cross sections

Magazine for the Structural Engineers Association of New York

2020 VOLUME 25 NO. 2

2020 EiSE Awards

STRUCTURAL ENGINEERS ASSOCIATION NEW YORK

SEAoNY
536 LaGuardia Place
New York, NY 10012
www.seaony.org

2020 EiSE Awards Issue

On the Cover
Charles Library - Temple University
By LERA

Contact us at
seaonypubs@gmail.com

Check out previous issues at
seaony.org/publications

For advertising inquiries, please contact our Sponsorship Committee at ***execdir@seaony.org****.*

CONTENTS

2020 VOLUME 25 NO. 2

MESSAGES

PRESIDENT'S MESSAGE (2019-2020)

Welcome to SEAoNY's Excellence in Structural Engineering Awards Issue of Cross Sections. Like so many other things during this challenging year, the EiSE Awards were delayed, but came together eventually. We had to cancel our annual Boat Cruise in June, and were thus unable to enjoy a nice evening of dinner and drinks, but we were able to have our Awards ceremony via Zoom in August.

I was happy to be part of the Awards judges panel this year. A special thanks to our 2019 Honorary Member and Associate Partner at Gilsanz Murray Steficek - Vicki Arbitrio, Director of Engineering at the National September 11 Memorial and Museum - Joe Flannigan, Assistant Vice President of Development at L&L MAG - Standish Lee and Chairman of the Civil Engineering Department at Manhattan College - Dr. Moujalli Hourani for each of your participation. It was a pleasure meeting with the panel members and discussing the very worthy entries.

We received 35 entries this year, each of them very deserving of award. Showcasing the breadth of work that our members are involved in, the projects ranged from temporary scaffolding to some of the world's tallest skyscrapers. They were located right here in New York City, at various locations throughout the country and on other continents. Kudos to the finalists, who in typical 2020 fashion, were asked to do something different – make a three minute video to describe your project; unsurprisingly they all excelled. The videos made our Zoom ceremony a roaring success and we just might have to figure out how to show videos on the next Boat Cruise – tentatively scheduled for June of 2021.

Congratulations to the all of the winners! Good luck creating next year's Excellence Awards entries!

With warm regards,

Jimmy Vignola, P.E.

EDITOR'S MESSAGE

Hello Friends and Readers,

I hope this note finds you in good health and high spirits. It has been a rather tough year for most of us, but I am optimistic for a strong finish to 2020! When something as major as a global pandemic happens, it truly emphasizes what is important; the simple things we often take for granted.

With no social life and an abundance of free time, I've made note of the things I've under-appreciated: spending time with my friends and family, being employed, seeing my colleagues at work, being able to read facial expressions, vacation, toilet paper... the list goes on, but I won't bore you. I will not opine on aspects of the pandemic response that are out of my control, but I believe things are starting to look better. We will emerge on the other side of this challenge as a stronger and more resilient city, as New York City always does.

In this issue of Cross Sections, please enjoy a recap of the EiSE Awards Ceremony. Though this year's celebration was not on a boat cruise per usual, the talent and ingenuity of our NYC structural engineers continue to impress and inspire.

I would like to also take a moment to thank The Foley Group, who have been working with us to create a new look and feel to Cross Sections. We are always looking for ways to improve, and we couldn't have done it without them.

Please read on and enjoy!

Dan Ki

2020 EiSE AWARDS

WINNER

RENOVATION/RETROFIT/REHABILITATION

PROJECT: WOOLWORTH TOWER RESIDENCES

DESIGN FIRM: GILSANZ MURRAY STEFICEK LLP ENGINEERS AND ARCHITECTS

The innovative and elegant early skyscraper completed in 1913, endures today as an iconic form on the New York City skyline - the tallest building in the world until 1930. Our team renovated, restored and redeveloped the upper 30-story "tower" to luxury condominiums, while the lower 28 floors of offices remained occupied throughout reconstruction. A high level of collaboration between the design and construction teams ensured this project was successful. All materials were hoisted within the building – no exterior crane! Where removals and reinforcing was necessary to create modern apartments, the building's stiffness was maintained to assure no change to the support conditions of the envelope.

