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OBAMA UNVEILS \$302-BILLION TRANSPORT BILL

PEER-TO-PEER EQUIPMENT RENTAL ROLLOUT

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HAKIM ASSUMES TOP SLOT AT N.J. TRANSIT

ENR FUTURETECH SPECIAL REPORT

ROBOT WORKERS

FINDING THEIR WAY TO THE JOBSITE

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XYPEX CHEMICAL CORPORATION
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Malcolm Drilling installed 5-ft secant piles for the TBM launch pit at SR 99 in Seattle.

Underground I

Digging Deep

Innovative technologies and products drive an increasingly busy foundation sector

By Karin Tetlow

What's Inside

UNDERGROUND TRENDS
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Ground Improvement Technologies and Cost-Effective Products Help Boost Underground Construction

Recent headlines focus on the world's largest tunnel boring machines on location in Seattle and London. Yet equally newsworthy is the growth of the underground construction sector and the products and technologies that stabilize foundations, permit environmentally responsible urban infrastructure and drive new markets around the globe.

High-rise complexes are changing skylines from San Francisco to Philadelphia, multifamily construction is on the rise, petrochemical industries are fast reemerging, and investment in heavily urban transportation projects is unprecedented. All of which are not only expanding demand for foundation work, but are requiring innovative foundation solutions.

"With the worldwide trend of increasing awareness of seismic risks, our clients are increasingly focused on mitigating the effects of soil liquefaction," says Kord Wissmann, Ph.D., president of Geopier, which has developed several ground improvement systems. He points out that there is a growing trend to use more cost-effective approaches that reduce liquefaction while addressing dynamic differential settlement such as that which occurs with wood mid-rise multifamily housing and its heavily loaded concrete parking structures.

In situ mass stabilizing methods where soil is mixed with cement or oxidizing binders are gaining in popularity. This is especially true for remediation projects where, according to the EPA's 1913 Superfund Remedy Report, ex situ treatments have decreased since 2005 in favor of in situ soil remediation.

Another practice in demand is crystalline technology that waterproofs concrete by using a chemical reaction to plug the capillaries that run through the material. While not new it has had a marked growth in acceptance in the past five years for use in sewer and water tunnels and deep foundations.

"It has reached a tipping point and is



ISCO supplies HDPE for municipal, waterworks, industrial, gas and a number of other applications.



Geopier provides liquefaction mitigation at A-1 Storage in San Diego, Calif.

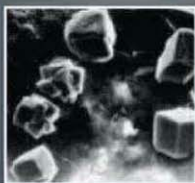
now specified and used on thousands of diverse waterproofing projects around the globe, a testament to the original concept we developed some 40 years ago," says Les Faure of Xypex Chemical Corp.

Today's high-density polyethylene (HDPE) pipe is a far cry from the clay sections still found in some underground waste systems. "In the past decade and a half there has been tremendous growth in a number of industries," says Scott Lindsay, director of Global EPC Sales for ISCO Industries, global supplier of HDPE products and services. "It can be used in

just about any water or gas application from infrastructure to petrochemicals to mining. It's non-toxic, corrosion and chemical resistant, has seismic ability and a long design life." International demand includes nuclear power in China and Vietnam, and petrochemical and mining projects in the Middle East, South America, Australia and Africa. He sees a huge market for it resulting from the boom in the liquefied natural gas market, which he predicts will be a game changer for transportation and energy infrastructure in the U.S. and globally. ■



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Waterproofing Foundations

Construction began for the new **University of Iowa Children's Hospital** in the fall of 2012. Plans include expanding existing programs and developing new services on-site and throughout Iowa. Designed by Heery International, the new structure costing approximately \$292 million, will have 480,000 sq ft in new construction plus 56,250 sq ft of renovated existing space. Two of the 14 floors are below ground. Adjacent to the building is a four-story underground garage.

The foundations will have approximately 4,000 cu yd of concrete containing Xypex Admix C-500 waterproofing used on the exterior foundation, columns and levels 1, 4 and 12. Heery International specified Xypex, though the site has an average water table, because it is a University of Iowa construction standard adopted after several years of successful use for



Foundations of the University of Iowa Children's Hospital will be waterproofed with Xypex.

all University underground structures. Xypex Admix is blended into the concrete mix at the time of batching to waterproof and protect concrete from the start. It creates a crystalline structure deep within the pores and capillary tracts of the concrete mass to prevent the penetration of water and aggressive chemicals. In contrast, barrier-type products, such

as membranes and cementitious coatings, function only at the surface of the concrete. Less costly to apply than most other products, Xypex, is resistant to extreme hydrostatic pressure from either positive or negative surface of the concrete, and can be applied in any weather.

The target completion date for the new hospital is March 2016. ■

PHOTO: XYPEX



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*U.S. Patent Pending



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