

# SCANNER

NEWSLETTER OF THE AMERICAN SOCIETY OF  
HIGHWAY ENGINEERS



August - 1994 - 1

## PRESIDENT'S MESSAGE

*by Raymond A. Petrucci, P.E.*

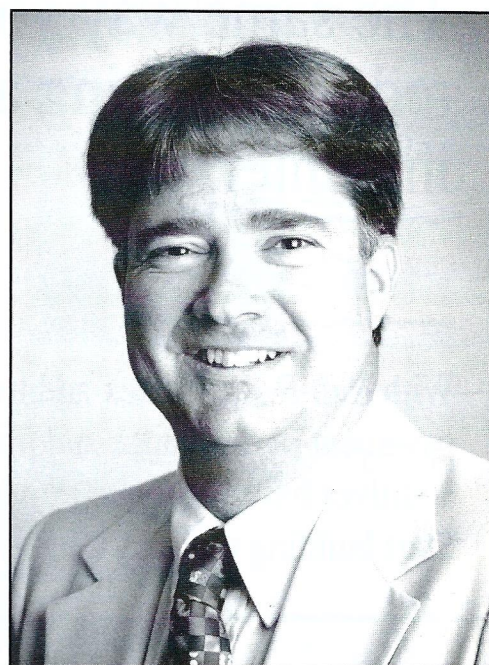
It's quite an honor and privilege to serve as your National President for 1994-1995. This comes at an exciting time for the highway industry and for the American Society of Highway Engineers. The time for the integration and coordination of all modes of transportation is upon us and we as members of the highway industry are leading the way. We have always invited planners, technicians, contractors, suppliers, and utility personnel - not just engineers - to become members. In keeping with our tradition, the invitation now extends to professionals not usually associated with highways, and to professionals working with new legislation. Everyone from environmental scientists to Clean Air Act specialists are encouraged to join.

It's important for us to foster an exchange of information and ideas from all areas of transportation. We do this by way of our programs. This was done so well at the recent ASHE National Convention in Atlantic City where we participated in programs conducted by an excellent group of experts from both the Public and Private sectors. Discussion revolved around the convention's theme of "Intermodal Mobility in the 1990's".

The structure of the Society is changing. The National Board of Directors is working hard to achieve our established long range goals. Regionalization plans are taking shape. The Executive Director Committee has been reestablished. Interest in new sections appears to be intense and to come from all areas of the country. These changes and growth will result in the local sections strengthening each other in their programs, in their management and in their perception of being part of a national organization.

As part of my remarks at the Atlantic City National Convention, I discussed the above issues but also emphasized that our individual careers, varied as they may be, are the reason we want to belong to our Society. We should be proud that we chose to have a career rather than just have a job. I would encourage members to be as involved with ASHE, your professional society, as much as you can. Everyone's energy is needed in these rapidly changing, exciting times!

P.S. The Scanner will continue to keep the general membership informed regarding National issues.



*President Raymond A. Petrucci, P.E.*

## ASHE SPECIAL THANKS FOR NATIONAL DIRECTORY

The Society wishes to express its thanks to the sponsors whose contributions and support made the publishing of the 1993-94 National Directory possible. The sponsors are listed in this article.

A special thanks and acknowledgement is given to Urban Engineers, Inc. for their contribution of staff and computer time in the development of the directory information and for the production of the 1993-1994 National directory. Particular recognition is given to James Charles of the firm who spearheaded this major and successful endeavor.

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# NJDOT SOLVES HAZARDS OF EMERGENCY U-TURNS

How do you ensure private vehicles do not use emergency U-turn openings in median barriers? Install a movable barrier gate as the New Jersey Department of Transportation (NJDOT) has done along the recently opened stretch of Interstate 287 in northern New Jersey. The barrier in the closed position provides similar features as that of the stationary "Jersey" barrier and in the open position provides passage for emergency vehicles.

