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Highlights of Recent Experience

Micropile Foundations
Rembco provided a complete design-build micropile foundation system for a 600,000 SF building in an area with great sinkhole risk. The deep foundation system was provided on an extremely fast schedule with only 8 weeks from bid solicitation to completion. Four drilling crews worked 6-day weeks, around the clock, to complete the project ahead of schedule. 555 micropiles (approximately 23,500 lineal feet of casing) were installed in 18 working days. Rembco completed design engineering, secured materials and mobilized to the site in 12 days following notice to proceed. A complex system of vertical and battered piles ranging in size and capacity from 5.5" diameter and 100 kip, to 9-5/8" diameter and 600 kip was used. This design reduced the number of piles from the owner's engineering estimate by 15%, providing a cost and schedule savings.
Type Facility: Distribution Warehouse
Location: – Portland, Tennessee
Approximate Value: $2,000,000 – 2006

Specialty Grouting, Chemical Grouting (Water Stoppage)
Stopped a 350 gpm ground water leak in a rock seam of a coal mine slope tunnel. Grout ports were drilled to intersect the seam at a depth of 10 feet into the rock. 140 gallons of expanding, hydrophilic polyurethane grout was pumped into the leaking seam. Drilling was provided by the mine. Supervision and grouting was provided by Rembco.
Type Facility: Coal Mine (Slope)
Location: Joliet, Illinois
Approximate Value: $40,000 – 2007

Cap Grouting, Compaction Grouting (Sinkhole Remediation)
At a solid waste composting center, three connected sink holes drained a 4-million gallon process water pond. This caused slope failures in an earthen dam between two ponds. Rembco advanced over 8,000 lineal feet of casing to bedrock, and injected 2,700 cubic yards of mortar-like grout to cap solution features and improve overburden soils. The pond was restored to full service without incident.
Type facility: Solid Waste Treatment Facility
Location: Knoxville, Tennessee
Approximate Value: $750,000 – 2005

Slope Stabilization, Soil Nailing, Rock Anchoring
Rembco completed multiple projects for a major retail department store. Approximately 150,000 SF of unstable cut face was stabilized using rock bolting with shotcrete facing, rock anchoring, rockfall protection systems, soil nailing, and shotcrete. Project value ranged from $100k to approximately $2M. Soil nail retaining walls ranged in size from 5,000 SF to 12,000 SF with lengths of up to 500 feet and heights up to 35 feet; many had residential properties directly above. Many designs were affected by property lines or utility rights of way. Rock slope stabilization and rock fall protection systems have been completed on cut rock faces up to 125 feet high. Rock anchors were used to construct a cast-in-

place tieback retaining wall with a height of up to 60 feet. Multiple tiers of rock anchors were installed to support the 400 foot long, 15,000 SF retaining wall.
Type Facility: Large Retail Stores
Locations: Bowling Green and Hazard, Kentucky
Clarksburg, West Virginia
Knoxville, Johnson City, Maryville and Nashville, Tennessee
Approximate Value: $5,000,000 – 2004 to 2007

Anchored Pile & Lagging Retaining Walls
Rembco has constructed multiple anchored tieback pile-and-lagging retaining walls to arrest active slope failures and to expand existing right of way for a major railroad company. The work is located at multiple sites in Tennessee, Georgia, and West Virginia. Retaining walls range in size from 5,000 SF to 25,000 SF and have been constructed alongside active mainlines without interfering with the daily operations of the railroad. Wall heights of up to 30-feet were constructed above and below track level. Solid-bar and wire strand anchors were used for permanent wall construction. Anchors were installed into the native bedrock at each site and then tensioned and tested. Lagging and walers were constructed using both concrete and timber.
Type Facility: Rail Road
Locations: Whiteside, Tennessee. Hooker, Georgia. Lanta, West Virginia.
Approximate Value: $5,000,000 – 2005 to 2007

Soil Nails and Rock Anchors
Rembco performed design-build construction on multiple retaining walls along interstate highway interchanges in Knoxville, Tennessee. The construction included both soil nails and rock anchors that were designed and constructed by Rembco. Retained height was 45 feet on a19,000 SF wall that had a major hotel located above. Active horizontal anchor slabs were used to prevent basal heave in the poor soil conditions. Secondary walls were as large as 12,000 SF with a retained height of 35-feet with a 2h:1v slope and highway above.
Type Facility: Interstate Highway
Location: Knoxville, Tennessee
Approximate Value: $2,000,000 - 1999

