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In This Issue:

Who can tell me where this stretch of highway is? — Ed.

The Wall Journal

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EDITOR'S CORNER by El Angove

Dancing with www.com

I know that there are those of you out there who have long memories and sharp teeth will remember my editorial of a year ago in issue 23, in which I substituted a picture of T. Rex for my usual physiognomy. On top of publicly announcing that I was a certified dinosaur, I compounded that gaffe with another: I as much as said I would never, repeat NEVER EVER, take The Wall Journal for a walk on the Internet. I should have learned from my first divorce that it is disasterville to say that "I will never, NEVER EVER, do that again."

A few weeks ago, Tim, the guy who owns the service bureau where I take my Mac removable drive to download his imagesetter with the latest issue data, which is then printed on film, which goes to the commercial printing house, from where The Wall Journal comes spewing off the presses, pulled me into his office and said he wanted to talk website to me. *(If any of you are taking journalism courses, don't show this paragraph to your prof. He might gag).*

Well, Tim pulls his chair up close to me and then looks around the room (where only us chickens are), lowers his voice to the conspiratorial level (there's still nobody else there), and says (without moving his lips) "I'm selling web pages."

You could have blown me over with a feather (me being one of the chickens). I thought that he was about to tell me where Carmen Santiago was, or that the Mother Ship was landing tomorrow and he was going home (after changing back into his real form, of course), or that he was selling XXXX-rated pornography on the Internet.

I figured it was the latter, since he seemed so secretive. So, I asked him if I could see one of these pages. He said, "Sure. I'll show you one I made of myself." I was startled. I said, "Tim, I don't want to see anything that is private to you."

"Oh, hell," he said. "There's nothing private about it — it's all over the Internet, right now." And he proceeded to his computer and dialed up the modem to his web site, and in just a minute or two, we were looking at Tim's face on his very own web page. I couldn't see any other skin on the page, only buttons, icons, tool bars, menu pull-downs and the like.

As Tim pushed buttons and scrolled menus, I discovered that this was not XXXX-rated, but was $$$$-rated. Tim had descriptions of all the services his bureau offered, with revolving signs, photos and movies. Loggers-on in Hong Kong, Paris and London could "walk through" his establishment and "talk" with the owner.

Tim reminded me that I already have some readers in those cities and others around the world, and the list is growing, but slowly. Word-of-mouth is a slow-moving train; Tim said to get on the Internet and **fly**!

One of Tim's services to his clients is the composition of web pages. He is in the process of drafting a Wall Journal home page. Together, we are going to explore the viability of installing The Wall Journal on the world-wide web. There is much to consider. An operational strategy must be developed which takes into account the hard-copy printed issue now in existence and the issue structured for the Internet.

I am talking with an ISP (Internet Service Provider) about their services (website maintenance, their coverage of the Internet, e-mail and other services) and the costs thereof.

I'm finding out the mechanics of this, but I need to know the wisdom and usefulness of going on the Internet. I need to know what you, the reader, thinks about it. I would much appreciate any comments, on any aspect of the subject. Do you all have modems? I'm sure most of you have computers, but what is your access to the Internet? If we were on the web, would you still want the printed edition? Is e-mail usurping fax? In short, is The Wall Journal @www.com worth while doing? Let me know. ■

Contributing Editor

Dear Mr. Angove:

This is a response to your plea for editorial subject matter (March/April Editorial):

As an project engineer working for a local agency, I have found your journal to be a great resource with regard to noise mitigation issues, regulation updates and new product information. I found Roger Wayson's series, Sound Fundamentals (July 1993 issue), very instructive, and shared those articles with co-workers and managers who were interested in expanding their knowledge base in noise issues. The information was of great help in communication with noise consultants and other environmental professionals with technical backgrounds.

There is one area of education which I have found lacking in most forums of this nature. That is, how to present this highly technical subject matter to a lay audience. The target audience includes concerned citizens who are affected by local public works projects, as well as the policy makers who must act as Solomon, between constituent frenzy and budget necessity. If we can't explain the actual impacts of our projects in non-technical terms, the projects may not progress beyond the "public involvement" phase.

I offer up a challenge to your learned colleagues, to draft an article or series focused on educating this lay audience. The desired result would be a format which could be handed out to anyone who is interested in a non-technical introduction to noise issues, and a discussion which would help them distinguish the facts from the myths relating to noise attenuation.

I have found that this audience has become increasingly sophisticated in their understanding that under some conditions, noise mitigation must be provided. The understanding usually ebbs with regard to what those conditions are that require action, what attenuates noise and why, and what doesn't work.

A typical project for our agency would be one that would involve a local arterial or intersection. The improvement might include upgrading a two lane facility to four, or adding bike or pedestrian features, or improving intersection capacity. The perception, particularly in residential areas, is that the road noise is much worse than it used to be. The emotion says that someone should pay to provide features which would "make it quiet like it was before."

Typical issues requiring response include:

- This project will remove my fence or hedge which is blocking road noise.
- What is the effect of a visual screen? What screens are only visual and which screens provide noise reduction.
- My house was 40 feet from the sidewalk before, now it will be 20 feet away.
- What does a 3dB (or 7dB) noise reduction sound like. Will my yard be quiet?
- How does the existing noise sound compared to future noise? What does traffic noise sound like when it reaches 67 dB? What is "approaching" the threshold mean?
- What does "reasonable and feasible" mean with regard to the federal mandate? At what value does the cost of mitigation outweigh the marginal improvement?
- Why do noise walls cost so much more than fences?

A discussion of these and similar issues would be a significant public service, particularly if it can be done without reliance on terms like "logarithmic functions," "octave bands," and "A-weighting." I know this is a challenging proposition, but I also know that the educational opportunity is great and the dividend earned by keeping public works projects on track and under budget would be enormous.

I look forward to reading your responses.

Sincerely,

David W. Schnell
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2930 Wetmore Ave.
Everett, WA. 98201
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(Thanks very much for your fine editorial, David. I know that some of our readers have fashioned hand-outs along the lines you describe for their public meetings. I hope that you get a good response from this, and perhaps you could spearhead a program to collect or develop this kind of material which could be available on a national basis. Good luck to you. — Ed.).

Contributing Editor

Per your request in the Mar/Apr (#28) "The Wall Journal" for editorials, I submit the attached contribution. Hopefully, it is "what you want" for an impromptu subject. It reflects my overall experience over the past 25 years as an acoustical consultant in dealing with community noise problems, and offering practical solutions and advice to my varied clients.

Highway Noise Barriers - then and now.

As you can see, I've been at this for a while. I have some things to say about highway noise barriers. First, on margin, I am for them. They do two basic things: They alter the aesthetic looks of the immediate environment to be something that can be controlled to be a nice thing. Second they reduce traffic noise emission to the outside of freeways to an extent. As long as we keep things in this perspective, we will do good for our clients and communities.

What can be bad about them? First of all, on first blush, roadway noise barriers are usually "over sold". That is, residents adjacent to the freeway are told that these barriers will reduce noise. One has to clearly understand human hearing perceptions and the closely associated decibel scale. A reduction in acoustic energy of 50% amounts to sound level reduction of 3 decibels, which is — for random noise such as traffic noise — a barely perceptible change. A humanly perceived reduction of loudness by 1/2 requires a sound level reduction of fully 10 decibels. Reducing something by 1/2 can be construed as a respectable reduction of same. Affecting a traffic noise reduction of 10 decibels can be something just short of an engineering miracle. Governmental entities and most engineers are not known for their ability to create miracles. So we are faced with a professional situation where residents expect miracles of us, but we fall short of same more often as not.

Second, roadway noise barriers can be expensive. That is mixed blessing; good for the "industry", but bad for long range business if not handled right. Being disappointed early-on by the design process for determining barrier height to affect certain decibel reductions, I was moved to add design integrity by predicting the "barrier attenuation" without, and then with the proposed barrier. Only the decibel difference was reported to my clients as the "performance". That improved my score, since I predicted less attenuation or demanded higher barriers than previously.

Subsequent mixed blessings appear as follows; there is a stretch of 1-270 around the east side Columbus, Ohio that has been the subject of numerous residential development sites dating from the '70s, and for most of which we provided the HUD noise analysis. For many of them, we recommended noise barriers which were as often as not implemented by the site developers to the best of each of their economic capability (read "random wood fences"). All said housing became fully occupied. As best as I could tell, there were no overt complaints about traffic noise. But I often pondered that not- too-nice appearance while driving past that menagerie of fences hoping that something nicer could have been done. Recently, extensive commercial development brought with it added lanes, a new intersection and lo and behold, the Ohio DOT made the wise choice to treat that stretch with newer. higher, uniform and somewhat attractive noise barrier walls. So life is not always unfair.

But back to barrier design. Obviously, the problem of highway noise control cannot be solved to a satisfactory aesthetic and engineering degree by treating only one lot or even a block of lots. The best solution is that a noise barrier should be an integral part of the highway design or renovation process —just as much as are grading, drainage, surfacing, landscaping and fencing. Indeed, community noise control is of necessity one of the fundamental design parameters, ranking equal to drainage and surfacing in my opinion. Accordingly. the mind set of the country's highway engineering disciplines must be to treat the noise emission vis-a-vis ADT and mix values alongside the aforementioned classical parameters. In that way. the bridge into the 21st century will be quiet and successful.

Yours truly,

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(Thanks for your virtually instantaneous response to my editorial, Angelo. I hope we hear more from you. — Ed.).

