

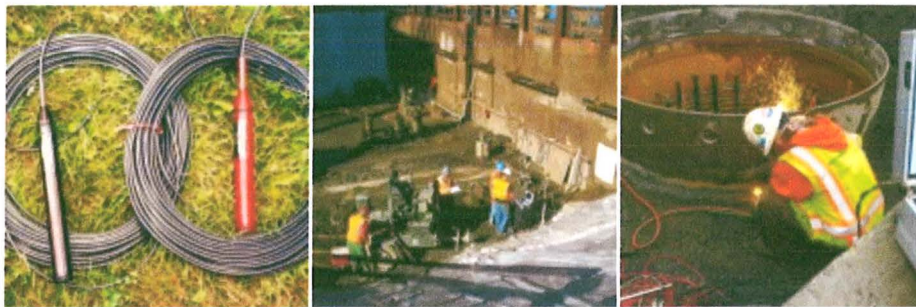
REVISE NOISE REGULATIONS - SUBSTITUTE ORDINANCE

IF YOU WISH TO SPEAK TO CITY COUNCIL, PRINT YOUR NAME, ADDRESS, AND EMAIL.

NAME (print)	ADDRESS AND ZIP CODE	Email
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Custom and Creative

We've invested heavily in specialty equipment so we can better serve you. Read on to learn more:

Crosshole Sonic Logging:

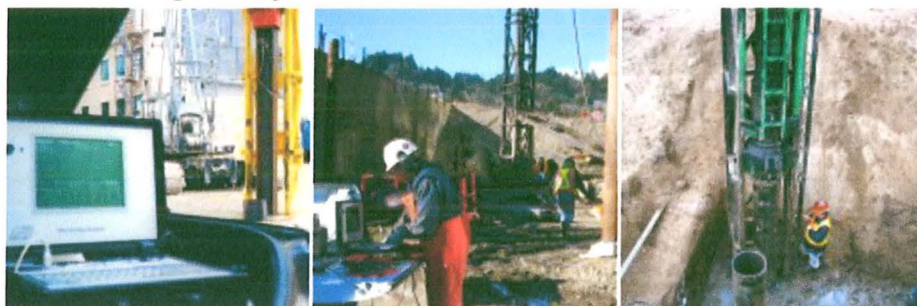
CSL is an acoustic, non-destructive method that verifies the quality of drilled shafts.

It involves lowering ultrasonic probes down access tubes in a drilled shaft. Recordings are made at depth intervals as the probes rise, and the ultrasonic pulses reveal any potential defects in the concrete.

Projects where we've used CSL testing include:

- I-5 over Coast Fork Willamette Bridge, Lane County
- Stafford and Borland Road Bridges over the Tualatin River, Clackamas
- Portland Aerial Tram
- The Casey (a 15-story condominium tower in downtown Portland)
- John Ross and 3720 (31-story condominium towers in the city's South Waterfront district)

Pile Driving Analyzer:



The PDA is a diagnostic tool for evaluating foundation pile systems and is the most widely used system for dynamic pile testing in the world.

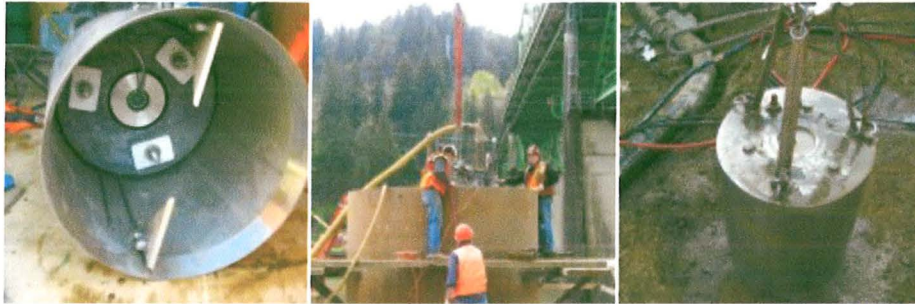
With the PDA, the capacity of several piles can be tested in one day for typically one-tenth the cost of a single conventional static test.

The PDA measures the strain and acceleration of a pile under a dynamic impact, and evaluates shaft integrity, driving stresses, and hammer energy during pile installation.

Project highlights of our PDA testing services in Oregon include:

- The Civic (16-story condominium tower), Portland
- I-5 over Latham Road, Lane County
- I-84 over Mosier Creek, Hood River County
- West Baseline Road Bridge, Hillsboro
- Rivers Edge Development in Longview, Washington

Dynamic pile testing can significantly reduce the pile lengths, saving time and money.

Drilled Shaft Inspection Camera:

GeoDesign's Drilled Shaft Inspection Camera (DSIC) can observe the condition of the bottom surface of a drilled shaft and measure the amount of any sediment.

Our evaluation of this tip-bearing surface enables us to design high-capacity drilled shafts that can save time and money during construction.

Examples of this service include:

- Sauvie Island Bridge Replacement, Portland
- EVO (27-story condominium tower), downtown Los Angeles

Mobile Geotechnical Laboratory:



We can also provide geotechnical testing of soils on-site with our mobile laboratory, which offers the following benefits:

- Reduces special transport costs and chain of custody
- Mitigates handling risks and staff exposure
- Engineering oversight of testing and handling of contaminated soil
- Manages risk associated with testing soils containing asbestos
- Contaminated soil can often be returned to site for disposal

We Are Not Alone

187272

In an email from Tiffany Sweitzer to the Kathy Couch at the Noise Control Office, Ms. Sweitzer said:

"This is crazy. I thought the last hearing that I had Doug Shapiro attend put an end to this..."

"It's too bad that a few people from one property have made such an issue out of a process that typically lasts just 30-40 days..."

Comments July 9, 2015 City Council Meeting:

Rory Martindale/DeWitt

"The point to transform Title 18 Noise Code with these recommendations based upon a singular event of pile driving at Block 17 does not seek to add merit to the code....it increases cost and timelines.."

This is not an isolated incident. Pile Driving noise is an issue all over the US.

Seattle

April 29, 2015

General construction noise is allowed in Seattle's multifamily and neighborhood commercial zones 7 a.m. to 7 p.m. weekdays, and 9 a.m. to 7 p.m. weekends and holidays.

For work involving jackhammers, vacuum-pump trucks, or **pile drivers, it's 8 a.m. to 5 p.m. weekdays and 9 a.m. to 5 p.m. weekends and holidays.**

....on Friday, Luma's team began at 6 a.m., waking me up. They started at 6 a.m., Saturday morning. I called Korsmo to complain. Korsmo explained his team was within its rights because it had a temporary noise variance (TNV).

Anyone can apply for a variance so long as they have a need to make noise for some purpose. Usually it's construction. The applicant must prove that the variance is necessary, that all reasonable measures will be taken to reduce the noise and that the noise won't "annoy a substantial number of people. But should the project still cause an annoyance, it's up to the residents to call in their complaints to the city.

after an applicant's TNV gets approved, the applicant is supposed to physically deliver hard-copy notices to all residential neighbors a minimum of 72 hours before the noise starts.

New York

Gowanus Construction Noise Rattles Neighbors

May 21, 2014

More than 250 people have signed a petition demanding that the construction work — in which long metal poles called piles are driven into the ground — be restricted from 8 a.m. to 4 p.m. on weekdays.

The work began roughly four weeks ago and typically starts at 7 a.m. with trucking and staging beginning even earlier, locals said.

Lightstone Group agreed to delay the start time for construction to 8 a.m., spokesman Ethan Geto told DNAinfo New York Tuesday evening.

