The Wall Journal™

The International Journal of Transportation-Related Environmental Noise Issues

1

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In this Issue

September

■ Harvey Knauer reports on PennDOT's innovative "I-95 Intermodal Mobility Project."

■ Cary Adkins' report on VDOT's I-66 HOV lanes and noise barrier projects.

October

■ A pictorial review of PennDOT noise barriers near Philadelphia and Allentown —by Harvey Knauer

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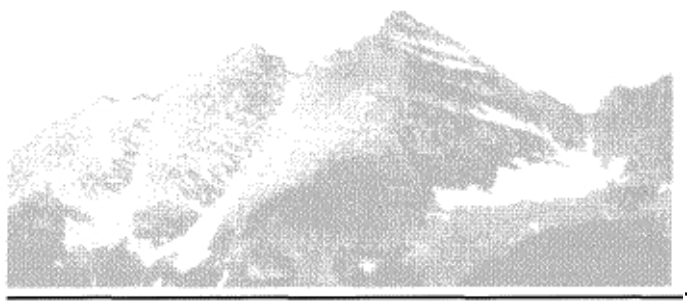
Colorado DOT Hosts A1F04 Summer Meeting

Committee Members at Work in The Rockies

Following in the ten-year tradition of alternative mid-year meetings, the 1992 summer session of the Transportation Research Board's A1F04 Committee on Transportation-Related Noise and Vibration is being hosted by the Colorado Department of Transportation at Colorado Springs on July 12-15. The meeting will be held at the Colorado Springs Marriott Hotel, located on a hilltop overlooking the city of Colorado Springs to the east and Pikes Peak to the west. Personal hosts will be Kenneth Gambrill (Manager) and Randy Flodine (Senior Transportation Specialist) of the Office of Environmental Review and Analysis.

Attendees will find relief from the exhaustive sessions in the awesome natural splendor of the surrounding Rocky Mountains and the wide range of cultural activities and historical attractions. Working and off-hours sight-seeing tours include visits to North American Aerospace Command, Stapleton International Airport, U.S. DOT High Speed Test Center, Flying W Ranch, Pikes Peak and Iron Springs Chateau.

Abstracts of the Papers and general comments on the presentations will be printed in the next issue of The Wall Journal.



Technical Presentations:

Strategic Three-Dimensional Aviation Noise Planning
Dr. Cliff Bragdon, Georgia Institute of Technology

Development Infill Potential, "All Stage 3" Air Fleets
Neal Phillips, Metropolitan Washington Airports Authority

Noise Analysis for AFB Disposal and Refuse Program
Ray Nugent, ACENTECH, Inc.

Stapleton Airport Noise Compliance Program
Bryan Rykes, Stapleton International Airport

Stapleton Noise Insulation Project
Dana Hougland, David L. Adams Associates, Inc.

Acoustic Characteristics of Porous Road Surfaces
Jean-Francois Hamet, Institute National de Recherche sur les Transports et leur Securite (France)

Texas DOT Noise Program Research Proposal
Cindy Wilson, Texas Department of Transportation

Transportation Vibration on High-Tech Facilities
Ray Nugent, ACENTECH, Inc.

Control of Bus Noise and Vibration in Mixed-Use Urban Construction
Brian Chapnik, Vibron, Ltd. (Canada)

MBTA (Blue Line) Noise Analysis
David Coate, ACENTECH, Inc.

Pueblo Test Track Research Program
Don Waldo, U.S. Department of Transportation

Noise Barrier Construction in High Water Table Environment
Win Lindeman, Florida Department of Transportation

Reference Energy Mean Emission Levels: the Florida Experience
Dr. Roger L. Wayson, University of Central Florida

Active Noise and Vibration Technologies R&D Program
Dr. Allen Curtis, Active Noise and Vibration Technologies, Inc.

