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President's Message

Perry M. Schweiss

Greetings and Happy New Year to all!

2008 is the year we celebrate our highly anticipated Golden Anniversary! This summer, June 17, 2008, marks exactly 50 years since the American Society of Highway Engineers was chartered in Harrisburg, Pennsylvania. Historic records reveal that the first chartering ceremony was only the culmination of two years of organizational meetings that began in 1956.

The first official gathering of the ASHE founding fathers was early 1957, and was attended by seven people, the majority of whom were Pennsylvania Department of Highway employees. The interest and attendance grew and subsequent meetings boasted over seventy people. With the final charter membership count at 105, the American Society of Highway Engineers officially began.

In the past 50 years, ASHE membership has steadily grown. Now the society stands strong with over 6,000 members and geographic boundaries whose roots have spread! From its starting point in Harrisburg, Pennsylvania, ASHE has branched out and where it now encompasses Ohio, New Jersey, Delaware, West Virginia, Maryland, New York, Florida, Tennessee, Virginia, Georgia, Kentucky, North Carolina, and North Dakota.

A detailed history of the Society, including histories of the individual Sections and Regions, is being compiled into a commemorative booklet that will be gifted to all attendees of the upcoming National Conference in Hershey, Pennsylvania.

I have related in previous messages that one of the primary areas of focus this year is encouraging young people in our industry to become involved in ASHE. Specifically, the National Board is exploring the financial support the Society provides for students in collegiate and university transportation programs. Many Sections and Regions offer annual scholarships to students in their areas and I have asked the Regional Directors to compile a summary of all scholarships that are presented each year. As an example of ASHE's generous financial support, Region 6 (comprised of Southern NJ, North Central NJ, Delaware Valley, First State, and NY Metro Sections,) has awarded over $225,000 in scholarships since 1995! Region 6 also dedicated the profits from their 2007 National Conference in Atlantic City to education assistance. Region 6 secured tax-exempt status for the conference by creating a non-profit corporation. This effort produced significant savings that, as per stipulations of the non-profit corporation formed for this Conference, have been used to establish a scholarship fund. The National Board is exploring other opportunities in supporting young people in their pursuit of education and training in all areas of the highway industry.

I am very pleased be a part of an organization which makes membership so affordable and so worthwhile. The support offered to current and future members of our industry through networking and scholarships — all through volunteer time — is invaluable and a true testament to the people that comprise the ASHE organization.

As always, I encourage the membership to share any ideas you may have in improving the services of ASHE by contacting me directly at:

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pschweiss@spkengr.com

Remember...make your reservations early for the 50th Anniversary Celebration at the 2008 National Conference! ■

Rare Procedure Aids Twin Tunnel Job in Pittsburgh

Mary Reed, CEG Correspondent

The usual crowd of interested onlookers won't be watching construction work when Pittsburgh's twin tunnel project gets fully under way.

That's because there will be little to see on the surface once the boring of two 2,400 ft. long tunnels 40 to 60 ft. below the Allegheny River moves full steam ahead.

The tunnels are part of the first phase of the Port Authority of Allegheny County's North Shore Connector project, a $435 million 1.2 mi. expansion of the city's light rail transit system. This new section of the 25-mi. line will eventually link the central business district in downtown Pittsburgh to the rapidly developing North Shore and preserve the ability for future extensions to the Pittsburgh International Airport.

The project also includes reconstruction of retaining walls on the 10th Street Bypass as well as building a trio of LRT stations. In addition, pilings supporting the Route 65 overpass on the North Shore will be replaced by drilled caissons spaced in such a fashion so as to allow room for a cut and cover tunnel to pass between them.

It is anticipated that the entire light rail expansion project will take 4.5 years to complete and once open will carry more than 14,000 riders on weekdays by 2025. This estimated average ridership includes thousands who attend concerts and sporting events held at the Pittsburgh Steelers Heinz Field and PNC Park, home of the Pittsburgh Pirates.

Funding for the project is being provided by the Federal Transit Administration, which is contributing $348 million. The remaining $87 million will come from state and local sources.

The $156.5 million tunnel will be constructed by North Shore Constructors Obayashi Trumbull JV (NSCOT JV), a joint venture formed by Obayashi Corporation of San Francisco, Calif. (headquartered in Tokyo, Japan) and the Trumbull Corporation, based in West Mifflin, Pa. The consortium was awarded the contract by the Port Authority of Allegheny County in July 2006.

This phase of the overall project includes the building of 1,500 ft. of cut and cover section and 2,400 ft. of bored tunnel, extending the existing light rail line by 3,700 ft. In early 2007, open excavation began on a launch pit from which a huge tunnel boring machine will begin chewing out the first of the two tunnels.

Giant Tunnel Boring Machine

The gigantic Shield Machine, which weighs more than 450 tons, has a diameter of approximately 23 ft., and is approximately 30 ft. in length. It was manufactured by the German company Herrenknecht AG, based in Schwanau, Germany, and shipped in early July.

Shield Machines are frequently used to bore through soft ground, a spokesman of North Shore Constructors Obayashi Trumbull JV said.

"The Shield, a thick cylindrical steel plate, is the ground support that prevents the bored tunnel from caving in on the machine and personnel inside the tunnel.

"Although the Shield completely supports the side wall of the bored tunnel around the TBM, the front face of the TBM cannot be fully supported, since excavated material needs to be transported through an opening just behind the cutting face while enough pressure to withstand the ground pressure ahead, and most of the time hydrostatic water pressure as well, is maintained," he said.

"The critical thing is to take out the same volume of ground as the volume just displaced by the TBM advancement," he continued.

"There are several ways to excavate a controlled amount of soil from the face while maintaining the in-situ face pressure at same time."

A similar type of TBM has been used on Seattle's ongoing Sound Transit Light Rail Project, which remains under construction by Obayashi Corporation. However, the borer to be used for the Pittsburgh job has a different approach to maintaining pressure at the cutting face than the TBM operating in Seattle.

"While the TBM in Seattle uses excavated material to balance the earth

pressure in a process called Earth Pressure Balance [EPB] Shield Tunneling, the TBM for this project will use slurry consisting of bentonite and water, along with controlled compressed air.

"Both type of Shield Machines have pros and cons, and we had chosen to go for the Slurry Shield Machine based on our preliminary study for the project conditions," the spokesman added.

How the Shield Machine Operates

During its excavations the Shield Machine will make an S-shaped bend beneath the middle of the Allegheny River to avoid passing under PNC Park, whose home plate sits approximately 443 ft. from the shoreline.

The first tunnel will take approximately six months to reach the opposite shore, after which the boring machine will execute a U-turn and excavate a tunnel back under the river in the other direction.

When boring begins this fall, 20 to 30 field employees will be working each shift of the 24-hour operation with an additional 30 to 50 carrying out structural work in other areas.

The Shield Machine performs a number of operations. The first major task is to excavate the ground at the face and pump out the excavated material to a separation plant located at the ground level.

The tunnel borer moves forward by means of a thrusting force produced by numerous hydraulic jacks connected to the shield and cutter head. Electric motors drive the cutter head. The crushed/shredded/grinded soil and rock from the cutting face will be mixed with the slurry mentioned above, and pumped through a steel pipe for disposal.

The second major task is to erect circular concrete rings, which consist of several precast concrete segments per ring that are assembled within the rear section of the TBM shield behind the TBM. As the completed rings leave the protection of the shield and are exposed to the ground, other TBM equipment will inject cement grout behind the rings to fill the annular void space.

The completed rings also serve as a reaction structure for the hydraulic jacks that thrust the TBM forward. These segments will be shipped to the job site on a daily basis as needed. One ring will typically consist of seven pieces, and the gaskets glued at its joints will be compressed when assembled in place to form a watertight joint, the NSCOT JV spokesman stated.

The TBM's digital guidance system indicates a variety of information on a monitor, including the position of the machine and any deviation from its designed alignment, allowing its operator to control and steer the machine based on continually presented information.