Elizabeth Kenney, a textile designer and writer who works from her home near Second and Bond streets, said the noise causes her desk and furniture to rattle.

"It's a quality-of-life issue," said Kenney, 47. "It's really maddening."

New Jersey

Constant pounding of pile driver next to Jersey City school is halted

A construction crew driving beams into the ground for two six-story apartment buildings next to a Jersey City school agreed to halt work when school officials complained that the constant pounding was disrupting the school day.

A construction code official visited the site, and with the aid of police was able to negotiate a compromise with the property owner in which the remainder of the pile driving would be conducted between the hours of 3 and 7 p.m. and on Saturday

St. Petersburg, Florida

St. Petersburg Is Pursuing an End to Noisy Pile Driving

The patience of downtown residents irked by pile drivers hammering away at a downtown construction site won't be further stretched by more metallic pounding when the nearby Tropicana Block is developed.

Nor will nearby residents scramble for noise-canceling earphones when Bliss, an upscale condo, rises near Beach Drive early next year.

Those developers say they'll employ quieter methods of building a sturdy foundation, instead drilling holes deep into the soil and filling them with concrete, rather than pounding in prefabricated pilings with a noisy motorized hammer.

"When you're close to neighbors — with all the noise and vibration — it may be a little more expensive, but it's the most sensitive way to go," Bliss developer Brian Taub said.

St. Petersburg, like Tampa, restricts the hours for pile driving, but is considering stronger measures to discourage noisy construction.

Almost all Florida cities — like their counterparts around the United States — allow pile driving, which is cheaper than drilled shafts or similar processes.

Pile driving also is the only option, advocates say, when the soil is unstable or contains hidden gaps or pockets that require builders to lengthen or shorten pilings.

"Pile driving was deemed the safest and most effective way of supporting the structure," DPR regional manager Page McKee said.

But St. Petersburg developer Joel Cantor said the main reason developers choose pile drivers is to save money.

Michael Cheezem, another St. Petersburg developer who has built numerous high-profile projects around Tampa Bay, said he hasn't used pile drivers in decades because of concerns for neighboring residents and businesses.

"Most companies I know want to save money. But pile driving just to save money? I don't know if I've ever seen that," said Van Hogan, director of development for the Pile Driving Contractors Association in Orange Park.

St Petersburg

Noise complaints may bring changes to construction techniques

March 23, 2015

After nine months of incessant clanging caused by the construction of a new 19-story apartment complex near Third Street and Fourth Avenue South, the biggest culprit, a massive pile driver, came to a halt in January.

The disturbances that downtown occupants have endured led fed-up members of the community to make numerous complaints with the city, which caught the attention of City Councilman Karl Nurse.

"The good news is we're building like crazy," said Nurse. "And the bad news is, we're building like crazy."

Nurse has proposed a task force comprising geologists, residents, engineers and developers to help find alternatives to pile driving, and other methods of mitigating construction noise for future projects.

For those who work from home, or who work second or third shifts, the situation was dire. "It would start between 7 and 7:30 every morning, and end around 6 every evening. Sometimes they stopped for a lunch break or (during) thunderstorms," said Dismukes. "That was almost worse, because we would be so relieved that it stopped, then it would start again ... I found myself praying for stormy weather."

For those who are worried about the construction of The Salvador, a 13-story condominium complex that will be built directly across the street from student housing, there is good news. City officials indicated last year that pile drivers will not be used in that project. According to St. Petersburg building official Rick Dunn, the project will use drilled shafts — a much quieter experience for neighbors of the planned construction site — rather than high-pressure hammers.

South Brooklyn

Pile Driving in Red Hook – an increasing concern, by George Fiala

March 10, 2015

A topic that the short-lived Red Hook Coalition attempted to tackle a few years ago was the many vacant lots that dot Red Hook. As the real estate market has begun to take care of that problem itself, a new problem has taken its place – pile driving. He went on to describe two types of pile driving – pounding and auguring. **Pounding causes more vibrations but is cheaper than auguring.**

A contractor planning to drive piles must notify neighbors ten days in advance, and must work only from 8 am – 6 pm. Driving can be noisy, and a noise mitigation plan is supposed to be filed with DOB.
Stop work orders can be issued when vibrations exceed a certain threshold.

**Charleston
July 9, 2015**

Farmers Market vendors told to wear earplugs as pile driving begins at hotel site

Vendors at the Charleston Farmers Market in Marion Square say they've been advised by a city official to wear earplugs and communicate with customers using dry-erase boards as construction crews begin the noisy process of driving pilings at a nearby hotel construction site this Saturday.

Pile driving is one of the loudest forms of construction noise, sometimes measured at decibel levels higher than that of a Boeing passenger jet taking off. Watson says sound level readings from the perimeter of the hotel site have been measured at 90 decibels during weekday pile driving — that is, slightly louder than a freight train at a distance of 15 meters.

Vendors were previously told that pile driving would not happen on weekends

**New York
State Halts Pile Driving For New Tappan Zee Bridge Due To Noise Complaints
August 1, 2014 8:05 PM**

It's quiet on the Hudson River once more after complaints from officials and residents in South Nyack brought an end to the pile driving going on at the new Tappan Zee Bridge. The state ordered the contractor to halt the pile driving after weeks of complaints from local officials

Gov. Andrew Cuomo's point man on the bridge said pile driving will resume but only after the contractor figures out a way to do it more quietly, Jones reported.

**Tampa Bay, Florida
43 times a minute, 'sound of progress' just makes people furious
September 21, 2014**

It started on a Tuesday, April 29, 7:01 a.m., while kids were eating Cheerios and professors were starting to shower and retirees were trying to sleep in.

A steady hammering, metal on concrete, booming through downtown. Bang. Bang. Bang. Bang. Forty-three beats per minute. So loud it rattled windows, throbbed through floors, woke people three blocks away.

Every weekday, plus some Saturdays, from sunup until 5 p.m., for five months now, the crushing cadence has continued. If you do the math, allowing time out for lunch and rain delays, that hammer has fallen more than 2 million times.

"They told us it would only last a couple of weeks.

...pile driver became pile drivers. Two machines, running side by side.

"And it's not just the sound. It's the pressure, the pounding," said Mark Bauer, 52, a professor at Stetson law school whose townhouse is across the street from the pile driver. "I've had pictures fly off the walls, glass shatter. There's a difference between unpleasant noise and life-changing disruptions. I can't read or write at home anymore."

Chronic noise can cause sleep disruption, noise-induced hearing loss, increased heart rate, even cardiovascular disease, according to a study published in the February issue of Environmental Health Perspectives.

The builder should never have been granted a permit for such a big building in the first place. If the land won't support it, put up something shorter.

TAMPA

Construction too noisy for residents near Busch Gardens

July 26, 2013

Residents living near Busch Gardens have lodged complaints to the City of Tampa about construction noise.

Because of safety concerns for workers and park guests, Busch Gardens officials say some construction is taking place while the park is closed, late at night and in the early morning hours.

Larry Ruch lives near Busch Gardens and recorded the sound of a pile driver at 3 a.m.

"Have some consideration and respect for our sleep," Valdes said, "not just for their construction deadlines."

if noise tests reveal an ordinance violation, mitigating factors would be required.

"That could be anything from operating the pile driving operation at differing times when they have allowance for a greater decibel level, or perhaps some sort of sound buffering or other kinds of engineering solutions," Snelling said.

Stories of the Effects of Pile Driving

Since the construction began I've been mildly irritated..... I try to be zen and I've been making the most of a poor situation by going to bed earlier and getting up earlier, but I have been in disbelief since the pile driving began - especially on the weekends when so many people are at home! It drives me batty and there's no escape from it. Even with my efforts to change my sleep schedule to accommodate construction last week was so busy I couldn't keep their hours and I was so sleep deprived, I came home from work Thursday at about 6, fell asleep immediately and slept straight through until they began pile driving the next morning - that was about 14 hours of sleep.

