



*"Together We Achieve
the Extraordinary"*

AA TEAMWORK

The Newsletter of ARORA and ASSOCIATES, P.C.

PENNSYLVANIA...IT'S A

By Cindy Case

HAPPENING PLACE!!!

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Just ask Tom Sweeney and Jeff Case! Arora's Harrisburg, PA office has been hard at work developing a broader client base over the last year. Harrisburg's clients now include Boroughs, Townships, Counties, Rail-rail Councils, other consultants, PENNDOT and the Pennsylvania Turnpike

Commission. Current project types include traffic analysis, traffic calming measures, roundabout designs, park master plans, trail projects, highway design and bridge replacements.

The efforts by the Harrisburg team have recently paid off in the form of two

contracts won in January. Jeff's leadership of the Coopersburg safety improvement project in PENNDOT's District 5 has developed into a great working relationship with the district staff in Allentown. District 5's confidence in Arora was evidenced by Arora's se-

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NY OFFICE ON THE MOVE

By Jason Thomas

The New York Office of Arora and Associates, P.C. has been buzzing with activities in the past few months. Not only have we moved and acquired new staff, but we have also won a project with the City of New York Department of Design and Construction.

On October 22nd of 2004, we left our office space in One Penn Plaza and moved downtown to the Wall Street district. Our new building at 115 Broadway is a Historic Landmark situated between the Trinity Church and Liberty Plaza (adjacent to the site of the planned Freedom Tower). Boasting a great

view of the WTC area, our office is also bigger, brighter and more modern than our former space. Though not as convenient as being attached to Penn Station, 115 Broadway is accessible by nearly every subway line in the city of New York as well the PATH train to Newark Penn Station and Hoboken, NJ. MTA-TBTA, NYCT and NYCDOT headquarters are close by and we are minutes from Battery Park and South Street Seaport.

Just prior to our move, Arora's NYC office gained a new manager, **Mr. Timothy J. Riordan**. Tim joins us with almost 25 years of experience working for ENR 500

firms in the design and management of bridge projects in the New York Metropolitan area. His varied background has included the successful undertaking of projects of all magnitudes and complexities. Tim has managed multidisciplinary projects coordinating the various disciplines of structural, civil,



Mr. Timothy J. Riordan

geotechnical, environmental, electrical and mechanical engineering, architecture, and landscape architecture.

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PENNSYLVANIA.....IT'S A HAPPENING PLACE!!!



Lower Saucon Road Bridge (left) was washed out during flooding from Hurricane Ivan. Building (right) is part of the historic Pichel Farm adding an archaeological challenge to the project.

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 lection for the Lower Saucon Road Bridge Replacement project. A unique aspect of this selection was that it was the first time that PENNDOT has ever used a modified

selection process by which a design consultant is selected right from an expanded (10 page) letter of interest.

The second big win for Harrisburg in January came in the form of a \$750,000, 3 year open end contract for design services with the Pennsylvania Turnpike Commission. Jeff's head is whirling from the rapid pace at which the Turnpike works! Not only does Arora have notice to proceed for the first work order of this contract, but Jeff Case and Jeff Grif-

fiths have already been on a field view for their project. The project involves the preparation of a design-build bid package for the reconstruction and relocation of 6 miles of the PA Turnpike in the Allegheny Mountains.

The announcement that Arora was opening an office in the Lehigh Valley came in December and Arora won a bridge replacement job there in January to give Tom a PENNDOT project to work on! Also, a recent government report has indicated that 22% of

Pennsylvania's 25,000 bridges are classified as deficient. PENNDOT has set a goal to improve this statistic, which will create a large amount of structures work in the next decade. With its newly opened structures office in the Lehigh Valley, Arora is poised to make the most of the upcoming structures opportunities. Tom's structures experience has already provided invaluable input in the most recent and upcoming PENNDOT letter of interest submissions!

LYNN AND MIKE'S MOST EXCELLENT ADVENTURE

By Mike Wright

Michael Wright and his wife, Lynn, accompanied Arun Shirole to India just before the tsunami devastated the Indian coast.

When Surinder asked me to represent the company in Chennai (a.k.a Madras), I had mixed feelings about the trip. This was a wonderful opportunity to travel to a place I have heard a lot about; but I was not sure that I

wanted to go to a country that does not use toilet paper. Before we left, everyone gave us advice: don't drink the water, don't eat fresh fruit and vegetables, don't go swimming, don't give money to beggars and don't wear shorts. We consider ourselves accepting of other cultures and we felt prepared, but the trip was a real adventure for us westerners.

