



ARORA and ASSOCIATES, P.C.
Consulting Engineers

“Together We Achieve The Extraordinary”

TEAMWORK

New Jersey
New York
Pennsylvania
Minnesota

Arora’s Pennsylvania Truss Bridges

Arora and Associates, P.C. is completing a gusset plate analysis for the Pennsylvania Turnpike’s Hawk Falls Bridge along the Northeast Corridor of the turnpike. This analysis went a step further than the FHWA I-35 analysis and included a finite element analysis of selected plates that revealed some interesting results.

The Hawk Falls Bridge carries the Northeast Extension of the Pennsylvania Turnpike over Mud Run, which forms the Hawk Falls Gorge. The five-span bridge consists of a three span, continuously haunched, Warren deck truss and two deck girder, side spans. Due to the similarity between the Hawk Falls Bridge and the I-35 Bridge, the Pennsylvania Turnpike Commission (PTC) initiated an investigation of the gusset plates on the Hawk Falls Bridge. Initial application of the analysis method used in the I-35 study indicated several gusset plates on the structure that were experiencing greater stresses than their designed capacity. However,



The Hawk Falls Bridge over Mud Run

the finite element analysis revealed that the loading of the plates using the FHWA example yielded overly conservative results for the geometry of the gusset plates on the Hawk Falls structure. Arora was able to modify the procedure to more accurately reflect the real-world loading environment on the bridge to satisfy concerns with gusset plates on the Hawk Falls bridge. The final results and report of the analysis are currently being completed.

Arora’s expertise with truss bridges was key to expediently completing the Hawk Falls analysis. Arora’s engineers drew from their experience with several recent successful projects.

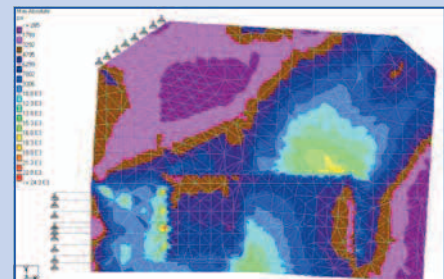
Arora is the prime consultant for the rehabilitation of a single span Pratt truss bridge over the Yellow Breeches Creek in York County for PENNDOT District 8-0. Arora also completed rehabilitation of an historic 178 foot Parker pin truss bridge, which included replacement of many of the structural members in place. Arora’s engineers designed a gateway truss bridge for the Delaware and Raritan Canal Commission. The design evokes the image of the history of the commercial growth of the region brought on by construction

of the D&R Canal and the railroads. Arora has received several awards and commendations for the 130-foot, curved-steel truss over US Route 1.

Arora is currently working with Montgomery County on the historic Pratt truss bridge carrying Feters Mill Road over the Pennypack Creek. The existing bridge structure is an 85-foot long single-span truss bridge originally constructed in 1883 which consists of fracture critical pin and eyebar connections along the bottom chord of the structure. Arora is conducting an assessment of the structure and developing recommendations for rehabilitation or replacement. For additional information, contact Jeffrey Case, P.E. at the Harrisburg, PA office.

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Finite Element Analysis for Hawk Falls Bridge

Lawrenceville, NJ Headquarters Moving to New Home

Arora's success, achieved through focusing on the needs of clients and exceeding their expectations, has created a need for more space. In January 2009 Arora will move its Lawrenceville, NJ headquarters into a new home, located at 1200 Lenox

Drive in Lawrenceville. The new 18,000 s.f. headquarters will be larger than the current office, allowing the continued expansion of operational and administrative areas.

and eastern Pennsylvania.

The layout for the new office are currently being developed and will include new workstations and office furniture. A new data network is being designed to maximize data transmission speed and permit the rollout of new information technologies. In addition, Lawrenceville employees will enjoy access to exercise facilities, walking trails and cafeterias within the park-like office complex.



According to Surinder Arora, "The firm has had offices in Lawrence Township since it's beginning, so it was important for us to stay close to our current location near I-95. This would also be least disruptive to our employees' commute." The new location will maintain easy access to I-95, I-295, the NJ Turnpike and Route 1 for reaching project sites and client offices through out New Jersey

