Across the U.S., families and businesses are feeling the squeeze of increasing oil prices. Trucking companies are facing higher operating costs. Motorists are paying more at the pump to support their driving habits. And retailers are passing along increased shipping costs to their customers.

However, high oil prices are being felt in more than just fuel prices and the cost of driving. The cost of asphalt used for paving also is escalating, making it increasingly difficult for public works departments to maintain roads and add new capacity. By 2032, the U.S. will add an estimated 49 million drivers and 58 million vehicles, according to a recent report from the Portland Cement Association, Skokie, Ill. Since 1982, vehicle registrations are up 55%, but highway miles have only increased 4.9%.

Now, some state departments of transportation (DOTs), cities and towns are turning to roller-compacted concrete (RCC) in the face of rising asphalt prices and benefiting from its durability and other characteristics as well.

RCC got its start in the 1970s, when the Canadian logging industry switched to environmentally cleaner, land-based log-sorting methods. The industry needed a strong pavement to...
stand up to massive loads and specialized equipment. Yet economy was equally important (log-sorting yards can span 40 acres or more). RCC met this challenge and has since expanded to other heavy-duty applications.

Conventionally, RCC is used when strength, durability and economy are primary needs such as port, intermodal and military facilities. Increasingly, RCC is being used for streets, highways and shoulders.

**Shoulder to roadway**

A.G. Peltz Group LLC has been a catalyst in the conversion of RCC from a niche product for industrial projects to a viable alternative for numerous paving applications. The Alabama-based company cites RCC’s uniformity and speed of construction as its trademarks.

Will Gray, managing partner for Peltz, has seen more and more expansion in RCC road applications. He said those efforts started by constructing shoulders with RCC on existing and new roadways.

The first major shoulder application for Peltz consisted of 35 lane-miles of 10-ft-wide shoulder reconstruction adjacent to the existing I-285 concrete roadway around Atlanta. The crew laid 39,000 cu yd of 6- and 8-in. RCC in the first application of RCC on an interstate roadway—a project that earned the 2006 National Partnership for Highway Quality Silver Award and the 2006 SCAN Innovation Award.

Gray pointed out that the big push recently is to use RCC as a base material with a thin layer of asphalt, but he believed the demand for unsurfaced projects will grow, especially for projects like highway center lanes.

In September 2008, Peltz constructed an RCC shoulder project of 5 lane-miles (25,000 cu yd) of interchange ramps and entrance roadways for the Kia Manufacturing Facility in LaGrange, Ga. The 10-ft-wide shoulders are 12 in. thick and mark the first use of dual-lift shoulders in the U.S. Also, the company is reconstructing a badly rutted U.S. 78 for the city of Charleston, S.C., with 10 in. of RCC and a 2-in. asphalt cap. Due to elevation constraints, the DOT chose RCC for the base materials because of its greater structural value.

**Passing Lane**

Other RCC specialists, such as Nickolas Savko & Sons in Columbus, Ohio, have been pioneers in utilizing RCC for residential and arterial streets. Savko brought RCC to dozens of neighborhoods, beginning in 2001.

A major test case for Savko was rebuilding Lane Avenue, a busy urban arterial street in the heart of Ohio State University with 8 in. of RCC carrying 3 in. of asphalt. On that project, Savko reconstructed a 70-ft-wide roadway with several intersections, all built under operating traffic conditions.

The RCC was particularly useful under the difficult traffic conditions. The city required a minimum flexural strength of 400 psi before traffic could be resumed on the new pavement, and this was usually accomplished within 24-48 hours after RCC construction. Because of its early stability, the RCC could support even earlier traffic in intersections and areas around businesses that needed uninterrupted access.

Bob Thompson, P.E., of Savko was very pleased with the RCC construction in such a complicated project: “We were confident that we could build an excellent final product, but we were really pleased with the RCC construction process under busy traffic conditions in an urban area.”

Because the RCC was being evaluated as a new product, the city requested a warranty for the Lane Avenue project. Martin Savko, vice president of Savko, had no hesitation about providing a five-year warranty. “We know that RCC is a tough, durable concrete that typically has a very long service life with little maintenance,” Savko said. “A five-year warranty is no problem for us.”

Based on these successes, Savko is still paving streets, including placing 2,400 cu yd in Marysville, Ohio, and 6,000 cu yd for Britton Parkway in Hilliard, Ohio, with RCC.

