made. Long-term repairs cannot be made until the road bed under the pavement surface is dry. Any repairs made while the roadbed is compromised will not last.

Long-term repairs may involve digging out the road and backfilling with a well-drained sand or gravel that will support the pavement and keep water from building up. A layer of asphalt concrete or a granular seal coat will be placed on top of the backfill to seal off the road.

Selecting the type of repair and whether it will be a permanent or temporary fix depends on few different factors. The classification of the highway, surface type, overall condition of the corridor, and age of the road are considered. Roads scheduled for major rehabilitation work will not receive long term-repairs.

How soon will repairs be made?

Timing will depend on how much repair work the road crew has scheduled. They may also be busy unclogging culverts and maintaining drainage runs. If a long-term repair is needed then they must wait until the area dries up before starting the work. Crews may prioritize their work depending on the type of highway and severity of the break up.

Descriptions of Maintenance Treatments

Spot Seal - The application of liquid asphalt and graded aggregate on surfaced roads to prevent moisture from entering the subgrade and to prevent further deterioration of the asphalt mat. Strip sealing is done in wheel ruts to prevent the moisture from accumulating.

Deep Patch - Repair of failed areas by excavating into the sub-grade by mechanical means and backfilling with well-drained sand or gravel.

Machine Patching - The process of spreading base or asphalt mix with a motor grader or other mechanical means to repair a failed area, wheel ruts, depressions, bumps, etc.

Crack Sealing - The sealing of cracks on a pavement with liquid asphalt and sand or rubber asphalt.

Gravel Blading - The reshaping of the road surface and spreading of aggregate on gravel surfaced highways by blading with a motor grader.

Spot Gravel - Spot re-graveling of gravel surfaces.

Dust Treatment - The application of calcium chloride, lignosulfinate, or asphalt to a gravel surface road to control dust created by traffic.

Hand Patching - Hand repair of small potholes or depressions using cold mix, hot mix or base and compacting.

Subgrade Stabilization - Use of clay, slit or gravel materials to stabilize sandy subgrades or cover rough road surfaces on gravel highways.

Sandvic Blading - Removal or recycle of bituminous surface material generally carried out to improve ride or rutting on TMS surfaces.

Micro-surfacing - Placement of a mixture of crushed gravel, liquid asphalt, mineral filler, water and other additives on the road surface producing a micro-surfacing treatment. Micro-surfacing can be used for both preventative and corrective maintenance. This treatment can restore skid resistance; eliminate minor surface irregularities, level wheel ruts to prevent hydroplaning and to repair surface deterioration from weather and traffic. A micro-surfacing treatment will restore pavement to a uniform black color.

Seal Coating – Placement of hot liquid asphalt and crushed gravel on the road surface. Seal coating provides a waterproof surface, non-skid surface, reduces deterioration and cracking and prolongs pavement life.