

A Sound Look at an Invisible Menace: Noise

By Dan Aubrey - January 22, 2020



Eric Zwerling directs the Rutgers Noise Technical Assistance Center on the Cook Campus and trains noise enforcement officers in New Jersey and around the world.

Eric Zwerling puts it this way. If you're living next to a tire manufacturing center and smoke and soot blow through your windows and cover your furniture, it is pretty clear your health is in jeopardy.

But, he adds, what if you change the soot to the persistent squealing of hydraulic drills, day-long hammering, and constant thudding of bouncing tires?

Then it is going to take a lot more than seeing to start believing that it too is affecting your physical and mental health — even though there a good number of studies that show it.

Zwerling brings up this potentially deadly invisible menace to a dozen municipal and county employees from New Jersey, South Carolina, and New York State during a recent Community Noise Enforcement Certificate course.

It is one of several regular offerings of the program he directs at the Rutgers Noise Technical Assistance Center. Part of Rutgers University's Department of Environmental Sciences, the center trains and certifies public officials on how to measure sound and determine if it complies with state codes.

And since New Jersey codes require community noise officers and investigators, the program — considered the only one of its kind in the United States and engaged internationally — provides the experience and knowledge for communities and citizens to prosecute the law and support

the claims against offending industries, businesses, bars, and individuals in a court of law.

The center's underlying philosophy, notes Zwerling in his course manual, is that "unregulated sources of noise can have impacts far beyond the obvious transitory nuisance, and complainants may be enduring more than simple annoyances."

Then he spells it out loud and clear: "Exposure to loud noise has been shown to result in uncontrollable stress, which can result in alterations in mood as well as hormonal and nervous system changes in healthy subjects. A lack of control over noise results in a variety of neurobiological and behavioral alterations, a phenomenon known as 'learned helplessness.' It has been demonstrated that blood pressure is reproducibly elevated in response to intermittent loud noise."

He adds that noise-related stress and fatigue has "destroyed marriages, cost people their jobs, and forced other people to sell their houses at significant losses."

It also can lead to "cases of arson, assault, murder, suicide, and motor vehicle accidents."

Skeptical? Test Zwerling's claim by simply scanning the internet for headlines dealing with noise and violence.

Take, for example, "A New Yorker's Solution to Noisy Neighbors Was Murder, Says the FBI." The man attempted to hire a hitman who turned out to be an agent.

Then there's "Florida Man Sentenced to Life for Killing Neighbor Over Noise."

And how about "Harlem Man Snaps and Fatally Shoots 'Noisy' Neighbors, Sets Apartment on Fire" and "Neighborhood Noise: 17 People Have Died from It"?

Other headlines show it isn't just a person-to-person problem. As already noted, industries also contribute to the problem: "Neighbor Sues Aspen Bar Over Noise and Loitering," "'Like a Jet Engine': Neighbors Complain About Noise From Trash Plant," and "Loud Noise May Raise Risk for Workplace Injuries."

Returning to noise-related court cases, Zwerling says “noise leaves no residue” and unlike a drunk driver, whose blood alcohol level can be measured, the mental health of a noise-stressed or sleep-deprived person cannot.

With its focus on protecting and preserving a community’s quality of life, Zwerling’s course is basically a noise ordinance boot camp arming officials to fight an invisible killer.

So what exactly is noise and how does one measure it?

You can take Zwerling’s three-day course offered to municipal and private employees – and this reporter – to get some anecdotal and legal answers.

It takes place in a 1960s-era garage-like structure on Rutgers’ Cook College Campus on Route 1 in North Brunswick.

Here Zwerling shares a professional perspective sharpened by three decades of experience.

A trained biologist with a friendly manner and a no-nonsense commitment to detail, Zwerling worked first with environmental issues and then found himself applying shared approaches to sound. He holds bachelor’s and master of science degrees from the University of Georgia.

Today he is an internationally noted noise consultant advising public and private clients.

Early on in the class, he shares his thoughts on noise – first as a subjective experience: “If you’re mowing your lawn, it isn’t noise. But if your neighbor is mowing, it is. Yet if your neighbor is mowing your lawn, it’s music.”

That light analogy leads to a more serious examination of the difference between sound and noise. “Sound is hearing. Noise is unwanted sound. Noise is a function of perception.”

