

The Wall JournalTM

Issue No.

25

THE INTERNATIONAL JOURNAL OF TRANSPORTATION-RELATED ENVIRONMENTAL ISSUES

Sep/Oct 1996

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**PRECAST CONCRETE
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If you have saved Issue No. 13, together with this issue you will have a complete index of all of the important articles, reports, paper summaries and product news we have published from the start-up.

On page 16 of this issue, you will find how to use the index, and how to obtain back issues which you may be missing.

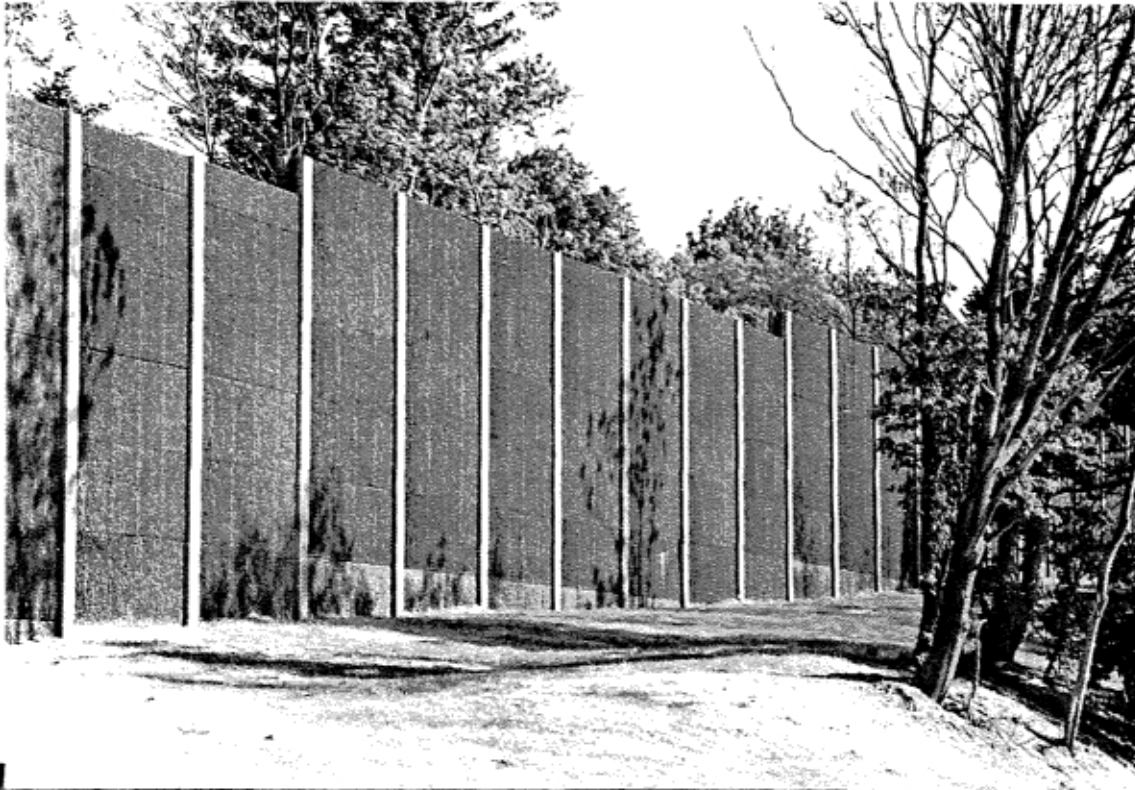
Looking for names and addresses of consulting engineers to help with your noise abatement projects?

Stop looking. Our list of long-time subscribers is on page 12.

Trying to locate vendors to bid on your noise barrier projects? Let your fingers do the walking through the pages of this issue.

It's where the elite meet to compete.

When beautifying and protecting soundwall...



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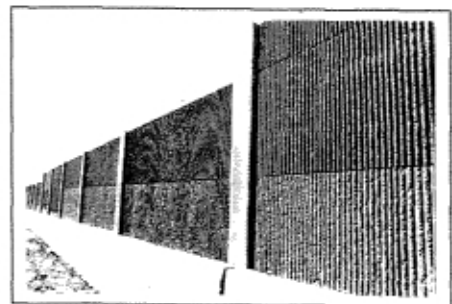
Sound absorptive highway noise barriers are becoming specified more and more. To significantly improve the appearance and durability of these structures, more specifiers are relying on Fosroc for:

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The Wall Journal

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Subscription and advertising information are shown on page 23.

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EDITOR'S CORNER

by El Angove

A Funny Thing Happened on the Way to the Forum

I was mugged. I couldn't believe it. The Forum was in shambles. My old friends had turned on me. None stood by my side. Traitors were all around me. The battle had bare begun before it was abandoned.

et tu Pedersenius? — et tu Figallini? — et tu Bucherus? — et tu McNairus? — et tu Hendriksius? How spake you now?

How boldly spake these noble senators when they entered the Forum in Issue No. 22 and proclaimed their positions on matters of technical performance of acoustical barriers. Staunch and defiant they were in defense of their beliefs, and their protagonists howled in anger and threatened response.

It appeared we were going to have some very enlightening articles, and possibly some conclusions, in The Forum.

A Farewell to Arms

Sadly, it seems the fires have died down. I say sadly because I think these were important defining criteria for the design and manufacture of noise barriers, and my understanding is that there is much confusion about, and almost no standardization of, these criteria.

I would like to see some more of the types of articles we saw in the Wall Journal Forum; those with logic, those with insight, those with foresight, and some with extreme bias. It takes a lot of input to mix and match to distill into a viable resolution of the problems. Let's keep the fires burning.

The Level Playing Field

I am no longer in the trenches, and have only second-party knowledge of events in the industry and in government. But, if what I hear is correct, it would seem to be high time to get to work on standardization of test methods for various materials, and for specifications for noise barrier materials. AASHTO have already shown the way with their "Guide Specifications for Structural Design of Sound Barriers." Now we need a "Guide Specifications for Product Design of Sound Barriers."

There appears to be a need for some mechanism which will assure the high-

way department that they will get what they want, let the contractor know that he is furnishing what the highway department wants, and make the noise barrier manufacturer provide exactly what is wanted by the Owner.

Many times, the bidding process becomes a nightmare for vendors and contractors alike, when specifications are not crystal clear. The contractor is at risk if he opts for a low bid, and later finds the product rejected by the state for lack of compliance with specs. The vendor also is living dangerously if not in compliance, because 1) he probably will not ever get another job with the contractor, 2) he may lose money in the effort to meet the specs and 3) he may find himself in court with the contractor and/or the state.

That is what happens when specifications are loosely drawn, without due consideration of what can occur in the intensive, albeit necessary, maneuvering among contractors and vendors in the bidding period. Public work is extremely competitive, and slight advantages can make or break a bid.

Therefore, in the big-ticket item of noise barriers, there must be a solid foundation for the pricing. And this, of course, is the Standard Specification. It could be a State spec; I would prefer a National Standard Specification.

