

- *Acoustic Shadows in Civil Wars*
- *Acoustic Invisibility Cloak*
- *Noise Cooks*

SOUND SNIPPET

Vibrating Window Negates Noise

The roar of jets. The shriek of car alarms. The din of traffic. All-intrusive noises can distract us from our work and keep us awake at night.

But help is on the way for the restless and sleepless. A noise-negating method that thwarts vibration with vibration could be available for use in apartments, hotels and offices in five years.

"A window acts like a loudspeaker and a membrane. If you control the vibration of the window, you can control transmitted noise in such a way that it is not acting like a membrane or a loudspeaker," said Thilo Bein, head of the business unit for energy, environment and health at Fraunhofer Institute for Structural Durability and System Reliability LBF in Darmstadt, Germany.

To make windows work less like loudspeakers, engineers thicken the glass to

double or even triple panes. But that can drive up the cost of construction. Ideally they would like to stop the sound waves in their tracks.

Bein and his team developed a method to do just that. They used



postage stamp-sized patches made of a ceramic called piezoelectric material, which behaves both like a sensor and vibration generator when shot with an electric charge. (The material can be made transparent and imbedded in the glass, too, although the team has not yet accomplished this step with the win-

dow.)

Wires running through the window link the stamp-sized patches to a computer controller and an amplifier. When a sound-generated vibration rattles the window, the piezoelectric patch senses it.

That data goes to the controller, which in turn delivers a specific electric charge back up to the patch, causing it to vibrate at a phase that ideally cancels out the sound vibrations.

In laboratory experiments, they were able to reduce noise of 90-100 decibels (the sound of a subway or power mower) by 50 percent.

(Continue on pg.4)

Inside this issue:

Did you know that..	2
Noise Cooks	2
Technology	3
Sound Snippet	3

DID YOU KNOW THAT . . .

The high-pitched ringing, whistling, and other noise that can drive tinnitus sufferers crazy may be the product of the brain turning up the volume to cope with subtle hearing loss, according to a paper in the September 21 issue of *Journal of Neuroscience*.



Acoustic shadows, which are the result of refraction, absorption and other atmospheric phenomena, are spots where sounds are not well heard even when

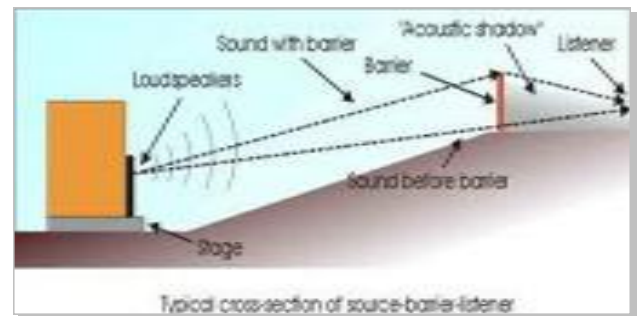
they can be heard quite clearly at a greater distance elsewhere.

They played an important role in several battles during the Civil War .

An editorial in the April 12 issue of *The New York Times* by the director of the documentary series on *The Civil War* uses the term to characterize the declining relevance of the Civil War to many Americans.

“.. Acoustic shadows .. the result of refraction, absorption..”

Tinnitus is usually, but not always, tied to some degree of measurable hearing loss. Research focused on people with tinnitus who seem to have normal hearing. Electrodes picked up a subtle abnormality in one of the nervous system's initial electrical responses to loud, rapid-fire clicks.



NOISE COOKS?

A paper in the July 1933 issue of *Journal of the American Chemical Society* reporting that intense sound could coagulate egg albumen apparently has been quoted as the scientific basis of bloggers claims that eggs could be cooked with



intense musical sound.

One blogger remembers that in the 70s teens would bring raw eggs to a rock concert and put them on the front of the stage. The eggs would be hard boiled by the music before the end of the concert and could be eaten.

TECHNOLOGY Acoustic Invisibility Cloak

A new acoustic invisibility cloak made of a plastic metamaterial makes objects invisible to sound waves, researchers say. It could be used to shield ships from sonar, or build better soundproof walls for concert halls and other spaces. We've seen this idea before, but now Duke University researchers have actually built it.

