

NABIE THE Examiner

NATIONAL ACADEMY OF BUILDING INSPECTION ENGINEERS • PO Box 860, Shelter Island, NY 11964-0860

The National Academy of Building Inspection Engineers is a chartered affinity group of the National Society of Professional Engineers (NSPE)

A Message from the President



Mark G. Soderlund, P.E.

Greetings to all fellow building inspection engineers. It seems that it was only a few weeks ago that I was writing my article for the summer newsletter and I was working in snow yesterday. Summer seemed to stretch into October so I can't complain about a short fall season. So much has happened in the past months as the months pass quickly.

I was able to attend the NSPE annual meeting in Seattle last July. Seattle was a great city to host a conference and it didn't rain the entire trip. It was an honor to give a presentation about NABIE to the house of delegates and attend Tim Austin's installation luncheon. Several weeks later, the NSPE board meeting was held in Minneapolis, so I had the opportunity to meet with Tim Austin, Arthur Schwartz, and Mark Golden. Mark Golden is the Executive Director and Arthur Schwartz is the Deputy Executive Director and General Counsel. Arthur will be speaking at our 2016 conference. We discussed ideas to give NABIE more exposure to the NSPE membership. The National Academy of Forensic Engineers, our sister affinity group, holds their annual conference in conjunction with the NSPE annual meetings, which has worked well for them. Our meetings have traditionally been in the winter but we may be able to hold a regional meeting in conjunction with the NSPE annual meeting. This would provide our organization more

visibility, especially if one of our members is a presenter at the NSPE meeting. It would also enable members within a region to come together that may not be able to travel across the country to our conference.

We are in the final planning stages for the 2016 conference in Scottsdale, AZ on February 12-14. The program is complete and we have another outstanding roster of speakers, including NSPE President Elect Kodi Jean Verhalen, who is a practicing attorney in Minneapolis. If you didn't see the email flyer, be sure to check out the details in this newsletter or elsewhere on the website. The email flyer and pending conference brochure are great ways to invite your colleagues and peers. We all know several building inspection engineers that would both benefit and enjoy the conference. I would like to challenge our members who regularly attend the conference to make a targeted effort to bring a colleague this year. I would also like to extend a special invitation to our members west of the Mississippi. In recent years, the Board has made an effort to hold conferences further west to make it more convenient for our members in the west and southwest to attend. We have made another huge shift west this year from Texas to Arizona. For those of you in these western and southwestern states who have not attended a conference in the past, this is your opportunity. We have come to your back yard for your convenience and we hope to see many of you. For our members on the eastern side of the country, the flights will be longer but you can be sure there won't be snow and you can bring your golf clubs. We hope to see all of you there too. On-line registration is open and the resort is taking reservations.

I continue to plug the conference attendance since membership growth continues to be our biggest challenge and our highest priority. Even if you are unable to attend the conference, I still challenge each of you to recruit one new member. The Board is discussing financial incentives to anyone who joins NABIE and attends the conference within the same year. Watch our website for more details on this. Have a safe and enjoyable Thanksgiving and we will see you in sunny Arizona!

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Rebuilding, elevating could be more expensive in new Coastal A zone

By Jean Mikle

A recent decision by the state to adopt more stringent construction standards for homes located near the ocean and Barnegat Bay could make it much more expensive for some Sandy victims to repair and elevate their homes.

"It may hurt people more who are elevating and not rebuilding," said Toms River Township Engineer Robert Chankalian, who learned of the change about a month ago. The township put out a notice "to residents in the floodplain" detailing the change.

Department of Community Affairs spokeswoman Lisa Ryan said the DCA does not have an estimate on the number of homes in New Jersey that are included in the new Coastal A zone designation, but it is likely to include hundreds of homeowners along the Jersey Shore.

The more stringent requirements will likely lead to higher costs for homeowners. It can cost between \$30,000 and \$150,000 to lift a home, which includes not just the home elevation but obtaining permits, building staircases and other necessary additions, and reconnecting utilities such as electricity and water.

Elevating homes in the V zone and the new Coastal A zone



An aerial view of Sandy damage in Ortle Beach from 2012. Photo credit: photos.nj.com



Post Sandy image of Jersey shore. Photo credit: Pinterest

with pilings or helical piles is generally more expensive than lifting a house where a closed foundation can be used, according to many builders. But DCA's Ryan said experts within her agency say that pilings can actually be cheaper than closed foundation construction in many cases.