At last, we would have a level playing field. The Standard Spec would cover the basic, bare-bones noise barrier. But, everyone needs choices to fit the particular site or state preference. A Special Provisions Section would define such enhancements as:

- Sound Absorption
- Textures and Colors
- Graffiti Protection
- Doors and Fire Hose Access
- Walls on Structure

To really smooth out the bidding process, I would suggest that prequalification of products be required before bidding to assure compliance with the specifications.

Comment would be welcomed.
We need more gladiators. ■



Coming in the next issue

Following is a summary of a paper by Robert L. Miller of Harris Miller Miller & Hanson Inc., which was published in the May/June Issue of Noise Control Engineering Journal. Both Mr. Miller and the Institute of Noise Control Engineering have given us permission to reprint his paper in The Wall Journal. The paper will be of interest to all of you. — Ed.

Federal regulations and other activities in noise control

Following the elimination of funding for the U.S. Environmental Protection Agency's Office of Noise Abatement and Control in the early 1980s, a coordinated Federal approach to noise control largely disappeared. Instead, governmental agencies were left to deal with their noise problems on their own, usually meaning that they responded only to specific legislation, political pressures, or litigation. Agency coordination, when it did occur, was effected by Executive Order. That is not all bad news.

This paper briefly reviews Federal regulations controlling the world of transportation noise over the past 25 years, but focuses to a greater extent on the ongoing efforts of government to influence the noise environments of our communities into the next century.

The paper summarizes the actions of the Federal Aviation Administration, the National Aeronautics and Space Administration, and the Department of Defense as they confront issues of aircraft noise and airspace management; the National Park Service as it struggles to resolve conflicting mandates to preserve natural quiet and solitude while providing access to and public enjoyment of National Parks and Forests; the Federal Railroad Administration and the Federal Transit Administration in their endeavors to control noise from transit, high-speed rail, and mag-lev systems; and the Federal Highway Administration as it develops better tools to assess and control the noise impacts of highway traffic.

TRB A1F04 COMMITTEE

ANNUAL MEETING REMINDER

Just a reminder that the Transportation Research Board's 76th Annual Meeting will be held January 12-16, 1997 in Washington, DC. If you haven't submitted your paper to TRB for consideration at the annual meeting, you are too late!

However, you should still plan on attending the annual meeting and taking an active part. Details on the A1F04 committee meeting and noise sessions will be printed in the next issue of The Wall Journal, if in hand at press time.

1997 SUMMER MEETING LOCATION SET

The land of the maple leaf will be the location for the 1997 summer meeting of A1F04, thanks to Soren Pedersen and the Ontario Ministry of Transportation. The meeting is set for July 20-23, 1997, so be sure to mark your calendars for this event.

While details are still being formulated, the Delta Chelsea Inn located in downtown Toronto has been selected as the site for the meeting. A room rate of \$124.00 Canadian has been obtained, single or double occupancy. At the current exchange rate, that figures out to \$80.60 plus tax U.S. dollars. The Delta Chelsea Inn is centrally located in the downtown business core of Toronto, and is within easy walking distance to the major shopping areas, theatres and restaurants. As it has in the past, Soren and the Ministry will present a full agenda of professional papers as well as field and laboratory trips.

(Ed. Note: While we shall make every attempt to publish full details of times and locations in advance of the dates of the two meetings, our receipt of the data and our printing deadlines may not allow sufficient time for travel and hotel arrangements to be made. If you plan to attend these meetings, we suggest you notify Gregg Fleming, Committee Chairman, at 617 494-2876, or Soren Pedersen at 905 704-2291, of your intent at least a month in advance of the dates of the meetings). ■

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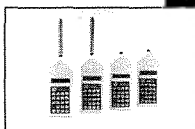


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PRESS RELEASE

NATIONAL TRANSIT INSTITUTE ANNOUNCES NATIONAL EDUCATIONAL PROGRAM ON TRANSIT NOISE AND VIBRATION IMPACT ASSESSMENT

The National Transit Institute announces the presentation of a training program on assessment of noise and vibration impacts of federally funded transit projects. This free, three-day course will be delivered four times between October 1996 and April 1998 at locations across the United States.

BACKGROUND & EDUCATIONAL NEED

Noise and vibration assessments are key elements of the environmental impact assessment process for mass transit projects. To promote quality and uniformity in those assessments, the FTA recently published a guidance manual, Transit Noise and Vibration Impact Assessment (April 1995), to be used by project sponsors and consultants in performing noise and vibration analyses. It covers the methods and procedures for estimating the level of noise and vibration impacts resulting from most federally-funded transit projects and for determining what can be done to mitigate such impacts.

The NTI training program has been designed and developed in close cooperation with the FTA Office of Planning. The course is intended to:

- Enhance the understanding of the noise and vibration assessment approach and of the analytical methods presented in the guidance manual;
- Show how noise and vibration assessment relates to the NEPA process, the Major Investment Study Process, and other related activities;
- Present information on available noise and vibration mitigation measures and considerations for determining the need for mitigation, and
- Illustrate the exercising of professional judgment in extending the basic methods of the guidance manual to situations not covered explicitly in it.

WHO SHOULD ATTEND

The course is aimed at users of the new FTA guidance manual. It is designed for those conducting noise and vibration studies, (e.g., specialists from acoustics consulting firms engaged in federal-aid transit work) as well as management personnel of project sponsors who need a fuller understanding of the methods used by consultants in such studies. In addition, it is

expected to be of interest to others in more general fields, such as environmental planners and transit project planners from local and state transit agencies

CONTENT and OBJECTIVES

This short course will be taught by two instructors, one of whom will be a representative of the FTA Office of Planning. Substantial classroom time will be devoted to exercises applying the procedures and methods described in the guidance manual or developed by extending the basic techniques to address conditions not explicitly covered in the manual. Personal computers will be provided for use by groups of participants in a spreadsheet demonstration. Upon completion of the course participants should:

1. Understand the basic concepts of noise and vibration and the requirements of the FTA;
2. Be able to determine when a noise or vibration assessment is required, and what level of impact assessment is appropriate,
3. Have sufficient knowledge to evaluate qualifications for producing a noise or vibration assessment for a transit project, and
4. Understand the procedures and major analytical steps of reviewing the noise or vibration report of a transit project.

Following are locations and dates of the upcoming sessions:

Sacramento, CA	November 18-20, 1996
Atlanta, GA	April 16-18, 1997
New York, NY	September 8-10, 1997
Chicago, IL	Apr. 13-15, 1998

For further information on the course, please contact:

Susan Greenstone, Registrar
National Transit Institute
Rutgers, The State University of New Jersey
120 Albany Street, Suite 705
New Brunswick, NJ 08901
(908) 932-1700 ext. 19
FAX (908) 932-1707

Cavanaugh Tocci Associates celebrates 20 years of consulting excellence

In the summer of 1975, Bill Cavanaugh and Lawrence Copley decided to wind down their then five-year partnership, which was flourishing along with their own independent practices. At that time, Greg Tocci was Cavanaugh Copley Associates only full-time employee. After considering all the options, Greg elected Bill's 50 percent partnership offer forming a new organization, and, on September 1, 1975, Cavanaugh Tocci Associates was born.

