Trenchless TECHNOLOGY™

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Gas Contractor Gets to the Core of the Matter with New Technology

Every spring, motorists' blood pressure rises with the temperatures as the new roadwork and utility construction season causes traffic headaches on city streets. Nothing infuriates drivers more than sitting in traffic due to roadwork, especially when they seem to experience the same delays day after day, year after year. But it's more than road rage - apart from the cost of road repair, millions of dollars in time and productivity are lost every year due to utility construction and road maintenance delays.

According to surveys carried out by the Ontario Ministry of Transportation, road congestion in the Toronto region costs businesses approximately $2 billion a year in lost time and productivity, primarily due to delays caused by truck deliveries. Federal Express and UPS report that every five additional minutes of congestion or traffic disruption per day costs them $40 million a year. And at the neighbourhood level, municipal roadwork and utility repairs directly affect local merchants and shopkeepers when access to their premises is restricted or customer parking is lost.

In North America, traffic disruption due to utility maintenance or roadwork is no longer just a nuisance or inconvenience to be endured, but has reached a stage where it affects not only the lives of millions of people but the functioning of the entire national economy.

So when innovative utility contractors, like Robert B. Somerville, one of Ontario's largest pipeline and utility contractors, employ horizontal directional drilling and a new keyhole technology to expedite gas utility maintenance and construction work on Toronto streets, they not only generate substantial economic savings for their clients but benefit the entire community as well. And this is a lesson with universal application.

An alliance partner of Enbridge Gas Distribution, Toronto-based Robert B. Somerville currently has four self-directed contracts to maintain and rehabilitate Enbridge's gas distribution systems. This self-directed approach, pioneered by Enbridge Gas Distribution, significantly improves their ability to effectively schedule installations and meet deadlines and budgets. To enhance this effort, Somerville has recently added a new keyhole coring and pavement reinstatement technology, originally developed by Enbridge, to their extensive roster of excavation and pipelining procedures.

The technology, known as Utilicoring, involves a very robust, purpose-built, truck-mounted, rotary cutting unit that works through a complete 270° arc (patent pending) and quickly and cost-effectively cores an 18" diameter hole through asphalt, asphalt-concrete and reinforced concrete road systems and sidewalks to enable crews to vacuum excavate, and view subsurface activity or repair underground plant from the road surface using long handled tools.

After the repair has been completed, the hole is backfilled to the level of the base of the pavement and the core or "coupon" that was originally cut from the pavement, is reinserted back into the road surface where it is permanently bonded by a specially engineered bonding compound (Utilibond™) that creates a bond stronger than the original pavement. The extremely rapid strength gain of Utilibond allows the road to be opened to traffic within 30 minutes of the repair. According to tests conducted by the University of Illinois at Urbana-Champaign, the bond strength of the core of pavement restored in this manner exceeds the AASHTO H-25 load bearing standard by a factor of five times and is capable of supporting the combined weight of five transit buses in just 30 minutes.

Not only can the Utilicoring process establish new levels of efficiency and save the utility millions of dollars annually in permanent pavement restoration costs but, because it is much less intrusive, it contributes to better relations with the traveling public and the residents - both of the constituencies most affected by ongoing maintenance work.

Conventional maintenance and repair methods that require large "open" excavations and theremoval and disposal of unwanted pavement and spoil, usually involve several large pieces of noisy and intrusive equipment (backhoes, dump trucks, pavement breakers) and can account for 80% of the total cost of a repair job -- as well as 100% of the disruption to the neighbours. By core cutting the roadway, and permanently reinstating the core after the repair, huge savings can be realized by both the contractor and the utility owner and the job can be completed faster and the road opened to traffic much sooner.

During May of 2004 Robert B. Somerville undertook a large gas rehabilitation job for Enbridge on a busy, mixed residential and commercial arterial roadway in Toronto, with average daily traffic levels of more than 20,000 motor vehicles per day. The rehabilitation project involved the installation of new PE services from a new 4" PPE gas main, running down the west side of the street, to houses and businesses on the east side, for six city blocks, or a little over half a mile.

In addition to reductions in overall cost, Enbridge's aim was to reduce the duration of the project and its impact on surrounding homeowners and businesses and to minimize traffic disruption on this heavily trafficked north-south thoroughfare. To achieve these objectives, Somerville opted against trenching and in favour of horizontal directional drilling (HDD) to install the new services. Road coring and permanent pavement restoration was used to accommodate these needs.

Daylighting, or potholing, to confirm the exact location of conflicting utilities before drilling is mandated with all horizontal drilling. In this case each new service installation required the exposing of five utilities - a 48" trunk water main, an 8" water main and a 6" gas main under the roadway and a concrete telephone duct and a high voltage hydro-electric conduit under the sidewalk. To accomplish this, Somerville elected to use the Utilicoring process to core cut and reinstate the inspection holes required to safely execute the drill shots.

