The Wall Journal™ 5

The International Journal of Transportation-Related Environmental Noise Issues

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- Dr. Roger Wayson's Classroom Series on Noise Fundamentals
- Feature Article on Design/Build Projects
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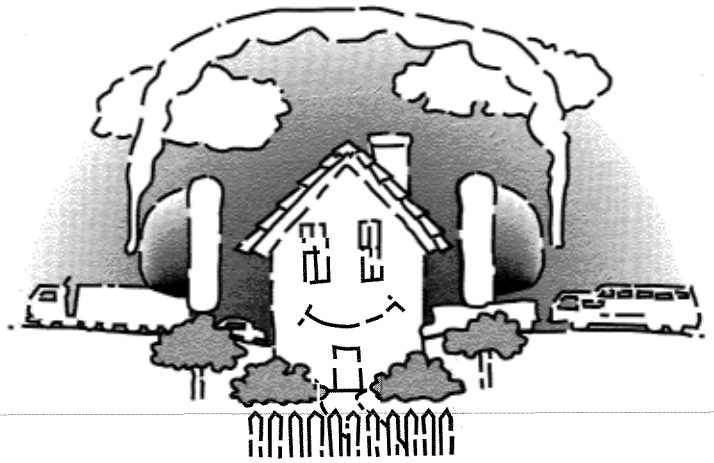
- Mailing List Expansion
- Call for Articles
- Feature Article/Paper of the Year Award

For Details of Announcements, see Editor's Corner, page 2.

Wanted: Sound Design



The 1993 Caltrans SILENT* Challenge

The California Department of Transportation announces the 1993 Caltrans SILENT* Challenge, and encourages California students of architecture, art, engineering, and landscape architecture to submit entries in competition for cash awards and prizes.

The Caltrans SILENT* Challenge seeks new and creative design for noise reduction features that limit the encroachment of transportation system-generated sound in adjacent neighborhoods, and blend artfully and aesthetically with their environs. SILENT* is Caltrans' acronym for Student Innovation Landscape-Enhancing Noise Technology.

Caltrans is responsible for the design, development, maintenance, and operation of California's transportation system, including more than 15,000 miles of highways. The department is also responsible for protecting Californians' right to the quiet enjoyment of their homes and property in neighborhoods and communities that may be juxtaposed to busy — and sometimes noisy — freeways.

The Caltrans SILENT* Challenge accords California students an opportunity to submit truly new designs for highway noise suppression systems and acoustic technology in a competition that may lead to resolution of a significant social and environmental issue.

Eligibility. The 1993 Caltrans SILENT* Challenge is open to college students throughout California and is not limited by field of study. Individual and team entries are encouraged. Caltrans employees, their families, associates and employees of members of the jury may not compete.

Awards. Substantial cash prizes and recognition trophies will be awarded the best entries as determined by an independent panel of jurists. Funding for each prize will be provided by the California Transportation Foundation, a nonprofit organization that encourages excellence in transportation development in California and is the co-sponsor of the competition. The value of each cash prize will be determined prior to the close of contest registration and will reflect contributions made by others to the Foundation for this purpose. Registered competitors will be notified by mail of cash prize amounts, and provided a list of jury members.

Objectives. Caltrans is searching for new technology, or better, more cost-effec

*(See **Sound Design**, page 5)*

The Wall Journal
The International Journal of Transportation-Related Environmental Noise Issues

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Editor
El Angove

Director of Publications
John G. Piper

All material submitted becomes the property of The Wall Journal, and may be edited for length, clarity and accuracy. Material will not be returned without special arrangements prior to submission. The Wall Journal will not be responsible for lost or damaged materials.

Published articles, comments, letters, papers and advertisements do not necessarily represent the views and/or endorsements of The Wall Journal. The authors of submitted material are solely responsible for the truth and accuracy of their submissions, and the Wall Journal cannot be held liable for any damages suffered by our readers as a result of their use of published material.

Our only intention is to provide a communications medium for the exchange of information among those parties who are involved with environmental noise issues. Circulation will be made to government agencies, consulting engineers, scientists, universities, contractors, vendors and others with an interest in noise abatement.

Subscription and advertising information are shown on the back cover page

The Wall Journal is composed in its entirety on Apple Macintosh computers.

Editor's Corner by El Angove

I would like to borrow a line used in an earlier issue by Domenick Billera (who borrowed it from another famous author)..."The time has come, the walrus said, To talk of many things..." In my case, those things are subscriptions, readership, reader participation and prizes. The first three of these are the life blood of The Journal. The **subscriptions** have been a real source of disappointment to me. In the first four issues, I asked often that readers **register** their desire to continue receiving The Journal, simply to verify to our advertisers and readers alike that the Journal is getting into the hands of people who have a **real interest** in transportation noise abatement. Take a look at what has happened after four issues:

This table is taken from the database used in the mailing of the issue you are now reading, and is similar to the past mailings. Of the 265 names in "Canada/Other" column, 223 are Canadian. The 42 remaining are from other parts of the world.