RENOVATION/RETROFIT/REHABILITATION


ARUP

PROJECT: OHIO UNION INFRASTRUCTURE UPGRADES

DESIGN FIRM: ARUP

The Ohio State University hosts an annual fundraiser known as the BuckeyeThon, which culminates in the Dance Marathon in the Ohio Union's Griffin Ballroom. With more than 2500 students dancing together at a time, the building was suffering from extreme vibrations, particularly noticeable in three spaces immediately below the ballroom. Arup was brought in to attend the event, measure vibrations, and advise on mitigation solutions. We ultimately settled on a solution incorporating tuned mass dampers and minimal structural retrofits, saving the client more than $700,000. Retrofits were selected in a way that efficiently used materials and avoided obtrusive construction work.

RENOVATION/RETROFIT/REHABILITATION

PROJECT: LEHIGH UNIVERSITY MOUNTAINTOP CAMPUS MIXING BOX - BUILDING C

DESIGN FIRM: CAST CONNEX CORPORATION

South Mountain, just outside of Bethlehem, Pa., is the home of Lehigh University's Mountaintop Campus, a sprawling site that was once home to the Bethlehem Steel industrial complex. Today, Lehigh is reinventing the facility as a next-generation academic environment. The newly completed "mixing box" uses much of the original steel framing, exposed to compliment the industrial aesthetic of the existing building. Structural challenges were overcome, and a thoughtful approach to adaptive reuse was maintained in order to create a distinctive, kinetic, flexible space aimed at stimulating the minds of students and springboard their ideas well beyond the box.

