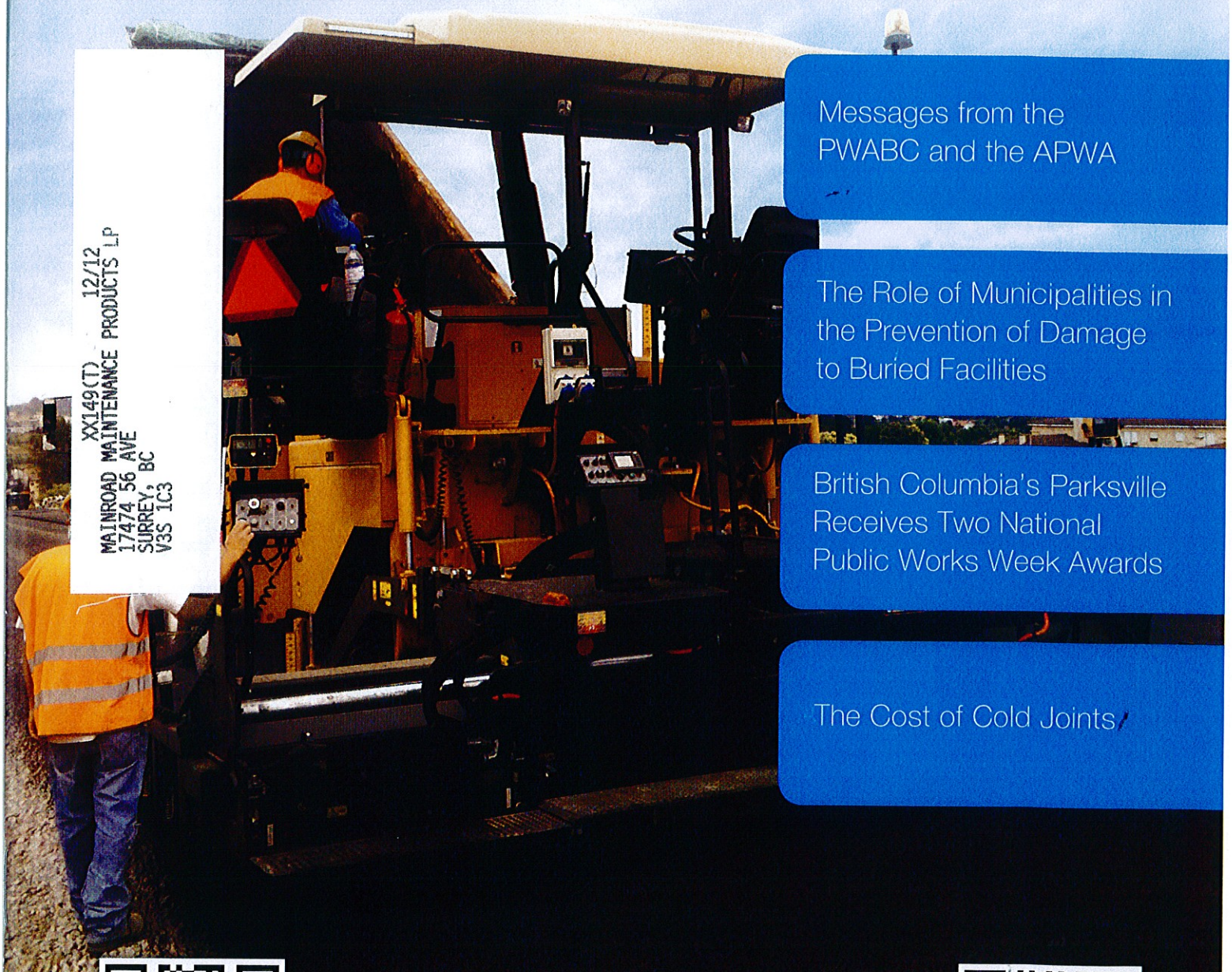
THE OFFICIAL PUBLICATION OF THE PUBLIC WORKS ASSOCIATION OF BRITISH COLUMBIA AND THE ALBERTA PUBLIC WORKS ASSOCIATION

