

DELIVERING SUCCESS

Winter 2008

Terracon

Building the St. Anthony Falls I-35W Bridge

On August 1, 2007, the I-35W Bridge over the Mississippi River in Minneapolis, Minn., collapsed killing 13 people and injuring 100 others. Just days after the collapse, the Minnesota Department of Transportation (Mn/DOT) began planning a replacement bridge, eventually naming it the St. Anthony Falls I-35W Bridge.

Construction of the new bridge began on October 29, 2007. Mn/DOT chose to accelerate construction of the I-35W Mississippi River replacement bridge project using the design-build procurement process. Design-build projects allow for the overlapping of design and construction, so construction can begin after only a portion of the final detailed design has been completed. For contractors and consultants, the aggressive design-build schedule requires fast mobilization and even faster turnaround on design and implementation.

On November 20, two days before Thanksgiving, Elie H. Homs, P.E., vice president of engineering services for Flatiron Constructors, Inc. (FCI), contacted Dave Harwood, P.E., one of Terracon's transportation sector leaders. FCI is one of the lead builders of the new I-35 bridge as part of a joint venture with Manson Construction Co. The team needed a shoring design for the bridge, a critical component to construction on one of the bridge bents. Calling on a national firm with considerable resources such as Terracon proved beneficial to FCI.

"Terracon has always been responsive to our requests to mobilize their design staff and field crews on very short notice and to work under challenging conditions in order to provide us with critical geotechnical services on a timely basis," Homs said.

"A call to the sector leadership can obtain results anyplace we service," Harwood said. Within eight hours, Swaminathan Srinivasan, P.E., senior principal, and James Wang, P.E., principal, two shoring design experts from H.C. Nutting (a Terracon company) Cincinnati office, were on a flight to Minneapolis.

(continued on page 2)



Rendering of St. Anthony Falls I-35W Bridge

(Building the St. Anthony Falls I-35W Bridge, pg. 1)

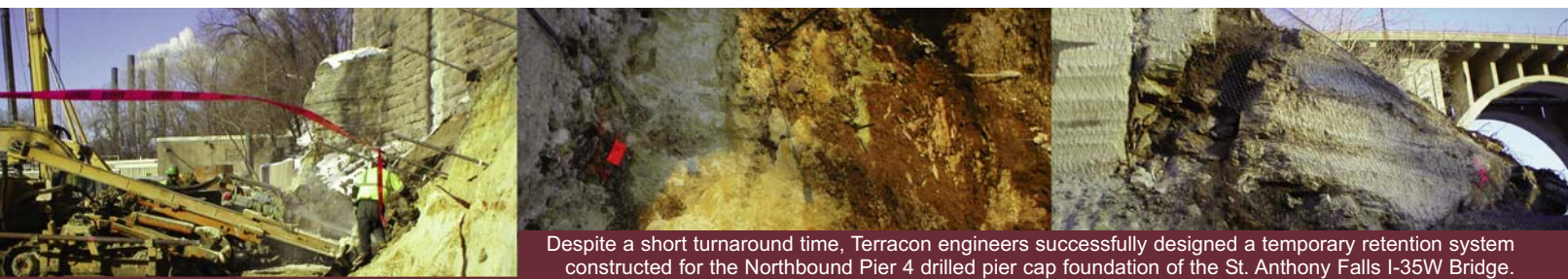
Homsi said that his previous experience with Terracon made him confident that he would get the service he needed. “Terracon has always been responsive to our requests to mobilize their design staff and field crews on very short notice and to work under challenging conditions in order to provide us with critical geotechnical services on a timely basis,” Homsi said. Terracon engineers did not disappoint and completed the design during the Thanksgiving holiday weekend to keep the project on schedule. A preliminary design was completed on November 23 and finalized on November 26, meeting FCI’s deadline.

To complete the project, Srinivasan and Wang designed a temporary retention system for the Northbound Pier 4 drilled pier cap foundation. Working with FCI, Mn/DOT, and the FHWA, Terracon completed and implemented the entire design in 15 days from design to start of construction. The temporary shoring system consisted of an open-cut excavation, 52 feet at its highest point, in the competent limestone and rock nails in the uncemented sandstone and weak shale outcrop. The rock nails consisted of No.10 Grade 75, 20-foot long Williams All-Thread bar installed in a 4-inch diameter hole.