In Situ Evaluation of Parallel Barrier Effectiveness
Gregg G. Fleming, U.S. Department of Transportation

Canada Develops National Noise Barrier Standard

By Soren Pedersen

In 1972 and 1974, the Ministry of Transportation of Ontario (MTO) constructed its first two noise barriers along Highway 401 in Toronto. Within a short time, it became evident that the barrier materials were beginning to degrade and it was apparent the barriers would not have the useful life and aesthetic value expected by the Ministry. Consequently, the MTO staff proposed to develop a new Ministry standard for the design, materials, installation and maintenance of noise barriers to be used along highways in Ontario.

The first version of this standard was ready by 1977 when the Ministry officially announced the Provincial Government's noise barrier program. This program not only included guidelines for the construction of noise barriers on new and widened highways, but also for retrofitting of existing highways where traffic noise impacted adjacent existing residential communities. For protection of new residential developments approved and constructed after 1977, the responsibility for mitigating the traffic noise rested entirely with the developer.

As the Ministry continued to refine the noise barrier standards for its own contracts, the private developers were left on their own to construct such noise barriers as they thought would shield their developments from highway noise.

In many cases, this proved to be quite an acceptable approach, with some of these barriers being the most well-constructed and attractive in the province. However, other cases proved to be disastrous for the new home owners.

Many new residents watched the developer's noise barriers begin to deteriorate in their own back yards. To make matters worse, the residents are required by local by-laws to repair or replace the noise barriers at their own expense. As these situations became more frequent, MTO was called on

continued, page 4

Advertising...

The Wall Journal offers a number of classified and display-advertising alternatives. If you would like to advertise your products or services in the Wall Journal, we are offering special introductory rates for the up-coming September issue.

For details, please call El Angove at
(703)720-0282,
or fax your request to El at
(703)720-0598.

FHWA Update by Bob Armstrong

I'd like to welcome all of you to this inaugural edition of The Wall Journal. This regular column in the Journal will alert readers to the goings-on within the Federal Highway Administration (FHWA), inasmuch as they relate to the issue of highway traffic noise. I will also try to pass along thoughts, ideas, and experiences which occur in daily contacts within the "noise community".

Regulations Reference:
The current FHWA noise regulations have essentially been in place since 1976. Previously, the regulations were referenced as *Federal-aid Highway Program Manual, Volume 7, Chapter 7, Section 3 (FHPM 7-7-3),* "Procedures for Abatement of Highway Traffic Noise and Construction Noise." However, the FHWA Federal-aid Highway Program Manual was abolished in December, 1991, and the correct reference for FHWA's noise regulations is now *23 Code of Federal Regulations (CFR) Part 772,* "Procedures for Abatement of Highway Traffic Noise and Construction Noise." No wording in the regulations has changed — only the reference. The new reference should be used in all future highway traffic noise analysis documentation.

Traffic Noise Prediction Procedures:
State highway agencies (SHAs) use FHWA traffic noise procedures, STAMINA 2.0/OPTIMA, to both assess traffic noise impacts and design noise abatement. Existing procedures have not been changed for more than nine years. The FHWA has begun an effort to incorporate innovations and improvements which have occurred over the last nine years in state-of-the-art methodology and technology for traffic noise prediction and barrier design. This effort will eventually result in the development of new computer software.

Transparent Barriers:
There is strong interest in the use of transparent highway traffic noise barriers in the area around San Diego, California. A number of private transparent barriers have already been constructed, and the California Department of Transportation is considering development of a standard specification for transparent barriers.

New Vendors:
New vendors for highway traffic noise barriers are the following

Concrete (Formliners for Aesthetics)
Custom Rock International
1156 Homer Street
St. Paul, MN 55116
(612) 699-1345

Concrete
Faddis Concrete Products, Inc.
3515 Kings Highway
Downington, PA 19335
1-800-777-7973 or
(215) 269-4685

Polymer (Composite Glass/Fiber Reinforced)
Channel Filled
with Recycled Tire Rubber
Carsonite International
1301 Hot Springs Road
Carson City, NV 89706
(702) 883-5104

Structural Sandwich Panels
(Prefabricated slabs of ground used tire rubber bonded to metal deck, Kanwall)
Kanan Associates, Inc.
9564 Basket Ring Road
Columbia, MD 21045
(410) 997-7526

NOTE: Listing of products and vendors is for informational purposes only and does not constitute either endorsement or approval by FHWA.

