The Minnesota Vikings have a new fan. Walter Krahl might not be sitting in one of U.S. Bank Stadium’s 65,400 seats later this year when the NFL team hosts its season opener, but this Terracon structural steel inspector has been thinking about the Minnesota Vikings 2016 kickoff every day for more than two years.

Walter worked closely with the stadium’s owner representative, Hammes Company Sports Development, Inc., providing structural steel inspections and testing at Alberici’s steel fabrication facility in St. Louis, Hillsdale Fabricators. This specialty fabrication shop, subcontracted by LeJeune Steel Company, created the heavy shape components including the massive ridge truss, supporting columns, and the thrust blocks which were installed as part of the stadium foundation system and entrenched in concrete to support the ridge truss.

“I still like my Rams, but having the opportunity to be involved with the quality inspections on the structural steel components for the new Vikings stadium definitely makes me want to see them do well,” said Walter, a 15-year, certified welding inspector. “The materials we work with support a state-of-the-art facility, and we had to make sure everything was built exactly as designed. I look forward to touring the facility someday and seeing all the pieces that our team worked on put into place.”

Continued on page 2
During every project, team members must be flexible and responsive in the dynamic construction environment—this project was no different. When complete, the U.S. Bank Stadium's 1.8-million-square-foot stadium will contain more than 3,100 tons of structural steel inspected by Terracon. Schedule compliance was critical to the project's success. The fabrication schedule fluctuated, requiring periodic 24-hour production. Walter and the Terracon team were able to deliver not only their expertise but the manpower to properly inspect and test all the structural members—sometimes on a day's notice. Tag-out procedures and constant communication were critical to ensure the structural members were fabricated to meet the project requirements.

"The U.S. Bank Stadium ownership is extremely happy with the way this team came together," said Gregg Johnson, Hammes Company Sports Development, Inc. "Reports were clearly detailed and in our hands quickly which led to no surprises. They were our fabrication shop's eyes and ears and made the owner's interests the focus of their work."

Late in the project similar inspections and testing services were needed at another fabrication shop in Columbia, Tenn., for the massive operable wall system through which fans enter the stadium. Thankfully, Terracon has a national network of qualified, experienced personnel and consultants who we were quickly able to mobilize to complete this inspection as well.

Walter is just one of Terracon's employees providing responsive service, whether to the owner, contractor, architect, or another team member. This personal commitment, combined with a national network of materials experts and resources, means that through their work, Terracon's employees will be supporting the Vikings' new stadium for many years to come.

EXPANDING FACILITIES CAPABILITIES:
Building Exterior Solutions, LLC

Terracon has strengthened our facilities services capabilities through the acquisition of Building Exterior Solutions, LLC (BES) of Texas. Terracon retains BES' 25 employees and maintains offices in Houston and Austin.

BES provides innovative investigation, evaluation, and construction solutions for exterior building systems. BES' experience resolving existing building envelope problems and developing new integrated building envelope designs reinforces Terracon's existing capabilities and strengthens the firm's ability to service clients across the country. BES joins Terracon's network of more than a dozen offices in the state of Texas.
WHEN IT COMES TO GEOTECHNICAL EXPLORATION:
Know Before You Explore

Terracon is applying big data concepts using our vast amount of historical and publicly available data regarding the subsurface to add an important first step in our geotechnical site characterization for project sites. We are predicting what we will encounter in order to maximize the efficiency of your project.

Every day, Terracon exploration teams gather information necessary to design new structures, highways, transmission lines, or other projects, and explore subsurfaces by drilling soil borings, probing with cone penetration devices, pressure meters, and the like. Each year, we generate about 5 million linear feet of new exploration data. This data is continually added to our 50+ years of project information. The aggregate value of this data is more than $1 billion, if collected in today’s fees.

Historically, geotechnical engineers have developed a scope of work to explore the subsurface, soil, rock, and groundwater for construction projects solely based on their personal understanding of the conditions in the vicinity and with little or no research. One could say that we have been applying a type of big data concept for years, but we restricted the curation and retrieval to the human mind and its inherent memory.

Our traditional methods worked well to a point, but as the world now is using sophisticated, digital methods of data storage and retrieval along with ever-more sophisticated algorithms for predictive modeling, simple personal recollections don’t work as well.