We arrived at our nice

western hotel at 3:00 AM after a 24-hour journey from home.

Arun arrived at 8:00 AM after a 30-hour trip from Minnesota. I got a few hours of sleep, but Arun hit the ground running. We went directly to meet our Indian associates and spent the day in meetings.

Lynn went sightseeing with a car and driver. India was right in her face. She felt like she glowed

because everyone was staring at the western woman and many people crowded around her to beg, sell something or work a scam. She had a hard time not giving anything to the beggars. She saw St. Thomas Mount where the remains of St. Thomas are interred; Fort St. George and an Indian temple with an unpronounceable name. Her car got into a fender bender with a bus, and

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ROUTE 1 PEDESTRIAN BRIDGE RIBBON CUTTING

By Eric Yermack

On Sunday, August 15, 2004 we had the long-awaited ribbon cutting ceremony for our Route 1 Pedestrian Bridge. The event was well attended by many enthusi-

astic members of the Central Jersey Bicycle Club and the East Coast Greenway Alliance. It was really great to be at an event where there was so much public support for the project. Also in attendance were repre-

sentatives of NJDOT, NJDEP, Lawrence Township, Mercer County, IEW and of course Arora. This brings to a conclusion a very successful project by Arora, which everyone in the company can be proud of.

A special thanks to Shashin and Yagnesh for helping out with the arrangements on Sunday. And last, but very not least, congratulations to Arora's Project Manager, Bala, for a project well done!!

LYNN AND MIKE'S MOST EXCELLENT ADVENTURE

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she did some shopping. She haggled and got some nice scarves.

The local Indian fare was delicious but having it for breakfast took getting used to. We sampled south Indian cuisine, which is even hotter than the northern cuisine that we get in the US. It was served on banana leaves, and you eat it with your fingers, right hand only.

Being an engineer, the thing that impressed me the most was the traffic. If you can imagine diverting all the traffic on Route 1 on to South Broad St. in Trenton while it's under construction. Remove all traffic signs and signals. Hold an antique motorcy-

cle rally and the Tour de France, and relocate the Trenton Farmers Market to the sidewalk. That is what the streets of Chennai are like, but it works. The traffic flow is analogous to walking through Penn Station in New York during rush hour. It looks like chaos but everyone negotiates their path with everyone around them. Drivers turning from side streets, just pull out into the flow using the oncoming lanes if necessary. The horn is the most important feature of the car. It's used constantly to tell other drivers where you are.

After two days of meetings, Lynn and I took a trip into the countryside to visit some temples. Out-

side the city, large trucks and ox carts replaced the buses and autorickshaws. Occasionally, we saw a cow lying in the road oblivious to traffic flowing around it. A portion of the trip through farmlands and villages was along a major highway (one lane in each direction) that was under construction. All work was being done by hand. Even the lane lines were painted by hand with paintbrushes.

The temples we visited in Kanchipuram are massive stone pyramids built from the 7th to 9th centuries. Old stuff! We were impressed but our enjoyment was dampened by some con-artists that took

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School Children

NY OFFICE ON THE MOVE

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Highlights of Tim's experience include the White Plains Road Line Rehabilitation, New York, NY where he managed the construction support phase of this \$193 million rehabilitation of the New York City Transit's White Plain Road Line; the design for the \$100 million Brooklyn Bridge Rehabilitation of Ramps and Approaches, Manhattan Brooklyn, NY on both the Manhattan and Brooklyn sides of the bridge; and the design and construction support phases of the Honeywell Street Bridge over Sunnyside Yard, Queens, NY, a \$35 mil-

lion replacement of the 22 span, 1,500 ft-long viaduct carrying Honeywell Street over the Long Island Rail Road and Amtrak.

Immediately following our move, we brought **Mr. Shekhar Scindia** on board as a Senior Project Engineer. Shekhar joins us with valuable bridge engineering experience, including 6 years with NYSDOT under the tutelage of our own Arun Shirole'. His NYSDOT experience is currently being directly applied to our Cross Bronx Expressway project where he is managing Arora's work as sub-

consultant to Edwards & Kelcey.