That’s followed by a discussion of the human physiological responses to sounds. While things like wind, water and rain, and even distant cars on the highway are heard, they’re general not a problem.

However, Zwerling says people’s nervous systems are hardwired to tune into such sounds as the spoken words (loud

talking and the lyrics in songs) and rhythms (music, repetitive sounds, machines).

It is when the people experiencing unwanted sounds sense a lack of control over them that stress levels shoot up and problems – including actual shootings – start.

Then he starts getting technical and leads the class through the various letters of the state law that deal mainly with industry – more on residents and municipal laws later.

Zwerling first directs the class to the New Jersey Department of Environmental Protection's Noise Control Act of 1971 legal definition: "Noise' means any sounds of such level and duration as to be or tending to be injurious to human health or welfare, or which would unreasonably interfere with the enjoyment of life or property throughout the state or in any portions thereof, but excludes all aspects of the employer-employee relationship concerning health and safety hazards within the confines of a place of employment."

The act was developed after the state legislature determined the "levels of noise in the community have reached such a degree as to endanger the health, safety, and welfare of the people of this state as well as the integrity of the environment; and that this threat can be abated by the adoption and enforcement of noise standards embodied in regulations."

It also established a Noise Control Council that involves other state departments, including the New Jersey Department of Health, to monitor and steer the law.

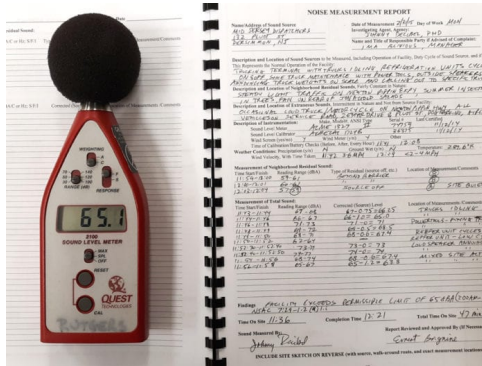
The NJDEP then made the law work objectively by establishing and codifying safe sound levels translated in decibels – the generally and federal government-accepted unit for measuring sound.

The "goldilocks" or just right formula is around 60 decibels – a normal conversation level that is a little louder than a quiet office and a little quieter than a laugh.

To get an idea of general ranges, quiet breathing is 10 decibels, a mosquito hum is 20, and a jet taking off registers at 130 decibels.

Decibels use a logarithmic scale, so a normal conversation is 32 times louder than quiet breathing, and a jet taking off is 128 times louder than a normal conversation.

As Zwering points out, New Jersey's legally accepted sound levels are 65 decibels during the day and 50 decibels at night, that's 10 p.m. to 7 a.m.



Measuring noise levels requires decibel-reading devices and a series of calculations.

He also shows that determining an offender is more complex than one would think.

After going over the state laws and various charts, Zwering hands out the enforcer's main tool: hand-held decibel-reading devices.

They are the smoking gun showing the evidence that a factory, bar, or even a tire manufacturer is exceeding the acceptable or allowable level of noise.

More than a hardware store-grade gadget or a smartphone application, these meters are legally required to meet American National Standards Institute specifications and state calibration regulations.

Zwering's second day prepares the class for hands-on testing, a process that is more involved than just reading numbers.

After showing the class how to prepare and handle the meters, he starts showing how to collect data for the proper test.

That means putting the offending sound in the context of the site's normal sound, aka the residual sound. It's like a location's normal blood pressure.

In order to demonstrate the procedure in real time and space, Zwerling takes us out of the classroom and onto the cold Cook College campus to find the residual.

Soon our meters are picking up the low numbers produced by the steady hum of vehicles seen over a field on nearby Route 1.

But the numbers spike when a car or bicyclist passes or overhead geese squawk.

They also go up as Zwerling makes a comment on the legal amount of time needed to do an onsite investigation (30 minutes) and how to log those “extraneous sounds” from the normal sound of the site during a specific time (make notes of the spike but don’t change the consistent base reading).

When Zwerling brings us back to the session room, he dispels the idea the test is over after comparing the readings of the residual sound with the offending sound.

That’s because decibels deal with ratios rather than increments and a formula involving a series of steps and charts is needed to do the real math – analysis that can hold up in court if a business decides to challenge the reading.