	UNITED STATES			CANADA & OTHER		
Category	**Mailed**	**Reg'd.**	**Paid**	**Mailed**	**Reg'd.**	**Paid**
Consultant	819	77	61	43	16	9
State Gov't.	328	103	Free	26	8	Free
Local Gov't.	186	26	Free	30	9	Free
Federal Gov't.	160	39	Free	8	5	Free
Noise Barr. Mfr.	114	41	27	39	7	2
Gov't. Assn.	67	11	Free	6	0	Free
Institution	50	8	Free	9	2	Free
Equipm't. Mfr.	16	0	0	2	0	0
Contractor	9	4	4	1	1	1
Unsorted	88	0	0	101	0	0
Totals	**1837**	**309**	**92**	**265**	**48**	**12**

Final Call for Registration and Subscriptions. Despite some of the accolades we have received concerning the content and quality of the Journal, it is obvious from the table that we may be reaching a number of readers who have little or no interest in our publication. Much as I hate to do it, **we will have to begin deleting the names of unregistered and/or unsubscribed readers** from our database at the time of mailing Issue No. 6 (approximately March 12). In fairness to earlier paid subscribers, the start date of their subscriptions will be adjusted to that date. The Wall Journal is a not-for-profit operation and pays no salaries. If you wish to continue receiving the Journal, **please register or enter your subscription order soon.**

Mailing List Expansion. We have an unused database of over 3,000 names, including contractors and government officials in rail, rapid transit and aircraft activities, which we are beginning to draw from to replace the deleted names. We will continue to increase our circulation to include highly-targeted readers with interests in the abatement of transportation-related noise. This is in the best interest of our advertisers, who are fast becoming our principal supporters, and that of the professionals and academics who wish to expand their communication with others in this field.

A Call for Papers and Articles. We need more editorial input. A handful of the veterans in the noise abatement endeavor are doing a great job of supplying good material for publication. However, we would like to see some **new faces** on our pages. There's a lot going on out there which needs to be shared with your fellow professionals. Please take a little time and give them the benefit of your experience, your technology, and your concepts. We will be happy to publish you.

The First Annual Wall Journal Award for Best Paper, Article or Feature Story. We'd like to get into the act of making awards at the TRB A1F04 Awards Dinner next January in Washington, D.C. The prize won't be a new Cadillac, but it won't be a pen-and-pencil set, either. The honoree will have to have been published in The Journal during 1992 and 1993, so save your best for us. We think you'll be happy with your award and prize. ■

FHWA Update by Bob Armstrong

Highway Traffic Noise Barriers and "The Song of the Open Road"

Occasionally, we in the public sector receive correspondence that cannot be called ordinary. The following example of such correspondence is the text of a letter sent to several newspapers and First Lady Barbara Bush. It eloquently describes the concerns of one person for what is deemed to be undesirable traffic noise barrier construction along an Interstate highway. I quote:

"I have a dream"...just close your eyes and imagine five miles of a cement wall that twists and turns its way through the town of _____ . Is this wall a "thing of beauty, a joy forever?" Whatever happened to "Trees?...a nest of robins in her hair who...lifts her leafy arms to pray." Robins...pray...sounds like it might be closer to what we all are in search of. Noise. Children make noise. People make noise. Animals make noise. Life makes noise.

Again, close your eyes and rid the world, or perhaps just the town of _____ of all the above noises. We could put walls around our children, people, animals, or just about anything in life. As a matter of fact, some of us build walls all of the time. To separate ourselves from life's harsh realities, we distance ourselves from one another. Perhaps we are so used to all of these walls that, in seeing another, no notice is taken.

Now, let's search for that first sign of spring...the robin. Close your eyes again and hear for the first time the noise it sings as its melody tries aimlessly to reach your heart. The tree is gone. Only the cold cement remains. The calming effect of green, and that which we cannot create, is gone. In its place, we have created a monster. Stress builds as we try to reason, yet can't quite see what it is we need to know.

Noise? A steady stream of noise causes us no real notice. Somehow through adaptation, we have grown immune to the sound. Only the differences of noise in our environment are noticed or heard. Now we have destroyed the "Song of the Open Road." The spring is over...the robin will not come again

What follows is the Federal Highway Administration response to the letter in behalf of Mrs. Bush. The response tries to be sensitive yet realistic:

Thank you for your letter to Mrs. Bush regarding construction of noise walls along I-__. Mrs. Bush's office forwarded your letter to us for reply.

To judge from the letter, your family is attuned to the poetry of life. In the poem you mentioned, "Song of the Open Road," Walt Whitman spoke of the "cheerful voice of the public road, the gay fresh sentiment of the road." I would not apply those words to I-__. The beauty of a tree, the sound of children playing...these pleasures are lost along a highway that carries over 100,000 cars and trucks a day. That is why the city of _____ petitioned _____ to build the noise walls.

You may have heard that beauty is in the eye of the beholder. Perhaps in the case of noise walls, beauty is sometimes in the "ear" as well. For motorists, noise walls may seem to create a concrete canyon. For residents near the highway, however, the beauty of life may be lost because unceasing roadway noise invades their home, drowning out the sound of conversation, of a baby, of a dream. For a highway's neighbors, a noise wall that turns the volume down may be the most beautiful sight of all. Today, the open road Whitman spoke of...the road for "Pausing, searching, receiving, contemplating"... remains in our scenic byways, our back roads, and our "Blue Highways," as a popular book called them. Transcontinental I-__ is another matter. "Something there is," said Robert Frost, "that doesn't love a wall," but I hope that as you travel I-__, you will think of the pleasure the noise walls provide to those who live behind them. ■

TRB A1F04 Committee by Domenick Billera, Chairman

What's an A1F04?

I have frequently received calls from individuals new to the issue of transportation noise who had learned that I was the head of "some committee on noise" and could I help them in some way. Also, I imagine that many readers of The Wall Journal may be unaware of the Transportation Research Board and its committee activities. Therefore, I would like to offer a brief summary of the history, purpose and goals of the Transportation Research Board in general and specifically our committee A1F04.

The Transportation Research Board is an agency of the National Research Council, which serves the National Academy of Sciences, the National Academy of Engineering and the Institute of Medicine. The Board's purpose is to stimulate research concerning the nature and performance of transportation systems, to disseminate information which such research produces, and to encourage the application of appropriate research findings.