WINNER

OTHER STRUCTURES

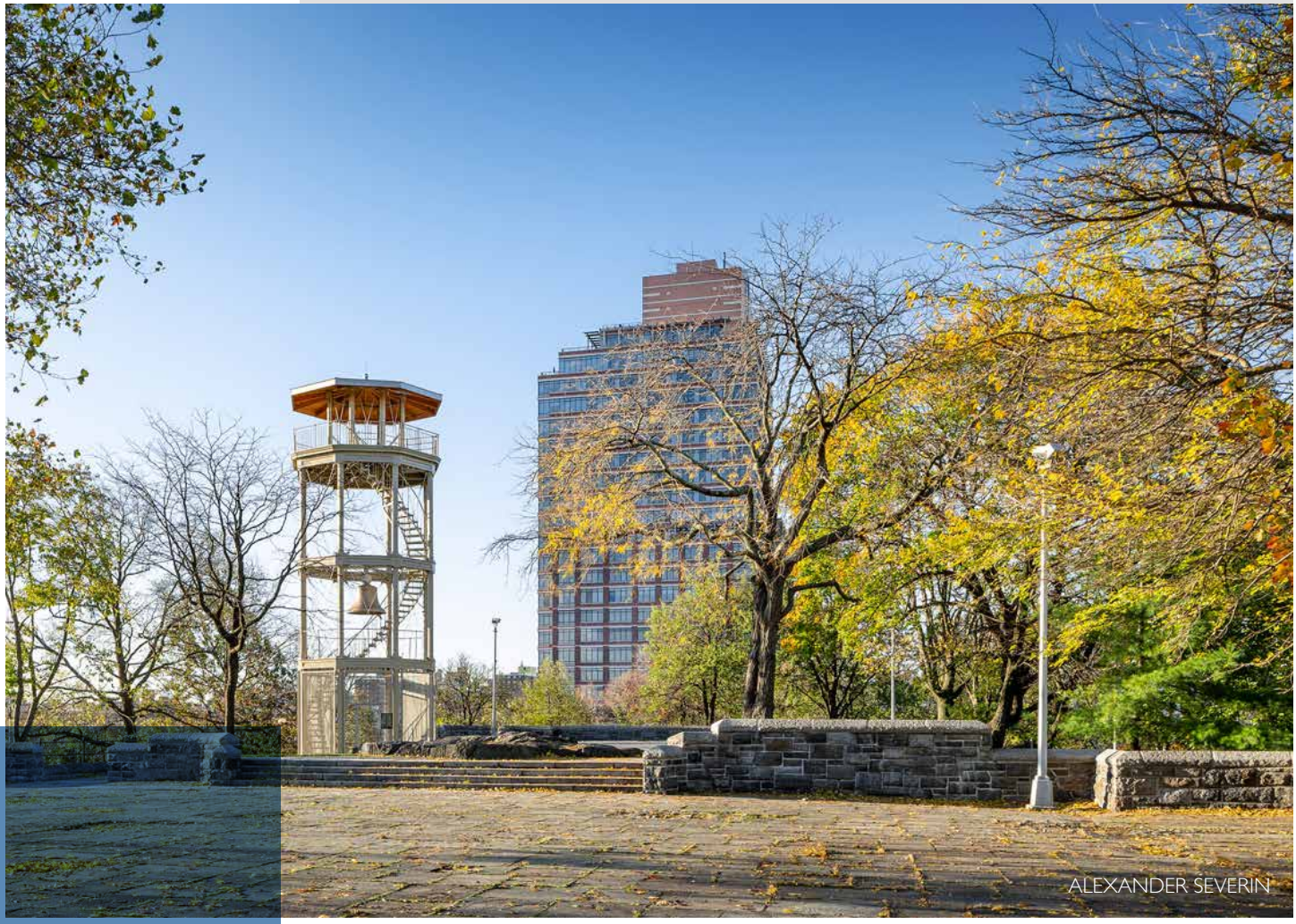
GMS

PROJECT: 730 FIFTH AVENUE
CANTILEVERED WORK PLATFORM

DESIGN FIRM: GILSANZ MURRAY STEFICEK LLP
ENGINEERS AND ARCHITECTS

The historic Crown Building is currently configured as a condominium, with one Owner for the retail spaces between the cellar and third floors and another Owner for the hotel and residential condominiums in the upper stories. Our firm provided the structural engineering to the Retail Owner and their architect to develop a unique solution to create a cantilevered work platform, which would protect pedestrians without posting columns down to the sidewalk, 47 feet below. The retail tenants understood that work on the upper levels and façade, would be on-going, and negotiated into their leases that the sidewalks would remain open, without restrictions or impediments to the flow of New Yorkers.

OTHER STRUCTURES



ALEXANDER SEVERIN

PROJECT: FIRE WATCHTOWER AT MARCUS GRAVEY PARK

DESIGN FIRM: THORNTON TOMASETTI

The Harlem Fire Watchtower, constructed in 1856, is one of America's oldest surviving cast iron framed structures. By the late 20th Century, the structure fell into disrepair and was near collapse. Corrosion and structural movement had damaged a majority of structural elements. Structural modeling of the tower's archaic structural system revealed that the original design was inadequate, and the frame had failed under wind loading, so new interventions were required. To satisfy both structural and historic preservation goals, it was decided to reconstruct the tower as it originally stood but add a bracing system to make it structurally sufficient.

OTHER STRUCTURES

STEVEN CAPRI, PE CONSULTING ENGINEER

PROJECT: WATERLINE SQUARE AMENITIES CENTER

DESIGN FIRM: STEVEN CAPRI, PE CONSULTING ENGINEER

Thirty five feet below the outdoor courtyard park ground surface at Waterline Square on the West side of Manhattan is the lowest level of a three story high underground canyon. This signature space is the Waterline Club which is the project's 100,000 square foot amenities center and it serves as the central connection of the three towers which form the two million square foot residential complex. A pair of stacked, winding pedestrian foot bridges and a sweeping spiral stair serve as the convergence points for the soaring ceilings which are constructed with GFRG in conjunction with over 900 individual aluminum fin elements.

WINNER

NEW BUILDING – LARGE (ABOVE 750,000 SQ. FT.)

PROJECT: 15 HUDSON YARDS

DESIGN FIRM: WSP

15 Hudson Yards will be the first luxury residential offering of the Hudson Yards Redevelopment Project. The stunning 920 ft tall tower encompasses over 980,000 square feet. At its slender (12:1) base, the adjacent mobile performing arts center, "The Culture Shed", undercuts the tower above creating a dramatic V-cut in the lower 140 feet of the building. Above The Culture Shed, the rectilinear floorplates continuously morph and taper into a tightly curved quatrefoil form at the tower's peak.

NEW BUILDING – LARGE (ABOVE 750,000 SQ. FT.)


DAVE BURKE

PROJECT: 35 HUDSON YARDS

DESIGN FIRM: SOM

35 Hudson Yards is a mixed-use skyscraper, located at the heart of Hudson Yards, an unprecedented real estate development constructed above active railroad tracks and tunnels on the West Side of Manhattan. Reaching a height of more than 1000 feet, the tower is the tallest residential building in the new district. SOM's integrated team of architects and engineers met the challenge of designing 35 Hudson Yards, with no direct concrete connection to terra firma. The building is a robust, stiff structure, designed to resist strong winds from the Hudson River and constructed on a fast-track schedule while maintaining a non-stop operation of critical infrastructure.

