



UMA Delivers Aesthetic Permanent Sculpted Shotcrete Walls

By Brian DeSpain

UMA Geotechnical Construction Inc. (UMA) typically finishes off the soil nail walls it constructs with a standard shotcrete finish. But sometimes the owner wants a more artistic approach.

That was the case for North Carolina Department of Transportation (NCDOT) on the I-40/I-77 interchange improvements project in Iredell County. UMA was contracted by Lane Construction to install roughly 45,000 ft² (4200 m²) of various sized soil nail walls with aesthetically

appealing sculpted shotcrete finishes. UMA's earth retention work was first required to hold up cuts for widened roadway sections and to facilitate new bridge construction.

The NCDOT selected an ashlar stone carved finish, which the department specified to match the previously completed project in 2012, that was constructed by UMA at the same interchange. The ashlar finish consists of a random pattern of multiple sized blocks, like a natural retaining wall, constructed with stacked stones. The department required

a pre-production mockup test panel to be completed and approved prior to constructing the sculpted shotcrete walls.

Unlike some decorative form-and-pour concrete wall finishes, there is no form liner involved with sculpted shotcrete walls; all work is accomplished by craftspeople. Workers working from manlifts did everything by hand, from shotcrete placement to carving the artistic patterns.

"With UMA's normal shotcrete wall, workers use batter boards, grade lines, and levels to make the finished wall flat and smooth," says Project Manager Brendan Falls. "In this case, they're using a hand trowel to carve the wet shotcrete into the predetermined pattern chosen by the state."

Unlike the soil nail wall behind it, which is top-down construction and built up using horizontal layers, the sculpted shotcrete finish is applied

across the entire wall with no particular pattern. Shotcrete nozzle men work primarily from manlifts, shooting up to 70 yd³ (54 m³) of material in a single day.



UMA's earth retention and sculpted shotcrete work on NCDOT's I-40/I-77 interchange improvements project held up cuts for widened roadway sections and facilitated new bridge construction.



UMA ofrece paredes estéticas de hormigón proyectado esculpido permanente

By Brian DeSpain

UMA Geotechnical Construction Inc. (UMA) generalmente remata las paredes de clavos de tierra que construye con un acabado de hormigón proyectado estándar. Pero a veces el propietario quiere un enfoque más artístico.

Ese fue el caso del Departamento de Transporte de Carolina del Norte (NCDOT) en el proyecto de mejoras de intercambio I-40/I-77 en el Condado de Iredell. UMA fue contratado por Lane Construction para instalar aproximadamente 45.000 ft² (4200 m²) de paredes de clavos de suelo de varios tamaños con acabados de escopeta esculpidos estéticamente atractivos. LOS trabajos de retención de tierra

DE UMA se necesitaron primero para retener los cortes para secciones de carreteras ampliadas y para facilitar la construcción de nuevos puentes.

El NCDOT seleccionó un acabado tallado en piedra de ashlar, que el departamento especificó para coincidir con el proyecto previamente terminado en 2012, que fue construido por UMA en el mismo intercambio. El acabado del ashlar consiste en un patrón aleatorio de bloques de varios tamaños, como una pared de retención natural, construida con piedras apiladas. El departamento requirió que se completara y aprobase un panel de prueba de maqueta de pre-producción antes de construir las paredes esculpidas de la escopeta.

A diferencia de algunos acabados decorativos para paredes de hormigón, no hay ningún revestimiento de forma que se implique con paredes esculpidas de hormigón; todo el trabajo es realizado por artesanos. Los trabajadores que trabajaban desde los levantamientos hacían todo a mano, desde la colocación discreta hasta la talla de los patrones artísticos.

“Con la pared de hormigón normal de la UMA, los trabajadores usan tablas de bateador, líneas de grado y niveles para hacer que la pared acabada sea plana y lisa”, dice el gerente de proyecto Brendan Falls. “En este caso, están usando una paleta manual para llevar la escopeta húmeda al patrón predeterminado elegido por el estado”.