TRB COMMITTEE A1F04 ON TRANSPORTATION RELATED NOISE AND VIBRATION

Gregg G. Fleming, Chairman

(Editor's note — Usually, we try to publish summaries and abstracts of the professional papers presented at the A1F04 Committee meetings, when they are available, because they are important. However, some very important things happen in the trenches at the subcommittee meetings. You will find interesting items in the minutes meticulously written by Committee Secretary Win Lindeman of Florida DOT).

MINUTES OF TRB COMMITTEE MEETING
A1F04(3) HIGHWAY NOISE SUBCOMMITTEE
January 13,1997 @ 9:00 am
Conservatory Room, Washington Hilton

CALL TO ORDER

Chairman Ken Polcak from the Maryland State Highway Administration (MdSHA) called to the subcommittee meeting to order and asked the attendees to introduce themselves.

Steve Ronning from the Federal Highway Administration (FHWA) used this opportunity to announce details of the 1996 awards dinner.

Gary Figallo from the Industrial Acoustics Co. announced that he was once again sponsoring a hospitality suite.

Mr. Polcak then reviewed the week's key A1FO4 events including Monday's Aircraft and Rail noise subcommittee meetings, Tuesday's key events including the 9:00am full A1FO4 committee meeting and the 7:30pm Annual Awards Dinner at the Orleans House restaurant . He announced that there would be two A1FO4 technical sessions Wednesday at 8:00am and 2:00pm in the Lincoln room of the Hilton Hotel, and an evening session (7:30pm) featuring a demonstration of FHWA's TNM noise prediction model in the Jefferson East Room.

Bill Bowlby from Vanderbilt University announced that there was going to be a presentation of high speed rail noise and vibration at TRB Session 351, Wednesday at 2:30 at the Omni Sheraton.

A1F04(3) REPORTS

Mr. Polcak asked if there was anyone present to report on the A1F04 summer meeting that was held in Chicago and sponsored by the Illinois Department of Transportation, the Illinois Toll Facility and H.W. Lochner & Associates. None being present, Mr. Polcak gave a brief overview of the proceedings, including multiple technical presentations and technical tours of the noise monitoring facilities at Chicago's O'Hare Airport, and the world-famous Riverbank Acoustical Laboratories. The summer meeting was well attended and that a good time was had by all. One notable absence was the new chairman of A1F04, Gregg Fleming from the US DOT Volpe Center Acoustics Facility who was busy becoming a daddy. Congratulations to Gregg and his wife on their new born. Our most recent Chairman Emeritus Domenick Billera from New Jersey DOT graciously filled in for Gregg.

Mr. Ronning from FHWA announced more particulars on the awards dinner including a cash bar beginning at 6:30pm followed by dinner at 7:30pm.

Mr. Polcak announced that this year's A1F04 Summer Meeting will be held in Toronto, Canada and will be sponsored by the Ontario Ministry of Transportation (OMT). He asked Soren Pedersen from the OMT if he had any details on the meeting. Mr. Pedersen announced that be and his staff were still planning activities. The meeting is currently scheduled from July 20 through the 23rd.

Gregg Fleming put out a call for volunteers to review a paper titled "Control of Highway Noise Sources," submitted by Lloyd Herman from Ohio University. Mr. Fleming stated that the reviews would have to be completed by February 1st.

PRESENTATIONS

Ms. Cynthia Lee, from the U.S. DOT Volpe Center Acoustics Facility, presented the FHWA's new noise video. The video looks at barrier types, safety issues and maintenance issues associated with noise barriers. Ms. Lee thanked Rudy Hendriks (CALTRANS), Harvey Knauer (PennDOT), Carey Adkins (Virginia DOT) and Ken Polcak (MdSHA) for their help in developing the video.

The video addressed a wide array of highway acoustic fundamentals including common noise levels associated with normal speech, ambient neighborhood noise, automobile noise including, noise metrics focusing on Leq, frequency, A weighting, decibels, noise barrier insertion losses, perceived noise reduction of 10 dBA, and noise levels at second and third row homes.

The video also discussed various noise barrier design issues such as the effects of noise reflections (identified the maximum 3 dBA increase and typical 1-2 dBA degradation of barrier insertion loss) from a single noise barrier and insertion loss degradation associated with parallel noise barrier reflections (varies between 2-6 dBA). The video also addressed the use of absorptive noise barriers to minimize parallel barrier reflection, along with the use of tilted noise barriers.

Also discussed were the use of berms and noise barriers as primary mitigation to highway noise impacts. Also addressed were barrier/berm aesthetics including both "bold or hidden" techniques such as stepping end panels and/or landscaping. The video also addressed various community considerations such as planting materials, varying barrier colors, and various noise barrier finishes. Examples of block, precast and wood noise barriers were presented.

The video addressed barrier/berm mitigation hiS~lighting that the maximum insertion loss is generally 10 dBA. The audio portion of the video then demonstrated what a 10 dBA insertion loss would sound like.

The video highlighted alternative barrier materials such as metal on bridge structures, berm/barrier combinations, and innovative techniques to increase barrier aesthetics and scenic views. The barrier materials included transparent materials (to help maintain views of commercial advertisement), green walls and stacked gabions. The video also highlighted that vegetation does not have a significant mitigation value. It was also mentioned that landscape designs should be sensitive to native vegetation and be located in areas not effected by road salt or other highway maintenance activities.

Also addressed were alternative barrier materials such as recycled plastic and discarded rubber tires.

Safety and environmental issues including graffiti, emergency vehicle access and fire hydrant access were also presented. It was highlighted that involvement of the community in the design process helps to identify safety issues and aesthetic concerns related to barrier materials such as exposed aggregate, gabions and berms landscaping

The video also discussed design considerations such as overlapping barrier (4:1) design ant structural considerations to withstanding impact from errant vehicles.

Ms. Lee followed the video by opening the floor to questions/comments.

Professor Curt Westergard from 3D Imaging LLC made a presentation on "Visualizing Noise Barriers Over Time." Dr. Westergard began his presentation by explaining that visualization techniques used in Hollywood film making has opened the door to visualization techniques that can be adapted for creating noise barrier visual models.

He then made a Powerpoint presentation of an animated oblique view of noise barriers.A feature of the animated noise barrier model were particles that simulated noise emissions from the truck stack moving towards the noise barrier. Dr. Westergard explained that these particles are termed "reflectors" and involve the same concept as was used in Steven Spielberg's Jurassic Park. He explained that his application of reflectors in transportation simulation started with demonstrating noise paths in traffic "roundabouts."

Dr. Bowlby asked if the reflectors followed the laws of gravity. Dr. Westergard stated that they did. Dr. Westergard then showed the reflectors in another simulation as they emanated from a power transmitter and bounced off a fanwall surround.

Dr. Westergard followed his presentation by opening the floor to questions.

The final presentation was made by Dr. Seishi Meiarashi of the Public Works Institute in Japan on the topic of "Improvements in Low Noise

Pavement" (Dr. Meiarashi suggested to the attendees that it would be easier for them to address him simply as "May"

May began his presentation by passing around samples of "Drainage Asphalt Pavement" (DAP) and "Porous Elastic Road Surface" (PERS). He then followed with a presentation which described his testing procedure for measuring the noise reduction qualities of the DAP and PERS road surfaces. He explained that he was able to develop a noise monitoring testing program that could differentiate between Driving Machine Noise (DMN) and tire noise. The tire noise was broken down into Tread Pattern Vibration Noise (TPVN) and Other Tire Noise (OTN).

May stated that a test track was set up with monitoring equipment placed at several points along the track at a distance of 5.5 meters from the test vehicles. He explained that various tire types were tested. "Normal" tires were tested for Tread-Pattern Air-Pumping Noise (TPAN), TPVN, OTN in addition to Aerodynamic Noise (ADN). "Urethane filled tires" were tested for TPVN, OTN, and ADN while "slick tires" were tested for OTN and ADN.

Tires were tested on automobiles, light trucks and heavy trucks. It was identified that the substantial noise factors for vehicles traveling at or below 80 km/hr were TPAN and TPVN for automobiles, DMN for light trucks and DMN, OTN and Al)N for heavy trucks. It identified that the substantial noise factors for vehicles traveling at or greater than 100 km/hr were OTN and ADN for cars, OTN and ADN for light trucks and DMN, OTN, ADN and TPAN for heavy trucks.

May identified that the Initial Porosity ratio (IPR) of standard porous TDP pavement was 20% or over, that pavement thickness was 3-5 cm and the aggregate size was 10-50mm. May stated that the abatement quality of the pavement degrades significantly over the first year of installation. He stated that the "Porous Elastic Road Surface" (PERS) pavement surface consists of rubber granulate with a urethane binder.

May found that PERS provided a 10 dB insertion loss for cars and approximately 5 dBA for light and heavy trucks over ADP surfaces. He stated that the abatement quality of the PERS more than tripled ADP during wet conditions.The test results identified a significant noise reduction quality of PERS over DAP road surface in the 650 Hz to 5 kHz frequency range.

May explained that additional tests were run to determine the durability and safety of PERS. His tests revealed that the surfaces "dynamic wheel tracking stability"exceeded 10,000, that the surface had zero "cantabro loss"and that its "skid resistance" exceeded 8. PERS's skid resistance was good but DAP's was better. He commented that PERS will burn but will maintain better than DAP surfaces.