NEW BUILDING – LARGE (ABOVE 750,000 SQ. FT.)

PROJECT: WASL TOWER

DESIGN FIRM: DESIMONE CONSULTING ENGINEERS

Wasl Tower is a new 63-story mixed-use tower with an additional two basement levels located in Dubai, United Arab Emirates. The project's centerpiece and namesake, a high-rise tower, is characterized by its torsion, or illusion of twisting movement. The tower also features one of the world's tallest ceramic facades, which has capacity to acclimatize to local temperatures through shading and cooling techniques. The aesthetic references the interconnectivity of Dubai's complex infrastructure. DeSimone was contracted to reduce the overall project cost by 20% through efficient structural solutions, succeeding in reducing construction materials by 35% without changing the project's architectural design.

WINNER

NEW BUILDING – MEDIUM (400,000 SQ. FT. – 750,000 SQ. FT.)

ENGINEERS' CHOICE AWARD

PROJECT: MINISTRY OF TAXATION

DESIGN FIRM: THORNTON TOMASETTI

The Ministry of Taxation (MOT) tower adds a new twist to the Baku skyline. The tower features five stacked cubes that cantilever independently from a circular central core—and each cube rotates 1.2 degrees from the cube below, resulting in a 40 degrees rotation overall. The tower posed interesting challenges related to its unique design, its location in a high seismic region, and significant wind demand. The team used Performance Based Design principles to address the seismic loads. Creative approaches to the lateral system, construction sequencing and truss design helped overcome challenges and create new landmark in the region.

NEW BUILDING – MEDIUM (400,000 SQ. FT. – 750,000 SQ. FT.)

THORNTON TOMASETTI

PROJECT: DAVID H. KOCH CENTER FOR CANCER CARE AT MSK CANCER CENTER

DESIGN FIRM: THORNTON TOMASETTI

The David H. Koch Center for Cancer Care at Memorial Sloan Kettering Cancer Center is a 450-foot tall, 750,000-square foot ambulatory care center in New York City. Located next to the East River and within a flood zone, resiliency was a key driver to the building's structural design, including operable flood barriers and relocating all major mechanical and medical equipment to the upper levels above the design flood elevation. Supporting these raised systems required significant structural coordination, most significantly at linear accelerator vaults constructed from five-foot thick concrete walls and slabs with more than 250 tons of lead.

NEW BUILDING – MEDIUM (400,000 SQ. FT. – 750,000 SQ. FT.)

PROJECT: EIGHTY SEVEN PARK

DESIGN FIRM: DESIMONE CONSULTING ENGINEERS

Eighty Seven Park is an 18-story luxury condominium tower with 70 residences, located on the edge of parkland and the Atlantic Ocean in Miami Beach, Florida. Designed in collaboration with Pritzker Prize-winning architect Renzo Piano, the tower features 22 ft cantilevered balconies on its east and west sides which were achieved with 15 in thick post-tension slab of 8 ksi concrete. The project enhances the presence of the green space in the North Shore Park area, extending the green area to the northern limit of the project site, with a reduced building footprint to create more space for greenery.

WINNER

NEW BUILDING – SMALL (UNDER 400,000 SQ. FT.)

LERA

PROJECT: CHARLES LIBRARY - TEMPLE UNIVERSITY

DESIGN FIRM: LERA CONSULTING STRUCTURAL ENGINEERS

The Charles Library redefines what a modern library can offer its inhabitants and surrounding community. The design architects, Snøhetta, conceived a grand architectural vision, with an emphasis on soaring, open, and fluid spaces. This vision demanded a dynamic and innovative structural system in kind, employing a combination of large cantilevers and long-span arches. The 4-story, 220,000-sf library features a 47,300-sf building-wide green roof, reading and study spaces, event space, a 3D-printing workshop, and virtual reality space, as well as a 3-story-tall automated book storage and retrieval system that condenses the vast majority of the library's collection into high-density storage units.

NEW BUILDING – SMALL (UNDER 400,000 SQ. FT.)

GEIGER ENGINEERS

PROJECT: LOUIS ARMSTRONG STADIUM

DESIGN FIRM: GEIGER LYNCH MACBAIN CAMPBELL ENGINEERS P.C.