Construction of the design began on December 5, just hours after Mn/DOT approved the design. Steve Gerber, P.E., geotechnical department manager in Terracon’s Minneapolis office, provided construction field observation to verify that the assumed soil/rock conditions were valid.

In addition to the shoring design, FCI hired Terracon to assist with some difficult drilling that was falling behind schedule. With one day’s notice, Terracon mobilized a drilling rig from its Cedar Rapids, Iowa, office and hired an additional local subcontract driller to complete the necessary drilling and return the project to its schedule. Drillers battled difficult weather and subsurface conditions to obtain high quality samples that exceeded expectations and production rates that had previously been unattainable.

“They mobilized drilling rigs from out of town with one-day notice, worked (both design and drilling) over the Thanksgiving holiday, and stayed on the job through freezing temperatures and a snow storm until the work was done,” Homsi said. The drilling and coring work was completed on December 3.



Despite a short turnaround time, Terracon engineers successfully designed a temporary retention system constructed for the Northbound Pier 4 drilled pier cap foundation of the St. Anthony Falls I-35W Bridge.

“They mobilized drilling rigs from out of town with one-day notice, worked (both design and drilling) over the Thanksgiving holiday, and stayed on the job through freezing temperatures and a snow storm until the work was done,” Homsi said.

The American National Standards Institute describes shoring as “the vertical supporting members in a formwork system.” According to the Steel Scaffolding and Shoring Institute (SSSI), the shoring directly supports the formwork and transfers the load of the concrete to a firm support below, such as a completed floor in a building, or to the ground, as would be the case in a concrete bridge.

“Typically a shotcrete facing is preferred for load transfer; however, due to extremely cold weather conditions and speed of construction along with associated costs, we were asked to come up with a creative facing solution,” Srinivasan said. The facing consisted of a Mn/DOT Class IV non-woven geotextile and Tecco steel wire mesh. Terracon also recommended installing a chain link fence over the entire excavation face for surface protection.

St. Anthony Falls I-35W Bridge Design Features (courtesy of www.mndot.gov).

- 100-year life span
- 10 lanes of traffic, five in each direction—two lanes wider than the former bridge
- 189 feet wide—the previous bridge was 113 feet wide
- 13 foot wide left shoulders and 14 foot wide right shoulders—the previous bridge had no shoulders
- Light Rail Transport-ready which may help accommodate future transportation needs
- Design-build project complete in 437 days
- Designed to be aesthetically pleasing and fit in with its environment
- Structural enhancements, including the use of high performance concrete to provide superior durability and multiple levels of structural redundancy to provide a long-lasting bridge for the future that will be economical to maintain
- A state-of-the-art sensor and monitoring system built into the bridge that will allow for easier and more comprehensive monitoring throughout the bridge’s lifetime
- A comprehensive safety program that will be implemented throughout all aspects of the design and construction process



Department of Homeland Security Finalizes List of Chemicals of Interest

Beth Pierson, Project Manager, Regulatory Compliance, Omaha, Neb.

The Department of Homeland Security (DHS) promulgated a Chemical Facility Anti-Terrorism Standard in the April 9, 2007, Federal Register and finalized the list of Chemicals of Interest (COI) in the November 20, 2007, Federal Register. The regulations are intended to enhance the security of the United States by lowering the risk posed by certain chemical facilities.

Chemicals of Interest

Regulations apply to facilities that possess a quantity of a listed chemical substance that has been determined by the Secretary of Homeland Security to be potentially dangerous. The COI are listed in Appendix A of 6 CFR Part 27 along with corresponding Screening Threshold Quantities (STQs), the quantity of a COI that triggers reporting obligations under the rule.