This past January, at the MIT faculty club in Cambridge (the site of NCAC's Spring meeting during the ASA's 1994 Sabine Centennial and 117th meeting), over 150 CTA clients, colleagues, friends and families helped them celebrate 20 solid years of acoustical consulting . . . what's more, enjoying every minute of it.

Greg brought to the partnership his mechanical engineering background from Tufts University, MIT and some post-graduate work in the "real world" at several A&E firms in Boston. His background in acoustics came from his acoustical research work at Cambridge Collaborative on consulting with Jerry Manning and with his former MIT and theses advisor, Dick Lyon. Bill Cavanaugh brought his professional training in architecture at MIT and his 17 years with Bolt Beranek and Newman as a principal consultant in architectural and environmental acoustics and as divisional vice president and director of BBN's then Architectural Technologies Division. ■

(Ed. Note: Above excerpted from article in NCAC Newsletter, a publication of the National Council of Acoustical Consultants.)



Dear Readers:

I have something which may be of great interest to many of you. Recently, while shuffling through the many bags of mail we receive, I found a letter to the editor that caught my immediate attention. There are those among you who may have the perception, intuition, business acumen and drive to take advantage of the opportunity for which this letter bears great potential. The letter follows:



El W. Angove
The Wall Journal
Lehigh Acres Florida

Subject: Call for Presentations, NPCA 1997 Annual Convention

One of our leading members has requested we contact and solicit your participation at our annual convention scheduled for February 10-12, 1997 in Denver Colorado.

The National Precast Concrete Association is a not-for-profit trade association dedicated to promoting the use of quality precast concrete products through education, plant certifications and other means. A large portion of our membership is comprised of manufacturers of transportation products, such as sound walls, retaining walls, traffic barriers, crossings and other products.

We understand that you have had a considerable involvement with sound barriers and that your insights would likely be of great interest to our membership. We would like to learn more about your efforts and invite you respond to the enclosed Call for Presentations.

NPCA's members are greatly interested in the needs of the specifying community, the quality of their products and the potential for new and improved product applications. Our members are also very interested in learning of projects in which the use of precast concrete products led to significant cost and schedule savings on projects. Given our memberships great interest in this subject, we would greatly appreciate if a "Call for Presentations" could be announced in the Wall Journal.

We look forward to hearing from you in the near future. Should you have any questions, please call me at (800) 366-7731.

Very truly yours,

Robert B. Austin, P.E.
Technical Services Director

National Precast Concrete Association
10333 N. Meridian Street, Suite 272 . Indianapolis, Indiana 46290
1-800/366-7731 . 317/571-9500 . Fax 317/571-0041

A Mini Editorial

Way back in 1976, when I first packed my bags and started out to sell precast concrete noise barriers to a sometimes skeptical and suspicious audience of highway engineers across the United States, I also had to look for competent precasters in the many areas of the country I traveled.

Concrete is a wonderful material – it has great structural strength, it can be molded into any shape or form, it can be textured and colored, it is very inexpensive to manufacture, but Lordy is it ever heavy!

You can't make precast noise barriers on the East Coast and ship them to Missouri. The freight would kill you. Ay, there's the rub. You have to make it close to where you are going to make use of it.

Fortunately, there are hundreds, if not thousands of precasters across the country. In those early days of the noise barrier industry, I had to look hard for a good precaster to make my product. Most precasters were still unaware of federal and state highway traffic noise programs coming online.

I lived near Boston, miles and miles and miles from most of the projects I was working on. Fortunately, where there are hundreds and thousands of practically anything, you will find an Association. A friend of mine told me about the NPCA, I called them, and they sent me a list of their members. After that, I made some presentations at some of their meetings and at individual members. I soon had good precast sources, both for bidding jobs making product, and in some cases handling the installation.

Bob Austin is looking for people who would like to make a presentation of their product or service at his Denver meeting. He has an information and application sheet he will be happy to send you. Their agenda will of course contain many subjects of interest to the membership, but perhaps not to you. However, **Sound Walls** is high on the agenda, and they have great interest in knowing more about precast noise barriers.

If **you** have interest, I would suggest that you call Bob as soon as you can. ■

The British form a noise barrier association — food for thought?

The Environmental Noise Barrier Association (ENBA) was formed in August 1993 by a group of companies involved in noise mitigation, who had become increasingly aware that noise pollution associated with highway projects had become a major environmental issue and that a concentrated effort was necessary to promote the use of new technology. The formal aims and objects extracted from the Association's Constitution are reproduced below.

AIMS

To promote a greater understanding of transportation noise issues, measurement and control technology among the general public, government officials, designers and specifiers. To assist and encourage the development of effective standards that represent best practice in the field. To actively encourage the use of better acoustic control technology.

OBJECTS

- To jointly promote quality and high performance noise reduction systems for road, rail and industrial applications.
- To set industry standards and create a code of conduct for members.
- To influence legislation for quality and high performance systems.
- To encourage Government departments and other client groups to invest in quality and high performance systems.
- To create a level of awareness of the benefits of installing quality and high performance systems.
- To provide impartial advice to members and potential users.
- To establish and maintain high standards of product technical competence and ethical conduct within the industry.

MEMBERSHIP

Membership is open to those who share the aims and objects of the Association. There are three possible classes:

Full Members

Available to companies satisfying the following criteria:

- are dedicated to the provision of high quality environmental barrier systems
- manufacture or have exclusive marketing to environmental barrier systems, capable of meeting a range of applications, including those requiring sound absorptive characteristics which when tested in accordance with ISO 354 1986, qualifies the product as sound absorptive, to the satisfaction of the Council.
- have capacity to offer competent technical advice to users, and design barriers to required performance specifications.

Corporate Members

For those having a commercial interest but not satisfying all of the criteria for Full Membership.

Associate Members

Open to Consultants, academics, members of professional institutions, local Authorities or other groups who have a specific interest in noise barriers or other noise reducing devices and who can contribute to the Aims and Objects of the Association.

Full Member

BACO Contracts Ltd.
Chalfont Park
Gerrards Cross
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Local Authorities M25 Consortium
C/o Royal Borough of Windsor and
Maidenhead
Directorate of Environmental Services
York House, Sheet Street
Windsor, Berks. SL4 1DD

A list of Individual and Honorary Members is held by the Secretary

For further information please contact
Brian Hunnibell - Secretary
Low Eaves, Blackfield Lane
Great Missenden
Bucks. HP116 9LL
Tel. 01494 837788

(Editor's Note: The above notice of a noise barrier association is of some interest to me, because I have had quite a few conversations over the past years, since I started publishing The Wall Journal, with friends who have suggested that I should form such an association.

The thought fills me with dread, as I am supposed to be in retirement, but I would like to hear from any of you how you feel about the association concept.

- Do you feel it is necessary?
 - Do you feel it would work?
 - Would it be useful?
- Please drop me a line).*

NOISE ABATEMENT WALL BASICS

By Tianjia Tang and Win Lindeman, Florida Department of Transportation

Introduction

There has been a lot of emphasis on the development of traffic noise prediction and noise abatement models. However, to successfully implement a noise abatement program through the use of a noise abatement wall, numerous parameters in addition to wall height and length and the well established structural criteria are required. The following is a review of some non-structural parameters which both noise specialists and structural designers should be aware of when recommending and designing a noise abatement wall.