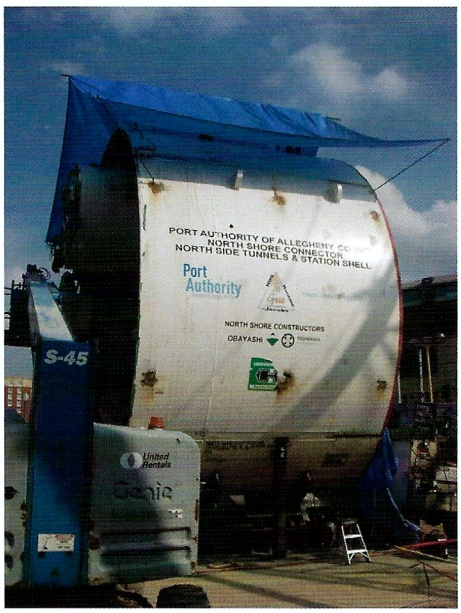
The TBM will begin by excavating the southbound tunnel. It can advance 30 to 60 ft. a day, depending on ground condition and will eventually pass through more than 70,000 cu. yds. of various types of soils including sand, gravel, clay, and claystone as it burrows under the river. The overall excavation volume of 200,000 cu. yds. includes both bored tunnels and the cut and cover tunnel.

Challenges to Be Overcome

"There are many challenges in the project," the North Shore Constructors Obayashi Trumbull JV company spokesman stated.

"For the TBM operation, they include boring underneath the Allegheny River as well as under a historical downtown area where a lot of old utilities exist, U-turning the TBM, and a sharp curve radius and inclined/declined grade more than 7.58 percent for the TBM alignment.

"Each of us on the project team has their own expertise and a variety of experience in their field. Gearing these multiple forces into one direction to reach our goal is the most challenging part. Teamwork and partnership will be the key to success in this type of complicated infrastructure project."



Tunnel Drill Head

Shield Machines do not represent a new technology, their use having been pioneered on the Thames Tunnel project in London in 1825 by the French engineer Sir Marc Isambard Brunel, assisted by his son Isambard Brunel, assisted by his son Isambard Kingdom Brunel.

However, the Slurry Shield Machine is relatively new and was introduced in Japan in the 1960s. "A number of Slurry Shield Machines have been used, mostly in Europe and Asia where soft ground tunneling is inevitable due to the geological nature of the motherland," the NSCOT JV spokesman said.

"As for Slurry Shield Machines in the U.S., this project will be a rare case, being only the second — or possibly the third, depending on the time of completion — on which a Slurry Shield Machine with this large a diameter will have been used.

"In addition, several specialized types of equipment rarely seen in the American market will be utilized, such as the slurry mixing and separation plant, the cutter soil mixing wall rig, and the slurry diaphragm wall rig," he concluded. ■

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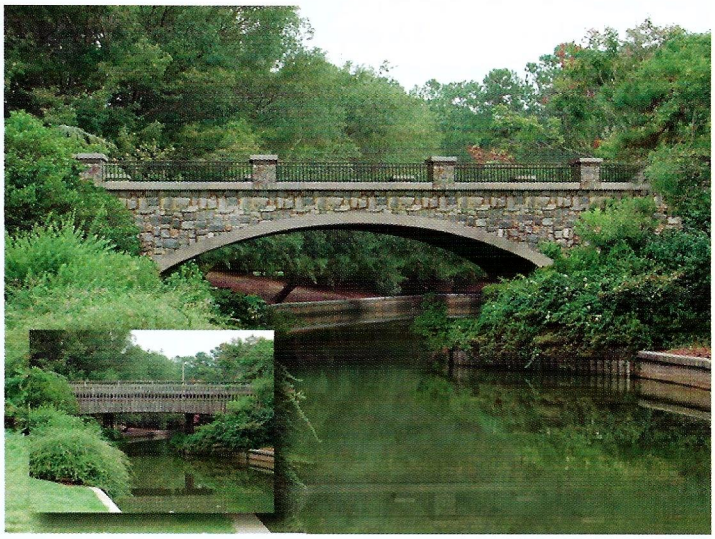
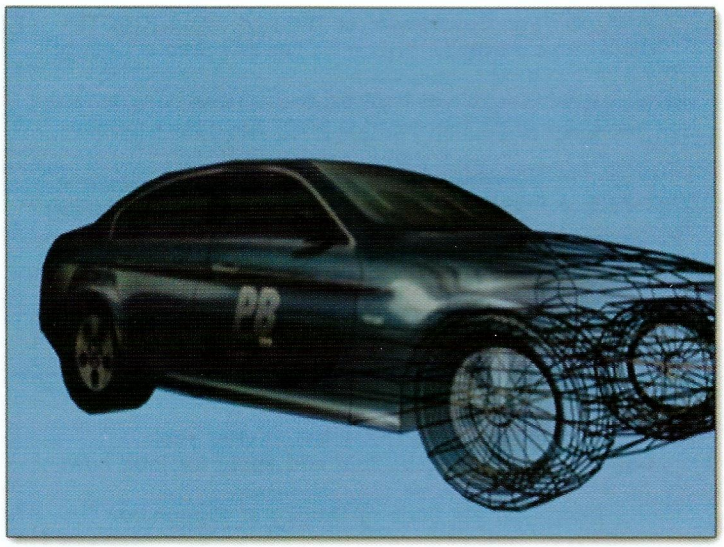
Shedding Light on Real Time Rendering & User-Interactive Content

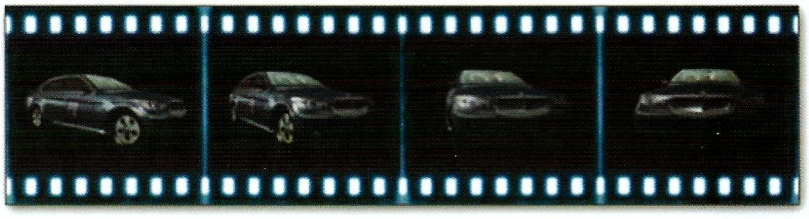
Brian Treacy, Senior Designer, PB Americas, Inc.



Traditional before-and-after rendering of the Rose Garden Bridge at the Norfolk Botanical Gardens in Virginia.



BMW 330i Blender & Photoshop



Four rendered frames of animation, Blender and Photoshop

The New Genre

The visualization industry has a simple goal: to help others visualize the final product—to see what they are going to get before building it. The product might be a complex road, a bridge, a house—or even a simple paperclip. Nevertheless, the industry endeavors to display the product in an innovative, thought-provoking way.

Most people reading this article are probably familiar with some of the traditional tools used, such as before-and-after renderings, animations, and simulations.

Recently, however, an exciting new genre exploded within the industry: real-time rendering and user-interactive content. Surprisingly, not many people know anything about this technology. Therefore, the aim of this article is to give a little clarity regarding this topic.

Yesterday

Fully understanding the idea of rendering in real-time first requires a little background knowledge of 3D modeling, rendering, and animation. It helps to see specifically how these processes evolved into real-time rendering and user-interactive content. Once these basics are covered, it will be easier to appreciate the potential of the technology by providing specific examples of how it applies to the construction industry.

Three-Dimensional Modeling: A working definition for this article: three-dimensional modeling is a process of creating computer-generated objects that have height, width, and depth. Graphic artists enhance the realism of these objects using methods of adding light and shadows and by painting them with textures and materials.

Predefined Rendering: Predefined rendering refers to snapping a picture of a three-dimensional object. This doesn't mean holding a camera to the computer screen and taking a photograph, but rather using a simulated camera actually built in to the software. This simulated camera recognizes the model and its materials, textures, lighting, and other applied effects, and creates a digital picture in a popular image format such as JPG or TIFF. Depending on the level of detail used by the graphic artist, this picture may appear to be as realistic as a photograph, or graphical like a sketch or simulation.

Animation: Once the concept of predefined rendering (rendering, for short) is understood, the

"Shedding Light" continued p. 20

ASHE National Conference
June 11 - 15, 2008

Looking Back...*Moving Forward*

ASHE
1958-2008

What could be better than to visit the "Sweetest Place on Earth" for a taste of some real summer fun?