Arora Continues to Provide Traffic Engineering Services to Local Governments

Arora and Associates, P.C.'s expert Traffic engineering staff has provided services to municipalities in NJ and PA for many years. Recently Arora provided traffic analysis services to Middleton Township, PA for two large development projects. Arora is currently providing municipal consulting services to Lawrence Township, in Mercer County, NJ; a community dealing with issues associated with suburban sprawl, urban renewal and redevelopment. Arora is reviewing Traffic Impact Studies submitted by land developers for adequacy. The traffic impact of proposed development is established by comparing pre-development with post-development traffic conditions. Such a comparison requires the use of baseline traffic volume data, site traffic projections, traffic distribution and assignment

models, and capacity/level of service analyses. If a proposed development's traffic impact is deemed significant, a traffic mitigation plan is developed to ameliorate the site's projected traffic impacts. The site plan documentation is reviewed to ensure the design provides safe and efficient access to and from the sites, safe and efficient internal site circulation and adequate site parking. Arora's reviews have included meetings with the applicant and his/her team of professionals and participation as experts in public hearings before the appropriate Board. In Arora's role as the Lawrence Township municipal traffic consultant, we have also assisted other municipal professionals and officials with the development of the town's Master Plan and other traffic-related areas of interest.

Arora has recently been appointed to provide traffic engineering consulting services to Hopewell Township in Mercer County, New Jersey, a growing municipality experiencing intense development pressures to both its suburban and rural areas. The services provided to Hopewell Township will be similar to those provided to Lawrence Township. Providing municipal traffic engineering consulting services is very rewarding because it gives rise to a unique set of challenges and opportunities through the input and interaction of a very diverse set of stakeholders.

For more information, contact James Kochenour, P.E. in the Lawrenceville office.

Road Safety Audits

Arora and Associates, P.C. participated as a member of a Safety Impact Team responsible for reviewing the crash history and overall traffic operations of a 10-mile segment of a major New Jersey state highway. This multi-disciplinary team was made up of public agency officials from the New Jersey Department of Transportation, Federal Highway Administration, various municipalities, consulting engineers, police officers, traffic safety organizations and other interested

officials.

The work effort involved a review of crash data for the 10-mile corridor segment, a field visit to review the project area conditions and identify problem areas, and a debriefing to arrive at a set of suitable crash countermeasures.

Upon completion of the study phase, Arora was commissioned to develop the countermeasures plans. This plan devel-

opment included improvements that could be implemented over a short period of time for a low cost (i.e. signal timing revisions, striping and signing modifications) to major countermeasures that included traffic signal modifications or new traffic signal designs. The resulting plans and supporting documentation were developed for construction. For more information, contact James Kochenour, P.E. in the Lawrenceville office.

Pennsylvania Roundabouts

Arora and Associates, P.C is using traffic and highway design expertise to preserve history and revitalize a local community in suburban Pennsylvania. Arora's design of two roundabouts and streetscaping in the local Harrisburg area blend new traffic engineering technology with the historic architecture in the Village of Linglestown to solve several traffic problems.



Founded in the late 1600's the Village of Linglestown is a typical town in Central Pennsylvania. Mr. Thomas Lingle's vision was a town square to be the center of Commerce in the village with residential Properties surrounding it. The layout of the town center has become known as a Pennsylvania Diamond. This concept has been identified as a cultural resource concept and is being protected and preserved throughout Pennsylvania. As with the majority of these one-time small frontier towns, more people moved into the area and population and commerce grew up around the town square. In the case of Linglestown, the "main street" of the village is now a vital arterial roadway pro-

viding a thoroughfare between two very busy limited access highways. However, in spite of all the growth that has occurred, the Pennsylvania Diamond in Linglestown remained completely intact in its original layout. Although Linglestown is now a part of Lower Paxton Township, just east of Harrisburg Pennsylvania, the charm and importance of the village square still exists today. To preserve and revitalize the Village of Linglestown, a committee of concerned Residents worked with the Pennsylvania Department of Transportation and Lower Paxton Township to conduct corridor improvements along State Route (SR) 39 through the center of the village. Through intense public involvement, design charrettes and traffic analysis, it was decided that roundabout intersections would be appropriate and effective for the traffic anticipated through out the project. This project will construct two roundabouts within the project limits. The roundabouts, designed by Arora, provide traffic calming features for the town center while allowing the high volume of traffic to move through.

Arora designed roundabout intersections at the Mountain Road and Blue Mountain Parkway intersections to avoid signalization of the thoroughfare, something the Village Committee was against. The roundabouts were sized to facilitate vehicular traffic and to discourage large trucks. Other traffic calming devices in-

clude intersection bulb-outs and chicanes. The streetscapes will include shade trees along the roadway, extensive sidewalks to reestablish the town square area and stamped cross walks. This project will improve the quality of life in the Village of Linglestown. When construction is completed, the traffic will be slowed to a manageable speed through



the area, new businesses will be drawn to the area and the traffic will move more efficiently. Also, a valuable part of Pennsylvania history will be preserved. Arora and Associates, P.C. is working with the Borough of Jonestown in Lebanon County to complete similar corridor improvements to it's Pennsylvania Diamond town square.