"We all know that the V zone requirements are much more stringent than anything else," said Trevor Newman, Toms River's storm-recovery ombudsman. He and Chankalian have been attempting to determine how many homes in Toms River fall within the new Coastal A zone by using aerial photographs and maps of waterfront areas.

Under the state's newly adopted Uniform Construction Code, homes in the new Coastal A zone — located seaward of the so-called "LiMWA line" — will likely be

required to build using the same pilings, helical piles and breakaway walls required of homes located in the V, or velocity, zone on FEMA's flood maps.

LiMWA stands for "limit of moderate wave action," and structures within the line's boundaries must be built to withstand the impact of breaking waves of between 1½ and 3 feet. In the velocity zone, houses must be built to withstand damage from waves of 3 feet or more.

The LiMWA line can be found on

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NABIE

To receive the special NABIE room rate of \$199/night, please make your reservations before January 21, 2016 and identify yourself as a registrant of the "NABIE 2016 Annual Conference."

NSPE Urges EPA to Require Licensed Professional Engineers to Perform Audits at Municipal Solid Waste Landfills

On September 14, NSPE submitted a public comment to the Environmental Protection Agency (EPA) commending the agency for proposing additional safety measures requiring a professional engineer to prepare site-specific gas collection and control system (GCCS) plans as part of the proposed rule Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills. As part of the proposed rule, EPA requested comments regarding the appropriate professional and educational requirements for auditors. NSPE asserted

that the auditing process is best performed by licensed professional engineers. EPA further inquired as to whether self-audits should be allowed in lieu of independent audits. NSPE strongly encouraged EPA to maintain the current system of independent third-party audits. However, should the EPA allow a self-auditing process, NSPE stated that the report must be prepared by a licensed professional engineer. See more at: <http://www.nspe.org/resources/issues-and-advocacy/latest-news/nspe-urges-epa-require-licensed-professional-engineers#sthash.dyJz18rX.dpuf>



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■ Rebuilding, Elevating After Sandy

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FEMA's preliminary flood insurance rate maps, where it can be seen as a black line with triangular flags. The line zigs and zags depending on topography. Chankalian said that in Toms River, a quick review of the maps shows the line mostly affecting homes that are located about one house in from the open bay or the ocean.

In other parts of the Shore, some streets have several houses that are located seaward of the line. The low-lying part of Highlands, for example, appears to have several homes on streets closest to Sandy Hook Bay that fall within the new Coastal A zone.

FEMA has sent out an advisory detailing key requirements for buildings in the Coastal A zone.

You can look up your property and see where it is located in relation to the LiMWA line by using FEMA's "What is my BFE?" look-up tool.

Ryan said the new Coastal A zone requirements "are based upon the best available data on the type of foundation required to protect the structure given the soil types" found in the area.

There is some good news for homeowners: Ryan noted there is a six-month grace period to phase in the new construction code.

"This means that homes in the permit pipeline need not be redesigned as a result of the amended code," Ryan said. Homeowners who apply for a building or elevation permit after March 21, 2016, will need to comply with the new regulations, Ryan said.



50 West Street, New York City. Photo credit: www.skyscrapercity.com

Keeping Skyscrapers From Blowing in the Wind

By Michelle Higginsaug, *New York Times*, August 7, 2015

Fueled by a scarcity of land and by demand from multimillionaires willing to pay record prices for helicopter views of Central Park and beyond, Manhattan developers are building ever taller, ever thinner apartment buildings on ever tinier lots. Clustered mostly in and around West 57th Street, these skinny skyscrapers are reaching heights of more than 1,000 feet.

One consequence of beanstalk proportions: The higher and slimmer buildings get, the more they tend to sway at the top.

On a typically breezy day, a tower 1,000 feet tall might move a couple of inches, according to Rowan Williams Davies and Irwin, consulting engineers. About once a year, a 50-mile-per-hour wind comes up, moving a tower of this size about half a foot. On a rare day, say once every 50 years, 100-mile-per-hour winds might move the tower as much as two feet.

While such movement does not present a safety hazard and is often imperceptible, it can make some people woozy. So developers of skinny skyscrapers are installing giant counterweights, or dampening systems, at the

apex of their towers to offset building motion. This ballast is not an amenity proclaimed in large type in a glossy brochure — or one most developers care to talk about. Nevertheless, it is viewed as state-of-the-art assurance for the penthouse-buying set.

