



FOUNDATIONVIEW



Foundation, Crawl Space & Basement Solutions for Design Professionals

- Volume 3
- Issue 3
- August 2014

2 Case Study:
Eddystone Continued

3 Leed Certification

4 The PolyLEVEL System

FULL STEAM AHEAD: *Eddystone Rail Project*



America is actively exploring its ability to produce new forms of energy while decreasing its reliance on foreign sources. The Eddystone Rail Project is one such venture developed in response to the country's changing supply and demand patterns. East Coast refineries have long sought access to growing supplies of crude oil produced in the U.S., specifically the Bakken region of North Dakota, to avoid paying higher prices for imported oil. With a goal of expanding access to long-term, economical supplies of crude petroleum produced domestically, the Eddystone Rail Project would distribute oil throughout the Philadelphia-area refinery market, which represents a key segment of the East Coast's almost one million barrels per day of refining capacity.

Challenge

Located on a former coal plant, Eddystone Rail, now a trans-shipment facility, was redesigned to receive Bakken crude delivered via rail from North Dakota oil fields. The crude would be transferred by pumps and a system of piping from rail cars to barges and shipped up the Delaware River to multiple East Coast refineries including New York and New Jersey for processing. The project site was situated in a heavy industrial area near the north bank of the Delaware River, generally between Philadelphia, PA and Wilmington, DE.

An extensive geotechnical study revealed the overall site was underlain by old fill, comprised of sandy soil material containing rubble, debris and coal fragments. Soil test boring indicated the fill depths ranged from 15 feet up to 35 feet. Beneath the fill was an alluvial deposit of silt and sand, directly underlain by bedrock. Due to the close proximity of the site to the Delaware River, groundwater was at a shallow depth below the site surface.

As a result of directly adjacent excavation activities, two Air Eliminator Pads associated with Pump Pits "A" and "B" had settled inconsistently. Both pads (3'-0" thick and measured 11'-0" x 12'-4") were constructed on four (4) geopiers, also referred to as rammed aggregate piers. However, when the soil lateral confinement was lost during trench excavations, the geopier reportedly compressed and shifted outward toward the excavation.

Although the excavations were quickly backfilled, the Structural Engineer of Record (SER) was concerned with long-term foundation pad alignment and stability and recommended that both pads be underpinned using eight (8) push piers on each pad. Since this was a very time-sensitive project with critical scheduling of different trades, the SER contacted Foundation Supportworks Inc. (FSI) in Omaha, NE for direct consultation. FSI quickly put the SER in contact with JES and within the same day the SER was provided with a general scope-of-work and concept drawings of the underpinning pier system. Within a week, JES had performed a site visit to assess the problem.



One (of two) Air Eliminator Pads that experienced settlement as a result of directly adjacent excavation activities.



Critical pipe connections needed to be aligned and stabilized.



Thank You for Your Referrals!

Our commercial/industrial division grew considerably in 2013 thanks to you and your confident referrals. We hold your referrals in the highest regard. JES specializes in the design and installation of foundation support systems for new construction and structural rehabilitation. We also offer poly-leveling, commercial crawl space encapsulation and many other related foundation services.

Contact Director of Engineering, Dave Stinnette, PE directly at dstinnette@jesnow.com.



JES Trusted Partners

JES is looking for strategic business partners within our industry such as engineers, designers, architects, property management and real estate professionals that share in a commitment to service excellence. The purpose of JES Trusted Partners will be to strengthen referral relationships as well as to share resources and information. Each JES Trusted Partner will be showcased on our new commercially focused website for their area of specialty later this summer. For more information on becoming a JES Trusted Partner, contact Eric Lackey at elackey@jesnow.com.

CASE STUDY: *Eddystone Rail Project*



FSI Model PP 288 Push Piers being driven around the Air Eliminator Pads through a Flush Mount Bracket.



5,000 psi mix concrete is poured into the Push Pier sleeves to add rigidity and strength.



PolyLEVEL is applied via an injection process through a series of pre-drilled holes in the Eliminator pad. These holes are methodically placed to provide fill in the proper areas.



The PolyLEVEL fill is monitored through the injection process to ensure proper application. PolyLEVEL is visibly filling gaps and crevices caused by settlement.

Solution

Through design consultation with the General Contractor, SER and FSI design staff, JES determined the best underpinning system would be the FSI Model PP288 Push Pier and a Flush Mount Bracket attached on the side of the 3' thick mat foundation at the prescribed locations indicated by the structural engineer. The Push Piers would be installed to rock or suitable bearing material (+/- 30'). Since groundwater was close to the surface, by using the Flush Mount Bracket, JES would eliminate excavation below the bottom of the pad foundation. The design working load on each pier was 15 kips.

As discussed with the SER, Pad A needed to be lifted several inches on one end to establish an acceptable service elevation. Pad B only needed to be stabilized in its current position. For added pier/tube system rigidity (both throughout its length and at the bracket), and to increase the factor of safety against pier tube buckling, JES filled the pier tubes with 5,000 psi bag mix concrete. The tubes were filled every six feet during pier driving. In order to maintain uniform bearing underneath Pad A after it was lifted, JES injected PolyLEVEL® (Expanding Polyurethane Foam) through injection ports on top of the foundation pad. To facilitate the injection process, JES worked with the PolyLEVEL® design team at FSI and determined that eight (8) injection ports would be required for proper PolyLEVEL® distribution. Due to the thickness of the Pad foundation, a 1-3/8" rock drill was used to pre-drill the injection holes. The injection ports were then glued to 36" long 3/4" PVC tubing which was installed through the pre-drilled holes. This allowed the PolyLEVEL® to be directly injected beneath the pad.

