Growth is Welcome but Brings Challenges—Jones Twp., Wilcox PA Solves Road Repair Problems with UNIQUE Products and Service from Delullo Stone Co.

<u>April 2013</u>

Pennsylvania State Rt. 66 is a 139mile southwesterly-northeasterly route in northwest PA. The roadway has its western terminus at the Pennsylvania Turnpike near Clarion, PA, and dissects the Allegheny National Forest, ending at US Rt. 6 in McKean County, PA near the NY state border.

This area is in the heart of the Marcellus/Utica shale gas reserves discovery, an extensive



area of booming economic development activity covering most of Pennsylvania, eastern Ohio, western New York and West Virginia, (see graphic.)



The massive Marcellus/Utica Shale deposit is creating new opportunities, and some challenges for many rural communities.

exploration, The gas/oil drilling, recovery, processing and transport occurring in these areas are generating a tremendous level of expansion and activity in these regions that has never been seen before. However, this same growth severely burdening is the infrastructure in many ways, which was not built for such a magnitude of activities.

The exploration, drilling, processing and transport of these valuable resources require many dozens of heavy tractor-trailer loads for each well location. This heavy vehicular traffic is mission-critical to the recovery efforts, and vehicle loads can weigh upwards of 25 tons, hauling everything from water, concrete, drilling equipment, rigs, chemicals, and waste byproducts to and from the well sites, processors, suppliers, and distributors. In fact, according to the PA Department of Community and Economic Development, each drilling well will require between 3.5-5 million gallons of fresh water per drilling event, as part of the hydraulic fracturing process ("fracking") to release trapped natural gas from these reserves.

All gas development creates traffic in rural areas. The large scale of development planned for the Marcellus, and the fact that it must be fracked, translates to dramatic increases in traffic compared to that generated by drilling conventional wells. One well service company, Gas Field Specialists, uses tanker trucks that can carry 5,460 gallons of fluid. If one well requires 2 million gallons of water for one fracking, that's 366 tanker trucks hauling fresh water and 183 tanker trucks hauling waste water, for a total of 549 tanker truck trips per well, per fracking. For the average fracking, which may take 3.5 million gallons, that is 960 tanker truck trips. In Pennsylvania, the Department of Environmental Protection estimates that one horizontal Marcellus well requires 1,000 truck trips during drilling and fracking.

Furthermore, spacing of these wells can be up to 16 wells per square mile. Most rural roads were simply not designed to withstand the massive loads and frequencies of truck traffic these energy recovery projects require.

Also, Rt. 66 is frequently shut down in winter for various reasons, including snow removal, accidents, and maintenance in the area, and when this occurs, aets rerouted through traffic Jones Township, Wilcox, PA, about 20 miles south of Bradford. PA for the detour, via Lamont Rd, locally-maintained two-lane а roadway, and part of over 43 miles of roads for which they are responsible for maintenance. According to Mr. Jeff Roberts, the Highway Superintendent for Jones Twp., Wilcox, these



detours are typically 4-6 hours in duration, and have happened often within the past year. As a result of this excessive wear-and-tear, Lamont Rd. is deteriorating at a rapid pace, and the picture below illustrates one such example.

Jeff indicated this road was continually failing and needing to be revisited for habitual repairs, which became a very frustrating and expensive task for Jeff's limited crew and

budget. The heavy truck loads, combined with the turning radius of the vehicles, were exerting force on the area which the repair simply could not handle.

Problems like the one shown also siphoned attention and resources from other maintenance and repair needs in town. Jeff Roberts began searching for other solutions to extend the useful life of this important road until its planned repaving in 2014-15.



The subject of this case study is a substantial failure of the road surface as a result of heavy truck traffic and a deteriorating road base.

In November 2012, Jeff attended a road repair and maintenance seminar hosted by Delullo Stone Co. of nearby Kersey, PA and UNIQUE Paving Materials Corp.® of Cleveland, OH to learn about various products and applications pertaining to his road repair needs.

UNIQUE Paving Materials Corp. manufactures UPM®, a top-quality permanent pavement repair material engineered to be a Once-and-Done solution to pothole and asphalt failure problems. Unlike conventional generic cold patch, (which is little more than stone mixed with some asphalt), UPM is formulated specifically to withstand the stresses of loads, freeze/thaw cycles, moisture, and adhesion/cohesion that cause other products to fail. UPM originated as the first premium asphalt repair product in 1959, and is still considered the gold-standard against which all other cold patch products are

judged. (In fact, the Federal Strategic Highway Research Program, study SHRP-H-106, used UPM as the control product.) JM Delullo Stone Company is the local producer partner for UPM in the west central PA area.

After learning about its highly engineered properties and superior performance capabilities, Jeff, consulting with UNIQUE's Account Executive Tony Guizzotti, decided to give UPM a try, with a free ton sample. Jeff was amazed at the survivability and performance of UPM in various potholes around the township. He then decided to try UPM for this major problem on Lamont Rd. On April 13, 2013, the city purchased approximately 4 tons of UPM from Delullo Stone Co. to conduct this coordinated repair and demonstration.