Louis Armstrong Stadium, part of the USTA Billie Jean King National Tennis Center, is a 14,000-seat open-air covered tennis venue. A unique ventilating system in the lower seating bowl along with terra-cotta louvered walls promote natural air flow. A fixed roof canopy supported by two 14ft deep trusses spanning 240ft provides shade for players and spectators alike. The stadium also boasts a tension-membrane-clad retractable roof comprised of two 20,800 sq. ft. panels that move in concert to cover, or uncover, the court. The project encompassed structural design from the pile foundations to the retractable roof's tension membrane and mechanization.

NEW BUILDING – SMALL (UNDER 400,000 SQ. FT.)

PROJECT: THE REACH AT JOHN F. KENNEDY CENTER FOR PERFORMING ARTS

DESIGN FIRM: SILMAN

The Kennedy Center's South Plaza Expansion adds 72,000 sf of much-needed interior space for this landmark cultural facility and living memorial. It consists of three partially buried white concrete pavilions, a two-story subgrade structure that connects them, landscaped terraces, and a pedestrian bridge. Cast-in-place concrete serves as the primary structural solution and aesthetic language. Working closely with the design team, Silman used several structural design techniques – such as voided concrete slabs, post-tensioning, and deep beams – to bring all the components of this project to fruition, creating a series of unique and thoughtful new spaces for education, rehearsal, and events.

Puerto Rico

Department of Buildings Annual COOP/ATC Training and Assistance for Earthquakes

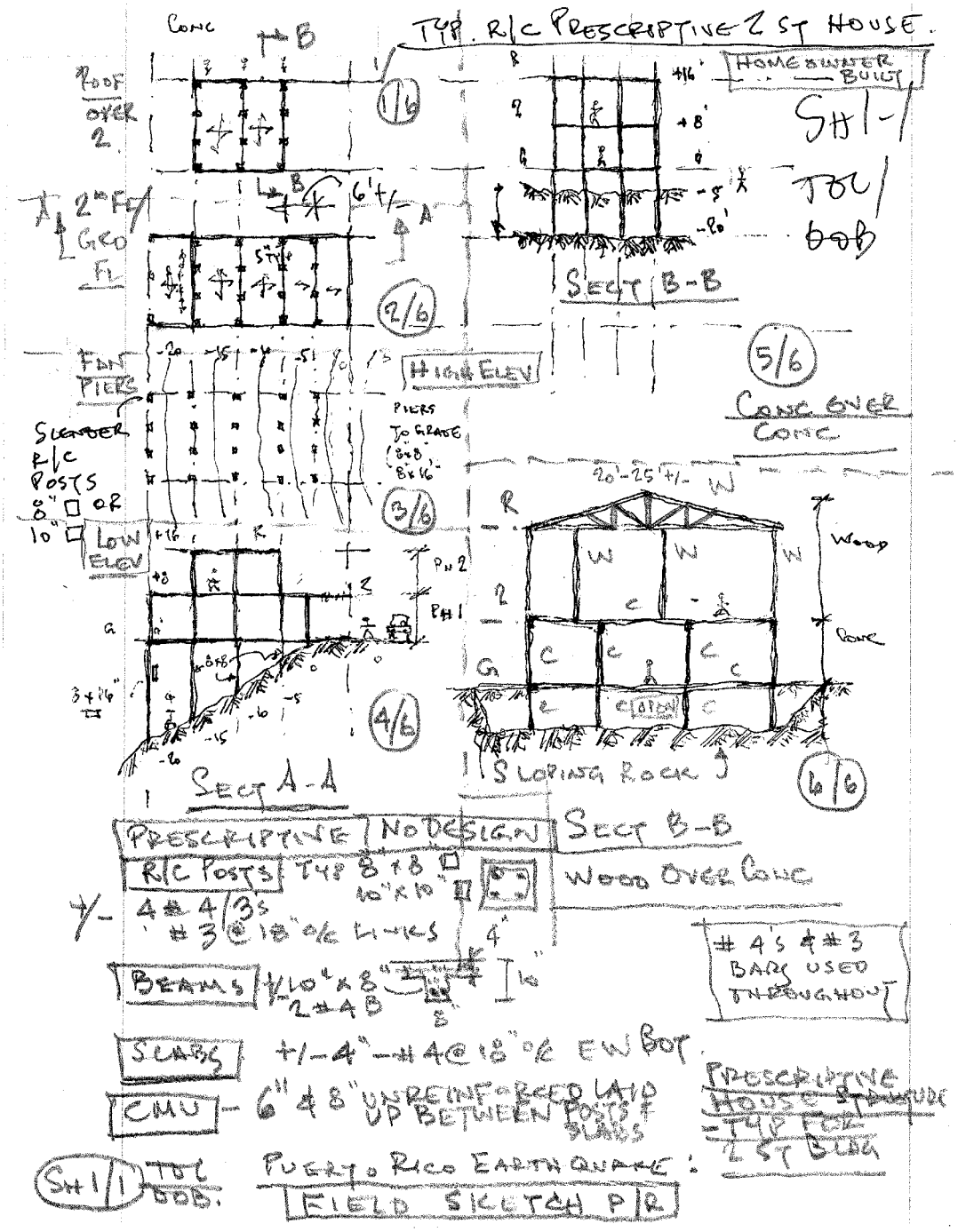
Timothy D. Lynch PE. *Chief Engineer Enforcement*
Vakhtang Tamasidze