Survey data points were determined by the General Contractor before and during the underpinning process. A total of sixteen (16) FSI Model PP288 Push Piers were installed. The piers extended to depths of about 22.5' to 28.5' for Pad A and 28.5' to 37.5' for Pad B. Pad A was lifted between 1" and 3", as directed by the survey crew monitoring the lift and establishing the desired elevation and alignment. Approximately 95 pounds of PL250 PolyLEVEL® was injected underneath Pad A.

LEED CERTIFICATION

Going for the Gold!



LEED, or Leadership in Energy & Environmental Design, is a green building certification program that recognizes best-in-class building strategies and practices.

JES recently participated in a new construction project at Hearst Elementary School in Washington, DC where the General Contractor is pursuing LEED® Gold Certification. The school needed more space to accommodate its enrollment capacity and required the construction of new buildings. In addition to creating a stable structure suitable for learning and teaching, the goal for this project includes securing a LEED Gold Certification for Building Design and Construction (LEED BD+C). The U.S. Green Building Council's LEED, which stands for Leadership in Energy and Environmental Design, is an internationally recognized certification program that uses different categories to rate a building's design, construction, operation and maintenance.

Though construction is ongoing at the school, JES completed the installation of Foundation Supportworks Inc. (FSI) Model HP 450 Helical Piles, which contain approximately 80 percent recycled content. Helical piles are deep foundation underpinning systems constructed using steel plates to provide long-term support. Recommended by experts as a time-saving and cost-effective alternative to foundation replacement, FSI helical piles are made of steel—a material constantly incorporated into a wide array of applications throughout its life cycle. Since steel is recyclable and made to exact specifications, its use helps minimize on-site waste and earn points toward certain levels of LEED certification.

Further supporting the effort to secure LEED Gold, material bins are strategically placed at the project site to divert a minimum of 75 percent of all construction waste away from landfills by recycling, donation or reuse. Waste reduction strategies have been implemented to ensure economical use of lumber, drywall, tile, metals, insulation and other building materials. Each bin has a designated handler responsible for recycling its contents. The waste management plan was reviewed and enforced by all parties involved prior to starting the project. Operation Go for the Gold is in full effect!

Over the years, there has been a concerted effort to establish recycled content recommendations in a variety of construction products and projects. Today sustainability and energy efficient are not simply buzzwords, but rather guiding principles for making the best use of available materials and avoiding waste whenever possible. As environmental concerns take center stage against a backdrop of growing discussions about climate change and energy conservation, recycled materials are quickly becoming an essential component of successful and responsible business strategies.

By increasing the amount of recycled and regional material used for a project, LEED certification can become a reality for building owners and operators hoping to decrease the environmental impacts of virgin materials. LEED certification requires stringent documentation, and the results can be well worth the investment. Driving innovation, improving indoor air quality, reducing costs, saving energy and decreasing water consumption are each appealing in their own right.

As the AEC industry takes steps toward improving its recycling collection methods and waste management strategies, companies can create their own modern green initiatives and earn points toward a credential that offers social, economic, environmental and business rewards.

Benefits of Helical Piles

Helical Piles are versatile, cost effective and lasting deep foundation solutions for a variety of applications. They can be installed in tight places and with small equipment compared to more conventional foundation repair methods. With built-in quality controls and torque-to-capacity monitoring, it is no wonder Helical Piles are gaining in use and popularity.

- Rapid installation
- Immediate load capacity
- Installation in high groundwater
- Installation with traditional equipment
- Environmentally friendly
- No soil cuttings
- Minimal site disturbance
- Minimal cleanup
- Installation in limited access and low headroom areas
- Installation monitoring as QC



The PolyLEVEL® System: Avoid unwanted trips



PolyLEVEL is a demolition free means to correcting sinking sections of concrete. PolyLEVEL is a less disruptive alternative to replacement with remarkable results!



JES provides concrete leveling services for commercial, municipal, industrial and residential properties to prevent safety hazards and restore external appearance. The PolyLEVEL® System is a proven concrete lifting technique that repairs sinking or settling concrete using a specially-engineered, high-density polyurethane. PolyLEVEL® consists of two liquids that are combined at the injection nozzle to form a powerful expanding foam to stabilize and level concrete sidewalks, floors and foundations. Used as a more affordable and effective alternative to slabjacking and mudjacking, PolyLEVEL is injected into small holes in the damaged concrete, where it expands and lifts the slab to the desired level. Once the injection is complete, the holes are cleaned and patched—all done! This simple procedure saves time, money and helps property owners avoid the hassles associated with injury claims. Contact JES today to learn more about our concrete leveling services.

Benefits

- Cost-effective, less expensive than concrete replacement
- Resolves unattractive safety hazards with little disruption
- Lifts sidewalks, basement floors, office floors, driveways, footings, patios, garage floors, pool decks and warehouse floors
- Supports weight within 15 minutes, whereas traditional mudjacking takes a whole day
- Contractors are able to control how much the concrete is lifted
- Associated equipment is relatively compact and self-contained.
- The PolyLEVEL® injection foam is simple to use and does not leave a mess
- No harmful chemicals released
- No additional weight on unstable soil
- Will not wash away once it is set

If you'd like to book a JES expert to speak at your company or industry meeting, go to www.jeswork.com/professional-resources/speakers-bureau.aspx

The mid-Atlantic's premier engineered solution expert for foundation repair, new construction deep foundation installation, crawl space moisture management and basement waterproofing.

www.jeswork.com
569 Central Drive, Suite 200
Virginia Beach, VA 23454