Measuring and math fill the afternoon and continue on the third day when we again do a field exercise and an exam.

That exercise is based on a resident versus business type of situation. A business starts a racket near a longtime resident, who then reports it to the police or health department. They in turn send us out to determine if the sound is within or exceeding the permitted noise level.

We head to a nearby campus building with a loud, rumbling, and continuously running cooling system and get started.

Meters are turned on and pointed towards the coolers, and a reading is easily made. It’s just slightly above 65.

Not so easy is getting a residual sound reading. That’s because the cooler is still rattling.

Zwerling tells us to be creative. So some class members solve the problem by using nearby buildings to block or reduce the

reported noise. Others, including me, move away from the building while keeping the same approximate distance from the highway and main road in order to get a reading.

But everyone wishes the cooling system would just stop for a few minutes and provide the investigator's best-case scenario: residual noise determined by the silent source.

The class members soon share numbers with one another and agree that the residual noise is low.

Now we go back to the classroom to apply the state-approved math and find that the cooler is on the borderline of a violation.

An official inspection would result in a warning to Rutgers and an alert to the property manager that a fine could be levied.

Now it's time for certification exam: two pages of questions and a practicum that involves measuring a case and filling out an investigator's form.

As Zwerling hands out the test, I reflect on what has drawn me to spend three days taking a course that I will never use.

The reasons are both social and personal.

The social is reflected by numerous stories that have been generating a buzz over the past few decades and are becoming more noticeable.

One is the recent Atlantic story "The End of Silence."

It chronicles the experience of a man who detects a new and persistent neighborhood hum that seems to be growing louder.

While he initially has trouble convincing municipal authorities that the sound is real and risks being seen as a crank, he eventually connects with other community members experiencing the same thing.

After some months of searching he finds the source: a recently created facility housing huge networks of computers used to process digital shopping transactions.

The story's online tag is "The tech industry is producing a rising din. Our bodies can't adapt."

Writer Bianca Bosker shares the story's simple idea early. "Scientists have known for decades that noise — even at the seemingly innocuous volume of car traffic — is bad for us."

Then she paints a picture: "Say you're trying to fall asleep. You may think you've tuned out the grumble of trucks downshifting outside, but your body has not: Your adrenal glands are pumping stress hormones, your blood pressure and heart rate are rising, your digestion is slowing down. Your brain continues to process sounds while you snooze, and your blood pressure spikes in response to clatter as low as 33 decibels — slightly louder than a purring cat.

"Experts say your body does not adapt to noise. Large-scale studies show that if the din keeps up — over days, months, years — noise exposure increases your risk of high blood pressure, coronary heart disease, and heart attacks, as well as strokes, diabetes, dementia, and depression. Children suffer not only physically — 18 months after a new airport opened in Munich, the blood pressure and stress-hormone levels of neighboring children soared — but also behaviorally and cognitively."

Merchandisers willfully contribute to noise pollution by enticing consumers to equate noise with making a personal statement or attracting attention — and then letting the public deal with it.

For evidence Bosker sites a "landmark study" that found the reading scores of sixth graders in a classroom facing a clattering subway lagged nearly a year behind students in quieter rooms, "a difference that disappeared once soundproofing materials were installed."

She also reports a study that suggested "subjects exposed to noise, even the gentle fuzz of white noise, become more aggressive and more eager to zap fellow subjects with electric shocks."

While the information is alarming, so too is the reality that the studies are 45 and 50 years old respectively and made before the proliferation of devices that easily reproduce or create amplified sounds – some reaching decibel levels greater than a jet.

Zwerling touches on the problems with current technology when he says people have taken to using today's powerful amplification to mark or claim territories – like dogs urinating on lawns.

That includes guys ripping out car floors, filling the space with downward-pointed speakers, and cranking high-volume music to announce themselves and to disturb – or obliterate – the peace.

There is also the apartment dweller who decided to punish his apartment neighbor regularly by pointing speakers on the common wall, turning music on at extremely high decibels in the middle of the night, and then leaving.

While these cases may seem extreme, they are actually part of a pattern where individuals test social sound limits before testing other laws.