The Board's programs are carried out by more than 270 committees and task forces composed of more than 3,300 administrators, engineers, social scientists and educators who serve without compensation. The programs are supported by state transportation and highway departments, the United States Department of Transportation, and other organizations interested in the development of transportation.

The Transportation Research Board operates within the National Research Council. The Council was organized in 1916 at the request of President Woodrow Wilson as an agency of the National Academy of Sciences to enable the broad community of scientists and engineers to associate their efforts with those of the Academy membership. Members of the Council are appointed by the president of the Academy and are drawn from academic, industrial and governmental organizations throughout the United States.

The National Academy of Sciences was established by a Congressional act of incorporation signed by President Abraham Lincoln on March 3, 1863 to further science and its use for the general welfare by bringing together the most qualified individuals to deal with scientific and technological problems of broad significance. It is a private, honorary organization of more than 1,000 scientists elected on the basis of outstanding contributions to knowledge and is supported by private and public funds. Under the terms of its Congressional charter, the Academy is called upon to act as an official, yet independent, advisor to the Federal government in any matter of science and technology, although it is not a government agency and its activities are not limited to those on behalf of the government.

To share in the task of furthering science and engineering and of advising the Federal government, the National Academy of Engineering was established on December 5, 1964 under the authority of the act of incorporation of the National Academy of Sciences. Its advisory activities are closely coordinated with those of the National Academy of Sciences, but it is independent and autonomous in its organization and election of members. In 1970 the Institute of Medicine was created to give emphasis to health concerns.

Next Month — What's an A1F04? (Part II).

Domenick Billera is Manager, Air and Noise Section, Division of Project Development, New Jersey Department of Transportation. He may be contacted by phone at 609 530-2834, or by fax at 609 530-3893. ■

Wilson, Ihrig & Associates, Inc. and Caltrans to Host A1F04 Summer Meeting

Wilson, Ihrig & Associates, Inc., and the California Department of Transportation (Caltrans) are hosting the 1993 summer meeting of the Transportation Research Board's A1F04 Committee on Transportation-Related Noise and Vibration in Berkeley, California on July 11-14. The meeting will be held at the Berkeley Marina Marriott Hotel, located on the Berkeley Shore of the San Francisco Bay. Personal hosts will be James T. Nelson (Vice President, Wilson, Ihrig & Associates, Inc.) and Dianne Steinhauser (Chief, Environmental Engineering Branch, California Department of Transportation).

*(See **A1F04**, next page)*

(***Sound Design***, from page 1)
tive, and aesthetically pleasing ways to resolve the conflict between noisy highways and quiet neighborhoods. Vehicle muffling systems will not be considered. Proposed designs should be compatible with neighboring environs in an artful and pleasing manner.

Background. Sound barrier costs amount to five percent of Caltrans' annual capital outlay, and total some $300 million since the first were built in 1968. By 1992, the median cost of constructing a noise barrier had risen to $11.02 per square foot! Masonry block construction is used in 85 percent of the noise barriers built in California. Ten percent are constructed from precast concrete, and five percent are built with alternative materials such as metal, reinforced stucco, wood, or earth berms and mounds. Caltrans has made a conscientious effort to reduce noise barrier costs, and improve their efficiency by specifying the use of materials other than concrete block, and encouraging more efficient construction techniques.

Evaluations. The jurors will select award-winning entries that best meet Caltrans' overall objectives: • Safe, ensuring protection for highway users and area residents. • Cost-effective, including initial outlay and long-term expenditure. • Functional. The design must work! • Aesthetically appealing, and environmentally-enhancing. • Graffiti-proof, repellent, preventive, and/or easily maintained. • Constructed with recycled materials, or newly-developed materials.

Registration. To enter the 1993 Caltrans SILENT* Challenge, [California college students] simply complete and return a registration form. Forms are available from the the head of your department, or Caltrans' Office of Transportation Facilities Enhancement. Photocopied registrations are acceptable, and there is no registration fee.

Submission Requirements. Graphic representations may incorporate any perspective that accurately expresses the design idea. Drawings and/or photographs will be accepted. Written reports (if submitted, but not required) must not exceed 500 words. A one-page statement of estimated costs must accompany the design. Each entry must be submitted on one 18" x 24" FomCor board, or its equivalent. All exhibits, including reports and cost estimates, must be attached to the graphic display board. DO NOT SUBMIT MODELS. Photos of models are acceptable, but must be attached to the single display board. The identification of the submitter MUST NOT be visible anywhere on the entry. Competitors should attach a sealed, blank #10 envelope which contains the entrants' identification, address and telephone number to the back of the graphic display board.

Schedule.
- Registration Closes: February 10, 1993
- Entry Submission Deadline: April 5, 1993
- Announcement of Winners: May, 1993

For More Information. Read "California Noise Barriers," June 1992, California Department of Transportation. A copy of the report was supplied to the head of your department. [Ed. Note to readers of The Wall Journal: See "California Noise Barriers Task Force Report - A Summary" in TWJ Issue No. 4].

Contact. Allen Wrenn, Transportation Facilities Enhancement Office, California Department of Transportation, 1120 N Street, Room 5306, Sacramento, CA 95814, Telephone (916) 654-6680; FAX (916) 654-3770.

Ed. Note: The above notice was reprinted with the permission of Caltrans. ■

*(**A1F04** from page 4)*

Sessions will include technical presentations and working tours. Off-hours sightseeing tours are also planned to enjoy the San Francisco Bay Area and surrounding areas. Abstracts for papers and presentations are requested. Any topic on transportation-related noise and vibration will be eagerly considered. Abstracts for papers are due March 19, 1993.