A diferencia de la pared de uñas del suelo detrás de ella, que es de construcción descendente y construido utilizando capas horizontales, el acabado escul-

pido de escopeta se aplica a través de toda la pared sin ningún patrón particular. Los nozzlemen de escopeta trabajan principalmente desde los levantamientos, disparando hasta 70 yd³ (54 m³) de material en un solo día.



La retención de la tierra de UMA y el trabajo esculpido de la escopeta en el proyecto de mejoras de intercambio I-40/I-77 de NCDOT mantuvieron los cortes para tramos de carreteras más ampliados y facilitaron la construcción de nuevos puentes.



Craftspeople in man baskets performed all sculpted shotcrete work by hand, from spraying material to carving the artistic patterns.



Shotcrete nozzle men worked primarily from manlifts, shooting up to 70 cubic yards of material in a single day



Once the soil nail wall was constructed, several layers of shotcrete were placed in front of it prior to carving the ashlar finish into the final two-inch layer

“The crew worked in man baskets with grade lines and levels along with trowels to finish out the pattern,” explains Falls. “The level ensures straight lines in the pattern and verifies that the surface is flat and smooth.”

Once the soil nail wall was constructed, several layers of shotcrete were placed in front of it. UMA started by attaching horizontal and vertical rebar in a grid pattern and applying a 6 in. (150 mm) layer of shotcrete for the temporary facing. Another 6 in. structural layer was sprayed on next to construct the permanent wall facing. The actual carving of the pattern took place after the last 2 in. (50 mm) layer was placed.

Despite weather delays, UMA finished the sculpted shotcrete walls on the I-77/I-40 Interchange on schedule in March 2020. Drivers on this heavily traveled new interchange may need some time to learn the new traffic patterns, but at least the view will be good.



Brian DeSpain is the president of UMA Geotechnical Construction and has been part of the geotechnical construction community since 2003. With a background in construction management, geotechnical engineering management, and strategic planning, he brings wide-ranging experience in the sales, field operations,

and management of deep foundation and geotechnical grouting operations. Brian also has extensive experience with grouting equipment, hydraulic equipment, hydraulic equipment design, drilling equipment, polyurethanes, deep soil stabilization and foundation stabilizations of large commercial buildings, tunnels, and highways.



Artesanos en canastas de hombre realizaron a mano todo el trabajo esculpido de la escopeta, desde el material de pulverización hasta el tallado de los patrones artísticos.



Los nozzlemen de escopeta trabajaban principalmente desde los levantamientos, disparando hasta 70 yardas cúbicas de material en un solo día.



Una vez construida la pared de la uña del suelo, varias capas de excreta fueron colocadas delante de ella antes de tallar el acabado del ashlar en la capa final de dos pulgadas.

“La tripulación trabajó en canastas para hombres con líneas y niveles de calidad junto con las paletas para terminar el patrón”, explica Falls. “El nivel garantiza líneas rectas en la matriz y verifica que la superficie es plana y lisa.”

Una vez construida la pared de la uña del suelo, se colocaron varias capas de excreta delante de ella. UMA comenzó mediante la fijación de una barra de refuerzo horizontal y vertical en un patrón de cuadrícula y la aplicación de una barra de refuerzo de 6 pulg. (150 mm) de capa de hormigón para el revestimiento temporal. Otra capa estructural de 6 in. Se rocía en el lado para construir el revestimiento permanente de la pared. La talla real del patrón se realiza cuando se coloca la última capa de 2 pulg. (50 mm).

A pesar de los retrasos climáticos, UMA terminó las paredes esculpidas de escopeta en el Intercambio I-77/I-40 en marzo de 2020. Los conductores de este nuevo intercambio muy transitado pueden necesitar algún tiempo para aprender los nuevos patrones de tráfico, pero al menos la vista será buena.



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