Types of Noise Abatement Walls

There are three factors typically involved in noise control. The first factor is noise sources. In highway noise situations, the sources are vehicles. The second factor is noise receivers. If no one is affected by the noise, there is no need for noise control. The last parameter is the path between a source and a receiver. A noise abatement wall is a man made obstacle between a noise source and a receiver which inhibits the propagation of sound. The energy of the incident sound upon a noise abatement wall is dissipated through absorption by the wall, reflection from the wall, and transmission through the wall.

If a noise abatement wall absorbs more than 50% of the incidenting sound energy, the main mechanism of noise reduction is absorption and the wall then can be defined as sound absorptive. The Florida Department of Transportation, for example, defines an absorptive wall as having a Noise Reduction Coefficient (NRC) rating equal to or greater than 0.790. Noise abatement walls other than those qualified as absorptive walls are considered sound reflective.

Parameters used to rate noise abatement material include both the noise absorption coefficient (NAC) and the NRC. The NAC is defined as the ratio of

the sound energy absorbed by the surface to the energy incident upon the surface ($NAC = \text{absorption/incident} \times 100\%$). It ranges from 0% to 100%.

The NRC is the arithmetic average of the sound adsorptive coefficient of a material at 250, 500, 1000, and 2000 Hz ($NRC = \Sigma NAC/4$). The NAC and the NRC are especially important when comparing commercially constructed noise absorption panels.

Noise Abatement Wall Materials and Construction Methods

While commercially prefabricated noise absorption panels are readily available and well characterized, the most popular materials used to construct noise walls (concrete, metal, and wood) often lack NAC and NRC data. Walls constructed from absorptive material will generally be lower in wall height than those constructed from reflective material (for the same amount of noise abatement). Also materials possessing high noise reduction coefficients will perform better in a parallel wall situation where reverberant sound is a problem.

Commercially prefabricated noise panels, due to their flexibility in assembly and high noise reduction coefficients, are very valuable for temporary noise abatement purposes such as driving piles and milling processes. Also, these material can be very valuable in places like overpasses and bridges.

Concrete is a popular noise abatement wall material and includes precast and cast in place. Precast concrete is a wall or wall unit fabricated offsite. These panels or units are typically mounted on a base or placed between posts on site. Cast-in-place concrete is poured into forms (molds) on site. Patterns on the wall can be obtained by establishing desired forms. Patterns can also be obtained through manipulating the stucco on the wall, if any. Forms can be built from wood, metal, fiberglass, plastics, or other composite material.

Steel and wood are also common noise abatement wall construction materials. Typically steel comes in panels. These panels are connected to one another either vertically or horizontally. Posts are required to support the panels. Wood walls usually take the form of planks or battens and its construction is similar to steel panels.

There are also commercially available noise absorption panels. These are specifically manufactured for noise abatement. Typically, the panel has a high NAC. These noise absorption panels can be made of steel, plastic, or concrete with fiberglass sandwiched in the middle, with the side of the wall facing the noise source being perforated.

Noise Abatement Wall Aesthetics and Special Features

Noise wall aesthetics is one of the most important aspects of a noise barrier next to its noise abatement capability. Ideally, a noise abatement wall should provide the required noise abatement and be pleasant to both the travelers on the roadway and residents. Factors such as wall color, wall texture (pattern), landscaping around the wall, figures, letters, and numbers on the wall should also be taken into consideration.

Wall texture refers to patterns and the roughness of a wall. Currently, patterns used by the Florida Department of Transportation highway noise walls include flat surface, fractured-fin finish, raked, simulated brick, and stucco finish.

Highway travelers are typically inside high speed automobiles. As a result of this, patterns facing the highway side should be large in size and dimension. Since the amount of time a traveler can view a subject is limited, details in the finish will not be evident and clear simple strokes rather than complicated pictures are more understandable. Simple vertical lines will be more desirable than horizontal lines on

the wall. Patterns which could cause travelers to become disoriented should be avoided. Observers on the residential side of the wall are in slow motion when compared with travelers on the highway side, therefore patterns can be more detailed. Simulated brick is a very popular pattern to use.

Everyone has their own favorite color. For highway noise walls, colors should be mainstream and pleasant for both travelers and residents. Be sure to observe any local ordinance regarding color schemes. Colors such as sandalwood, white, beige, and Sahara Rose, for example, have been used on noise walls constructed by the Florida Department of Transportation.

Frequently communities ask to have subdivision names or other features placed on some of the walls to make it more pleasing. All such figures should be simple and have sufficient size. Detailed drawings facing the highway will not be appreciated. Typical methods of placing these patterns, numbers, and letters on a wall include embossing, engraving, and flat print.

Embossing refers to having the figures or numbers raised above a flat wall. It can be done at the time of construction by using forms. Also pre-made figures, letters, and numbers can be attached to the wall. Typically, engraving refers to carving desired figures or patterns into a wall while printing refers to a flat print on a flat wall.

Graffiti protection should be considered as an important part of a wall finish. A very rough wall surface will discourage graffiti spraying as compared with a flat surface. Anti-graffiti coating on a wall should be able to either prevent the adherence of paint on the wall or facilitate the removal of any graffiti from the wall.

Often residents complain about highway noise simply because landscapes (bushes and trees) along a highway are modified or changed. Proper landscaping helps to increase acceptance of a wall in a neighborhood and reduce the number of complaints related to noise problems from residents. Trees and bushes on both sides of

a wall will help to reduce stresses which a wall can produce to both travelers and residents. Be sure that planted vegetation does not cover special design features (logos, symbols, etc.).

A long and continuous wall constructed along a highway is certainly a potential hazard to travelers. Openings (doors) may be needed for the purposes of both safety and maintenance convenience. Also openings to handle fire or other emergencies on the roadway must be considered.

Parallel Noise Abatement Walls

Parallel noise walls refer to walls constructed along both directions of a roadway opposing each other. In highway noise abatement situations, reverberant sound may occur if parallel walls are placed too close together. Fortunately, any reverberant occurrence between two parallel noise walls (known as multiple reflection) seldom results in any measurable noise increase. The rule of thumb is that as long as the distance between parallel walls is ten times more than the height of the noise wall, noise level increased due to reverberant is minimal (unnoticeable by human ears). In the event that multiple reflection is anticipated to be a problem, using noise absorptive material to construct the walls or extending the walls farther apart may be practiced.

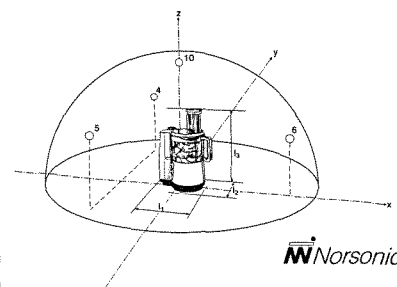
Summary

In order to implement a successful noise abatement program through the use of noise abatement walls, factors in addition to structural elements, length and height must be taken into account. A truly effective and desirable noise wall can only be achieved with a clear understanding of each factor involved and a sound public involvement program. ■

(Tianjia Tang, Ph.D. is Senior Environmental Scientist at FDOT District Five, Deland, FL and may be reached at 904 943-5400.