“It makes sense to do it, because who wants to wear a seasick band when you’re at your house?” joked Brian K. Lewis, an associate broker at Halstead Property, who is representing a buyer in contract at 780-foot-tall 520 Park Avenue, and other buyers considering apartments at the towers One57 on West 57th Street and 432 Park Avenue, which all have dampening systems. “They’re not marketing it,” he added.

Dampening systems are not as alluring a draw as a slick lobby. One type, called a tuned mass damper, is made of steel or concrete, weighs anywhere from 300 to 800 tons and is housed with other mechanical equipment at the top of the building. A typical system can take up approximately 1,000 square feet of space and utilizes a double-height ceiling. Connected to the structure’s walls

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by a system of pistons and spring mounts, the damper acts like a massive shock absorber, pulling the building back toward its original position whenever high winds blow.

Another type of damper, known as a slosh damper or slosh tank, uses tons of water instead of steel to add weight to the top of a building.

"It's this incredible bit of technology that really gets hidden," said Stephen DeSimone, the president of DeSimone Consulting Engineers, which specializes in the design of high-rises. His firm is employing mass dampers to help minimize sway at rising buildings, including Time Equities' 50 West, a 780-foot-tall curved glass condominium in Lower Manhattan, and 100 East 53rd Street, a 710-foot-tall condominium by Vanke, Hines and RFR Holding. "Nobody knows it's there, standing guard, if you will."

These massive stabilizers are increasingly an integral part of skyscraper design in New York as buildings climb from ever smaller bases. In the last five years, Rowan Williams Davies and Irwin, a Canadian firm, a.k.a R.W.D.I., has worked on nine water-based and 14 mechanical dampers in New York. That's up from just four slosh tanks and three tuned mass dampers between the late 1990s and the last recession.

Right now, at least 10 luxury Manhattan apartment buildings under construction plan to install one.

Among them: 111 West 57th Street, the 1,428-foot-tall condominium and conversion of the landmark Steinway building undertaken by JDS Development Group and Property Markets Group; 53W53, the 1,050-foot tall apartment house next door to the Museum of Modern Art, by Hines, Goldman Sachs and the Pontiac Land Group of Singapore; Vornado Realty Trust's 950-foot-tall limestone tower at 220 Central Park South; and 111 Murray Street, a 792-foot-tall curved glass condominium by Fisher Brothers, Witkoff and New Valley, on the edge of TriBeCa.

Then there's 432 Park Avenue, a venture of CIM Group and Macklowe Properties, which topped out last year at 1,396 feet and holds the title for the tallest residential tower in the Western Hemisphere. It has two tuned mass dampers.

Dampening systems are not required by the New York City building code, and structural engineers emphasize that this equipment has nothing to do with the integrity of the building.

"It's purely about comfort," said Silvan Marcus, a

director of building structures for WSP, an international engineering consultancy. "It's related to money and how luxurious the place is."

Builders put skyscrapers through all kinds of tests to make sure they will perform well in every conceivable weather condition. Scale models are placed in wind tunnel machines that simulate extreme winds. Based on the results, changes can be made in the design, like shoring up the building with thicker walls and columns.

The terra-cotta panels and bronze latticework on the east and west facades of 111 West 57th, for example, were designed partly to reduce the wind forces on the building.

Granted, all skyscrapers sway to some degree. And most of the time that movement is so slight it is imperceptible. But with tuned mass dampers costing relatively little — roughly \$5 million, not much in the scheme of things, with penthouses selling for as much as \$100 million — it's worth the investment for developers to ensure that the buyers of their apartments rarely, if ever, have any reason to consider wind speed.

"Unless you're a supersensitive person, you're probably not going to feel it," said Izak Senbahar, a developer of 56 Leonard, an 821-foot TriBeCa tower that is to have a water-based damper. "But if you're building a luxury apartment, you have to think about the comfort of every buyer." In that sense, he said, "I think it's a must."

Most of the developers contacted for this article were not willing to discuss the dampers going into their buildings. If they were concerned that doing so might incite jitters among potential penthouse buyers, they wouldn't say.

Mr. Senbahar, one of two developers who returned calls by deadline, likened the system to any other building amenity. "Your marketing people may not think a damper is sexy," he said, pointing out that marketers tend to be more excited about features like dog spas than building engineering. "I was joking," he added, "but a damper and a dog-grooming station are just two amenities of a building."