ASHE 2008 in Hershey, Pennsylvania will be packed full of events sure to be crowd pleasers as we celebrate 50 years of ASHE. With local attractions like Hersheypark, Hershey Country Club, Hershey Gardens, The Chocolate Spa, Hershey's Chocolate World, ZooAmerica, the whole family can join in on the fun.

The Hershey Lodge and Convention Center, a premier convention resort, will be the location for the event to be held June 11-15, 2008.

"Looking Back...Moving Forward" is the theme for the 2008 event. Thursday evening there will be an Icebreaker Party to celebrate ASHE's 50th Anniversary! ASHE had its humble beginnings in central Pennsylvania, so we'll be celebrating with an old fashioned birthday party, complete with cake, ice cream, friends and a few surprises.

Friday evening will feature a "Cruise Through Time Dinner". Relax while touring the Hershey Antique Auto Museum, getting your picture taken in a vintage car, indulging in special treats (including chocolate, what else?!) and dancing to the sounds of the Fabulous Greaseband who will lead us through the different decades of ASHE with their musical selections.

The conference will feature interesting and educational technical sessions focused on current issues affecting our industry. Continuing Education Units will be awarded for all technical sessions. Once the technical sessions and tours have wrapped up, join us for Saturday night's "Red Carpet Revue Dinner Gala." This event is sure to be the highlight of your trip to Hershey. Joan Rivers will be greeting you on the Red Carpet with an interview of our very own ASHE "stars". Following dinner we will be entertained and mesmerized by Keith Matheny, a mentalist and motivating entertainer. Keith combines audience participation with fun demonstrations of the power and abilities of the mind. He will read your thoughts and predict answers to problems before they're even asked!! To wrap up our conference you'll enjoy some music by a local DJ. You're sure to be entertained as we end the conference with a night to remember.

By now, you should have received a list of available sponsorship and exhibitor information for the occasion. Sponsorships are available from $300 to $5,000, suitable for a range of budgets. Exhibit booths will be offered at $750, including one conference registration. Please respond at your earliest convenience to take advantage of these sponsorship opportunities. Visit our website at www.ashe2008.org for up-to-date conference activity information.

If you are a golfer, you won't want to miss playing on the Hershey Country Club Courses. The Club is ranked in the top 50 resorts in the U.S. by Golf Digest and features two spectacular 18-hole courses. The classic par-73 West Course, with its lush, tree-lined fairways has attracted top professional golfers, such as Ben Hogan and Nancy Lopez. George Fazio designed the spectacular par-71 East Course, featuring breathtaking views of the countryside.

If you are not a golfer, or if you wish to just pamper yourself; then you'll need to sign up early for the Hershey Spa. The Spa is well known for its sweet treat to their guests' needs for making the outer body feel as good as the chocolate does for one's inner self. What ever you do, don't wait to make an appointment for this special treat, space is limited and goes fast!

So what are you waiting for? Mark June 11-15 on your calendar now so you can be part of an educational, fun-filled, chocolate-covered experience in the lush green rolling hills of Central Pennsylvania, in a town where streetlights are shaped like Hershey's Kisses and the air is filled with the aroma of chocolate. Bring the whole family! ■

The Bridge

Michael D. Hurtt, P.E., Senior Highway Engineer
ASHE Member, Central New York

Something terrible happened last summer. Something terrible happened, but nobody seemed to care, and for my part, I did nothing to stop it. Something terrible happened, and now that it is done, it can't be undone, and for that we should all feel a sense of loss and regret.

Progress had its way with the world once again, and I must admit I was instrumental in the process. Another piece of our history was sacrificed for the sake of progress, ironically the same progress that originally created this piece of history, vintage 1932.

1932 was a difficult year. It was the third year of an economic depression that had taken the nation and the world by surprise. The magnitude of this economic slump could not even be fathomed early in the spring of 1932, but the pinch was felt by all. President Hoover was generally made the scapegoat for the Nation's trouble, and that perception help to oust him from the Presidency later that year, when he was replaced by Franklin D. Roosevelt.

Jobs were hard to come by in 1932. Unemployment was approaching 25%. Those that had work were extremely grateful for it. One such person was a young Italian immigrant named Salvatore, or Sal as he was known to his friends. Sal was a stone mason by trade and considered himself very lucky to be doing bridge stone work on one of the few public-works projects in upper Westchester County, New York State, close to where he lived. The project was the construction of the "Bronx Parkway Extension." The Parkway was designed to provide a scenic, rapid route from New York City to the Bear Mountain Bridge and points north. Rapid, being a relative term, meant 40 mph in a Model A Ford or Chevrolet Coupe. In upper Westchester County, the Parkway turned from its northerly route and headed west into the City of Peekskill. A northerly route continued, but it was designated as the "Eastern State Parkway". In later years the north-south route was renamed the "Taconic State Parkway" and east-west route was renamed the "Bear Mountain Parkway." At the interchange where these two routes diverged, a small barrel-arch bridge structure was built. This was Sal's bridge.

The bridge was relatively simple in its architecture, with one exception. The under-roadway crossed the Parkway at a heavy skew. Rather than designing a large, yet simple symmetric opening to accommodate the skewed road, the bridge designers chose a smaller but vastly more complicated skewed opening. The resulting design produced a tight, "warped" barrel-shape that fit in extremely well with the nature of the Parkway. To further maintain the scenic nature of the route, this bridge, as with all bridges on the Parkway, was to be stone-faced, but otherwise inornate. This in and of itself was unusual, given that most of the other bridges on the Parkway had towers or turrets or ornate wingwalls. The simplicity of this structure, at least in Sal's opinion, lent to its beauty and helped set it apart from the others.

Sal wasn't involved in the concrete work for this bridge. There were more than enough men available to do that type of work. Sal was a tradesman; he worked with stone. Stone was Sal's passion, and there was plenty of stone work on the Parkway Project to keep skilled masons like him busy. Sal arrived early each morning, lugging 50 pounds of his own tools in a worn leather satchel, and worked late into the day, six days a week. The pay wasn't much by today's standards, but in 1932, any paying job was coveted. The work was extremely hard, but that only made it that much more rewarding. To be able to create with one's own hands is satisfaction onto itself for a craftsman. Sal's strong hands were hard and callused from years of labor, but they knew exactly how to caress a piece of stone. With chisel and hammer and the singing of steel on stone, the beauty of the bridge blossomed as the stonework enveloped the cold concrete frame.

The bridge was inherently strong by design, and the strength from its craftsman builders was further embodied into the structure. The Romanesque art of stone arch construction, handed down from father to son for generations, ensured that this bridge would survive the test of time. However, as it was to turn out, time wasn't the bridge's only enemy.

Fast-forward 70 years to the 21st Century. Our defining legacy may be that of the "throw-away" society we've created. Coffee maker on the fritz? Throw it away and buy a new one. Television reception not the greatest? Replace it with a bigger one. No one expects that things can be fixed anymore. It is far easier to demolish and start from scratch than to modify or repair to suit our growing needs.

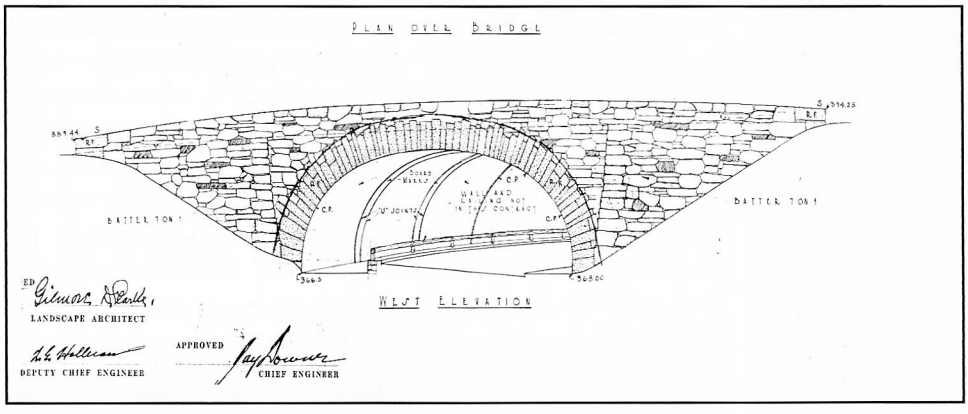
The same mentality is being applied to our infrastructure. Even bridges being designed and built today using our advanced technology will require refurbishing or replacement in 50 years.