A 30-year-old study published in John Jay College's Law Enforcement News says, "Violations of the noise code create an atmosphere that condones the breaking of the law, and breaking one law – even one not that important in the bigger picture of law enforcement – encourages disobedience toward other laws."

The takeaway is that noise is the aural component of the Broken Window Syndrome, the study that argues that unaddressed small crimes in a neighborhood lead to larger problems.

One of the study's authors, psychologist Arline L. Bronzaft, who also co-wrote the influential book that transformed New York City, "Why Noise Matters," revisited the topic in a 2018 Crime Report article, "Noise and Crime: A Link Too Often Ignored."

And a 2016 Environmental Health Perspective study found young people in noisy communities had more behavioral

problems than those in quieter and more peaceful communities.

My personal connection is linked to noise, crime, and neighborhood deterioration.

Years ago my wife and I purchased our first home. We were on a modest income and keeping to our means. After some searching, we found an affordable attached home on the main street of an old New Jersey town.

The old neighborhood was racially mixed, included longtime families, younger newcomers, and renters. It seemed poised to get stronger.

While there was a noticeable degree of traffic in front of our house (the residual noise mentioned in the course), it was generally predictable.

But after about a year or so, something changed, and our neighbors on the street behind us began having intermittent sound wars.

It is not clear who started blasting the music first, but it soon involved multiple residents cranking up the volume and sometimes pointing speakers out the windows to fire back.

With the warring residents staking out their aural territory and declaring their social identities with music (ranging from country to rap to gospel to rock), tensions mounted, and the neighborhood slowly divided into camps.

After one household established itself as the winner, the occupants regularly blasted music — including some with noticeable obscene lyrics — and attracted others fun seekers who added to the noise.

Since one of the sound offenders was mentioned frequently in the local newspaper for drug arrests, it was clear that the neighborhood was not going in a healthy direction.

When older neighbors began to get afraid, they sold their homes at reduced rates or escaped by renting their houses to social service groups, including one that began housing ex-convicts from around the state.

Meanwhile several of us in the neighborhood attempted to address the situation with the police department and township.

But the noisemakers were pros. They knew when the police were called, turned down the music, and dispersed before anything could be done.

Then there was an unexpected turn. The Catholic Church across the street from our home was sold to a small, independent congregation. The worship practices of this makeshift, nominally Christian group included lengthy and multi-day scheduled services that featured loud amplified music and shrieking-in-tongues through loudspeakers.

When we asked the police to speak the church about the volume, the congregation retaliated by turning it up and screaming, "This is war!"

Emboldened by the church's behavior, the noise makers behind us felt free to turn up the volume, and the cycle continued.

When we were finally able to get the township to intervene, neighborhood damage had been done. People were not interested in moving in, and property values dropped. When my wife and I decided to move on, it took years to sell the house, and it was to someone who was related to the woman next door.

I was reminded of my experience with this type of invisible, nerve-wracking menace recently when the renters across from my current home turned our street into an impromptu sports expo where unsupervised youths – sometimes up to three dozen – used the street at all hours of the day – including the middle of the night – to play basketball and football, sometimes simultaneously.

In addition to the ongoing thud of multiple basketballs, the gathering included hours of loud and high-pitched screaming, cursing, and sexually and racially derogatory outbursts, with loud music sometimes mixed in for extra effect.

Following the pattern that Bronzaft and others noted, youths, young men and young women from around the district, were drawn to the street. Soon some were intimidating and

harassing neighbors, taunting car drivers by jumping in front of their moving vehicles, littering, trespassing, and gathering on homeowners' properties – even when the family that hosted the “games” was away.

Realizing that the neighbor who allowed all this was unwilling to address the situation and even began to ratchet it up when the police brought it to her attention, I was reliving our previous situation and knew what could happen if it wasn't addressed.

I was also reliving the problem of trying to convince officials and the police of a problem.

That was when I began looking anew at the noise ordinances and seeing them as front-line tools against neighborhood decline.

I also saw it as an important topic in an era of music blasting everywhere, rattling trucks, muffler-less vehicles, loud jet engines, leaf blowers, people using amplifiers during backyard parties, and society being trained by merchandizers to accept unhealthy and irritating sounds in much the same way the cigarette industry got people accustomed to smoking and smelling like smoke.

The occasion also caused me to start searching for a simple legal tool to employ and share with others.