The NJDOT for years has been getting letters from local municipalities who will be responsible for providing emergency service on the new highway and how the limited number of access points will severely hamper their response time. Certain stretches of highway have more than five (5) miles between interchanges with a continuous median barrier separating the northbound and southbound roadways. In addition, the highway's alignment takes it through some rugged terrain in Morris, Passaic and Bergen Counties

which generally does not allow for emergency access from local roads. The addition of the movable barrier at two locations along I-287 has helped soften the municipalities concerns over response time and has helped them more adequately distribute their coverage areas.

The movable barrier has also eliminated the attraction for motorists to make illegal U-turns which often lead to accidents. In addition, the movable barrier eliminates the hazards of exposed barrier ends and/or attenuators.

The movable barrier which is manufactured by Energy Absorption Systems, Inc. is being marketed as the BarrierGate. The BarrierGate is corrosion resistant, is 35 inches high, 19 inches wide at the top and 30 inches wide at the base in the general shape of a Jersey barrier. The two BarrierGate sections retract when activated providing an opening of 40 feet in the median. The gate runs along a concrete track which is easily traversable by a vehicle.

The BarrierGate is activated by a key pad which requires you input a four digit number, which is accessible from a car window. The gate lifts up approximately three inches and retracts to its fully open position in approximately forty-five seconds. Once through the opening the gate must be reactivated to close it.

The BarrierGate has satisfied the strict requirements NCHRP 350 as a longitudinal barrier. Mr. Frank Della Rossa, a Project Engineer for NJDOT, states "The theory is great, but the fine tuning of the BarrierGate operation is still needed." Over time NJDOT hopes the technology of the BarrierGate will be improved to be activated remotely to reduce the time an emergency vehicle must wait for it to open and for it to close automatically after a specified time period. In addition, Della Rossa would like to see the addition of flashing lights prior to the BarrierGate warning motorists of the presence of emergency vehicles making U-turn maneuvers.

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# NATIONAL BOARD NEWS

The National Board met for a regular board meeting on April 29, 1994 at Bedford, PA and also for the Annual Board Meeting at the National convention at the TropWorld Resort and Casino in Atlantic City, NJ on May 19, 1994. National First Vice-President Raymond Petrucci presided over the regular board meeting in the absence of President Nesslinger, National President Rowland Nesslinger presided over his last official meeting at the National Convention. The following committee reports and actions were presented at these meetings.

## NEW SECTIONS COMMITTEE:

Chairman Greenwood presented an extensive report of the activities regarding the progress of the committee on several fronts that have been aided by ASHE members. The areas include:

\* **Atlanta, Georgia** - Efforts are continuing to work with the group to further organize.

\* **Charlotte, North Carolina** - Society brochures and video were sent the group to assist in establishing a new section.

\* **Lansing, Michigan** - Members of Central Ohio Sections have been leading the effort for a new section and an initial meeting is being scheduled.

\* **Springfield, Illinois** - Members of Central Ohio Section have targeted this area and are planning an introductory meeting.

\* **Orlando, Florida** - Members of the Central Florida Section are initiating efforts in DeLand, Bartow /Lakeland, Dayton Beach and Tampa; ultimately spurring efforts towards Tallahassee and other parts of Florida.

\* **Bismarck, North Dakota** - Members of the Central Ohio Section have made great efforts in the forming of a new section. Brochures, video and other materials have been sent to the group and Chairman Greenwood attended an organizational meeting on April 11, 1994. Plans have been made to finalize the draft of officers and directors and the first official section meeting is being scheduled.

The New Section Committee and the membership involved in efforts for the establishment of new sections were advised that copies of the

National Directory are available for the work with the new section areas.

## MEMBERSHIP COMMITTEE:

Chairman Martin summarized the Committees work efforts during the year which have included: (a) obtaining input from Sections to assist input for the Society's Reorganization Plan; (b) assisted and/or offered assistance to several sections in the area of membership services and strategies; (c) researched the pending National PE/LS Continuing Education for the Board; (d) initiated a comprehensive listing of speakers/topics/contact persons for programs which will be assembled for the Society Sections; (e) researching opportunities for media exposure to increase the visibility of ASHE considering establishing a data base system similar to other associations and societies; and (f) recommendations for preparing a joint informational/membership drive for the next year.