Thompson knows the price of asphalt has something to do with the success of RCC for roads: “Most definitely, from a cost statement, using RCC is a no-brainer, and it’s far more economical when you consider the life-cycle costs.”

For example, asphalt pavements need to be resurfaced, on the average, every eight to nine years. This work can be expensive and cause additional traffic headaches for commuters. A properly designed concrete road, however, can last up to 30 years before any resurfacing maintenance is required, saving states up to 20% or more in paving costs throughout the road’s lifetime.

**A lesson in RCC**

In the western U.S., the Colorado DOT is considering alternatives to asphalt and conventional concrete, primarily because of the costs. Interstate Highway Construction Inc., Englewood, Colo., will be laying some test sections of RCC for the Colorado DOT in some roadway applications in the near future.

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about RCC. “We need to educate the industry on the characteristics of RCC to see if the attributes of the RCC alternative fit each individual application. It is, of course, imperative in any application to make sure the specified use is properly matched with a set of construction specifications to ensure the design matches the intended use of the pavement.”

Derin Campbell, manager of design and construction for the Boone County Department of Public Works in Columbia, Mo., has been reading about RCC for the past few years and may have found the right opportunity to introduce it.

After the Missouri DOT said it was not accepting any further asphalt project bids, Campbell took things a step further for his county and decided to seek RCC bids for Boothe Lane. The chip-sealed and gravel road is sorely in need of a smoother surface, and Campbell believes RCC is the answer.

“We’re using this as a test,” said Campbell. “If all goes well, we might use it to rehab some subdivision streets.”

Campbell said this project and some local tests have stirred up tremendous interest from local contractors, especially the asphalt paving contractors. “I think this might add one more tool to their toolbox,” said Campbell.

In Fishers, Ind., on the northeast side of Indianapolis, Builder’s Concrete Supply & Co. took the plunge into working with RCC in August 2008. In the first phase of the project, Builder’s constructed a 5-in. base of RCC and a 1½-in. topper of asphalt to repave several streets adjacent to Southeastern Avenue following a sewer rehab project.

Scott Noel, sales manager at Builder’s, said they were able to sell the Indianapolis Department of Public Works on RCC primarily because of the high asphalt prices.

However, without a pug mill in the Indianapolis area, Builder’s engaged in an unconventional approach to working with RCC: using ready-mix trucks to mix the raw materials.

“We made it work,” said Noel, noting that Builder’s had performed a great deal of testing with different mixtures to find the ideal finished project.

“Moisture is the key to success in working with RCC,” added Builder’s Quality Control Manager Scott Hall. “It can’t be too wet and can’t be too dry. So no matter how you mix it, it’s critical to monitor moisture.”

Gray doesn’t see this approach as a new trend in working with RCC, noting it should only be used for very small projects.

And small projects is exactly how Builder’s is proceeding. The company and its engineering partner, Calumet Civil Contractors, are working on projects as small as a 50-cu-yd intersection for the town of Fishers, slowly gaining traction with RCC where asphalt has been the default material of choice.

That is one trend that is likely to take shape. Adding lanes to miles of highways could reduce congestion and save fuel. But these new roads need to meet the demands of an increasing population while addressing both economic and environmental priorities, using materials that are both cost-effective and sustainable.

Roads paved with RCC meet this challenge on both fronts. Concrete has traditionally been perceived as the higher-priced but longer-lasting material. Now, high oil prices are making concrete more competitive in terms of both initial costs and life-cycle costs.

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Will Gray’s List of RCC Advantages
1. Rising asphalt prices.
2. Allows the contractor to lay big lifts, typically 8-10 in., minimizing road closure. (RCC can save 30% of total reconstruction time, and local lanes only need to be closed half as long).
3. Durability. Base performance is more rigid.
4. Low maintenance. Base is resistant to rutting.
5. Fast turnaround. Local traffic can cross the pavement immediately after paving.

Bob Thompson’s Three Elements to RCC Success
1. Mix design: Optimizing local aggregate sources and blending it properly for a dense, strong mix. (If there is no local aggregate source, it may not be economical.)
2. Right equipment:
   a. Pug mills—The ideal way for the mix to achieve uniformity and consistency; and
   b. High-density pavers—Especially for anything over 6-in. lifts. Otherwise, too much rolling occurs.
3. Experience and personnel: You need a team that understands RCC and how to place vertical and horizontal joints. More and more customers want joints with RCC for aesthetic purposes.

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