Now that I know there are other options they could be using I'm just shy of infuriated. Thinking about this construction going into the summer, and over the next few *years*, as well, being unable to open my windows. Portland is about doing better. -Lea

My apartment has been rocked and my cable service has been disrupted 3 times in two weeks.

I know this is going to continue, and even though we are so happy to see the neighborhood grow, but this way it feels worse than anything imagined.

-Charles

The construction in our neighborhood has had a huge impact on my life and well being. My apartment is MAYBE the minimum of 50' from and facing the construction. When they are driving I cannot be in my home, even with ear plugs. My apartment is jolted with such force that it rattles the glasses in the hutch.- Maura

I live in the Sitka Apartments, overlooking 11th Street, between Overton and Northrup. I am on the 2nd floor. As a freelance writer, I spend most of my days at home. Since Andersen Construction started pile driving on Block 17, this means many of my work hours are spent finding ways to drown out the noise, and many times, finding somewhere else to get my work done, when the constant pounding and shaking becomes too much. My work includes movie reviews, and watching films at home, that I can barely hear. Now that the weather is warm, I can't open my windows to get air lest the hammering fill the whole room. The construction has affected my sleep patterns, waking me up every morning in a most unpleasant manner, making it hard to transition out of sleep and into my day. Depending on where the pile driver is positioned, the sound travels up Overton to the buildings just past 10th, and then echoes back, creating a doubling effect and an inescapable cacophony. Escapes to the public park are impossible, as the noise there is unbearable. When I go on my jog, I can hear the noise

all the way up to Thurman and 17th and down to the waterfront. These people have taken over life for blocks upon blocks. There's little escape. It's hard to sleep, it's hard to think, I go between feeling trapped in their bubble and being run out of my own apartment. It's the very definition of "unsettling." - Jamie S. Rich

The pile driving is quite disruptive to my concentration. I work from home using a computer and the phone all day. And now into the night. My wife and I live in the West building. Sixth floor facing Northrup. The pounding and shaking begin around 8 am each morning and go throughout most of the day...every 20 minutes or so, a 10-15 minute pounding and shaking cycle begins as another steel pole is driven into the ground. Impressive sight to watch. But very disruptive to my work efforts. I cannot concentrate during a pile driving cycle. Work productivity slows during the day and I have to work into the night to catch up. During client calls I have been asked what the rhythmic hammering sound is. They are amazed I accomplish any of their project objectives. And my calls are done with the window tightly closed. I would like to keep the window open all day...but shut it at the beginning of each cycle. Now as the weather warms up I live with my office being hot and stuffy at times throughout the day!
-Brad Dong

The pile driving that takes place six days per week across the street from my residence is extremely disruptive to my daily life. I notice that I, and my neighbors, are more emotionally on edge and more agitated in general. Urban living can already be stressful for many community members, and the increased, un-regulated noise resulting from the pile driving exacerbates that stress.

The raising of voices regarding extreme construction noise in the Pearl District is about community values. A community is an interdependent group of people based on mutual respect. This is not an "us (residents) vs. them (developers)" situation – this is an opportunity to address how all community members (workers, children, elderly, developers, investors, pet owners, city officials, et al) may be best served.
-Mark Woodlief

I for one am suffering from headaches and spastic nerves and muscle spasms from the endless impossible pounding. I am a pretty calm person and already at 8:40 am I can feel the tension and my muscles tightening. I was at the chiropractor yesterday and twice last week, it helps for a while then I return to this. Personally as a heart patient I try so to remain calm this so doesn't help.-anonymous

My name is Isabella Giordano, I am 23 years old and currently live at the Sitka. Every morning I am rudely awakened by my apartment shaking. Once this awful sound starts I am no longer able to sleep and lie in bed listening to the repeated pounding until I have to get up for work. I think it goes without saying that my work performance is being affected because I'm so incredibly tired and aggravated. The Sitka is the perfect building for me because I can only afford low income housing and it is close to my job that I have been at for four years. If the ludicrous and absolutely unnecessary construction begins of the 28 story building in the lot across from me, and the already existing construction behind me continues I will be forced to leave. No person can live in such unbearable conditions. The noise would be abusive. I feel that it is mentally and physically affecting me, my neighbors, children, pets, and the community. Please help.

Six weeks ago I was a different person. I was calm and reasoned well, I was making future plans. Within the last six weeks that has changed on mentally and physically to where I have difficulty maintaining my patience, my sleep has radically changed from deep to a few hours at a time, my low-blood pressure is now 15-20 points higher than normal, and my hands sweat every time the pile driver booms into the ground.

My neighbor's dog whines and yaps all day to it out of frustration; my cat hates me because it can't nap during the day and my mind is foggy all the time too. There are days when I'm out somewhere and I feel oddly dizzy and fatigued and it frightens me a bit. And some days indoors when the pounding (physically visceral -- vibrating) is literally endless I feel like screaming back. We have two more weeks and I'm worried that it will have more than a side effect on my health.

The continuous vibration during the day makes it impossible to nap and that is not good.
-Jen Elliott

I join my fellow residents in the Pearl in expressing my deep concern for the absolute shattering of my quality of life in the Pearl. To the construction people, or should I say the destruction people, in your zeal to complete the buildings you are assigned to do, there has been no regard for the people who live with this on a daily basis. If you think we are going to give up on asserting our rights, you are very much mistaken.
-BTS

I have been recovering from recent spinal surgery and am still in almost constant severe pain. Because I don't sleep well, I usually need to sleep in quite late in the morning, as well as take daily naps. Both have been impossible due to the endless horrible noise and vibrations from the pile driving. Consequently, my doctor has put me on additional medication for both my nerves and exhaustion. I have also started suffering from severe migraine headaches, my first in over thirty years, and am being treated for them as well, with additional medication. The combination of chronic exhaustion and severe migraines has just about pushed me over the edge, and is dramatically slowing my

recovery. I am also receiving additional help from my physical therapist because the back muscles surrounding my incision have become so tight from the constant tension, and my hearing aids "squeal" painfully whenever I go to my car, because the noise in the garage is so over-powering.-Susie Mize

The deafening noise is just one of the many deleterious effects of pile driving. Not only has it severely impacted my quality of life but also it has infringed on my livelihood as well. As a writer, the majority of my work requires a great deal of quiet time to formulate sentences into concepts that convey the essential sentiments of my clients. The insufferable resounding of the pile driver, deprives me from my ability to concentrate for any significant length of time. The incessant reverberation affects not only my bookcases, shaking them but also my entire body is subjected to the earsplitting noise and vibration, hour, after hour, approximately 10 hours for 6 days a week. I have never been an anxious person but since this construction fiasco has commenced, hitherto, my anxiety level has risen exponentially; this effect I gravely attribute to the outdated mechanism, the city of Portland has willfully condoned to use for this construction project. Finally, I quake with panic at the thought of going forward for the duration of the remainder of the year, as there approximately will be 4-5 more construction projects slated for development in this area; these projects will all necessitate the use of this noise polluting contraption. For a city that uses and prides itself on the slogan "the city that works", I unfortunately feel this method is not working; and regrettably I feel bullied into accepting and tolerating the loss of the sanctity of my quality of life because of it.
-Grace Forrester

I am a stay-at-home Dad and my daughter has a tough time with the noise. Once we were out walking and we were on the corner of Overton and 12th when the pile driving started without a warning. It startled me and her. She would not stop crying for a while after that. I don't like the idea that it could be affecting her hearing. I avoid going outside when the pile driving is going on, but it is inevitable. - Tommy Beck

My blood pressure is normally low at 120/70 or less. With the start of pile driving, it has gone up to 135/91 which is pre-hypertensive. My doctor prescribed anti-anxiety medication. Normally I do not take any medication.- P. Hanson

7/29/15

To: Portland City Council

Subject: Proposed Pile Driver Noise Code Changes

My name is Brooks Hickerson and I live at 1255 NW 9th Ave. in a building called the Pinnacle. THE BEAT GOES ON.