As demonstrated in Zwerling's course, there are laws with clear information and strong fines for industrial noise level offenders (\$3,000 per day).

However, the front line for residential problems – where things can get tense and deadly – is on the municipal level.

And it is there where things can get staticky.

The general system works as follows.

Noise enforcement is coordinated through the state Department of Environmental Protection's Office of Local Environmental Management in the Division of Compliance and Enforcement. The state does not handle complaints or investigations.

The actual enforcement is delegated to all 21 counties and qualified municipalities. The reason is that trained and certified investigators around the state are closer to the problem and can address it faster.

Yet the counties only deal with industry-related noises and don't address residential problems. That has to be done on the municipal level.

Municipalities, in turn, have three noise-related response options to deal with such situations.

One is a Model Noise Ordinance that can be adopted. The state calls the boilerplate text a "primary tool" that "regulates a number of noise sources not covered under the state regulations, including noise from residential and multi-use properties and equipment."

A second tool is a Local Nuisance Code that, as state officials say, "does not rely on sound level measurements and is based on a more subjective interpretation, referred to as 'plainly audible,' which is defined as 'any sound that can be detected by a person using their unaided hearing faculties.' An investigating officer might also consider 'unusual' or 'unnecessary' noise as a violation. The advantage of enforcing noise under a nuisance code is the flexibility that local officials have to enforce against a wide array of noise sources not addressed in the state regulations or the Model."

The disadvantage, says the state law, "is that violations are often viewed as subjective and thus are more difficult to enforce in court if prosecution is necessary."

And a third option is for the municipality to rely on the county to respond to noise complaints. Yet this is only for industries, and if there are no other ordinances, residential and neighbor-to-neighbor problems are not addressed.

Despite the options and the growing need to address noise, obstacles remain.

One is that some noise violators have gotten so use to loud noise that they do not see anything wrong with making noise or playing loud music.

Another is a belief that all forms of sound are protected by the First Amendment of the United States Constitution, and the church and some of the noise-making neighbors noted above claimed such rights.

But, as Zwerling's Community Noise Enforcement manual notes, the United State Supreme Court found there is no constitutionally protected right to amplify sound, nor is there a constitutional right to force unwilling people to listen to your speech or expression. And local government can constitutionally restrict such expression.

And while there are noise exemptions for a variety of things from railroad traffic to farm animals to ringing church bells, church amplification and screaming for god are not protected by law.

And, interestingly, the noise makers seemed not to realize that there are laws designed to stop them from what they were doing.

Yet perhaps the biggest problem is a municipality's lack of general planning to address noise disturbances.

Of the 565 New Jersey municipalities, approximately 70 have adopted the Model Ordinance to clearly address noise problems.

But even the Model Ordinance can get muddled because noise regulation falls under both the health and police departments – potentially creating a procedural gray area and officials who are not fully informed.

There is also the reality that a township may not think noise is a problem worth considering. That is until the township is forced to do, as the Atlantic story showed.

And, unfortunately, there is corruption. Zwerling tells the story of a town where a man was harassed by a noisy neighbor related to town officials who refrained from intervention.

Then there is a history of New Jersey officials being paid by violators to look the other way, as in the recent case of a Newark code enforcer bribed by an after-hours club.

And during my own small-town problem, one of the noisy church members had gleefully told me they had gotten a “good” lawyer to protect them, one of the town council members (who eventually dropped them as a client).

Meanwhile, back at Cook College, I am one of the last ones to finish up the exam and hand it in.

Zwerling checks it out, makes some comments regarding my sloppiness, and then approvingly nods his head – the signal to a municipal employee to pick up the meter and address some noise.

And while I know I won’t be on the street, I’m happy I understand and can share the system to help address this growing social problem.

As I get ready to leave, I have a final chat with Zwerling and mention something a lawyer recently told me about neighborhood problems and laws: “There used to be neighborly civility, but that’s gone out the window.”

Zwerling gives a pained smile and says with regret, “If there were civility, we’d be out of jobs.”

And I think of what the lawyer had added, “So we need ordinances.” And awareness.

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New Jersey Noise Control Council, NJDEP, Bureau of Local Environmental Management, Box 420, Trenton.
www.nj.gov/dep/enforcement/ncp.html

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