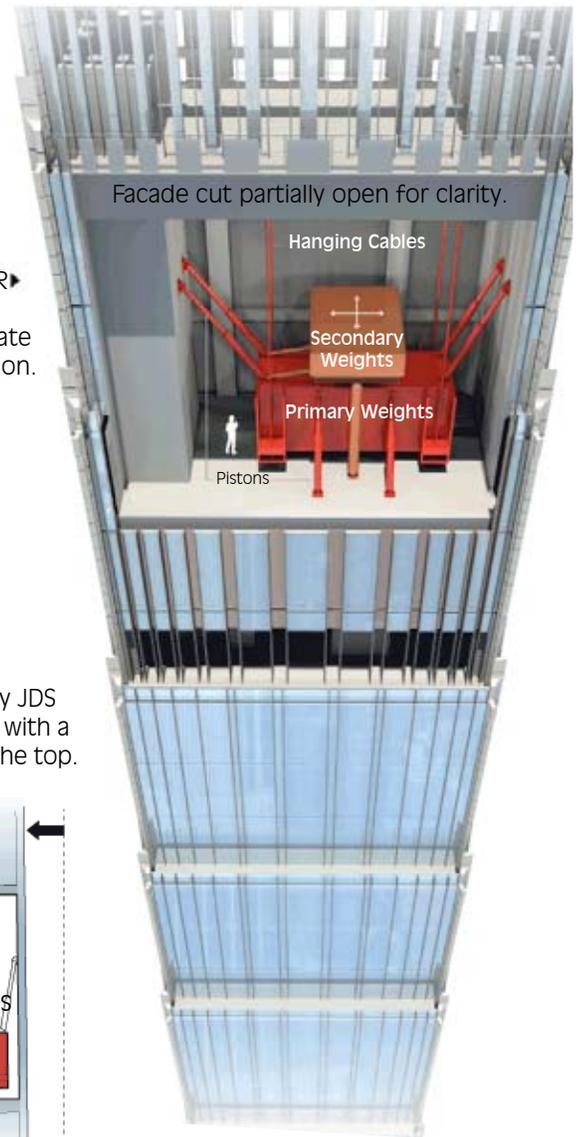
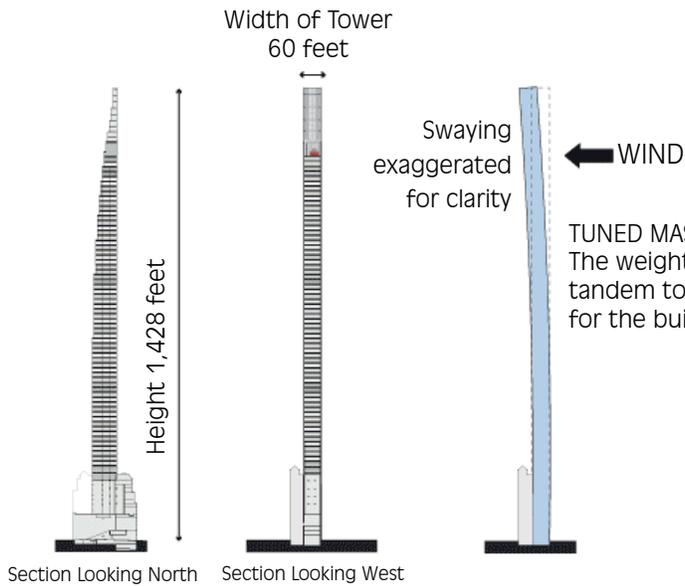
Another developer not shy about discussing building sway was Simon Koster, a principal of JDS Development Group, which with the Property Markets Group is building 111 West 57th Street. With a 60-foot-wide tower, the 1,428-foot condominium is perhaps the slimmest of them all. Designed by SHoP Architects, it will have an 800-ton tuned mass damper.