## CONVENTION COMMITTEE:

**Convention 1995 Committee** L. Williams reported the Pittsburgh Section will be advertising the 1995 conventions in Atlantic City, presenting the attendees with information on the 1995 convention in Pittsburgh.

## ETHICS AND PRACTICE:

Chairman Ralston discussed the proposed mandatory continuing education requirements for professional engineers. The Committee recommended that any continuing education be voluntary which is consistent with other professional organizations. Sections will be requested for their input and comments.

## REORGANIZATION COMMITTEE:

Chairman Haslett stated a full report will be presented at the next meeting.

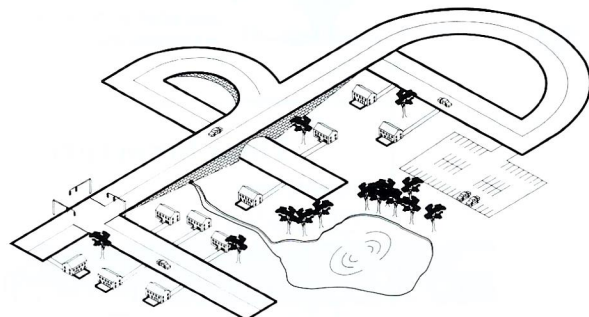
## NATIONAL DIRECTORY:

A. Kozel stated a notice is included in the April issue of the Scanner regarding (a) change of address and information update procedures for members (b) availability of computer

*Continued on page 5*

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# NATIONAL BOARD NEWS

Continued from page 4

diskette for Sections and (c) procedures for sections to issue directories to new members. The final report on the cost of the production of the 1993-1994 National Directory was presented. Total cost of the directory was \$10,948.98 with income from advertisers of \$9,500.00. The balance of \$1,448.98 was paid by the Society. The Society wishes to thank the advertisers for their support and contribution to ASHE. (See the list of advertisers on front cover of this issue).

## OTHER BUSINESS:

Members of the Pittsburgh Section requested and was given the opportunity to present their concerns and comments regarding Life Membership in ASHE. Research of past records indicate that a special assessment was approved by the National Board in 1984 to address the cost of the life members who are not required to pay dues. The Pittsburgh Sections requested the National

Board review this situation and utilize the assessment funds to relieve the sections of the burden of cost for life membership. The Board agreed to review the matter. ■

## Enhance Your Local Section Meetings

Enhance your local section meeting by inviting vendors of highway related products to set up a booth during the social hour. The Carolina Triangle Section Technical Committee has had good results getting vendors. We hope this has provided all of our members the opportunity to gain additional knowledge and enjoy themselves at the same time. ■

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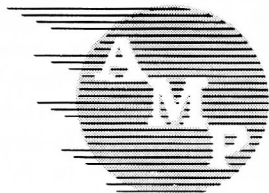
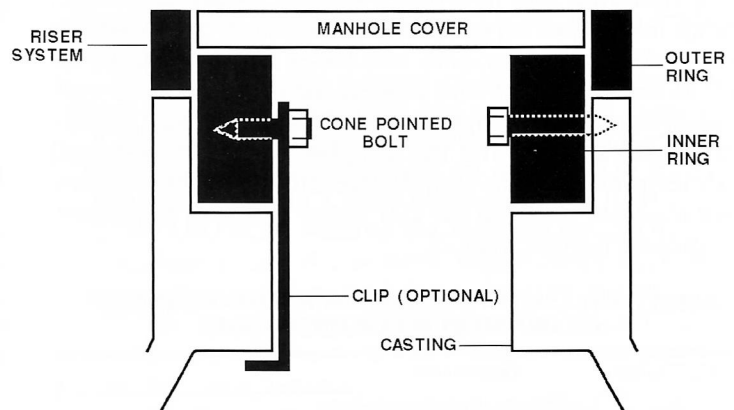
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# BRIDGE SCOUR PREDICTION METHODS APPLICABLE TO STREAMS IN PENNSYLVANIA

By Dennis Johnson and Arthur C. Miller Phd, P.E.