To obtain a complete listing of known vendors , or for qestions and comments concerning this column should, contact Bob Armstrong at (202) 366-2073 or Steve Ronning at (202) 366-2078.

Editor's Corner by El Angove

When I retired from The Reinforced Earth Company early this year, I like to think that I was the world's oldest living, steadily-employed noise barrier salesman. That may not seem to be much to crow about, but it certainly provides me with a unique, long-term perspective of this country's highway traffic noise abatement programs.

Bill Pickett and I founded The Fanwall Corporation in 1973, about the time he got his first patent on the Fanwall noise barrier. I was a salesman in the building construction industry and Bill worked for Bolt, Beranek and Newman. In his spare time, Bill succeeded in getting FHWA approval for an experimental Fanwall project on Interstate-95 in Newburyport, Massachusetts, five walls of which were installed in 1974-75. The glow of this first success inspired us to seek funding from a group of Connecticut investors, and we quit our jobs and formed The Fanwall Corporation in April, 1976 in Framingham, Massachusetts. It took us the rest of 1976 to put together a brochure and a technical manual. On January 5, 1977 I loaded my car with Fanwall literature and left my home in a heavy snowstorm for a four-week, eighteen-state presentation tour to introduce Fanwall to state highway noise officials. (In those four weeks, it snowed every day but five; check your weather reports). For the next two years, we were able to put together a handful of jobs to keep us alive.

We were beginning to despair of being able to continue, until we received an invitation from Harter Rupert to attend a noise barrier conference in Los Angeles on December 11-15, 1978. That conference expanded our horizons and confirmed our belief in our chosen endeavors. That historic conference has been published as the "Proceedings of Conference on Highway Traffic Noise Mitigation, Los Angeles, California, December 11-15, 1978", 265 pages. Lou Cohn (then with NYSDOT, now Chairman of the Civil Engineering Department, University of Louisville) wrote in the Introduction: "This conference represents the first major activity of TRB Committee A1F04, Transportation-Related Noise, since the highly successful 1975 Workshop on Highway Traffic Noise Prediction Methods. That workshop, held in Washington, D.C., brought together by invitation a small group of experts for the task of defining the state of the art in traffic noise prediction". Hallelujah! Just look at the names of the presenters and committee members at that great Conference: Lou Cohn, Joe Pulaski, Win Lindeman, Gene Miller, Charlie Adams, Bill McColl, Oscar Janeway, Fred Hall, Jim Lawther, Walter Whitnack, Tim Barry, Myles Simpson, Grant Anderson, Chris Menge, Randy Blum, Ahmet Anday, Daryl May, Mas Hatano, Earl Shirley, Harter Rupert, Bill Bowlby, Len Kurtzwell, John Wesler, Bob Armstrong, Harvey Knauer, and Rudy Hendricks, just to name a few. Fortunately, most of these names are still with us and very active in A1F04 activities.

There have been many other great A1F04 meetings in the 14 years since that "first major activity". But the Los Angeles affair really established the esprit de corps of A1F04. The after-hours social gatherings and group forays into the wilds of L.A. provided a bonding experience which has endured and flourished. We now have a homogenous assemblage of engineers, scientists, planners, programmers, vendors and "friends" who share that good fellowship. The only thing we do not have is a more frequent forum to share our intellects, our achievements, our experiences, our research and our ambitions. I hope that The Wall Journal will fill that void. This is your forum. With your help, and only with your help, we can create a dynamic compendium of the works of transportation-related noise abatement. We need you as our reporters and contributing editors.