May stated that the test results identified that the PERS mix that would result in the greatest abatement would have an initial porosity ratio of 35-40%, a 3 cm pavement thickness and a 4-5% urethane binder. This would result in a 10-15 dB reduction for light and heavy trucks.

May cited that future research should include PERS's performance under real highway conditions and should also consider durability and true field measurements.

A1F04(3) ANNOUNCEMENTS/DISCUSSIONS

Mr. Polcak asked if Mr. Armstrong would comment on the recent research needs conference held in Washington D.C. Mr. Armstrong stated that a meeting held in November was similar to the 1991 Denver conference to prioritize research needs involving 12 environmental topics. The topics were discussed with members of TRB, FHWA, FTA and members of private industry. Participants from A1F04 included Joe Ossi (Federal Transit Administration), Domenick Billera (NJDOT), Robert Armstrong (FHWA), Eric Stusnick (Wyle Laboratories), Dr. Meiarashi (May) and Mike Staiano (Staiano Engineering). Mr. Armstrong explained that working groups met for 2 days and developed the top 5 research needs for each of the 3 transportation modes for the next 3-5 years. The recommendations will be published by TRB and distributed to funding agencies. He explained that he has a circular from the meeting for those interested.

Mr. Fleming announced the availability of two documents. The first is a "Highway Noise Monitoring Manual" that is compatible with the FHWA's TNM model. This manual will replace the current "Sound Procedures" manual. The NTIS publication number for this document is PB 97:120489. The second publication is the complete noise monitoring database developed for the TNM noise model.

Mr. Knauer announced that the 1997 ASHE National Convention will be held in Valley Forge, Pennsylvania this year and will include a demonstration of the TNM model along with a tour of Pennsylvania noise barriers.

Jim Nelson from Wilson, Ihrig and Associates announced that the Rail subcommittee was meeting at 7:30pm this evening and that a presentation was going to be made on "Swedish Rail Noise Issues."

Mr. Stusnick announced that he is searching for neighborhoods that have experienced a10 dBA noise level increase resulting from a transportation improvement project. Anyone who could assist Mr. Stusnick should give him candidate neighborhoods within the next 6 to 12 months.

Mr. Armstrong announced the availability of copies of the "1995 Noise Barrier Construction Trends" near the room entrance. He explained that this listing was also recently published in "The Wall Journal." He also mentioned that in August, revisions to the regulations regarding Type II noise barriers, now require that Federal funding may only be used for residences that existed prior to the original highway noise source. The Type II policy manual should be published in March. Mr. Armstrong stated that the FHWA has approved 28 state DOT Noise Policies. All policies were to be completed by June 12, 1996. At this time, he has 11 state policies still outstanding including Washington DC and Puerto Rico. Mr. Armstrong stated that he would make a TRB presentation once all the policies were completed. Dr. Wayson asked if platted development preceding a highway would qualify for Type II abatement. Mr. Armstrong stated that it would most probably qualify.

Domenick Billera announced that the National Technical Institute is working on a New Jersey research project that is developing a noise barrier design for the NJDOT. A prototype design will be constructed in the near future.

Mr. Waldschmidt asked if the FHWA had developed a state DOT training program for the new TNM prediction model. Mr. Armstrong stated that he will be addressing this issue Wednesday night, but that he anticipates development of an introductory CD-ROM that would accompany the model and possibly a long term NHI (National Highway Institute) training program. He stated that the FHWA would also be looking to the private sector to provide much of the training.

Michael McNerney of the Center for Transportation Research at the University of Texas is developing a catalog of effective noise barriers for the Texas DOT. He also stated that they are finishing the third year of their "How Noise Barriers Work" study. He explained that this study is also examining the effectiveness of quiet pavement surfaces. They are using a construction trailer to measure pass-by noise levels and are recording the levels on digital-audio tape. He stated that he is currently working with a South African firm that has developed a quiet surface type. Mr. McNerney also explained that Novachip (Pennsylvania firm) is producing a quiet pavement type being used in Texas. He explained that the Texas Department of Transportation project also includes studying nationwide Type II programs and that it will bc contacting A1FO4 committee members for input. He mentioned that the Texas DOT liked Mr. Knauer's publication on Type II noise barriers in Pennsylvania and wanted to develop something similar.

Mr. Sandberg stated that he had copies of his latest paper on highway pavement types for those interested. He mentioned that there is a study currently being performed in Sweden that is examining 60 mm aggregate chips. He mentioned that this challenges England's belief that 20 to 60 mm chips are also best for noise absorption. Mr. Sandberg stated that 8 mm chips are being studied with good results. Mr. Sandberg also announced that there is now an internationally approved monitoring procedure for monitoring various pavement types. He also stated that there is another study that is developing a procedure for classifying road surfaces. He commented that the Nordic noise model has been revised and is available through him. He mentioned that tire noise emissions are now being handled by the United Nations Economic Committee and that the committee will be meeting in Geneva to discuss this issue.

Mr. Jim Byers of the Pennsylvania Department of Transportation stated that there is currently no funding in Pennsylvania for Type II noise barriers. He also mentioned that PennState University is working with PennDOT to develop construction specifications for wooden noise barriers. He also mentioned that the department is working with West Virginia University on low-cost noise barrier solutions. He also stated that the department is assessing incompatible development situations in noise mitigation.

Seeing that there was no further discussion or announcements, Mr. Polcak thanked the presenters and all attendees for a productive meeting and followed by adjourning the meeting. ■

Value-engineered features and benefits of **monowall**™ *approved for Florida DOT Qualified Products List*

The Florida Department of Transportation in their letter of March 24, 1997 to Pickett Wall Systems, stated that it has completed its evaluation of the **Monowall** Noise Barrier System and based on the information submitted, will approve it for inclusion on the Qualified Products List (QPL) and use on their projects.

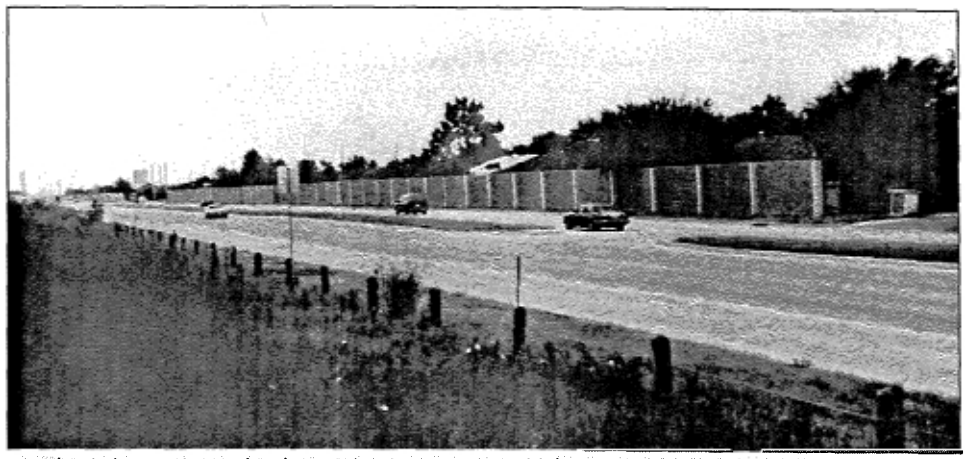
This concluded over a year of correspondence and submittals and revisions between FDOT and Pickett. Pickett said it was a grueling exercise, but was well worth the experience, since it forced him to fine-tune the engineering design and calculations for **monowall** to accommodate FDOT requirements, and in the process he forged a solid business and technical relationship with GAI Consultants in Orlando for engineering counsel and computer-assisted engineering.

Now that **monowall** will be on the QPL for FDOT noise barrier projects, Pickett Wall Systems will be actively pursuing the projects, and thus will be focusing on the contractors and precasters in Florida. Which brings us to the features and benefits of value engineering, important factors for contractors and precasters alike.

Frank Lloyd Wright and George Buckminster both followed the principle of 'form follows function' in their designs for habitation. Design to the function first.

In the case of the highway traffic noise barrier, we also have function and form to consider, as well as the environment, which in itself has three components: noise pollution, air pollution and visual pollution. First, we will discuss the function.

The prime function of the highway traffic noise barrier is to reduce the impact of the highway noise on the nearby residents. Its performance in noise reduction is specified by acoustics engineers in the project plans. They specify the height, length and alignment location of the noise barrier, as well as any quantitative sound-absorptive treatment (if required). For barriers constructed of very lightweight materials, there may also be a specification for sound transmission loss (STL). In the case of precast concrete noise barriers, the STL factor is insignificant, since the Mass Law states that a panel which has a surface through-weight of 2 lbs/sf or more has sufficient mass to prevent transmission of noise through the panel which is higher than that which is diffracted over the top or around the ends of the wall. Even a thin 4-inch thick precast concrete panel has a surface through-weight of about 50 pounds (if you had a one-inch thick concrete panel, it would weigh. about 12 pounds, which is a 600% overkill of the Mass Law's 2 lbs/sf minimum).



The value-engineered reduction in pieces, parts and labor which is obtained by the monolithic panel/post module, leads to large manufacturing materials cost saving, and also contributes to the higher rate of on-site erection. This shortens the soundwall construction phase on the project, opens and/or returns the highway to use, and gets the traffic moving again in a hurry.

Therefore, much of the acoustic design work on the highway traffic noise barrier has been specified by skilled engineers in the highway departments or by their consultants. It follows for the providers of the barriers to comply with the plans and specifications for the dimension and performance criteria, but also to conform to the soils and meteorology requirements.