Dennis Johnson is a Ph.D candidate at Penn State and Arthur Miller is a Professor in the Civil Engineering Department. Dr. Miller has been doing research in hydraulic engineering for the past twenty (20) years.

The Pennsylvania Department of Transportation, PennDOT, currently owns or maintains in excess of 28,000 bridges over eight (8) feet in length. The most common type of damage sustained by these bridges is pier and/or abutment scour that is caused by floods or extreme flow situations. PennDOT in conjunction with the Pennsylvania State University undertook a research project to evaluate the applicability of existing scour prediction equations to streams in Pennsylvania.

The Federal Highway Administration, FHWA, has mandated that all State Department of Transportation identify bridges that are susceptible to scour. To accomplish this task, PennDOT developed a methodology to rank the bridges most prone to scour, which necessitated predicting scour depths at these sites, as well as predict scour depths at future bridge sites.

To formulate methods to predict scour, PennDOT provided information on bridges through its Bridge Management System (BMS) bridge inspection database. The research team selected 15 bridge sites (7 for the abutment study and 8 for the pier study). An extensive literature search was performed and a large number of scour equations were investigated. The parameters that were thought to be relevant for scour of both pier and abutments include: approach flow depth and velocity; alignment of the flow; constricted flow area, depth and topwidth; pier width and shape; and foundation material and grain size distribution of the streambed.

Data was collected for each bridge site via actual field visits, hydraulic and hydrologic reports, design drawings, bridge inspection reports, and information provided by local residents. Survey data was taken for all locations as well as soil samples in and around the bridge sites as well as upstream of the bridge. A grid system was used to collect the soil samples and the samples were later analyzed to determine particle size distribution. The hydraulics were modeled utilizing the U.S. Army Corps of Engineers Computer Program, HEC-2.

TABLE 1 - PARAMETER DESCRIPTION FOR DEVELOPMENT OF ABUTMENT SCOUR EQUATIONS

Parameter	Description
$K_1$	Coefficient of abutment shape
$\theta$	Angle of embankment to flow
$QC_{left/right}$	Flow constricted by the embankment
$AC_{left/right}$	Flow area constricted by the embankment
$TW_{left/right}$	Topwidth of the flow constricted by the embankment
$YC_{left/right}$	Depth of flow constricted by the embankment = $AC_{left/right}/TW_{left/right}$
VC	Velocity at the upstream side of bridge
G	Geometric standard deviation = $(D_{84}/D_{16})_{0.5}$

$YC_{left/right}$  Depth of Scour at the left/right abutment.

The flows were estimated for the sites in a number of ways. In most cases, high water marks were known and the flow was determined by comparing the water surface elevations predicted by the computer model with the known high water elevations. Estimated scour depths were obtained from actual field measurements, inspection reports, and in two (2) cases, measurements after the bridge had failed. In order to be conservative, the estimated maximum scour depths were increased by a foot or more. Also, the scour was assumed to be the product of local scour only, rather than a combination of local and contraction scour.

The conclusion of the abutment scour portion of the study resulted in equation 1.

$$\frac{YS}{YC} = 2.65K_1 \left(\frac{\theta}{90^\circ}\right)^{0.13} \left(\frac{TW}{YC}\right)^{0.375} Fr^{1.28} G^{-2.34}$$

The resulting equation had an  $R^2$  (variance) value of 0.9682. This equation was then compared with the recommended FHWA equation for procedures for evaluating scour at bridges. The results were markedly different with the FHWA equation over predicting the scour depths from 1.3 to 10 times the measured values.

TABLE 2 - PARAMETER DESCRIPTION FOR DEVELOPMENT OF PIER SCOUR EQUATION

Parameter	Description
$K_1$	Corection coefficient for pier nose shape
$\theta$	Angle of attack
PW	Pier width
$Y_a$	Approach flow just upstream of the bridge
$V_a$	Approach velocity
$D_{16}, D_{50}, D_{84}$	The respective sediment grain sizes of which X% of the streambed is smaller than, where X = 16%, 50% and 84% respectively

The conclusions for the pier scour resulted in equation 2.

$$\frac{Y_s}{Y_a} = 0.45K_1K_2 \left(\frac{PW}{Y_a}\right)^{-0.48} Fr^{0.10} G^{-0.45}$$

The resulting equation has an  $R^2$  value of 0.26 confirming the rather poor agreement with the data. Comparisons with the recommended FHWA equation however showed that the recommended procedure over predicted by as much as 6 times.