Win Lindeman. is Environmental Scientist at FDOT Central Office, Tallahassee, FL and may be reached at 904 488-2914).

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SOUNDCORE® — A NEW PRODUCT PROFILE

By Gary Figallo, Product Manager, Industrial Acoustics Company

In a previous issue of The Wall Journal, it was noted that, by far, reflective concrete barriers constitute the largest percentage of highway soundwalls. The increasing demand for sound wall barriers along our nation's highways has brought with it the introduction of many new companies offering products to meet the expanding noise barrier marketplace. But only one has introduced a concept that can dramatically change the way noise barriers are built.

Soundcore, Inc. has taken a concrete product that has been produced for over thirty years and applied it successfully to address the demanding product requirements of sound barriers. It was initially successful for its low cost. It will continue to be successful for its low cost, durability and good looks.

Since the first Soundcore® noise barrier was installed in 1994 for the state of Ohio, over two million square feet of Soundcore panels have been erected. Recently, Soundcore, Inc. joined forces with Industrial Acoustics Company to promote the Soundcore Noise Barrier System.

Soundcore panels are prestressed hollowcore concrete planks. These panels are capable of spanning surprisingly long distances. The standard 6 inch thick panel can span distances of up to ten meters (32.8 feet) between posts. This allows for a large reduction in the number of posts and foundations which results in substantial cost savings for noise walls.

STC	51
Transmission Loss @125 Hz	36
Standard Panel Height	48"
Post Spacing up to	32.8' (10m)

In addition, walls can be built faster since there is an overall reduction in the number of components that must be handled. Since the hollowcore planks have continuous voids, panels weigh only 46 pounds per square foot. They are delivered on standard flatbed trailers. By reducing the overall weight of the product, shipping costs are lowered, fewer trucks are required, coordination of deliveries is easier, and smaller, more

mobile cranes can handle the lightweight panels.

Soundcore panels are produced on continuous casting beds up to 600' long, providing high capacity production economically and efficiently. Reinforcement strands are carefully placed and stressed to high tension prior to concrete placement by the hollowcore casting machine. Slabs are then cured overnight to the minimum strength needed to allow the stress from the strand to be transferred to the concrete. As panels are cut to length the concrete is compressed by the strand. Panels are then removed to storage and cured to the strength required by the design criteria.

Since the bed is cast in one 600' long plank, panels can be cut to various lengths to meet project specific requirements. Thus, longer panels that are needed to span underground culverts, utilities, or other obstacles are produced right along with shorter panels. The short panels might be required for noise wall sections that step up sloping ground.

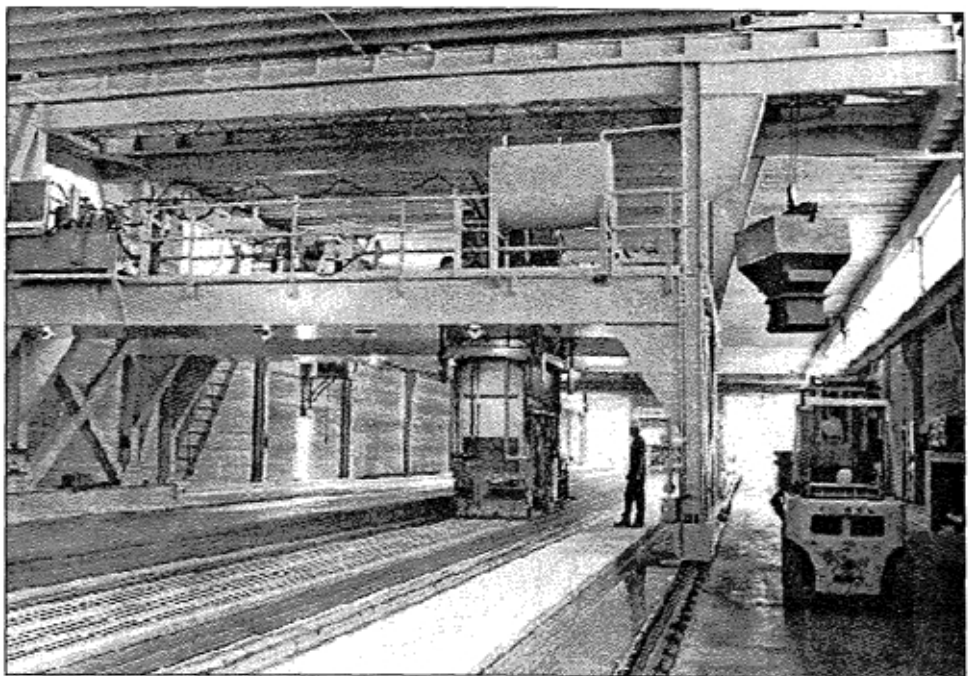
Due to the repetitive manufacturing process, the economy of the hollowcore system allows for large quantities of panels to be produced with a mini-

mum amount of labor. This manufacturing process also helps maintain uniformity of texture and color from one panel to the next which is an important aesthetic consideration.

The prestressed hollowcore manufacturing process results in low initial cost. Low life cycle costs are a result of two factors: 1) very low water cement ratios which correlate well with excellent freeze/thaw resistance, and 2) prestressing which minimizes hairline cracks because the concrete is always in compression, even under the stresses induced by maximum wind speeds.

As reported in *Better Roads*, June 1996, "The single most important factor controlling concrete strength and durability is the water-to-cement ratio." Concrete for Soundcore production is made under the "Zero-slump" guidelines of ACI with a low water-to-cement ratio.

The production of Soundcore panels on flat beds allows for the creation of molded architectural features on one side of the panel through the use of elastomeric form liners. Split-face masonry block, fractured fin, ashlar stone, and even real brick surfaces are just some of the community pleasing appearances that can be cast-in.



Interior of Spancrete manufacturing facility which produces Soundcore panels. The concrete placement machine is shown here traversing the 600'-long casting bed.

On the opposite side, various textures such as exposed aggregates, rake finishes, or other patterns can be produced to harmonize the wall with the landscape. The Soundcore panels can also be colored with acrylic stains such as Cementrate (by FOSROC). English ivy and other vines can grow and cover the wall, drawing life giving nourishment and water directly from the ground.

Soundcore panels can be installed in either concrete or steel posts. Innovative Soundcore prestressed concrete posts can be manufactured in conjunction with Soundcore panels to provide pleasing architectural views. Steel posts offer a thin flange that is hidden by the long spacing between vertical flanges.

Offset panels can be installed to break up linearity of long planar walls. The thin wall profile fits into tight spaces on narrow rights of way.

Soundcore Inc. also has a sound absorptive noise barrier system, **Soundcore Plus**. Cementitious wood fiber planks are mechanically laminated to the prestressed hollowcore concrete panels. This absorptive system therefore, has all the qualities and advantages of reflective Soundcore.