Sal's bridge didn't need replacing. Sal's bridge didn't even need repairing. After 70 years, Sal's bridge was doing fine, and could do another 70 without breaking a sweat. The world, unfortunately, grew up around Sal's bridge. The leisurely-paced two-lane Parkway that was once carried by Sal's bridge had changed into a fast-paced commuter route. Four lanes were squeezed onto the bridge, but even that wasn't enough. Finally, a complete revamping of the corridor was decided upon by the Powers-That-Be. This was to be a signature project for some engineer, and I was that engineer.

Among the many tasks to be undertaken as part of this new roadway project was the replacement of all the original bridges, including Sal's. I believe that I understood the significance of this particular bridge right from the start. But that didn't matter, because regardless of its significance, regardless of its simple beauty, this bridge stood fast in the path of progress, and there was no saving it. Like so many other things from 1932, it just didn't fit anymore in the world that progress had created. Ultimately and predictably the decision was made to take the bridge down. It was left up to me to decide when and how it was to be done.

I decided upon a glorious end only fitting for such a simple, yet remarkable structure. Unfortunately, even that wasn't to be. Instead of exploding the bridge in one fantastic display of fireworks as I had prescribed in the contract (an end befitting the bridge's years of graceful service), the contractor chose instead to slowly hammer away at its base, undermining the very core of its strength, until predictably man accomplished something that time could not, and the bridge collapsed under its own immense weight. The broken pieces of concrete, stone, and steel were later buried along side the new replacement bridge, with only the memories of those few involved marking its final resting.

A bridge, simply speaking, is something that provides for a separation.



A bridge, simply speaking, is something that provides for a separation. It removes conflicts at life's crossroads. In much the same way, a bridge is also something that provides a connection. Sal's bridge was significant because of the connection it provided.

It removes conflicts at life's crossroads. In much the same way, a bridge is also something that provides a connection. Sal's bridge was significant because of the connection it provided. This significance can be measured in many ways, such as the utility it provided for 70 years between the local community and the metropolis of New York, or the connection its architecture made with the classical European style of its design. For me however, its significance was far more personal. I like to think of Sal's bridge as something that has helped me make a connection with life's biggest separation: time. It has helped me to explore my roots and look back on the past, even if only for a short period of time. Over the years Sal built many things, from roads to bridges to buildings. Because of the skills he possessed, he was able to work in a time when many others could not, and this allowed him the means to create the most important thing a man can: a family. The pride he had in his accomplishments is second only to the pride I have in knowing he was my grandfather. ■

ASHE National Board Member Bios 2007-2008

Terence D. Conner, P.E.
National Secretary

Terry is a member of the Southwest Penn Section in Region 3 where he was a two term President. He has been our National Secretary for approximately (29) years. As a result of his dedicated service to the ASHE Organization, the National Board awarded him an Honorary Membership.

Terry earned his B.S. in Civil Engineering from Pennsylvania State University in 1961. He began his engineering career in the public sector by gaining employment with the Pennsylvania Department of Transportation. Terry is a Professional Engineer and Professional Land Surveyor in the state of Pennsylvania. He worked more than (30) years in PennDOT at various levels of design and management before retiring from the State. Terry then moved to the private sector and began working for McTish, Kunkel & Associates, Incorporated in Rostraver, Pennsylvania. He has been their Vice President – Western PA for the last (14) years. Terry retired from McTish, Kunkel & Associates in May 2005. He's also a member of ASCE, PSPE, and NSPE.

Terry and Diane have been married for (47) years. They reside in Uniontown, Pennsylvania. They have four children and five grandchildren. He and his wife like to attend plays at various theaters and he enjoys playing golf. Terry also sings in the Uniontown Chorale, attends various church functions, and is a Director of AAA East Central.

Kevin E. Duris, P.E.
2nd Vice President

Kevin is a member of the Pittsburgh Section. He has been active on the ASHE Pittsburgh Board of Directors from 1995 to 2007 and has served as President in 2000. Kevin was chairman of the Sponsorship/Advertising Committee for the 2005 ASHE National Conference hosted by the Pittsburgh Section. He is a current chairman of the National Board Conference Committee, member of the National New Sections and Website Committee. Kevin has been involved on National Committees since 2000 and member of the National Board since 2005.

Kevin earned his B.S. in Mining Engineering from the University of Pittsburgh in 1980. After graduating, he was hired by Trumbull Corporation, a heavy and highway contractor located in Pittsburgh, PA. His first assignment was Project Engineer for a project on I-80, Brookville, PA. He has held field positions as Project Engineer, Superintendent and Project Manager on many projects in Pennsylvania. During the winter months, Kevin helped estimate bids until permanently settling into Trumbull's main Pittsburgh office in 1988. Here, he estimated bids and is currently the Assistant Chief Estimator. Most recently, lead the estimating team to successful bids for the $61 million reconstruction of I-79, Neville Island to I279, in Allegheny County, PA and the reconstruction of Parkway East, Bates Street to Edgewood, for $39 million in Allegheny County, PA. Kevin is a Professional Engineer in the state of Pennsylvania.

Kevin is single and resides in Oakmont, PA. He enjoys golf, racquetball, swimming, boating, skiing, roller blading, riding the Harley and home improvement projects. Kevin never misses too many golf outings and never misses a Steeler game.

Calvin Leggett, P.E.
Region 8 Director

Calvin has been a member of the ASHE Carolina Triangle Section for (14) years and served as Section President in 1988. He also is a member and former President of the Raleigh Engineers Club, member and former president of the North Carolina Section of the International Institute of Transportation Engineers, and a Registered Professional Engineer in North Carolina.

Calvin was born in Oxford, Mississippi where he attended grammar and high school. He then attended the University of Mississippi and received a Bachelors of Science degree in 1973. Calvin received a Master of Civil Engineering Degree from North Carolina State University in 1975.

His career began with the North Carolina Department of Transportation where he served as a Planning Engineer in the Planning and Research Branch. He developed long-range transportation plans for various towns and cities in North Carolina and later held the position of Unit Head until 1985.

In 1985 he went to work for the City of Raleigh in the roles of Transportation Services Engineer, MPO Director, and Transit Administrator. While working with the City, some of his major accomplishments were the expansion and update of the Capital Area Long Range Transportation Plan, approval of development plans for the Briar Creek area and the NCSU Centennial Campus, development of the City's first transportation Impact Fee ordinance, and opening of the Moore Square Transit Transfer Facility.

Calvin returned to work for the NCDOT in 1988 as head of the Program Development Branch. This branch has primarily responsibility for the development of the State's multi-year Transportation Improvement Program, scheduling of the

"National Board" continued p. 17

"National Board" continued from p. 15

preconstruction activities leading to the right-of-way acquisition, and award of contracts for major construction projects, financial management of Federal and State Roadway Construction Funds, preliminary project studies, municipal and private agreements, and State aid to local street systems. In 1993 he was promoted to Director of Planning and Programming.

In 1999, Calvin was reassigned as Manager of a new Program Development Branch, which incorporates the previous Program Development Branch's activities with Research and Analysis functions. He provides leadership and guidance to developing NCDOT positions on federal legislative and reauthorization issues. He developed the successful legislation to create a statewide toll road authority, and since 2003 has also worked with the NC Turnpike Authority. In 2005 he served as Chair of the Planning Committee for the first North Carolina Transportation Forum held in Charlotte.

Calvin has a (14) year old daughter, Lydia Elaine. Calvin is a member and Elder in the Hudson Memorial Presbyterian Church in Raleigh.

Thomas S. Morisi
Region 4 Director

Tom has been a member of the Altoona Section for nearly (20) years. During that time, he has served various positions on the Altoona Board of Directors, including President in 2002/2003. He is currently serving as the Region 4 Treasurer, as well as, Co-Chair of the Technical Committee for the 2008 ASHE National Conference in Hershey, PA.