# THE ROADRUNNER

SUMMER 2013





Messages from the PWABC and the APWA

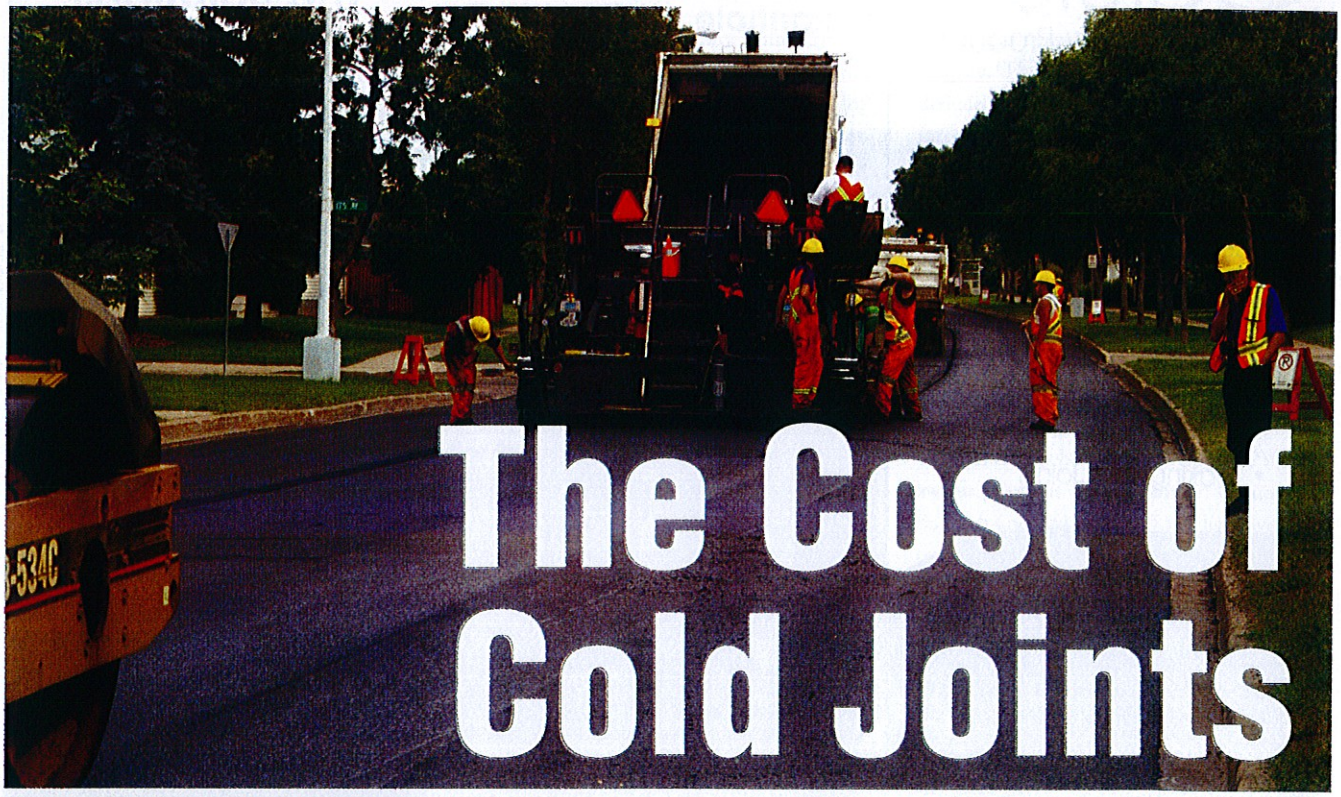
The Role of Municipalities in the Prevention of Damage to Buried Facilities

British Columbia's Parksville Receives Two National Public Works Week Awards

The Cost of Cold Joints

FIND OUT WHAT'S HAPPENING ONLINE

Canada Post Mail Publications Agreement Number: 40609661



# The Cost of Cold Joints

By Richard Hoare

Despite technological advancements for industry and products, cold joints remain a plague of the asphalt business. Cold joint costs start immediately when hot asphalt comes out of the paver. Every location will generate different costs but with cold joints, it is simply unavoidable.