Here, the structural design begins. By now it is well known what the state wants in a wall — it is so long, so high and it runs along the side of the highway for two miles. The State has also advised us the type of soils and their bearing capacities where the wall will be built, and specified what the design wind load is. It would seem that the structural parameters had been established.

It's not rocket science to begin design of a noise barrier system from that platform, but you wouldn't believe it from some of the designs that have been submitted since the beginning of the noise barrier race in the Seventies.

All you have to do is ask your self three questions and you are off to a good start:

1. What material will I use?
2. How will it stand up in wind?
3. How can I sell it?

The answer to question (1) is simple. It's REINFORCED CONCRETE — the world's cheapest structural material for long-time durability, workability and 'environmentability.' It is easy to mold into shapes and patterns, it can be colored, it is available everywhere, it can even be precast on site, and it is perfectly at home in the highway environment.

The answer to question (2) seems to have misled many suppliers of traditional post-and-panel noise barrier systems. They somehow always separate the panel from its post, producing two disparate parts to serve the same purpose — to attach the panel to a post. Separate parts can mean separate suppliers and delivery systems, on-site storage, delays on the job, back charges, headaches.

It seemed obvious that we should produce the post and panel at the same time, in the same precast pour, killing two birds with one stone. On the next page, you will see how this simple decision has produced cost savings all the way down the noise barrier project line. From engineering to materials and forms purchase, to set-up for precasting, to stripping panels from forms, to yard storage and jobsite delivery, to site preparation and traffic control, and erection of panels directly from the delivery truck and into permanent position in the wall.

All of that is due to **monowall**'s monolithic, one-piece post-and-panel design, which is where the system got its name — **mono**lithic**wall**. At the very beginning of a project, the selection of **monowall** will cut in half all of the tasks associated with the major cost item (the wall system) in the noise barrier project.

The integrated post and panel eliminates one very large vendor from the job budget , the cash stream and the job flow

chart. Which also minimizes the opportunity for logistical slip-ups and progress delays — lost time and money!

monowall is friendly to the precaster. The forms are fairly simple in design, and may be fabricated by the precaster, or other arrangement with the licensor. Precasting is simple. A post form is attached to one end of the casting surface, and the panel nose form attached to the opposite end. Steel angles are used to close and form the top and bottom edges of the panel.

The entire monolithic post-and-panel is lifted from the casting bed as shown in the photo at right. The panels are then stored in their final vertical position in the precast yard, ready for pickup and delivery to the job site after curing.

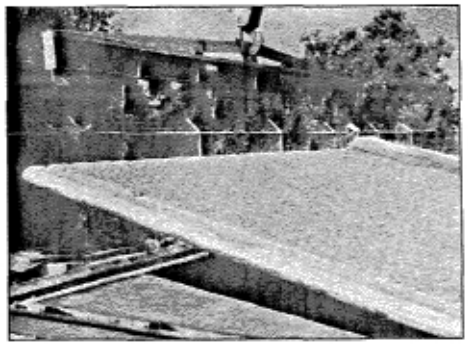
Poured concrete pile- or caisson-type foundations are required with any straight-line post and panel wall system. **monowall** is no exception. Except that **monowall**'s 'post' is not submerged in the wet concrete of the caisson, as steel posts are, for example. The installations of the foundations and the wall system may be entirely separate operations, performed months apart.

The photos show how the caissons are prepared to accept the installation of the **monowall** modules. Micro-positioning is not required; the 4-inch diameter steel canisters allow placement in any direction when needed, before the grout is pumped in.

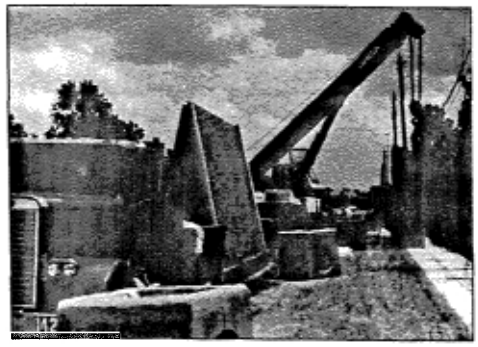
After the caissons have cured, installation of the **monowall** system can begin at any time. Delivery trucks can be loaded at the precast yard, driven to the job site, positioned near the wall, and the panels picked one at a time by a crane of suitable reach and capacity, and lowered into place as shown in the photo. Installation is completed as shown in the photos.

The installer will find that **monowall** is easy and fast to erect. The caissons provide the general positioning of the 'post' and any close adjustment is accommodated by the open area in the canisters. Spacing of 'posts' is automatic, and true verticality is obtained since the module is still suspended from the crane while the fast-setting grout is applied.

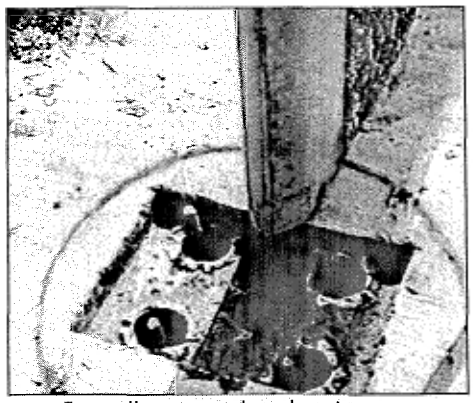
monowall, being monolithic, solves the problem of disparate appearances of posts and panels, and being concrete, can be textured and colored in hundreds of variations. Fully engineered, designed to be cost-effective to contractor, precaster and owner, **monowall** should be the most-favored noise barrier system of choice. ■



monowall module, made the day before, is lifted by crane from the casting bed. Note the curved 'nose' edge in the foreground, and the bulk of the 'post' edge opposite. Lifting inserts are in the top edge.

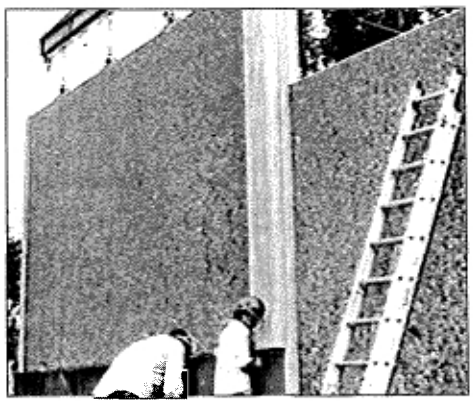


After the modules have cured, and when the Contractor requires, the **monowall** system is delivered to the job site, and the modules are picked from the truck by the crane and placed directly in their final location.



Four tall corrugated steel canisters are embedded in the caisson at the time of its pour. Four splicing rods of engineered length for the stability support specified are inserted into the canisters. The previous panel has already been installed, checked and set, ready to guide the next panel in.

The next panel is moved horizontally into place about four feet above the top of the caisson. The splicing rods are lifted, inserted and screwed into the anchored threaded insert which has been precast into the 'post'.



After securing the splicing rods, the canisters and their common square recess are filled with fast-setting, high-strength grout . The panel/post module is lowered to the caisson top. The 'post' bottoms have a square raised boss which automatically forces out excess grout from the recess, insuring complete rod enclosure and seating of the 'post'.

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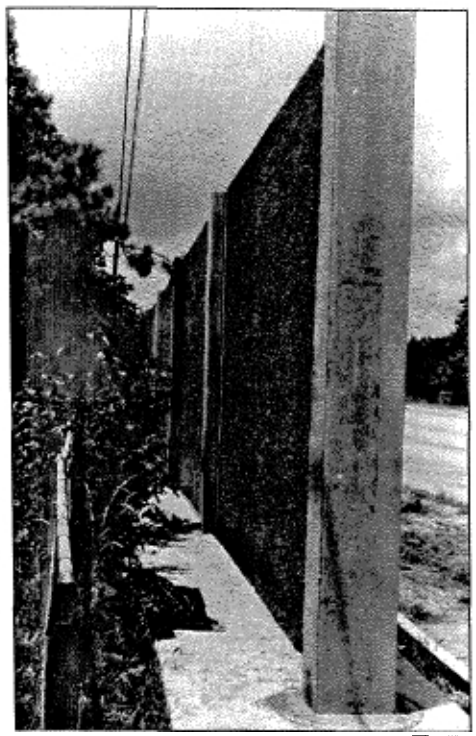


This installation of **monowall** was on a Texas DOT project,which had a specification for a poured concrete "mowing strip" along the entire alignment, as shown above.