Tom is a 1987 graduate of the University of Pittsburgh at Johnstown with a Bachelors Degree in Civil Engineering Technology. He is a Certified Bridge Safety Inspector and a member of ASHE, PHIA and APC. Tom has been employed at Keller Engineers, Incorporated, of Hollidaysburg, PA for the past (14) years where he is Manager of the Transportation Division. He is responsible for the supervision and management of all transportation projects within the Division including highway and bridge design and bridge inspection. Prior to his employment at Keller Engineers, Incorporated, Tom worked for six years as a designer on various bridge and highway projects while at another firm.

Tom lives in Johnstown, PA with Nancy, his wife of (19) years and their 16 year old son, Jake. He cherishes the time spent with his family and his hobbies include bowling, boating, and working around the house.

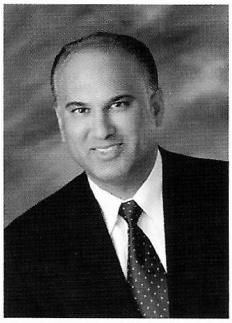
Perry M. Schweiss
National President

Perry is a member of the Southwest Penn Section and served as Section Secretary of the Southwest Penn Section from 1996 to 2005. He is Immediate-President of the Section. He also served as the Treasurer for Region 3 from 2003 to 2005. Perry served as Region 3 Director from 2003 to 2005 and has chaired the Constitution and By-Laws, Budget and Audit, and Legislative Review Committees.

Perry earned his B.S. in Structural Design & Construction Engineering from Penn State University in 1987. After graduating he was hired by Arora & Associates, Inc. located in West Trenton, New Jersey. In 1992 Perry accepted a position at Sucevic, Piccolomini & Kuchar Engineering, Inc. (SPK) in Uniontown, Pennsylvania. He was promoted to Vice President of Operations in 2001. Perry is a Professional Engineer in the states of Pennsylvania, West Virginia, and Maryland. He is also a Professional Land Surveyor in West Virginia. Perry is proud to be the second ASHE National President from SPK. Domenic Piccolomini, President of SPK, served as 2000-2001 National President.

Perry resides in Morgantown, West Virginia. He has 2 boys, Eddie (14) and Tyler (12). Perry cantors for St. John's Church and both freshwater and saltwater fishing are hobbies of his. Perry says that he also enjoys all types of cooking. ■

As the Wheel Turns



URS Corporation is pleased to announce the appointment of **Samir (Sam) D. Mody, P.E.** as Vice President and New Jersey Transportation Group Manager

Mr. Mody will be responsible for providing the Branch Office Managers in Wayne, Newark, and Burlington with leadership to increase the URS presence and rich tradition of service in the New Jersey marketplace. Mr. Mody will spearhead the development of a strategic business model for procuring surface transportation design, CM transportation, and mass transit work in New Jersey as well as providing technical oversight and project management in the delivery of cost effective and constructible transportation solutions to our clientele.

With nearly twenty-five years of experience in the administration, design, and construction supervision of transportation and major civil engineering projects, Mr. Mody is experienced in both the private and public sectors. As a consultant and NJDOT employee, he understands the needs of government for the successful delivery and construction of transportation investments.

Mr. Mody is an active member of the American Council of Engineering Companies of NJ (ACEC-NJ) Transportation Committee since 1999. He is the recipient of the 2006 Member Recognition Award and recently elected to serve as a Director on the Executive Committee. He is also a charter member of both the Southern NJ and NY Metro sections of the American Society of Highway Engineers (ASHE), an association lasting over 20 years. Mr. Mody has served the organization in many capacities at the Local, Regional, and National levels, including a leadership role during both the 1994 and 2007 ASHE National Conventions, and he is currently serving as the Southern NJ Section President and Region 6 Director.

Mr. Mody is a Licensed Professional Engineer in the states of New Jersey, Pennsylvania, and Delaware. He received his BSCE and MSCE degrees from Drexel University.

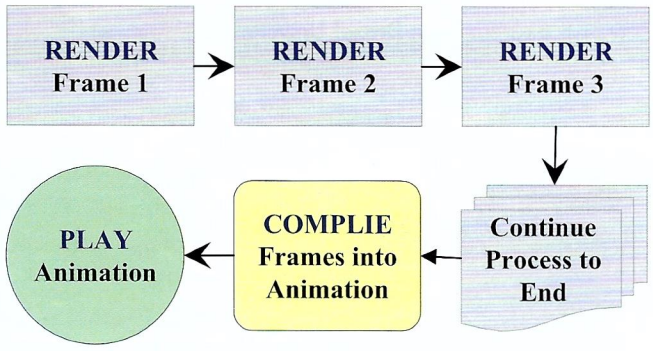
Scott W. Sibley, P.E., was recently named a vice president with Gannett Fleming, an international planning, design, and construction management firm. Based in the firm's Valley Forge, Pa., office, Sibley is a project manager of the Transportation Division.

With more than 25 years of experience, Sibley manages the designs of transportation projects, including highway, traffic engineering, transportation enhancements, and rail. He also oversees the preparation of construction plans, estimates, and specifications. Integrating designs from various disciplines, Sibley implements environmental studies and applications for environmental permits which include coordination with communities and other stakeholders.

Sibley holds a bachelor of science in civil engineering and math from Carnegie Mellon University and a master of science in civil engineering from Villanova University. A registered professional engineer in Pennsylvania and New Jersey, Sibley is a member of the American Society of Highway Engineers and the Institute of Transportation Engineers, Mid-Atlantic Section. ■

"Shedding Light" continued from p. 9

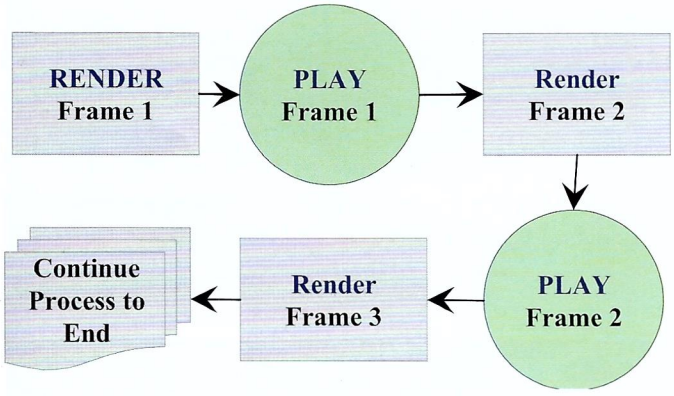
next step is the process of animation. Animation is nothing more that a bunch of pictures changing at a fast speed. Through the rendering process, the camera takes several pictures, called frames. The software then takes each frame and compiles them into a file, where it then assigns each a certain length of time to display (usually about 1/30th of a second, measured in frames-per-second, or fps). Animation results when each frame plays consecutively, as illustrated below. We will refer to this as predefined animation.



Evolving to Real-Time Rendering

Rendering in real time is the next step in progression. To see exactly how it differs from a predefined animation, we look to the order of events below.

Why is this new system significant? Why does the order of



frame-creation and frame-playing matter? Generally speaking, changes now occur on the fly. More specifically, a real-time "animation" has the potential to become a brand new, different animation from the original in every way. We have already determined that a predefined animation is nothing more than a bunch of pictures playing at a certain speed. What would happen if you watched 30 seconds of your animation, and decided you didn't like the angle your camera was pointing? Traditionally, the graphic artist would have to stop playing the animation, adjust the camera angle, then render the entire animation over again. Rendering in real-time solves this problem because when the graphic artist finds the camera to be at the incorrect angle, they simply change it during the middle of the rendering process!

Shedding Light on Time Saving Improvements

A predefined animation obviously takes some time to render, as seen in the previous example. Lengthy render times are a significant hurdle to overcome for real-time rendering to work. Because of this, programmers developed a way to transfer the workload from the computer's processor to its video card. As time progressed, manufacturers developed superior video cards, and graphic artists developed time-saving techniques. These improvements have allowed real-time rendering to become possible.