In excess of 25 equations for both abutment and pier scour were tested for their applicability to Pennsylvania streams. None of the established equations predicted very well. The present study was limited by the data based used; however, the results of the study do indicate that the current scour predictive equations are not applicable to streams in Pennsylvania. One of the critical factors in the formation of the maximum scour depth is the stream bed's particle grain size distribution. A natural amoring to scour occurred for most of the streams tested in this study.

It is anticipated that additional data will be acquired to further modify the equations developed in this study. With the additional information, more reliable predictive methods for scour will result.



# SAFETY BARRIER MAKES ITS DEBUT

*Tim Reid, P.E. Technical Committee Chairman, Carolina Triangle Section*

A new product designed to take worker safety to a higher level is getting its first test in the state of North Carolina. The product, called Triton Barrier, is manufactured by Energy Absorption Systems Inc. of Chicago. It is a lightweight portable traffic barrier which is filled with water after placement. Triton Barrier meets the need for safety in the parameters of limited time and resources, and is being used by the North Carolina Department of Transportation (NCDOT) on a road widening project near Winston-Salem, North Carolina. Along Route 421, the Lewisville/Clemons Road, state crews were working in close proximity with the existing highway. Traffic engineers felt the flow of vehicles was too close to the work-site to insure proper safety with cones and barrels and that positive protection was required. Rather than use heavy, cumbersome conventional concrete barriers for the short term job, the engineers searched for an alternative that was easier to move around yet still provided maximum safety for the work crews.

Triton Barrier was selected to provide the necessary worker protection and according to NCDOT Traffic Engineer Wanda James, this project was the ideal test case for the barrier. "We wanted to see how the Triton Barrier performed in the high-visibility site at lower speeds," James said. "We felt this site was a prime location for testing because of the volume of traffic and the speeds involved." James said the state originally considered using concrete barriers on the project, but design problems required a different approach. "We needed a barrier that would go up quickly and could be removed quickly," James said. The Triton Barrier was ideal for such a project.

The barriers were shipped to the site and then were installed by NCDOT personnel. Sales representatives for Triton Barrier watched the installation but let the NCDOT install the barriers to get experience in the deployment. The workers were able to place the Triton Barrier along 250 Feet of the project in just 20 minutes and this was the first time the workers had ever handled the barrier.

## Features of Triton Barrier

**Weight** - Since the Triton Barrier is filled with water after placement and weighs only 140 pounds empty, it can be placed easily by two workers with no special equipment.

**Visibility** - Triton Barrier comes in orange and white. These colors are molded into the barrier and do not scrape off. The color is similar to the high visibility orange cones and barrels typically used in construction zones. Portable concrete barrier typically has a standard concrete finish but could be painted.

**Mobility** - Due to its light weight when empty, the barrier can be placed easily by two workers. The barrier has provisions for forklift tines or cables to allow movement when the unit is filled. The barrier can be stacked three units high and transported on flatbed trucks.

**End Treatment** - Triton barrier acts as its own end treatment and is approved by the Federal Highway Administration. The first unit is left empty and will crush if impacted. The next four barriers which are filled with water are part of the end treatment. This eliminates the

need for expensive add-on end treatments. Also, if the end unit is impacted, simply replace the damaged units.

**Deployment** - More than 600 linear feet of Triton Barrier can be placed in one hour with no special equipment required.

Manufactured in 6-1/2 foot long sections, the barriers are constructed of lightweight polyethylene plastic shell that resists breaking, cracking and corrosion under harsh environmental conditions. Each piece weighs just 140 pounds and can be handled by one or two men. Freezing does not adversely affect the barrier, but provisions to move the barrier while filled have to be made.