Anyone interested in attending or participating in the activities at this annual summer conference may obtain information regarding registration, fees and topics for papers by contacting: James T. Nelson, Wilson, Ihrig & Associates, Inc., 5776 Broadway, Oakland, California 94618, telephone: 510 658-6719, fax: 510 652-4441. ■

Summary of Professional Papers

Presented at the TRB A1F04 Summer Meeting at Milwaukee: July 21-24, 1991 - **Part II**

"Noise Control, O'Hare International Airport"

Presented by: Mary Rose Loney
Ist Deputy Commissioner
Chicago Department of Aviation

Summary: Not Available

Highway and Airport Noise Studies Using CAD/GIS"

Presented by: Areg Gharabegian
Engineering-Sciences, Inc.
199 S. Los Robles Avenue
Pasadena, CA 91101
(818) 440-6047

Summary: Computer-Aided Drafting (CAD) system and Geographic Information System (GIS) can be a very useful tool for conducting highway and airport noise studies. The use of a CAD/GIS system in conjunction with a highway or airport noise model will increase the accuracy of the results and will reduce the study time. For traffic noise studies, special software is used to read X-Y coordinates of roadways, natural barriers and sound walls from a digitized map and prepare an ASCII file which can then be used as input data to the noise model. For airport noise studies a CAD/GIS system can be used to prepare flight track input data, plot noise contours over land use maps, calculate impacted population, and analyze the effects of different flight tracks.

The use of a CAD/GIS system in conjunction with the Federal Highway Administration (FHWA) Highway Noise Model STAMINA, the California Department of Transportation (Caltrans) SOUND32 Model, and the Federal Aviation Administration (FAA) Integrated Noise model (INM) will increase the accuracy of the results and will reduce the study time. Engineering-Sciences has developed special software to be used on Intergraph and AutoCAD systems for conducting highway and airport noise studies.

"Utilizing Radar Data to Identify Aircraft Noise Events"

Presented by: Steve Alverson
Harris Miller Miller & Hanson Inc.
945 University Avenue, Suite 101
Sacramento, CA 95825
(916) 568-1116

Summary: One drawback of unattended noise monitoring is the difficulty in accurately identifying what caused a particular noise event. In the area of aircraft noise monitoring, recent advances in the acquisition and correlation of radar data with measured noise levels have improved the accuracy of unattended noise monitoring.

This paper explores the process by which the radar data is acquired, converted into a usable format, and correlated with aircraft noise data. The paper also provides examples of practical applications of radar and aircraft noise data correlation. Finally, the paper will explore some of the limitations of this technology.

"Aircraft Noise Recognition with Intelligent Noise Monitoring Terminals"

Presented by: Robert Krug
Cirrus Research, Inc.
6818 W. State Street, Suite 170
Wauwatosa, WI 53213
(414) 258-0717

Summary. The airport noise monitoring system installed at Sydney and Brisbane, Australia were required to have aircraft noise recognition built into the remote noise monitoring terminals. Using "short Leq" techniques, the noise monitoring terminals are able to compare the noise with a template to discern the probable presence of an aircraft and acquire event data on each fly over. Each event is stored in the terminal. The central host computer can download event data as they occur or when required. Event data is compared to data from the secondary surveillance radar to achieve a very high "hit rate". The terminal incorporates some learning capability to increase the "hit rate" of recognition. Any, or all, of the acquisition parameters in each terminal can be configured from the host using a modem link. In a similar way, diagnostics can be performed from the host without visiting each terminal. Typically, one to two weeks of raw data and up to 10,000 aircraft events are stored in each terminal. This allows for unattended operations, as well as security backup for the host. With very large internal stores, in the order of 2 megabytes, the new generation of units can simultaneously store raw data elements and full environmental information, as well as each aircraft event.

"A General Comparison of Airport Noise Contours with Actual Noise Measurements"

Presented by: Rich Letty
Acentech Incorporated
125 Cambridge Park Drive
Cambridge, MA 02140
(617) 499-8000

Summary: On a recent project regarding sound insulation of three schools in the vicinity of Robert Mueller Municipal Airport in Austin, Texas, we were also requested to update the existing noise contours to reflect current 1990 aircraft operations at the airport. In addition, LDN and single event aircraft Sound Exposure Levels (SEL) were also obtained at each of the three schools. Using information available in the OAG guide to define aircraft fleet mix, and estimates of flight track utilization by aircraft type, we present a comparison of the airport noise contours using the INM computer model with aircraft operations input by percentage vs. frequency. This comparison shows that there can be significant noise contour differences when using the two INM data input methods. Because of the reliance on airport noise contours to determine land use planning and to define residential areas eligible for sound insulation, these differences should not be ignored. In addition, using the grid point analysis capability of the INM computer model, we will compare measured and predicted LDN and aircraft SEL noise levels at the three schools.

"Noise Source Identification and Database Control for Unattended Noise Monitors"

Presented by: Chris Menge
Harris Miller Miller & Hanson Inc.
429 Marrett Road
Lexington, MA 02173
(617) 863-1401

Summary: This talk will be a demonstration of NOISE MANAGER, a database control system developed by HMMH for noise monitoring data. Features of the system include:

- Field downloading of daily, hourly and event data using portable computers.
- Appending of downloaded data to the cumulative databases. Before appending data the system checks data integrity and combines partial days and hours. As the data is being appended, Leqs and Ldns due to events are calculated.
- Extracting records based on criteria such as date, site, maximum and minimum Ldn, and maximum and minimum SEL. The extracted daily, hourly and event records can be displayed in the linked browse windows and sorted based on user-selected criteria.
- Plotting bar and line graphs of hourly results and line graphs of event time histories. Summary reports of hourly and daily results can be prepared for printing or importing into a spreadsheet.