We can do so much better. And we are beginning to do just that.

Terracon has Introduced the Report of Expected Geotechnical Conditions (REGC). REGC combines local geotechnical engineers’ expertise with historic exploration data and related information available in the public domain of a project site. All of this data is managed through our proprietary GIS-based systems.

The result is a prediction of the geotechnical conditions that will be encountered, identification of possible geotechnical risks, and finally, suggestions of applicable foundation types for the construction project. Engineers can then consider the thoroughness and consistency of the data and determine how confident they are with the recommendations.

Using the REGC provides many benefits to clients compared to the traditional way of exploring the subsurface. One advantage is the ability to develop a more effective exploration work scope for the project. This can save thousands of dollars in exploration costs.

Clients also have the benefit of a jump start for planning a project. Early cost estimating and route or site selection is much clearer when using REGC to predict the geotechnical conditions. As we learn to benefit from using big data for geotechnical site characterization, we become more confident in foundation design recommendations by comparing what we have encountered to the conditions expected and typical for the area. Greater confidence likely means lower priced foundation systems.

Instead of believing that the next construction site conceals a mysterious unknown subsurface awaiting discovery, the REGC process can take our profession to a level where research and analysis will determine the need to search files and public resources before heading out to the field for exploration. Thus, our teams will be more prepared than ever before to provide our clients with the most accurate information to complete projects the right way.

The Report of Expected Geotechnical Conditions (REGC) combines local geotechnical expertise and historic data, to predict geotechnical risks for our clients.

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VC DONALD, P.E.

Vic Donald is the national director of geotechnical services. He has more than 38 years’ experience in geotechnical and geo-environmental engineering working with clients and geotechnical engineers across the country.
SILICA EXPOSURE LIMITS: Changing the Way You Work

OSHA’s Final Rule lowering the exposure limit of respirable crystalline silica takes effect June 23. Companies have one year to meet compliance guidelines.

Silica is one of the most common, naturally-occurring elements on the planet. It is everywhere and, unfortunately, also known to present serious health hazards to people, especially those working in and around construction sites.

For the past three years, the Occupational Safety and Health Administration (OSHA) has been working to pass a new silica exposure rule. The rule was issued in March and is scheduled to officially take effect June 23. Companies have one year to meet compliance guidelines, and if you are in the construction industry, this rule will probably change the way you work.

Crystalline forms of silica, if disturbed and Inhaled, can cause silicosis, chronic obstructive pulmonary disease (COPD), lung cancer, and even kidney failure. Concrete contains up to 80 percent silica, as does concrete masonry unit (CMU) block, brick, sand, and rock. Even granite, including granite countertops, can contain more than 40 percent silica. Harmful exposures can happen when cured concrete and similar products are cut, drilled, chipped, and hammered, causing the release of airborne silica particles, although any process that generates small airborne particles that can be Inhaled is potentially hazardous. This regulation focuses on protecting workers by limiting their exposure to airborne dust.

The key feature of the new construction industry rule is found within Table 1 at the web address provided below. This table lists 18 common tasks and outlines specific control measures, timelines, and respiratory protection precautions. If employers comply with all the requirements outlined in Table 1, they are not subject to the PEL. Requirements include installing water dust suppression or HEPA-filtered dust collection systems to protect workers using masonry saws, grinders, jackhammers, and drills.

For any tasks where exposure is possible but not identified in Table 1, employers are required to conduct an assessment to determine whether silica concentrations are above the Action Level (equal to half the PEL). If work areas are identified where exposures exceed the Action Level, a written exposure control plan will be required. Those employers who aren’t following the rule may be jeopardizing worker safety and targeting their companies for legal action. Keep in mind those class action lawsuits we’ve all seen trumpeted by the media.

Terracon encourages our clients to begin incorporating appropriate engineering controls and best practices into their projects now. Many construction firms have implemented proactive programs without workplace slowdowns. Being proactive also gives employers time to phase in the purchase of new or upgraded equipment, such as wet saws or HEPA-filtered vacuum attachments. Construction firms and companies that collaborate with their in-house health and safety teams or outside consultants can reduce potential downtime, as well as expenses related to implementation and compliance.

As we have seen with other regulatory roll-outs, many requirements outlined in the new silica standard can seem daunting. But once the initial apprehension has passed and companies commit to protecting the health of their biggest assets — their employees — silica best management practices will become routine and will support the long term success of their businesses.