As the barrier is put in place, each section is filled with water ballast, increasing the weight to 1,350 pounds. Each plastic shell is strengthened by an internal steel framework and a steel cable recessed into the top of the section. Individual sections are connected by knuckles which interlock with those of the other segments. The end knuckles are vertically aligned to accept a steel connecting pin, joining the sections and the tension cables for maximum performance. The sections can swivel at the pin for easy positioning around work areas. Since this is very similar to the connection system used on concrete barrier, workers adapted to the Triton Barrier quickly. The water can be drained through threaded plugs in the base or pumped out through the fill opening.

The barriers have several advantages for urban projects such as the test site. In addition to providing complete protection for work crews, they offer quick, easy deployment and retrieval because of their weight. For a short term job such as this one, they are an economical alternative to concrete.

The project provided two unexpected additional tests for the Triton Barrier. First, one barrier sprung a leak and was repaired on the spot. Second, since the job involved undercutting four to five feet below the existing grade for the widening to progress, the barriers were removed and reset once the traffic was shifted over to the undercut section.

NCDOT likes the concept of providing a temporary safety barrier for employees and saw a lot of potential in the product once it was demonstrated. It has many applications since it can be thrown on any kind of truck and taken to any job site. Utility contractors and highway contractors who work close to the road are among the prime candidates to use the system, while other applications such as line painting and lane closures are suitable as well. The most important thing is that a contractor can provide safety for his workers without a great expense by using the Triton barrier.

In the final analysis of the effectiveness of the Triton Barrier on the Lewisville/Clemons Road project, the NCDOT considered all of the previously mentioned comparisons between Triton and portable concrete barriers, the effectiveness of the barrier, and the ease of installation. Based on the success of this project, NCDOT is eager to utilize Triton Barrier at other locations and several are currently planned. If the future test installations are as successful, North Carolinians should be seeing more of the Triton Barrier in workzones throughout the state. ■



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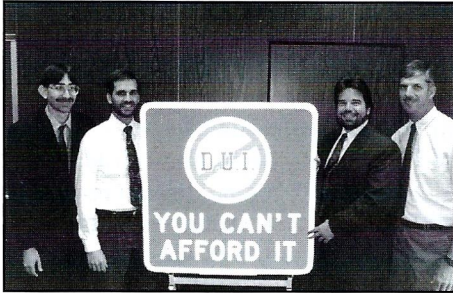
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# ASHE MEMBERS SCULPT A D.U.I. PROGRAM IN PENNSYLVANIA



Left to Right: Darryl Messinger, Terrence Kerr, Timothy Pieples, P.E. and John Hetrick, P.E.

Special blue, white and red signs appear along primary roadways throughout the five-county Engineering District 10 area of the Pennsylvania Department of Transportation as PennDOT launches a special campaign,

designed by a team of four ASHE members who are employed in the local district, to raise public awareness of the costs of driving under the influence.

PennDOT's "DUI — You Can't Afford It" campaign, funded in part by a \$20,000 grant from the Federal Highway Administration, was initiated in District 10, which encompasses the counties of Armstrong, Butler, Clarion, Indiana and Jefferson counties, in response to traffic fatality averages involving alcohol that exceeded statewide levels. Alcohol was involved in one-half of all fatal traffic accidents (one county's incident rate was 80%), compared to a statewide average that held steady at 41%.

The campaign was launched during the Thanksgiving/Christmas season, a poignant time of year when alcohol is made a part of holiday family and social gatherings.

The 'You Can't Afford It' campaign expands the focus beyond loss of life, pain and suffering that is already established by other programs by identifying the actual costs involved with driving under the influence. Court costs, increased insurance premiums, liability claims, license suspension or revocation and attorney's fees are just a few of the costs that can be financially paralyzing to even the first time offender. The bottom line is that driving under the influence is not worth the hassle and cost.

For a first time conviction or acceptance into an Accelerated Rehabilitation Disposition (ARD) program, the DUI offender could lose their license for up to one year; be sentenced to jail for 48 hours to one year; pay a fine of \$300 or more; be required to undergo alcohol and drug rehabilitation treatment; and be required to participate in a 12-1/2 hours of Alcohol Highway Safety Education classes.