Examples of Chemicals of Interest and Quantities

Chemical of Interest	Minimum Concentration	Screening Threshold Quantity or STQ
Acetylene	1%	10,000 pounds
Ammonia (anhydrous)	1%	10,000 pounds
Ammonia (concentration 20% or greater)	20%	20,000 pounds
Butane*	1%	10,000 pounds
Chlorine	1% / 9.77%	2,500 pounds / 500 pounds
Chlorine Dioxide	1%	1,000 pounds
Ethane*	1%	10,000 pounds
Isopentane*	1%	10,000 pounds
Pentane*	1%	10,000 pounds
Propane	1%	60,000 pounds

*Constituent of gasoline and/or propane.

DHS groups COI according to four main security issues: (1) release (including toxic, flammable and explosive); (2) theft and diversion (including chemical weapons, chemical weapon precursors,

weapons of mass effect, and explosives and improvised explosive device precursors), (3) sabotage and contamination, and (4) critical to government mission and national economy.

Mixtures

Rules for calculating the quantity of a COI in a mixture to count toward the STQ differ according to the type of security risk posed by the COI. For some mixtures, if a COI is present at a concentration at or over the minimum concentration level, that quantity of the COI must be counted toward STQ. For other mixtures, the quantity of the entire mixture is counted toward the STQ.

Fuels

For fuels, the National Fire Protection Agency (NFPA) flammability rating determines the calculation method for COI in mixtures. If a mixture has a NFPA flammability rating of 4 and contains a COI at or above the minimum concentration of 1 percent, the weight of the entire mixture must be applied toward the screening threshold. If a fuel is stored in an aboveground tank farm, has a NFPA flammability rating of 1, 2, or 3, and a COI content greater than 1 percent, the amount of the COI in the fuel at or above the minimum concentration would be applied toward the STQ.

Gasoline contains several COI that are present above the minimum concentration level of 1 percent and the NFPA flammable rating for gasoline is 3. Therefore, COI present in gasoline at or above the minimum concentration must be quantified and applied toward their respective STQ. Facility owners and managers should be aware that not all of the COI constituents of gasoline are listed on material safety data sheets. For example, 5,000 gallons of gasoline stored in an aboveground tank weighing 6.25 pounds per gallon with a concentration of 17 percent isopentane contains approximately 5,317 pounds of isopentane to be applied toward its screening threshold of 10,000 pounds.

Propane

DHS increased the STQ for propane from 7,500 pounds to 60,000 pounds, with an additional qualifier that excludes propane in tanks with capacities of 10,000 pounds or less.



Eric Kunz, P.E.

Principal, Office Manager

Eric Kunz, P.E., serves as the office manager of Terracon's Rockford, Ill., office. Eric joined Terracon in 1996. He is responsible for the business development and growth of the office, as well as construction materials engineering and testing and geotechnical project management. Eric is a registered professional engineer in Illinois and Wisconsin. He previously won the Illinois Society of Professional Engineers Young Engineer of the Year award and Outstanding Chapter Member.

Years of Experience:
14

Memberships:
American Society of Civil Engineers (ASCE)
National Society of Professional Engineers (NSPE)
Illinois Society of Professional Engineers (ISPE)

Education:
Bachelor of Science in Physics – Illinois State University
Bachelor of Science in Civil Engineering – University of Illinois



Mike Covert, P.G.

Senior Principal, Corporate Director of Environmental Services

Mike Covert, P.G., serves as the Corporate director of environmental services. He is currently responsible for coordinating all environmental services in the South Central Operating Group, including practice development, revenue growth, and improved loss prevention. Mike joined Terracon in 1998 with the acquisition of HBC Engineering, of which he was a founding principal. He is a registered professional geologist in Texas, Georgia, and North Carolina. As Corporate director, he coordinates Terracon's due diligence practice, including standardization of Phase I ESAs, implementation of Terracon's automated report and proposal system, and training company-wide.

Years of Experience:
27

Memberships:
ASTM E-50 Environmental Committee

Education:
Bachelor of Science – Southern Methodist University
Master of Science – University of Texas at Dallas

Value Engineering Solutions

Scott D. Neely, P.E., Phoenix, Ariz.