Learn more about the new silica rule at https://www.osha.gov/silica/.

Alex Peck

Alex Peck is a Certified Industrial Hygienist (CIH) and serves as the industrial hygiene department manager in Salt Lake City. His expertise includes special emphasis on facility safety and health, chemical exposure, hazardous waste site safety and health, indoor air and environmental quality, noise exposure, radiation, microbial contamination and remediation design, Accident Prevention and Site-specific Health and Safety Plans, occupational health and safety, and Internal programs and operating procedures.
Ryder Trauma Center is recognized as one of the world’s leading healthcare facilities and is credited with saving thousands of lives every year as a part of the University of Miami and Jackson Memorial Medical Center. As the only certified Level 1 trauma center in South Florida for both children and adults, Ryder is centered on the principle of lowering the preventable death rate by expediting delivery of care during the crucial hour immediately after injury occurs. So when this facility with a worldwide reputation for clinical excellence began experiencing moisture intrusion issues, they took swift action to create a non-disruptive solution to the problem.

LIFE-SAVING MEDICAL FACILITY FACES MOISTURE ISSUES

When the facility managers of Ryder Trauma Center discovered moisture intrusion issues, they turned to Terracon for a timely and efficient building enclosure diagnosis.

COMBINING FIELD EXPERTISE AND MODELING SOFTWARE

Terracon was retained as the building enclosure and moisture intrusion consultant for renovation of the four-story, 166,000 square-foot free-standing facility. The Ryder building enclosure includes all the systems separating the interior environment from the exterior, primarily consisting of an Exterior Insulating Finish System wall cladding (a synthetic material system in the stucco family), punch type windows and storefront systems, membrane roof systems, and below-grade waterproofing systems. Terracon consulted throughout the project design phase and performed a hygrothermal analysis on the building enclosure systems as part of the design and construction documents peer review.

Hygrothermal modeling is the process Terracon uses to analyze a building’s moisture conditions and the effects of humidity on building wall and roof systems, as well as the responses of those systems and their components based on thermal loading of the outdoor environment. Thermal loading occurs when temperature conditions in a building influence moisture transport, while inversely and simultaneously high moisture levels lead to increased heat loss.

EFFICIENT BUILDING ENCLOSURE DIAGNOSIS

The team reviewed Ryder’s existing facility drawings and compared them with the proposed renovation systems. Terracon identified two individual vapor barriers in the wall cavity: one existing and one proposed as part of the new design. The team determined the existing vapor barrier would create condensation problems in the wall cavity, especially in the hot, humid Miami climate. Next came the challenge of removing the existing vapor barrier. The planned renovation would involve only the exterior cladding and interior finishes, as most of the facility’s systems were scheduled to remain in place. As a result, the only feasible method of vapor barrier removal was from the exterior after the cladding had been removed. All of the vapor barrier could not be accessed from the exterior, so Terracon was tasked with determining the percentage of existing vapor barrier that should be removed to control the location of naturally forming condensation.

Using our hygrothermal modeling capabilities, Terracon completed the building enclosure evaluation and provided the trauma center with moisture intrusion solutions that allow the facility to remain focused on its life-saving mission.

KRISTOPHER LINSTER, LEED AP BD+C, CDT, RRO

Kristopher Linster is the facilities service manager in the Jacksonville, Fla., office. He has been involved in more than 15 building enclosure commissioning projects with Terracon over the last five years. His experience in the investigation, design, and observation of building enclosure systems has become a springboard to providing building enclosure commissioning services to national commissioning firms, owners, and end users. These projects include renovations, additions, and new construction projects with construction costs up to $100 million.
More Than 130 Offices Nationwide

RECOGNIZING CHAMPIONS OF SAFETY

safetyweek 2016
May 2 - 6

Terracon has a personal and uncompromising commitment to everyone going home safe to their families each and every day. Join us in celebrating U.S. Industry Safety Week and the Construction Industry Safety Initiative (CISI). By working together to share best practices and seeking out partnerships with CISI companies, we are championing efforts to keep workers safe on and off the job.

Visit Terracon’s social media sites during Safety Week for daily, shareable messages featuring champion safety practices at work. #2016SafetyWeek