Add to those costs the lost wages incurred because of time off-work associated with the penalties. And for minors, the penalties can be just as tough or tougher.

As part of the program, approximately 120 signs were placed on 26 primary highway corridors where the majority of DUI accidents occur and in heavily populated areas. Signs were also erected on Interstates entering District 10.

The signs, designed by a team of PennDOT District 10 employees, all of whom are members of ASHE, are patterned after anti-driving while intoxicated efforts in Texas.

The "DUI: You Can't Afford It" program includes news releases, assistance by the Pennsylvania State Police, informational literature and coverage by the print and broadcast media.

PennDOT is presently implementing this initiative statewide and hopes that the heightened public awareness of the costs of driving under the influence will serve to

reduce the number of tragic accidents caused by drinking and driving.



## COSTS AND PENALTIES associated with DRIVING UNDER THE INFLUENCE (D.U.I.)

### ACCELERATED REHABILITATION DISPOSITION PROGRAM (ARD)

X License Suspension 3 to 6 months	
X Possible guardian interlock	
X Treatment and counseling	
➤ Probation.....	\$300
➤ Alcohol Safety School .....	\$160
➤ Restitution and Fines .....	\$450
➤ Administrative Costs .....	\$100 - 600
➤ Court Costs .....	\$100 - 200
➤ Court Reporting Network.....	\$ 30 - 50
<i>Total</i>	\$1140 -1760

### CONVICTION

X Criminal Record	
X Prison Term: 48 hours to 2 years	
X License Suspension: 12 months	
X One Day Community Service	
➤ Processing and Fines.....	\$400 -1500
➤ Alcohol Safety School .....	\$160
➤ Court Costs .....	\$100 - 200
➤ Court Reporting Network.....	\$ 30 - 50
➤ Supervision Fee 1 to 2 years .....	\$300 - 600
<i>Total</i>	\$990 -2510

### OTHER COSTLY EFFECTS

- X Drastically Increased Car Insurance
- X Expensive Legal Fees
- X Lost Work Time and Wages
- X Name Printed in Newspaper for D.U.I.

You are considered legally intoxicated if your blood alcohol concentration is .10% or higher.

**Don't Drink and Drive -  
YOU CAN'T AFFORD IT!!**





# STEPHEN B. LESTER RECEIVES AWARD

PHILADELPHIA - Local Pennsylvania Department of Transportation official Stephen Lester has won the recognition of his peers nationwide by being named as one of 1994's Top Ten Public Works Leaders by the American Public Works Association (APWA).

Representative of "the finest the public works profession has to offer," according to APWA President George Rowe, Lester's ability to form partnerships of municipal officials and private developers to fund highway improvements critical to the needs of both groups contributed to his being selected for the award. An example of his ability is the Great Valley, US 202 project, a 10-year project resulted in the formation of a transportation district and the creation of an authority to borrow \$4 million to leverage state funds which later became available.

District Engineer Lester was also involved in the 1990 creation of the Interstate Land Management Corporation which was initiated to eliminate the blighting influence of the right-of-way areas next to major highways in the "olde

city" portion of Philadelphia. This quasi-public corporation serves as a single point of communication for the city, state and federal agencies and departments that are involved with community groups. Revenues from the leasable properties fund landscaping, maintenance and security for the other areas.

Lester's career with the Pennsylvania DOT spans nearly three decades. After joining the department in 1965 as an intern in civil engineering and became district engineer in 1987. He is responsible for administering and planning, design, construction and maintenance of all state-owned highways and bridges in Philadelphia, Bucks, Chester, Delaware and Montgomery counties. His staff includes more than 1,000 employees for nearly 4,000 miles of roadway and more than 2,600 bridges.

The Top Ten Awards program highlights the annual observance of National Public Works Week, May 15-21, throughout the United States and Canada. ■



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# BRIDGE SUPERSTRUCTURE RESEARCH

*The following information was presented in the Pennsylvania Transportation Institute's (PTI) 1992-1993 Annual Report and is reproduced here to inform ASHE members of on-going research that will affect their profession.*

To address several problems the Pennsylvania Department of Transportation (PennDOT) has identified in relation to bridge superstructures, Pennsylvania Transportation Institute (PTI) researchers have undertaken a study dealing with three specific areas.