Although developed for airport clients, NOISE MANAGER has proven to be a valuable tool for any noise survey using continuous noise monitoring. The capability of selecting specific events from a database of thousands of events, and displaying the time history of the events is particularly valuable in identifying noise sources and correlating events between two monitors. This capability will be demonstrated for noise monitoring locations near airports, highways and railroads. ■

Ed. Note:

The above paper summaries are a continuation of those printed in Issue #4. The remaining six paper summaries from this meeting will be printed in Issue #6.

We will continue to print abstracts, summaries and other information on the activities of TRB Committee A1F04 from the past. At some future time, we will combine all of these in a single, indexed and categorized reference file, available to our readers.

Conference Calendar

April 19-23, 1993
12th Annual Highway Noise Analysis Seminar
At: Center for Continuing and Professional Education, Shelby Campus
University of Louisville
Louisville, Kentucky
Contact for registration: Dr. Louis F. Cohn or Dr. Roswell A. Harris
Tel: 502 588-6456 Fax: 502 588-8573

April 28-30, 1993
Second Conference on Recent Advances in Active Control of Sound and Vibration
At: Virginia Polytechnic Institute and StateUniversity, Blacksburg, Virginia
Contact: Ms. Dawn Williams, Conference Coordinator
Virginia Polytechnic Institute and State University
Mechanical Engineering Department
203 Randolph Hall
Blacksburg, Virginia 24061-0238, USA
Tel: (703) 231-4162 Fax: (703) 231-9100

May 2-5, 1993
NOISECON '93
(With National Council of Acoustical Consultants)
At: Williamsburg, Virginia, USA
Contact: David G. Stephens
MS 462, NASA Langley Research Center
Hampton, Virginia, USA
Tel: (804) 864-3640 Fax: (804) 864-7687

May 10-12, 1993
"Modeling of Mobile Source Air Quality Impacts"
At: University of Central Florida
Orlando, Florida
Contact: Dr. Roger Wayson
University of Central Florida
Tel: 407 823-2480 Fax: 407 823-5483

May 10-13, 1993
SAE Noise and Vibration Conference and Exposition
At: Grand Traverse Resort, Traverse City, Michigan
Contact: Ms. Patricia Gouhig
SAE Specialty Conference Administrator
400 Commonwealth Drive
Warrendale, Pennsylvania 15096, USA
Fax: (412) 776-0002

May 17-21, 1993
Acoustical Society of America
(With National Council of Acoustical Consultants)
At: Hotel Laurier, Ottawa, Canada
Contact: Elaine Moran, ASA
500 Sunnyside Blvd.
Woodbury, NY 11797
Tel: (516) 576-2630 Fax: (516) 349-7669

May 23-26, 1993
Second National Conference on Transportation & Air Quality
At: Danvers, Massachusetts
Contact: Dr. Roger Wayson
University of Central Florida
Tel: 407 823-2480 Fax: 407 823-5483

June 13-18, 1993
86th Annual Meeting & Exhibition, Air & Waste Management Association
"Environmental Noise Assessment"
At: Denver, Colorado
Contact: Dr. Roger Wayson
University of Central Florida
Tel: 407 823-2480 Fax: 407 823-5483

July 6-9, 1993
The 6th International Congress on Noise as a Public Health Problem
At: The French Riviera, Nice, France
Organizers: The French National Institute for Transport and Safety Research (INRETS, Lyon-Bron)
Contact: Noise and Man '93
INRETS-LEN
Case 24
F-69675 BRON CEDEX, France

July 11-14
1993 Summer Meeting of the TRB A1F04 Committee on Transportation-Related Noise and Vibration
At: Berkeley, California
Contact: James T. Nelson, Vice President
Wilson, Ihrig & Associates, Inc.
Tel: 510 658-6719 Fax: 510 652-4441

August 9-13, 1993
Advanced Traffic Noise Modeling
At: Vanderbilt University
Nashville, Tennessee
Contact: Dr. William Bowlby
Bowlby & Assoc., Inc.
Tel: 615 327-8130 Fax: 615 327-8137

August 24-26, 1993
Inter-Noise '93
At: Leuven, Belgium
Contact: Ms. Christine Mortelmans
Technological Institute
K VIV
Desguinlei 214
B-2018, Antwerpen, Belgium
Tel: (03) 216 09 96
Fax : (03) 216 06 89

October 4-8, 1993
Acoustical Society of America
(With National Council of Acoustical Consultants)
At: Hotel Radisson, Denver, Colorado, USA
Contact: Elaine Moran, ASA
500 Sunnyside Blvd.
Woodbury, NY 11797
Tel: (516) 576-2360 Fax: (516) 349-7669

October 4-8, 1993
Annual Conference, Canadian Acoustical Association
At: Toronto, Canada
Contact: Chris Andrew
Tel: 416 392-0791

TheBulletin Board

To: The Editor
The Wall Journal
From: Dr. Balu Balachandran
Parsons, Brinckerhoff Quade & Douglas, Inc.

I have not had an opportunity to review the full version of the paper on "The Effectiveness of I-440 Noise Barriers" which was presented at the TRB A1 F04 Summer Meeting in Colorado Springs. In the abstract of the above paper, it is mentioned that "the results of 24-hour measurement periods show that insertion losses vary throughout the day."