SOUNDCORE PLUS	
NRC	0.8
Absorption @ 250 Hz	0.7
Standard Panel Height	48"
Post Spacing up to	32.8' (10m)

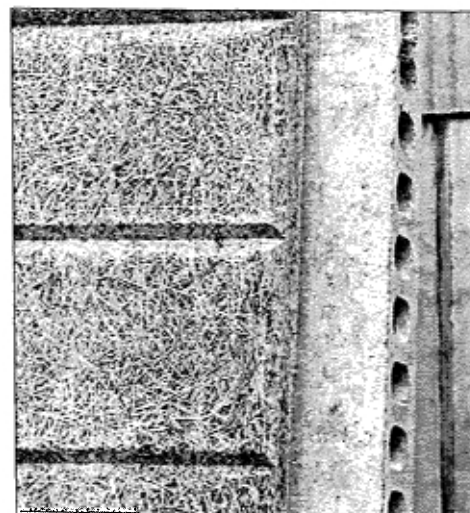
The absorptive panels are manufactured in a high volume production operation assuring uniformly high quality. The product passes all freeze thaw, exposure and durability tests. The acoustical performance of the absorptive facings are good, with an NRC of 0.80 and an absorption coefficient at 250 Hz of .72. Certified test reports are available. The system provides the flexibility to place absorption in specific locations where projects need it.

In addition to excellent reflective or absorptive noise barrier panels, Soundcore, Inc. can offer engineering expertise. Soundcore Chief Engineer George Underhill, PE is board certified and licensed in 38 states. Soundcore, Inc. provides full engineering services and shop drawings. Marketing partner, Industrial Acoustics Company provides

acoustical expertise and local representation.

Manufacturing facilities are located throughout the Mid-Atlantic, Northeast, Midwestern States, Southern California, Texas, and Florida. Opportunities exist for precasters wishing to produce Soundcore's patented sound wall system in Southern and Western States.

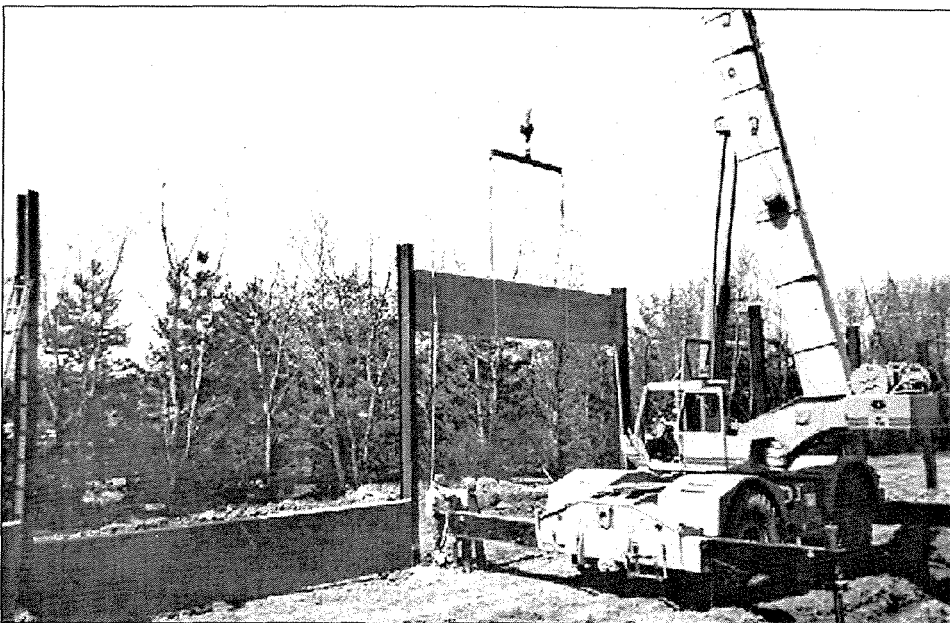
We invite your inquiries regarding Soundcore and Soundcore Plus. Call Gary Figallo at Industrial Acoustics Company (718-430 4515) or George Underhill at Soundcore, Inc. (716-833-7651). Call to request our Engineering details package for use in designing your project. We will also entertain requests to value engineer our product into your current project. ■



Close-up of edge of Soundcore Plus panel, showing hollow-core concrete substrate and mechanically-laminated sound-absorptive face panels with architectural finish. Panels are for a Virginia DOT project.



Highway view of Soundcore project in Cleveland, Ohio. Steel posts are spaced 24 feet on centers, and the 48"-wide panels are 'stacked' to the 24 foot height of the wall.

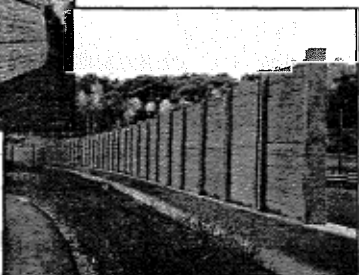
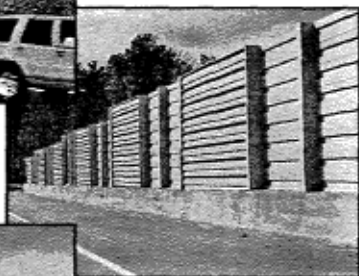


Construction photo from the Cleveland project pictured above. The steel posts are preset in poured concrete foundations. After the concrete has reached design strength, the panels are simply lifted directly from the delivery trucks, placed between the flanges of the steel posts as shown here, and lowered to their permanent position in the wall.

A Directory of Consulting Engineers Who Subscribe to The Wall Journal

Ed. Note: I have been asked many times by readers for the names and addresses of consulting engineers who are active in the field of transportation noise abatement. Since this list is comprised of long-time subscribers, I believe this is it.

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NRC	1.0 (0.95)	0.80	0.80
Sound Absorption at 125 Hz	1.1 (0.95)	0.3	0.3
Sound Transmission Class	38	51	38
Transmission Loss at 125 Hz	23	36	16
Std Panel Height, in. (mm)	24 (610)	48 (1219)	48 (1219)
Std Post Spacing, ft (m)	16 (5)	32.8 (10)	16 (5)
	REFLECTIVE SYSTEMS		
	NoiShield-R	Soundcore	AcoustaWood
Sound Transmission Class	27	51	38
Transmission Loss at 125 Hz	13	36	16
Std Panel Height, in. (mm)	16 (406)	48 (1219)	48 (1219)
Std Post Spacing, ft (m)	10 (3)	32.8 (10)	16 (5)