For additional information, contact Jeffrey Case, P.E. at the Harrisburg, PA office.

Capers Wins NJSPE Outstanding Professional Engineer Award



Harry Capers, Arora's Corporate Bridge Engineer, received the Outstanding Professional Engineer Award from NJ Society of Professional Engineers at their annual awards and installation reception on June 12, 2008. Mr. Capers was recognized for his expertise and leadership in bridge design for the State of New Jersey, as well as his long-term counsel to profes-

sional and academic organizations around the world. Congratulations to Harry! Mr. Capers may be contacted at the Lawrenceville office.

Dr. Karna Wins George Stout Award



Dr. Upendra Karna, Arora's Manager of Geotechnical Engineering, received the George Stout Award from the South Jersey Branch of the American Society of Civil Engineers. The award was presented at the Branch's Annual Awards Luncheon on May 9, 2008. The award is given in recognition of professional achievements and outstanding contributions to the Branch. Dr. Karna has been an active member and an officer for many years, and served as Branch President in 2006. He will begin his term as President-elect of the NJ Section of ASCE in the Fall. Congratulations to Upendra! Dr. Karna may be contacted at the Lawrenceville office.

Arora and Associates, P.C. to Lead U.S. Domestic Scan Program

Arora and Associates, P.C., along with two of its sub consultants, American Trade Initiatives, Inc. and Applied Research Associates, Inc., was selected last fall to plan and manage the National Cooperative Highway Research Program (NCHRP) Project 20-68A, The "US Domestic Scan Program". Arun Shirole, P.E., Senior Vice President, will serve as the Principal in Charge and Harry Capers, P.E., Corporate Bridge Engineer, will serve as the Principal Investigator.

The program envisions conducting three to five domestic technology scans each year, each addressing a single technical topic. These scans will be conducted by teams consisting mainly of members of various state agencies and Federal Highway Administration (FHWA) with a subject matter expert in the field designated

to assist in planning the scan and to document findings.

The NCHRP project panel has selected the following "Best Practices" topics to be studied over the first two to three years:

1. Project Delivery Management
2. Accelerated Construction Techniques
3. Winter Maintenance
4. Regional, Multi-Agency Traffic Signal Operations Management
5. Bridge Management Decision-Making
6. Managing STIPs, TIPS, and Metropolitan Transportation Plans in Response to Fiscal Constraints
7. Maximizing Traffic Flow on Existing Highway Facilities
8. Addressing NPDES and Other Water Quality Issues in Highway System Management

9. Work Zone Assessment, Data Collection and Performance Measurements

The current three-year schedule of activities is intended to be the first stage of what American Association of Highway and Transportation Officials (AASHTO) and NCHRP anticipate will be a continuing domestic scan program. Additional information on the program, as well as instructions on submitting suggestions for possible scan topics, can be found on the AASHTO website at:

<http://www.transportation1.org/nchrp/20-68A/Default.aspx>

For additional information, contact Arun Shirole, P.E. at the Minnesota office or Harry Capers, P.E. at the Lawrenceville office.

Sustainability and Looking to the Future

When you hear the word "Sustainability" the textbook definition comes to mind, which is a characteristic of a process or state that can be maintained indefinitely or for the foreseeable future, but sustainability is much more than that. In fact, it is a philosophy that promotes sound decision making over a wide range of subject areas. It is applicable to nearly everything including the kinds of decisions we make in our personal lives, the projects we design, and the way a business can be run. If we want our lives, projects and businesses to exist for the foreseeable future, then they should all incorporate sustainable practices to achieve this goal. So what really is Sustainability? It is the philosophy that we should consider economy, society and the environment as interrelated parts of a whole. One might argue that because we already use context sensitive design, accelerated bridge construction and best management practices, we are already implementing sustainability. However, when each of these is viewed separately, we may completely satisfy the needs of one, but utterly fail at meeting the needs of the other equally

important parts. For example, a project can be designed to meet society's need to provide a safe, effective transportation infrastructure, but it may cost too much or have too great of an environmental impact to be constructed. Likewise, a project can be designed to have no environmental impacts and be within budget, but it may no longer meet the project need for which it was originally intended.