Invisibility cloaks work by bending light waves in ways that would not normally be possible, through the use of man-made materials called metamaterials. This cloak uses many of the same principles

to bend sound waves, so a ship made of this material would render sonar useless, because the sound waves would not bounce back.



This device consists of stacked sheets of plastic peppered with holes, whose arrangement and size redirects sound waves. The device resonates at frequencies that either absorb or reflect sound waves, so it both blocks and contains them — anything underneath the stack would not hear sound, and

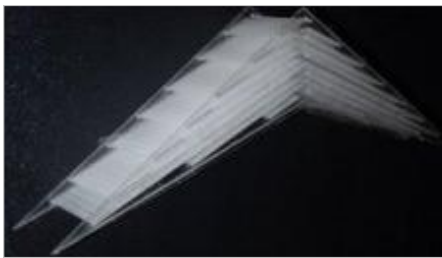
sound waves could not be used to locate something coated with the stack.

It works in air for audible frequencies between one and four kilohertz, which corresponds to two octaves on the higher half of a piano, BBC says.

Researchers led by Steven Cummer of Duke University tested the stacked sheets on a flat surface, placing a 4-inch block of wood underneath it. The block of wood could not "hear" the sound — there were no sound waves passing through — and "attempts to locate the object using sound waves would not find it,"

(Source : BBC News)

"..device consists of stacked sheets of plastic peppered with holes..."



SOUND SNIPPET

Guests at an international hotel chain may sleep more soundly after the introduction of "snore patrols" and "snore absorption rooms," according to a story in Reuter Life! (online) July 20.

Sound proofing on the walls and headboards, anti-snoring pillows and white noise machines are among the features designed to ease snoring.





Introducing AURORA Stretch Membrane

ANY shape, size, form, colour and texture.

Pertac Resources Sdn Bhd
(co. no. 477277V)

16-4, Jalan Metro Pudu 2
Fraser Business Park
Off Jalan Yew
55100 Kuala Lumpur

Phone: (603) 9222 6880
Fax: (603) 9222 3880
E-mail: info@pertac.com



Vaulted, wavy, concave, convex, velvety, mirror-like, translucent, glowing...

All but a few possible descriptions for the new look that can be achieved with this stretch membrane system

Just let your imagination run wild with this absolutely versatile stretched wall/ceiling system.



- Exhibition Stand
- Sports Complex
- Corporate Lobbies
- Meeting & Conference Rooms
- Museum & Galleries
- Bars and Restaurants
- Retail Outlets
- Shopping Malls
- Airport Terminals
- Hotels/Ballrooms

Please contact us for more information on Aurora Stretch Membrane.

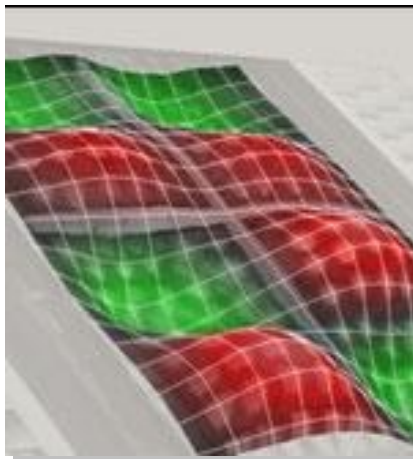
SOUND SNIPPET : Vibrating Window (Cont')

But getting the system to market may be harder than it seems, said Gary Koopmann, professor of mechanical engineering and director of the Center for Acoustics and Vibration at Pennsylvania State University in University Park.

"The main hurdle to transition it into a practical application is the cost," said Koopmann.

Every window needs to be wired and maintained, which adds to the bottom line. In addition, different kinds of

sound, particularly those that



are steady, are easier for the computer controller to re-

spond to rapidly and generate an appropriate noise-canceling vibration. Sounds that disappear or change quickly are more difficult to manage, he said.

"For airport noise, the noise is transient. To have a control system respond instantly to a transient sound coming in is nearly impossible," he said. Bein and his team will be working over the next year to make the system reliable and bring the cost down.

Source : Tracy Steadler (Discovery News)