Reducing Skyscraper Sway

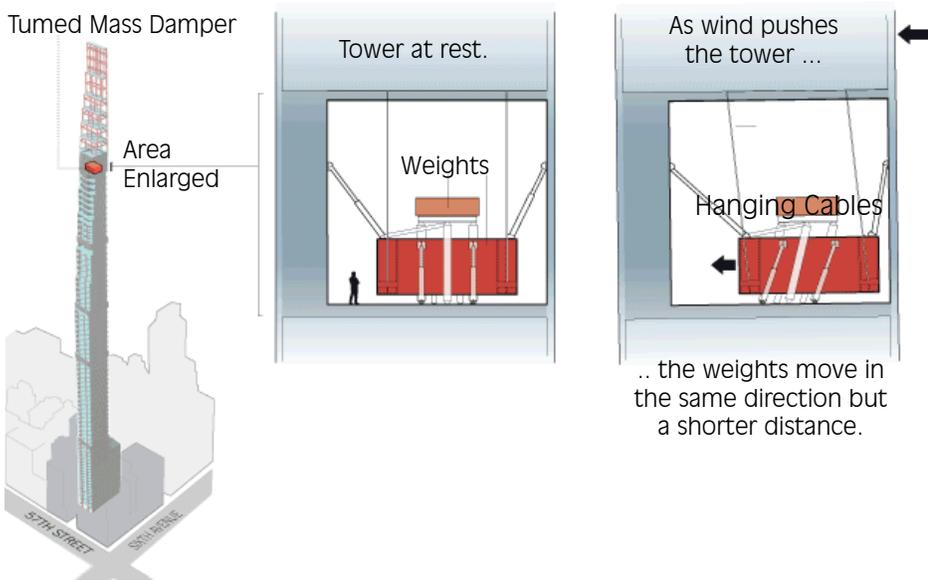
By Mika Gröndahl, New York Times, August 6, 2015

All tall buildings sway in high winds. And the skinnier they are, the more they tend to sway. While the movement does not present a safety hazard and is often imperceptible, it can make some people queasy. To keep residents comfortable, developers of skinny skyscrapers are placing "tuned mass dampers" at the top to slow building motion. These giant counterweights are increasingly an integral part of building design in New York as skyscrapers climb taller from smaller bases.

Tower at 111 West 57th Street



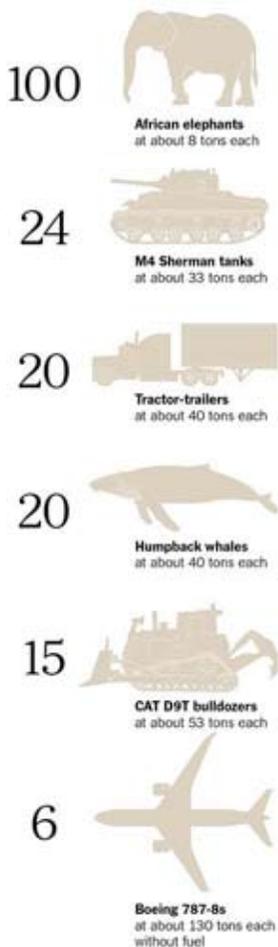
One of the tallest and slimmest residential towers going up in New York is 111 West 57th Street, a condo tower above the landmark Steinway Hall building by JDS Development Group and Property Markets Group. Designed to rise 1,428 feet with a 60-foot-wide tower, the condominium will have an 800-ton mass damper at the top.



Sources: SHoP Architects, WSP

Heavy on Top

To keep skinny skyscrapers from swaying when high winds blow, developers are placing giant counterweights at the top. They can weigh anywhere from 300 to 800 tons apiece. To get an idea of how much heft that is, consider the following 800-ton equivalents.



engineers say. In a building, however, people don't anticipate that the floor will move. "It's your home," said Mr. Marcus of WSP. "Imagine you start eating and you see the wine in your glass going left to right."

While slosh-inducing storms are rare, a damper would slow the acceleration, measured in milli-g's, by up to 50 percent, according to R.W.D.I. The perception of motion, therefore, would also be reduced.

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"Is the building structurally sound without the damper? The answer is absolutely," Mr. Koster said. "All buildings move. It's about tailoring that movement" for the comfort of the occupants.

Engineers have no problems talking about dampers, enthusing about aspect ratios, milli-g's and other measurements that go into their design. They point out that it is not so much the actual displacement of a building that is pertinent, but rather the acceleration and deceleration of the building's sway when winds kick up.

"When you're in a car, you may be going 60 miles per hour and you don't feel it," said Eli Gottlieb, a senior principal of Thornton Tomasetti, a New York engineering firm that is working on at least three Manhattan buildings that will have dampers. "But every time the car accelerates or decelerates or changes lanes, you feel the start and stop."