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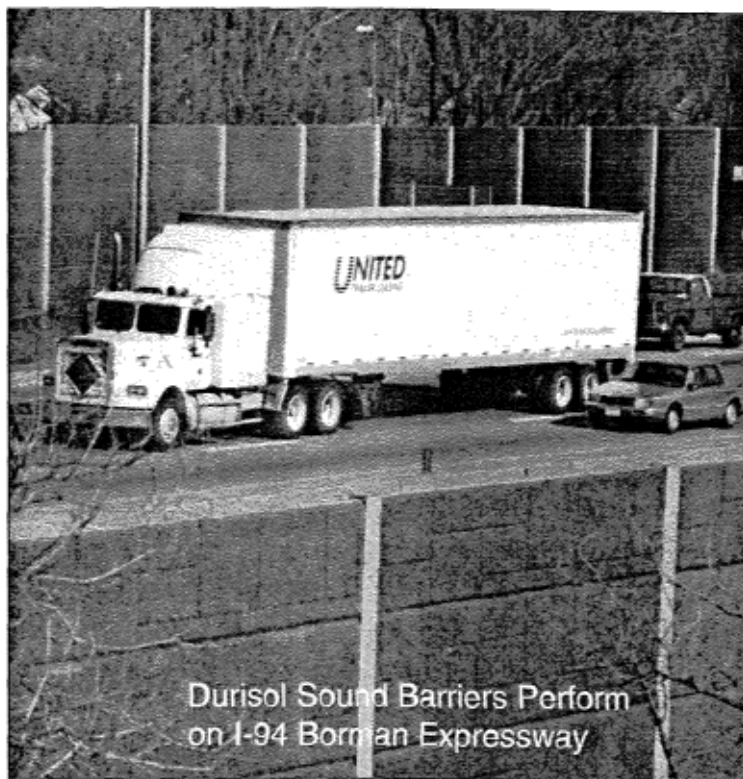
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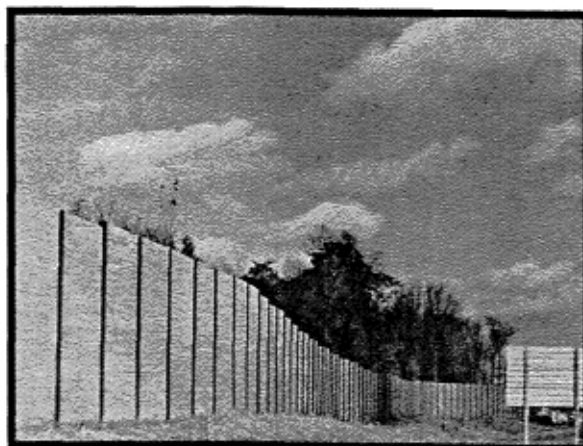
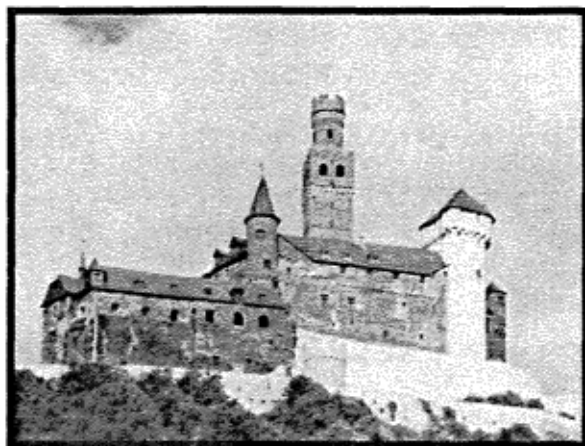


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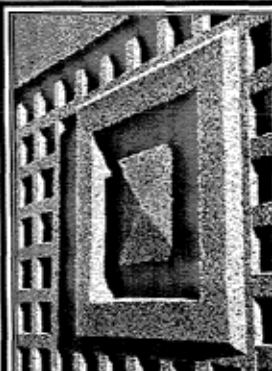


The Second 12 Issues

A recap of items of interest from Issues No. 13 to 24. These are articles, summaries of professional papers, case histories and general information, sorted by subject and content.

This is a follow-on to the recap of items from Issues No. 1 to 12, as published in Issue No. 13. The number in parentheses following the title of the Article or Paper denotes the Issue in which that item was published. At the present time, we still have a supply of every Issue in stock. Information on ordering back issues appears on page 21 of this issue. With this issue, and Issue No. 13, you will have a complete list of the most important items we have published.

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TRB A1F04 Committee Report on Summer Meeting in Chicago (23)	Michael Bruns, Illinois DOT	Air/Rail/Highway
PennDOT's Task Force on Dirt and Gravel Roads (24)	Wayne B. Kober, PennDOT	Air/Water Quality
DNL Demographics: Alternative to Analysis of Airport Noise Complaints (14)	Maria Nucci, Esq., Pittsburgh Int'l Airport	Aircraft Noise
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A View of Sound Insulation Fenestration (18)	Frank Iacovino, Acentech Incorporated, et al	Aircraft Noise
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Controlling Heliport Noise in Suburban Environment (18)	James Cowan, McCormick, Taylor & Assoc., et al	Aircraft Noise
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Aircraft Community Noise Impact Model (ACNIM) (24)	Eric Stusnick and Xin Zhuang, Wyle Laboratories	Aircraft Noise
Validation of Aircraft Noise Models at Lower Levels of Exposure (24)	Juliet Page and K. Plotkin, Wyle Laboratories	Aircraft Noise
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Industrial Acoustics Installs Run-Up Pen at Heathrow Airport (16)	Press Release	Aircraft Noise
Parametric Amplification of Sound (13)	Frank Hodgson, The Kilo Foundation, Inc.	Ancient Mayan Walls
Parametric Amplification of Sound — Part 2 (15)	Frank Hodgson, The Kilo Foundation, Inc.	Ancient Mayan Walls
The Acoustic Phenomena of the Temples at Chichen Itza (19)	Wayne Van Kirk	Ancient Mayan Walls
Sound Phenomenon from the Mayan Ruins (24)	Roger Wayson, University of Central Florida	Ancient Mayan Walls
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FHWA Update (24)	Bob Armstrong, FHWA	General