Once maintenance work to repair cold joints begins, overall expenditures will to climb. Crack-sealing or grind and pave cost thousands and pothole repairs pour money into pavement with no asset return. Having to do a full pavement removal and re-lay years ahead of schedule is when costs skyrocket into the millions.

The first failure of an asphalt surface will be at the cold / paver joints. These inherent weak areas are created when asphalt paved in the first paver pass has cooled (and started to harden). The second adjoining paver pass installs hot asphalt but the temperature difference between the two mats prevents cohesive binding; instead the mats butt up against each other.

One common issue with cold joints is the creation of a density differential between the two separate mats. Compaction of the unsupported edge is difficult as the rollers squash the mix and thin out the depth of the lift. The edges tend to receive less compaction than the rest of the pavement surface. Once the adjoining mat has been laid only then can the rollers provide optimum compaction at the joint. In these situations, half of the asphalt has cooled to a point where optimum densities are impossible to obtain.

The initial mat edge can be subject to cracking due to the development of a higher amount of air voids that is directly related to incomplete or ineffective compaction. Incomplete compaction in these areas can also lead to longitudinal or general "alligator" cracking. Once cracking begins, maintenance costs climb.

Water ingress is the single most significant factor in pavement failure. The cold joint is an unbound crack in the asphalt surface, inevitably an entry point for water. Water will cause breakdown at all depths, from the subgrade through to the surface.

In northern climates and mountainous regions where temperatures drop below freezing, frost heaves from moisture in the pavement cause rapid and dramatic deterioration of the pavement structure. Cold joints in this

environment create a risk of pavement failure, higher maintenance expenditure or re-surfacing.

### Construction mitigation of cold joints

Industry has established procedures during construction that are designed to lessen the effect of the inevitable cold joints. These include strategic placement of the joints outside of wheel paths or remedial work during and/or post construction.

One technique is the use of multiple pavers working together in an offset pattern. This creates a single asphalt mat. Unfortunately, this is rarely feasible because of the constraints of project size, accessible equipment or the availability of roads and lanes to perform this operation.

Methods used during construction include manually shaping the unconfined edge; hand raking of the joint; overlapping paver runs to cover the colder edge; creating a taper wedge to help transfer the joint; and milling or grinding out the edge. Advancements in equipment have helped, such as an asphalt roller designed with a disc to create a "wedged edge" during compacting.

There are common repair methods utilized for cold joint issues. Crack sealing is used to prevent water ingress into cracks and joints. This will be repeated numerous times during a pavement life cycle due to the increasing negative effects of the joints. Grind and pave of the cold joint is also used in more extreme situations but this, unfortunately, creates two new joints where only one previously existed. Inevitably, cold joint areas will require pothole patching and repairs and the maintenance costs continue to climb.

### Best practice? Eliminate cold joints!

Warm mix technology has been successful for overall surface performance and compaction issues. But, if warm is better than hot, then cold is best! Cold asphalt paving would eliminate cold joint creation and all of the negative consequences that result in future maintenance expenditures.

EZ Street Asphalt has proven the benefits of cold paving with a series of successful small paving projects across Canada. EZ Street is a high performance polymer modified asphalt produced and stockpiled in advance and is paved cold. Projects include timber bridge decks, sub-zero winter paving and urban resurfacing. Applied cold, using cold equipment, EZ Street has exceeded client expectations and results to date outperform what hot asphalt would have provided. Benefits and savings will continue well into the future.

By using EZ Street cold asphalt the contractor is no longer subject to temperature limitations (air or product). One hundred per cent optimum densities can be achieved, as the product stays manageable throughout the compaction process and allows the paver joints to merge and bond to form a single wide mat. Three paver runs with EZ Street Asphalt will leave no joints in the surface.

The plague of cold joints is finally eliminated!

---

*Richard Hoare is General Manager for Mainroad Maintenance Products. He recently completed an in-depth technical paper on cold joints and how EZ Street Asphalt can eliminate them. EZ Street Asphalts paving projects can be viewed at www.ezstreetasphalt.ca/casestudies.*