This is to be expected since barrier insertion loss depends on the effective source height, which in turn has been found to depend on the speed of the three categories of vehicles (cars, medium trucks and heavy trucks) throughout the 24-hour period. The higher the speed, the lower will be the effective source height on the noisy side of the barrier. Above approximately 55 mph, the tire/road interaction is the major noise source. At such speeds, the barrier insertion loss will be at its highest.

At other speeds (below 55 mph), the barrier insertion loss will gradually decrease until it reaches its lowest value. At the lowest speed, the source heights of medium and heavy trucks will reach their maximum heights assumed in the STAMINA 2.0 model. Therefore, the FHWA STAMINA 2.0 model will require further refinement to truly reflect the effects of vehicle speed on barrier insertion loss by taking into consideration the influence of speed on the effective source heights of medium and heavy trucks. ■

To: Dr. Balu Balachandran
c/o The Wall Journal
From: Dr. William Bowlby
Vanderbilt Engineering Center for Transportation Operations & Research

Dr. Balachandran makes an interesting and what I consider to be a valid point regarding the effect of vehicle speed on barrier insertion loss. (I need to point out that a subsequent look at our 24-hour data suggests a difference in nighttime background noise between the two study microphones seems to be responsible for part of the change in measured insertion loss between day and night).

I would add that in addition to lowering the effective height as speed increases (and hence, as tire noise increases relative to engine/exhaust noise), there is a shift to dominance of the higher frequencies associated with tire noise. As you know, these higher frequencies are attenuated more easily than lower frequencies, whch could also work toward increasing the overall insertion loss. Dr. Roger Wayson's recent data on Florida vehicle emission levels showed this frequency shift (his results are also presented at the Colorado Springs TRB A1F04 Summer Meeting and will probably be published in the Transportation Research Record this year).

I believe the next generation of the FHWA traffic noise model should and will consider the source height and frequency phenomena in more realistic ways than is currently done. However, I do not expect any changes in the STAMINA 2.0 program before that new model is developed, which I should anticipate being in about three years from now. ■

Recycled Tires

by Soren Pederson
Ministry of Transportation
Ontario, Canada

I would like to sidestep a little from the regular article on the Product Approval Process planned for this issue to address one of the topics which was raised on January 12 in Washington, D.C. at the Annual Transportation Research Board meeting of the A1F04 subcommittee on transportation-related highway traffic noise.

The issue of using recycled rubber from tires in roadway construction products has been under investigation for many years by numerous government agencies worldwide. The results of their efforts indicate widely varied success in trying to adapt this type of material into a usable product. One of these products recently studied by the Ministry of Transportation was a noise barrier wall panel made of rubber crumb from recycled tires. The attempts by the manufacturer to have this noise barrier product accepted for use on Ministry contracts proved to be quite a learning experience for all parties.

Our findings indicate that it is *theoretically* possible to use recycled rubber tires to manufacture an acceptable noise barrier panel. However, numerous concerns were raised during our evaluation process. The following is a summary of those concerns and the issues which must be addressed in evaluating such products:

Flame Spread and Smoke Generated. Rubber is notorious for its flammability and the dense smoke it produces while burning. If a noise barrier manufactured from this material should ignite as a result of such incidents as grass fires, vehicle impact or vandalism, the accelerated flame spread and the dense smoke generated could result in environmental, legal and safety problems.

One method of reducing rubber's susceptibility to these concerns is the addition of flame and smoke retardants. To ensure that the retardants are adequate, standards must be established for the minimum allowable rate of flame spread and smoke generated, at a value not greater than the rate for a typical fence material such as wood.

Toxicity. Recycled rubber tire material has been found to be non-toxic under leachate testing. However, additives such as binders, retardants, coatings, and coloring are included in the mix to form and enhance the material, which could create potential toxicity problems. In many cases, these additives are proprietary with the specific formulations kept in confidence by the manufacturer. It must be stipulated to the manufacturer that the concerns for environmental damage and health hazards be addressed by requesting leachate testing or other methods to determine the toxicity of the finished noise barrier panel material.

Structural Strength. Rubber material, on its own, does not have sufficient rigidity to be considered as a structural component of the noise barrier panel. The bonding agents must provide adequate stiffness to enable the panels to be considered strong enough to withstand wind loading, or the rubber material must be firmly attached to a suitably stiff backing or core.

Binders. Rubber and some binders tend to oxidize over time when exposed to the elements. They may also be susceptible to certain chemical or petroleum products. This increases the premature disintegration of the panels. The use of concrete as a binder does not work well. Even with the use of exotic modifiers, the results are questionable, particularly when exposed to salt and cold weather for a long period of time.

The rubber crumb should be new or have been protected from the elements. The binders

(continued next page)

(*Recycled Tires*, from page 8)
used must be stable under prolonged exposure. The manufacturing process must ensure that each rubber particle is completely encapsulated by the binder. If cement is used, the rubber surface must be treated or impregnated with a bonding agent compatible with both the rubber and the concrete. Or, the concrete must contain modifiers which will allow it to firmly bond to the rubber and be able to stand the test of time.

Coatings. Some coatings have a questionable life expectancy. They have a tendency to oxidize prematurely, particularly when used in conjunction with certain pigments. If the surface of the noise barrier panels are being manufactured to be sound-absorptive, the coatings may clog the surface openings, thereby reducing the Noise Reduction Coefficient (NRC). The finished panels must be subjected to weatherometer testing to determine the longevity of the coatings. Also, the NRC rating must be verified *after the panels have been coated.*

Sound Transmission Class (STC). Although the surface weight of the panels (weight per square meter or square foot through the finished panel) may be sufficient to meet general requirements for minimum STC ratings, it may not be sufficient when produced as a porous, sound-absorptive panel. Even when stiff backers or cores are used, the nature of this material may require the cores or backers to be extensively perforated to promote bonding. The finished, assembled noise barrier panel must be tested to verify the STC rating.