Shekhar's work experience involves several years as a Structural Engineer for an ENR 500 competitor at which he worked on many NYC agency owned projects. Several highlights of his project experience are: NYC Dept. of Sanitation Analysis & Design of Marine Transport Station Access Ramps; analysis and design of 11 span continuous concrete box girder bridge ramps and development of GT-STRUDL structural analysis models per AASHTO requirements; the design of VMS and

"Tim joins us with almost 25 years of experience in the design and management of bridge projects in the New York Metropolitan area. "

VSLs sign structures for the MTA-TBTA wide installation of variable speed limit and variable message signs program at 9 major facilities in the NYC area including the Verrazano, Triborough, Bronx, Whitestone, and Throgs Neck Bridges, and the Queens-Midtown

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TROPICANA CASINO GARAGE COLLAPSE

By Jeff Case

As you may have read recently, the final determination of the cause of collapse of the Tropicana Parking Garage structure was released. Arora had some ties to the events of that day.

As a review, the Tropicana Casino in Atlantic City was constructing a seven story addition to, and on top of, an existing three story parking struc-

ture. During the placement of concrete for the last bay of the structure, the floor collapsed and caused a progressive collapse of the five floors below.

After the collapse, six construction workers were unaccounted for. Two were later found to be outside the structure. One was injured in the collapse and died while on his way to the hospital. This left three workers unaccounted for. Work crews and Atlantic City fire fighters were anxious to go into the structure and find the missing men, but the concern of a secondary collapse of the unstable structure lead them to contact NJ's Urban Search and Rescue team to assist. The NJ team is specially trained for working in these types of

situations and rescuing victims that are entombed in the collapsed structures. Jeff Case from the Harrisburg office is one of five Structures Specialists on the team and responded to the call on that day.

The formerly horizontal floor slabs from the exterior garage bay were now hanging nearly vertical from the interior column bent. This raised a concern for a series of six thin shear walls on the exterior of the building that were left unsupported and were approximately 80 feet tall. There was great concern that these would collapse into the structure or into the adjacent (occupied) casino building. Additionally, it was determined that the reinforcing in the floor slabs was changed from the original design. As this steel was the only thing holding the floor slabs, the detail of the steel reinforcement was critical to the stability of the remaining structure.

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Jeffrey Griffiths, P.E.

MEET THE NEW FACES IN HARRISBURG

Jeffrey Griffiths, P.E., joined Arora's Harrisburg office in August 2004. Jeff, his wife, son, and daughter live in Mechanicsburg, PA. Jeff graduated from the State University of New York at Buffalo with a B.S. in Civil Engineering. Jeff has more than 10 years of PENNDOT and NYSDOT experience in highway.

His experience includes roadway plan preparation including highway and interchange geometry, drainage, hydrology and hydraulics, cost estimates, specifications, right-of-way plans, traffic control plans, signing and striping plans, utility relocation plans, public meetings, and Microstation and InRoads training. Jeff

recently completed a \$60M project in Williamsport, PA for PENNDOT as Project Engineer. Jeff joined the Harrisburg Team at a sprint and has worked on **seven** major submissions in the six months that he has been with Arora. With his "can do" attitude, he has become a vital member of the Harrisburg Team.

"After the collapse, six construction workers were unaccounted for...Jeff Case is one of five Structures Specialists on the [NJ Urban Search and Rescue] team and responded to the call..."

"His experience includes roadway plan preparation including highway and interchange geometry..."

ROUTE 49 BRIDGE OVER THE SALEM RIVER



Design of foundations and embankments in tidal waterways on soft, compressible marshlands is a challenging task for geotechnical and structural engineers. Arora's Geotechnical Department met this challenge on the \$20 million replacement of the Route 49 Bridge over the Salem River. Arora recommended innovative foundations and helped NJDOT construct their largest bridge-supporting drilled shafts.

The Salem River, which runs between Mannington Lake and Delaware Bay, has six-foot tides and fast currents. The new three-span, steel-girder bridge was constructed next to the existing bascule bridge and port facilities, and the piers were designed to withstand large vessel collisions.

Arora recommended 125-foot deep, eight-foot diameter drilled shafts to support the piers after a thorough investigation and analysis. Extending the drilled shaft systems

up to the bridge superstructure eliminated the need for expensive cofferdam construction. Construction involved partial casings with slurry-assisted excavation. Most of the foundation's capacity would be mobilized by skin friction so a two-layer Osterberg load cell test was conducted to confirm both skin friction and end bearing. Although this multi-level, O-cell testing is expensive to conduct and rarely implemented, Arora recommended it to assure the shaft would have adequate capacity to carry the bridge loads. The load-testing program verified an ultimate shaft capacity greater than 5,000 tons, which exceeded the required minimum value of 4,000 tons. Arora used the test results to reevaluate the design assumptions and reduce the production shaft length and lower NJDOT's construction cost.