Anchored Sheet Pile Wall
Rembco has completed a tieback sheetpile wall alongside a canal to provide a barge loading area. The tieback wall utilized driven sheets with soil bonded tieback anchors to resist the crane surcharge loads. Extending for a total length of approximately 800 feet along the canal bank, the tieback wall had a retained height of up to 20 feet with a crane surcharge load of up to 1,000 kips near the top of the wall. Tiebacks up to 100 feet long were installed using mud-rotary drilling techniques in the sands and marine clays alongside the canal. Drilling was completed by reaching over the top of the driven sheet pile above the canal's waterline.
Type Facility: Ship Loading Dock
Location: – Port Allen (Baton Rouge), Louisiana
Approximate Value: $3,000,000 – 2007

Compaction Grouting
Compaction grouting was used to improve the ground where a new building was to be constructed. 209 injection casings were advanced through the poor overburden soils into bedrock. As the casings were retracted, a total of 9,700 cubic feet of low-mobility grout was injected at controlled pressures to fill voids and compact surrounding soils.
Type facility: Academic Building
Location: Roanoke, Virginia
Approximate Value: $270,000 – 2006

Cap Grouting, Compaction Grouting (Sinkhole Remediation)
The floor slab and interior columns of a large distribution warehouse had subsided up to seven (7) inches in three separate areas. The extent of the affected areas totaled approximately 150,000 square feet (SF) of the 600,000 SF facility. A structural analysis revealed that the stresses induced by the subsiding columns jeopardized the capacity of the

roof system, mandating that the columns be lifted to their original positions. A geotechnical investigation identified sinkholes as the cause of the ground loss into the karstic bedrock, 40 to 70 feet below the building. Casings were advanced to bedrock on a grid pattern to achieve complete coverage of the solution features. Over 12,000 cubic yards of grout were produced in Rembco's mobile batch plant and injected to cap the bedrock, fill voids in the overburden soils, and heave the slab and column footings to the desired elevations. Operations were conducted around the clock to minimize disruption and downtime for the client.
Type facility: Industrial Warehouse
Location: Philadelphia, Pennsylvania
Approximate Value: $1,900,000 - 2004

Specialty Grouting, Chemical Grouting
Performed specialty grouting services for water stop and soil improvement around a troublesome joint in an existing 96" diameter concrete pipe buried approximately 20 feet below the ground surface. Approximately 270 gallons of polyurethane resin were pumped through multiple ports to fill the voids and stop the leaks.
Type facility: Steel Mill
Location: Schererville, Indiana
Approximate Value: $36,000 – 2005

Radioactive Waste Grouting
Radioactive waste trenches were sealed with cement, microfine cement and acrylamide grout to "lock" it into place. The injection system included 700 sleeve pipes and a manifold that allowed up to eight simultaneous injections. Synchronized, multiple passes were conducted with a computerized data acquisition system. In-situ hydraulic conductivity measurements confirmed our success in reaching target levels.
Type facility: Federal Research Facility
Location: Lawrenceburg, Tennessee
Approximate Value: $1,000,000 – 2006

Excavation Support and Micropiles
Designed and installed a temporary shoring system, adjacent to active, heavy industry, for excavation 25 feet below grade. The total area of the excavation sidewalls was approximately 25,000 SF. Surcharge loads such as equipment foundations and building columns were included in the design of the shoring system.
Following completion of the excavation support system, Rembco provided a complete design-build system of micropiles to provide support for new furnaces. The micropile system met stringent design requirements to limit the differential settlement due to elastic behavior of the piles while transitioning between many different load cases. A complete finite element model for the furnace foundation was used by Rembco to provide the best possible solution for the difficult loading conditions. Most piles were 9-5/8" micropiles with a working capacity of up to 600-kips. Smaller piles were also used to balance the performance of the system. The design accommodated variable bedrock profile and met deflection requirements for industrial equipment foundations.
Type Facility: Heavy Industry
Location: Alcoa, Tennessee
Approximate Value: $2,000,000 – 2007/2008