In the last three years seven buildings have been constructed within three blocks of my residence. The first three of these buildings used a impact pile driver. The last four buildings used an augur to drill a foundation. I counted over 800 impacts to drive a single pile into the ground, and it can require 200 piles per building foundation. This is more that 160 thousand impacts spread over 6 or 7 weeks at a noise level of 110 decibels. The OSHA standard for maximum allowable noise level for an 8 hour shift is 90 decibels (occupational noise exposure standard 1910.95). They half the exposure time for every 5 decibel increase. The exposure time allowed at 110 decibels is 30 minutes over an 8 hour shift, because a 110 decibel noise is 10 times louder than a 90 decibel noise.

Dr. Charles Liberman from Harvard Medical School studies pathways between the ear and the brain. His article "Hidden Hearing Loss" in August, 2015, Scientific American describes how the inner ear converts sound energy to nerve impulses that are delivered to our brain. He points out that audiogram, the gold standard for hearing tests, measures inner earn hair cell damage, and it is a very poor measure of auditory nerve

damage. Audio nerve damage degrades our ability to understand speech and nerve damage is not repairable. Therefore, our current noise level standards are incomplete and inadequate to describe hearing loss due to loud noises.

Williams and Dame plans construction of a 9 story office building on Block 5 of the Station Place property at NW 9th and Overton. I asked about their foundation plans and they said they planned to use IMPACT PILE DRIVERS, just as they had on the Station Place and Marriott construction. THE BEAT GOES ON.

So what are you to do? You have to decide what hearing loss is acceptable to what portion of Portland population?

I urge you to be most conservative. I urge you to BAN IMPACT PILE DRIVERS outright. Then use the variance process when geophysical conditions require such extreme measures that endanger the health of Portland citizens.

THE BEAT GOES ON...but it does not have to.

Brooks Hickerson

July 29, 2015

M. Charles Liberman is a professor of otology and laryngology at Harvard Medical School and director of the Eaton-Peabody Laboratories at Massachusetts Eye and Ear. He specializes in studying the pathways between the inner part of the ear and the brain.



NEUROSCIENCE

HIDDEN HEARING

LOSS

Jackhammers, concerts and other common noisemakers may cause irreparable damage to our ears in unexpected ways *By M. Charles Liberman*

FOOTBALL FANS OF THE SEATTLE SEAHAWKS AND THE KANSAS CITY CHIEFS ROUTINELY compete at home games to set the Guinness World Record for the noisiest stadium. On October 1, 2014, the Chiefs hit the latest peak: 142.2 decibels (dB). That level is like the painful, blistering roar of a jet engine at 100 feet—a typical example that hearing experts give for a noise that is more than loud enough to cause hearing damage. After the game, the fans were ecstatic. They reveled in the experience, noting the ringing in their ears or the feeling that their eardrums were about to explode. What was happening inside their ears was far from wonderful, however.

A hearing test, if administered before and immediately after the game, might have shown a marked deterioration. The softest sound that a fan could have heard before kickoff—say, whispered words—might no longer be detectable by half-time. The thresholds for hearing might have risen by as much as 20 to 30 dB by the final whistle. As the ringing in fans' ears subsided over the course of a few days, the output of the hearing test, an audiogram, might well return to baseline, as

the ability to hear faint sounds returned.

Scientists long thought that once thresholds returned to normal, the ear must have done so as well. Recently my colleagues and I have shown that this presumption is not true. Exposures that lead to only a temporary rise in thresholds can, nonetheless, cause immediate and irreversible damage to fibers in the auditory nerve, which conveys sound information to the brain. Such damage may not affect the detection of tones, as shown on the

audiogram, but it can hamper the ability to process more complex signals. This newly recognized condition is called hidden hearing loss because a normal audiogram can hide the nerve damage and the hearing impairment associated with it.

As a person continues to abuse their ears, the toll on the nerve fibers can mount. In fact, such damage may contribute to the gradual deterioration in the ability of the middle-aged and elderly to discriminate the subtleties of speech. Hid-

den hearing loss, however, is by no means confined to older adults. The latest research suggests that it is occurring at ever younger ages in industrial society because of greater exposure to loud sounds, some avoidable, some not.

A SENSORY MARVEL

THE VULNERABILITY of the ear stems from its awe-inspiring sensitivity, which allows it to function across a vast range of sound levels. Our ability to just make out a quiet sound at frequencies near 1,000 oscillations per second, or 1,000 hertz (Hz)—in other words, the threshold at which we can perceive that sound—is defined as zero decibels. Using this logarithmic measure, each 20-dB increase in sound level corresponds to a 10-fold increase in the amplitude of the sound waves. At 0 dB, the bones of the middle ear, whose vibrations drive the hearing process, move less than the diameter of a hydrogen atom. At the other extreme, such as the pain-inducing levels of more than 140 dB at the record-setting Chiefs game, the ear is forced to deal with sound waves that are 10 million times greater in amplitude.

Hearing begins as the outer ear funnels sound waves through the ear canal to the eardrum, which vibrates and sets the bones of the middle ear in motion. The resulting vibrations then make their way to the inner ear's fluid-filled tube, the cochlea—the location of hair cells that occupy a spiraling strip of tissue called the organ of Corti. These cells get their name from hairlike protrusions known as stereocilia that extend in bundles from one end of the cells. Hair cells most sensitive to low frequencies lie at one end of the cochlear spiral, and those most sensitive to high frequencies lie at the other end. As sound waves bend the "hairs," these cells convert vibrations to chemical signals, emitting a neurotransmitter molecule—glutamate—at the other end, where the hair cells form synapses with the fibers of the auditory nerve.

At the synapse, the glutamate released from a hair cell crosses a narrow cleft to bind to receptors on the end, or terminal,

of an auditory nerve fiber. Each terminal is at one end of a nerve cell that extends a long fiber, an axon, to its other end in the brain stem. Glutamate bound to nerve fibers triggers an electrical signal that travels the entire length of the auditory nerve to the brain stem. From there the signals move through a series of parallel neural circuits that traverse various regions—from the brain stem to the midbrain and thalamus—and finish their journey at the auditory cortex. Together this complex circuitry analyzes and organizes our acoustic environment into a set of recognizable sounds, whether it be a familiar melody or the wail of a siren.

Hair cells come in two types, termed outer and inner. Outer hair cells amplify the sound-induced motions in the inner ear, whereas inner hair cells translate these motions into the chemical signals that excite the auditory nerve. The inner cells are most directly responsible for what we think of as "hearing" because 95 percent of auditory nerve fibers form synapses only with inner hair cells. Why so few fibers connect the outer hair cells to the brain remains a mystery, but it has been theorized that the fibers connected to outer hair cells may be responsible for the pain that we all suffer when the loudness of a sound wave approaches 140 dB.