That sensation is acceptable in a moving vehicle partly because it's expected,

To give developers an idea of what those milli-g's actually feel like, R.W.D.I. has teamed up with the Fisheries and Marine Institute of Memorial University of Newfoundland. There, a simulator designed to replicate the movement of oceangoing vessels in rough seas for mariner training offers a virtual reality experience of building sway in blustery weather.

The simulator, usually outfitted to look like the bridge of a ship, is decorated with furniture when a developer is the client, including a couch, a chandelier and wine glasses filled with water. Instead of rocky seas, city views are projected on the walls. While clients sit, stand or lean against a kitchen counter as they might at home, "we take it through the full range," with and without a damper, said Jon Galsworthy, a principal of R.W.D.I.

The developers get an idea of what they might expect to feel without a damper on, say, a windy day in the spring, during a big nor'easter, or when a hurricane hits. "It makes it very, very real and leaves a very distinct impression," he said.

So what exactly does it feel like? "You get a little dizzy and a little disoriented," said Maria Halfyard, a manager of the Center for Marine Simulation at the Fisheries and Marine Institute. "You're like, whoa, this is weird. I'm in a building and I'm moving and I feel like I'm getting motion sick."

But those who have lived in high places say the sway can also be exciting. "I actually thought it was really cool," said Christopher Meloni, the actor, who lived with his family on the 60th floor of the Park Imperial in Midtown Manhattan for several years until moving to Los Angeles a couple years ago.

Even though the Park Imperial has a dampening system, Mr. Meloni said he "would feel the sensation and then I would look to my right and I'd see the buildings next door moving back and forth through my framed window and go, 'O.K., I'm not crazy.'

"To me, the joy about living that high is the weather phenomenon," he added. "Sometimes you're fogged in and so you feel, 'here I am flying through the clouds.' You'll see the storm fronts coming from over New Jersey and over the middle of the Hudson. It always was very, very exciting."

Mr. Meloni's apartment is on the market for \$8.95 million. With its high-floor panoramic views, said Mr. Lewis, the listing broker of Halstead Property, it is "attracting strong interest."

A Belated Look at New York's Cooling Towers, Prime Suspect in Legionnaires' Outbreak

By Winnie Hu and Noah Remnickaug, August 4, 2015

Since the outbreak that gave Legionnaires' disease its name nearly four decades ago, water-cooling towers have been identified as prime breeding grounds for the deadly disease.

But even as cases have increased across the nation, and experts have called for more safeguards, New York City has done little to address the risks the towers pose as they power air-conditioning systems in many large buildings.

Now, as New York faces the largest outbreak of Legionnaires' disease in the city's history, Mayor Bill de Blasio and other officials are trying to marshal a more aggressive approach to the disease and to quell concerns raised by seven Legionnaires' deaths since July 10, all of them in the South Bronx. At a news conference on Tuesday in the Bronx, the mayor said that the total number of cases had risen to 86 and that more cases were expected to be reported, though the outbreak appeared to be ebbing.

Given its name by a 1976 outbreak at an American Legion convention in Philadelphia, the airborne respiratory disease has sickened thousands of New Yorkers. The city's first confirmed case, in 1977, was a 68-year-old Manhattan woman (who recovered), and since then, the disease has struck again and again, in apartment complexes, office buildings and even on a cruise ship. But the disease has typically come in smaller numbers and with only scattered deaths, and that has largely left the government reacting to outbreaks rather than trying to prevent them.

Mayor Bill de Blasio spoke at a news conference on Tuesday about the recent outbreak of Legionnaires' disease in the Bronx. Credit Chang W. Lee/The New York Times

Often described as a severe form of pneumonia, the disease can spread through air-conditioning systems, exposed overhead pipes and other common features of urban life.

And it can take as little as walking by one of these sources carrying the legionella bacteria and inhaling its contaminated mist to contract the disease, though certain people — older adults, smokers, those with weakened immune systems — are more susceptible.



Mayor Bill de Blasio spoke at a news conference about the recent outbreak of Legionnaires' disease in the Bronx. Photo credit: Chang W. Lee/The New York Times

In recent years, the country has seen a spike in legionella-related illnesses. The number of cases reported to United States public health authorities rose to 4,548 in 2013 from 1,127 in 2000, according to a 2015 medical journal article.

This year, the Centers for Disease Control and Prevention has reported about 2,400 cases of Legionnaires' disease nationwide, with more than 130 of them in New York City.