NJIT DEVELOPS FIN WALL

by Walter Konon, Eugene Golub, Edward Douenheimer and Ala Saadeghvazini

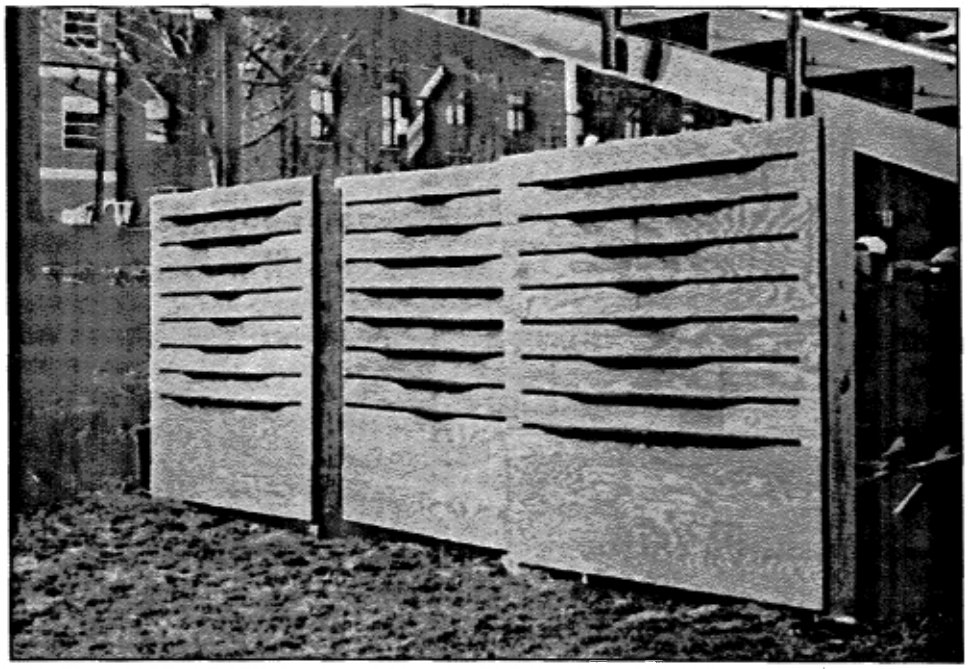
Sound barrier wall construction combats noise pollution in adjacent neighborhoods, but also obscures the landscape we all enjoy viewing while driving. Existing walls are often perceived as having a monotonous unattractive appearance.

In an effort to develop more aesthetically pleasing noise barrier walls and at the same time improve field constructability, a team of engineering faculty at the New Jersey Institute of Technology (NJIT), consisting of Edward Douenheimer, Walter Konon, and Ala Saadeghvazini, has developed a fin wall design that addresses both of these issues. The project is supported by the New Jersey Department of Transportation (NJDOT) coordinated by Domenick Billera in cooperation with the Center for Transportation Studies and Research at NJIT.

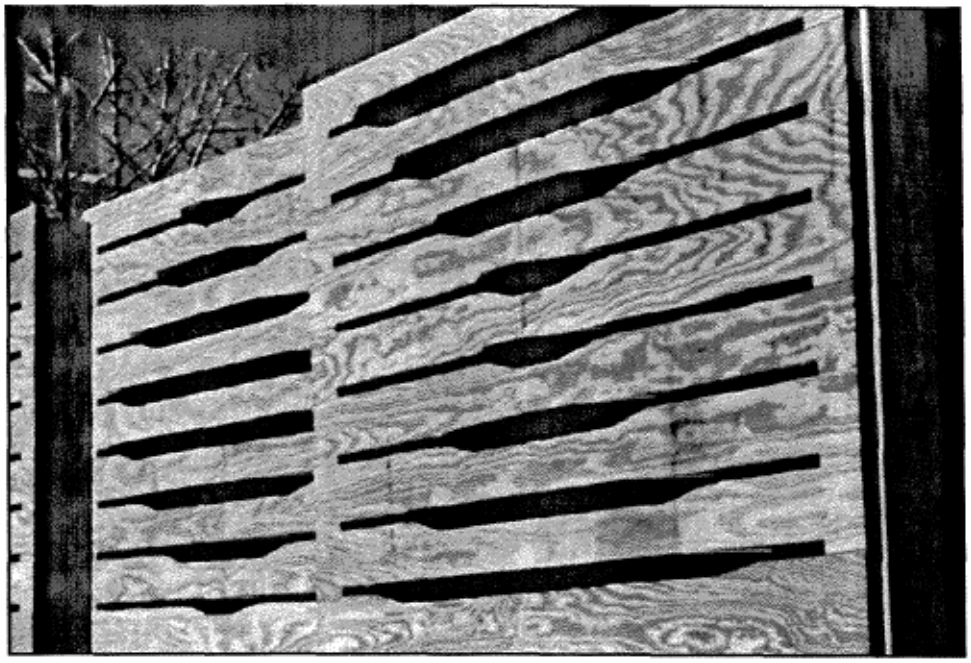
The fin wall design is based on a concept developed by architect Ashok Bhavnani in 1994 for the NJDOT. The design concept incorporates shadow creating fins which also aid in noise abatement. The fins project 1 ft. from the wall panel face and are positioned at 2 ft. intervals with the first fin located 8 ft. from ground level. The lower 8 ft. finless section of the wall is protected by landscaping and other anti-graffiti measures.

In the design developed by NJIT, recycled plastic fins are field attached to 26 ft. long concrete wall panels. The erection of panels into a wall segment with differently configured horizontal fins can create a limitless variety of wall patterns. A dynamic shadowplay is produced by sunlight casting the fins' shadows on the wall plane surface. Depending on the sun's angle and intensity, the length and definition of the shadows change and add to the visual variety.

A one-third scale wood and plastic model of a 24 ft. high fin wall was built at NJIT to evaluate its cost and constructability and to demonstrate the visual effect of the shadowplay. Currently used standard concrete H post and panel systems require precise vertical and horizontal positioning of posts which can lead to field erection tolerance problems. The NJIT developed system has the face planes of succeeding wall segments offset and attached to the front or back of a standardized post. This allows for wall direction changes and reduces field erection costs.



One-third scale wood and plastic model of a 24 ft. high wall was constructed at NJIT to evaluate cost, constructability and visual effect. The bottom third of the wall was left plain to be protected by landscaping and other anti-graffiti measures. The fins on the top two-thirds of the panels project one foot from the wall and are spaced two feet vertically.



Close-up view of model shows staggered arrangement of panels which are alternately attached to the front and back faces of the standard post. This permits wall direction changes and reduces field erection costs. Also, the aesthetics of the wall are enhanced by introducing more shadow area.

NJDOT personnel, noise wall manufacturers, and installers who have inspected the NJIT model have reacted positively toward the improved aesthetics and constructability. Efforts are underway at NJIT to develop a final design and build a full scale prototype of the fin wall. ■

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Environmental Research Needs in Transportation

An Upcoming TRB Circular

Announcement by Jon Williams, Senior Programs Officer, Transportation Research Board

(Ed. Note: In Issue No. 27 of The Wall Journal, we published the opening announcement by Jon Williams of the upcoming TRB Circular with the title in the header above, along with the first highway noise research title. In Issue No. 28, we completed the list of highway noise research needs. In this issue, you will find the remaining research needs to be considered for aircraft and transit noise problem areas).

Problem Area: Aircraft Noise

Title: Supplementary Metrics for the Evaluation of Aircraft Noise Impact

Problem Statement: The Day-Night Average Sound Level (DNL) is the acoustic metric currently used by the Federal Aviation Administration in evaluating the community impact of aircraft noise around airports and in establishing a design criterion for residential sound insulation programs. Recent experience has indicated that the use of this metric alone may not be technically sufficient in many situations. In addition, much of the public's perception is that an averaging metric, such as DNL, does not correlate well with their response to the intruding aircraft noise. Four areas in which responses to aircraft noise appears to be greater than that which would be expected from the existing aircraft DNL are: (a) near small and mid-sized airports where the average Sound Exposure Level (SEL) of single aircraft overflights, at a given DNL contour, is much greater than the corresponding SEL at that DNL contour near a large airport; (b) at locations where background noise levels, as characterized by L_{90}, are more than 10 dB below the noise levels produced by aircraft overflights, as characterized by L_{10}; (c) at locations distant from airports where new air traffic patterns have introduced recognizable aircraft noise into regions that previously did not often experience such noise events; and (d) near airports at which there has been a discontinuous increase in the amount of air traffic or a dramatic change in air traffic patterns. Research is required to identify acoustic metrics that can be used to supplement DNL in evaluating community impact and in establishing design criteria for residential sound insulation programs in these situations.

Proposed Research: Research on appropriate supplementary noise metrics should be carried out in three areas: (1) investigation of the use of single-event acoustic metrics to supplement DNL sound insulation programs, (2) investigation of other cumulative acoustic metrics that account for community response to new or dramatically changed noise exposure, and (3) investigation of noise metrics that compare intrusive noise levels to background noise levels. As part of this research, previous single-event and cumulative noise metrics should be reviewed in terms of the parameter which each considers (i.e., total acoustic energy, maximum sound level, duration, number of events, signal-to-noise ratio, variability of sound level, etc.). Where data are available, community reactions to aircraft noise should be compared in terms of those metrics which appear feasible. including the changes in those metrics as the result of changes in air traffic patterns. Gaps in the existing knowledge should be identified and appropriate acoustic measurement/social survey studies recommended to remove these gaps.

Cost: $200,000
Duration: 12 months

Title: Technology for Aircraft Noise Control

Problem Statement: The state of the art in noise control technology for aircraft is not sufficient to eliminate adverse environmental impacts from airport and aircraft operations. Continued research and development of advanced technology to reduce noise exposure below the current FAR 36 Stage 3 levels is required. Future growth of air transport will be restricted if advanced technology for noise control is not developed. This problem is further compounded by the fact that, while there is a successful but modest technology-specific research program being jointly carried out by NASA and FAA, there is no basic aircraft noise research program at NASA or in any other federal agency.