Historically hearing loss has been assessed mainly by audiograms. Ear doctors have long known that workers pounding sheet metal into boilers often had permanent hearing loss for tones in the middle-frequency region. Audiograms record our ability to detect tones at octave-frequency intervals: for example 250, 500, 1,000, 2,000, 4,000 and 8,000 Hz. In the early stages of noise-induced hearing loss, the audiogram exhibits what is called the boilermaker's notch, an inability to detect sounds in the middle frequencies of the human hearing range.

In the 1950s and 1960s epidemiological studies of workers in noisy factories showed a clear relation between length of employment and a decline in hearing acuity. The initial deficit near 4,000 Hz

tended to spread to other frequencies over time. Many older workers lost hearing entirely above 1,000 or 2,000 Hz. Such high-tone loss causes a severe hearing impairment because much of the information in speech is in the frequency range that has become unresponsive.

Human studies such as these inspired the federal government in the 1970s to establish noise guidelines to limit workplace exposures. Today several federal agencies regulate noise levels on the job, including the National Institute for Occupational Safety and Health and the Occupational Safety and Health Administration. The different agencies suggest different standards. The lack of precise agreement reflects challenges in assessing noise damage. The problems are twofold. First, there are enormous individual differences in susceptibility: there are what might be described as "tough" ears and "tender" ears. That means regulators must choose a percentage of the population they wish to protect and what level of hearing loss is acceptable. The other problem is that the effects of noise on hearing result from a complex combination of duration, intensity and frequency of sounds to which one is exposed.

Currently OSHA mandates that noise levels not exceed 90 dB for an eight-hour day. The risk of noise damage above that is roughly proportional to the total dose that is delivered to the ear (duration multiplied by intensity). For each additional 5 dB above the eight-hour standard, OSHA guidelines recommend a halving of exposure time—in other words, a worker should not be exposed to 95 dB for more than four hours daily or to 100 dB for more than two hours a day. By these measures the 142-dB-plus exposure of football players for the Guinness noise record would exceed OSHA guidelines in around 10 seconds. Of course, OSHA does not regulate noise levels for fans at football games, even for U.S. farms, where teenagers are using tractors and combines all day long, at a serious risk of hearing loss.

For the past 60 years hearing

IN BRIEF

Conventional wisdom holds that loud noises cause muffled sound or ringing in the ears, but the ears soon recover.

Elevated noise levels can produce permanent damage to auditory nerve fibers that carry sound into the brain.

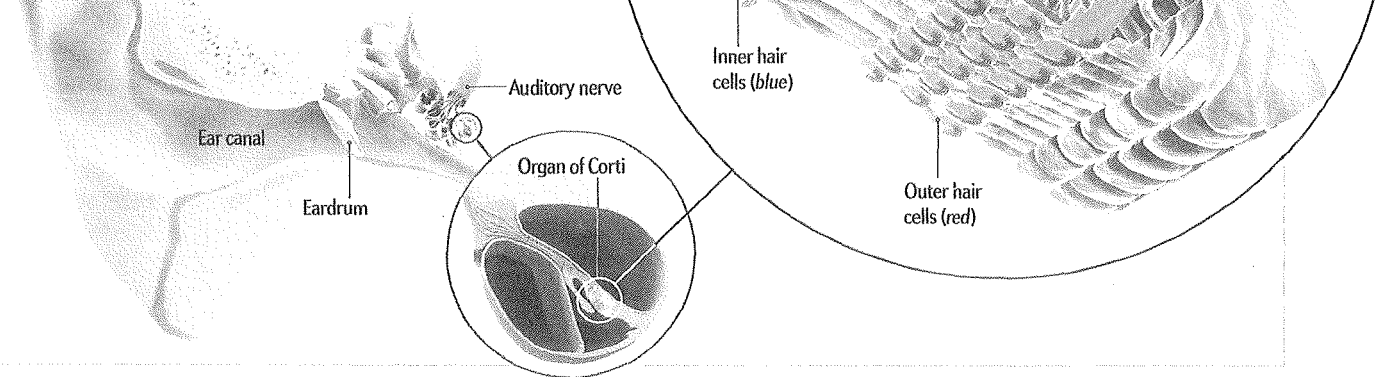
Hidden hearing loss that results may allow someone to hear sounds without making out what a speaker is saying.

A drug that lets the damaged neurons recover may be one solution to this ubiquitous problem.

HEARING TRAUMA

Big Bang Aftermath

When sound waves travel through the ear canal, past the eardrum, they reach the inner ear. There, in the organ of Corti, sound-induced vibrations stimulate the outer hair cells (*inset*). These vibrations, amplified by the outer hair cells, are then detected by inner hair cells, which translate them into chemical signals to be sent to fibers in the auditory nerve. Hair cell damage has long been known to cause hearing loss. But it turns out that the fibers, too, can be damaged by loud noise, leading to hearing loss even when hair cells remain intact.



ists have assumed that routine readings of an audiogram reveal everything we need to know about noise-induced damage to hearing. Indeed, the audiogram will show if there has been damage to the inner ear's hair cells, and investigations from the 1940s and 1950s revealed that hair cells were among the most vulnerable cells in the inner ear to acoustic overexposures.

Experiments in animals, some performed in our laboratory, have shown that outer hair cells are more vulnerable than inner ones, that hair cells in the section of the cochlea that detects high-frequency tones are more vulnerable than those in the low-frequency region, and that, once lost, hair cells never regenerate. Even before the cells degenerate, loud noise can damage the bundles of stereocilia atop the cells, and this damage is also irreversible. When damage to or death of hair cells occurs, hearing thresholds are elevated—the radio must be turned up, or a colleague across the table must raise his or her voice.

More incisive study of cochlear damage in humans has been hampered by the fact that the tiny hair cells cannot be biopsied safely or imaged in a living individual with any existing technique. Damage associated with noise-induced hearing loss

in humans has been studied only in people who have donated their ears for scientific study after death.

In part because of these limitations, the question of whether hearing loss is unavoidable in the aging process—or whether it is a consequence of repeated exposure to the clamor of modern life—continues to puzzle hearing scientists. A tantalizing hint came from a study in the 1960s, in which researchers sought out groups living in uniquely quiet environments, such as the Mabaan tribe in the Sudanese desert. Hearing testing was significantly better in Mabaan men, from 70 to 79 years old, compared with a group of American men of the same age. Of course, these studies cannot tease out other differences between an average American and the typical Mabaan, such as those related to genetic background or diet.

DEEP DAMAGE

RECENT INVESTIGATIONS by my colleagues and me into the effects of noise on hearing have added a sobering new dimension to our understanding of the dangers of acoustic overexposure. Scientists and clinicians have long known that some of the hearing impairment from noise exposure

is reversible and that some is not. In other words, at times hearing thresholds return to normal a few hours or days after an exposure—other times recovery will be incomplete, and the higher threshold will persist forever. Hearing scientists used to think that if the threshold sensitivity recovered, the ear had completely recovered. We now know that this is not true.

The loud pop of Fourth of July firecrackers or the roar of the crowd at a football game not only affects the hair cells, it also damages the auditory nerve fibers. We and others showed in the 1980s that overly loud noise causes damage to the terminals of the nerve fibers where they form synapses with hair cells. The swelling and eventual rupture of the terminals probably occur in response to excess release of the signaling molecule glutamate from the overstimulated hair cells. Indeed, too much glutamate release anywhere in the nervous system is toxic. The conventional wisdom had been that these noise-damaged fibers must recover or regenerate after intense noise exposure because auditory thresholds can return to normal in ears that showed massive nerve swelling immediately after exposure.

In my lab, we were skeptical that such

How to Protect Your Hearing

In animal studies in several different species, we have produced irreversible nerve damage in the ear with two hours of continuous exposure to noise at 100 to 104 decibels (dB). There is every reason to believe that human ears are just as sensitive. Most daily exposures in our lives do not continue for that long. Nevertheless, it is prudent to avoid unprotected exposure to any sounds in excess of 100 dB.