This definition of real-time rendering is still a bit vague, but it is supposed to be. This concept is almost impossible to understand without clarification by real examples. Before we get to the examples, though, we need to shed some light on one more facet first, user-interaction.

User-Interaction

We will quickly look at two traditional roles in this field: the graphic artist who creates the animation, and the observer who watches it. The graphic artist is much like the director of a movie. He or she creates the model, assigns materials and lighting, and directs the script and camera. Essentially, the graphic artist predetermines what the observer will see. Here, the only responsibility the observer has is to watch and comment.

We have seen a brief example of how the graphic artist can interact with an animation rendered in real-time. He or she has the ability to change it on the fly and see the changes immediately. What does this added functionality offer the observer? The new function allows the observer the ability to interact. In fact, we will even upgrade their status from an observer to a user. The user can now interact with an animation rendering in real-time within the scope that the graphic artist previously provided.

In fact, real-time rendering and user-interactive content is akin to a video game. Have you ever seen a racing game where you act as a driver, driving a car around a city—navigating through traffic, avoiding pedestrians? The video game industry survives on these two concepts of real-time and user-interactivity (though they also include a third element: that is, a goal...such as to win the race). The construction industry has the same opportunity to leverage this technology for their projects. With the intent of tying all of this together, we turn to some examples, which will bring clarity.

Civil: The graphic artist builds a model of a road, then adds a virtual car with which to drive. The user chooses when to speed up, slow down, and where to turn at an intersection. The user may also interact with simulated traffic added by the graphic artist. Day,

night, and weather conditions may exist, as do roadway lights and timed traffic signals.

Tampa, SR686 Roosevelt Boulevard: As part of the final design plans to reconstruct a portion of Roosevelt Boulevard, PB conducted a study to add a major flyover. PB developed a Real-Time User Interactive presentation to show FDOT the relationship between the proposed flyover and one of the glide paths for small aircraft at St Petersburg Clearwater International Airport.

Structural: The user may pilot a helicopter and fly around and over a new bridge; or steer a boat and drive under; all while watching a simulation of it opening (if a movable bridge) and its effect on traffic.

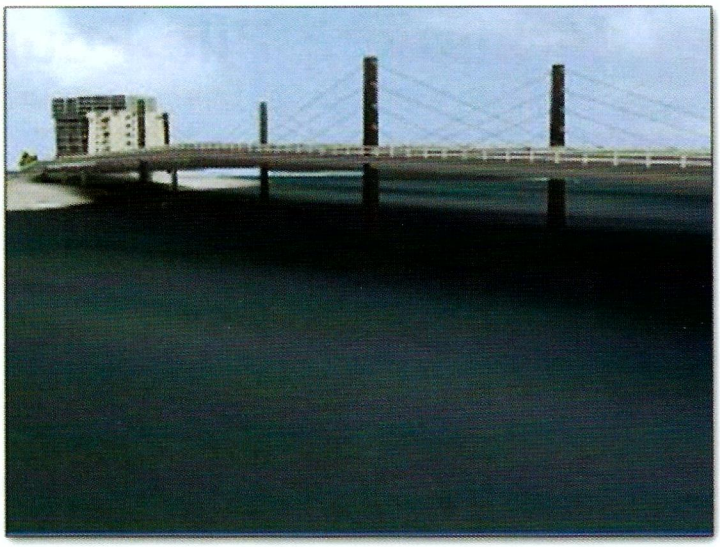
Transit: The user takes a tour of a proposed subway station. The trains arrive and depart on a schedule. The user may explore the station and hear what the virtual passengers have to say.

Construction: The user flies around the job site, watching the building process occur through its different sequences of construction and maintenance of traffic effects on simulated traffic.

As implied by these examples, the goal of mixing real-time rendering with user-interaction and 3D modeling is to display the finished product as realistically as possible, within an equally realistic navigable world, with which the user can interact and manipulate.

More Than a Presentation, an Adventure

Real-time rendering with user-interactive content presents an exciting new dimension to the visualization field akin to taking an afternoon stroll through a painting. As you proceed through the experience, you take in all the delight of looking at a painting, exploring it with your eyes, coming across little details that the artist strategically hid for you to discover and admire, as if hunting for treasure. It brings great delight to stumble across some new ability or accidentally triggering some type of event. With the right tools and a bit of imagination, you can take what is supposed to be a presentation and turn it into an adventure. ■



Example of a structural project, screenshot within Blender

Tampa, SR686 Roosevelt Boulevard, screenshot within Blender

Underpinning Pile Foundations

Matt Pierce, P.E.; Firooz Panah, P.E.; and Keith Chong, P.E. of DMJM Harris

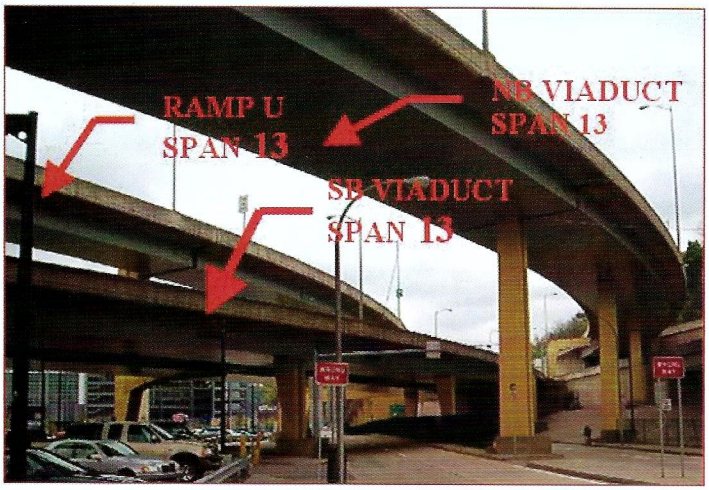


Figure 1: Adjacent SR 0065 NB and SB viaducts

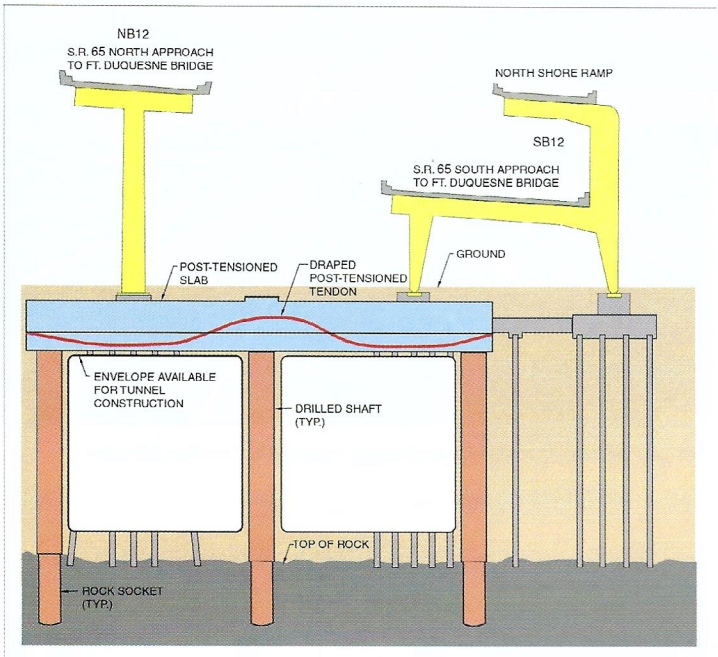


Figure 2: LRT Alignment below Bents

Construction of the North Shore Connector LRT system by the Port Authority of Allegheny County in Pittsburgh, Pennsylvania requires foundation underpinning of two adjacent multi-span continuous steel box girder structures. The unique 40 year old 1,500' long 45' high viaducts, carrying SR0065 northbound and southbound, are a series of curved three-span continuous structures comprised of box girders rigidly framed into steel support bents with end-bearing pile foundations. The northbound viaduct features a single roadway level supported by fixed single-column steel bents while the adjacent southbound viaduct features two stacked roadway levels supported by pinned two-column steel bents (Figure 1). The LRT alignment crosses directly below three separate viaduct foundations requiring removal of steel H-piles and construction of two individual underpinning systems (Figure 2).