Research Objective: The 1991 Research Needs Statement identified the development of a comprehensive, coherent, multiyear cooperative aircraft noise research effort between NASA, FAA and elements of the aerospace industry as a critical requirement. Such a program has been developed and is being carried out through the Noise Reduction Element of the NASA/FAA Advanced Subsonic Transport Program. The program is now at midpoint. The program is on track to achieve interim goals for a 3 dB reduction in jet engine noise and a 25% reduction in nacelle treatment effectiveness. Scale model demonstrations of several aspects have been undertaken or will soon be done. However, achievement of the ultimate goal of a 10dB reduction in community noise has been threatened by changes in budget uncertainties and funding reductions. The Steering Committee of the Noise Reduction Element has also identified additional research needs, including landing gear noise, a review of airframe noise sources and levels with respect to overall community noise levels, and active noise control technology. The Steering Committee is also in process of identifying additional goals beyond the year 2000 when the program is currently slated to end. A successful aircraft noise control technology research and development program requires a sustained commitment over a long time period from both federal agencies and industry. The Workshop reaffirms its identification of basic and applied research in aircraft noise control technology as a critical area of need.

Cost: $194 million through year 2000.
Duration: 10 years

Title: Effect of Sudden Changes in Noise from Aircraft Operations on Sleep Disturbance and Annoyance

Problem Statement: Recent field studies of sleep disturbance from aircraft noise in Great Britain and in the United States have generated considerable controversy in those two countries since they determined that sleep disturbance by aircraft noise appears to be far less common than had been previously thought. A possible explanation for the results of these studies is that one eventually habituates to the noise environment and numerous awakenings do not then occur. There has been little work done to study this habituation since sudden discrete changes in

(continued on page 12)

(**Research Needs**, *from page 11*

aircraft noise exposure do not normally occur. Such studies are necessary, however, if the public is to be convinced of the validity of the recent work.

Additionally, the introduction of aircraft overflights into a community that has previously experienced few such noise events generally causes considerable human annoyance. For example, the introduction by the FAA in 1987 of the Expanded East Coast Plan, which modified the routing of commercial aircraft into the three metropolitan New York airports, caused considerable adverse community response and litigation, even in areas where the aircraft are at cruise altitudes.

Research Objective: The objective of this research is to study the accommodation of humans to sudden, discrete changes in the noise exposure from aircraft overflights by artificially introducing such an acoustic environment into a selected population of homes and measuring the sleep disturbance and annoyance responses of the residents as a function of time after the introduction of the discrete change.

Cost: $500,000
Duration: 24 months

Title: Assessment of Sound Insulation Modification Procedures

Problem Statement: Currently a large number of airports in the country are either planning to begin sound insulation programs, engaged in conducting pilot sound insulation programs, or actively undertaking large-scale, continuing sound insulation programs. Although there is informal communication between airport officials charged with implementing such programs, there is no formal guidance from those airports further along in their sound insulation programs to assist those airports just starting such programs. In addition, most airports manage these programs in very different ways. There has been no assessment of what management techniques work best in various situations.

Proposed Research: Identify, categorize, and assess active sound insulation programs in the United States and other countries. Identify those elements of such programs which are most successful and those elements that are least successful. Develop a guidance document to assist airports in setting up and successfully managing sound insulation programs.

Cost: $150,00
Duration: 9 months

Title: Standardized Testing Methods for Exterior to Interior Noise Reduction

Problem Statement: Currently accepted FAA methods for testing exterior to interior noise reduction on structures vary from region to region and conflict with accepted practice established by the American Society of Testing and Materials and the International Standards Organization. Results from the different test methods vary widely.

Proposed Research: Conduct a study of the various test methods over a range of structures before and after noise insulation. Evaluate the results based on their correlation to perceived improvement as well as repeatability and consistency. Develop a recommended standard test procedure.

Cost: $150,000
Duration: 9 months

Title: Model Building Code Development

Problem Statement: An increasing number of local governmental authorities are

implementing building code sections which regulate the sound insulation of buildings around airports. Without the benefit of a model building code to follow, many of the published codes are technically inaccurate and virtually unenforceable. In addition, many states and communities cannot adopt any code which has not already been adopted by one of the three major code agencies.

Proposed Research: Review existing building codes to determine their applicability to sound insulation modifications. Identify those portions of existing codes which are most pertinent. Assess the requirements and capabilities of the various local building code governing bodies. Review the impact of liability issues. Develop a Model Building Code which allows for the setting and evaluation of standards for exterior to interior sound insulation for use by local authorities when addressing planning and mitigation of aircraft noise. Present the proposed model building code to the three major code authorities for consideration.

Cost: $200,000
Duration: 12 months

Title: Computer Model for the Prediction of Noise from Transportation Systems

Problem Statement: There is currently pressure from government officials and the public to extend the analysis of aircraft noise in Part 150 studies and other environmental studies from the 65 dB Ldn contour to the 60 dB and 55 dB Ldn contour. Current aircraft noise models, such as the Federal Aviation Administration's Integrated Noise Model (INM) and the U.S. Air Force's NOISEMAP program, calculate only the noise in a community due to aircraft, ignoring any contribution from other transportation noise sources, such as highway or rail traffic. Similarly, the Traffic Noise Model (TNM) being developed by the Federal Highway Administration ignores noise contributions from aircraft and rail traffic. Fortunately, each of these models uses the U. S. Air Force's NMPLOT program for producing the final noise contours, which are the primary output of the models. NMPLOT has the capability of combining several noise contours into a single contour representing the sum of the individual contours. Thus, the potential exists for combining these two models (and rail and ship noise models, if such models are ever developed) into a single transportation noise model.

Proposed Research: The objective of this research is to produce guidelines and specifications that could be used by the developers of noise models for individual transportation modes to insure that their model could be combined, at some point in the future, into a single transportation noise model .

PROBLEM AREA:
TRANSIT NOISE AND VIBRATION

Title: Transit Vibration Criteria Study

Problem Statement: There is significant proliferation of light and heavy rail transit systems within heavily populated areas. Introduction of new systems often involves aligning track near residential and commercial structures, often requiring costly mitigation to avoid adverse vibration impact. Criteria for human exposure to rail transit ground vibration are available in ISO and ANSI standards and are presented in the FTA Guidance Manual. Assessment involves measurement of vibration levels in third-octave bands generally from 1-80 Hz. The measured vibration levels are compared to

(continued next page)

(**Research Needs**, *from page 13)*
either frequency-dependent band limits or summed over a frequency bandwidth. However, the Guidance Manual recognizes that movement still exists in the use of vibration descriptors. Measurement practices are not as standardized as they are for airborne noise evaluations, e.g., measurement averaging (exponential vs. linear) and averaging time are unspecified, band level limits and overall limits both are considered, and frequency bandwidths other than 1-80 Hz are often used. There is a need to further standardize measurement practices to quantify vibration exposures with metrics which reasonably predict human response (preferably in terms of a single-number vibration descriptor to simplify the evaluation and reporting of exposures). Finally, the criteria for mitigation need to be reviewed.

Proposed Research: A comprehensive attitudinal survey should be conducted parallel with measurements of 1/3 octave band vibration levels and overall A-weighted sound levels. The tests should include exposures from light- and heavy-rail transit, railroad, and highway truck and bus passbys of various frequencies. Measurement locations should include outdoors and indoors in structures of various types. The results of the survey and measurements should be compared applicable criteria. A technical report should describe the results of the attitudinal survey, vibration and noise measurements, event frequency and duration, and should compare results with existing criteria.

Cost: $300,000
Duration: 2 years

Urgency and Payoff Potential: The avoidance of vibration mitigation using floating slabs, ballast mats, or other measures, would be a substantial payoff. However, the greater return on this research effort would be the ability to align rail systems closer sensitive receptors confidence that vibration problems would not result.

Title: Wheel Squeal Abatement

Problem Statement: Wheel squeal is generated when a rail car rounds a curve of tight radius. Modern heavy rail systems are usually designed such that revenue track is of sufficient radii that squeal is unlikely to occur. However, light-rail systems must often follow existing urban streets and tight radii cannot be avoided. System-wide control of wheel squeal may be needed for these systems. Heavy rail systems may experience wheel squeal in maintenance yards where selection of curve radii to prevent squeal is impractical. For these systems location-specific squeal controls are desirable. System-wide squeal control may be obtained by wheel damping devices of varying effectiveness and cost. Lubricants delivered by vehicle-mounted and wayside applicators of various design have been proposed.. While grease lubrication has been used successfully by some properties, concerns exist regarding impacts on vehicle traction and safety which have prevented implementation by some transit agencies. Compilation of grease lubricant experience is needed to assess the legitimacy of these concerns. The effectiveness of these lubricants in controlling squeal, and the operational circumstances in which a particular design would be appropriate, should be investigated. In addition to a rigorous evaluation of the performance of these products, an examination of the practical impacts on operations, safety, and sec-

ondary impacts (e.g., soil contamination by the lubricant) is needed

Proposed Research: The product of this effort should be a manual covering all aspects of the generation of wheel squeal, the various products and methods available for eliminating the problem, the effectiveness of these products and methods, and other considerations (such as safety, operational issues, and costs) in the selection of a systemwide or site-specific approach to the mitigation of wheel squeal. On the question of the effectiveness of the various products, especially the newer vehicle-mounted lubricators, it is expected that actual experimentation will be needed to supplement the available data gathered from transit agencies that have experience with some of these techniques.