Many sounds in daily life take us into a danger zone. Concert venues and clubs routinely produce peak levels of 115 dB and average levels in excess of 105 dB. Gas-powered leaf blowers and lawn mowers reach levels at the users' ears between 95 and 105 dB, as do power tools such as circular saws. Frequency of the sounds matters. The more high-pitched whine of a belt sander is more dangerous at the same decibel level than the lower-pitched roar of an undermuffled motorcycle. Jackhammers produce levels of 120 dB even for passersby, and the rapid-fire impulses of the metal rod on concrete produce lots of the dangerous high-pitched sounds.

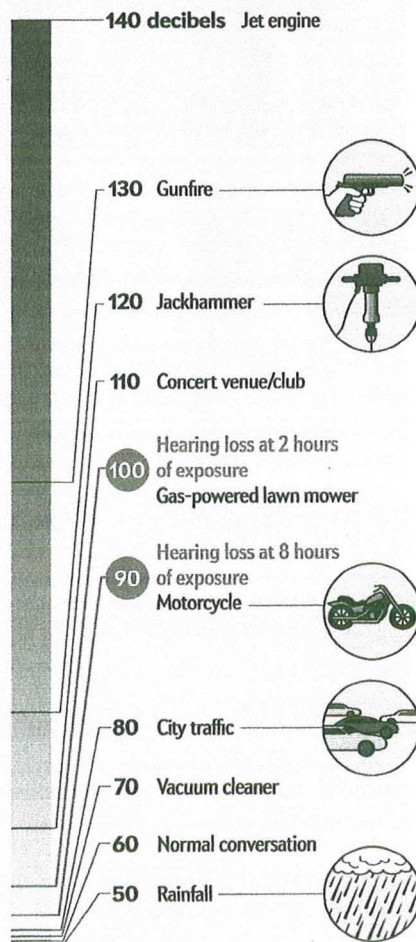
What can we do? These days almost all of us have access to surprisingly accurate sound-level meters in our pockets or purses. There are numerous free or inexpensive apps for iOS and Android phones that provide reliable readings of sound pressure produced by a musical instrument or a car backfiring to within 1 to 2 dB of the most expensive professional sound-monitoring equipment. The app for iOS that worked best for me, Sound Level Meter Pro, is still under \$20 and gave me readings in my laboratory that were accurate to less than 0.1 dB.

Once you are aware of which sounds in your environment are potentially dangerous, the good news is that effective ear protection is cheap, easy to use and extremely portable. If properly inserted, the foam-type insert plugs can attenuate the sound level by 30 dB in the most dangerous frequency regions. Roll one between your fingers to squeeze it into the thinnest cylinder you can and then quickly insert it as deeply in your ear canal as you can. It is no more difficult or dangerous to do so than putting in ear-

bud headphones. Let them slowly expand, and within a minute you are ready to rock and roll.

If you are attending a concert, these foam earplugs provide too much sound muffling. When you want to hear the sound but just at a lower (safe) level, use "musicians' ear plugs." Several brands are available online for \$10 to \$15 a pair. They are designed to provide 10 to 20 dB of sound attenuation, with equal muffling of low- and high-pitched sounds, so that the timbre of music is unaffected.

Most important, pay attention to what your ears are telling you. If you have left an event or an activity sensing that sounds seem muffled, like you have cotton in your ears, or if you have ringing in your ears, odds are that you have destroyed some auditory nerve synapses. Don't despair but try not to let it happen again. —M.C.L.



badly damaged synapses could regenerate in the adult ear. We also knew that noise-induced nerve damage would not necessarily be reflected in the standard testing because animal studies dating back to the 1950s showed that loss of auditory nerve fibers, without loss of hair cells, does not affect the audiogram until the loss becomes catastrophic, greater than 80 percent. It appears that you do not need a dense population of nerve fibers to detect the presence of a tone in a quiet test booth. By analogy, take a digital image of a group of people and sample it repeatedly, each time at a lower resolution. As you decrease the pixel density, the details of the image become less clear. You can still tell there are people in the picture, but you cannot tell who they are. Similarly, we hypothesized, diffuse loss of neurons need not affect your ability to detect a sound, but it could easily degrade understanding of speech in a noisy restaurant.

When we began investigating noise-induced nerve damage in the 1980s, the only way to count the synapses between auditory nerve fibers and inner hair cells was with a technique called serial-section electron microscopy, a highly laborious process requiring roughly a year of work to analyze the nerve synapses on only a few hair cells from one cochlea.

Twenty-five years later my colleague Sharon G. Kujawa of Massachusetts Eye and Ear and I were trying to determine whether one episode of acoustic overstimulation in the ears of young mice could accelerate the onset of age-related hearing loss. The noise to which we exposed the animals was designed to produce only a temporary elevation of auditory thresholds and thus no permanent hair cell damage. As expected, the rodent cochleas looked normal a few days after exposure. But as we examined the animals from six months to two years later, we saw an accumulating loss of auditory nerve fibers, despite the presence of intact hair cells.

Fortunately, much had been learned since the 1980s about how to explore the molecular structure of these synapses. Antibodies had become available that could bind to, and tag with, different fluorescent markers, structures on each side of the synapse between the inner hair cell and auditory nerve fiber. The tags allowed us to count synapses easily under a light microscope. We quickly accumulated data showing that a few days after noise expo-

sure, when the auditory threshold had returned to normal, as many as half of the auditory nerve synapses were gone and never regenerated. The loss of the rest of the neurons—the cell bodies and the axons that project to the brain stem—became evident within a few months. By two years, half of the auditory neurons had completely disappeared. As soon as the synapses were destroyed, the affected fibers were of no use and did not respond to sounds of any intensity.

In the past few years we have documented noise-induced degeneration of synapses in mice, guinea pigs and chinchillas—and in postmortem human tissue. We have shown in the animal studies and in human ears that the loss of connections between auditory nerve fibers and hair cells occurs before the threshold elevations associated with hair cell loss. The idea that auditory nerve damage causes a kind of hidden hearing loss—an important component of noise-induced and age-related hearing impairment—has now become widely accepted, and many auditory scientists and clinicians are working to develop tests to determine if the problem is widespread and if our noisy lifestyles are leading to an epidemic of ear damage in people of all ages.

REPAIRING NERVES

PUT IN ITS SIMPLEST TERMS, the audiogram, the gold standard test of hearing, measures auditory thresholds and is a sensitive gauge of cochlear hair cell damage. Yet it is a very poor indicator of damage to auditory nerve fibers. Our research has shown that the nerve damage of hidden hearing loss does not affect the ability to detect the presence of sound, but it most likely degrades our ability to understand speech and other complex sounds. In fact, it may be a significant contributor to the classic complaint of the elderly: “I can hear people speaking but can’t make out what they are saying.”

Audiologists have long known that two people with similar audiograms can perform very differently on so-called speech-in-noise tests, which measure the number of words correctly identified as the level of a background noise increases. Previously they have ascribed these differences to brain processing. Our research suggests that much of it arises because of differences in the surviving population of auditory nerve fibers.

Hidden hearing loss may also help explain other common hearing-related complaints, including tinnitus (ringing in the ears) and hyperacusis (inability to tolerate even sounds of moderate loudness). These conditions often persist even when an audiogram flags no problem. In the past, scientists and clinicians have pointed to the normal audiogram of a tinnitus or hyperacusis sufferer and concluded, again, that the problem must arise in the brain. We suggest instead that the damage may have taken place in the auditory nerve.