In total, Somerville cored and reinstated a total of 200 cores in the roadway (4" asphalt concrete over 8"-12" PCC base) and sidewalk (7" concrete). While the rectangular launch pits for the HDD were temporarily reinstated using conventional means (engineered fill with cold patch), all of the cores were permanently reinstated with Utilibond. This process allowed the road to be opened to traffic within 30 minutes and dramatically reduced the number of "charge backs" by the City of Toronto for the cost of permanent repaving.

Rodger Magee, Vice President of Operations of Somerville, a leader in adopting new construction technologies such as horizontal directional drilling and hydrovac excavation, is pleased with their proactive position. "We've never waited for the competition to set the pace when considering new construction technologies". If we can gain efficiencies and realize cost savings, we're quick to move. When Utilicor Technologies showcased this new coring and pavement reinstatement process last year, we saw real potential. And just as we thought, it has saved us both time and money, helped us secure new revenue streams, and improved our bottom line."

"But we don't do our work in a vacuum. As important as timesaving and other cost efficiencies may be to the bottom line, being able to do our work with a minimum of inconvenience to the public and the neighbours is equally important. Complaints from homeowners and adjacent businesses on this job were virtually eliminated and our efforts to reduce disruption were really appreciated. The coring and reinstatement process not only made good business sense but it minimized much of the inconvenience caused by conventional excavation methods and produced positive results for everyone."

Jamie Coward, project supervisor for Somerville, liked the flexibility and efficiency of the coring and reinstatement process. "The time saved using the coring process was huge. We were able to more efficiently schedule our work by segmenting it into its component parts: drilling, coring, vacuum excavation and reinstatement. By using specially designed circular road plates from Utilicor, we were able to allow traffic to flow in two of the four lanes at all times and thereby reduce the impact of the work on the neighbourhood and the travelling public. It also allowed our crews to run at an optimum rate without having to wait for another crew to complete its task and this helped us schedule the work more efficiently. But most importantly, we were able to keep traffic moving as close to normal as possible."

Ken Watts, Somerville's Rotary Coring truck operator, also speaks highly of the process. "We used to saw cut and jack hammer the pavement, truck the spoil, vacuum down to the pipe and when we were finished, close it up again with a temporary patch. Scheduling these activities on a large job like this can be a real headache. This rotary coring process simplifies everything and results in a permanent pavement repair - and that's great. But being able to open the road again to traffic within half an hour of the repair - that's priceless."

Enbridge Gas Distribution has been using the coring and reinstatement process in Toronto for more than 12 years and over that period the City of Toronto has realized that core cutting and reinstatement, when possible, is a better way to get the job done and approved it as a permanent repair. Not only is the local community and the travelling public inconvenienced less by this type of excavation and reinstatement, but the taxpayers benefit from the reduced impact that this less-intrusive type of excavation has on the road itself.

In May 2004, Robert B. Somerville undertook a large gas rehabilitation job on a busy, mixed residential and commercial arterial roadway in Toronto. Road coring and permanet pavement restoration was used.

According to independent testing that compared the effectiveness of the keyhole cutting and restoration technique with conventional trenching methods conducted between 2001-2003 for the City of Toronto, the keyhole method was found to be superior. While the conventional repair sagged and leaked, the keyhole section continued to perform well throughout the full life of the experiment. The surface of the restored keyhole remained level with the road profile, the grout (Utilibond™) surrounding the AC/PCC core remained intact with no cracking or separation, and the subsurface sand cover and surrounding clay under the keyhole were exposed to much lower levels of moisture (one of the major causes of erosion and premature degeneration of the roadway) compared with the conventionally restored cut.

The core samples taken through the bonded area from each side of a reinstated core show effective, waterproof coupling between the core and the remaining slab of pavement.

"The keyhole coring and reinstatement process also means fewer potholes and call-backs for the contactor or the utility", says Colin Donoahue, Vice President of Field Operations of Utilicor Technologies, the company that manufactures and distributes the coring trucks and the Utilibond™. "With this process, once the repair is complete, it is difficult to know that we were ever there. Utility customers also benefit, not only in customer satisfaction with an upgraded and improved service with less disruption, but in the overall savings, which are passed on directly to the gas consumer. With lowered maintenance cost comes lower gas delivery costs. The consumer wins on both accounts."

"First it was directional drilling and then vacuum excavation that were new and innovative technologies that helped contractors remain cost-competitive, work smarter and do our job better", says Somerville's Magee. "Now, with Utilicoring and Utilibond, we can do our work even more efficiently and with less inconvenience to the public." That, to Magee, who has been a pipeliner and utility contactor for more than 20 years, "is where the rubber meets the road."

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