This project is about turning silver into gold. Not really, but interestingly the National Gypsum plant being built in Arizona will turn raw gypsum rock into “wallboard.” When completed, the new plant will be capable of producing one-billion-square-feet of wallboard per year, enough to complete 100,000 average-sized homes annually. And at a lower cost due to value engineering solutions.

In September 2006, Terracon's Phoenix office was asked to prepare a geotechnical engineering report for the project. The National Gypsum project included the plant facility, kiln arm, dome for raw material storage, wet end, railroad spur, and off-site roadways. To complete the geotechnical engineering report, n-values, and the AASHTO design approach were used to provide drilled pier load graphs. At the time of the report, the maximum column loads were on the order of 500 kips.

Approximately six months after the geotechnical engineering report was completed, the Phoenix office was contacted by the structural

engineer and was told the maximum column loads for the wet end portion of the facility would be approximately 1,100 kips. The original explorations were not deep enough to provide drilled shaft load graphs that would support 1,100 kips column loads. Upon further discussions with the structural engineer, it became apparent there were numerous heavy column loads across the site that would require exploration to greater depths than originally performed prior to that information being available. The option to use cone penetrometer information to potentially increase the load capacity for drilled shafts on the site was discussed at that time.

The Phoenix office contacted National Gypsum and informed them that there was a good chance of increasing the load capacity of the drilled shafts if cone penetrometer information correlated with a couple of deeper borings that were used. In the end, the Phoenix office increased the load capacity by approximately 50 percent, and saved the client \$250,000 in concrete costs alone. Terracon has also been contracted to perform the construction materials and related testing services through 2008.

“Our decision to use Terracon as our geotechnical engineering source turned out to be a very good one. Terracon was proactive in convincing us to explore other options for testing our soil for load capacity and foundation design which resulted in great savings. We will most certainly use Terracon on our future projects,” said Joe Brown, senior project manager, National Gypsum Company.

Master Service Agreements Make Good Business Sense

Kevin Langwell, Vice President of Client Development

Clients who have needs for multiple Terracon services in various locations are increasingly recognizing the value of establishing Master Service Agreements (MSAs), as opposed to individual proposals/contract terms for each project.

The standard Terracon MSA contains the contract terms and conditions that have been mutually agreed to, along with several related "exhibits." Exhibit A describes the typical project or facility type, Exhibit B describes the scope of services that can be provided under the MSA, and Exhibit C explains the compensation terms, which can be negotiated pricing, or can specify that each job will be bid separately by filling in the price line on a "Task Order" form.

MSAs reduce the proposal generation and review time by 75 percent or more for both the client and the consultant. Once the MSA has

been executed, full proposals are no longer necessary. A simple one page Task Order that references the terms of the MSA is utilized. The client fills in the information on what services will be needed, and provides information on the property type and location. The need for back and forth negotiations on terms and conditions is no longer necessary on a per project basis.

If negotiated pricing is part of the contract terms and the client wishes for Terracon to proceed, they simply sign the authorization to proceed on the bottom of the Task Order, and send it to their Terracon point-of-contact (either electronically or by fax). If there is no negotiated pricing in place, then Terracon fills in the price to perform the service(s) for that particular project/location, signs it, and sends it back (either electronically or by fax). If the scope differs from Exhibit B of the MSA, a separate scope is attached to the order. If the client wishes us to proceed based upon the price submitted, they will sign the authorization to proceed and send back.

For more information on negotiating a MSA with Terracon, contact your local Terracon representative, or call 1-800-593-7777 and ask to speak with someone in the Legal Department about establishing a Master Service Agreement.

(Department of Homeland Security Finalizes list of Chemicals of Interest, pg. 3)

Exemptions

In the final rule, DHS added certain exemptions. Examples of exempt COI include those that are:

- Used as a structural component.
- Used as products for routine janitorial maintenance.
- In process water or non-contact cooling water as drawn from environmental or municipal sources.
- In air either as compressed air or as part of combustion.

Other chemicals of interest may be exempt if contained in certain articles or solid wastes (including hazardous wastes) or are present in a laboratory under the supervision of a technically qualified individual.