Our research raises questions about the risks of routine exposure to loud music at concerts and clubs and via personal listening devices. Although noise-induced hearing loss is clearly a problem among professional musicians, even those playing classical music, epidemiological studies of casual listeners have consistently failed to find substantial impact on their audiograms. The federal guidelines developed to minimize noise damage in the U.S. workforce are all based on the presumption that if postexposure thresholds return to normal, the ear has fully recovered. As we have learned, this assumption is wrong; thus, it naturally follows that present noise regulations may be inadequate to prevent widespread noise-induced nerve damage and the hearing impairment that it causes.

To tackle this question, we need better diagnostic tests for auditory nerve damage, short of counting synapses in postmortem tissue. One promising approach is based on an existing measure of the electrical activity in auditory neurons, called the auditory brain stem response (ABR). The ABR can be measured in an awake or sleeping subject, fitted with scalp electrodes to measure electrical activity (electroencephalography) in response to the presentation of tone bursts of different frequencies and sound-pressure levels. Historically the ABR test has been interpreted largely on a pass-fail basis: the

presence of a clear sound-evoked electrical response is interpreted as normal hearing, and the absence of a response is evidence of impairment.

In animal work, we have shown that the amplitude of the ABR at high sound levels is very informative: it grows in proportion to the number of auditory nerve fibers that retain a viable connection with inner hair cells. Correspondingly, a recent epidemiological study inspired by our research has used a variant of the ABR test on a group of British college students with normal audiograms and found smaller response amplitudes among those who report having been repeatedly exposed to the din of clubs and concerts.

In search of potential treatments for hidden hearing loss, we are now asking whether we can reverse the noise-induced degeneration by treating the surviving neurons with chemicals designed to regrow nerve fibers, reestablishing connections to inner hair cells. Although the synapses themselves are destroyed immediately after the noise exposure, the slowness of the degeneration of the rest of the nerve (its cell body and axons) makes us optimistic that normal function can be restored in many human subjects. We have had encouraging results in animal studies by delivering neurotrophins (nerve growth promoters) directly to the inner ear.

Hidden hearing loss may soon be treatable by injection through the eardrum of gels that slowly release neurotrophins to restore synapses months or years after a noise insult. They would be administered immediately after exposure to loud noise, such as the explosion at the finish line of the Boston Marathon in 2013 that damaged the hearing of more than 100 spectators. An otologist may one day be able to deliver drugs to the cochlea using a minimally invasive treatment for noise-induced ear damage as easily as an ophthalmologist corrects a myopic eye by laser surgery of the lens. ■

MORE TO EXPLORE

Adding Insult to Injury: Cochlear Nerve Degeneration after “Temporary” Noise-Induced Hearing Loss. Sharon G. Kujawa and M. Charles Liberman in *Journal of Neuroscience*, Vol. 29, No. 45, pages 14,077–14,085; November 11, 2009.
Synaptopathy in the Noise-Exposed and Aging Cochlea: Primary Neural Degeneration in Acquired Sensorineural Hearing Loss. Sharon G. Kujawa and M. Charles Liberman in *Hearing Research*. Published online March 11, 2015.

FROM OUR ARCHIVES

Regaining Balance with Bionic Ears. Charles C. Della Santina; April 2010.

scientificamerican.com/magazine/sa

Moore-Love, Karla

From: Dutt, John on behalf of City Info
Sent: Monday, July 27, 2015 12:39 PM
To: Marc K. Binder; City Info; Council Clerk – Testimony
Subject: RE: For the City Council Meeting July 29, 2015

Marc – I am forwarding this over to CCTESTIMONY@PORTLANDOREGON.GOV which is the email address they have set up for people to submit comments/testimony to City Council

John R. Dutt

City/County Information and Referral Manager
 503-865-2625

How did I do?



[Click on a face to provide feedback on my performance!](#)

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www.portlandoregon.gov/OMF/CivilRights

www.portlandoregon.gov/OMF/ADA

From: Marc K. Binder [mailto:binderma@comcast.net]

Sent: Sunday, July 26, 2015 1:10 PM

To: City Info <cityinfo@portlandoregon.gov>

Subject: For the City Council Meeting July 29, 2015

Dear City Council:

I am respectfully making an urgent plea and recommendation in the strongest possible terms to not permit the use of pile drivers during the construction planned for the Block 5 building at NW 9th Ave and Northrup St. My wife and I are residents of the Lexis Condominium, directly across from Block 5, and have personally experienced the comparison between pile drivers versus the newer auger drill during the recent area additions. The difference was enormous with the pile driver experience being **intolerable and horrendous**.

Pile drivers should at best, be curtailed to remote area construction and **NEVER** used in such a high density population area such as the Pearl District. Optimally, this outdated equipment would best be **banned**. The bone jarring noise from pile drivers has caused trauma and extreme stress to (wo)man and beast alike, hearing loss, and sleep disruption, among other maladies. I'll briefly expand on the latter.

July 27, 2015

AUDITOR 07/27/15 AM 9:39

Mayor Charlie Hales
1221 SW 4th; Room 340
Portland, OR 97204

Re: Noise Ordinance Changes (Title 18) and **Impact Pile Drivers**

Dear Mayor Hales,

At Wednesday's City Council meeting you will be continuing a hearing for the adoption of a revision to the Title 18 Noise Ordinance. The amendments proposed to date do not adequately address the special issue of **impact pile drivers**.

"18.02.020 Policy Statement.

(Added by Ordinance No. 175772, effective August 1, 2001.)

It is the intent of the City Council to minimize the exposure of citizens to the potential negative physiological and psychological effects of excessive noise and protect, promote and preserve the public health, safety and welfare. It is the intent of the City Council to control the level of noise in a manner that promotes the use, value, and enjoyment of property, conduct of business, sleep and repose and reduces unnecessary and excessive sound in the environment."

"18.10.060 Construction Activities and Equipment. -

(Amended by Ord. No. 159276 effective Jan. 24, 1987.)

- A. Maximum sound levels: No person shall operate any equipment or appurtenances thereto in commercial construction activities which exceeds 85 dBA, when measured at 50 feet (15.2 meters) from the source. This standard shall not apply to trucks (see Section 18.10.020), pile drivers, pavement breakers, scrapers, concrete saws and rock drills."

The "Maximum sound levels" standard does not adequately address the broader problems caused by **impact pile drivers** to surrounding residents due to the special ground disturbance, higher noise levels, vibrations, damage to building foundations, and other wide ranging effects. You should amend 18.10.060 to state **Impact pile drivers shall not be authorized without a favorable decision from a Hearings Officer.**

This amendment will allow the application to describe why only an **impact type pile driver** should be used while also providing technical information and possible alternatives prior to permitting the use. That will avoid the delay and complexity of an appeal by using the application process to address the issue of **impact pile drivers**.

I hope you will adopt the suggested language.

Bonny McKnight

bonnymcknight@gmail.com

REVISE NOISE REGULATIONS FOR PILE DRIVING

IF YOU WISH TO SPEAK TO CITY COUNCIL, PRINT YOUR NAME, ADDRESS, AND EMAIL.