The Department of Buildings (DOB), working with NYCOEM, FDNY, DDC, HPD, SEAoNY, AISE, AIA, and other agencies, provide free, one day training programs to the industry on how to quickly evaluate and record buildings that are damaged or potentially damaged after natural disasters. Our training is an important part of New York City's Continuation of Operations Program (COOP). The COOP is part of an incident management program based on FEMA's National Incident Management Systems (NIMS). Given New York City's size, we have our own version of NIMS called CIMS which is run by NYC's Emergency Management team. NIMS and CIMS are organizational structures that establish a chain of command that oversees the incident, as well as separating the incident into manageable Operations, Logistics, Financial and Planning Sections. Under the NIMS and CIMS programs, agencies have defined "core competencies". DOB's core competency is performing RAPID and DETAILED building evaluations for occupant safety.

NIMS, CIMS, COOP and ATC training allow NYC to operate seamlessly during large or small scale emergencies. Advanced Technology Council (ATC), a national non-profit technical organization who prepare engineering solutions for emergency situations, has published two useful national standards for building evaluations. The two standards are used by DOB as part of our core competencies. The first standard is called ATC 20 and is based on Earthquake damage. ATC 45, the second standard, addresses the more frequently encountered wind and food damage resulting from coastal storms.

ATC 20 and 45 are based on nationally standardized RAPID and DETAILED building evaluations. RAPID building evaluations are just that, quick checks of the exterior and on occasion, the interior of a structure using key structural indicators as noted on the ATC forms. Once the evaluation is complete, structural integrity can be determined. Ultimately, the building is posted SAFE (green), UNSAFE (red), or somewhere between the two (yellow). DETAILED evaluations require a more in-depth survey and are most typically performed on publicly accessible and essential buildings.

DOB as Industry Leaders in Emergency Response: This article discusses how, over the last few years of expanded training, DOB and our agency colleagues have become experts in performing rapid and detailed evaluation in a multitude of different scenarios. We have assisted with mutual aid deployments for



earthquake and hurricane devastation in Puerto Rico, snowstorms in upstate New York and recently, safe COVID inspections for essential sites. One of our most valuable adaptations has been the move from a paper-based program to a completely digital platform. Productivity, accuracy, and ease of reporting have been greatly improved.

Superstorm Sandy: On October 29th, 2012, Superstorm Sandy passed over New York City, destroying hundreds of buildings, damaging thousands more, and leaving many without power or a roof over their head. In the weeks after the hurricane, sixty-six thousand impacted buildings had to evaluated. Due to the sheer number of buildings requiring evaluation, DOB supplemented our staff with outside consultants. Rapid evaluations focused on whether a building was safe for occupancy, or unsafe, requiring a vacate. Engineers and inspectors used ATC 45 Safety Evaluation of Buildings after

Cracking between the windows

Windstorms and Floods which, at the time, was paper based. The program relied on tax and land maps and time-consuming end-of-day clerical data entry. All told, five weeks were spent determining the initial public safety for the impacted buildings.

The Need for COOP / ATC Training: After a natural event impacts a region, be it an earthquake or hurricane, the buildings within the region need to be promptly checked for occupant safety. Damage from an event is often negligible, but a determination as to their safety has to be made promptly. Impacted and lightly damaged buildings are often habitable with noted restrictions, e.g. "front room and 2nd Floor to remain vacant." The DOB's annual training, based around ATC's standardized field evaluations for professionals and inspectors, provides uniform, rapid assessment guides for structural conditions.