Cost: $150,000
Duration: 1 Year

Urgency and Payoff Potential: Planning and final design of numerous light rail systems and extensions is currently underway, including systems in Salt Lake City, Denver, San Diego, Portland, Baltimore, northern New Jersey, Sacramento, Milwaukee, Seattle, and others. Wheel squeal in the populated urban areas where these systems will be partly or entirely located is a major concern in the development and design of the system. In some cities, systems have had to be retrofitted with devices to control squeal where the original design did not anticipate the problem and the severe public reaction to the problem. A manual on all aspects of wheel squeal would provide invaluable information for rail transit agencies. The payoff would be significant and the need is immediate.

Title: Warning Signal Assessment and Control

Problem Statement: New rail transit systems across the U.S. are creating increasing numbers of at-grade rail-and-roadway intersections. Transit vehicle-mounted warning horns and fixed wayside crossing signals are necessary for safety but can be a source of annoyance to surrounding residents. Compilation of data regarding warning signal safety requirements, noise emission levels, and reduced-impact alternatives is needed to assist transit system designers and operators. New technologies for effective warnings at reduced community noise impact need to be identified for development. Currently, warning signal exposures are evaluated with respect to the same impact criteria as used for line operations-noise sources of considerably different character. Review of the suitability of these criteria is desired to assure that warning systems are appropriately designed.

Proposed Research: Perform literature review which examines warning signal usage requirements/regulations, documented noise impacts, and mitigation strategies attempted and their results. Perform an attitudinal survey of community response to warning signal exposures along with sound level measurements quantifying the corresponding noise exposure. Define possible mitigation measures deserving further development. Prepare report of findings and recommendations.

Cost: $100,000
Duration: 12 Months

Urgency and Payoff Potential: The tradeoff at issue here is between the safety of at-grade roadway crossings of transit rail lines and the severe noise impact of a warning device on the sur-

(continued next page)

(**Research Needs**, *from page 15)*
rounding community. Transit planners and designers need as much information as possible to make recommendations that ensure proper balance between two very important but conflicting objectives.

Title: Transit Vehicle In-service Noise Emission Levels

Problem Statement: Rail vehicle noise emissions are known to depend strongly upon wheel and rail conditions. Vehicle sound levels may increase 10 dB or more with the presence of wheel flats or rail corrugations. Most data available for transit system design are for vehicles with new wheels and trackwork with new rails; thus, noise mitigation features—such as noise barriers—which are designed based upon these data may be inadequate after a period of revenue service operations. Understanding of typical in-service vehicle noise emission growth is needed to guide the design of noise abatement treatments with a margin of safety to assure that noise receptors are adequately protected throughout the life of the transit facility.

Proposed Research: Review the literature to categorize rail car types and configurations, and track conditions with respect to noise emissions. Define significant maintenance parameters (e.g., age and time since last wheel truing/rail grinding). Design vehicle noise emission test sample based upon railcar categories and maintenance parameters. Conduct railcar noise emission testing.

Cost: $150,000
Duration: 1 year

Urgency and Payoff Potential: The rail transit vehicles being manufactured for the newer rail systems being built in the U.S. are designed with fairly tight noise specifications. These specifications and new vehicle testing have been used in developing the FTA's guidance manua, "Transit Noise and Vibration Impact Assessment." As the newer systems and vehicles age, it is not known how much deterioration will occur in their noise profiles. Older rail transit technologies have significantly different noise characteristics and cannot be used to estimate the effect of age on the newer systems. A limited study indicates that the FTA manual may result in estimates that are 1 dBA or more too low. The result may be inadequate protection of noise-impacted communities after several years of operation of the new rail systems.

Title: Computer Module and Database for Calculating Fixed Guideway Transit Noise

Problem Statement: FTA has published a manual on transit noise impact assessment which is useful in environmental impact assessment and preliminary design of rail transit systems. However, there is no standard noise model for use in the detailed final design of mitigation elements such as noise walls. With the advent of the Federal Highway Administration's Traffic Noise Model (TNM), the foundation for an accurate overground prediction model has been developed. Relatively minor changes to the algorithm of TNM would be required to allow its use in transit system design while ensuring consistency with the FTA guidance.

Proposed Research: The objective of this research would be to: (1) design and develop a computer module for computing noise due to guided transit vehicles; and (2) develop a reference noise database which, coupled with the computer module, can be incorporated into the FHWA TNM.

Cost: $300,000
Duration: 24 Months ■

(Ed. Note: This publication is now available from the Transportation Research Board, designated as TRB Circular 469, titled Environmental Research Needs in Transportation. This Circular also includes the research statements for 12 other transportation environmental topic areas. The publication may be ordered by telephone at 202 334-3214.

Other questions may be addressed to:
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U.S. Department of Transportation

Research and Special Programs Administration

Volpe National Transportation Systems Center

TRANSPORTATION -RELATED ACOUSTICS ENGINEER OR PHYSICIST

The Acoustics Facility of the Volpe National Transportation Systems Center is seeking a senior-level professional to perform acoustic/noise studies related to transportation. These studies involve the modeling and measurement of noise emanating from aircraft and ground vehicles. Familiarity with noise models such as the Federal Highway Administration's STAMINA model and the Federal Aviation Administration's INM model are useful. Applicant should be cognizant of modern noise measurement and analysis instrumentation and methods. A degree, preferably in engineering or physics, from an accredited college or university is required. Salary ranges from $55,068 to $71, 587. Send resumes to: Alfrida Coombs, DTS-841, Volpe Center, 55 Broadway, Cambridge, MA 02142. http//www.volpe.dot.gov. The U.S. Government is an Equal Opportunity Employer.

Gregg G. Fleming
Chairman

Don't miss the A1F04 Summer Meeting in Toronto July 20-23,1997!!! Soren Pedersen has put a lot of work into what is shaping up to be a very fine summer meeting. In addition to three days of presentations, he has arranged for tours of the Toronto area noise barriers on Monday, the Bombardier Regional Aircraft Company on Tuesday and the Toronto Transit system on Wednesday. He has put together a fun-filled evening program, as well as a full spouses program.

Speaking of the A1F04 Summer Meeting, I'm pleased to announce the winners of the Committee's First Annual scholarship Program: Mr. Rudy Hendriks of California Department of Transportation and Mr. Jay Waldschmidt of Wisconsin Department of Transportation. Rudy has been involved with Committee activity since the early 1980s and has served as a full member since 1991. He has also won the Committee's Annual Best Paper Award twice. Jay has been actively involved with Committee activity for several years and was recently appointed a full member.

Due to escalating costs associated with paper publication in their annual Record, TRB has been maintaining a policy of only publishing 50 percent of the papers recommended by each committee. The good news is that TRB, based on recommendations from Mr. Jon Williams, will publish a summary document containing copies of all the A1F04 recommended papers. The advantage here is that members of our Committee will have referencable copies of all recommended papers in a single cohesive document. The expectation is that this document will be available for distribution at the Summer Meeting. In addition, in previous articles I have made reference to a TRB-hosted/FAA-funded aircraft noise modeling workshop which took place at TRB's Woods Hole, MA facility in May 1996. A document summarizing the proceedings of that workshop are also expected to be made available at the Summer Meeting.

TRB is again holding firm on an August 1, 1997 deadline for candidate papers to be submitted for the 1998 Annual Meeting. I will have submission forms available for distribution at the Summer Meeting. Prospective Authors may also obtain these forms from the TRB web site at: http://www.nas.edu/trb/meeting/index.html.

Last but certainly not least, I would like to provide a brief update on the FHWA TNM. The latest version is currently undergoing rigorous testing by Foliage Software systems, Harris Miller Miller and Hanson and the Volpe Center. Following this round of testing, the program will be distributed to the TNM Technical Review Panel for further exhaustive testing (expected to begin the first week in June). Members of the Review Panel are expected to meet at the Summer Meeting in Toronto to discuss their findings. Currently, it is expected that the final version of the TNM will he delivered in the late summer time frame, and public distribution will occur later this year or early next year. ■

April 28, 1997

The Wall Journal
205 Danby Road
Lehigh Acres, Florida 33936

Subject: FHWA Environmental Excellence Awards

Attn: The Editor

Dear El:

I would be remiss for not writing to mention several organizations and their people who worked diligently toward the successful completion of the S.R.581 Connector. The award nomination could only be two pages long, and I didn't think that the Judges would appreciate it if I used 6 point type for the submittal, so some key facts were omitted for brevity.

Jay Josselyn of JTE Constructors, Inc. of Lorton, Virginia was the key man who managed the wall construction. Building the undulating foundation for the Fanwall noise barrier was tricky at best. Jay is a one of a kind project manager with his people-oriented approach to problem solving. He worked his way through the challenging shop drawing approval process and got the job done. He also worked with a local community to construct the wall along side of a ball field (Wall Journal Issue No 21) under the direction of JTE President Jack "Tommy" Elmore.

Tim Williams and Charlie Chappel of Williams Precast in Cumberland, Maryland cast the Fanwall panels. They deserve the credit for making a very tough job an award winner. They are the best people one could ever hope to work with. And Slaw Precast who cast the bridge mounted panels. The precast to which the sound absorptive panels was attached was extremely accurate, allowing the installation of cladding panels to go very smoothly.

I'm sure there are others who are proud of the project and who, (like me) claim that they built this award winning job. Ira Price who provided the Fanwall shop drawings, and the general contractor, Trumbull, and the engineers at PennDOT, for example, come to mind. Well, the guys in the trenches never get enough credit. Here's to all of you.