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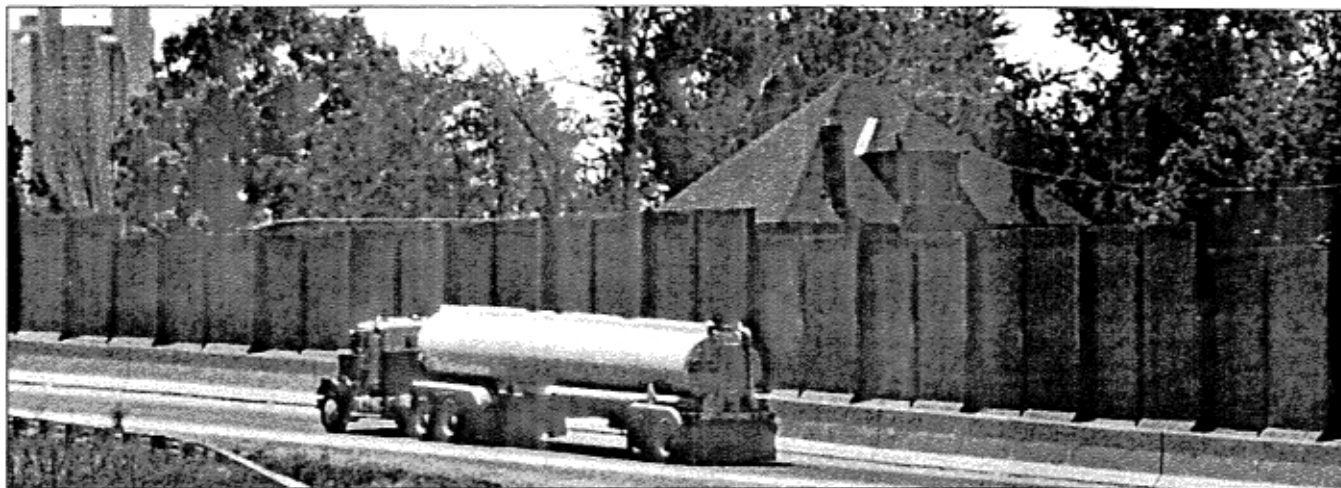
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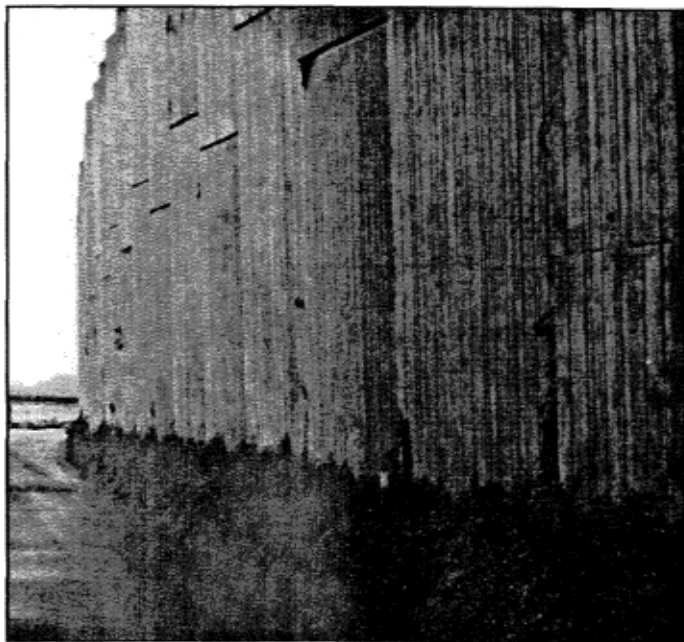
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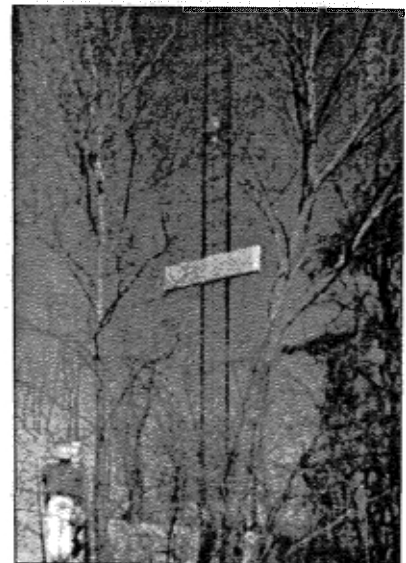
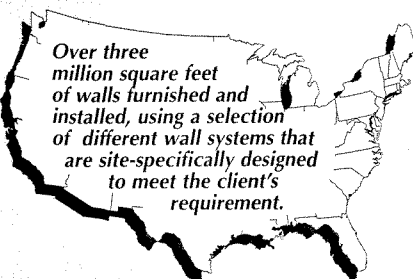
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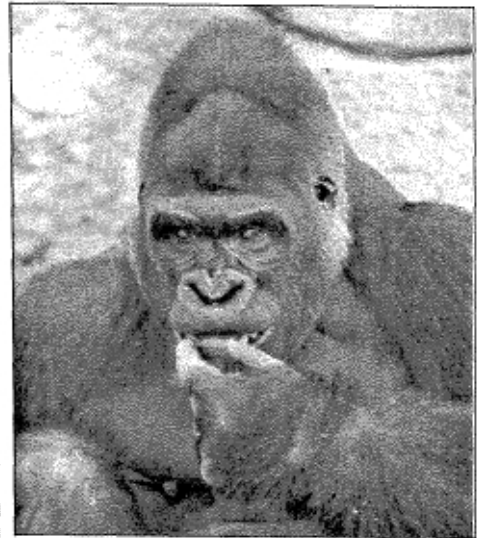
The Walrus says: "I've decided to extend my vacation for another issue; there are a lot of hot walrus honeys up here and I just can't tear myself away. Anyway, El owes me. Besides, Bob Bullmoose tells me the orders for back issues are rolling in. Keep up the good work, Bob. See you soon."

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Hi. My name's Gus. I talked to you a little in the last issue, but I don't think it sank in. You may recall that I said that if you are a government, university or library employee, you get a free subscription to The Wall Journal. O.K.? Right.

BUT, I also said that you have to register, just like it says at the top of page 23. If you are not registered, I will have to go into the computer and erase your name from the database. And El hates it when I go into the computer room, because I always bend those little floor panels.

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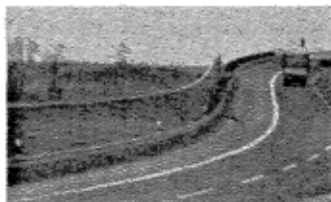
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I have this recurring dream. I see hundreds of engineers and scientists sitting at their computers, just like these guys below, and they're banging out professional papers and project reports of inestimable technical intelligence and untold worthiness.



But, when I wake up and discover it was all only a dream, I cry. Every time I go to the post office, I don't find my box bulging with articles and papers to print — and I weep.

If I don't get any more input than I do now, I will be in a dilemma. I have this fine machine ready to roll and no gasoline. I may have to resort to publishing my life story and memoirs.

Then, you'll be sorry. — Ed.

Don't Be Bashful!



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~~Even a Complaint~~
(strike that)
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The Last Word

Outside of scrambling for good technical material to publish, the next hardest thing is filling in the holes.

I love to get a paper or article of a couple of thousand words and a few photographs. I can scan the text and pictures into my computer in a manner of minutes. Immediately, I have three or four pages all filled up.

Of course, there's a bit of tweaking to be done — things like font changes, adding headlines and captions, touching up the composition — stuff like that. But, The **space** is all used up!

Now, in an artsy magazine, the use of empty space is often artfully used. I can understand that. If they don't have something to say, they can put a picture of a big banana in that space. Cool.

However, in the world of **journals**, bananas are not a big thing. Readers of journals want **hard copy**. Info counts — pizzazz leaves a giant sucking sound.

Getting back to holes. Holes are the things that you find after you have entered all the material you have gathered for the issue, and it is all laid out

in front of you, and you now see all of these little empty spaces.

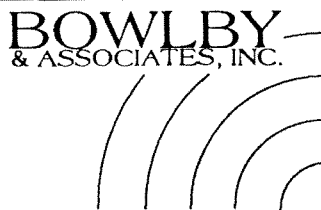
What to do? If you don't have any 250-word tidbits to stick here and there, you go a little crazy trying to find something to plug up the holes.

You can't take another 1,500 word article and scatter it all around. If you don't have Associated Press or Reuters on the wire, you don't have all these little items (called fillers) available to you. So, what do you do? Punt.

Well, I punted a lot in the last issue, and got in a few more this issue. I had to introduce my wild animal associates (sorry, but you will see more coming), since I don't have any human faces working here.

As you can see, I want to avoid the holes. I like 1,000 to 3,000 word articles and papers or project reports. I can suck those babies right into the computer. Then, I can stop pestering you with my blathering. ■





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