NAME (print)	ADDRESS AND ZIP CODE	Email
✓ Rory Martindale	13909 NE 10th Ave Vancouver	rory@dewittcont.com
✓ Garth Ullakko	13909 NE 10th Ave Vancouver	garth@dewittconst.com
✓ Joel Burt	13909 NE 10th Ave Vancouver	jeb@dewittconst.com
left Lightning Watchdog X		
✓ MARY SIPE	1230 NW 12th Ave #502	maryesipe@gmail.com
✓ Patrice Hanson	1221 NW 11th Ave #101 97209	patrice939@gmail.com
✓ STAN PENKIN	123 NW 12 Ave 97209	STANLEYPENKIN@COMCAST.NET
✓ Tom Foster	1955 NW 9th Ave #520	TomFoster@EquityGroup.com
✓ Maryhelen Kincaid	2030 NE Blue Heron Dr.	jamasu8b@msn.com
✓ RYAN HIRE	1636 E. Burnside St.	ch4ke@nwcarpenters.org
✓ Kermie Standlee	4900 SW Griffith Dr, Suite 205, Beaverton, OR	kstandlee@acoustedgroup.com

Testimony presented by Mary Sipe at the July 9, 2014 City Council Meeting to review recommendations from the Noise Review Board to amend Title 18 as it applies to construction noise specific to Impact Hammer Pile Driving.

While I support the recommendations to amend Title 18 and urge the City Council to approve them, I have some thoughts I would like to share:

The Noise Review Board is **not** recommending the exclusive use of specific types of pile driving such as the Continuous Flight Augercast (CFA) because:

1. Project engineers have indicated that the augercast is not appropriate for every site and the engineer should make the judgment when it can and should be used.
2. Because the soil brought up by the augercast must be treated as hazardous waste and increases both the risk and cost of using this method.

The augercast has been used successfully on a 28 story building and a 30 story building in The Pearl District. To me this would be an indication that the augercast is a viable alternative in some pretty challenging conditions.

In an email from Tiffany Sweitzer of Hoyt Street Properties to the Noise Control Office, she said that using the augercast on Block 15 took more time and added to the cost of the project and that they would not use that method again.

The impact hammer pile driving on Block 17 lasted for 7 weeks.

However, as I recall the augercast pile driving on Block 15 lasted about 4 weeks.

Claims that the augercast costs more money, takes more time, and cannot be used because of soil conditions have never been quantified.

It seems that the Noise Review Board has taken the developers and contactors at their word on these arguments...where is the proof? And are these good reasons ignore the negative impacts of the impact hammer to the health and well being of neighboring residents?

Our group has spent the past year researching and gathering evidence about the augercast method. We have provided the Noise Review Board with compelling documentation to support our claims.

The Noise Review Board has relied primarily on input from DeWitt. DeWitt has used the Impact Hammer on the majority of the construction in the Pearl District. I do not believe that they have used the augercast on any sites in the Pearl District.

I would be more supportive of the Noise Review Boards recommendations if they had sought input from Pacific Foundation, the company that used the augercast on Block 15, The Overton and the Abigail projects.

I agree, the augercast method may not be appropriate for every project and the decision should be made by the project engineer.

However, I would suggest that the project engineer be required to provide geological evidence that the augercast **cannot** be used.

This is probably outside of the scope of the Noise Control Office and would need to be addressed by another entity. Who would that be?

The Board is recommending a change to the permissible hours of pile driving by reducing the allowed time by one hour per day and one day per week.

Tiffany Sweitzer from Hoyt Street properties has already sent an email to the Noise Control Office asking if Variances to this restriction will still be available.

I urge the City Council to not allow variances to the permissible hours of Impact Hammer pile driving.

Approving variances will simply make this new restriction worthless.

In another mail from Tiffany Sweitzer to the Noise Control Office, Ms. Sweitzer said:
"This is crazy. I thought the last hearing that I had Doug Shapiro attend put an end to this..."
"It's too bad that a few people from one property have made such an issue out of a process that typically lasts just 30-40 days..."

Noise is unwanted sound.

18 7 2 7 2

14 months ago, after extensive research and talking with developers and builders, Pearl district residents testified before you and asked for a ban on impact hammer pile drivers. Today you can ban impact hammer pile drivers. Additionally you can ban all noise producing construction equipment currently exempt in the code (18.10.060) from use on Saturdays and Sundays because that equipment cannot operate below noise code standards. Quiet Weekends.

In my 3 minutes I will provide you with information you might not know, and suggestions that will help you in your decision today. I submitted written testimony last week and hope you were able to review that as it was more indepth.

There have been hundreds of emails, and several public information requests for NRB meeting minutes and Noise Office staff emails. Several things I gleaned from those documents:

- DeWitt Construction, according to the Deep Foundation Institute, of which they are a member, owns 3 patents for pile drivers.
- There is a bias toward the citizens who brought complaints and questions of policy to the NRB and Noise Office. I have witnessed several instances in NRB meetings when Pearl District neighbors were not respected and made to feel like they should not be complaining. (story of noise in the hall at NRB meeting)
- A staff member in the Noise Office, in email communications with developers, labor unions, and contractors states her husband is a union carpenter and she understands the difficulties of the construction industry in Portland. She admits making a special effort to notify union and other interested groups of hearings and meetings. Contrast this to me asking why I, and a representative from Pacific Foundations (who testified at prior meetings that his company had used auger cast drilling), didn't get notified of the public hearings held to develop the proposal before you today, and the answer was we "didn't check the box to get notified" on prior meeting sign in sheets. I am on the Noise Review Board meeting notification list. I am quite sure John Mohlis never attended a NRB meeting and never checked the box, yet he received an email notifying him of the hearings.
- After the March 11th Council hearing on a noise variance appeal a group of us were sent to Commissioner Fritz's conference room to create a task force to determine how to follow up on recommendations. It was not productive and upon leaving David Vanadia asked David Sweet, "what can we do to work on this issue?" David Sweet replied "Stop sending emails and asking questions. It takes too much time to answer." No committee has ever been formed.
- A pile driver contractor testified at a NRB hearing that "pile driving only happens for 3 hrs and 52 minutes in an 8 hr day" which proves his lack of knowledge of impact. Those combined 4 hrs. are spread out over the entire day, with almost no predictability of occurrence. Approximately every 2 hours a loud, irritating noise could occur.

My "What Would You Do" suggestions, beyond banning impact hammer pile drivers and providing Quiet Weekends are:

- Each of you should try and find a noise variance on the Noise Office webpage that was issued for your neighborhood. You will see it needs fixing.
- Fix the public notification process for the issuance of variances. Lots to do here.

- Move the burden of proof for appeal from residents impacted by a variance to the entity wanting to create the disturbance. Contractors can appeal the application of code to the Hearings Officer for the use of impact hammer pile drivers outside code requirements.
- Provide citizens with educational materials on how to register complaints, how the notification system works and what to expect. A simple handout would be sufficient.
- Create a subcommittee of the NRB to address the issues of variances and provide needed recommendations. This worked for demolitions and now deconstruction. NRB members have admitted they do not have the expertise to address geotechnical questions nor have the data to evaluate mitigation alternatives.
- Direct BPS to start a RICAP project for High Impact Noise Zones, and do it now.
- Do not rely on numbers of violations for measurement of success.
- Forget the zone change request in this proposal as it can be handled in the Mixed Use Zone project to be completed in September.
- Recognize this is a health and livability issue with lives at stake. Money and profit should not be the sole basis for decision making.
- Consider all this may take an additional staff position or temporary contractor. Embrace that concept.

“The bird does not sing because it has an answer, but because it has a song.” Attributed to Maya Angelou on a postage stamp, but made by Joan Walsh England

I may not have all the answers, but my “song” is to ask you to protect the citizens of this City, to fix the public information and engagement pieces of noise variances, and most importantly provide relief and restore 2 days a week of quiet for the residents in *all* areas of the City dealing with the impacts of construction noise.

Thank you for listening,

Maryhelen Kincaid

2030 NE Blue Heron Drive, Portland, OR 97211