Sincerely,

Gary S. Figallo
Industrial Acoustics Company
1160 Commerce Ave.
Bronx, NY 10462
Tel. 718 430-4515 Fax 718 863-1138

Letters to the Editor

State of New York
Department of Transportation
Albany, New York

Dear El:

I am not sure that I formally "registered" for the Journal. Perhaps that is the reason for the missing issues. So here it gives. Please begin a subscription for me to the Journal and mail it to this address: William McColl, NYSDOT, State Campus 5-303, Albany, NY 12232.

Now that we have that done, I have one small suggestion. When providing "summaries" of conference papers, rather than using what appear to be the paper's abstract, why not use the conclusion instead. The abstract is frequently done months in advance of the paper, while the conclusion is often a "summary" in and of itself and has more actual information.

Once again, thanks for your efforts on all our behalf; we greatly appreciate it.

Sincerely,
Bill McColl

University of Alberta
Canada

17-05-97

El, two things...
1. I saw the announcement about Environmental Research Needs in Transportation. I would like to find out more about this program. I am interested to apply for one or more of their defined research directions.
2. I am interested to publish a short article in The Wall Journal dealing with atmospheric effects on the acoustic performance of road noise barriers. I do my word processing on a PC; what format would be most effective for you for the text and graphics?

Ken Fyfe, Assoc. Prof. Mech. Engrg.
Phone 403-492-7031, fax 403-492-2200
e-mail ken.fyfe@ualberta.ca

(Ed. Note: Since Ken's fax came in on a Saturday morning, I felt that he deserved a speedy answer and faxed him right back. For you, the reader, the answer to (1) is to be found at the end of the article on page 16 and the answer to (2) is on page 22 of this issue).

Virginia Tech
Virginia Polytechnic Institute
and State University

To The Wall Journal

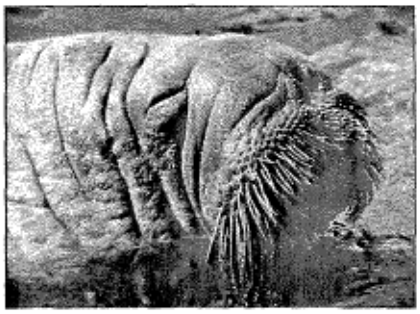
I would like to request a free subscription to The Wall Journal. We have been conducting extensive research on the use of wood in the U. S. infrastructure and believe your journal would be of great benefit to our work. Thank you.

Sincerely,

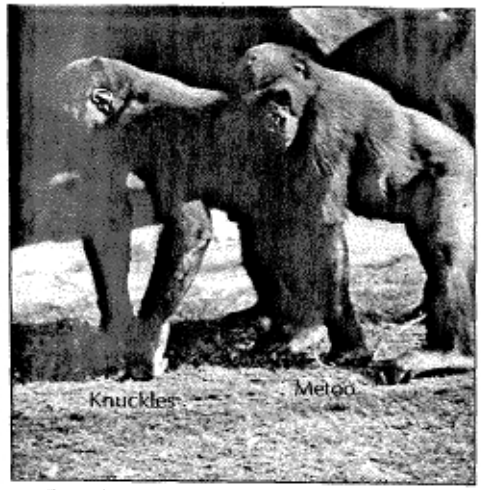
Dr. Robert Smith
Assistant Professor/Extension Specialist
Forest Products Marketing

(Done. And thank you — Ed.).

In the Back Issue Room with The Walrus and Gus the Gorilla



Listen, boys — I don't care if Gus is your uncle, you've got to stop hanging around here. You're giving the place a bad name, what with all the grunting and screeching and gorilla doo on the lawn. Gus has gone into town, but I can tell you right now that he's certainly not going to give you boys a job here. You're too stupid. Now, beat it, Knuckles! Go climb a tree. You too, Metoo!



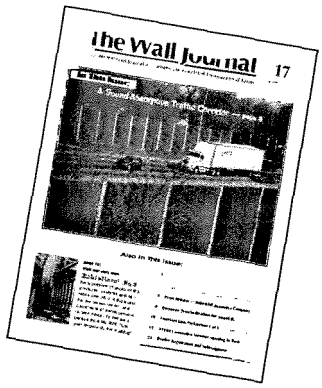
What do you think, Metoo? We could take that tub of lard and start a candle factory. We're gorillas. He can't talk to us that way. Let's jump him.

I don't know, Knuckles. Maybe he said we were stooped, which we kinda are. Maybe Gus would be mad at us. We'd better wait.

I can't stand it, Metoo. I'm gonna go over there and do a knuckle job on that mush-faced barge. See you.

In the Back Issues:

- Noise Barrier Construction Forecast
- Summaries of Professional Papers
- Noise Barrier Project Reports
- Fundamentals of Sound
- New Product Press Releases
- TRB A1F04 Committee Meetings
- State DOT Noise Barrier Programs
- FHWA Noise Model Updates
- Noise Abatement in Other Countries
- Airport Noise Control
- Construction Trends in Noise Barriers
- Product Approval Process
- FHWA History of Barrier Construction
- Materials Test Standards
- Rail Transit Noise Control
- And a Bunch More



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Authors! Would you like to see your immortal words in print? We need those words to fill the pages of The Wall Journal. We can't put out a single issue without your help. Perhaps you are uneasy about submitting material for publication. Maybe we can help you with some of our requirements:

1. Articles should usually not exceed 3,000 words of text. Long articles will probably be set in 9-point fonts, approximately 1,000 words per page. Shorter articles may be set in 10-point font, approximately 800 words per page. This does not include photos, graphs or tables.
2. Text is preferred laser-printed on laser print paper. Format is not important; we shall scan the paper directly into the computer, which is pre-programmed for font, font size and columnar layout. You may furnish an IBM-compatible disk in Word Perfect if you wish, but we prefer the paper copy.
3. Color photographs and slides are also scanned into the computer, and will be returned to you after the issue has been printed, if you request. The photos are fine in the 4 x 6 or 3 1/2 x 5 print sizes. Good exposure would be appreciated — and try to get the sunlight on a long wall shot, if possible.
4. Graphics such as charts, graphs, maps and other line art are preferred to be furnished as laser prints for scanning. We may not have the graphics program which produced the art work, and could therefore not support it in our computer.
5. Please furnish captions for all photos and line art, describing what is being shown. The caption should tie the art or photo to the text stream, and can even be copied from the body text.
6. Be sure to include a photo of yourself — join the family!

286 words - 10 point

INDEX OF ADVERTISERS

The Off Ramp

I have taken the risk of reprinting an article by Betty Coppola in **Senior Magazine**, published in Sacramento, California, without her permission. I hope she doesn't mind.

Betty turned the "Senior Spotlight" on Mas Hatano, who is a good friend of mine and is Chairman Emeritus of the TRB A1F04 Committee on Transportation Related Noise and Vibration. Mas chaired the committee for most of the 80s, as I remember.

He has many friends in the transportation departments, many of whom are readers of The Journal. I hope you enjoy reading what Mas is doing in his retirement.

Keeping Up With Mas Hatano — by Betty Coppola

Mas Hatano may know there is a television set in his house but he doesn't spend much of his time watching it. If anything, he's busier now than before he retired from his civil engineering career in 1991. Wasting no time changing gears, Hatano immediately volunteered time to the various historic venues in Old Sacramento and has now been a docent at the Railroad Museum for the past five years. He conducts tours there and serves as a 'trainmaster,' which means scheduling the shifts of the other volunteers.

Hatano says museum volunteers are very well trained and are supplied with a wealth of material. "On tour we actually use only about 5% of what we've been given because there are always time constraints and I like to focus on some specifics and some human interest stories." In general, he recommends that visitors allow at least an hour for a conducted tour. "We also have one of the foremost train libraries in the United States for real train buffs to study," he says. The library is located on the second floor of the building adjacent to the museum.

The time commitment for a docent is 7 hours per month and docents enjoy social events such as dinners in the museum and selected field trips. Hatano also gives tours of the State Capitol once a week.

Asking about his other interests is a loaded question. "I teach the '55 Alive' driving for seniors 55 or older, and seniors taking the class qualify for a discount on their automobile insurance." Classes are held at the YMCA about 3 times per year and cost $8.00. For specific information about classes call 737-3181, extension 102. His other teaching activities include an Elderhostel class in local history focusing on Sutter's Fort, gold rush, and California's statehood. He is also involved in the Japanese-American oral history project with CSUS, of which 70 interviews have been completed, and has been asked to create a course on the story of Japanese-Americans for the University of the Pacific.

Is there time for anything else? "One of my higher priority items is bicycling, he says. "During the warm months I bicycle 6 days a week and get in about 150 miles." His trim, fit physique is testimony to the nearly 6,000 miles logged last year.

He carries an appointment book now (which he never did during his working years) to keep track of his many commitments. But, he confesses, too much activity can take a toll. "They're creating a stress on me I don't want and I want some more time to myself." So he has said no to some requests for more of his time. "But," he continues, "it gives me such satisfaction to provide a service to people and to help people, that it keeps me wanting to do everything."

Hatano was born in Sacramento and raised in Loomis. The family was interned at Tule Lake during World War II. After the war he completed his education and followed a professional career in civil engineering with the State of California Department of Transportation in their testing and research laboratory section. "It provided interesting work and allowed me to participate in national organizations. I did a lot of traveling around the United States and to Washington, D.C., presenting technical papers," Hatano recalls. He also served as chairman of a major transportation and research board committee.

Hatano and his wife have three grown sons and four grandchildren. ■

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