A thorough subsurface investigation and laboratory testing program con-

ducted by Arora revealed a 100-foot thick marsh deposit at the west side of the bridge. This cohesive deposit complicated the design of the west abutment and approach embankment. Arora recommended supporting the abutments on 18-inch diameter concrete-filled pipe piles. The anticipated soil consolidation at the west abutment would cause significant negative skin friction. Preconsolidating the abutment area was the solution to mitigate the negative friction. The contract specifications called for fill plus eight feet of surcharge with wick drains for primary consolidation to be placed for nine months. Then four additional feet surcharge should be placed for four more months. During construction the subsurface materials performed as anticipated.

This thick layer of cohesive marsh deposits also posed a significant challenge for the west approach embankment de-

sign. Extensive global and local slope stability analyses simulated the long-term and short-term subsurface conditions. The 11-foot high embankment resulted in a consolidation settlement of six feet. Over-excavating all the unsuitable cohesive materials was not feasible, hence installing a 100-foot deep wick drain system and eight to nine feet of surcharge to accelerate the consolidation process was recommended. To check the embankment settlement and slope stability; settlement plates, vibratory wire piezometers, inclinometers and observation wells were installed and monitored. Consolidation settlement occurred as predicted.

Arora made this project a success by creating innovative foundation solutions to overcome undesirable geotechnical site conditions.

Schedule of Events

4/19 – ASCE, South Jersey Branch, Route 49 Bridge presentation by ARORA

5/13 - ASCE, New Jersey Section Awards Dinner

June – NJSPE Awards Banquet 2005 Outstanding Engineer Award to Narendra Khambhati, P.E.



Mr. Shekhar Scindia

"Shekhar's valuable bridge engineering experience includes 6 years with NYSDOT under the tutelage of our own Arun Shirole'.



Mohammed Baksh

NY OFFICE ON THE MOVE

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and Brooklyn Battery Tunnels.

Most recently, **Mohammed Baksh** joined us as a CADD Designer and Detailer. Mohammed enhances our CADD capabilities with his experience that also includes other ancillary tasks such as conducting traffic counts. Mohammed is very familiar with New York Metropolitan area project owners having provided services to MTA-TBTA, NYSDOT, PA of NY&NJ, and NJDOT throughout his career with small design firms in New York.

To celebrate our new office space, as well as to welcome our new staff members, we hosted a successful Open House

on Wednesday, December 8th of 2004. Success was measured by a good turnout of colleagues (including associates from Barbara Thayer, Naik-Prasad, Parsons and H2L2) as well by the abundance of assorted holiday goodies that Arora staffers eagerly feasted on for days following the event.

And finally, the year 2005 rang in with a bang for ARORA's New York office. Shortly into the New Year, we were selected by NYCDDC to perform Resident Engineering Inspection Services for the Construction of Sidewalks in the Borough of Queens. Arora's role in this project is as a Joint Venture Partner to Tectonic Engineering and Land Sur-

veying (newly formed partnership: Arora – Tectonic JV). The construction cost is approximately \$6,000,000. This marks Arora's reentry into the field of Construction Inspection in NY.

Arora's 2005 outlook in NYC is considerably brighter thanks in part to this positive change affected over the past several months. We hope to continue to expand and take on new and challenging projects in the days ahead, building on Arora's stellar reputation in the civil engineering world. Anytime you are in the Big Apple, please feel free to stop by the ARORA NYC office.

ARORA RECEIVES AWARDS

Scotch Road Receives 2005 Project of the Year

On February 26, 2005, the Professional Engineers Society of Mercer County honored the Route I-95 / Scotch Road Interchange Improvement project at the PESMC Forty-Fifth Annual Awards Dinner. The project was selected as the "2005 Project of the Year". Arora was honored as the Designer of the project along with NJDOT as the Owner and Ferreira Construction Company as the Contractor. This project was very successful and innovative and is a major accomplishment for Mercer County. *Congratulations to all of those involved!*

Secaucus Transfer Station Selected as NJSPE Outstanding Engineering Achievement Award

The Secaucus Transfer Program, featuring the Frank R. Lautenberg Rail Station at Secaucus Junction has been selected as the NJSPE 2005 Outstanding Engineering Achievement Award. This project kept many of us very busy for years designing the several railroad bridges and structures for this \$600 million mega-project. Edwards and Kelcey (Prime Consultant) and NJ Transit are extremely proud of this major engineering achievement and Arora is also proud of its major role in the success of this project.