Precisely how and where the 86 people with Legionnaires' in the current South Bronx outbreak contracted it remained under investigation by health authorities. But five water cooling towers — a component of the heating, ventilation and air-conditioning systems in many modern buildings — have tested positive for legionella in the affected area and are thought to be the source of the outbreak. That finding has highlighted longstanding concerns about the upkeep and oversight of the cooling towers, which provide the damp, warm environment that the bacteria need to thrive and must be cleaned regularly to prevent bacteria from taking root.

Dr. Jay Varma, deputy commissioner for disease control for the city health department, said in an interview that the city had not proposed regulation sooner in part because identifying the cause of the disease can be difficult in many cases. He said it was also not known how often cooling towers were the source. "The challenge is we don't

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know where most infections normally come from," he said.

In the South Bronx, Dr. Varma said, officials are confident that they have identified and addressed the likeliest cause of the outbreak but have yet to determine whether it was one or more of the towers. Citing privacy laws, he said the city would not release the names of the dead.

At the news conference on Tuesday, Mr. de Blasio said the city planned to tighten regulation of the towers, but in recent days, community leaders, neighborhood residents and industry experts have faulted the city for failing to have a more rigorous inspection regime in place.

Although the city currently monitors cases of Legionnaires' disease, by the time health officials register an abnormal increase in diagnoses, an outbreak may already be underway, as the disease has an incubation period of up to 10 days.

In December and January, there was another outbreak of Legionnaires' disease in the Bronx, with 12 confirmed cases. Eight involved residents of Co-op City, the sprawling complex of apartment buildings in the northeast Bronx. Cooling towers were later found with the bacteria. None of those cases were fatal.

Mr. de Blasio, in defending the city's response on Tuesday, said the recent outbreaks in the Bronx had underscored the key role of cooling towers in spreading the disease and had prompted city officials to become more active. "Previously, and this is the consensus of everyone I've talked to who are experts in this field, there wasn't an identified pattern that suggested these cooling towers were a problem," he said. "Now we have a pattern."

But a study published last year by researchers in the city's health department documented the rapid increase in cases of the disease and pointed to cooling towers as one of the risk factors in outbreaks. The study also noted that the disease was often concentrated in impoverished neighborhoods, saying, "If environmental issues in high-poverty neighborhoods contribute to the disparity, greater effort may be warranted, for example, on the upkeep of cooling towers and water systems in the buildings in these areas."

The C.D.C., the New York State Department of Health and a variety of industry groups have all published guidelines for maintaining cooling towers in an effort to

help health care facilities prevent the spread of legionella bacteria. In June, the American Society of Heating, Refrigerating, and Air-Conditioning Engineers, an influential engineering association, specifically addressed cooling towers in a standard published in June to reduce the risk of legionella.

But generally such standards are not binding, leaving building operators to weigh the risks of legionella with the hefty price of monitoring.

"Hindsight is 20-20, but it's not a new disease," said Bill Pearson, who served on the committee that wrote the recent standard. "And it's not like we haven't known about the risk of cooling towers, and it's not like people in New York haven't died of Legionnaires' before."

In 2000, City Councilman James S. Oddo, who represented Staten Island, proposed a resolution to determine best practices for preventing Legionnaires' disease at hospitals in the city. The resolution, which Mr. Oddo, now the Staten Island borough president, says was inspired by a report he saw on television, ultimately failed.

A grave warning came five years later. Seven patients contracted Legionnaires' disease, two of whom died, at NewYork-Presbyterian/Columbia hospital, and a city and state investigation traced the source to a tainted water supply in a hospital building. The hospital, which was cited by state health officials, later adopted a stringent monitoring system.

But concerns about the disease have lingered around the city. Indeed, during a 2010 committee hearing on indoor air hazards that might spread legionella and other bacteria, James F. Gennaro, then a city councilman from Queens, interrupted a representative for a contractors' association to say his testimony was "freaking me out so bad I'm putting like, you know, Purell on right now."

One of the largest outbreaks took place in 1994 on the cruise ship *Horizon*, part of Celebrity Cruises, which departed from New York City. One passenger died from Legionnaires' disease, and federal health officials found 16 other confirmed and 34 suspected cases of the illness in passengers on the *Horizon* between late May and mid-July of that year. The outbreak was traced to legionella found in the sand used in filters in the ship's whirlpool baths.

Benjamin Mueller and Kate Pastor contributed reporting, and Susan C. Beachy contributed research.