After simple RAPID or DETAILED evaluations, the buildings are "posted" with paper placards, or "spot-painted" RED, YELLOW, or GREEN. RED indicates conditions unsafe for occupancy, GREEN indicates safe occupancy and YELLOW indicates safe with some restrictions. During Superstorm Sandy, the evaluations were performed using pen and paper. This process is time consuming and requires significant manual entry into a database. Ultimately, the longer engineers and inspectors take to complete the evaluations, the longer the public is exposed to potentially unsafe conditions. COOP and ATC training is essential for accelerating the evaluation process. Our engineers and inspectors must be ready to work immediately, already trained using the latest field evaluation technology. To achieve this, DOB mandates an annual day of COOP / ATC 20 and 45 training. This has resulted in a large roster of technical and inspectorial staff ready to perform

RAPID and DETAILED evaluations. Our program has also moved into digitized ArcGIS technology. Although an individual still needs to visit the buildings and evaluate using the standardized ATC methodology, the assessments are now entered on phone apps with preloaded GIS maps and site-specific forms.

The Switch from Paper to Digital Evaluations: The DOB, working in conjunction with arcGIS service providers, FDNY, and NYC Emergency Management, has switched from analog documentation of building assessment to a fully digital platform. With the introduction of arcGIS mapping, survey data and productivity dashboards are available to command teams in real time. Customized phone apps loaded with GIS maps and surveys have reduced timeframes for building evaluations, eased field efforts, and greatly improved productivity, thus saving time on the overall disaster assessment.

Albanian and Puerto Rican Earthquakes: Even though earthquakes are rare occurrences in New York, our ATC 20 earthquake damage assessments have been used twice in the last year. In November 2019, Albania experienced damaging earthquakes that collapsed buildings and caused dozens of fatalities. Volunteer professionals from New York nobly responded to Albania to help with RAPID and DETAILED evaluations of essential buildings. Several of the volunteers had previously attended our COOP and ATC training which increased their productivity and focus. The second application of our ATC 20 protocol was for building assessments after the recent earthquakes in Puerto Rico.

After several days of small earthquakes and tremors, the south west of Puerto Rico was struck by a 6.4 magnitude earthquake. This caused power outages and structural damage to roads, bridges, and thousands of buildings. Soon after, DOB building evaluation teams of engineers and inspectors deployed to the island with our NYCOEM colleagues under a mutual aid package. Our response teams uploaded maps and apps on handheld smart phone devices prepopulated with custom GIS capabilities, local maps, and edited ATC surveys to initiate the response effort. Since the methodology for rapid assessments for earthquake-damaged buildings is very similar to those damaged by wind and flooding, the phone apps are much the same.

Hundreds of highly trained professionals and inspectors have become valuable local and national resources.

Switching from one assessment methodology to another only required a few hours of programming and orientation. With the pre-configured smart devices, teams of inspectors and engineers working in dense urban areas of residential buildings were able to perform weekly RAPID building inspections in the thousands – a remarkable number. Our engineers and inspectors were surveying between 50 to 100 buildings a day. All DOB teams were accompanied by municipal employees who handled communication with locals. Most importantly, we also collected critical census data for the local municipalities; who was in residence, cell phone numbers, if residents had special needs, etc.

During the Puerto Rico deployment, having cell phones preloaded with GIS maps meant addresses and land maps were not required for complete and thorough assessment. Furthermore, we were able to optimize the assessment apps based upon local building construction methods, effectively reducing clutter of the user interface. The GIS phones allowed for photos taken at the buildings to be automatically linked with the RAPID and DETAILED assessments.

Our DOB inspectors and engineers focused on typical structural issues affecting the thousands of one- and two-story, 500 square foot to 700 square foot concrete residences supported upon slender concrete piers. Just about every building we visited was prescriptively built by the owners. Soft story drift of the second floor and the roof was common but was not found to be structurally critical in most buildings. To speed up our evaluations, the local municipal assistant filled out homeowner data on the phone app while the team quickly assessed the inside and outside of these homes.