Keep those cards and letters coming.

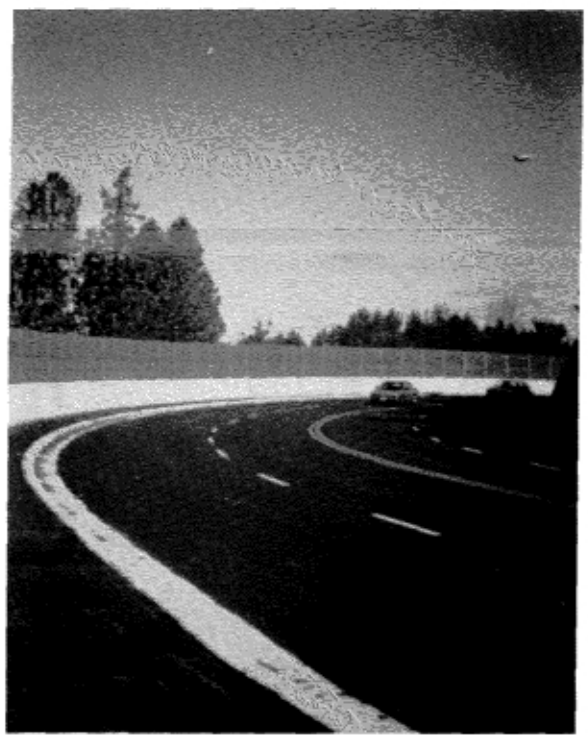
El Angove

$15 Million VDOT Abatement Project

by Cary B. Adkins

The Virginia Department of Transportation (VDOT) is scheduled to advertise in August the largest sound barrier project in its history. Since beginning a noise abatement program in mid 1970, VDOT has constructed almost 36 miles of sound barriers along its highways at a cost of $46 million. The largest abatement project to date, in terms of cost and square feet of barrier, is currently under construction along I-66 in northern Virginia near Washington, D.C. That project, which will be the subject of a future article, consists of 13 barriers totaling 6.3 miles and 550,000 square feet at a cost of $9 million.

The barriers to be advertised in August will be constructed in conjunction with the addition of HOV lanes to I-64 in the cities of Norfolk and Virginia Beach. Thirteen barriers ranging in height from 7 to 32 feet and totaling 9.6 miles and 922,000 square feet at a cost of $15 million will provide 5 to 16 decibels of noise reduction to 907 impacted receptors. Of the total receptors impacted within the project corridor, 91% will be protected by the barriers. The cost to provide adequate abatement to the remaining 9% is not considered reasonable in accordance with VDOT's noise abatement policy.



The VDOT specifications call for sound-absorptive barriers to minimize the effects of reflected noise on Interstate-66 project near Washington DC.

The construction of the HOV lanes will result in only a 1 to 3 decibel increase in noise levels along the corridor. However, levels are already high and will reach 77 dBA by the design year 2010. Residents along I-64 have complained about high noise levels for years. Since VDOT does not have a retrofit program, the addition of the HOV lanes represents the first opportunity for consideration of noise abatement in the project area.

Barrier segments on bridges will be metal; all other segments will be precast concrete. All but one of the barriers will require an absorptive finish on the roadway side, and the residential side of the precast concrete segments will have a "fuzzy" raked finish. TWJ

Note: All cost figures used in this article are estimates and include only the cost of materials and installation.

TRB A1F04 Committee

By Domenick Billera

"The time has come, the walrus said, to talk of many things,
of shoes and ships and sealing wax, of cabbages and kings ....."

—Lewis Carroll

And indeed The Wall Journal is something whose time has come. A1F04 welcomes this inaugural issue and wishes the Journal a long and successful existence. Hats off to El Angove for the vision to create this forum for those of us involved in the ever-evolving field of transportation noise abatement,and a hearty thank you for providing me this space to report on the activities of TRB Committee A1F04, Transportation-Related Noise and Vibration.