Several alternatives were investigated including a monolithic concrete slab system, steel transfer girder system, and post-tensioned concrete beam system. The post-tensioned system was found to satisfy project requirements of constructability, durability, redundancy, and viaduct displacement limitations less than ¼" vertical movement during and after construction to minimize impacts to the fracture critical viaducts. The design and construction approach seeks to control deflections through complex construction sequencing and a detailed instrumentation and monitoring program. A portion of the construction sequencing involves incremental pile cutting and post-tensioning to balance the transfer of load from the pile foundations to the underpinning structures.

Each underpinning system is composed of concrete transfer slab(s) supported by a pair of post-tensioned inverted concrete T-beams founded on drilled shaft caissons. The larger system is a 104'-3" two-span continuous structure with a pair of 5' diameter end support caissons and a single 7' diameter middle support caisson (Figure 3). The smaller system is a 78'-6" single-span structure founded on a pair of 5' diameter caissons at each end support.

Construction of the underpinning systems is underway with completion of the underpinning currently scheduled for December 2007. Figure 4 illustrates this unique construction site with Bents SB12 and NB12 (Bent 12 underpinning) shown in the foreground and Bent SB13 (Bent 13 underpinning) shown in the background. The 5' diameter drilled shafts for the Bent 12 underpinning are visible in the foreground along with the permanent casing for the 7' diameter middle support caisson. Figure 5 shows the construction site looking back station with Bent 13 underpinning location in the foreground. ■

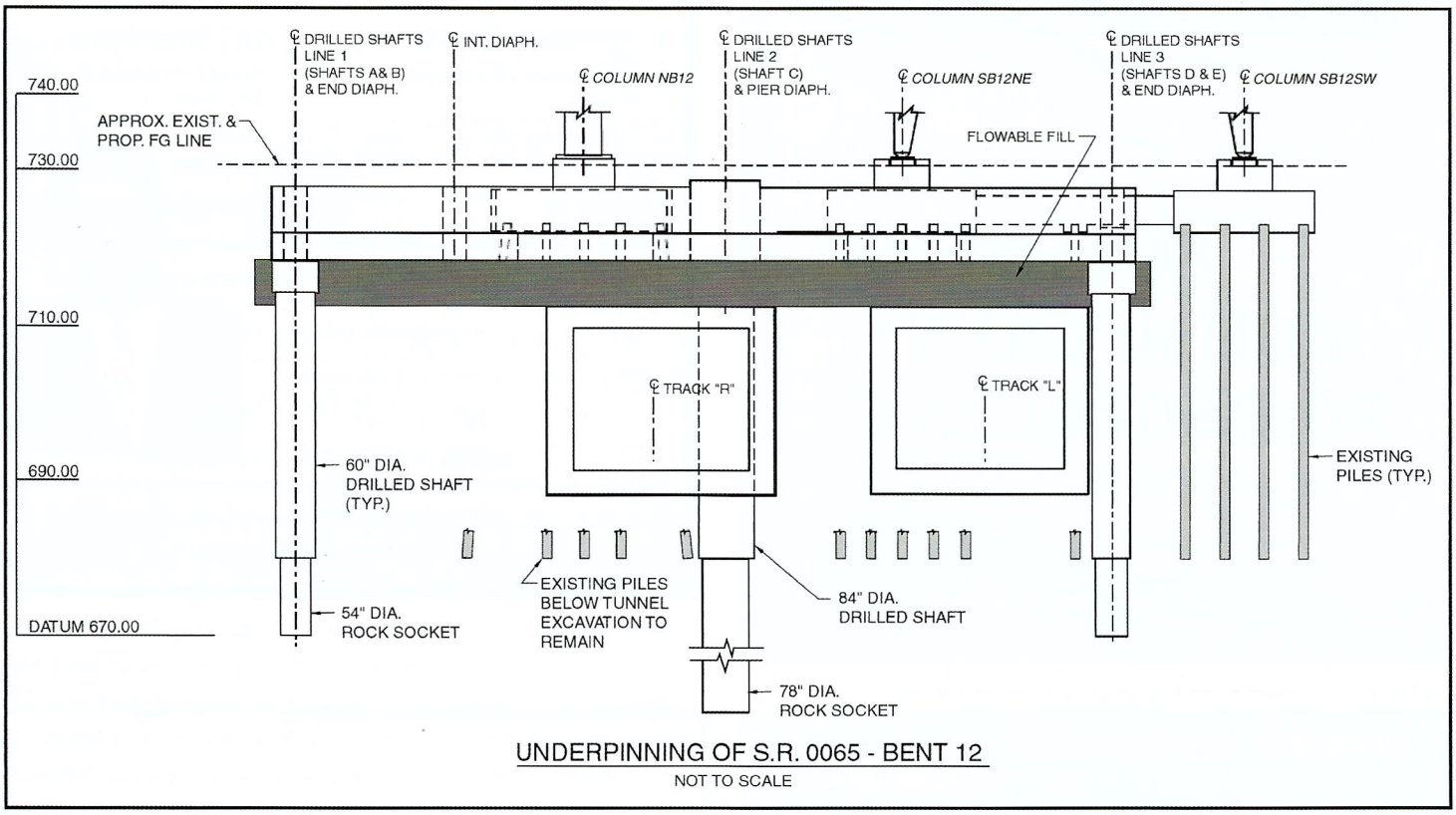


Figure 3: Bent 12 Underpinning

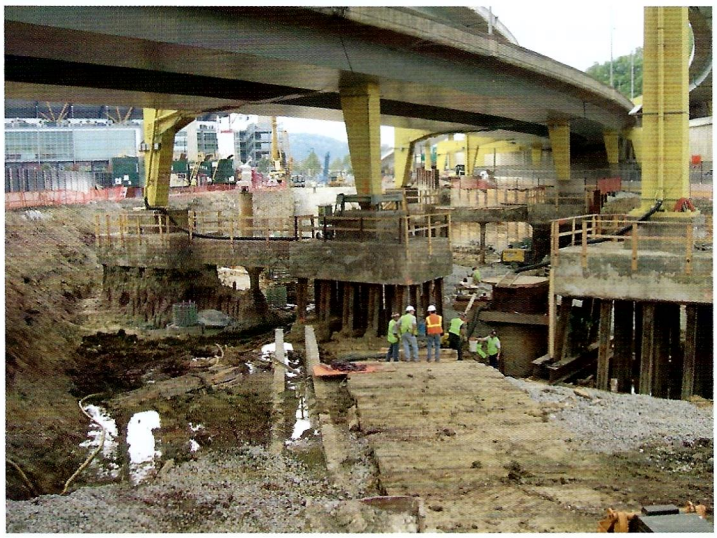
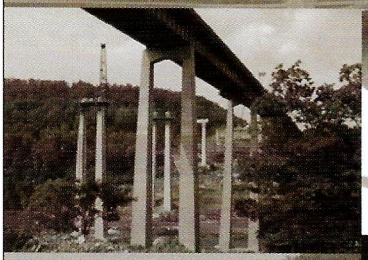
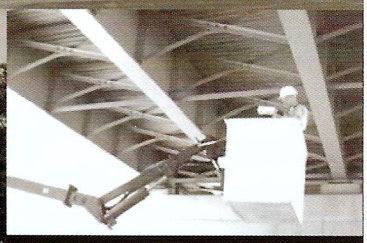
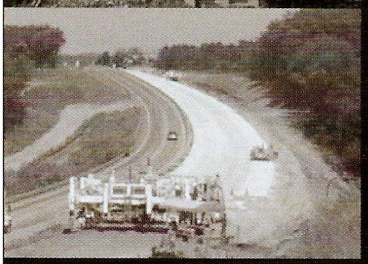


Figure 4: Underpinning construction site looking along LRT alignment – ahead station

Figure 5: Underpinning construction site looking along LRT alignment – back station



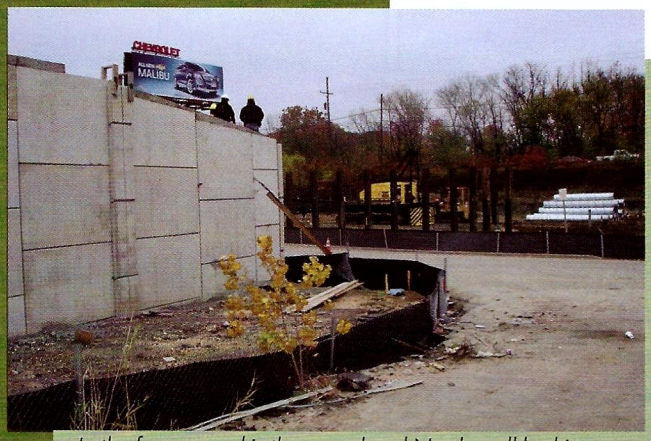




Road and Bridge Supports at Greenbelt Station Combined for a Unique Solution

Eric Hilberath

Most drivers probably never think about it or even realize it's there until their laps are covered in coffee, but the "bump" at the end of a bridge can be as annoying and even as dangerous as a large pothole. For departments of transportation, the bumps represent a maintenance issue as well. They occur because most bridge abutments are supported on piles while most bridge-approach embankments are founded directly on existing soils or fills.