Working with Local Municipal Employees: DOB inspectors and engineers were always accompanied by municipal employees who interacted with the local residents. This greatly improved trust in our mutual aid mission. The municipal governments also benefited from the real time data uploads from our phone apps. We identified many residents who were living in temporary tents instead of structurally sound houses. Much time was spent with residents to secure tall furniture and flat screen TVs. These items frequently tipped over during the numerous post-

earthquake tremors, blocking doors and causing injuries. We also collected useful legacy issues relating to unrepaired damage from Hurricane Maria, and simple 'wear and tear' maintenance issues. Unsafe occupied structures, classified as RED, were immediately brought to the attention of the local officials who dealt with all issues. All told, three teams of DOB inspectors performed nearly 20,000 RAPID assessments in three weeks.

In conclusion, DOB's adoption of ArcGIS survey apps, coupled with the annual COOP/ATC training program has radically improved the speed, ability, and efficiency to assess large numbers of potentially damaged occupied buildings. Hundreds of highly trained professionals and inspectors have become valuable local and national resources, ready and proud to serve the public in a moment's notice.

The SEAoNY Structural Engineering Emergency Response (SEER) committee advocates for the second responder training, within the structural engineering community. SEER committee encourages interested SEAoNY members to visit our committee website https://seaony.org/SEER and reach out for more information at seaonyseer@gmail.com.

ROBERT T. RATAY, PHD, PE
1936—2020

BY DAVID PERAZA, PE

An engineer, an educator, a mentor, a friend, and a tireless force of nature, Bob passed away at the age of 83 in January of this year after succumbing to an illness.

His family hosted a memorial in his honor shortly after his passing to "commemorate his life and adventures. " And he did indeed have many adventures. As his son Chris said at the memorial, by the time he passed away, Bob's bucket list was zero…he had done it all!

Bob was an immigrant from Budapest, Hungary. He earned his Bachelors, Masters, and PhD degrees in civil engineering from the University of Massachusetts. He was a design engineer for 25 years, during which time he worked for Severud Associates, among other firms. He also taught engineering at prestigious universities, such as Columbia University, Pratt Institute, Polytechnic University (now NYU Tandon), and City College of CUNY. He also established his own engineering practice, focused on forensic investigations and expert witness work.

Bob spearheaded the preparation of SEI/ASCE 37-02 Design Loads on Structures During Construction. A prolific author on engineering subjects, he led the preparation of several highly regarded handbooks. He was active with professional organizations, including the American Society of Civil Engineers (ASCE), the International Association of Bridge and Structural Engineers (IABSE), and SEAoNY.

Bob was passionate about improving structural engineering practice by educating engineers regarding the lessons learned from failures. He lectured on this topic at a SEAoNY event and published related articles in Structure Magazine.

Whether you knew him as a design engineer, as an educator, as an expert, or as a leader in the engineering community…I'm sure that you will agree with me that Bob was a person of the highest integrity, that he was an extremely competent engineer, that he was a pleasure to work with, and that his work raised the standard for the practice of engineering.

I had the bonus of knowing him as a friend. Besides teaching and publishing together, we also laughed, drank sake, and experienced new cultures. I am both grateful and a better person for knowing him. I will always remember him, and I will miss him greatly.

Here's to the Life and Adventures of Bob Ratay! We can best honor his memory by embracing our careers and lives with intelligence, integrity, and passion.

SEAoNY
536 LaGuardia Place
New York, NY 10012

SEAoNY SUSTAINING MEMBERS & CORPORATE SPONSORS

PLATINUM LEVEL

Computers and Structures, Inc.
Gilsanz Murray Steficek LLP
Severud Associates
Silman
Thornton Tomasetti

GOLD LEVEL

Skidmore, Owings & Merrill LLP
American Institute of Steel Construction

SILVER LEVEL

ADAPT
Arup
Buro Happold
Cast Connex Corporation
GACE
Howard I Shapiro & Associates
International Masonry Institute
Keller
Leslie E. Robertson Associates
McNamara Salvia
MiTek
Murray Engineering
New Line Structures
New Millenium
Pieresearch
RAND Engineering & Architecture, DPC
Rosenwasser Grossman Consulting Engineers PC
Structural Technologies
STV
Tishman/AECOM
WJE
WSP/PB

TO INQUIRE ABOUT BECOMING A SUSTAINING MEMBER OR A CORPORATE SPONSOR, PLEASE EMAIL SEAONY AT ADMIN@SEAONY.ORG FOR DETAILS.

■ CORPORATE SPONSOR