For those of you unfamiliar with A1F04, a few words of introduction. Our committee, as part of the Transportation Research Board, within the National Research Council, serves as a forum and information clearinghouse for anyone involved in transportation noise issues. Our main activities are: identifying research needs, promoting the exchange of technical information through paper presentations and conference sessions at the TRB Annual Meeting each January in Washington, D.C., our Summer Meetings (reported elsewhere in this issue) and our newsletter to committee members and friends (academic researchers, consultants, state transportation agency staff, suppliers and constructors of noise-related equipment & materials, and other interested parties.)

The Committee is comprised of three subcommittees which are dedicated to aircraft, highway and rail/mass transit noise issues.

Currently, the big news in the Committee is a change in the Highway Subcommittee Chairmanship. Dr. Bill Bowlby of Vanderbilt University, after a long and meritorious service, is being succeeded by Ken Polcak of the Office of Environmental Design of the Maryland State Highway Department.

If you would like to learn more about the Committee and receive one of our newsletters, please give me a call and we'll talk of many things!

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The Challenge for The Future

By William Bowlby

I would like to issue a challenge to all of us that we must have **FOCUS** as we look ahead in our field: **F**unding, **O**pportunities, **C**apabilities, **U**nderstanding, and **S**tandards.

Funding is an obvious key for research and development, design, construction and maintenance related to noise abatement. The new Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) is a six-year, $150 billion comprehensive piece of legislation that will chart our country's transportation programs into the next century. Funding has been increased in many categories and the new Surface Transportation Program (STP) gives states more flexibility in spending, which could benefit noise abatement.

However, we appear to have missed out on what could have been a natural mechanism for funding Type II (retrofit) noise barrier projects. The Act established a new category called Transportation Enhancement Activities, with 10% set aside of the STP funds. Ten, and only ten, types of enhancements are listed in the Act, and noise abatement is not in that list. As this issue goes to press, the technical corrections bill for ISTEA will probably be completed. If your congressman or senator is on one of the transportation committees, contact him or her and see if anything can be done.

Opportunities exist, however, for other types of support. Congressman Richard J. Durbin (D - IL) submitted a bill last fall to review funding for the Environmental Protection Agency noise program. As you probably know, the Office of Noise Abatement and Control (ONAC) lost its budget and its people early in the Reagan administration: "Noise control is a local issue, best handled by locals." Sure, but federal assistance to those locals turned out to be critical. Joseph Soporowski of Rutgers University reported in 1990 that of the 220 state and local programs receiving EPA funding in 1980, less than 80 are still operating. ONAC had its problems and made its enemies, but its low-cost technical assistance program served a valuable role.

Durbin held a workshop in December, 1991 that generated a report called "Combatting Noise in the '90's: A National Strategy for the United States."

He and his colleagues, including Patricia Schroeder (D - CO) feel environmental noise control is important. Write to Durbin's office for a copy of the report, and then send a letter to your congressman asking for his or her support.

Also, FHWA articulated a new Environmental Policy a couple of years ago which included noise abatement as a goal. Since then, the environmental research program has grown, aided by a TRB research needs conference last fall. Noise must compete for research dollars against all other environmental areas, and against some perceptions that most of our problems have been solved, or at least that we've had our share of the pie already. We must continue to educate within our organizations and professions that we do not have all the answers and that much remains to be done.

Capabilities are indeed critical. We need state-of-the-art analysis tools, cost-efficient and effective noise abatement systems, and well-trained people. It is crazy for noise analysts to not take advantage of the capabilities of computer-aided roadway design systems, or to work with limited, out-of-date noise measurement equipment. New tools are available now and more will be in the future. Investigate, plan and budget now. New materials and barrier systems are also important.

We need cost-efficiency and we need to think in terms of life-cycle costs. We now have a 20-year "history" to our noise program, which is showing us the problems with early wood and metal systems or certain too-porous concrete products (which are currently not on the market). Durability and low maintenance are critical. Turnover of personnel has also been a problem in our field. It is hard to build an institutional memory to prevent the mistakes of the past from being repeated.