SPOTLIGHT ON...

Khambhati Selected for NJSPE Outstanding Engineer Award

The New Jersey Society of Professional Engineers has selected Senior Vice President Narendra Khambhati, P.E. for the 2005 Outstanding Engineer Award. Narendra is receiving the award for his meritorious contributions to the field of Engineering, among them being his contributions to the Mathcounts program over a span of several years and his role in establishing Arora and Associates, P.C. NJSPE will hold its Awards Banquet in early June. More details of the banquet are to follow. *Congratulations NK!*

LYNN AND MIKE'S MOST EXCELLENT ADVENTURE

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us for about \$20. We found out later that this is common at tourist stops in the area. We were more careful at the coastal town of Mamilampuram where we visited the Shore Temple and huge stone sculptures carved from the bedrock called the Five Rathas.

On our last day, we visited a mall to see how it compared to US malls. It consisted of three floors of stores built around two atriums. The stores were

like western shops with marked prices and cash registers. There was a food court with a Subway sandwich shop next to snack bars selling chat and samosas. Just like in America, this is where the teenagers hang out. If one walks down the halls away from the atrium, the character is more like a flea market with small shops where one can haggle for anything from hand carved elephants to laptops.

The most beautiful thing

in India was the women. All women wear brightly colored saris or salwar kameez, even laborers that we saw at an archeological dig. The exception was some jean-wearing teenagers at the mall. A woman in a silk sari riding sidesaddle on the back of a motorcycle was a common sight on the streets.

We thoroughly enjoyed our most excellent adventure. As for my toilet paper worry, it was not a problem. I'll leave it at that.

TROPICANA CASINO GARAGE COLLAPSE

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The USAR team arrived at the casino in mid afternoon on the 30th and worked through the night to recover the missing workers. During the operation, Jeff established a monitoring site on the roof of a nearby apartment building to watch the garage structure for any signs of secondary collapse. Several points were selected to monitor the building and a survey transit was used. Be-

cause the deck floor slabs were hanging by the reinforcing steel in the slabs, it was important to make sure that the steel could support the weight. Jeff and the other engineers met with the contractor and design engineer to discuss this issue. In the early morning hours, Jeff was assigned to work with one of the rescue teams in the recovery of the body of the last of the missing workers. Jeff supported the rescue team and pro-

vided structural oversight while the rescue team worked between three hanging floor slabs. The hanging floor slabs could be heard groaning and creaking while the rescue crew worked between them.

The operation for the USAR team was completed approximately 7 am in the morning. The USAR team proceeded to demobilize and return to their base at Lakehurst Naval Air Station.

"In the early morning hours, Jeff was assigned to work with one of the rescue teams in the recovery of the body of the last of the missing workers..."

SPOTLIGHT ON...

ARUN SHIROLE' HONORED

On October 20, 2004, at its biennial International Conference in Kyoto, Japan the International Association of Bridge Maintenance and Safety (IABMAS) honored Arora Senior Vice President Arun Shirole' with an award for his outstanding contributions to the advancement of the state-of-the-art of Bridge Management around the world.

On January 27, 2005, the National Partnership for Highway Quality (NPHQ) recognized the work of the Independent Review Committee (IRC), of which Arun was a member, and the Maryland State Highway Administration (SHA) with their highest award. The "2004 NPHQ Making a Difference Gold Award for Risk Taking in Quality Highway Work" was presented to them for their work on the Woodrow Wilson Bridge Project – Re-bidding of Bridge Contracts on I-95 over the Potomac River. Arun received the NPHQ award certificate for his valuable contributions as a member of the IRC. The NPHQ is a partnership of federal and state officials and leaders in the roadway industry who advocate customer-centered practices for roads that are completed quicker, ride better, last longer, reduce congestion and improve safety.

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MISSION STATEMENT

Arora and Associates, P.C. is a team of dedicated professionals providing quality engineering services to improve the infrastructure and to meet clients' goals in a cost effective manner utilizing state-of-the-art technology. Arora and Associates, P.C. will uphold these principles to ensure a bright future ahead.

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TEAMWORK

The Quarterly Newsletter