Reporting Requirements

If a facility possesses (or had in its possession within the last 60 days) a COI above its STQ, information regarding the COI must be submitted to DHS using the Chemical Security Assessment Tool (CSAT) Top-Screen.

CSAT Top-Screen

DHS developed computer applications designed to collect information from covered facilities. Top-Screen is one of the computer applications in the Chemical Security Assessment Tool (CSAT). A facility must complete and submit a CSAT Top-Screen if it possesses any of the COI at their corresponding STQ. CSAT Top-Screen information must be submitted within 60 calendar days of the effective date of Appendix A (the date it is published in the Federal Register) or within 60 days of when a facility comes into possession of a COI at or above its STQ.

Facilities must be registered with DHS, and then managers must complete web-based Chemical Terrorism Vulnerability Information (CVI) training and sign a non-disclosure statement prior to accessing CSAT Top-Screen. CVI is considered to be secure but unclassified information and must be given protections from public disclosure. DHS has minimum safeguarding standards for individuals who mark, store, control, transmit, and destroy CVI.

Level of Security Risk

Based on information submitted using the online CSAT Top-Screen, the DHS will determine a facility's level of security risk. After entering information into CSAT Top-Screen, the system will generate a message stating the facility may or may not be regulated.

DHS has categorized levels of security risk into four tiers with facilities in Tier 4 posing the highest risk. DHS will notify facilities of presumptive levels of security risk. Depending upon the outcome of the risk determination, a facility may need to develop a Security Vulnerability Assessment, develop a Site Security Plan, or take no further action. Security Vulnerability Assessments must be completed and submitted within 90 days of written notification from DHS. Site Security Plans must be completed and submitted within 120 days of written notification from DHS.

Information regarding user registration, CSAT Top-Screen, CVI, and frequently asked questions is available on the Department of Homeland Security web site at www.dhs.gov/chemicalsecurity.

Please note: This article provides generalized information about the regulation and is not intended to be used as a substitute.

Terracon

Consulting Engineers and Scientists
18001 W 106th Street, Suite 300
Olathe, KS 66061
1-800-593-7777
www.terracon.com

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NEWS Briefs



Iowa River Landing project

Terracon relocated its corporate headquarters on December 10, 2007, from Lenexa, Kan., to Olathe, Kan., in the southwest quadrant of the Kansas City metropolitan area. As Terracon grows by opening new office locations and adding staff in all areas, we remain committed to continually providing a high level of service for clients and employees. The corporate office relocation was necessary to accommodate a growing corporate staff as a result of recent firm expansion. During the last decade, Terracon's nationwide operations have expanded from 45 offices to 98 offices currently. In the last three years, Terracon has added approximately 1,000 employees across the country.

The new Terracon Corporate headquarters' address is 18001 W. 106th Street, Suite 300, Olathe, KS 66061. Telephone and fax numbers remain the same.



Iowa River Landing project

The Iowa River Landing project in Coralville, Iowa, a project that Terracon has provided hundreds of thousands of dollars worth of Brownfields related services on, was recently awarded the 2007 EPA Region 7 Phoenix Award. The project represents more than \$1.1 million in EPA Brownfields grant work and approximately \$100 million in new and planned construction since 1999. The Phoenix Award represents a blend of disciplines, including the environmental consulting community, the public, real estate developers, bankers, economic development agencies, attorneys, plus federal, state, and local governments. The project team will compete nationally for the Grand Phoenix in June 2008. In the 10 years of the Phoenix Award competition, Terracon has been a part of six winning Brownfields project teams.



Artist rendering of cable-stay bridge

The Missouri Highways and Transportation Commission selected the Parsons Transportation Group, which includes Terracon, for the \$245 million kcICON project. It will feature a landmark cable-stay bridge, and will upgrade Interstate 29/35 to six lanes. Six bridges will be widened or replaced along this Interstate as well. Terracon will provide geotechnical services.

Terracon



H. C. NUTTING COMPANY



SPENCER J. BUCHANAN ASSOCIATES, INC.

Contact Us

- To request additional information, call us at 1.800.593.7777
- To change your address
- To add or remove a name from the mailing list
- To provide feedback e-mail the editor at succeseditor@terracon.com