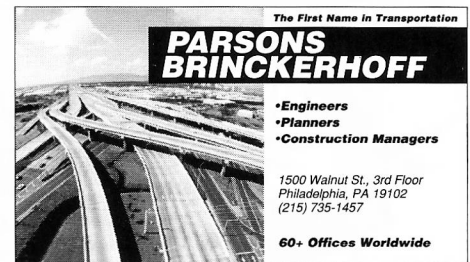
The first area addresses the need for comprehensive design details for converting existing simple-span structures to continuous structures for live load. Through various studies, PTI researchers have successfully developed a procedure and set of standard details for retrofit designs. Such conversions are anticipated for the many multiple-span, prestressed concrete structures that were designed and built as simple-span structures but will be undergoing deck replacements or major deck rehabilitations in the

near future. These construction activities will provide an opportunity to eliminate the simple supports and reconstruct the bridges so that they conform to current design practices for live load continuity. Although the conversions will occur predominantly on prestressed concrete structures, some multiple-span and simple-span steel structures might also be converted to jointless structures.

A second area relates to the lack of existing specifications (by PennDOT and by the American Association of State Highway and Transportation Officials) concerning allowable stresses for overloads on prestressed concrete bridges. Realizing that specifications are vital because overload conditions produce stresses that may exceed the design stresses in the pre-compressed tensile zone, PTI researchers have developed recommendations for design criteria related to overload conditions.

The third area concerns the use of integral abutments. PennDOT has limited experience with the design

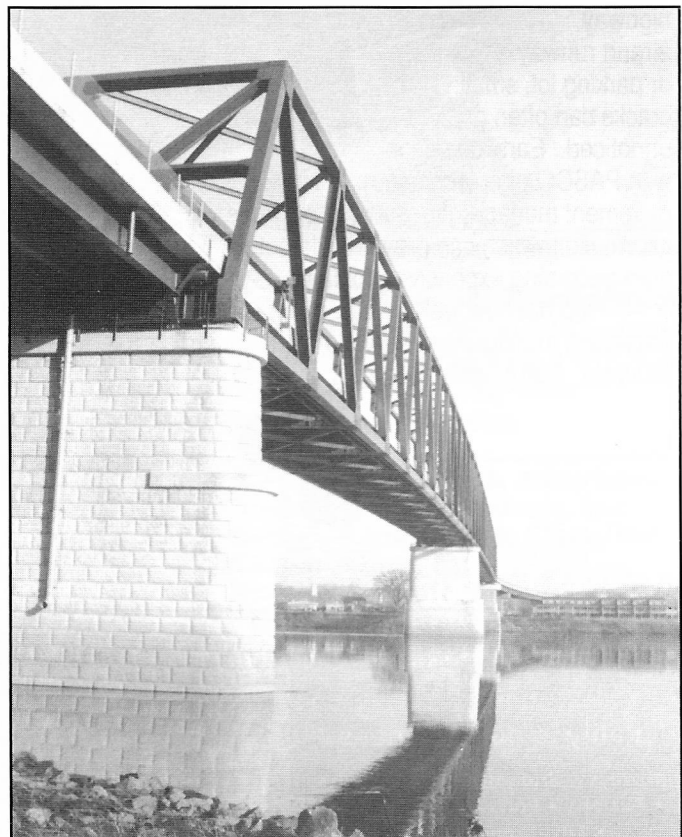
and construction of integral abutments; therefore, the agency has constructed one bridge as a Federal Highway Administration demonstration project in Engineering District 9 and also has conducted a national survey to determine the practices of other states. PTI's study of this area has included an evaluation of Penn DOT's existing experience and knowledge plus additional research to determine the best course of action for the state. Based on their findings, PTI researchers have proposed a design procedure and appropriate specifications and standards for integral abutments on bridge superstructures in Pennsylvania. ■



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