Understanding is essential, whether it be for newcomers to the field or for experienced professionals. Questions abound when we talk of understanding. What are the goals of our analysis or design? What is the appropriate level of analysis? What are the assumptions behind our prediction models? What are their limitations? What are the limits of our own body of knowledge on the subjects of traffic noise generation, propagation and attenuation?

And importantly, what have others done, either elsewhere in our country or abroad, on problems that we thought to be limitations in the body of knowledge? Good research and development is important, but good technology transfer is what helps us get the job done. Certainly this newsletter is one of those technology transfer mechanisms. Active participation in organizations like the Transportation Research Board, the American Society of Civil Engineers and the Institute of Noise Control Engineering is time well-spent. Find the time to write about and share what you have learned or need to know. We need to work to build and maintain that institutional memory.

Standards. As we learn, one of the best mechanisms is to translate that knowledge into standards — and then use those standards in our work. Standards take many forms. ANSI, ASTM and SAE have numerous procedures for measuring, calculating or specifying sound level descriptors and for specifying measurement equipment. These standards are the result of long hours of work by volunteer experts to develop a consensus approach. Not knowing of these documents or not using them may deprive us of the repeatable, accurate, defendable answers to our questions or problems.

Standards also play a vital role in noise barrier systems, whether it be during acoustical design, structural design, material selection, construction or maintenance. The information in Soren Pedersen's article elsewhere in this issue reflects so much experience that it is a shame for these standards (and others) not to be used or at least evaluated carefully and adapted to your own situation.

Obviously there is much more that can be said on the topic of noise abatement. I'm sure you could come up with your own list of subjects. Regardless, we do need to FOCUS on the tasks at hand, which include convincing skeptics, competing for funds and educating administrators, while seeking out innovation and trying to satisfy the demand for abatement. And, we need to FOCUS with persistence on the fact that noise abatement is an important quality of life issue. If we, the professionals, cannot make that case, who else will?

William Bowlby, Ph.D., P.E., is president of Bowlby and Associates, Inc., Nashville, TN

Canadian Standard

Continued from page 1

to mediate and advise in several disputes between municipalities, home owners and developers.

This prompted MTO to take the initiative to approach the Canadian Standards Association (CSA) to sanction the development of a national noise barrier standard which could be adopted by all. CSA agreed to this proposal and authorized the creation of a Working Group under the direction of the CSA Technical Committee on Acoustics and Noise Control. The Working Group was then established in 1988 with members coming from numerous government and private organizations from across the country.

In the beginning, the members were concerned that this proposed standard, when developed, would not be able to gain enough recognition to justify continuing support from the CSA. This created some uncertainties within the group and, as a result, work on the standard was suspended. However, as more and more people became aware of the existence of this draft standard, requests for copies started to pour in from across North America and Europe. This overwhelming show of support spurred the Working Group toward completing its work.

Rather than develop the standard from scratch, the Working Group decided to use the well-seasoned standards developed by MTO as a framework and build from there. The group agreed on two important basic principles for the new standard. One was that the standard would incorporate a complete certification or pre-qualification program and a quality assurance program for each noise barrier installed. The second was that it would only deal with the overall physical design of the barrier system, the materials used and the construction methods. It would not include requirements for the acoustical design, such as location, wall height and length.

During its four years of work, the Working Group contributed hundreds of man-hours, produced four draft versions, and reviewed over 200 comments from various organizations before it submitted the last draft to CSA for final review on March 30, 1992. It is anticipated that this new standard will be published before the end of this year.

As Chair and on behalf of the 16-member team that worked so hard on this standard, I would like to extend our warmest thanks to those who supported our efforts and provided invaluable comments. We could not have done it without you.

If you are interested in receiving the latest version of this draft standard, please write to:

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