The repair highlighted in these photos is Lamont Rd at the corner of Highland Rd. Extensive heavy-load truck traffic has literally crushed and disintegrated previous repairs and the asphalt surface to the point of complete failure.

Prior to installing the UPM the following day, the road surface was prepared by removing as much loose debris and failed cold patch as possible. By creating as solid base as they could, the best potential adhesion could be achieved .between the UPM and the remaining roadway base and surface.



Jeff Roberts removing failed chunks of asphalt from the roadway in preparation for installing UPM.

The morning of April 4th, the temperature was 35°F when repairs were begun around 9:00 a.m. Other cold patch products are hard-as-rock and completely unusable in such conditions. However, UPM is manufactured specifically in multiple seasonal grades, to ensure the material remains workable and pliable for the road crew personnel installing it. Jeff and crew were pleasantly surprised and commented on the ease and handling of the winter-grade UPM compared to products used previously.



A single water tanker load can weigh 25 tons, far exceeding the design capacity of this road.





Because UPM is produced in seasonal grades including a winter formulation, road crews can easily work with and install material to make necessary repairs, even in 35-degree weather.

UPM is also manufactured in Spring/Fall and Summer grades to ensure that proper installation, compaction, and performance are delivered, regardless of the season of installation.

After the UPM material was shoveled into the repair area, it was compacted using the city's street roller. Compaction is essential to the effective performance of UPM, by removing excess air voids and maximizing the adhesion, (sticking to the pothole walls, floor, and road surface), and cohesion, (sticking to itself) properties of the UPM chemistry.



Good compaction is essential to properly achieving the bonding and strength of UPM, and using a roller is beneficial but not the only means of compaction.

Although a street roller was used for compaction in this case, it is not the only means of compaction—UPM can be conveniently compacted by using a plate tamper, hand tamper, or by simply rolling the truck tires back and forth over it a few times.



Another popular and effective method of compacting UPM is truck-rolling.

Several weeks after installation, the repaired area is holding firm, with no rutting, shoving, or crumbling of material despite the ongoing traffic loads and inclement weather of early spring. Jeff Roberts reports being thoroughly impressed with the survivability of UPM despite the challenging conditions. "Nothing else has come close to working there like UPM," he said. Jeff has since purchased an additional 8 tons of UPM to date from Delullo Stone for additional repairs in other areas of the city, and expects to continue using UPM for years to come.

The repair highlighted in this case study will be monitored and updated periodically. To be notified when updates are issued, please send an email with "Wilcox Update" in the subject to <u>CS@UniquePavingMaterials.com</u>.

Postscript, 4/18/2013:

After several weeks of ongoing heavy truck traffic, the subject repair area shows the UPM is still holding solid, with no cracking, breaking, alligatoring, or other failure, as shown in picture.



The initial repair of UPM continues holding strong, showing no signs of asphalt failure.

The importance of having a solid, stable base for effective repairs is also clearly illustrated in this case, and a weakened, deteriorating, and unstable base is one of the primary causes of roadway failure. If the base is unable to support the loads to which it is subjected, the roadway above the base has a high probability of eventual failure. Fortunately, UPM provides the highest degree of flexibility of any road repair material in overcoming such problems. (See picture below.)



Because of the flexibility of UPM, the repair did not break or crack like other materials, but instead flexed and "rode" the depression caused by the failing road base. Additional UPM will correct this depression back to level of road surface.

At the middle of the repair on the side nearest the berm, it is clearly visible that an area of approximately 3 feet by 3 feet has slightly sunk because of a weakened base. Ideally, prior to the repair using UPM, the affected area should have been dug out to the depth of the road base, and the weakened base material removed and replaced. However, there was simply no time to undertake a full-depth repair in this case. As a result, the traffic has compacted the road surface further down towards the base.

At this point, other repair materials would have failed on the surface—the surface compaction would have cracked and broken hot-mix asphalt, as well as conventional cold patches because they lack the flexibility to move and the cohesiveness to bind together. However, because of the flexibility of UPM, it simply "rode" the depression, remaining completely intact, solid, and crack-free. Further, because of its specific design chemistry, UPM has the unique characteristic of bonding to itself. Therefore, to repair this depression, the town need only install additional UPM, which will be documented in further updates to this case study. Stabilizing the failing area stopped further deterioration of the surrounding alligator cracking, which would have eventually broke into the failure zone. This type of road repair creates the opportunity for a future chip and seal or overlay when budgets accommodate.

With great opportunity come challenges to be overcome. Since 1959, UNIQUE Paving Materials Corp. has been helping agencies and municipalities identify, assess, and overcome the many road repair and maintenance challenges they face every day. With a complete line of road and highway repair products, unsurpassed laboratory resources, and 50-plus years of innovation and expertise, UNIQUE is proud to partner with tens of thousands of agencies across the country including Jones Twp., Wilcox, PA.

For additional information, questions, or copies of case studies cited, please contact:

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