In the foreground is the completed North wall looking across Branchville Road at the piles that will support the bridge on the south side.

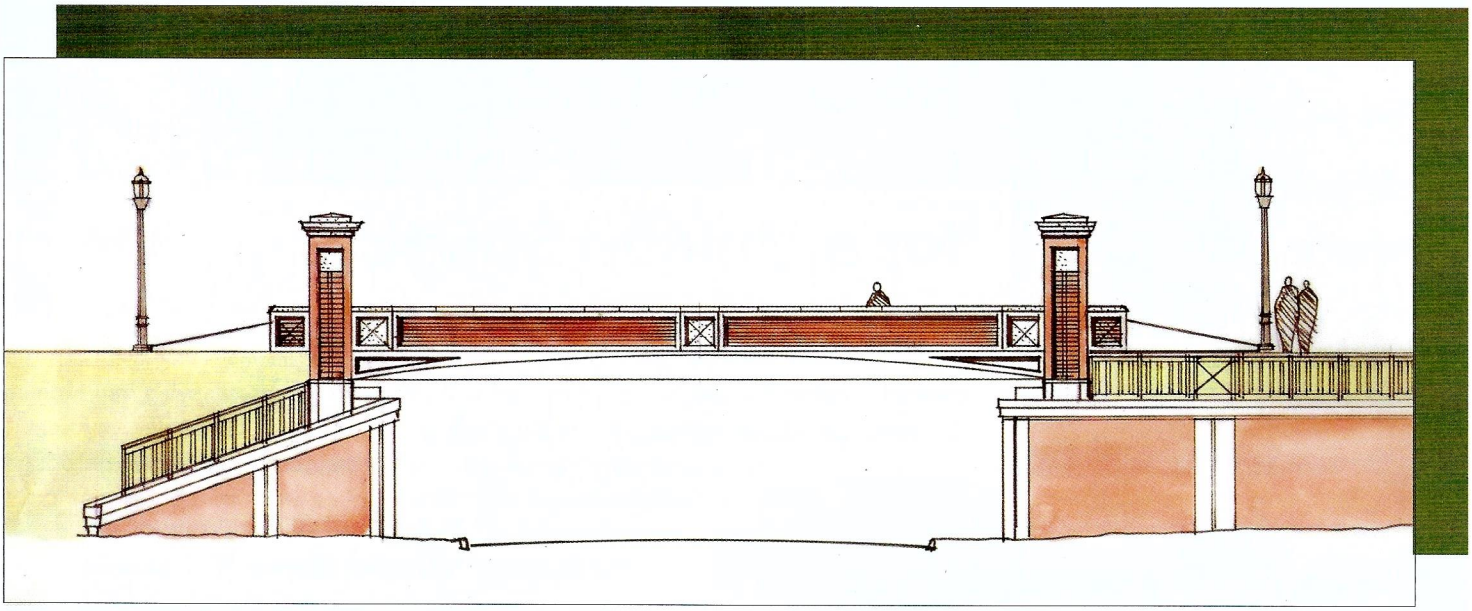
Northern wall under construction showing H piles inside the corrugated steel sleeves. Uses of sleeves gives the piles the necessary flexibility during expansion and contraction of the bridge without transferring those forces to the wall.

The bridge on North-South Boulevard in Greenbelt, Md. will have none of that. Spanning Branchfield Road and intersecting with the heavily traveled Route 193, the bridge adopts a design-build solution incorporating a combination of soil reinforcement technologies. For the bridge abutment, conventional sleeved H piles are used to support the bridge seat and the Geopier® system supports the mechanically stabilized earth (MSE) wing walls and embankments at the foundation level. This combination of support systems ensures that the differential settlements between the MSE wall and the bridge superstructure are minimized over the bridge's 100-year design life.

North-South Boulevard is the entrance to Greenbelt Station, a 240-acre mixed-use site under development and adjacent to the Metrorail and MARC commuter train stations. With 2,200 planned residential units, more than one million square feet of office space, and 300 hotel rooms, planners expect the 200-foot-long bridge and embankment to carry a lot of traffic. Site investigations identified undocumented/uncontrolled fills on both sides of the bridge, raising the probability of excessive differential settlement between the MSE-supported embankments and the pile-supported bridge superstructure. Geotechnical Engineer Hardin-Kight suggested that either over-excavation and replacement of soil or the installation of the Rammed Aggregate Pier® elements that would provide the additional support necessary to bring differential settlements down to acceptable levels.

The general contractor for the project, Concrete General, asked design-build specialist GeoStructures for a design for the Geopier soil reinforcement system, which is created by drilling 30-inch diameter holes and ramming well-graded aggregate into one-foot layers to reinforce the surrounding fill soils. With 150 of the elements installed 20 feet deep and providing a 4,000 psf allowable bearing capacity, the abutment areas were stiff enough to support the MSE walls.

"Supports" continued p. 26



Rendering Courtesy of Dewberry, Structural and Architectural Designer, www.Dewberry.com

"Supports" continued from p. 25

"The other alternative was to excavate and replace the fill material with engineered fill, but using the Geopier system was easier," confirms Butch Lundgren, general superintendent of Concrete General.

For the walls themselves, GeoStructures subsidiary EarthTec used the company's EarthTrac HA™, an updated MSE wall system using galvanized, ribbed-steel soil reinforcements to which precast concrete facing panels are fastened. EarthTrac HA is an MSE design that works well with bridge abutments because the strips can be slightly skewed around the bridge support piles and sleeves. EarthTrac HA has been used on several other sites in the Mid-Atlantic, and at Greenbelt Station it is used for the abutments headwalls and for the 26' wing walls to the abutments. The architectural plan incorporates pilasters stained white with MSE panels finished in a brick color. EarthTec manufactures the panels in its own precast plant to avoid delays from outside suppliers.

The only approved product on the Maryland State Highway Administration list for walls up to 50 feet high, EarthTrac HA complies with the AASHTO Load and Resistance Factor Design (LRFD) Specifications and the Standard (Allowable Stress) Bridge Design Specifications. Under the Federal Highway aid program all states must adopt LRFD for bridge design.

For design-build projects like this, EarthTec and GeoStructures integrate geotechnical design solutions that deal with issues such as settlement, bearing capacity and global stability. The integration of the MSE wall design elements into a single package with the ground improvement options means highway engineers and general contractors don't have to piece together solutions using techniques that may provide uneconomical solutions.

Of course, the timely delivery of the infrastructure is required before the homes and other buildings can be completed at Greenbelt Station. The first section is scheduled to open in Spring 2008 at which point the developer will transfer ownership and maintenance of the road and bridge to the county. At least the adopting authority won't have to field complaints and make repairs because of the "bumps." ■

Eric Hilberath is Mid-Atlantic Regional Manager of GeoStructures (www.geostructures.com), a design-build contractor with a specialty in ground-improvement. Through its EarthTec subsidiary (www.earthteccorp.com) it designs, supplies, and builds MSE structures. Contact him at ehilberath@geostructures.com or (703) 771-9844.

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