Recyclability. Finally, the recyclability of the finished noise barrier panel itself may be the most important and fundamental issue to be addressed. What have we really gained if the finished product cannot be itself recycled after its functionality has been expended? Will this product be allowed into landfill sites in 20 or 30 years, or have we concocted an above-ground garbage dump?

During the A1F04 subcommittee meeting mentioned at the top of this article, I was asked by several members present to detail some of the experience of our Ministry in evaluating the use of recycled tires in the manufacture of noise barrier panels. I hope the above will be of some use to other transportation agencies investigating this issue. Obviously, the problem of disposal of used tires may be with us for a very long time. Finding an environmentally-useful solution to this problem may be difficult, but certainly worth the time and effort.

Soren Pedersen is a Design Development Analyst for the Ministry of Transportation of Ontario, head office located in Toronto, Ontario, Canada. He may be contacted by phone at 416 235-3509, or by fax at 416 235-5314. ■

Recycled Paint

by Steven M. Greenberg
Vice President, The Green Paint Co.

Noise barriers are usually very high and long structures, often placed very close to the roadway due to limited right of way available and to provide maximum protection for traffic noise-impacted neighborhoods. In such locations, the soundwalls are subjected to the degradating effects of de-icing chemicals, carbon dioxide, freezing and thawing weather, acid rain and road dirt. Painting them is one method of providing protection against this deterioration for a longer, more attractive useful life. The higher quality paint used, the longer the life. But, what about the high cost of good paint?

The Green Paint Company, based in Manchaug, Massachusetts has taken an interest in working on this problem. In addition to addressing the high cost problem, The Green Paint Company (GPC) has addressed another public problem....what to do with leftover paint. As a result of their research, GPC has become a manufacturer dedicated to environmentally-sensitive and responsible paint products. They are the only company licensed by the Massachusetts Department of Environmental Protection to recycle both latex and oil-based paints, from which they make a high-quality, 90% post-consumer, recycled product marketed at a much lower price than comparable-quality new paint products.

GPC works closely with municipalities and industry to hold collection events which save a great amount of money, are easier to arrange, and are safer in comparison with previous collection methods. Following a collection event, GPC brings the collected paint back to its plant, sorts the leftover paint through an extensive protocol, and reprocesses it testing for PCB's and heavy metal contamination. Lastly, the reprocessed paint is run through a series of quality control tests to ensure viscosity, coverage, reflectance, grind, Ph level, sag and other characteristics as required by the particular product specification. GPC manufactures eight products with post-consumer recycled products, including exterior oil stain and latex house paint.

The Green Paint Company has made a commitment to the environment in its efforts to help in the collection and recycling of leftover paint. It would be well worth looking into using Green Paint to help reduce the cost of maintaining both existing and future barriers. Buying recycled paint would help solve a public problem while assuring a market for this environmentally friendly product.

Steven Greenberg may be contacted by phone at 508 655-8560, or by fax at 508 653-1917. ■

Maryland Minutes

by Ken Polcak, Maryland State Highway Administration

Greetings from the Land of Pleasant Living. In my premier contribution to The Wall Journal, I must add my voice to those accolades previously expressed to long-time friend and supporter of TRB Committee A1F04, El Angove, for providing this new and exciting forum for those of us involved in the field of transportation-related noise. I urge everyone to contribute to this effort by submitting articles and letting the noise 'community' know what you are doing. This is a forum for all of us, and it will be what we make it... a truly "grass roots" technology transfer medium.

A1F04 Highway Noise Subcommittee: As the newly-appointed chairman of this committee, I want to express my sincere appreciation for the opportunity to further contribute to the work of A1F04. It is gratifying to follow the tenure of Dr. Bill Bowlby, one of the true icons in our field, although this will indeed be a tough act to follow. Anyone who is interested in becoming involved in the work of this committee is welcome to call me.

Ongoing and Pending Studies: The MD SHA Office of Environmental Design has numerous ongoing studies in several areas related highway noise abatement, on which I shall report in comingissues of The Wall Journal:

- Phase 2 of noise barrier effectiveness studies on the I-270 corridor in Montgomery County (the Phase 1 report was completed in March, 1992).
- Insertion loss study for the first Type II (retrofit) noise barrier built in Maryland under a new cost-sharing policy with local governments along I-95 in Howard County; field data collection has been completed, data analysis is ongoing.
- Work is proceeding on the final draft report on the effectiveness of open-graded asphalt in reducing vehicle tire noise. Publication has been delayed due to the recent addition of data from a fourth test site.
- Early site reconnaissance is underway for a future study of vehicle noise emission levels related to different pavement types.
- As an offshoot to a combined study by Maryland DOT and the Strategic Highway Research Program (SHRP) on stone mastic asphalt, the MD SHA Office of Environmental Design will be assessing the noise reduction capacity of stone mastic asphalt pavement. Effects on the Leq noise level, and the frequency spectrum will be assessed through direct comparative field measurements.
- A statewide site inventory and assessment is underway for a project to measure the noise reduction capacity of vegetative stands. The goal is to quantify and compare different types of vegetation and their effects on noise propagation, also through direct comparative field measurements.
- A construction noise monitoring study is ongoing for residential communities near the site of the replacement of a drawbridge for MD Route 450 over the Severn River near the state capital of Annapolis.
- Nearing completion of the most intensive noise monitoring and impact analysis project ever conducted by MD SHA, related to the proposed improvement of U.S. Route 50 to interstate standards (redesignation to be I-595). The project has involved extensive community input and coordination efforts.
- Have begun work on development of GIS/database applications for the MD SHA Type I and Type II noise abatement programs and noise complaint tracking and archiving system.