Economy, society and environment are in fact three legs of a support system that are all equally important and without any one of these three, our lives, projects and businesses will not be sustainable. As we look to the future, our clients will increasingly demand that we implement a sustainability philosophy when designing projects. This is not a matter of "if" but "when". To meet this challenge, Arora is consciously adapting to this changing environment and implementing sustainable practices. For additional information, contact Eric Yermack, P.E. at the Lawrenceville office.

Arora's Route 70 Bridge Over The Manasquan River Project

Eric Yermack, P.E., Arora and Associates, P.C.'s Manager of Structural Engineering, recently presented a paper, "Accelerated Bridge Construction Using Precast Piers", at the 25th Annual International Bridge Conference in Pittsburgh, Pa.



The presentation in the special session on accelerated construction highlighted the Route 70 Bridge project's use of a unique precast pier solution to construct the replacement bridge. The precast pier system consisted of architectural, High Performance Concrete (HPC), pier columns, caps and cofferdams with post-tensioning. This method of construction satisfied environmental requirements and produced a signature bridge over 700 days ahead of schedule. For additional information, contact Eric Yermack, P.E. at the Lawrenceville office.

TRB's "Bridge Aesthetics Source Book"

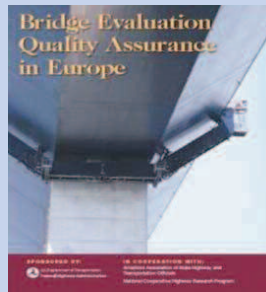


The TRB Subcommittee on Bridge Aesthetics (AAFF10(2)) recently completed the first draft edition of the TRB "Bridge

Aesthetics Sourcebook, Practical Ideas for Short and Medium Span Bridges". Arora staff worked extensively with other members of the Subcommittee to develop an approach to bridge aesthetics, the practice of applying aesthetic treatments to bridges, and illustrative case studies. The draft Bridge Aesthetics Sourcebook can be viewed or downloaded at the Subcommittee's website <http://bridgeaesthetics.org/>. For additional information, contact Eric Yermack, P.E. at the Lawrenceville office.

"International Scan on Bridge Evaluation Quality Assurance" Report Released

The Federal Highway Administration has released FHWA-PL-08-016 report regarding the "International Scan on Bridge Evaluation Quality Assurance". This report documents information that was obtained during visits in Europe with bridge engineers from Finland, Denmark, Sweden, Norway, France and Germany regarding the most effective bridge inspection programs and quality assurance (QA) practices within their countries. Harry Capers P.E., Corporate Bridge Engineer, served as the scan facilitator and primary author of the report.



PDF or HTML format at:

http://international.fhwa.dot.gov/links/pub_details.cfm?id=564

An electronic version is currently available from the FHWA website either in

For additional information, contact Harry Capers, P.E. at the Lawrenceville office.

Arora's Major Training Initiative

Arora and Associates, P.C. embarked on a major corporate-wide training initiative in 2007 that was completed in May 2008. Over 55 employees participated in training on the latest versions of CADD and InRoads programs. The training was a huge success, helping the staff become more familiar with the latest versions currently being used within the organization.

For training flexibility, the program was setup as a web-based, on-demand training system that allowed staff to incorporate assigned training into their busy schedules. The training improved efficiency in areas of engineering design and plan production. The employees feedback was very positive.

Future training areas being considered are Project Management, Leadership and various engineering topics .

For additional information, contact Mandeep Arora, P.E. at the Lawrenceville Office.

Arora Construction Inspection Group Continues to Grow.....

Arora and Associates, P.C.'s Construction Inspection group has been very active over the last few months. Under the leadership of Tom Dowd, the Manager of Construction Inspection, our team is participating in projects within all three NJDOT construction regions as sub-consultants to other firms. Currently, Arora's staff is working on a series of resurfacing projects in the North region, operational improvement, drainage and resurfacing projects in the Central region, and a roadway reconstruction project in

the South region. Starting later this summer, our staff will be providing services to the New Jersey Turnpike Authority. These projects include shoulder repair and safety improvements on the Garden State Parkway and safety improvements and painting on the Newark Bay Bridge on the Turnpike.

The Arora Construction Inspection group is comprised of licensed engineers, NICET certified inspectors and NICET equivalents, some with over 30 years of

experience in construction inspection, including Resident Engineer positions. Most have Traffic Control Coordinator and/or Society of Asphalt Technologists certifications.

The group provides expertise in the areas of Construction Management and Inspection on roadway, bridge and utility projects. The staff is also well versed in CPM scheduling and reviews, as well Value Engineering.

Over 25 Years of Excellence!

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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