Thanks, FHWA: MD SHA has had the good fortune to have the use of the Federal Highway Administration's Traffic Noise Research Mobile Laboratory (the "Noise Van") for the past two summers *(Ed. Note: see article on the "Van" in Issue No. 4)*. The Van is not only practical for simple community noise measurements, but is an invaluable resource for detailed, research-oriented studies. Many of the projects listed above involve use of the Noise Van for field data collection. Responsibility for the Van has recently been assumed by the FHWA Office of Environmental Policy. It is hoped that interest will remain high in the research community to enable FHWA to continue to maintain this valuable technology resource.

Ken Polcak is an Environmental Specialist and head of the Noise Abatement Analysis and Design Group, Office of Environmental Design, Maryland State Highway Administration, 707 N. Calvert St., Room 312, Baltimore, MD 21202. Tel: 410 333-8072, fax: 410 333-3139. ■

New Products

PRESS RELEASE:

DiffusorBlox©: The First Load-Bearing Diffusing and Absorbing Concrete Masonry Unit

In 1993, almost 100 years after the beginnings of the domestic concrete block industry, RPG Diffusor Systems™ founder, Dr. Peter D'Antonio, developed a new patented noise control load-bearing acoustic block system called DiffusorBlox, which epitomizes the evolution of the CMU into a high performance acoustical device. DiffusorBlox are based on quadratic residue diffusor (QRD®) number theory technology commercially developed by RPG Diffusor Systems, Inc. in 1983.

DiffusorBlox are the most effective acoustical barrier for environmental noise control, because they use both absorption and diffusion to control noise. DiffusorBlox extend the mid-band absorption of conventional absorbing block to the 125 Hz octave band, with an ideal absorption efficiency of 100% at 100 Hz. This remarkable absorptive performance results from a unique cavity design and two independently tuned and overlapping low frequency Helmholtz resonator chambers.

In addition, DiffusorBlox simultaneously provide broad-bandwidth sound diffusion to further diffuse any remaining unwanted sound. Diffusion is achieved because the surface variations of DiffusorBlox are based on a precise mathematical number theory formula which guarantees appropriate phase relationships in the scattered sound. Diffusion is effective in noise control, because sound arriving from any direction is uniformly distributed into many directions, thereby minimizing the sound in any particular direction.

QRD Diffusor technology has been proven to be effective in over a thousand installations worldwide. In a typical highway barrier installation, for example, DiffusorBlox now permit absorption of low frequency motor noise and rumble, while simultaneously dispersing mid-high frequency cross-highway reflections, which are only reflected and redirected by flat timber, precast concrete or conventional absorbing block surfaces.

DiffusorBlox are the perfect choice for noise control applications such as transportation barriers, airport barriers, power transformer substations, amphitheater berms, as well as sports arenas and stadiums where strong reflections and echoes can be controlled by diffusion, while still maintaining the ambiance and excitement of a "live" facility.

DiffusorBlox provide an NRC of 0.85 for the unpainted block and 0.40 for the painted block. The STC for painted block is 55. Structural testing at NCMA is in compliance with ASTM C90-90. DiffusorBlox are produced near the job site by qualified licensed block producers using proprietary automatic block machine molds, thereby minimizing transportation costs. The DiffusorBlox system consists of three blocks. The A block measures 7 5/8"(H) x 15 7/8"(W) x 11 5/8"(D) and weighs 47 pounds. The B block measures 7 5/8"(H) x 15 7/8"(W) x 11 5/8"(D) and weighs 37 pounds. The C block measures 7 5/8"(H) x 15 5/8"(H) x 3 5/8"(D) and weighs 13 pounds.

For further information, contact Dr. Peter D'Antonio at RPG Diffusor Systems, Inc., telephone 301 249-0044, fax 301 249-3912. ■

Letters to the Editor

Dear El,

I recently received a copy of Issue No. 3 of your new Journal. Congratulations on providing a useful communications medium for those involved in environmental noise issues.

I remember well the days when you, Bill Pickett and a few of us acoustical consultants were pioneering the application of barrier wall systems as "legitimate solutions" to many environmental noise problems.

I have taken the liberty of filling out reader cards for the three organizations you should keep in touch with, ASA, INCE and NCAC are the major associations for professionals involved in consulting or research on environmental noise issues. Their 1993 scheduled meetings are enclosed for listing in The Wall Journal Conference Calendar.

Regards and best wishes for the success of The Wall Journal.

Bill Cavanaugh

William Cavanaugh is a Senior Principal of Cavanaugh Tocci Associates, Inc. of Sudbury, Massachusetts. He is also past president (1977-1979) of the National Council of Acoustical Consultants (NCAC).

Dear El,

The Wall Journal looks great. I'm guessing that the National Council of Acoustical Consultants might be interested in your publication. Also, articles which appear in The Wall Journal may be appropriate news items for the NCAC Newsletter. If you are interested, contact Mrs. Virginia Maguire at NCAC, P.O. Box 359, Springfield, NJ 07081-0359.

Congratulations on this fine publication, and I look forward to speaking with you again, perhaps at a TRB A1F04 meeting.

Sincerely,

Gregory Tocci

Gregory Tocci is a Senior Principal of Cavanaugh Tocci Associates, Inc. of Sudbury, Massachusetts. ■

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